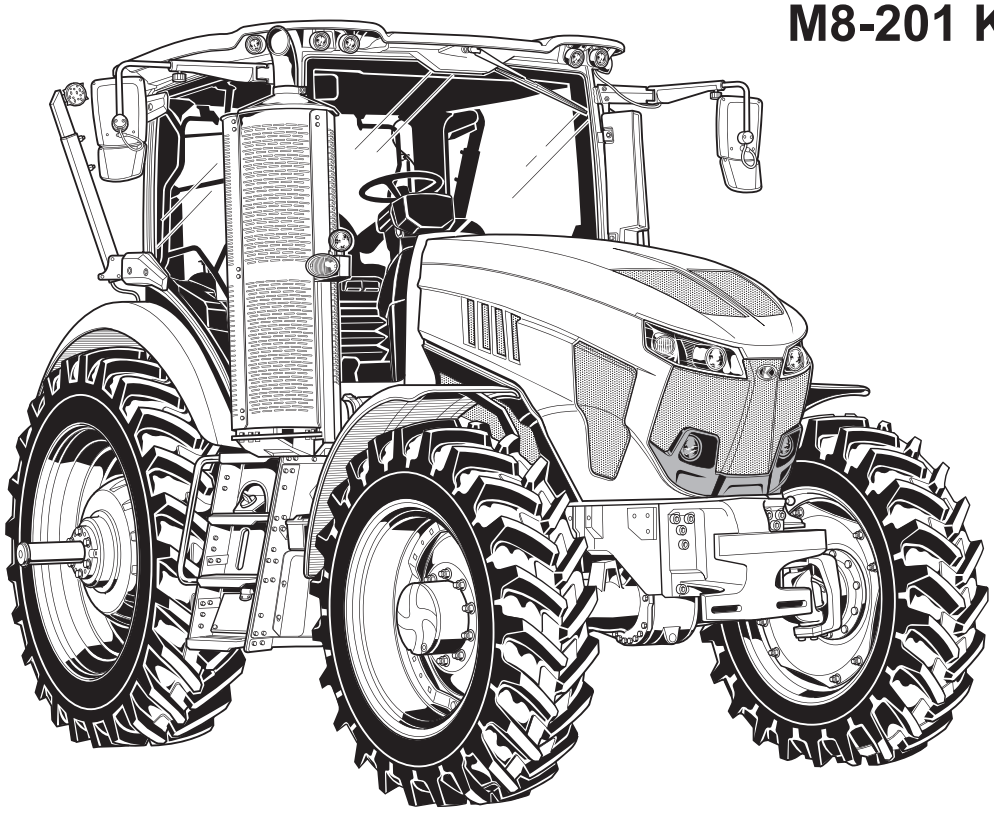
# OPERATOR'S MANUAL

# KUBOTA TRACTOR

**MODELS M8-181 KVT**

**M8-201 KVT**



*READ AND SAVE THIS MANUAL*

Kubota

# Foreword

## To the Owner

This manual contains information concerning the operation, adjustment, and maintenance of tractors. You have purchased a dependable machine. With proper care and operation, you can expect to receive the performance and long service we have built into this tractor.

**MAKE SURE ALL OPERATORS READ THIS MANUAL CAREFULLY AND KEEP IT AVAILABLE FOR READY REFERENCE.**

The tractor was designed to power and propel itself and common agricultural equipment in normal and customary agricultural applications. Safe operation of the tractor requires that all operators are familiar with the instructions in this manual and follow guidance herein for correct use of the tractor. The dealer will instruct you in the general operation of your tractor. The dealer's staff of factory-trained service technicians will be glad to answer any questions that may arise regarding tractor operation.

For engine maintenance not covered in this manual, follow instructions provided in the Cummins Engine Operator's Manual. Before putting the tractor in service, become familiar with all operating functions and procedures outlined in both manuals.

The warranty coverage extended to the tractor is explained in the Warranty and Limitation of Liability Agreement form. The dealer will provide you with a copy of the warranty and retain a copy which you have signed. After you read the warranty, ask the dealer to explain any points that you may not understand.

Do not modify, alter, or permit anyone else to modify or alter this tractor or any of its components, or any tractor function, without first consulting a dealer. To find a dealer, visit KUBOTA.com. Contact a dealer for any questions regarding tractor modifications.

Your safety, and the safety of those around you, depends upon the care and good judgment you use while operating this equipment. Read the safety precautions carefully.

For a complete list of the delivery service checks performed by the dealer, refer to the Delivery Report in this manual. The first copy is your record of service performed by the dealer, which is to be removed from the manual, the second copy is the dealer's record. Make sure that you and the dealer sign both copies.

After you have operated the tractor for 50 hours, have the dealer perform the factory recommended First 50–hour service. Return this manual with your tractor to the dealer so the "First 50–hour Service" checklist can be filled out. You will be responsible for the cost of transport, lubricants, fluids, filters and other items replaced as part of normal maintenance. Prior to taking the tractor to your selling dealer for service, it is recommended that you contact the dealer to determine if there are any other charges you will be responsible for.

All data given in this book is subject to production model variations. Dimensions and weights are approximations only, and illustrations do not necessarily show tractors in standard condition. For exact information about any particular tractor, please contact the dealer.

## Improvements

KUBOTA is continually striving to improve our products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

**This Page Is Intentionally Left Blank.**

## Cummins Engine Information

Engine Manual - KUBOTA tractors are powered by Cummins ™ engines. You are provided with a copy of the Cummins owner's manual. If you do not have a copy of the Cummins engine manual for your tractor, you may request one from your KUBOTA dealer or contact Cummins Inc. at:

Box 3005, Columbus, IN 47202-3005. Telephone 800-343-7357, fax 800-232-6393, internet www.cummins.com

## Modification and Warranty

Any attempt to alter or modify the engine or engine sub-systems is a violation of the warranty terms and will result in immediate termination of the engine and tractor warranty.

Any attempt to modify the tractor or tractor sub-components without specific instruction to do so from service support may, at the sole discretion of KUBOTA, result in loss of warranty.

## Disclaimer

KUBOTA Corporation makes no warranty or guarantee of any kind, written or expressed, implied or otherwise with regard to the information contained within this manual. KUBOTA Corporation assumes no responsibility for any errors that may appear in this manual and shall not be liable under any circumstances for incidental, consequential or punitive damages in connection with, or arising from, the use of this manual. KUBOTA reserves the right to make changes to this manual at any time without obligation or notice.

## KUBOTA

Since its inception in 1890, KUBOTA Corporation has grown to rank as one of the major firms in Japan. To achieve this status, the company has through the years diversified the range of its products and services to a remarkable extent. 30 plants and 35000 employees produce over 1000 different items, large and small.

All these products and all the services which accompany them, however, are unified by one central commitment. KUBOTA makes products which, taken on a national scale, are basic necessities. Produts which are indispensable. Products which are intended to help individuals and nations fulfill the potential inherent in their environment. KUBOTA is the Basic Necessities Giant.

This potential includes water supply, food from the soil and from the sea, industrial development, architecture and construction, and transportation.

Thousands of people depend on KUBOTA's know-how, technology, experience and customer service. You too can depend on KUBOTA.

You are now the proud owner of a KUBOTA Tractor. This tractor is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials and under a rigid quality control system. It will give you long, satisfactory service. To obtain the best use of your tractor, please read this manual carefully. It will help you become familiar with the operation of the tractor and contains many helpful hints about tractor maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them

## California Proposition 65

**WARNING**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

## Canadian Electromagnetic Compatibility (EMC)

This machine complies with Industry Canada ICES-002.

| Part Number: LBT00-13943 | |
|---|---|
| **First Release:** | **03/11/2020** |

## Units of Measurement

The following chart lists the standard units and their abbreviations used in this manual.

***NOTE: All Imperial fluid measurements are in U.S. customary units.***

| Abbreviation | Description |
|---|---|
| **~** | Approximately |
| **≈** | Approximately Equal |
| **°C** | Degree Celsius |
| **°F** | Degrees Fahrenheit |
| **A** | Ampere |
| **AWG** | American Wire Gauge |
| **bar** | Bar (barometric pressure unit) |
| **BTU** | British Thermal Unit |
| **cca** | Cold Cranking Amps |
| **ccw** | Counter Clockwise (rotation) |
| **cfm** | Cubic Feet Per Minute |
| **cid** | Cubic Inch Displacement |
| **cm** | Centimeter |
| **cm³** | Cubic Centimeter |
| **cu** | Cubic (with U.S. customary units) |
| **cw** | Clockwise (rotation) |
| **dB** | Decibel (sound pressure unit) |
| **dB(A)** | Decibel A Scale |
| **dia** | Diameter |
| **fl oz** | Fluid Ounce |
| **ft** | Foot |
| **ft·lb** | Foot Pound |
| **g** | Gram |
| **gal** | Gallon |
| **gpm** | Gallons Per Minute |
| **GVWR** | Gross Vehicle Weight Rating |
| **ha** | Hectare |
| **hp** | Horsepower |
| **Hz** | Hertz |
| **in** | Inch |
| **in·lb** | Inch Pound |
| **J** | Joule |
| **kg** | Kilogram |
| **kg/ha** | Kilograms Per Hectare |

| Abbreviation | Description |
|---|---|
| **kg/m²** | Kilograms Per Square Meter |
| **km** | Kilometer |
| **km/h** | Kilometers Per Hour |
| **kPa** | Kilopascal |
| **kW** | Kilowatt |
| **L** | Liter |
| **L/min** | Liter Per Minute |
| **L/s** | Liter Per Second |
| **lb** | Pound |
| **m** | Meter |
| **m³** | Cubic Meter |
| **mA** | Milliamp |
| **mg** | Milligram |
| **mi** | Mile |
| **min** | Minute |
| **mL** | Milliliter |
| **mm** | Millimeter |
| **mPa** | Megapascal |
| **mph** | Miles Per Hour |
| **N·m** | Newton Meter |
| **oz** | Ounce |
| **ppm** | Parts Per Million |
| **psi** | Pounds Per Square Inch |
| **pt** | Pint |
| **qt** | Quart |
| **rpm** | Revolutions Per Minute |
| **s** | Second |
| **sq** | Square (with U.S. customary units) |
| **V** | Volt |
| **W** | Watt |
| **yd** | Yard |
| **yr** | Year |
| **Ω** | Ohm |
| **2WD** | 2 wheel Drive |

| Abbreviation | Description |
|---|---|
| **4WD** | 4 Wheel Drive |
| **API** | American Petroleum institute |
| **ASABE** | American Society of Agricultural and Biological Engineers, USA |
| **ASTM** | American Society for Testing and Materials, USA |
| **CVT** | Continously Variable Transmission |
| **DEF** | Diesel Exhaust Fluid |
| **DT** | Dual Traction (4WD) |
| **fpm** | Feet per Minute |
| **DPF** | Diesel Particulate Filter |
| **GST** | Glide Shift Transmission |
| **Hi-Lo** | High Speed-Low Speed |
| **HST** | Hydrostatic Transmission |
| **m/s** | Meter Per Second |
| **PTO** | Power Take Off |
| **RH/LH** | Right-hand and left-hand |
| **ROPS** | Roll-Over Protective Structures |
| **rpm** | Revolutions Per Minute |
| **r/s** | Revolutions Per Second |
| **SAE** | Society of Automotive Engineers, USA |
| **SCR** | Selective Catalytic Reduction |
| **SMV** | Slow Moving Vehicle |

# Operator's Manual – Contents

**This Page Is Intentionally Left Blank.**

# Section 1: Safety – Contents

**This Page Is Intentionally Left Blank.**

## Introduction

This manual was prepared to assist the operator in the correct procedures for breaking in, driving, operating and maintaining this new piece of equipment. Read this manual carefully and keep it for future reference with other related information in the storage pocket (1), attached to the rear of the seat.

The manual is configured to help the operator find information in a fast, easy process. The manual is divided into the following sections:

1. Safety
2. Controls and Instruments
3. Operation
4. Hydraulic Operation
5. Lubrication and Maintenance
6. Troubleshooting
7. Specifications

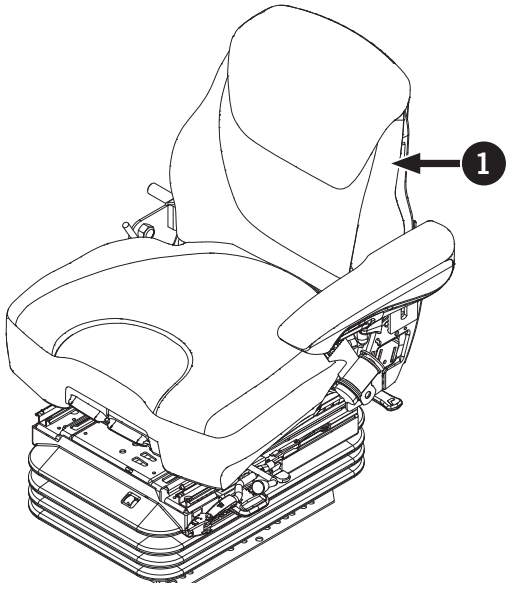
Contact a Kubota dealer with any questions regarding the operation or maintenance of your Kubota equipment. Dealers have the factory trained personnel, equipment, genuine replacement parts and professional experience to meet all service and maintenance needs.

Kubota equipment is designed for performance, economy and ease of operation under a variety of operating conditions. The equipment was carefully inspected at the factory and by the dealer to make sure it is in optimum condition prior to delivery.

It is important that routine maintenance and service, as specified in this manual, is carried out at recommended intervals to maintain this condition and ensure trouble-free operation.

At Kubota our company policy is one of continuous improvement. We reserve the right to change prices, specifications or equipment at any time without notice.

***IMPORTANT:*** *Read and follow the guidelines set out in this section before operating the tractor.*




The data in this manual is subject to production variations. Dimensions and weights are approximate only, and illustrations do not necessarily show equipment in standard condition. Contact a Kubota dealer for exact information about any particular piece of equipment.

### Statement of Use

Kubota designed this new piece of equipment for conventional agricultural applications. Damage caused by use of the equipment in non-conventinoal applications, industrial applications (i.e., road building) or due to improper weights or ballast will not be covered by warranty.

Failure to follow the information contained in this manual may lead to excessive wear, premature failure and deterioration of your equipment. Personal injury and property damage may also occur.

The new piece of equipment requires proper operation service and maintenance to achieve long life and owner satisfaction.

## Safety Symbols

This is the Safety Alert Symbol. It means that attention is required and that the safety of people nearby is involved. It is shown with a Signal Word (DANGER, WARNING and CAUTION) indicating that a hazard exists and with instructions to avoid the hazard.

The Signal Word DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.


The Signal Word WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.


The Signal Word CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.


The Signal Word *NOTICE* indicates information considered important but not hazard related (ex. messages relating to property damage).


### Other Information

The following general text may also appear in the manual. The NOTE and IMPORTANT statements draw awareness to recommended procedures that will assist the operator.

***NOTE: Indicates an important installation, operation and/or maintenance procedure which should be followed.***

***IMPORTANT:*** *Indicates an important or specific step within the operation or maintenance procedure.*

## Safety Icons

The safety icons used in this manual are approved according to ISO 11684, ANSI ASABE AD11684. The icons have general meanings and are not intended to replace the text that accompanies each safety message box. Table 1-1 and Table 1-2 shows a list of safety icons that may be used in this manual.

**Table 1-1: Safety Icons**

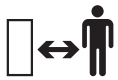
| Icon | Description |
|---|---|
|  | Stand back; keep a safe distance |
|  | Risk of impact from small flying objects |
|  | Risk of crushing; pinching of hands |
|  | Risk of electric shock |
|  | Risk of burns from hot surfaces |
|  | Risk of entanglement with moving parts. Be careful of moving parts |
|  | Vehicle may move; stand clear of moving vehicle |
|  | Risk of fluid impingement from pressurized fluid or gas |
|  | Risk of battery explosion |
|  | Particles in the air; risk of inhaling dangerous substances |

**Table 1-1: Safety Icons**

| Icon | Description |
|---|---|
|  | Wear eye protection |
|  | Wear ear protection |
|  | Wear protective shoes |
|  | Wear head protection |
|  | Wear gloves |
|  | Risk of fire; flammable substances |
|  | Risk of rollover, tipping or overturning |
|  | Risk of fall; falling from a height |
|  | Seat belt; always wear a seat belt |
|  | Reading required; read carefully; also used as a generic icon |

| Table 1-1: Safety Icons | |
|---|---|
| **Icon** | **Description** |
|  | Risk of crushing, particularly for body |
|  | Master System Warning |
|  | Fast |
|  | Slow |
|  | Creep |
|  | Lock |
|  | ON (engaged) |
|  | OFF (disengaged) |
|  | Service |

**Table 1-2: Engine Icons**

| Icon | Description |
|---|---|
|  | Diesel Fuel |
|  | Hourmeter/Elapsed Operating Hours |
|  | Engine Coolant-Temperature |
|  | Engine Intake/Combustion Air-Filter |
|  | Engine Oil-Pressure |
|  | Water Separator |
|  | Engine-Warning |
|  | Engine-Rotational Speed |
|  | Engine-Rev Limiter |
|  | Engine-Over Speed |
|  | Engine-RPM Memory A |
|  | Engine-RPM Adjuster |

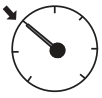
**Table 1-2: Engine Icons**

| Icon | Description |
|---|---|
|  | Engine-RPM Increase |
|  | Engine-Run |
|  | Engine-Start |
|  | Engine-Stop |
|  | Electrical Power-accessories |
|  | Diesel Preheat/Glow Plugs (Low Temperature Start Aid) |
|  | High Exhaust Lamp |
|  | Regeneration |
|  | Regeneration inhibit |
|  | DEF/AdBlue-Level |
|  | DEF/AdBlue-Low Level |
|  | DEF/AdBlue-Poor Quality |

**Table 1-2: Engine Icons**

| Icon | Description |
|---|---|
|  | DEF/AdBlue-Trouble |
|  | DEF/AdBlue-Freeze |

**Table 1-3: Vehicle Body Icons**

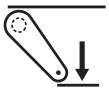
| Icon | Description |
|---|---|
|  | Travel Direction - Forward |
|  | Travel Direction - Rearward |
|   | Travel Direction |
|  | 4-Wheel Drive-On |
|  | 4-Wheel Drive-On |
|   | 4-Wheel Drive-Automatic |
|  | Headland Management System |
|  | Cruise Control |
|  | Limp Home |
|   | Escape |

| Table 1-3: Vehicle Body Icons | |
|---|---|
| **Icon** | **Description** |
|  | Transmission Oil Filter |
|  | Low Temperature Reguration |
|  | Gear Shifting Warning |
|  | Clutch |
|  | Brake |
|  | Parking Brake |
|  | Parking Brake/Brake Oil |
|  | Air Brake |
|  | Differential Lock |
|  AUTO | Differential Lock - Automatic |

| Table 1-3: Vehicle Body Icons | |
|---|---|
| **Icon** | **Description** |
|  | Steering Wheel - Tilt |
|  | Steering Wheel - Telescope |
|  AUTO | Automatic Steering Control |
|  | Steering Oil Filter |
|  | Front Suspension |
|  | Front Suspension - Lock |

**Table 1-4: PTO Icons**

| Icon | Description |
|---|---|
|  | PTO-Off (Disengaged) |
|  | PTO-On (Engaged) |
|  540 | PTO-540 rpm |
|  540E | PTO-540E rpm |
|  1000 | PTO-1000 rpm |
|  1000E | PTO-1000E rpm |
|  | PTO-Front |
| F  | PTO-Front |
|  | PTO-Rear |
| R  | PTO-Rear |

| Table 1-5: Hydraulic Icons | |
|---|---|
| **Icon** | **Description** |
|  | Draft Control |
|  | Position Control |
|  | Hydraulic Oil Filter |
|  | Lift Arm Control-Up/Transport |
|  | Lift Arm Control-Up |
|  | Lift Arm Control-Down |
|  | Lift Arm Control-Down |
|  | Lift Arm Control-Block |
|  | Lift Arm Control-Float |
|  | Lift Arm Control-Lock |

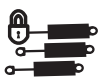
| Table 1-5: Hydraulic Icons | |
|---|---|
| **Icon** | **Description** |
|  | 3-Point Lifting/Lowering |
|  | Lift Arm Height |
|  | Remote Cylinder - Retract |
|  | Remote Cylinder - Extend |
|  | Remote Cylinder - Float |
|  | Remote Cylinder - Lock |
|  | Remote Cylinder - Lock |

**Table 1-6: Electric Icons**

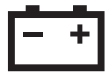
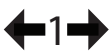
| Icon | Description |
|---|---|
|  | Battery Charging Condition |
|  | Master Lighting Switch |
|  | Headlight - Low Beam |
|  | Headlight - High Beam |
|  | Headlight - Flashing |
|  | Worklight |
|  | Position Lamps |
|  | Turn Signal |
|  | Turn Signal - Trailer |
|  | Hazard Warning Lights |

**Table 1-6: Electric Icons**

| Icon | Description |
|---|---|
|  | Audible Warning Device |
|  | Beacon Light |
|  | Windshield Wiper |
|  | Windshield Wiper - Intermittent |
|  | Windshield Washer |
|  | Rear Window Defroster |

## Precautionary Safety Statements

This section details the following in order:

- General safety
- Operating safety
- Maintenance and storage safety
- Electrical safety
- Battery safety
- Hydraulic system safety
- Welding safety
- Transport and towing safety
- PTO safety
- Cab safety
- Diesel fuel handling safety
- Diesel exhaust fluid handling safety

**WARNING**

Careful operation is your best insurance against an accident.

Read and understand this manual carefully before operating the tractor.

All operators, no matter how much experience they may have, should read this and other related manuals before operating the tractor or any implement attached to it. It is the owner's obligation to instruct all operators in safe operation

## General Safety

- Use personnel protection equipment that is appropriate for the task and/or mandated by Federal, State or Local Laws or Regulations including: gloves, hard hats, boots, face and eye shields, respirators, etc.
- Use seatbelts at all times.
- New operators must read and understand the manual before using the equipment or be instructed on its use and operation.
- Do not allow unqualified persons to operate or work on the equipment.
- Review the safety precautions and operation instructions in this manual at least once a year.
- Have a first-aid kit and a Class C fire extinguisher available in the work area.
- Do not modify the equipment.
- Keep the equipment clean. Make sure all decals and warning labels are legible. Clear all debris and chaff from around the engine and all hot spots.
- Perform a proper equipment inspection as described in this manual before each use of the equipment.
- Do not by-pass or disable safety locks or devices at any time.
- If lightning is close, take the following precautions to avoid personal injury:
    - It is safe for the operator to wait in the cab. Never attempt to step off of the tractor and onto the ground as there is a serious risk of electrocution.
    - Pull over to the side of the road, turn off the engine and turn on the hazard lights. Sit in the operator's seat with your hands in your lap and wait for the storm to end.
    - Avoid touching any metal inside to outside controls or objects such as door handles, steering wheels, shift levers, radio controls. If lightning is far away where it is not an immediate danger, close the cab door.
    - Rubber tracks or tires do not provide appropriate insulation from lightning strikes.

**DANGER**

Always make sure the jack is capable of carrying the weight of the tractor. Using an inappropriate jack will result in damage to the tractor and possible injury or death of anyone working near or under it.

- If the tractor must be raised using jacks, place the jacks under the axles.
- This tractor is not designed to be lifted off the ground (such as with a crane).

## Cab ROPS Safety

- Kubota recommends the use of a cab or Roll Over Protective Structures (ROPS) and seat belt in almost all applications. This combination will reduce the risk of serious injury or death, should the tractor be upset. Check for overhead clearance which may interfere with a cab or ROPS.
- If the cab or ROPS is loosened or removed for any reason, make sure that all parts are reinstalled correctly before operating the tractor.
- Never modify or repair any structural member of a cab or ROPS because welding, bending, drilling, grinding, or cutting may weaken the structure.
- A damaged cab or ROPS structure must be replaced, not repaired or revised.
- If any structural member of the cab or ROPS is damaged, replace the entire structure at your local Kubota Dealer.
- Always use the seat belt if the tractor has a cab or ROPS.
- Do not use the seat belt if a foldable ROPS is down or there is no ROPS. Check the seat belt regularly and replace if frayed or damaged.
- The cab is not tested for FOPS (Falling Object Protection Structure).
- Keep the cab maintained and in clean serviceable condition. Be careful when driving through garage doorways or working in confined spaces with low headroom so as not to contact obstacles.
- Do not drill, weld, modify or alter the cab in any way. Modifications may weaken the structure and endanger operator safety. Unauthorized modifications may be illegal in some jurisdictions and could lead to fines or prosecution.
- Never attach chains or ropes to the cab or main frame for pulling purposes.
- Never take unnecessary risks even though the cab affords the maximum protection possible.
- Never carry harmful chemicals in the cab. Chemicals may spill from the container and cause damage to the cab and fumes could incapacitate the operator.
- Never allow mud, crop residue, tools and equipment to accumulate inside the cab or on steps. They may interfere with pedal operation or entry/exit from the cab.
- The cab is not designed to provide a “sprayer safe” environment for the operator. The cab air filtration system does not provide a specified level of protection against hazardous substances. When applying chemicals with a sprayer, do not rely on the cab filter to provide protection from airborne chemicals. When working in an area that may have vapors or aerosols in the air, refer to the product MSDS sheet for information on appropriate personal protective equipment.
- If clothing or footwear has come into contact with harmful chemicals, remove the items before entering the cab.

## Avoid Crysalline Silica (quartz) Dust

**WARNING**

Avoid exposure to dust containing crystalline silica particles. This dust can cause serious injury to the lungs (silicosis).

If dust which contains crystalline silica is present, there are guidelines which should be followed.

1. Be aware of the health effects of crystalline silica and that smoking adds to the damage.
2. Be aware of and follow OSHA (or other) guidelines for exposure to airborne crystalline silica.
3. Know the work operations where exposure to crystalline silica may occur.
4. Participate in air monitoring or training programs offered by the employer.
5. Be aware of and use optional equipment controls such as water sprays, local exhaust ventilation, and enclosed cabs with positive pressure air conditioning if the machine has such equipment Otherwise respirators shall be worn.
6. Where respirators are required, wear a respirator approved for protection against crystalline silica-containing dust. Do not alter the respirator in any way. Workers who use tight-fitting respirators cannot have beards/mustaches which interfere with the respirator seal to the face.
7. If possible, change into disposable or washable work clothes at the work site; shower and change into clean clothing before leaving the work site.
8. Do not eat, drink, use tobacco products, or apply cosmetics in areas where there is dust containing crystalline silica.
9. Store food, drink and personal belongings away from the work area.
10. Wash hands and face before eating, drinking, smoking, or applying cosmetics after leaving the exposure area.

## Before Operating the Tractor

- Know your equipment and its limitations. Read this entire manual before attempting to start and operate the tractor.
- Pay special attention to the danger, warning and caution labels on the tractor.
- Do not operate the tractor or any implement attached to it while under the influence of alcohol, medication, controlled substances or while fatigued.
- Before allowing anyone to use your tractor, explain how to operate and have them read this manual before operation.
- Never wear loose, torn or bulky clothing around tractor. It may catch on moving parts or controls, leading to the risk of an accident. Use additional personal protection equipment (PPE), e.g. hard hat, safety boots or shoes, eye and hearing protection, gloves, etc., as appropriate or required.
- Do not allow passengers to ride on any part of the tractor at anytime. The operator must remain in the tractor seat during operation.
- Check brakes, clutch, linkage pins and other mechanical parts for improper adjustment and wear. Replace worn or damaged parts promptly. Check the tightness of all nuts and bolts regularly. (For further details, see “Maintenance” section.)
- Keep your tractor clean. Dirt, grease, and trash build up may contribute to fires and lead to personal injury.
- Use proper weights on the front or rear of the tractor to reduce the risk of upsets. When using the front loader, put an implement or ballast on the 3-point hitch to improve stability. Follow the safe operating procedures specified in the implement or attachment manual.
- The narrower the tread, the greater the risk of a tractor upset. For maximum stability, adjust the wheels to the widest practical tread width for your application. “Wheels and Tires” on page 3-83.
- Do not modify the tractor. Unauthorized modification may affect the function of the tractor, which may result in personal injury.

## Operating Safety

Operator safety is a priority. Safe operation, specifically with respect to overturning hazards, entails understanding the equipment and environmental conditions at the time of use. Some prohibited uses which can affect overturning hazards include traveling and turning with implements and loads carried too high etc. This manual sets forth some of the obvious risks, but the list is not, and cannot be, exhaustive. It is the operator's responsibility to be alert for any equipment or environmental condition that could compromise safe operation.Do not exceed the designed speed, pressure or load capacity ratings for the equipment at any time.

## Tractor Start Up

- Always sit in the operator's seat when starting engine or operating levers or controls. Adjust seat per instructions in the operating the tractor section. Never start engine while standing on the ground.
- Before starting the engine, make sure that all levers are in their neutral positions, that the parking brake is engaged.
- Fasten the seat belt if the tractor has a cab or a foldable ROPS in the upright and locked position.
- Do not start engine by shorting across starter terminals or bypassing the safety start switch. Machine may start in gear and move if normal starting circuitry is bypassed.
- Do not operate or idle engine in a non-ventilated area. Carbon monoxide gas is colorless, odorless, and deadly.
- Check before each use that operator presence controls are functioning correctly. Test safety systems.
- For trailing PTO-driven implements, set the drawbar to the towing position.
- Attach pulled or towed loads to the drawbar only.
- Keep all shields and guards in place. Replace any that are missing or damaged.
- Avoid sudden starts. To avoid upsets, slow down when turning, on uneven ground, and before stopping.
- The tractor cannot turn with the differential locked and attempting to do so could be dangerous.
- Do not operate near ditches, holes, embankments, or other ground surface features which may collapse under the tractor's weight. The risk of tractor upset is even higher when the ground is loose or wet. Tall grass can hide obstacles, walk the area first to be sure.
- Watch where you are going at all times. Watch for and avoid obstacles. Be alert at row ends, near trees, and other obstructions.
- When working in groups, always let the others know what you are going to do before you do it.
- Never try to get on or off a moving tractor.
- Always sit in the operator's seat when operating levers or controls.
- Do not stand between tractor and implement or trailed vehicle unless parking brake is applied.
- Never utilize the Headland Management System, if anyone is in the work area of the tractor.

## Tractor Operation Safety

- Pull only from the drawbar. Never hitch to axle housing or any other point except drawbar; such arrangements will increase the risk of serious personal injury or death due to a tractor upset.
- For trailing PTO-driven implements, set the drawbar to the towing position.
- Attach pulled or towed loads to the drawbar only.
- Keep all shields and guards in place. Replace any that are missing or damaged.
- Avoid sudden starts. To avoid upsets, slow down when turning, on uneven ground, and before stopping.
- The tractor cannot turn with the differential locked and attempting to do so could be dangerous.
- Do not operate near ditches, holes, embankments, or other ground surface features which may collapse under the tractor's weight. The risk of tractor upset is even higher when the ground is loose or wet. Tall grass can hide obstacles, walk the area first to be sure.
- Watch where you are going at all times. Watch for and avoid obstacles. Be alert at row ends, near trees, and other obstructions.
- When working in groups, always let the others know what you are going to do before you do it.
- Never try to get on or off a moving tractor.
- Always sit in the operator's seat when operating levers or controls.
- Do not stand between tractor and implement or trailed vehicle unless parking brake is applied.
- Never utilize the Headland Management System, if anyone is in the work area of the tractor.

## Instruction Seat Safety (if equipped)

- Instructional seat is provided only for training and instructing operators or diagnosing machine problems.
- It is not intended to carry children nor any other person for any other purpose.
- Always wear your seat belt and stabilize your body by holding the handrail on the cab frame.
- Use caution to avoid the risks of obstructing operator's view, falling from the machine and interfering with controls.

## Safety for children

Tragedy can occur if the operator is not alert to the presence of children. Children generally are attracted to machines and the work they do.

- Never assume that children will remain where you last saw them.
- Keep children out of the work area and under the watchful eye of another responsible adult.
- Be alert and shut your machine down if children enter the work area.
- Never carry children on your machine. There is no safe place for them to ride. They may fall off and be run over or interfere with your control of the machine.
- Never allow children to operate the machine even under adult supervision.
- Never allow children to play on the machine or on the implement.
- Use extra caution when backing up. Look behind and down to make sure the area is clear before moving.

## Tractor Operation on Slopes

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra attention.

- To avoid upsets, always back up steep slopes. If you cannot back up the slope or if you feel uneasy on it, do not operate on it. Stay off slopes too steep for safe operation.
- Driving forward out of a ditch, mired condition or up a steep slope increases the risk of a tractor to be upset backward. Always back out of these situations. Extra caution is required with 4-wheel drive models because their increased traction can give the operator false confidence in the tractor's ability to climb slopes.
- Keep all movement on slopes slow and gradual. Do not make sudden changes in speed, direction or apply brake and make sudden motions of the steering wheel.
- Avoid disengaging the clutch or changing gears speed when climbing or going down a slope. If on a slope disengaging the clutch or changing gears to neutral could cause loss of control.
- Special attention should be made to the weight and location of implements and loads as such will affect the stability of the tractor.
- To improve stability on slope, set widest wheel tread as shown in "Wheels and Tires" on page 3-83.
- Follow recommendations for proper ballasting.
- To avoid free wheeling:
  - Do not shift the shuttle lever while on a slope.
  - Stop completely by using the brake and by depressing the inching pedal, then shift the shuttle lever.
  - Start off after selecting shuttle direction, by releasing the inching pedal.
- When driving down a slope, make sure the 4-wheel drive is engaged to increase traction (if equipped).

## Tractor Operation on Road

- Lock the 2 brake pedals together to help assure straight-line stops. Uneven braking at road speeds could cause the tractor to tip over.
- Check the front wheel engagement. The braking characteristics are different between 2 and 4-wheel drive. Be aware of the difference and use carefully.
- Always slow the tractor down before turning. Turning at high speed may tip the tractor over.
- Make sure that the Slow Moving Vehicle (SMV) sign is clean and visible. Use hazard lights and turn signals as required.
- Observe all local traffic and safety regulations.
- Turn the headlights on. Dim them when meeting another vehicle.
- Drive at speeds that allow you to maintain control at all times.
- Do not apply the differential lock while traveling at road speeds. The tractor may run out of control.
- Avoid sudden motions of the steering wheel as they can lead to a dangerous loss of stability. The risk is especially great when the tractor is traveling at road speeds.
- Do not operate an implement while the tractor is on the road. Lock the 3-point hitch in the raised position. For travelling with the ride control on, however, keep the 3- point hitch unlocked.
- When towing other equipment, use a safety chain and place an SMV emblem on it as well.
- Set the 3-point hitch lock button in the lock position to hold the implement in the raised position. If traveling with the ride control on, unlock the 3-pt hitch lock button.
- If you drive the tractor with a trailer loaded with something heavy in tow and step on the brake pedal, the tractor is pushed forward by the trailer due to an abrupt slowdown. This may fail to keep the tractor under control.
- Before stepping on the brake pedal, press the transmission ratio lock button for smooth slowdown.

## Parking the Tractor

- Disengage the PTO, lower all implements to the ground, place all control levers in their neutral positions, set the parking brake, stop the engine, remove the key from the ignition and lock the cab door (if equipped). Leaving transmission in gear with the engine stopped will not prevent tractor from rolling.
- Make sure that the tractor has come to a complete stop before dismounting.
- Avoid parking on steep slopes, if at all possible park on a firm and level surface; if not, park across a slope and chock the wheels.
- Failure to comply with this warning may allow the tractor to move and could cause injury or death.

## PTO Safety

- When operating stationary PTO driven equipment, always apply the tractor parking brake and place chocks behind and in front of the rear wheels. Stay clear of all rotating parts. Never step over rotating parts.
- Wait until all moving components have completely stopped before getting off the tractor, connecting, disconnecting, adjusting, cleaning, or servicing any PTO driven equipment.
- Keep the PTO shaft cover in place at all times. Replace the PTO shaft cap when the shaft is not in use.
- Before installing or using PTO driven equipment, read the manufacturer's manual and review the safety labels attached to the equipment.
- To prevent PTO driven equipment from improper or unsafe use, select the lower speed (540 rpm) unless the higher one is specifically recommended as safe by the equipment manufacturer.

## Service Tractor Safety

Before servicing the tractor, park it on a firm, flat and level surface, set the parking brake, lower all implements to the ground, place the shuttle lever in neutral, stop the engine and remove the key.

- Allow the tractor time to cool off before working on or near the engine, muffler, radiator, etc.
- Do not remove radiator cap while coolant is hot. When cool, slowly rotate cap to the first stop and allow sufficient time for excess pressure to escape before removing the cap completely. If the tractor has a coolant recovery tank, add coolant or water to the tank, not the radiator.
- Always stop the engine before refueling. Avoid spills and overfilling. Make sure the equipment is properly grounded before refueling.
- Do not smoke when working around battery or when refueling. Keep all sparks and flames away from battery and fuel tank. The battery presents an explosive hazard, because it gives off hydrogen and oxygen especially when recharging.
- Before "jump starting" a dead battery, read and follow all of the instructions.
- Keep first aid kit and fire extinguisher handy at all times.
- Disconnect the battery's ground cable before working on or near electric components.
- To avoid the possibility of battery explosion, do not use or charge the refillable type battery if the fluid level is below the LOWER (lower limit level) mark. Check the fluid level regularly and add distilled water as required so that the fluid level is between the UPPER and LOWER levels.
- To avoid sparks from an accidental short circuit, always disconnect the battery's ground cable (-) first and reconnect it last.
- Do not attempt to mount a tire on a rim. This should be done by a qualified person with the proper equipment.
- Always maintain the correct tire pressure. Do not inflate tires above the recommended pressure shown in the operator's manual.
- Securely support the tractor when either changing wheels or adjusting the wheel tread width.
- Make sure that wheel bolts have been tightened to the specified torque.
- Disconnect the battery's ground cable and stop the engine to avoid the possibility of the machine runaway due to four wheel drive (4WD) braking system during testing, service or repair with only rear wheels off the ground.
- Do not work under any hydraulically supported devices. They can settle, suddenly leak down, or be accidentally lowered. If it is necessary to work under tractor or any machine elements for servicing or adjustment, securely support them with stands or suitable blocking beforehand.
- Escaping hydraulic fluid under pressure has sufficient force to penetrate skin, causing serious personal injury. Before disconnecting hydraulic lines, be sure to release all residual pressure. Before applying pressure to the hydraulic system, make sure that all connections are tight and that all lines, pipes, and hoses are free of damage.
- Fluid escaping from pinholes may be invisible. Do not use hands to search for suspected leaks; use a piece of cardboard or wood. Use of safety goggles or other eye protection is also highly recommended. If injured by escaping fluid, see a medical doctor at once. This fluid will produce gangrene or severe allergic reaction.
- Do not open high-pressure fuel system.
    - High-pressure fluid remaining in fuel lines can cause serious injury. Do not disconnect nor attempt to repair fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with high pressure common rail fuel system.
- To avoid hazardous high voltage, turn the key switch to the OFF position if it is necessary to check to repair the computer, harness or connectors.
- During Diesel Particulate Filter regenerating operations, exhaust gases and exhaust filter components reach temperatures hot enough to burn people, or ignite or melt common materials.
- Keep the tractor away from people, animals or structures which may be susceptible to harm or damage from hot exhaust gases.
- To prevent fires, keep the DPF/SCR (Selective Catalytic Reduction) muffler and its surroundings clear of anything flammable and keep clean at all times.

- During regeneration, white exhaust gas may be visible. Do not allow regeneration in a non-ventilated space.
- During regeneration, do not leave the tractor.
- Before servicing a tractor equipped with the front suspension, be sure to lower the machine to the lowest position.
- The front suspension hydraulic circuit is still under high pressure after the engine has stopped. Do not disconnect the pipes and/or hoses because you may get injured by high-pressure oil. If pipes and/or hoses are found worn or damaged, consult your local Kubota Dealer for this service.

## Maintenance and Storage Safety

- Do not attempt any repairs that are beyond your abilities or understanding.
- Refer procedures that require special tools and equipment to a Kubota dealer.
- Place all controls in neutral, turn engine off, engage parking brake and block equipment wheels before attempting any equipment inspections or repairs.
- Allow equipment to cool before inspecting.
- Use the correct blocking and support to prevent unintended equipment movement during repairs or maintenance.
- Use the proper tools and have sufficient light in the work area.
- Keep the service area clean and dry.
- Do not substitute fasteners and hardware with different or unknown grades.
- Follow the proper short-term and long-term storage instructions as described in this manual.
- Do not look directly into High Intensity Discharge (HID) lights or radar units. Damage to your eyes may occur.
- Do not handle LED or quartz light bulbs with your bare hands. Use clean and dry gloves to protect the bulbs from dirt and oil on your hands.
- Use caution when handling LED light ballast. High voltage may be present even with the engine off.
- Do not remove the radiator cap when the radiator is hot and under pressure. Always allow the engine to cool before servicing. To remove the radiator cap, always wear gloves and eye protection. Turn the cap slowly to the first stop and allow pressure to escape before fully removing the cap.
- Always dispose of all drained fluids and removed filters using environmentally safe procedures. Always follow local and national environmental laws governing the disposal of used engine oil, fluids and filters.
- Do not attempt to service the air conditioning system. Severe skin and eye injury may result from escaping refrigerant. Special equipment and procedures are required to service the air conditioning system. See a Kubota dealer for service.
- Do not permit modifications of the equipment or any of its components or functions without first contacting a Kubota dealer.
- Always store heavy wheels properly with care and attention making sure they cannot fall causing damage or injury.

## Electrical Safety

- Ideally, use a qualified Kubota service representative to conduct electrical testing and repairs on the equipment.
- Unplug attached electrical devices before conducting repairs.
- Turn the battery shut-off switch to OFF before repairing or servicing the electrical system.
- Remove battery cables before repairing or servicing the electrical system. Refer to this manual for the procedures on removing and reattaching battery cables.
- Use caution when handling HID light ballast. High voltage may be present even with the engine off.

## Battery Safety

**DANGER**

- Batteries contain corrosive acid and generate highly flammable corrosive gas.

- Always wear protective clothing and safety glasses to protect eyes when working with batteries. In case of contact with skin, flush the affected area with water for 5 minutes and seek immediate medical attention.

- Follow all battery safety precautions to avoid death, serious personal injury, explosions or fire.

**WARNING**

All batteries generate hydrogen gas, which is highly flammable. If ignited by a spark or flame, the gas may explode violently causing a spray of acid, fragmentation of the battery, and possible severe personal injury, particularly to the eyes. Therefore, as a safety precaution, wear protective clothing and goggles. Do not smoke or expose the battery to open flame. Do not connect or disconnect live circuits. Follow the connection procedure as outlined above.

- Do not smoke or expose the battery to open flame. Batteries generate hydrogen gas, which is highly flammable. If ignited by a spark or flame, the gas may explode causing a spray of battery acid and fragments, causing severe personal injury.
- Do not open sealed valve regulated batteries (AGM or Gel types).
- Always cover vents with a damp cloth to minimize gas seepage.
- Never lean over battery while testing, boosting or charging.
- Do not remove or damage vent caps.
- Do not connect or disconnect live circuits.
- Never make or break any of the charging circuit connections, including the connection at the batteries, when the engine is running.
- Never short any of the charging components to ground.
- Do not use a booster battery of higher than 12 V nominal voltage.
- Always observe correct polarity when installing the batteries or using a booster battery to jumpstart the engine. Follow the precautions in this manual for boosting the tractor. Connect positive to positive and negative to negative.

## Hydraulic System Safety

**DANGER**

During normal operation, the engine may pressurize diesel and hydraulic fluid to extreme levels. Escaping fluids under high pressure can penetrate the skin and cause serious and life threatening injury.

Never use hands to check for fluid leaks. Use a piece of cardboard or paper to search for a suspected leak.

Obtain immediate medical attention if hydraulic fluid penetrates skin.

- Hydraulic oil is flammable. Do not expose oil or oil vapor to a flame or sparks.
- Do not heat or weld near hydraulic lines or components.
- Do not overfill the hydraulic fluid tank.
- Inspect hoses and fittings before each use. Hoses with leaking fittings, cuts, abrasions or bulges, and hoses that are soft, twisted or crushed must be replaced.
- Lower hydraulic components to ground level or support components before relieving the system pressure. Use hydraulic cylinder rod locks when applicable.
- Relieve system pressure before disconnecting any hoses or components.
- Clean all components and fittings before removal using a non-volatile cleaner. Cap all openings immediately to prevent system contamination.
- Some hydraulic components are heavy. Use sufficient lifting and carrying devices for moving these components.
- Make sure that replacement parts and hoses have the same pressure rating as the original parts.
- Remove and replace components one at a time to avoid misrouting of connections.
- Reinstall all clips, retainers and strain relief in their original locations.
- Do not reuse contaminated hydraulic oil. Use new hydraulic oil when refilling the system.
- Make sure that all connections are tight before applying pressure to the system.
- Accumulators may store hydraulic pressure even when the engine is not running. Some accumulators require special instructions to relieve this pressure. Refer to this manual before disconnecting.

## Welding Safety

- Follow the safe handling and use guidelines for welding with either gas or electric welding equipment.
- Have a first-aid kit and a Class C fire extinguisher available near the work area.
- Arc flash can cause retinal burning and cataracts. Protect your eyes with approved welding safety glasses.
- Protect your body from welding spatter and arc flash with protective clothing.
- Make sure there is adequate ventilation available when welding in confined areas or where there are barriers to air movement.
- Do not weld near hydraulic or pneumatic lines.
- Always completely clean the area to be welded so that it is free of grease, fuel or oil before welding. Remove any paint from the weld area before welding. Some paints can release toxic fumes.
- Attach the welder ground cable at least four feet away from the weld area.
- Never weld on one frame member (i.e., front or rear frame) and have the ground cable of the welder on the other frame.
- Always disconnect the ground cable from the batteries before carrying out arc welding on the machine or on any attached implement.
- Never allow welding cables to lay on, near or across any electrical wiring or electronic component while welding is in progress.
- Remove the electrical connectors attached to the transmission control module, even when the negative cable of the battery is disconnected, to provide additional protection to the transmission controller on continuous variable transmission units.
- Arc/MIG welding equipment and processes create magnetic waves which may affect pacemakers and other sensitive electronics.

## Transport and Towing Safety

**DANGER**

Always use extreme caution when attempting to free a mired piece of equipment. Attempting to free a mired piece of equipment involves potential safety hazards such as roll over, tipping or overturning. In addition, tow cables can fail in the stretched overworked conditions and in extreme cases, tow bars may even fail.

- Do not allow passengers on the equipment.
- Ensure that all lights and mirrors are clean and functioning correctly.
- Use safety chains with sufficient rating when towing.
- Always lift and engage safety locks raised position (toward the towed implement) to make sure it remains in position in the advent of a hydraulic line failure.
- Maintain a clear line of sight to all parts of the towed equipment.
- Do not tow equipment over 34 kph (20 mph) that is not equipped with brakes.
- Equipment that weighs 3 300 lb (1 500 kg) or over 1.5 times the weight of the towing vehicle must have brakes.
- Make sure that the implement is in transport condition with all components lowered, retracted or folded into designated transport positions.
- Install additional lighting to the sides of wide implements and to the rear of implements to alert passing traffic.
- Maintain the correct tire air pressures.
- Make sure that hitches and receivers are properly rated and installed correctly. Check the hitch connection before towing.
- Be aware of overhead obstacles and power lines when transporting and positioning equipment.
- Follow all local laws and requirements when driving and towing on public roads.

## Diesel Fuel Handling Safety

- The engine is designed to run efficiently on ultra-low-sulfur diesel (ULSD) fuel. Using a fuel with high sulfur content will damage the engine and after-treatment system. Contact a Kubota dealer for more information and suppliers of ULSD fuels.
- Do not add gasoline, alcohol or blended fuels to diesel fuel. These combinations create an increased fire and explosive hazard. These fuel blends, in an enclosed fuel tank, are more explosive than pure diesel. Do not use these blends.
- Bio-diesel blends up to B20 can be used as fuel provided the blend does not exceed a sulfur content of greater than 15 ppm.
- For more information on the proper use of bio-diesel fuels, contact a Kubota dealer.
- Do not smoke while refueling equipment or when standing near fuel. Keep any type of open flame or sparks away.
- Do not remove the fuel cap or refuel with the engine running. Allow the engine to cool before fueling.
- Always use the proper fuel transfer hose and nozzle. Make sure the nozzle and hose are grounded to dissipate static electric charges.
- When refueling, make sure the nozzle is in contact with the filler neck of the fuel tank before fuel starts to flow and during the entire time fuel is flowing.
- Always maintain control of the fuel filler pipe nozzle when filling the tank.
- Do not fill the fuel tank to capacity. Allow room for expansion.
- Always wipe up spilled fuel immediately.
- Always tighten the fuel tank cap securely. If the original fuel tank cap is lost, replace it with a genuine replacement cap. A non-approved cap may not be safe.
- Always keep equipment clean and properly maintained.
- Do not drive equipment near open fires.
- Do not use fuel for cleaning purposes.
- Always arrange fuel purchases so that summer grade fuels are not held over and used in the winter.
- Always ground fuel storage tanks to prevent static buildup.

## Safety Labels

The following safety labels are installed on the tractor at the indicated areas. Labels will vary depending on the options associated with the selected model. They are intended for the safety of anyone working on or near the equipment. Please become familiar with the location of these safety labels and the information contained on them.

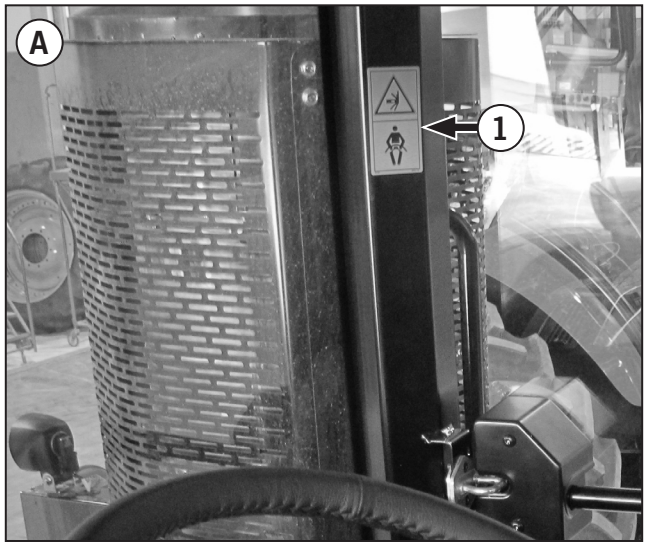
***IMPORTANT:****If safety labels have been damaged, removed, become illegible or parts replaced without safety labels, new labels must be applied. Obtain replacement safety labels from a Kubota dealer.*

1

**Seat Belt:** Use seat belt when operating the tractor.

**Posted Locations:**

- (A) Front right cab post

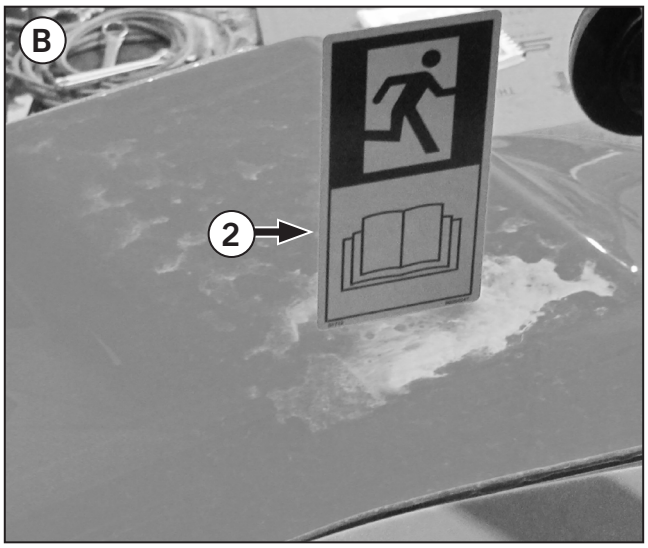



2

**Emergency Exit:** You can use the door latch on the the right side of the tractor to leave the cab in an emergency. See page 1-42

**Posted Locations:**

- (B) Emergecy exit

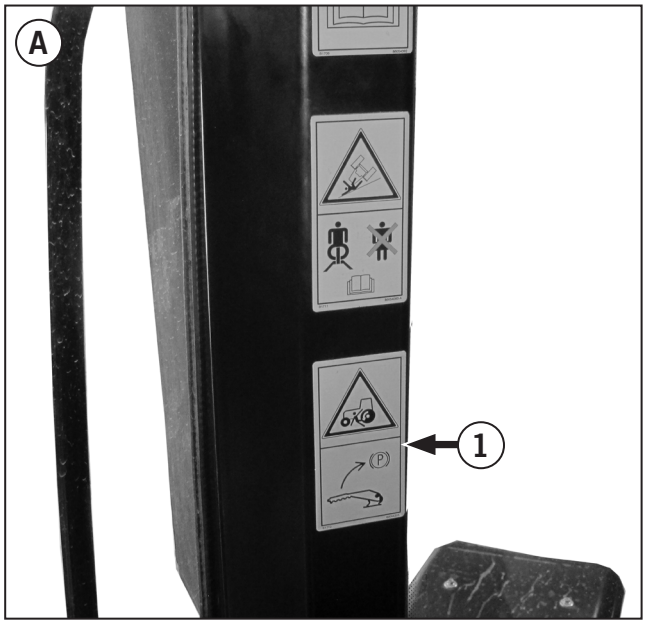


1

**Engage Parking Brake:** Engage parking brake before exiting the cab. See page 3-22 for parking brake operation instructions.

**Posted Locations:**

- (A) Front left cab post



**1**

**Instructional Seat:** Consult the operator's manual for information on the appropriate use of the instructional seat. (See page 2-24).

**Posted Locations:**

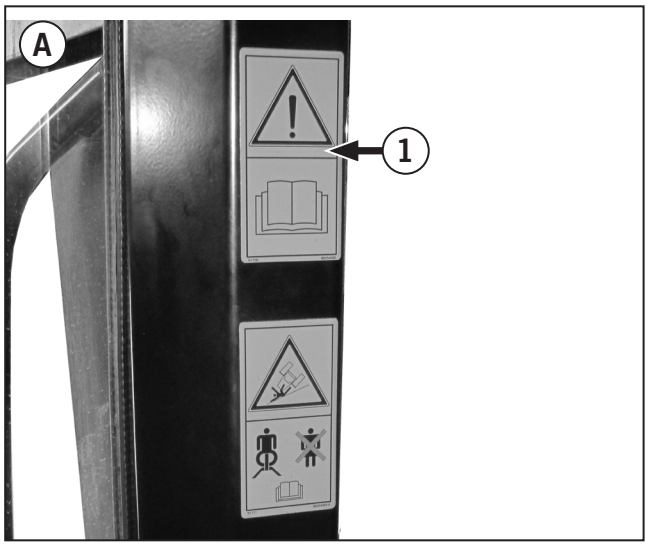
- (A) Front left cab post

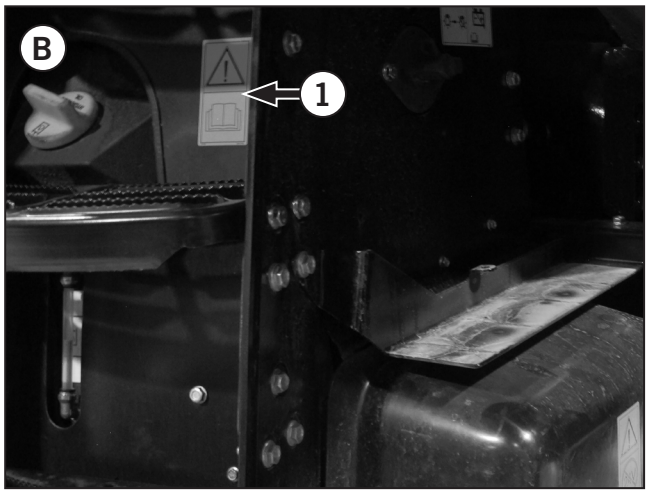
1

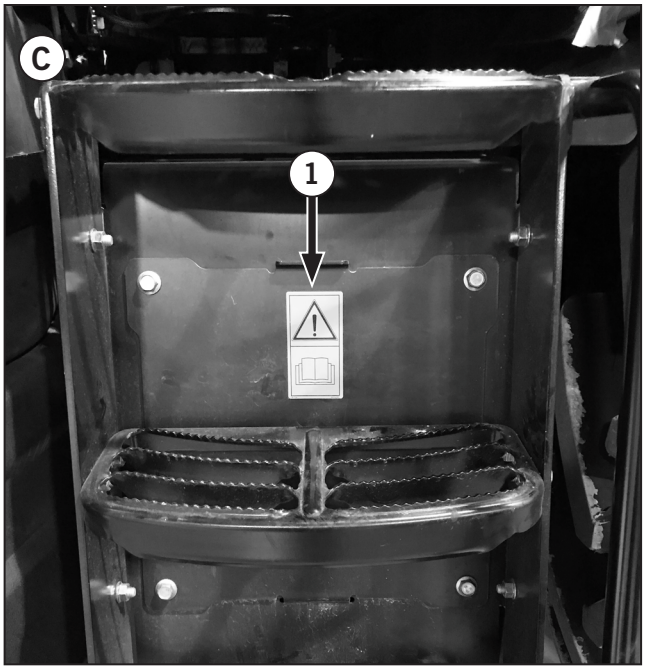
**Read Operator's Manual:** Read the operator's manual before performing maintenance or operating.

**Posted Locations:**

- (A) Front left cab post
- (B) Hydraulic Tank
- (C) DEF Supply Module Access Panel



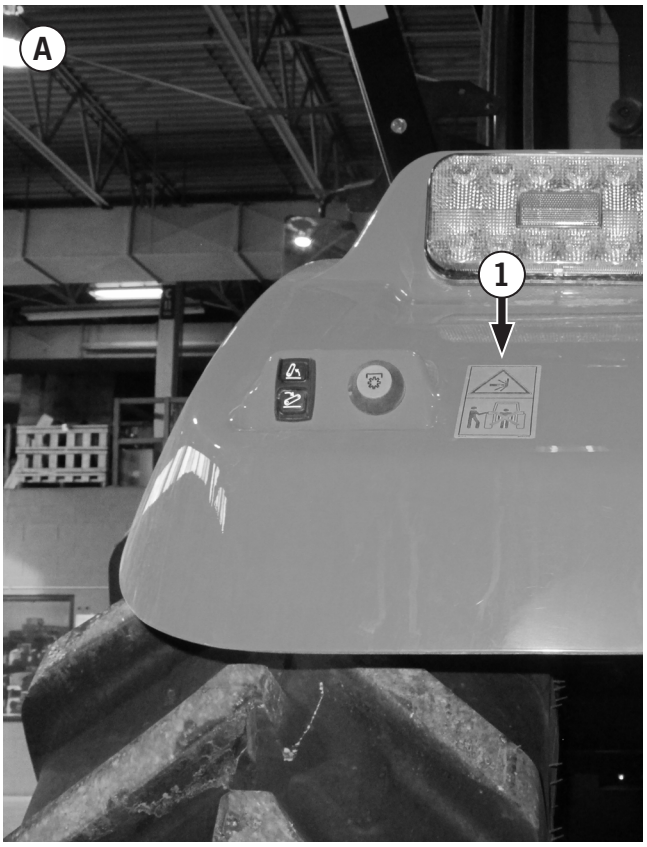



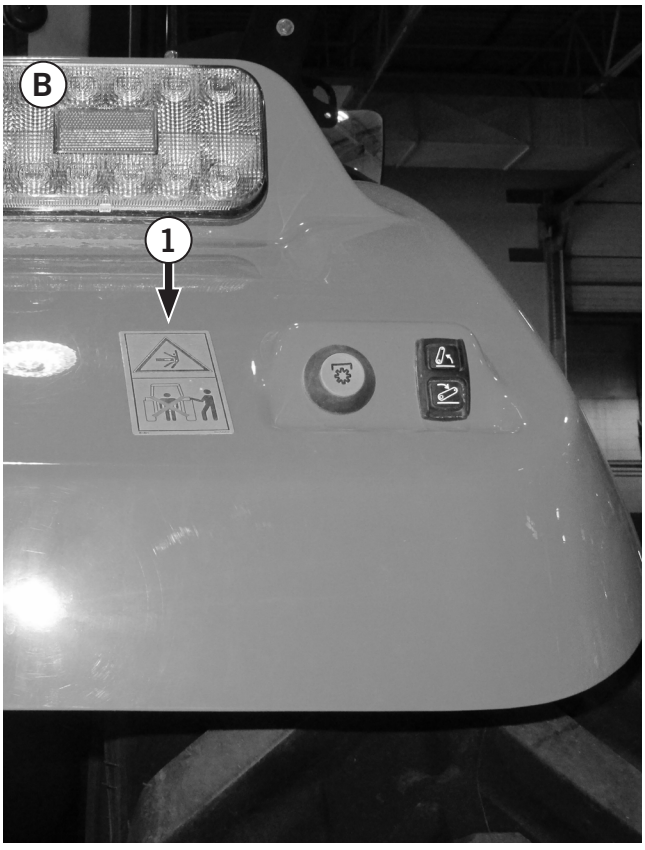
1

**3-pt Hitch and PTO:** Stay clear of 3-pt hitch and PTO shaft. Keep all shields in place.

**Posted Locations:**

- (A) Rear left fender
- (B) Rear right fender



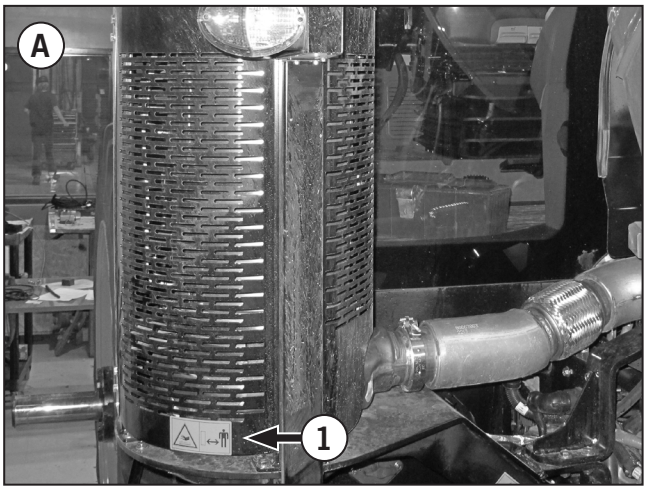



❶

**Hot surface:** Allow engine/ components to cool before servicing.

**Posted Locations:**

- (A) Exhaust

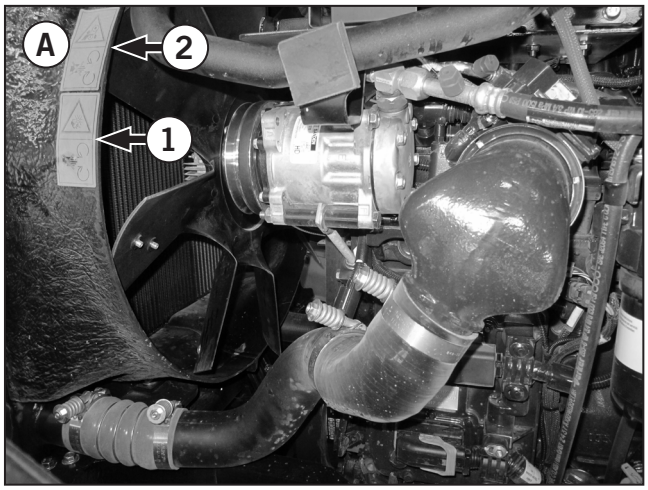


1

**Engine Guards:** Do not open while engine is running. Contact with belts and rotating parts will result in serious personal injury.

**Posted Locations:**

- (A) Hood Shroud left side
- (B) Hood Shroud right side

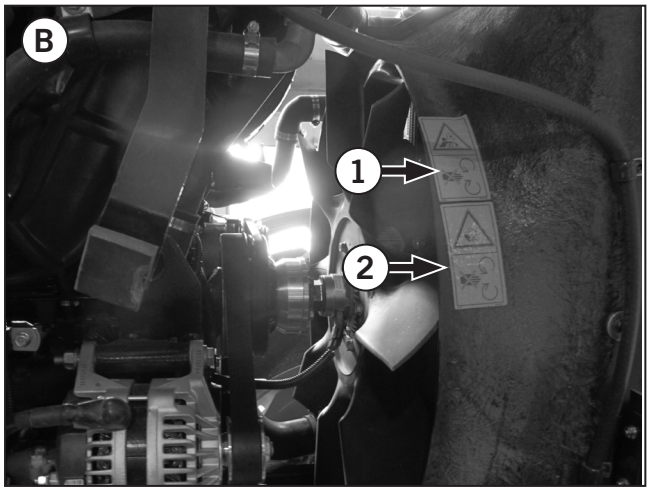



2

**Engine Running Warning:** Do not open while engine is running. Contact with rotating fan or belts will result in serious personal injury.

**Posted Locations:**

- (A) Hood Shroud left side
- (B) Hood Shroud right side

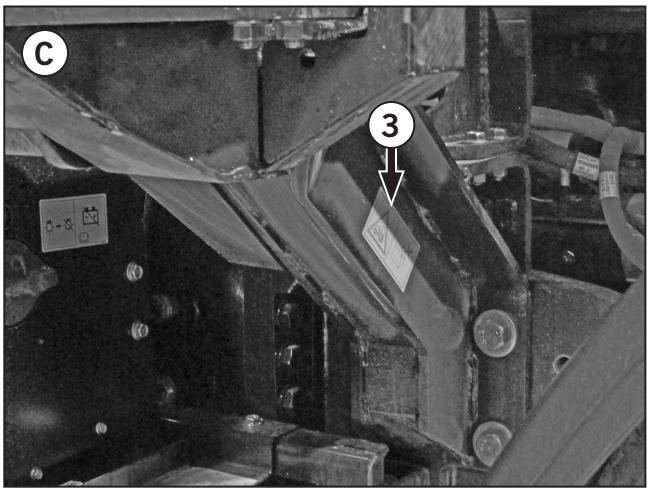



3

**Engine Start Warning:** Do not bypass the starter safety switch. The tractor may move suddenly and result in serious injury.

**Posted Locations:**

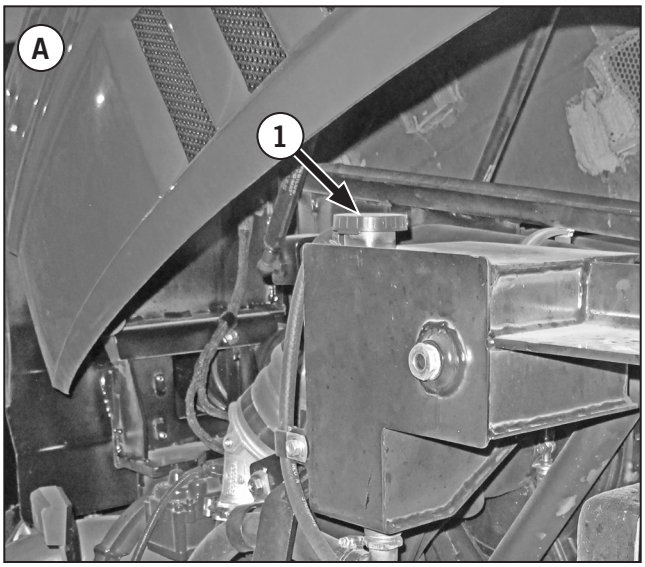
- (C) Engine right side, near battery



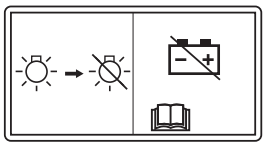
1


**Pressure Warning:** Do not remove the radiator cap when the radiator is hot and under pressure. Always allow the engine to cool before servicing. To remove the radiator cap, always wear gloves and eye protection. Turn the cap slowly to the first stop and allow pressure to escape before fully removing the cap.

- (A) Top of engine coolant reservoir



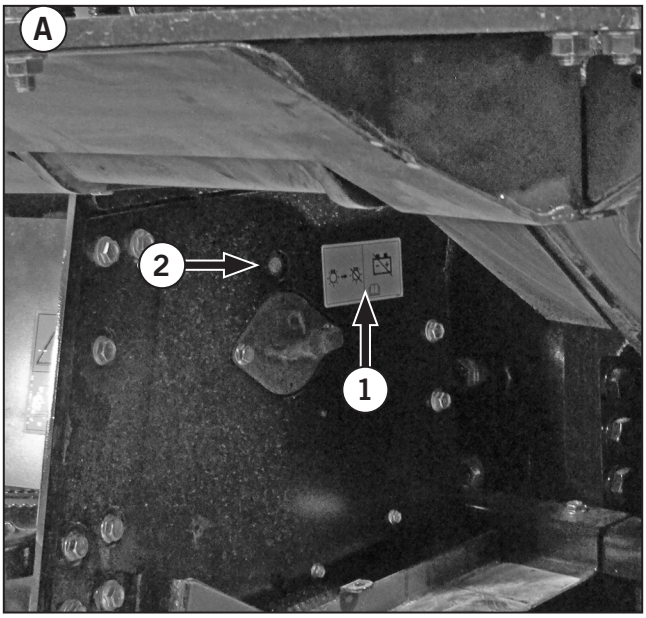
1



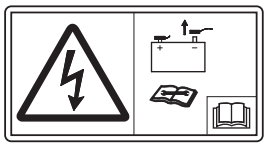
**Power On Indicator Light:** The battery indicator light (2) is located beside the battery shut-off switch. The indicator light will illuminate after the engine has shut down. Do not turn the battery switch to OFF until Power On Indicator light goes off to allow the engine ECM to shut down.

**Posted Locations:**

- (A) Aftertreatment base, near battery



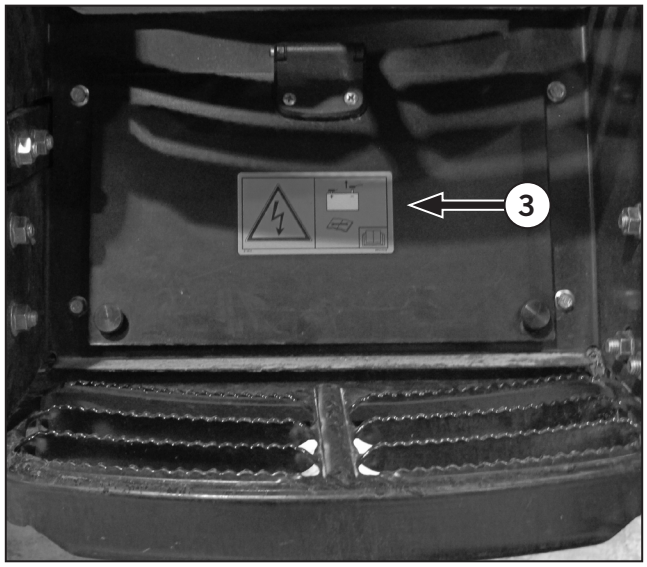

3



**Battery Boosting:** Do not connect jumper cable to negative post of discharged battery. Read service procedures before boosting the batteries.

**Posted Locations:**

- (A) Hydraulic reservoir

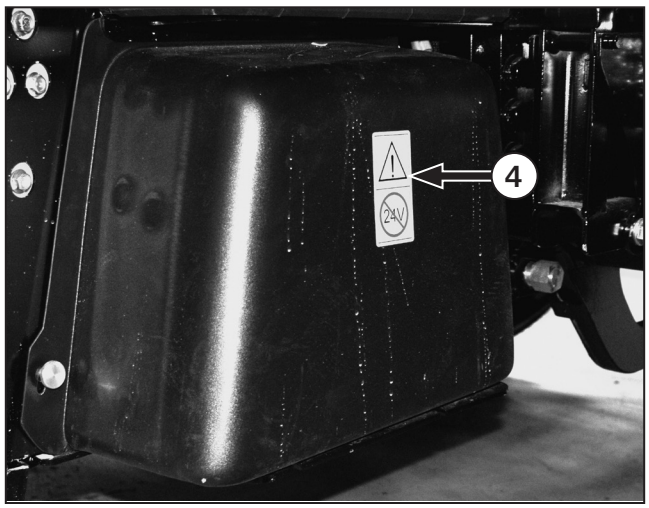



4

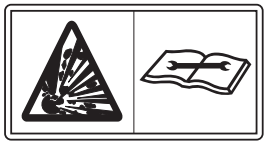

**Battery Boost Warning:** Do not boost batteries with 24 volts. Damage to electrical components can occur.

**Posted Locations:**

- (A) On battery cover.



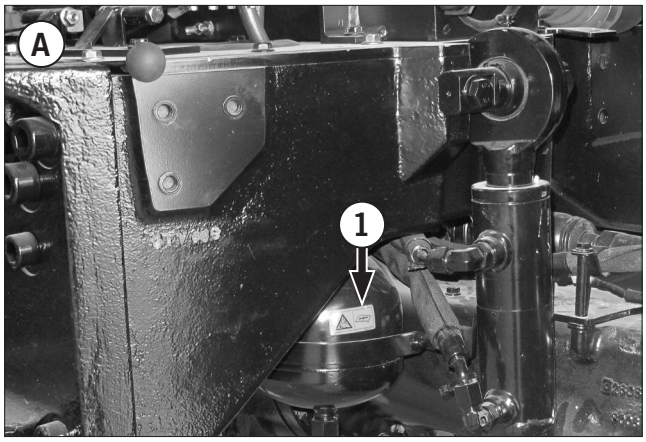
1



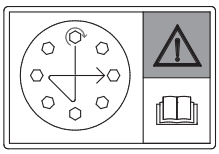
**Accumulator Warning:** Contents under pressure. Accumulators may store hydraulic pressure even when the engine is not running. Read service procedures before performing maintenance.

**Posted Locations:**

- (A) Multiple locations and varies based on tractor.



1

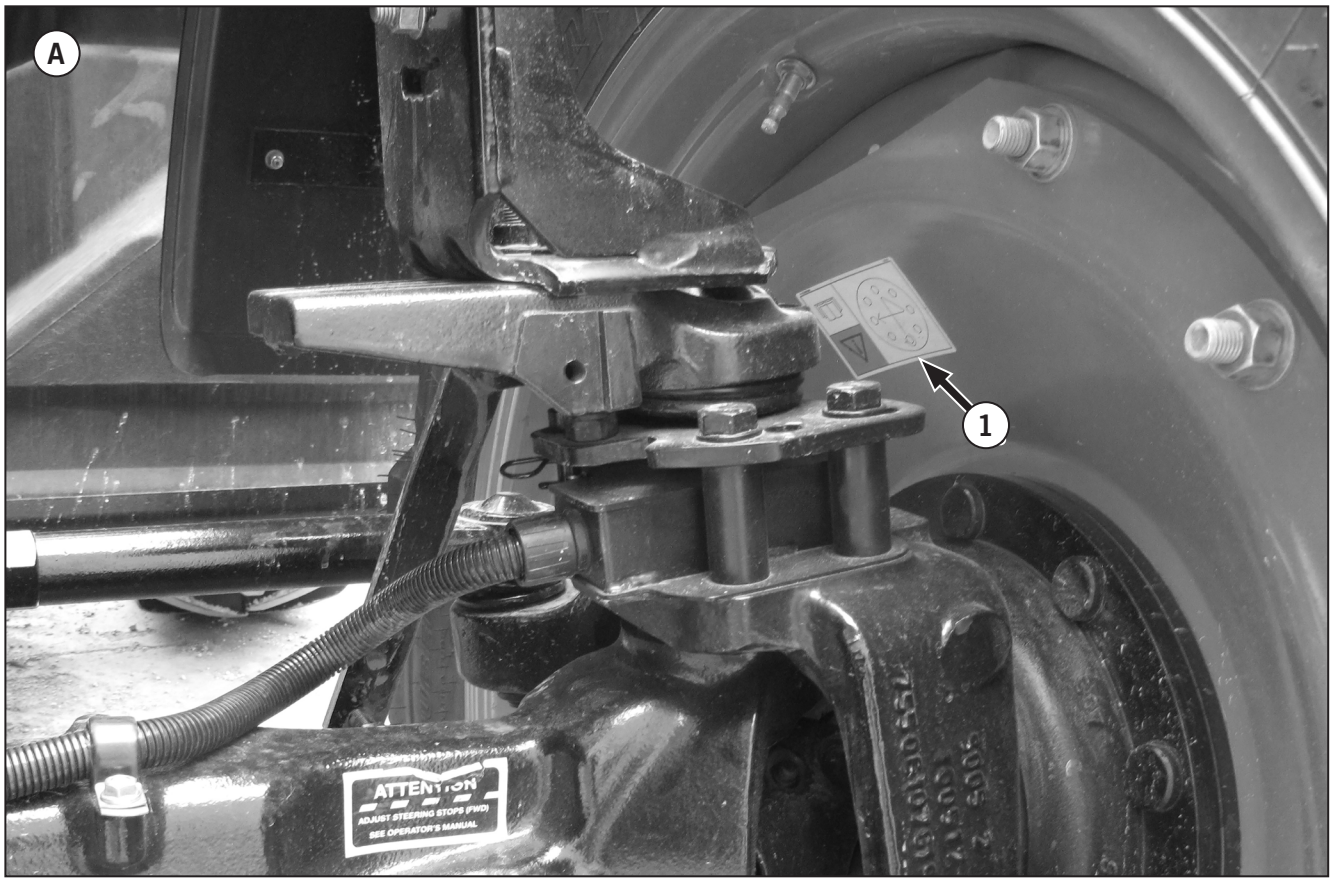


**Wheel Nut Torque Sequence:** Tighten all wheel nuts in a criss-cross sequence. Refer to the operator's manual for wheel hardware maintenance information:

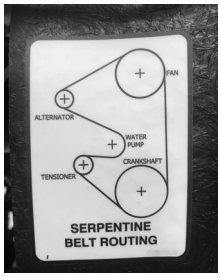
- During the break-in period (first 50 hours of operation): Tighten the wheel nuts to 739 N·m (545 ft-lb) after the first hour of operation and after every 3 hours of operation for the first day. Re-tighten to the specified torque daily until wheel hardware maintains the specified torque.
- Check wheel hardware every 250 hours of operation.

**Posted Locations:**

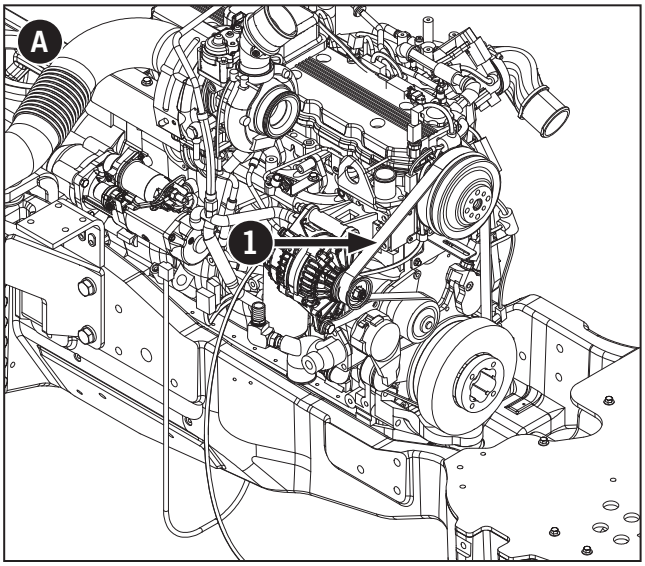
- (A) Inner rim of every wheel (2 shown).

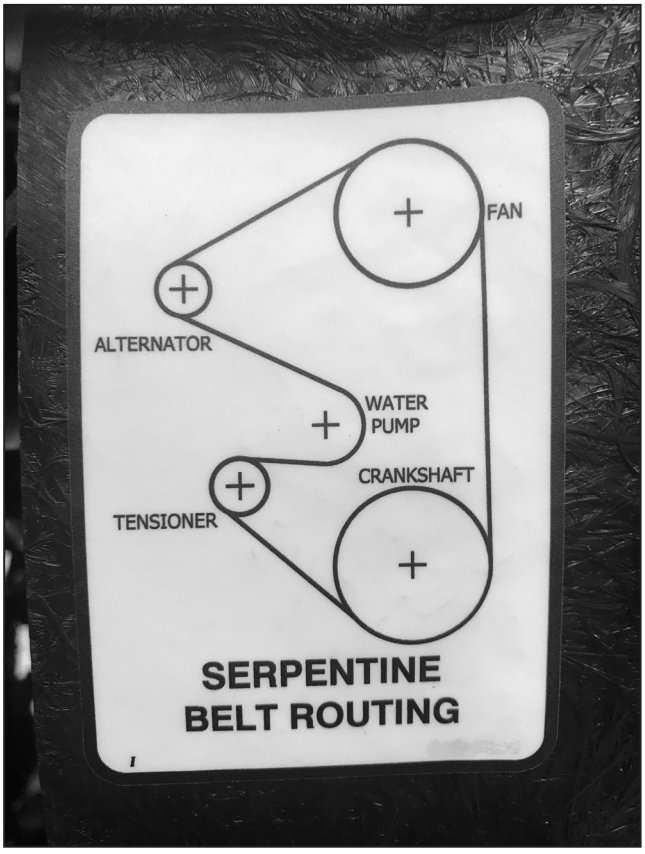


1




- **Serpentine Belt Decal** (A)
- Posted Location: Fan Shroud

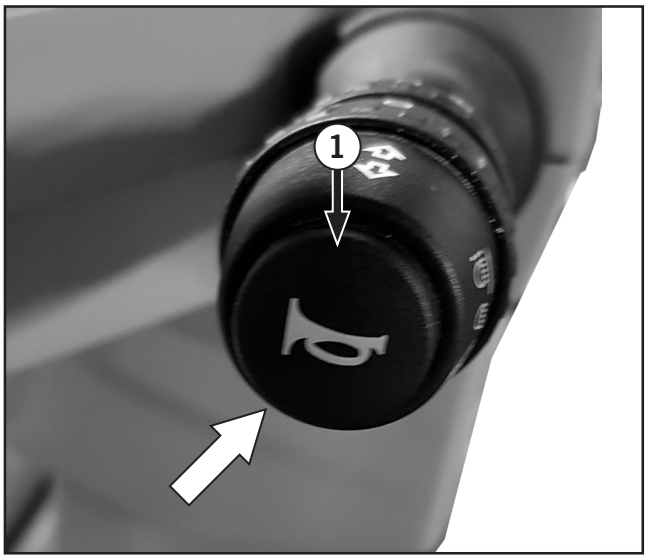


## Safety Equipment and Functions

### Horn

Push at the end of the lever to activate the horn (1).



## Emergency Exit

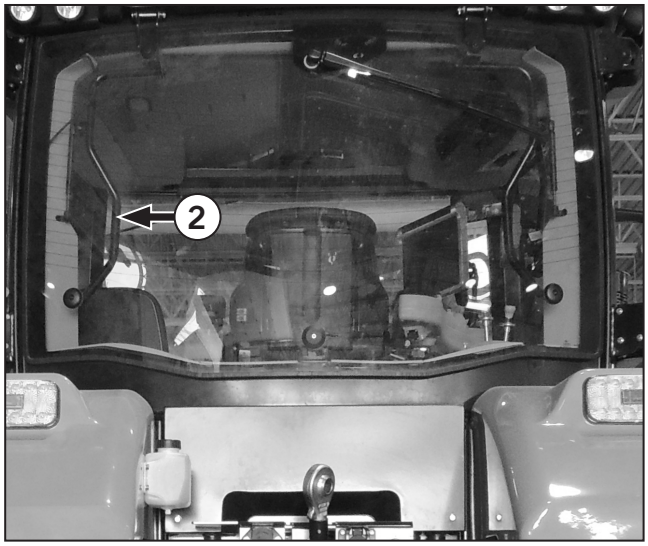
**WARNING**

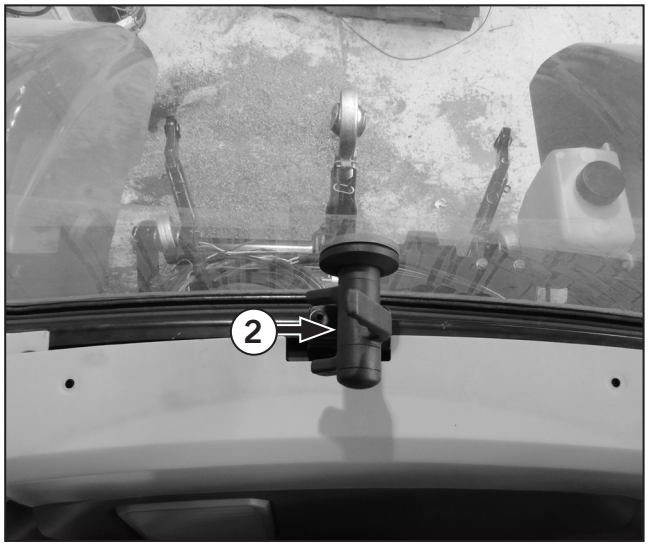
Do not operate the tractor with the emergency exit open.

The emergency exit handle (1) is located on the right side of the cab.

To operate:

1. Open the right door if the left door is blocked or exit through the rear window (2) if cab doors are blocked in an emergency situation.

## Cab/Roll-over Protection Structure (ROPS)

**DANGER**

Always use the safety belt with the cab/ROPS to prevent being ejected from the tractor in the event of rollover. Safety belts save lives only when used correctly.

### Roll Over Protection Structure

The tractor incorporates a Roll Over Protective Structure (ROPS). The ROPS certificate is located on the inside cab and can be accessed through the back deck.

Factory installed safety belts are also installed as standard equipment. The safety belt, when properly used by the operator, maximizes the protection offered by the ROPS.

### ROPS Maintenance and Inspection

***NOTE: The ROPS must be inspected by a certified technician.***

After the first 50 hours of operation and every 1 500 hours of operation (or yearly, whichever comes first):

- Check the torque of the cab/ROPS mounting bolts, as detailed in the Lubrication and Maintenance section of this manual
- Check the operator seat's mounting bolts and safety belt mounting bolts. Tighten the seat mounting bolts to 40 N·m (30 ft-lb). Replace any worn or damaged parts.

## Damage to the Cab/ROPS

**DANGER**

Never attach chains, ropes or cables to the cab/ROPS for pulling purposes. Always tow from the tractor drawbar. Be careful when driving through door openings or under low overhead objects. Make sure there is sufficient overhead clearance for the cab/ROPS.

Do not try to weld or straighten the cab/ROPS. If the cab/ROPS is removed or replaced, make certain the proper attachment hardware is used and torqued to the proper specification. Contact a Kubota dealer for parts and service.

If the tractor has rolled over or the cab has been seriously damaged (such as striking an overhead object during operation or transport), it must be replaced to provide the original level of protection.

Check for damage to the cab/ROPS, operator's seat, safety belt and safety belt mountings after an accident. Replace all damaged parts before operating the tractor.

### Falling Object Protection System

Model M8-181 and M8-201 tractors are not equipped with a Falling Object Protection System (FOPS).

### Noise Levels

The following levels are produced by the tractor.

**In-cab Noise level at 7 km/h:**

- 1200 rpm - 71.2 db (A)
- 1800 rpm - 71.5 db (A)
- 2250 rpm - 72 db (A)

Always wear appropriate ear protection when working in or around a tractor.

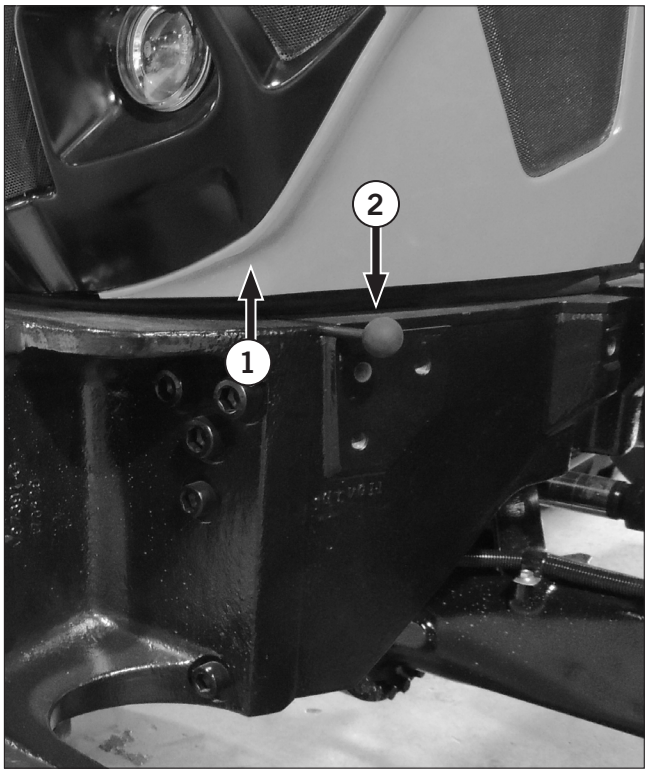
Operator's seats are component type approved in accordance with 78/764/EEC.

## Protective Shielding

**WARNING**

Always make sure protective shielding is installed, operational and in place before starting or operating the tractor.

The protective shielding around the engine, the operator and other vital components such as batteries are important safety features of the tractor. These shields protect the operator from contact with moving parts, hot gases and other dangers that will cause critical injury if not properly secured in place.




### Engine Hood

The engine hood (1) protects the operator from hot gases and moving parts.

Do not start the engine unless engine hood is closed and in the locked position.

To open engine hood:

1. Hold the hood and pull the release lever (2).

To close the engine hood:

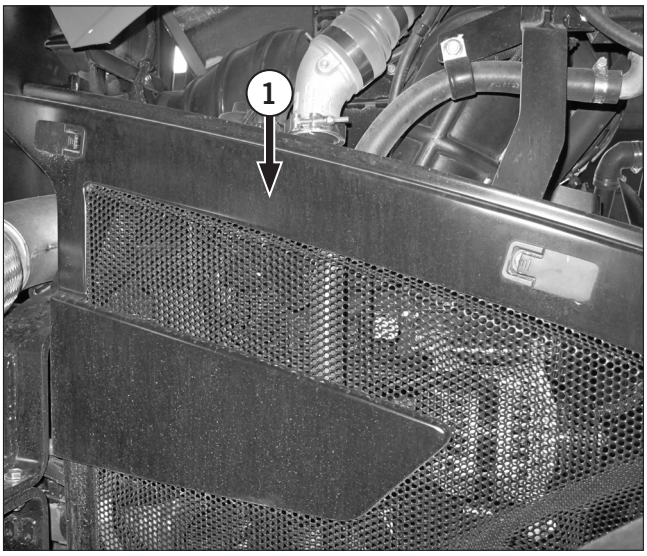
2. Pull down the on the strap (not shown) and push the hood into position with both hands.

## Engine Side Cowlings

**CAUTION**

Always firmly grasp the engine hood when opening and closing to avoid pinching. The engine hood may close quickly.

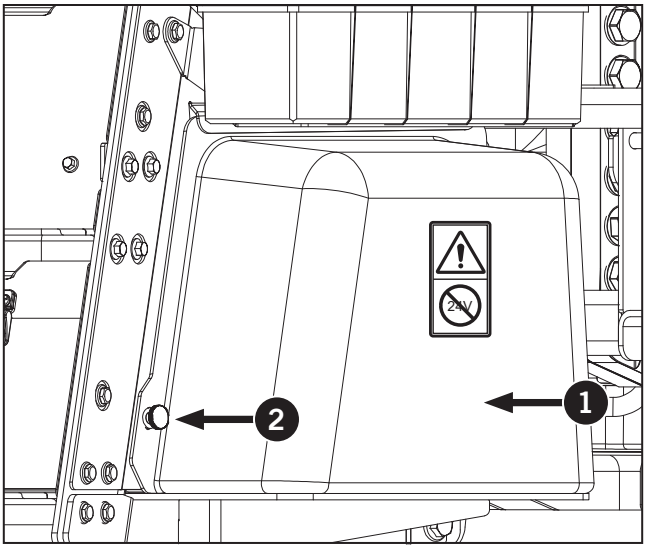
The engine side cowlings (1) protect the moving parts in the engine compartment and direct air flow through the cooler package. Do not start the engine unless engine side cowlings are in place.



## Battery Box

The battery box (1) is mounted beside the hydraulic reservoir on the right side of the tractor. The cover for the box is held in place with 2 knobs (one on each side) (2).

The battery box protects the 2 tractor batteries and the electrical connections.



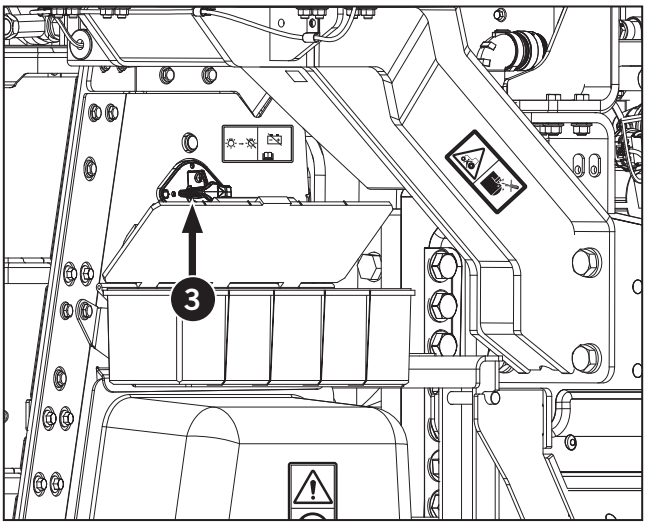

## Battery Shut-off Switch

**NOTICE**

The battery shut-off switch shall not be used as an emergency engine shut-off switch. Turning the battery shut-off switch to OFF while the engine is running may result in damage to vehicle electronics.

Located above the tool box (not shown), the battery shut off switch (3) provides the control needed to terminate electrical power. This switch can be disengaged and padlocked when the tractor is parked, or when there is a need to disconnect the main batteries.

- Turn the battery shut off switch to the OFF position to disconnect battery power.
- Turn the battery shut off switch to the ON position to connect battery power.



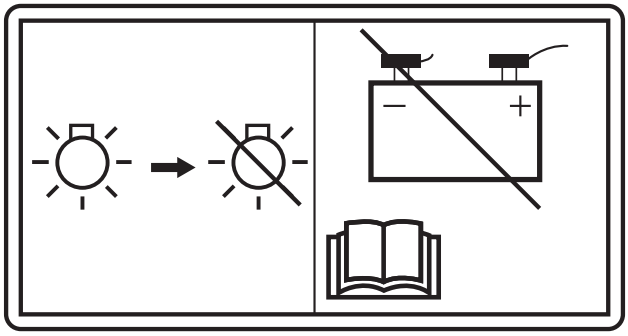
## Power Off Indicator Light

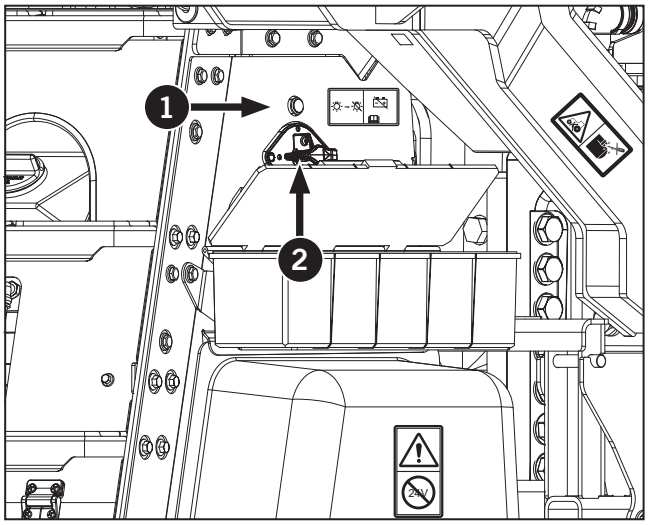
**DANGER**

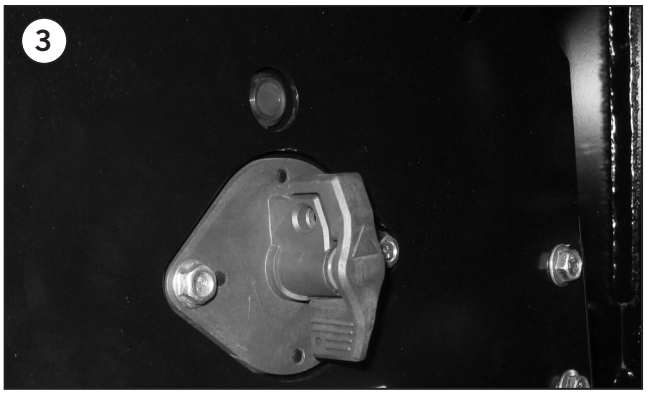
Turn the battery shut-off switch to OFF and disconnect all battery cables before welding or servcing the elctrical system. The alternator is still live when only the battery shut-off switch is turned to OFF.

**NOTICE**

- The battery shut-off switch can not be used as an emergency engine shut-off switch. Turning the battery shut-off switch to OFF while the engine is running may result in damage to vehicle electronics.
- Wait for the Power-off Indicator (POI) lamp (1) to shut off before turning the battery shut-off switch to OFF.






**Battery switch turned OFF**

The battery shut-off switch (2) provides the immediate control needed to terminate electrical power. This switch can be disengaged and padlocked when the tractor is parked, or when there is a need to disconnect the main batteries.

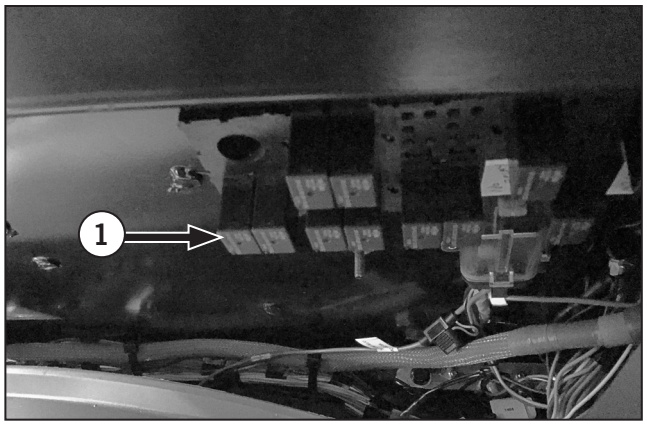
- To disconnect battery power, turn the battery shut-off switch to OFF (3) (switch pointing up as shown).
- To connect the battery power turn the battery shut-off switch to ON (4) (switch pointing to your right).


**Battery switch turned ON**

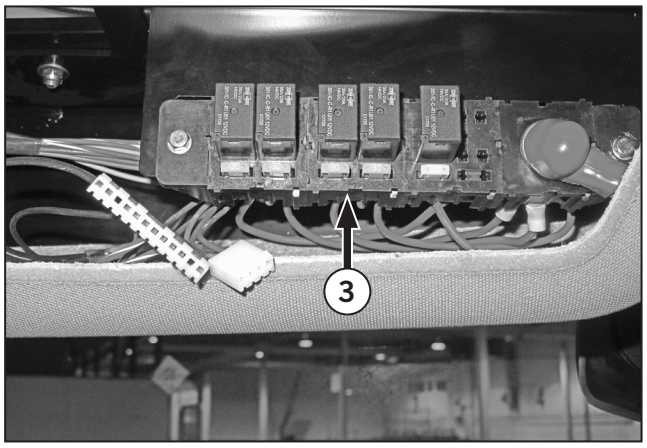
## Fuse Panel

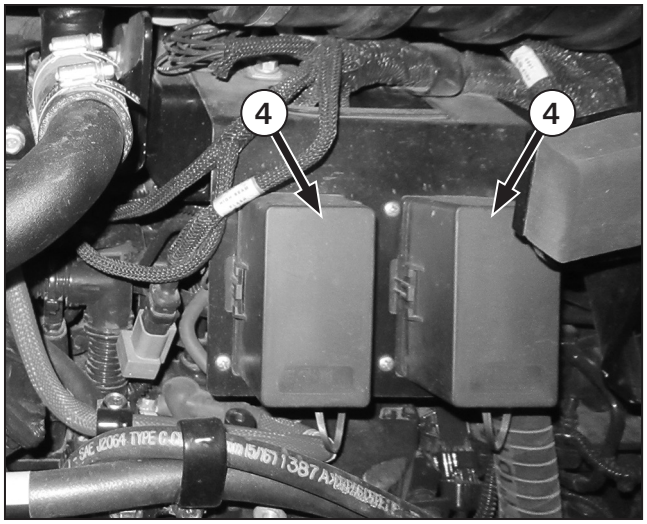
The fuse panels are located in the following below:

- Behind operator's seat (1)
- Right side bottom of the cab (2)
- Behind the upper radio and climate control bezel (3)
- Left side under hood (4)







## Master PTO Shield

The master Power Take-off (PTO) shield (1) will cover the tractor PTO stub shaft when the PTO option is available with the tractor. The shield can be pivoted to make installing the PTO shaft easier. Master PTO shield must be in place when the PTO is engaged.

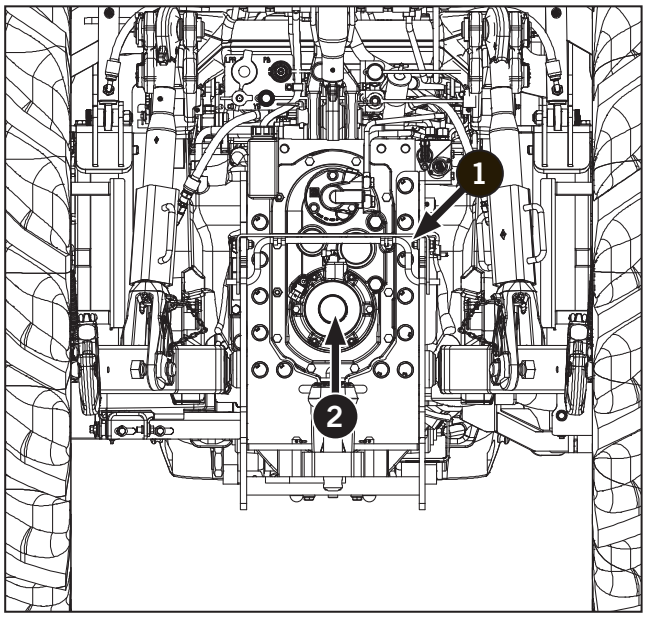
Refer to PTO in Section 3: Tractor Operation for information on PTO operations.

## PTO Output Shaft Cover

The PTO output shaft cover (2) is pressed onto the housing and protects against accidental contact with the shaft when there is no equipment in use.

Always install the cover over the tractor's PTO tube shaft whenever the shaft is not attached to an implement. The cover turns clockwise into the mounting plate to install and counterclockwise to remove.

***NOTE: Be sure to store the cover in a safe place when it is removed.***



**This Page Is Intentionally Left Blank.**

# Section 2: Controls and Instruments – Contents

## Tractor Orientation

The model M8-181 and M8-201 tractors are classified as mechanical front-wheel-drive vehicles.

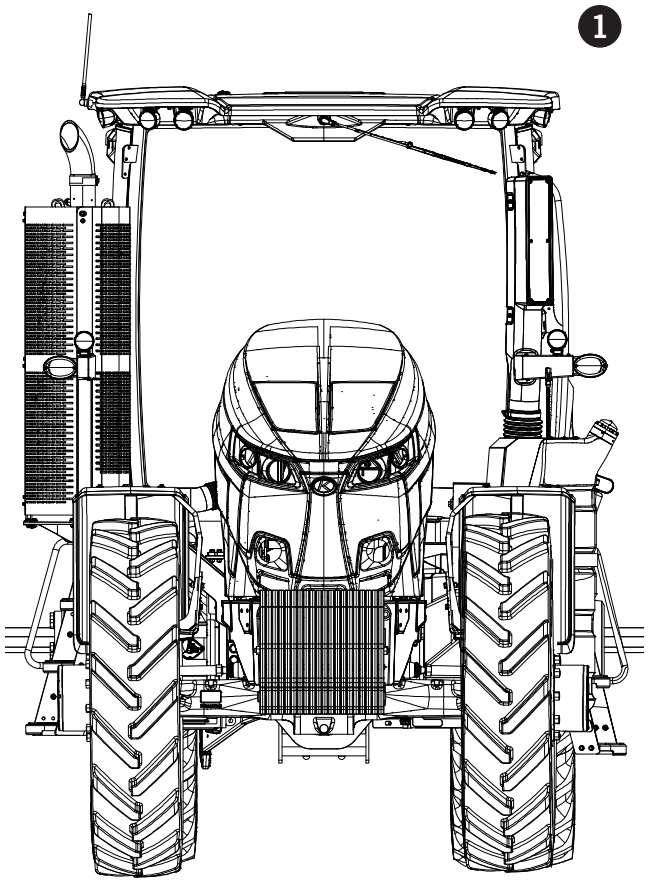
The main components include:

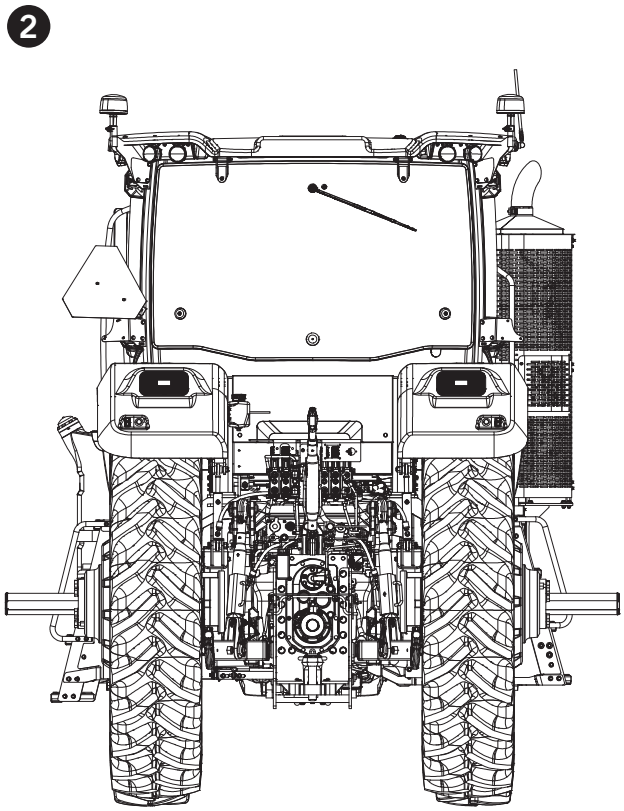
- The transmission and rear differential which are bolted together. The rear axles are attached to the rear differential. The rear differential has a separate auxiliary shaft that supplies power for the tractor to stay stationary but the PTO can still be functional. The power to the front driveshaft is supplied by a clutch pack which runs of the main clutch gear.
- The front frame which supports the engine components and the front axle. The hood support frame and cooler package also mount onto the front frame.
- The cab which mounts onto the transmission and the rear axle.

### Tractor Terminology

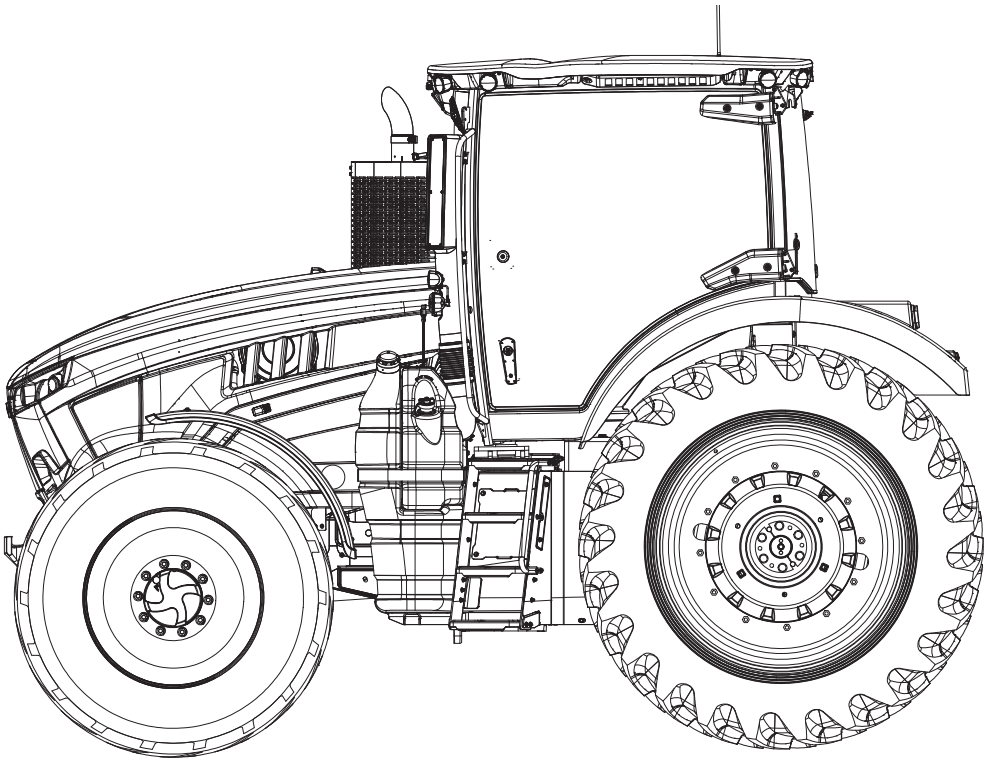
In this manual, the direction Front means as viewed from the driver's seat when facing forward in the normal manner. Left Side and Right Side are viewed in the same sense. Exceptions to this rule may be found where the wording As viewed from is used.

| | |
|---|---|
| 1 | **Front:** The engine end of the tractor; also known as the Forward Direction of Travel. |
| 2 | **Rear:** The drawbar end of the tractor; implements are attached to this end. |
| 3 | **Left:** The doorway side of the cab. |
| 4 | **Right:** The right view of the tractor. |

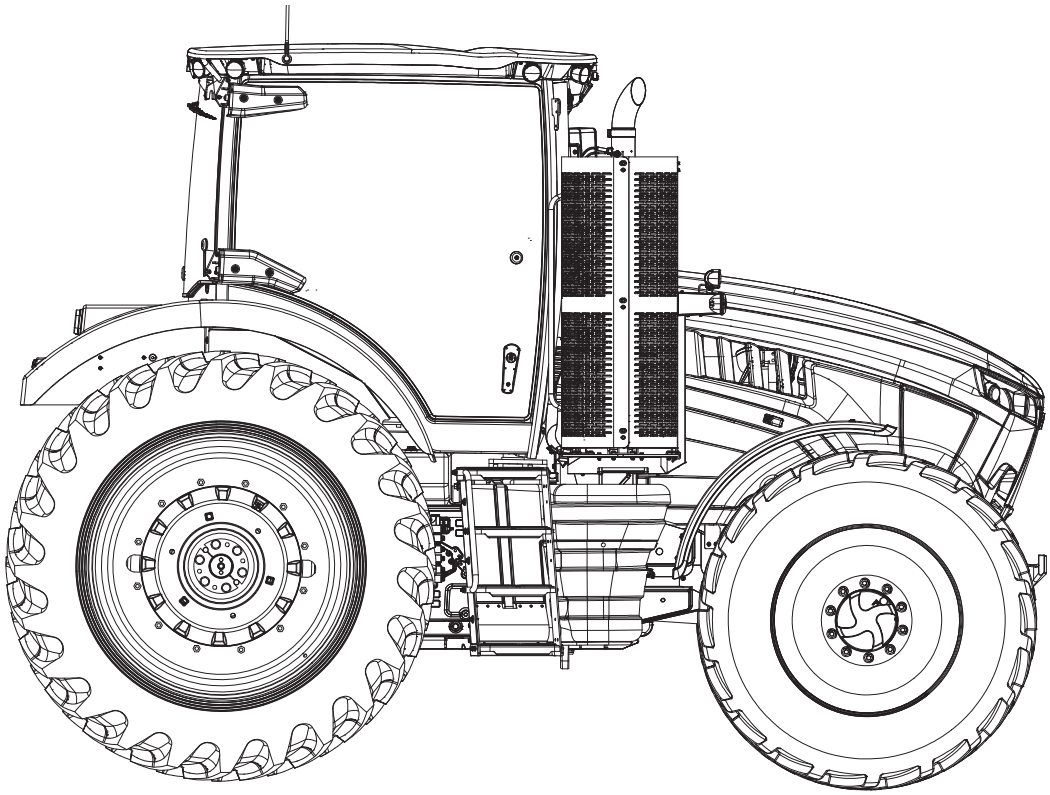


3



4

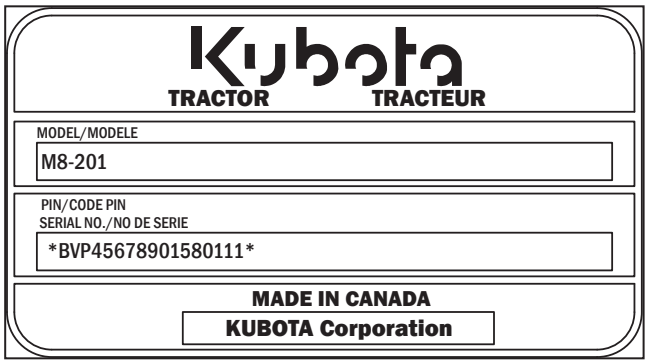


## Tractor Identification

***NOTE: Tractor identification data shall be supplied to the dealer when requesting parts or service. This data is also needed to identify the tractor if it is ever stolen.***

The tractor and its major components are identified using serial numbers and/or manufacturing codes. These codes are recorded on the vehicle identification plate (ID plate) (1).

1. Record the tractor's identification data in this manual using the sample ID plate, right.
2. On a separate piece of paper, record the tractor's identification data.
3. Keep this data in a safe place for easy access if the tractor is ever stolen.

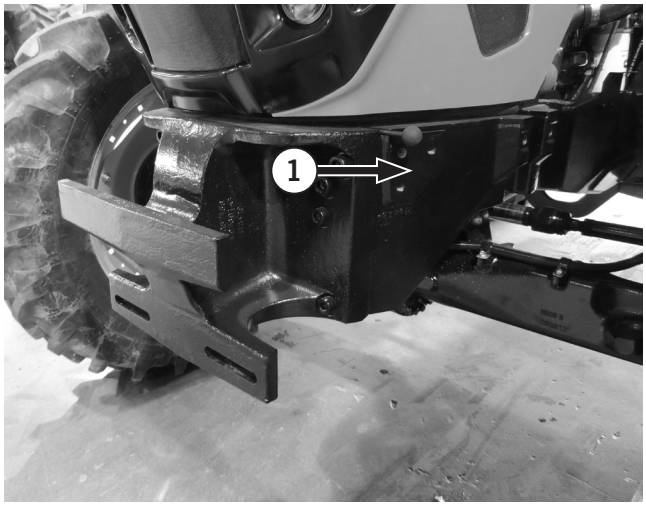



### Cab and ROPS Plate

The cab and rops plate is located on the cab.


### Tractor Serial Number

The tractor serial number is stamped on the front frame. Use this serial number stamp if the ID Plate is removed or mutilated.

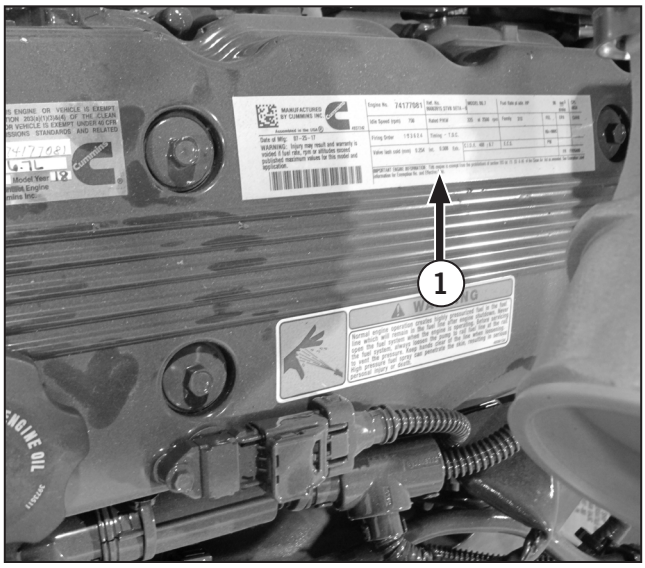


## Engine Serial Numbers

The engine identification data plate is located on the right-hand top of the engine (1).

The plate provides, the serial number, control parts list, model number and rated horsepower.

***NOTE: Engine serial number can be found on the ECM plate as well.***

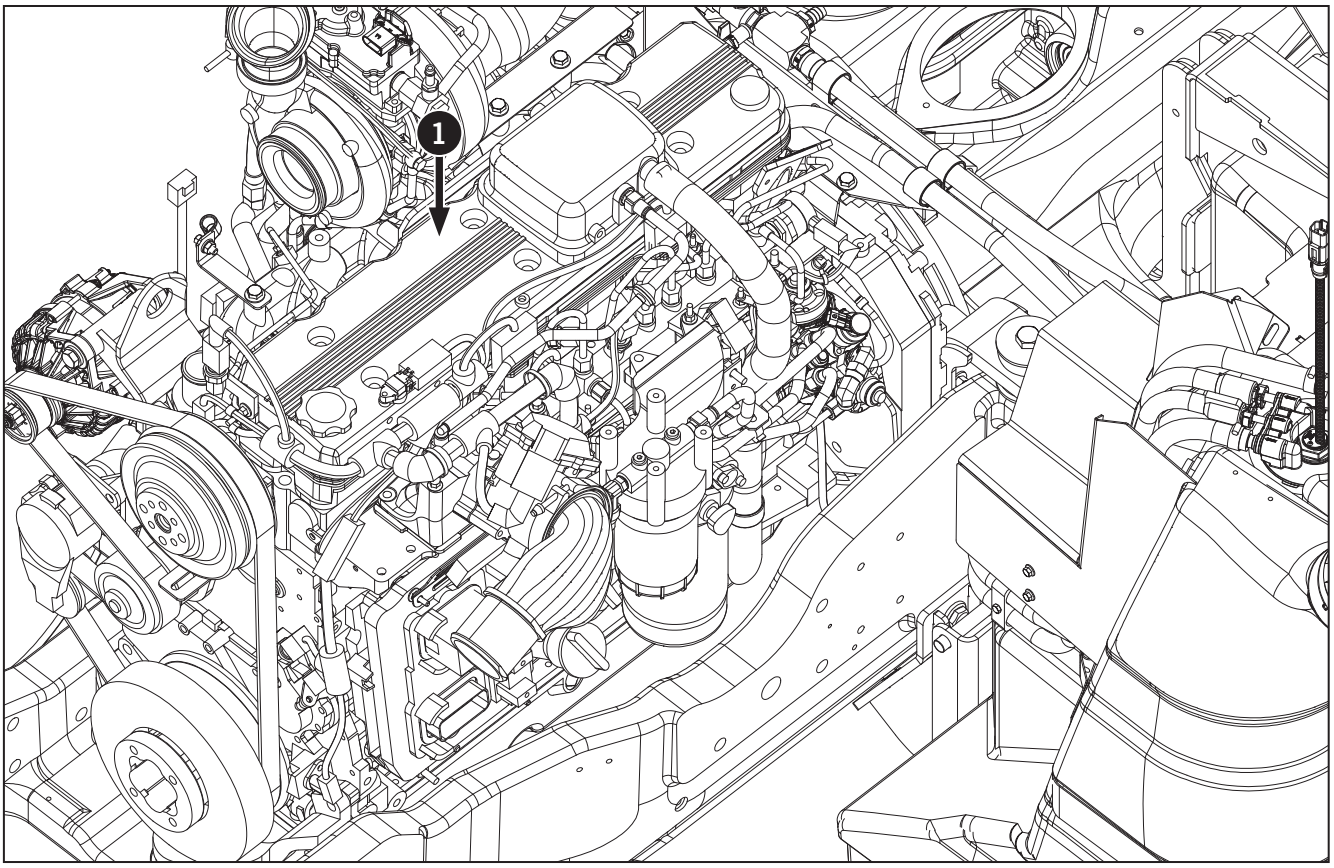



**NOTICE**

The engine is under the manufacturer's warranty at the time of delivery.

Only authorized Cummins dealers and service providers are permitted to perform maintenance and repairs under the warranty terms. Any unauthorized repairs may void the warranty.

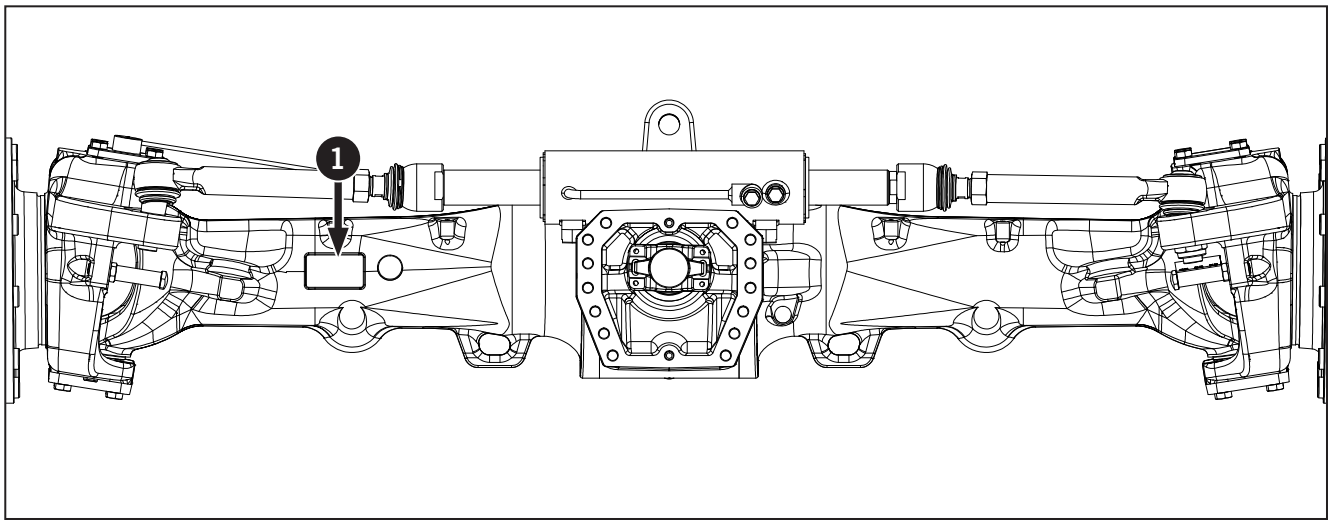
Contact Kubota dealer for more information.



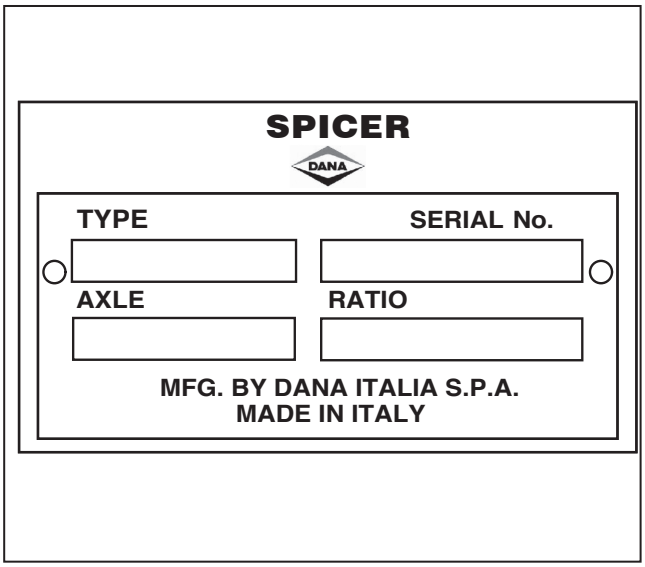
## Front Axle Serial Number

The axle serial number and axle type are on the plate located on the front left of the axle housing (1).

Record the information on the sample front axle ID plate, below.



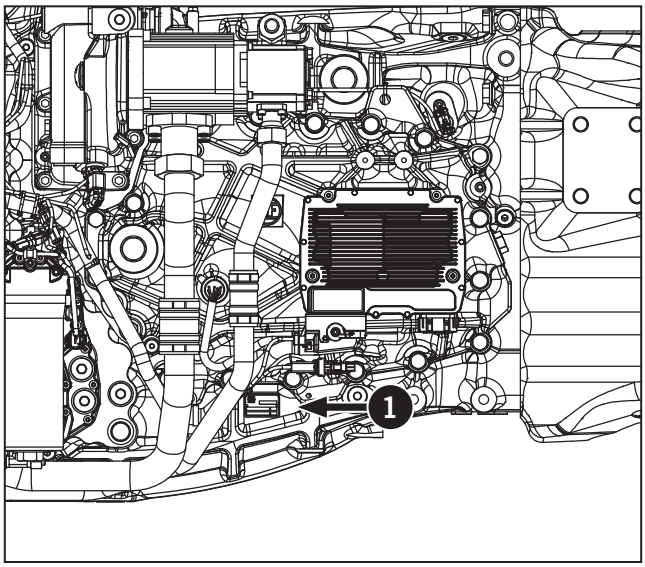

- Axle Type
- Differential Ratio
- Total Ratio
- Serial Number
- Axle Number



## Transmission Serial Number

The transmission serial number and type are located on the plate on the lower right side of the transmission (1).

- Record the information on the sample transmission serial number ID plate, below.
- Transmission type
- Total ratio of the transmission
- Unit number
- ZF parts list number
- Customer code
- ZF List of Lubricants



## Steering Column and Pedals

Table 2-7 identifies pedals and the functional parts of the steering column.

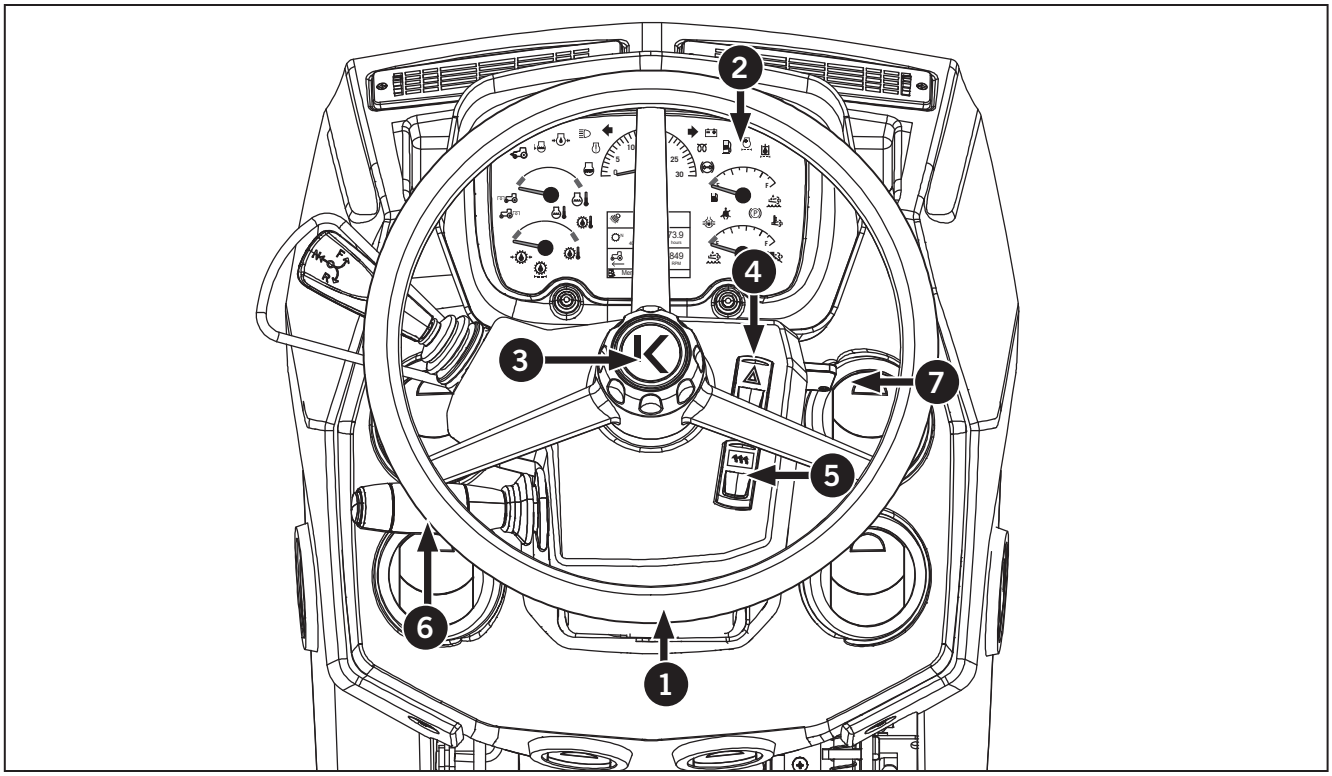
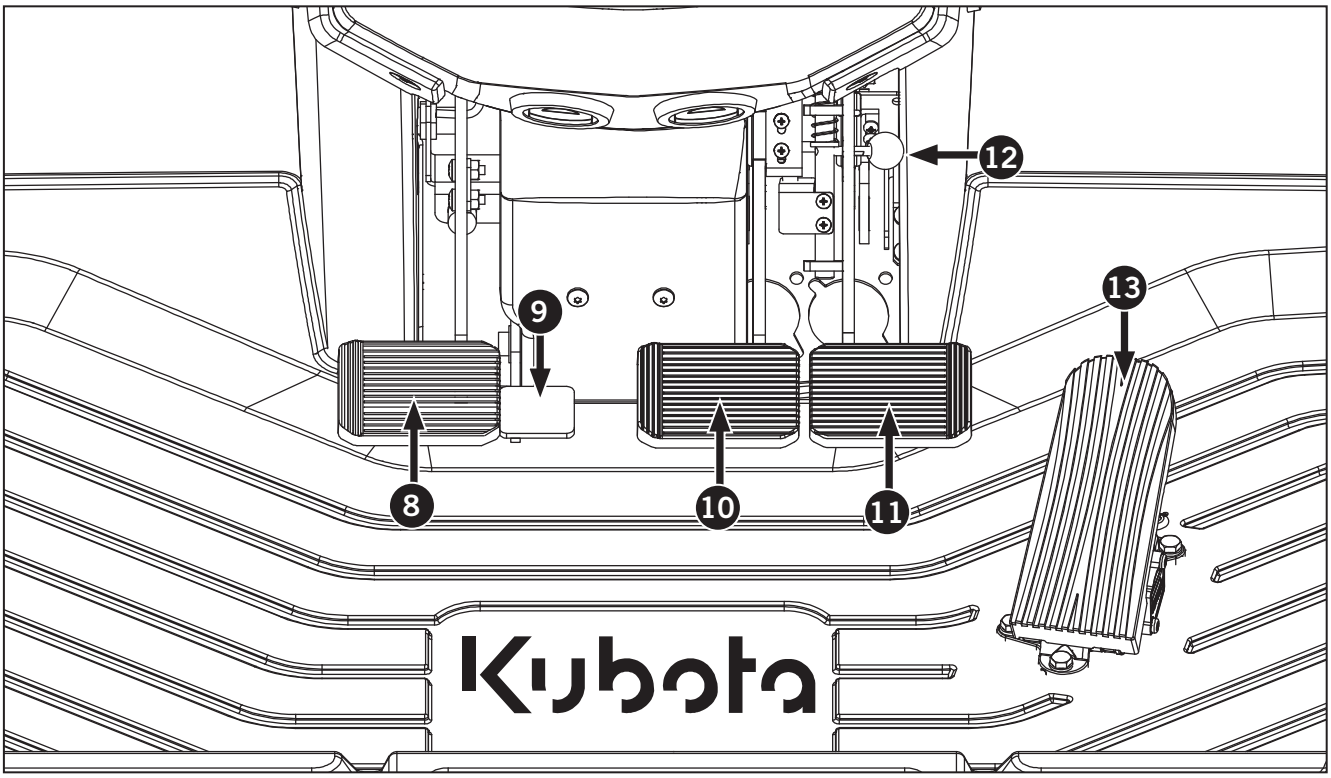



**Table 2-7: Overview of Steering Column and Pedals**

| Ref | Description | Use / instructions |
|---|---|---|
| 1 | Steering Wheel | Steers the tractor. |
| 2 | Electronic Instrument Cluster (EIC) | Shows gauge and indicator lights. Use to monitor and control the aftertreatment system, calibrate equipment and customize settings such as units of measure. See “Electronic Instrument Cluster (EIC) and Display Monitor” on page 2-21. |
| 3 | Steering Column Adjusting Knob | Used for adjusting the height of the steering wheel. See “Adjust Steering Wheel Position” on page 2-11. |
| 4 | Hazard Warning Light Switch | Press to activate hazard lights. See “Hazard Warning Lights” on page 2-13. |
| 5 | Rear Defrost Switch | Press to activate the rear defrost switch. |
| 6 | Multifunction Switch | Used for signalling turns, honking the horn, flashing/locking high beams and wiper controls. Push the button at the end of switch to honk the horn. See Table 2-8 on page 2-12. |
| 7 | Ignition Switch | Starts the engine. See “Tractor Start-up” on page 3-13. |




| Table 2-7: Overview of Steering Column and Pedals | | |
|---|---|---|
| **Ref** | **Description** | **Use / instructions** |
| 8 | Inching Pedal | Used for slowly hooking up implements. See “Inching Pedal” on page 2-14. |
| 9 | Tilt Control Pedal | Used for adjusting the angle of the steering wheel. See “Adjust Steering Wheel Position” on page 2-11. |
| 10 | Left Brake Pedal | Stops the tractor. See “Stopping the Tractor” on page 3-19 |
| 11 | Right Brake Pedal | Stops the tractor. See “Stopping the Tractor” on page 3-19. |
| 12 | Brake locking plate | Used for locking the brake pedals together. See Brakes in Section 3: Tractor Operation for details. |
| 13 | Foot Throttle | Foot pedal is an accelator pedal only and can not be configured. |

## Adjust Steering Wheel Position

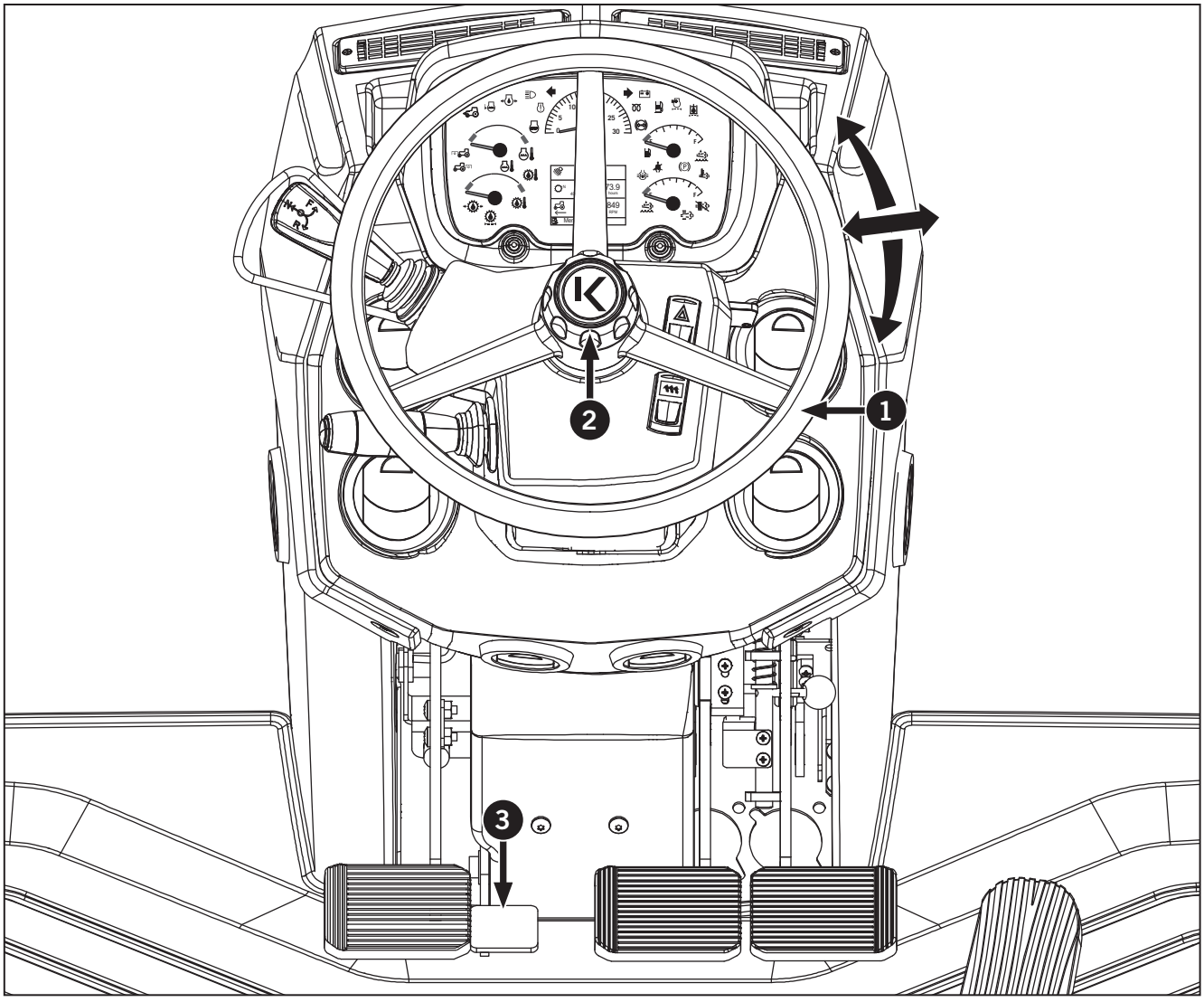
Adjust the height and angle of the steering wheel (1) as required.

To adjust the height of the steering wheel:

1. Unlock the wheel by turning the knob (2) counterclockwise.
2. Pull or push the steering wheel to the desired height.
3. Lock the wheel by turning the knob clockwise.

To adjust the angle of the steering wheel:

4. Press and hold the tilt control pedal (3).
5. Tilt the steering wheel up or down to the desired position.
6. Release the tilt control pedal.

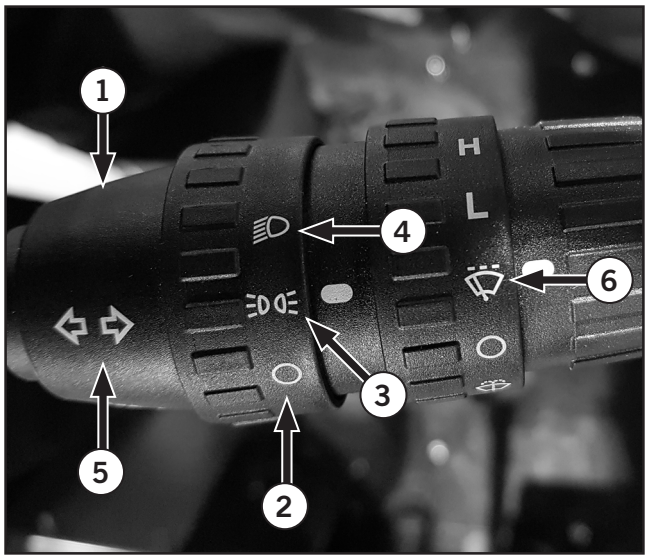


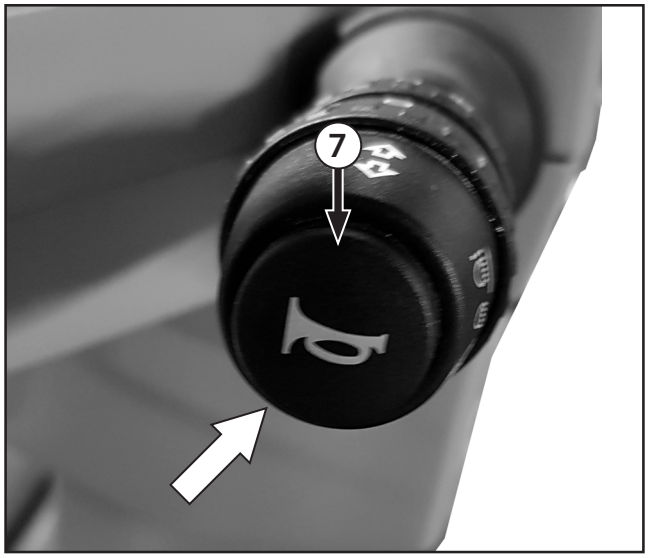
## Multifunction Switch

The multifunction switch (1) is located on the left side of the steering column. Table 2-8 explains how to operate the switch.

**Table 2-8: Multifunction Switch Operation**

| Ref | Description |
|---|---|
| 2 | **OFF:** To deactivate the lights, rotate the multifunction to Off ◯. |
| 3 | **Worklights:** Rotate the switch forward to activates the roadlights and back lighting. |
| 4 | **Low beams/Night Mode EIC:** To activate the low beams and night mode on EIC, rotate the switch into position. |
| 5 | **Signal Left Turn:** Pull the switch backward. This will activate the EIC that will flash in unison with tractor left turn signal light. |
| | **Signal right turn:** Push switch forward. This will activate the right turn flasher on the EIC that will flash in unison with tractor right turn signal light. |
| 6 | **Windshield Wiper Controls:** Rotate the switch to activate the front and rear wipers. See "Windshield Wiper – Operation" on page 3-55 for more information. |
| 7 | **Horn:** Push to activate the horn. |




**To activate high beams:**

- Pull the multifunction switch up to momentarily activated high beams.
- Push the multifunction down to keep high beams on.

## Hazard Warning Lights

**WARNING**

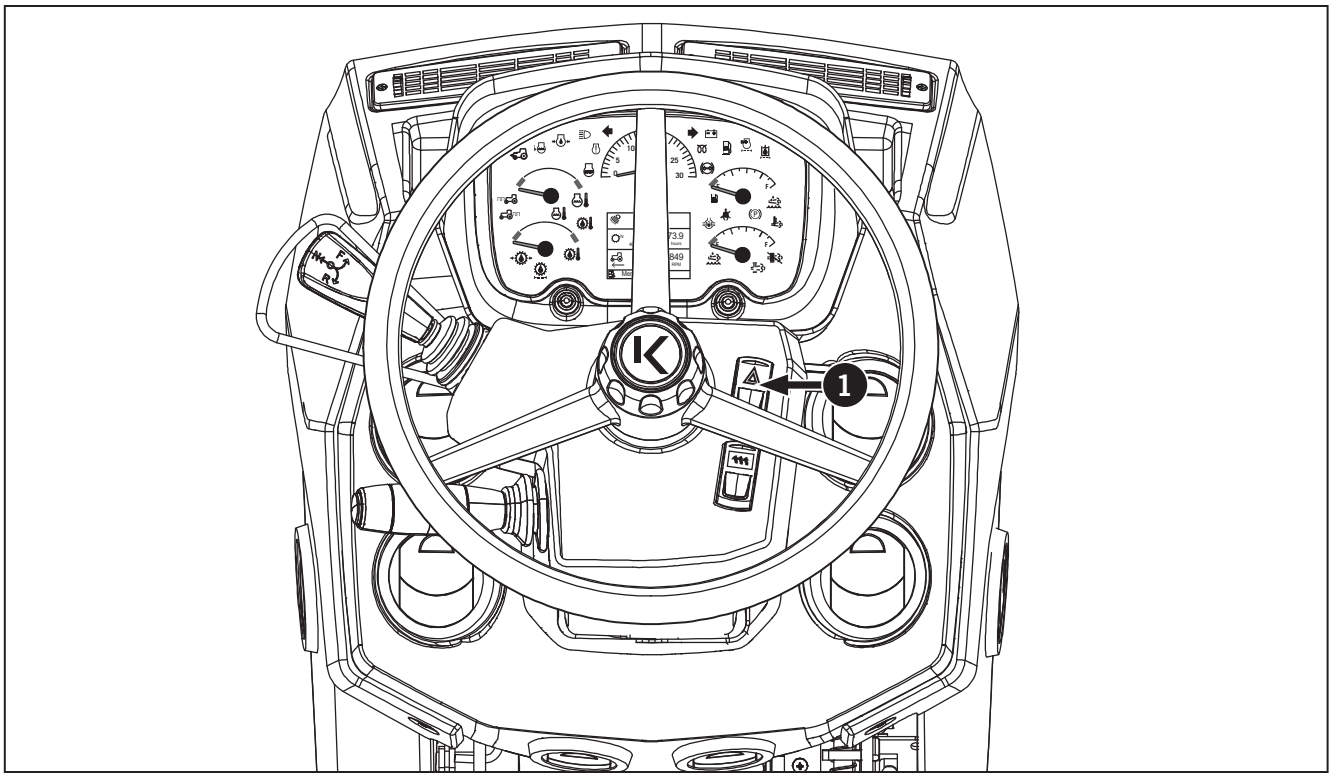
Always look before exiting the cab on a public roadway. Turn hazard warning lights on to signal other motorists to give the tractor a wide berth when passing or to slow down.

The hazard warning lights switch (1) activates the tractor hazard warning lights located on the extremity bar.

- Push the hazard light switch to activate and deactivate.

The hazard warning lights warn other drivers the tractor is traveling at a reduced speed on a public road, is pulling off to the side of the road or is already on the shoulder.

The turn signal light indicators on the dash will flash.



## Foot and Floor Controls

**WARNING**

Always lock the brakes together when traveling on the highway or if a hydraulically braked trailer is attached. Never use the brakes to aid turning at high speed.

### Parking Brake (not in picture)

The parking brake uses a conventional lever to operate brake discs located in the rear axle planetary. The lever is located to the left of the driver's seat. See Brakes in Section 3: Tractor Operation for details.

***NOTE: A two-minute pulsating audible alarm will sound in unison with a flashing parking brake light to remind the operator to apply the parking brake if the operator leaves the seat without applying the parking brake.***

### Inching Pedal

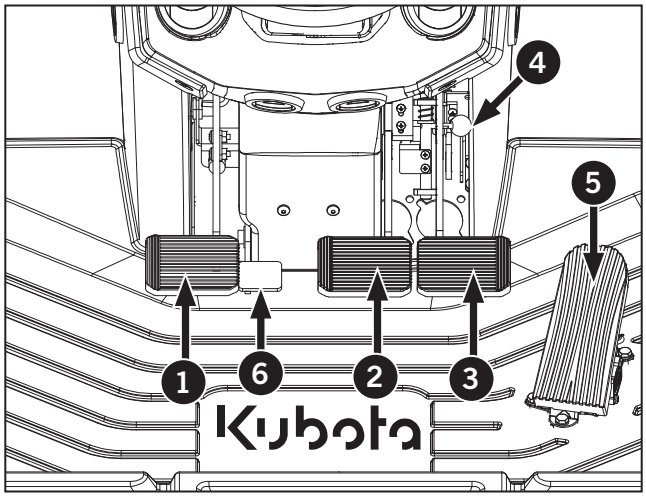
The inching pedal (1) is installed in place of the clutch pedal found on tractors with conventional transmissions.

The inching pedal operates like a clutch for safe, accurate positioning of the tractor when attaching implements or operating in confined spaces, etc.

Pressing the pedal interrupts power flow from the engine to the rear axle. Release the pedal slowly to restore power flow. Refer to Inching Operations in Section 3: Tractor Operations for details.

### Left Wheel Foot Brake Pedal

The left foot brake (2) may be operated independently of the right foot brake to aid turning in confined spaces or together with the right foot brake for normal stopping. Unlock the brake pedals when operating in the field. Refer to Service Brakes - Foot Brakes in Section 3: Tractor Operation for details.




### Right Wheel Foot Brake Pedal

The right foot brake (3) may be operated independently of the left foot brake to aid turning in confined spaces or together with the left foot brake for normal stopping. Unlock the brake pedals when operating in the field. Refer to Service Brakes - Foot Brakes in Section 3: Tractor Operation for details.

### Brake Interlock Lever

To lock the brake pedals together:

1. Move the brake interlock lever (4) up or down to engage and disengage the service brake pedals together. Refer to Brakes in Section 3: Tractor Operation for details.

### Foot Throttle

The foot throttle (5) is an accelerator only and can not be configured.

***NOTE: Set the hand throttle to the idle position whenever the foot throttle is to be used.***

### Steering Column Release Pedal

Use the steering column release pedal (6) to adjust the tilt on the steering wheel.

## Operator Seating

**CAUTION**

- Seat belts save lives. Always wear the seat belt when operating the tractor.
- Passengers must sit in the instructional seat (if equipped) with the seat belt fastened at all times. Do not allow passengers if the tractor is not equipped with an instructional seat. Do not permit children to ride in or on the tractor.

***NOTE: Adjust the seat, steering wheel and controls to the most comfortable position before operating the tractor.***

The tractor will be equipped with either a standard seat or optional deluxe seat. There is also an option for an instructional seat.

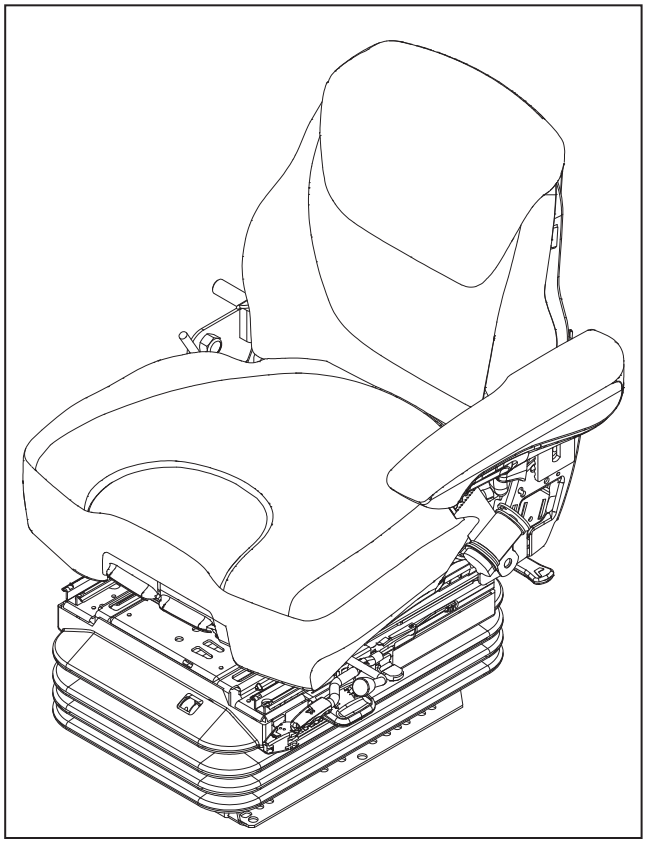
- The standard seat (View A) is designed to provide maximum operator comfort. See "Standard Seat" on page 2-16.
- The deluxe seat is designed to provide maximum operator comfort and is also equipped with:
  - Electrical Lumbar Adjustment (Leather Seat Only);
  - Heated Seat Cushion (Fabric Seat);
  - Heated and Cooled Seat Cushion (Leather Seat) ; and
  - Semi-Active Air Suspension System

See "Deluxe Seat" on page 2-18.

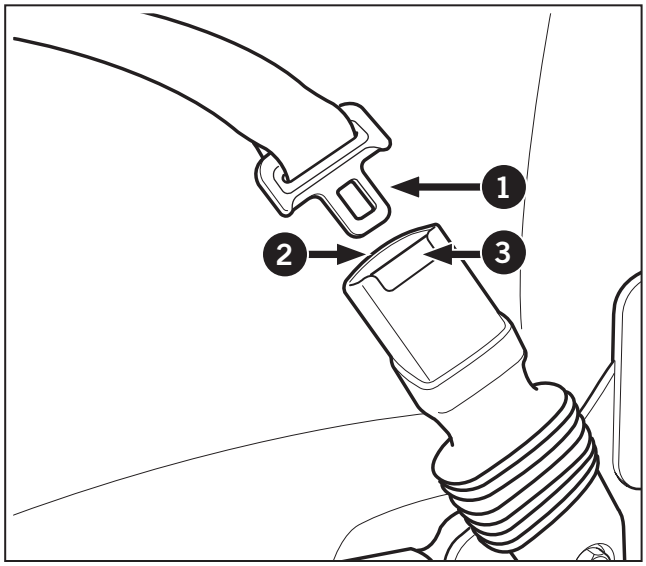
### Seat Belts

Tractors are equipped with a retractable seat belt for the operator seat and a non-retractable seat belt for the instructional seat.

1. To fasten/release seat belts, pull the belt forward from the reel.
2. Push the tongue of the buckle (1) into the buckle (2) until a click indicates it is properly engaged.
3. To release the belt, push the red release button (3) on the buckle and remove the tongue from the buckle.



**View A:** The standard operator's seat



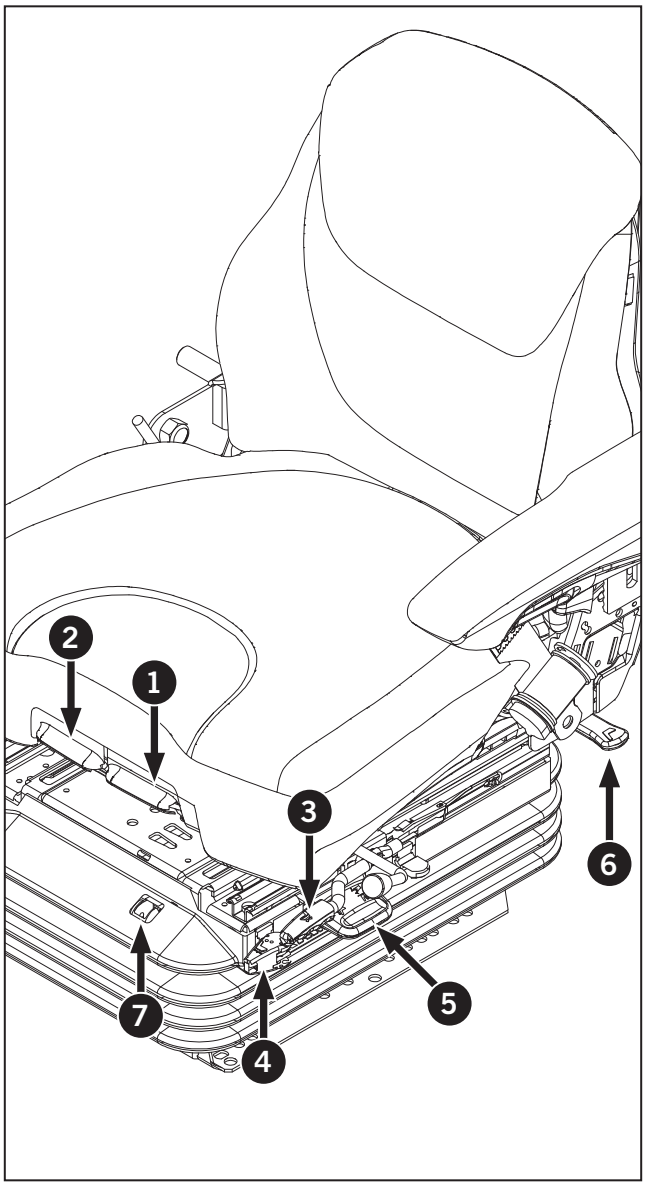

**View B:** Detail of seat belt

## Standard Seat

**NOTICE**

Make all adjustments in order. Turn the ignition key to the ACC position. Do not start the engine.

The standard seat is equipped with the following power and manual controls. Adjust the seat using the following procedures:




1 

**Height Adjustment**

Raise or lower the seat. Release when desired height is achieved.

2 

**Seat Depth Adjustment**

Pull the right handle upwards and move the seat backwards or forwards.

3 

**Fore/Aft Position Adjustment**

Lift handle to release and move the seat forward or backward. Let go to lock in position.

4 

**Fore/Aft Isolation Locking Lever**

Lift the lever to float through the 51 mm (2 in) fore and aft positions. Push down to lock in position.

5 

**Weight Handle Adjustment**

Pull or push the lever until the green marking is visible in the weight and height indicator.

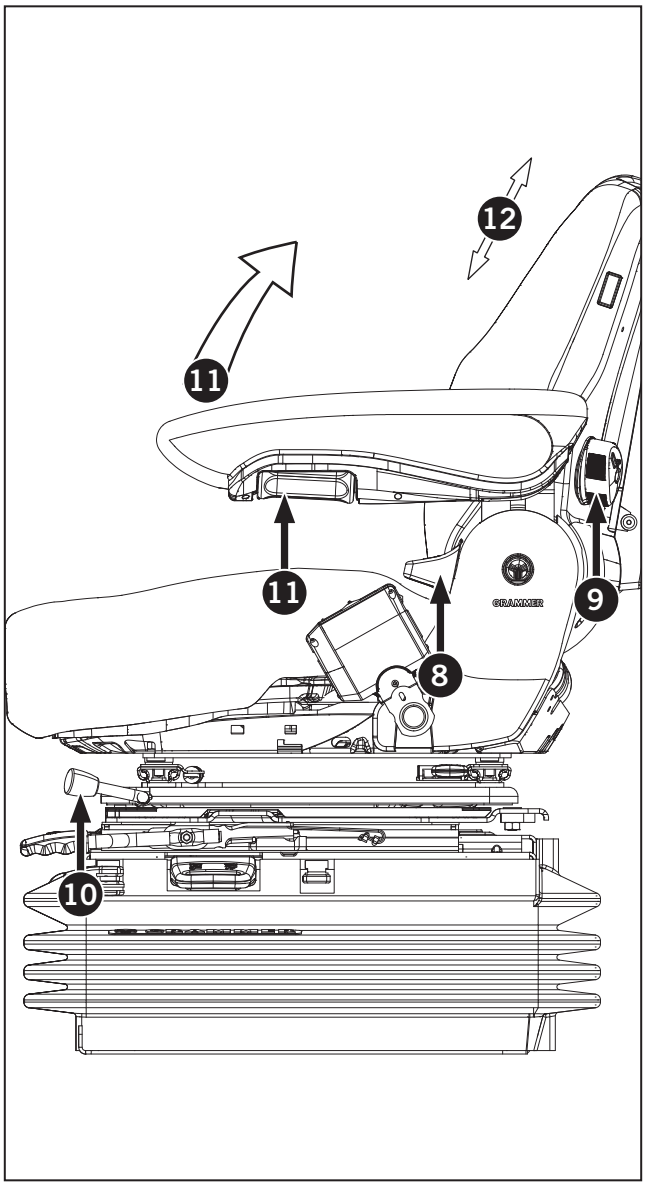
6 

**Locking Lever for Lateral Horizontal Isolation**

Lift the lever to float through the 51 mm (2 in) fore and aft positions. Push down to lock in position.

7 **Weight and Height Indicator**

Indicates the weight and height of the operator seat.




**8** 

Lift the lever and tilt the backrest to the desired position. Release to lock in position.

**9** 

**Lumbar Adjustment**

Rotate the wheel clockwise to increase lumbar support and counterclockwise to decrease lumbar support.

**10** **Swivel Adjustment**

Pull up on the lever to adjust. Push down to lock in 1 of 4 positions.

To adjust seat swivel:

1. Move the swivel lever to the rear.
2. Swing the seat into the desired position.
3. Release the lever to lock the seat into position.
4. Moving the swivel lever fully rearward will allow the seat to swivel freely.

**11** **Armrest Angle Adjustment**

Rotate the roller on each armrest to adjust to the desired angle. Armrests can also be raised up to the full vertical position for easy access.

**12** **Headrest Adjustment**

Pull the headrest upward using the handle incorporated in the back of the headrest.

## Deluxe Seat

**WARNING**

This seat is equipped with a seat heater and ventilation system. There is a possibility that some people may suffer heat-induced burns or excessive cooling when using the system. Do not use either of these systems if you have a diminished ability to sense temperature, a reduced ability to feel pain or have sensitive skin.

When using the seat heater or ventilation system, do not place anything on the seat that insulates against heat or cooling, such as a blanket, cushion or similar item. This may cause the seat heater or ventilation system to overheat which may cause a heat-induced burn or may damage the seat.

**NOTICE**

Make all adjustments in order. Turn the ignition key to the ACC position. Do not start the engine.

The deluxe seat is equipped with the following power and manual controls. Adjust the seat using the following procedures:

1. **Height/Weight Adjustment**

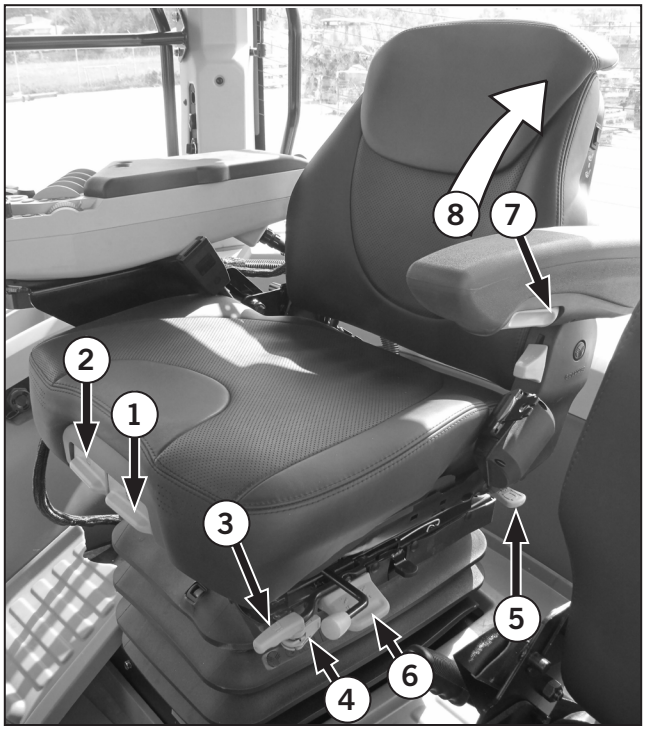
   Raise or lower the seat. Release when desired height is achieved.

2. **Seat Depth Adjustment**

   Pull the right handle upwards and move the seat backwards or forwards.

3. **Fore/Aft Position Adjustment**

   Lift handle to release and move the seat forward or backward. Let go to lock in position.




4. **Fore/Aft Isolation Locking Lever**

   Lift the lever to float through the 51 mm (2 in) fore and aft positions. Push down to lock in position.

5. **Locking Lever for Lateral Horizontal Isolation**

   Lift the lever to float through the 51 mm (2 in) fore and aft positions. Push down to lock in position.

6. **Weight Handle Adjustment**

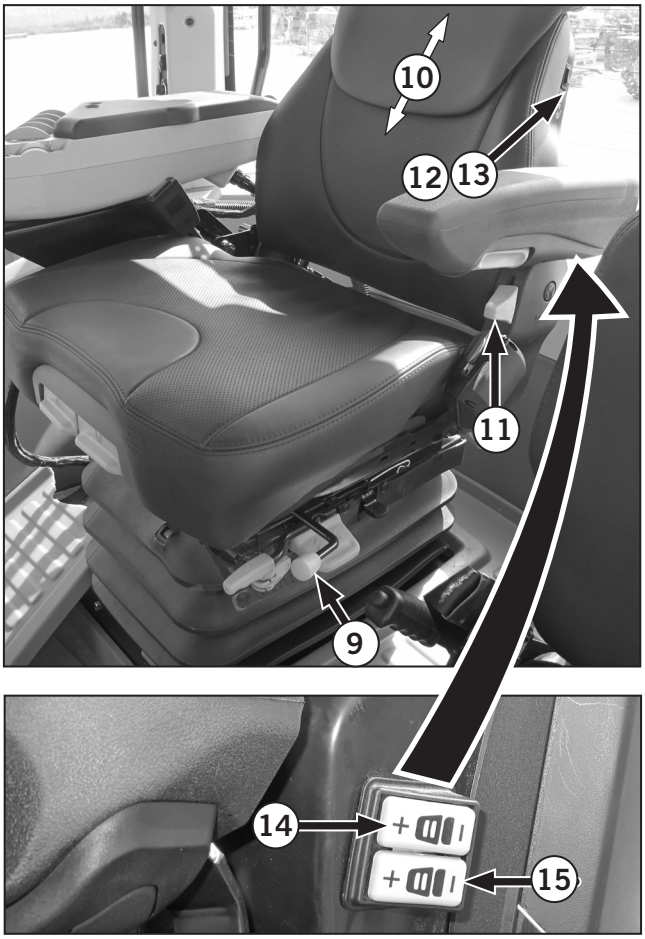
   Pull or push the lever until the green marking is visible in the weight and height indicator.

7. **Armrest Angle Adjustment**

   Rotate the roller on each armrest to adjust to the desired angle.

8. **Armrest Vertical/Horizontal Position**

   Armrests can also be raised up to the full vertical position for easy access.




**9** **Swivel Adjustment**

Pull up on the lever to adjust. Release to lock in 1 of 4 positions.

To adjust seat swivel:

1. Move the swivel lever to the rear.
2. Swing the seat into the desired position.
3. Release the lever to lock the seat into position.
4. Moving the swivel lever fully rearward will allow the seat to swivel freely.

**10** **Headrest Adjustment**

Pull the headrest upward using the handle incorporated in the back of the headrest.

**11** **Backrest Adjustment**

Lift the lever and tilt the backrest to the desired position. Release to lock in position.

**12** **13** **Seat Fan or Heated Seat Cushion (leather type seat only)**

Press this switch to select either the built-in fans (12) or the heated seat cushion (13). Only 1 of these options can be turned on at a time.

The deluxe fabric seat is equipped with only heated seat cushion.

**14** **Lumbar Adjustment**

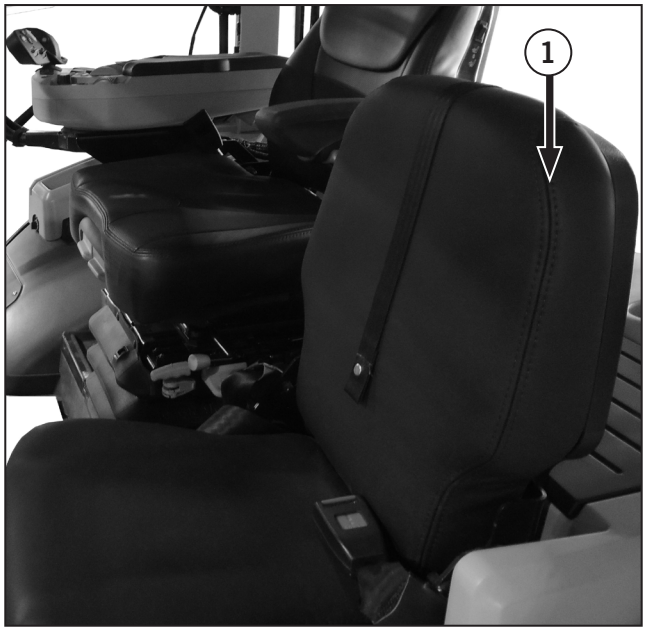
**15** Press the (+) switch (14) to increase lumbar support and (-) switch (15) to decrease lumbar support.

The deluxe fabric seat is equipped with mechanical lumbar adjustment same as standard seat.

## Instructional Seat

**WARNING**

- Do not permit children to ride in or on the tractor.
- The instructional seat is for training purposes only.
- Passengers must sit in the instructional seat (if equipped) with the seat belt fastened at all times. Do not allow passengers if the tractor is not equipped with an instructional seat.




An instructional seat (1), with seat belt, is available for the purpose of training new operators on the tractor. When not in use, this instructional seat will fold away for convenience.

The seat will fold up and can be held in place with a strap to secure the seat cushion. Alternately, the back of the instructional seat can be folded down. This configuration allows a laptop computer to be placed on the back rest in the lowered position.

# Electronic Instrument Cluster (EIC) and Display Monitor

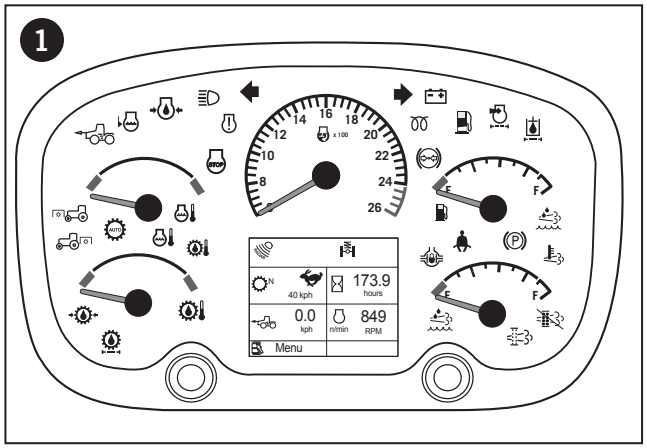
## Introduction: Uses, Similarities, Differences

Use the electronic Instrument cluster (1) (EIC) to do the following:

- Control and monitor the aftertreatment system.
- Check if equipment is engaged (differential locks, PTO, transmission auto shift).
- Configure equipment such as dpf, pto, override, reverse and tire size)
- Calibrate equipment software as radar, steering angle sensor, front suspension, cab suspension, etc.

Use the display monitor (2) to do the following:

- Configure the hydraulic system (setting flow rate limits and hydraulic operation mode of the implement valve).
- Configure equipment such as the 3-pt hitch, Power Take-Off (PTO), differential locks.
- Operate the tractor performance monitoring (TPM) system.
- Check monitor parameters such as engine temp, wheel speed, engine hours, etc).
- Use the headland management system (HMS).
- Check all warning lamps such as critical engine lamps and presence of active fault codes.




## EIC — Functional Area Identifcation

"Table 2-9: Functional Parts of the Electronic Instrument Cluster (EIC)", identifies the functional areas of the EIC. See the following pages for signal light identification and LCD display usage instructions.

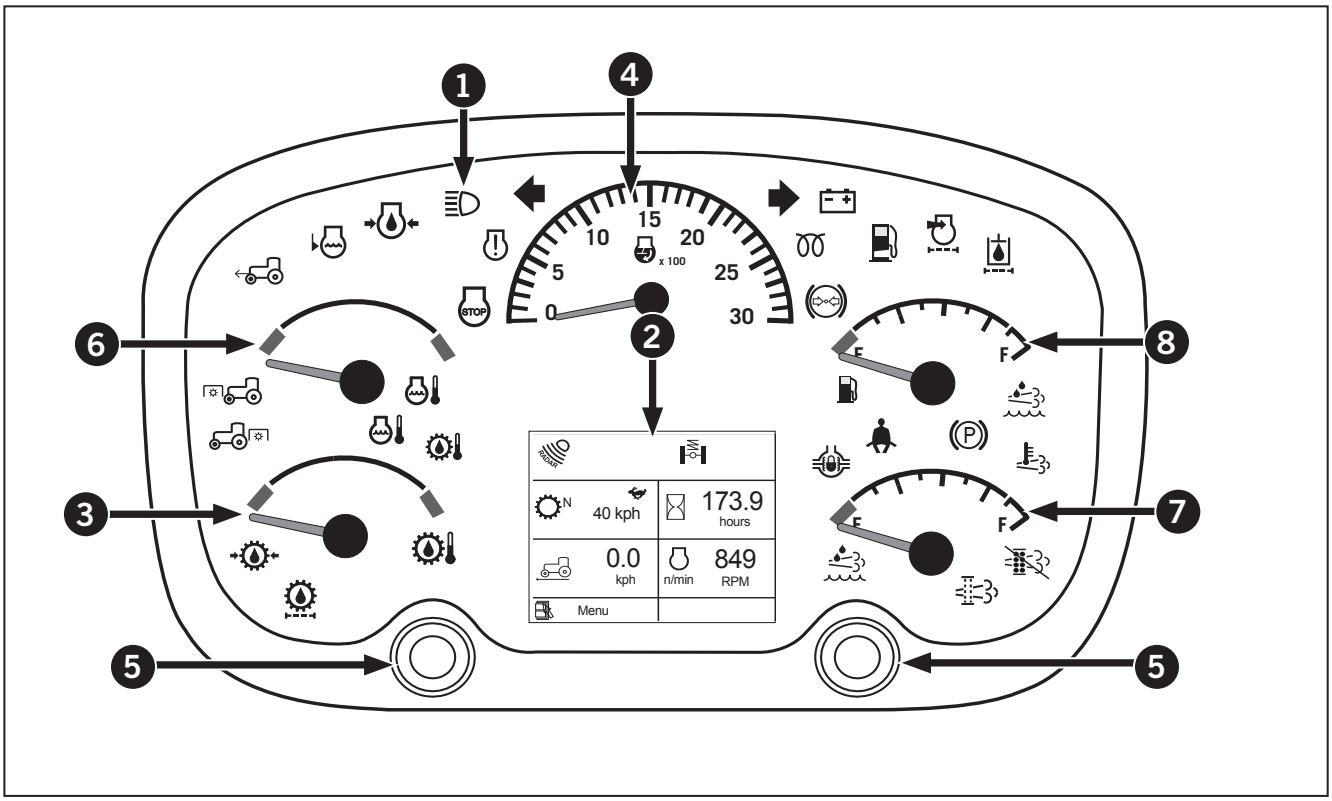
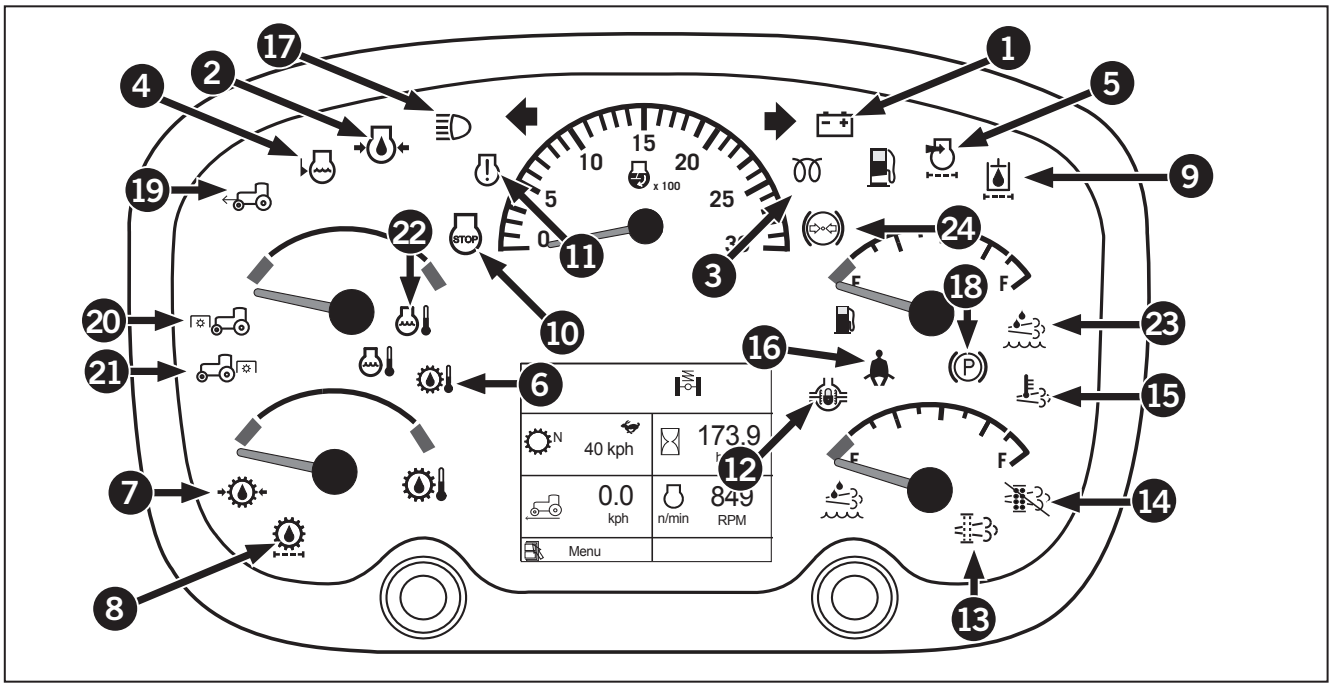



**Table 2-9: Functional Parts of the Electronic Instrument Cluster (EIC)**

| Ref | Description | Instructions |
|---|---|---|
| 1 | • Warning light display area<br>• Some special equipment signal lights | All signal lights identified in "Table 2-10: EIC Signal Lights (A = Aftertreatment Warning, E = Equipment Status, S = Service Required)" on page 2-23.<br><br>LCD display usage instructions detailed in Table 2-11. |
| 2 | • LCD display for tractor information screens | |
| 3 | • Transmission temperature | |
| 4 | • Tachometer/Engine RPM | |
| 5 | Buttons to use the LCD display / tractor information screens | |
| 6 | Engine temperature gauge | **Blue** = Cold, **Red** = Hot |
| 7 | Diesel Exhaust Fluid (DEF) gauge level | If the DEF level is low an amber solid light will appear. |
| 8 | Fuel guage | **E** = Empty, **F** = Full |




## EIC — Signal Light Identification

Table 2-10 identifies the all signal lights that may appear on the EIC.

- If you see a "Service Required" indicator lamp (Type "S"), contact KUBOTA dealer if you do not find a solution in either the lubrication and maintenance section (Section 5) or in the troubleshooting section (Section 6) in this manual.

**NOTICE**

Only authorized Cummins dealers and service providers are permitted to perform repairs on engines. Customers/Operators are advised to contact a KUBOTA dealer for assistance in locating a Cummins dealer.

**Table 2-10: EIC Signal Lights (A = Aftertreatment Warning, E = Equipment Status, S = Service Required)**

| Ref | Indicator | Type | Description | Recommended Action |
|---|---|---|---|---|
| 1 | ALTERNATOR | S | **Alternator Charge Indicator:** Illuminates steady and sounds an alarm if alternator is not charging battery. | Check electrical connections. Check alternator belt. |
| 2 | | S | **Engine Oil Pressure:** Illuminates when low engine oil pressure is detected. | Check engine oil level. |
| 3 | | E | **Inlet Heater/Ready to Start:** Illuminates when key is turned to the run position and is cold enough outside to activate grid heater. | See "Cold Weather Starting" on page 3-17. |
| 4 | | S | **Coolant Level Low:** Illuminates when coolant in reservoir is low. | Stop the tractor and refill the coolant reservoir. |

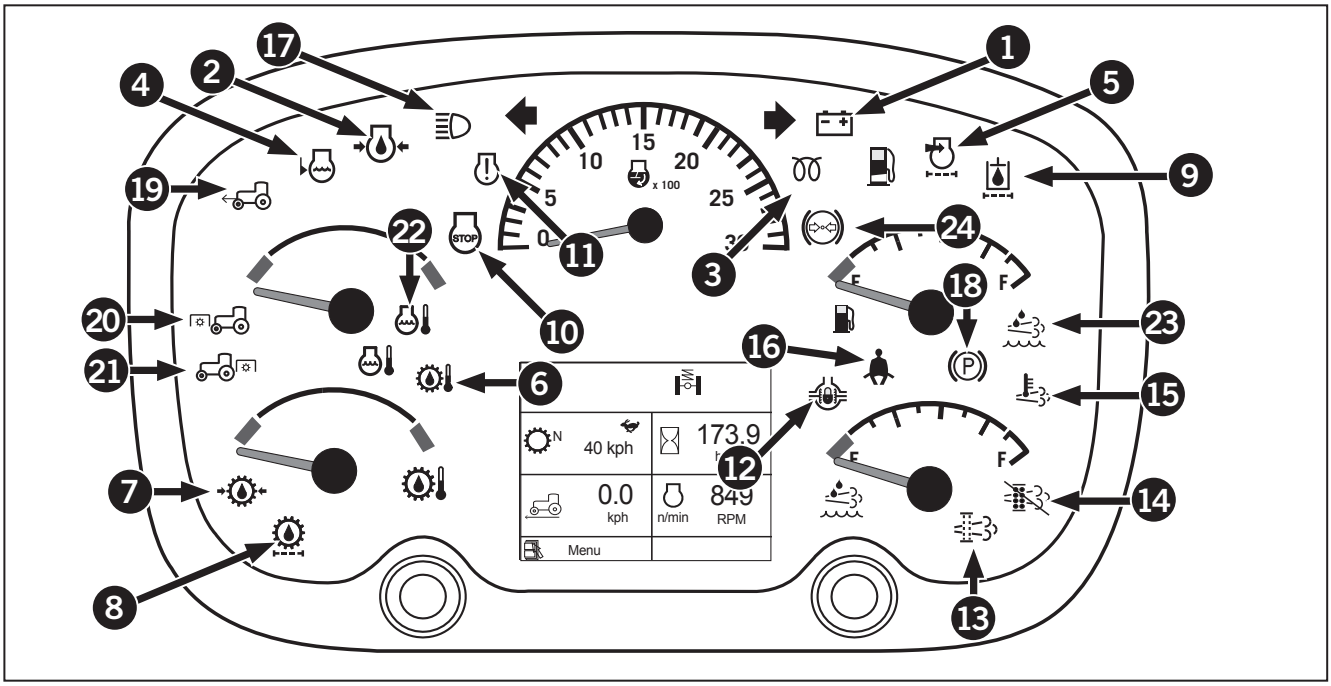



**Table 2-10: EIC Signal Lights (A = Aftertreatment Warning, E = Equipment Status, S = Service Required)**

| Ref | Indicator | Type | Description | Recommended Action |
|---|---|---|---|---|
| 5 |  | S | **Air Filter Restriction:** Illuminates if a fault has existed for 10 seconds. | Stop the tractor and service the air filter. |
| 6 |  | S | **Transmission Oil Temperature:** Flashes when high transmission oil temp detected (above 99 ºC (210 ºF). | Stop the tractor. Check the transmission oil level. Check the coolers for blockage. |
| 7 |  | S | **Transmission Oil Pressure:** Illuminates and sounds an alarm indicating low transmission oil pressure. | Stop the tractor. Check the transmission oil level. |
| 8 |  | S | **Transmission Oil Filter:** Illuminates indicating a filter bypass condition due to a blocked filter. | Service within 1 hour. |
| 9 |  | S | **Hydraulic Oil Filter:** Illuminates indicating a filter bypass condition and no longer filtering oil returning to the reservoir. | Service within 1 hour. |
| 10 |  | S | **Stop Engine:** Illuminates when a critical condition has been detected. | Stop the engine immediately.<br>***NOTE: The engine may shut down automatically.*** |
| 11 |  | S | **Engine Warning Light:** Yellow for non-critical and maintenance and red for critical faults. | Check service indicators and perform necessary maintenance. Consult a KUBOTA dealer. |

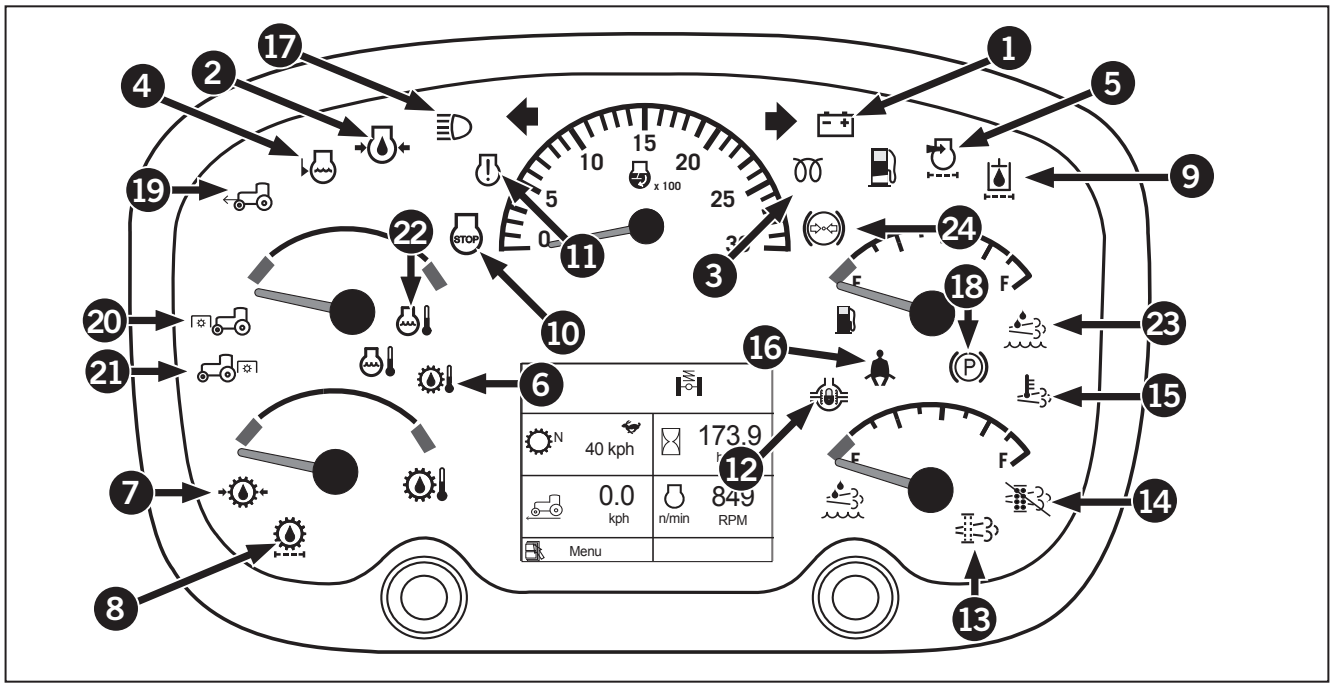
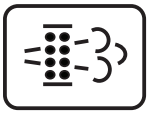
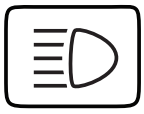



**Table 2-10: EIC Signal Lights (A = Aftertreatment Warning, E = Equipment Status, S = Service Required)**

| Ref | Indicator | Type | Description | Recommended Action |
|---|---|---|---|---|
| 12 |  | E | **Differential Locks (option):** Illuminates when the differential lock button is engaged on tractors equipped with differential locks. | See "Differential Lock" on page 3-50 for instructions. |
| 13 |  | A | **Diesel Particulate Filter (DPF) light:** DPF filter is filling — MAY BE FLASHING AND / OR USED WITH THE ENGINE STOP OR WARNING LIGHT. | See "Aftertreatment System Operation" on page 3-171. |
| 14 |  | A | **Regeneration inhibit light on:** Regeneration has been stopped. | See "Aftertreatment Indicator Lamp Identification: Exhaust System Cleaning Disable (Inhibit) Lamp" on page 3-190 for instructions on responding to the aftertreatment system. |
| 15 |  | A | **High exhaust temperature light on:** Higher than normal exhaust temperatures may exist due to DPF regeneration. | Stop tractor and service. |
| 16 |  | E | **Seat Belt:** Illuminates when the ignition switch is turned to the RUN position and stays illuminated for 5 seconds to remind the operator to fasten the seat belt. | Fasten your seat belt. |
| 17 |  | E | **High Beams:** Illuminates when tractor lights are switched to high beam. | See "Table 2-8: Multifunction Switch Operation" on page 2-12. |

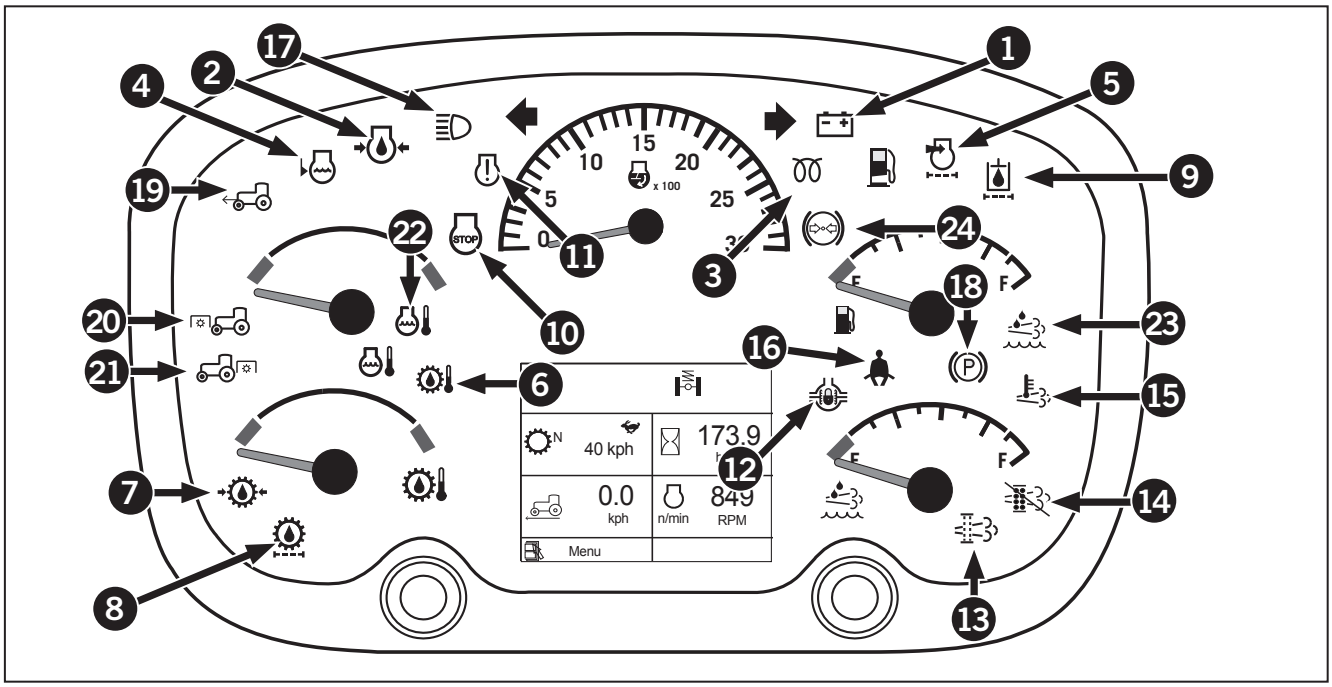



**Table 2-10: EIC Signal Lights (A = Aftertreatment Warning, E = Equipment Status, S = Service Required)**

| Ref | Indicator | Type | Description | Recommended Action |
|---|---|---|---|---|
| 18 |  | E | **Parking Brake:** Illuminates when the parking brake is applied.<br>**Absent Operator Warning:** If you leave the operator seat for more than 3 seconds while the engine is running, the parking brake lamp will flash and an audible alarm will sound. | For operation instructions, see "Parking Brake" on page 3-22 |
| 19 |  | E | **Front Wheel Assist:** When the service brake pedals are applied, the front wheel assist is automatically activated so that both front and rear wheels assist in braking. | For operation instructions, see "Service Brakes – Foot Brakes" on page 3-21. |
| 20 |  | E | **Front PTO:** Illuminates when front pto is enabled. | See "Power Take-off (PTO) (Front and Rear)" on page 3-156 |
| 21 |  | E | **Rear PTO:** Illuminates when rear pto is enabled. | See "Power Take-off (PTO) (Front and Rear)" on page 3-156. |
| 22 |  | E | **Engine Coolant Temperature:** Illuminates when engine coolant temperature has risen above acceptable limits. | Check coolant level<br>Check cooler for obstructions |

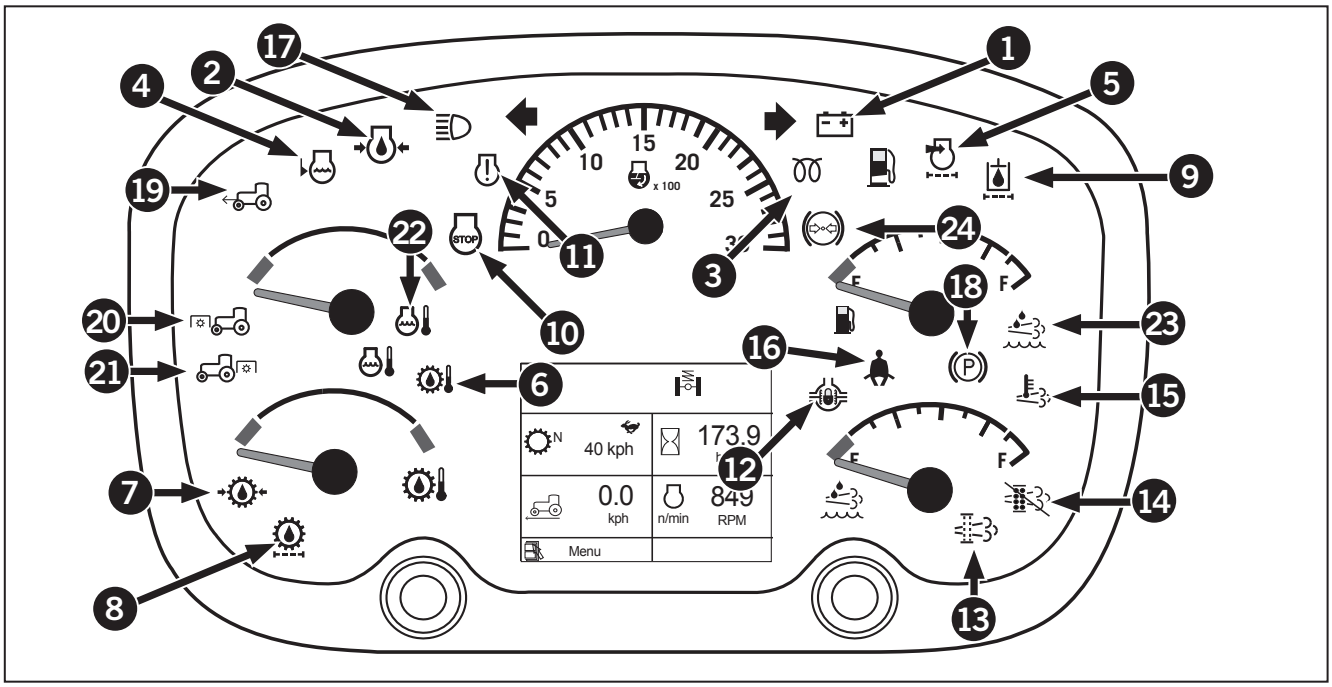



**Table 2-10: EIC Signal Lights (A = Aftertreatment Warning, E = Equipment Status, S = Service Required)**

| Ref | Indicator | Type | Description | Recommended Action |
|---|---|---|---|---|
| 23 |  | A | **Diesel Exhaust Fluid (DEF)**: DEF level is low. | See "Diesel Particulate Filter Regeneration" on page 3-181. |
| 24 |  | A | **Brake Pressure is Normal:** This icon will appear if the brake pressure is normal. | No action is required from the operator. |

## Navigating the EIC Tractor Information Screens

Table 2-11 explains how to use the buttons on the dash to cycle through the tractor information screens (1). The next page lists all the screens available and where their instructions are in this manual.

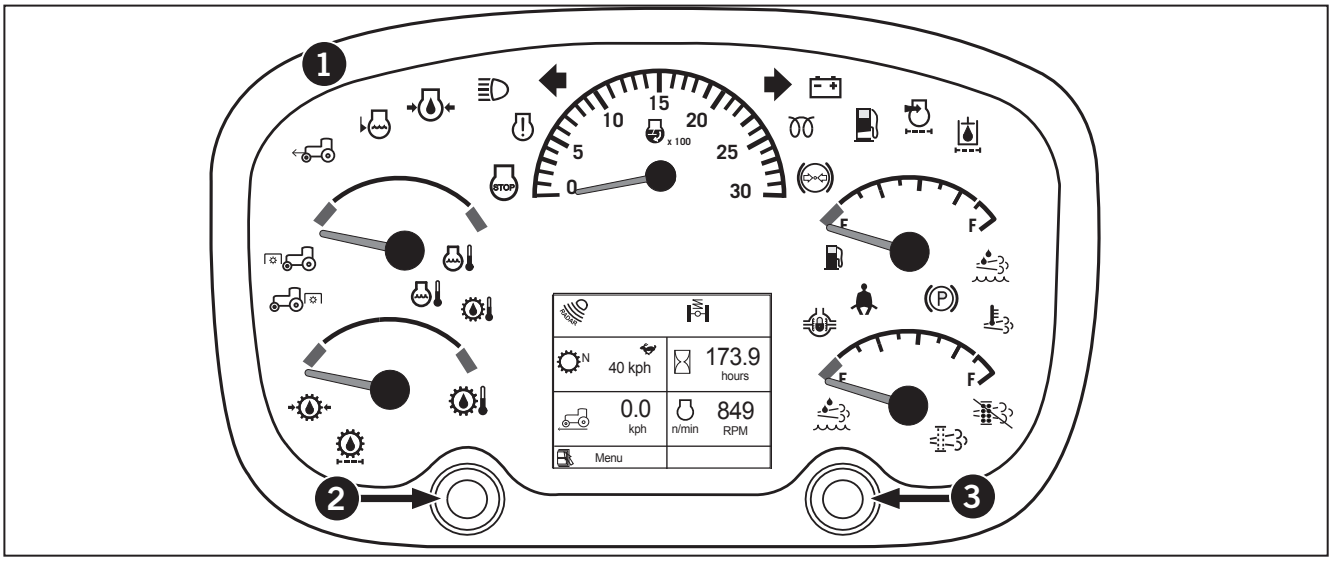
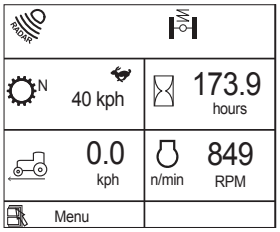
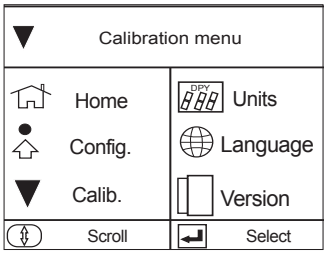
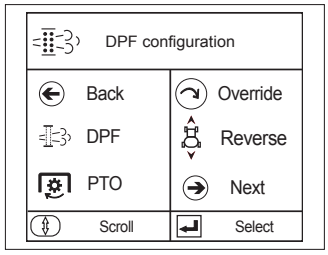
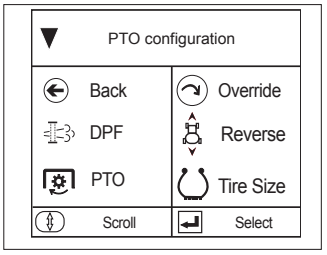
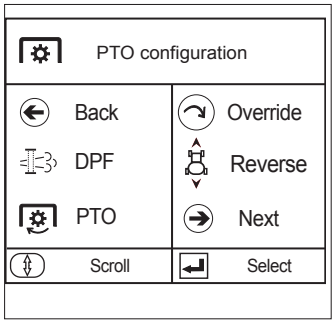
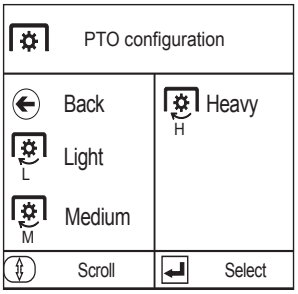



**Table 2-11: Controls for Navigating Tractor Information Screens**

| Screen Type | Press | Resulting Screen Type | Notes |
|---|---|---|---|
| **Main Menu Screen** | | **Next Top Level Screen** | |
|  | 2 |  | Press to access the menu screen. After menu appears, use (2) to scroll through the menus. |
| **Top Level Screen with Submenu** | | **Next Submenu** | |
|  | 3 |  | Press (3) to select a screen such as Configuration, Calibration, Units, etc. |
| **Top Level Screen with a Subscreen** | | **Subscreen** | |
|  | 2<br>3 |  | Some top level screens such as Config has subscreens within subscreens. Use the scroll button (2) and select button (3) to access these screens. |

## EIC: Summary of All LCD Screens

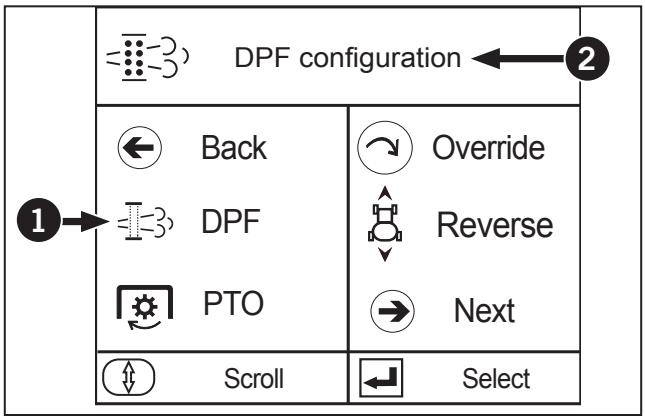
The tractor information screens are described in order of appearance starting from the default screen.

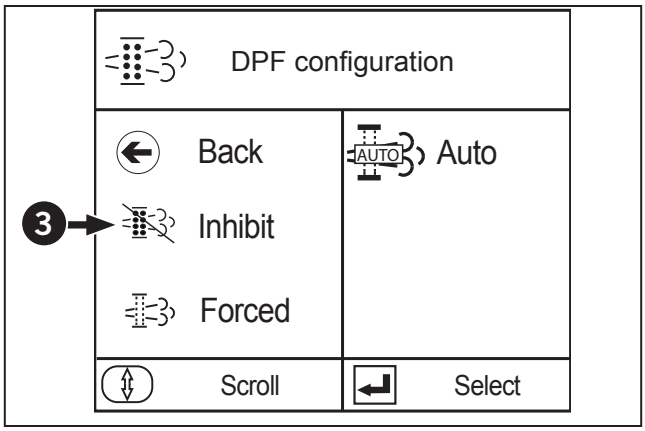
1. **Config** – Shows configurations that are present in the tractor. Configuration screens are organized into subscreens as follows:
   - **DPF:** Configure Diesel Particulate Filter.
   - **PTO:** Configure Power Take-Off.
   - **Override:** Tractor shutdown.
   - **Reverse:** Configure reverse characteristics.
   - **Tire Size:** Configure the tractor's tire size .
2. **Calibration** – Calibration settings are organized as follows:
   - **Wheel Angle Calibration (requires steering angle sensor):** Calibrate the steering sensor option (if equipped). The steering sensor automatically disengages differential locks and front wheel assist (FWA) when the tractor turns.
   - **Tire Size Calibration:** Calculates the tire size.. This value is used to calculate ground speed.
   - **Zero Slip Calculation (requires ground speed sensor):** Use this screen to derive tire size using the ground speed sensor (radar). Wheel slip % is calculated from the difference between the ground speed calculated by the radar and the ground speed calculated by the tire size.
   - **Suspended Axle Calibration:** If the tractor is equipped with a suspended axle, re-calibrate the axle after updating software.
   - **Suspended Cab Calibration:** If the tractor is equipped with a suspended cab, re-calibrate the cab after updating software.
3. **Unit of Measure:** Change unit of measure to metric or imperial.
4. **Language**: Shows different types of language that can be set to.
5. **Version:** Check the software installed on the tractor for EIC and VCU.

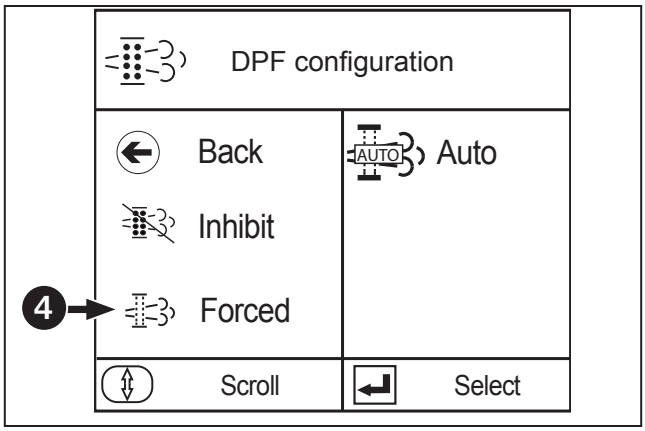
## DPF Modes of Configurations

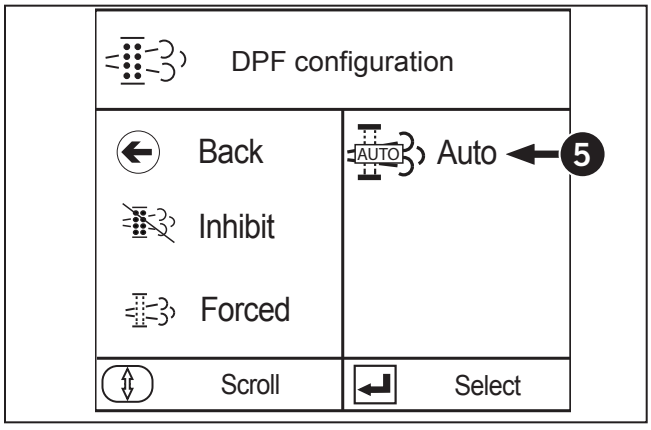
The 3 following DPF mode of configurations (1) located in the EIC screen (2) allows the operator to set the regeneration mode of the DPF to either:

- Inhibit (3)
- Forced (4)
- Automatic (5)



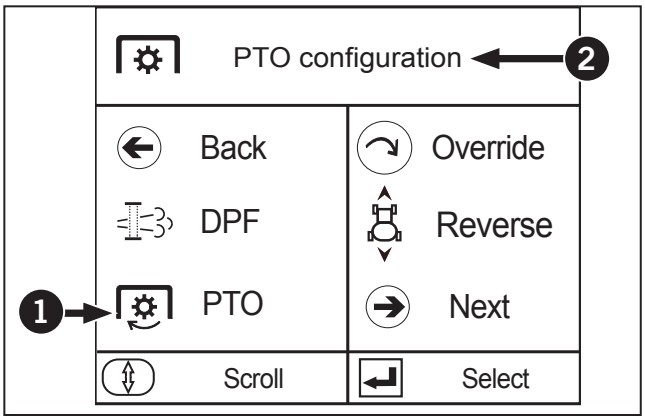



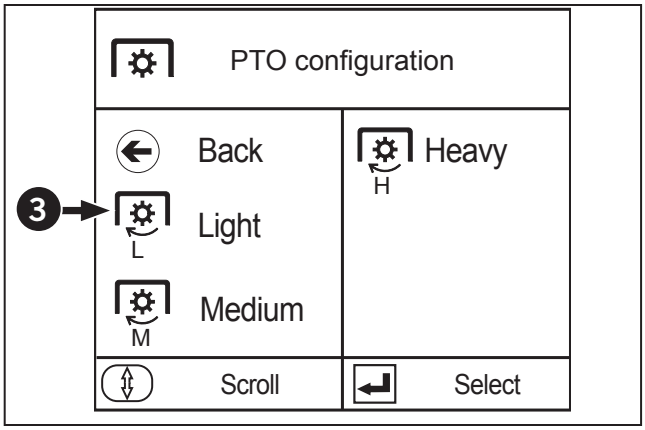



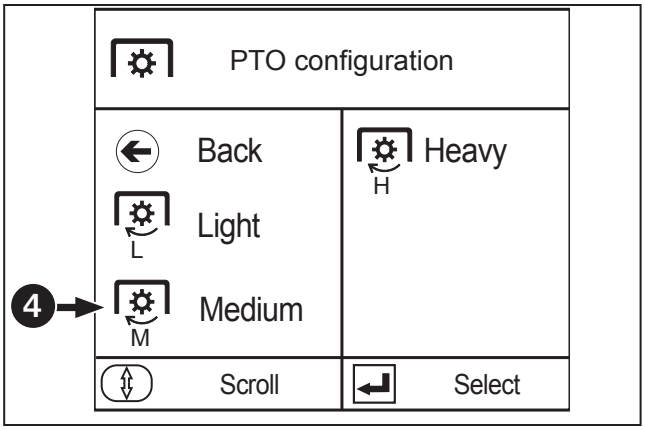
## PTO Modes of Configurations

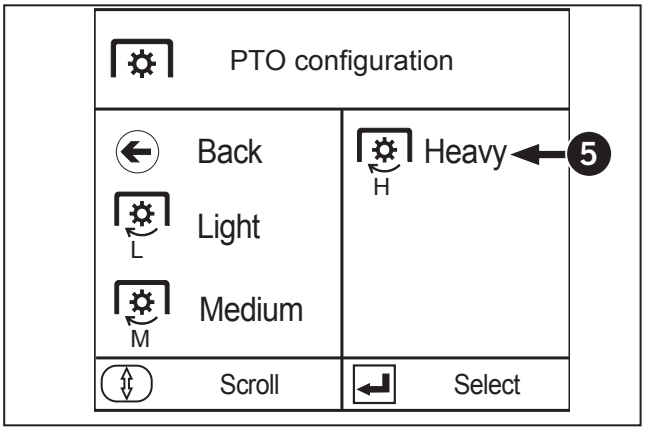
The 3 following PTO configurations (1) located in the EIC screen (2) allows the operator changes to the engagement characteristics of the PTO based on the size of implement load and type of soil.

- Light (3)
- Medium (4)
- Heavy (5)



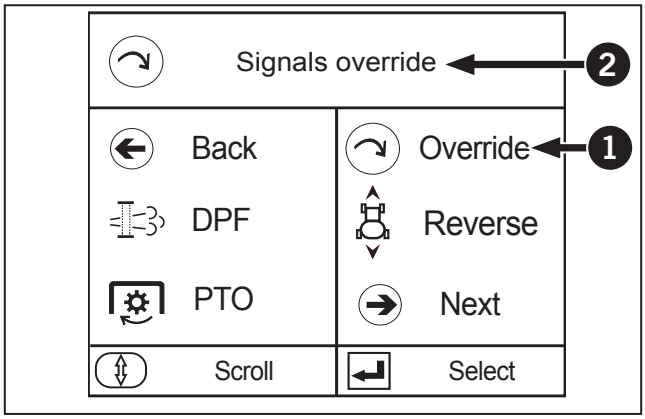



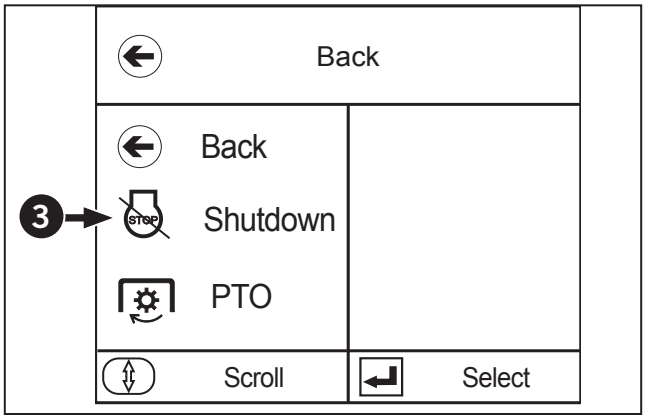



## Override Configuration

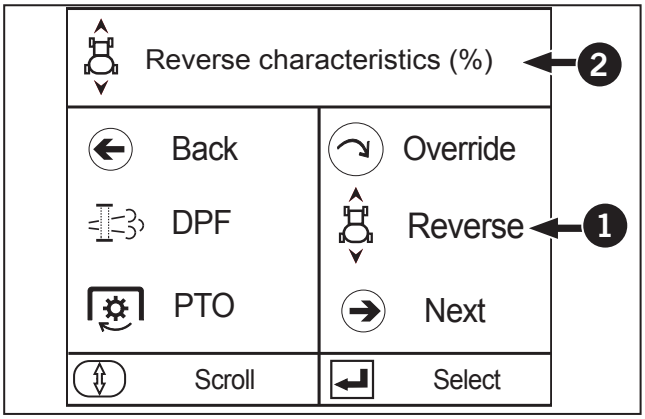
The override function (1) located in the EIC screen (2) prevents engine shut down (3) for 30 seconds. Typically, the engine will shut down for 30 seconds after the red stop engine lamp has illuminated. The override switch can be pressed any time during this 30 second duration to prevent the engine from shutting down for another 30 seconds in order to move the vehicle to a desirable location. This feature should be only used in an emergency situation.

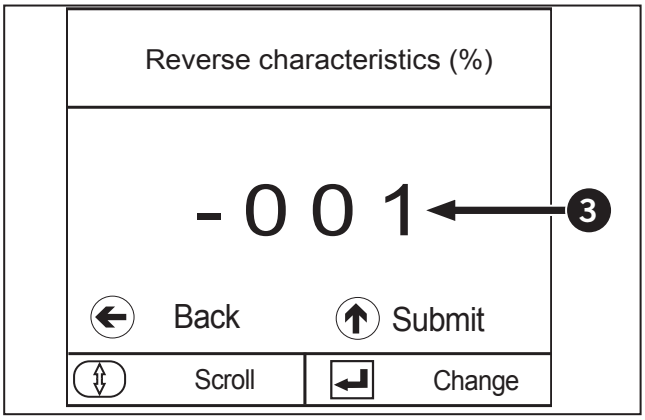


## Reverse Configuration

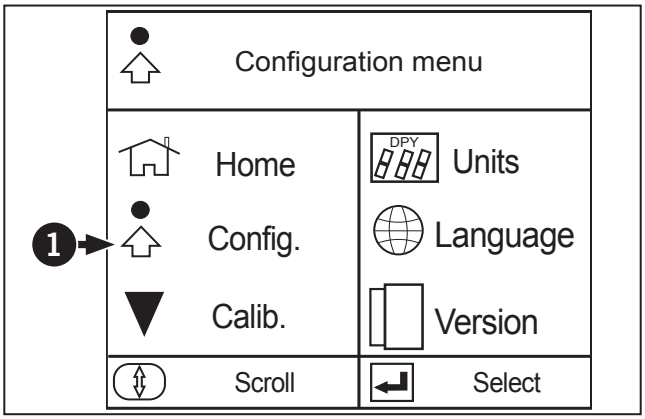
The reverse function (1) located in the EIC screen (2) allows the operator to customize the behavior of reverse gear engagement during shuttle shifting. The settings ranges from aggressive to quick engagement behavior to a longer duration very smooth engagement.

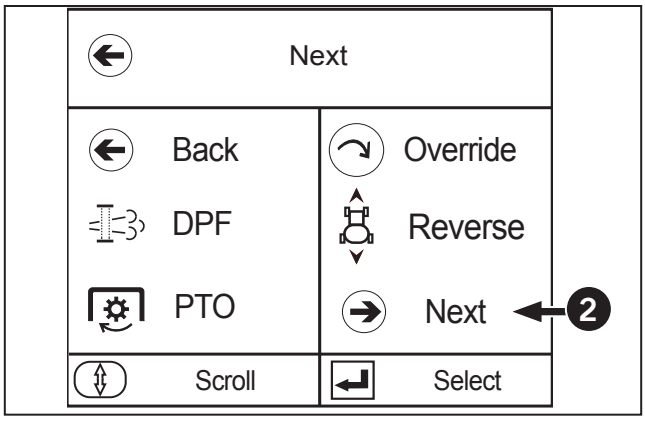


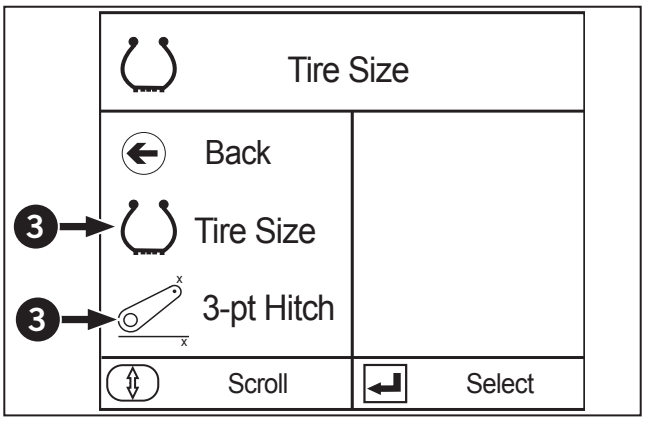



## Next Button

Select Config (1) on the EIC screen to locate the Next Button (2). This consists of the Tire Size and 3PT Hitch functions (3).

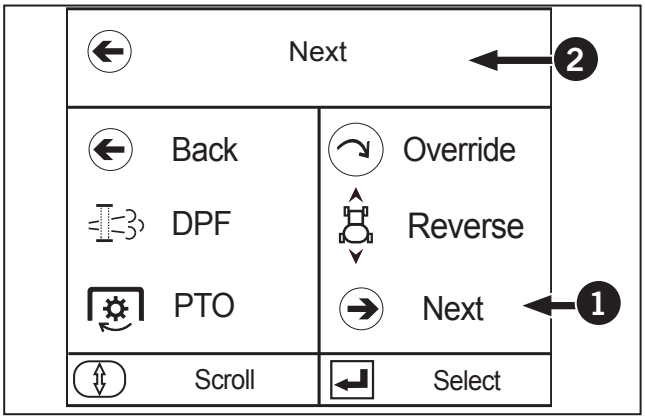


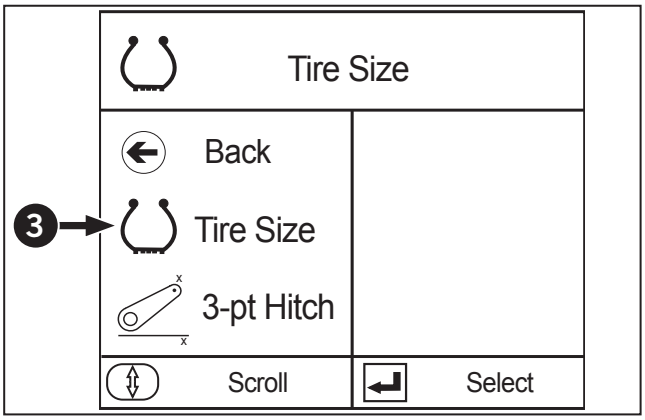



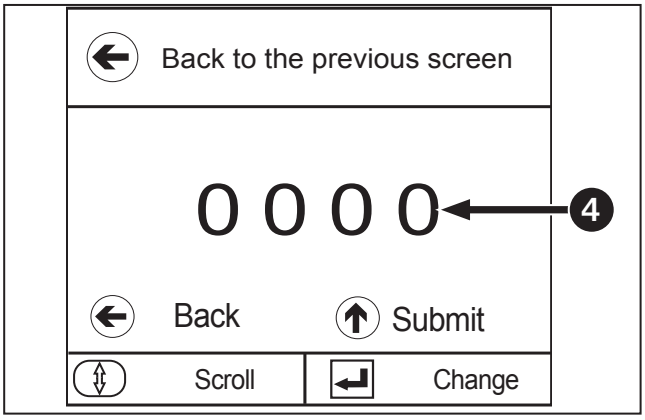



## Tire Size Configuration

Select the Next (1) function on the EIC screen (2) for the tire size function (3). This allows the operator to manually enter SRI (speed radius index) (4) of the rear tires into VCU (vehicle control unit) and is used to calculate ground speed. The default or previous value will remain in the VCU if the value entered is out of range.

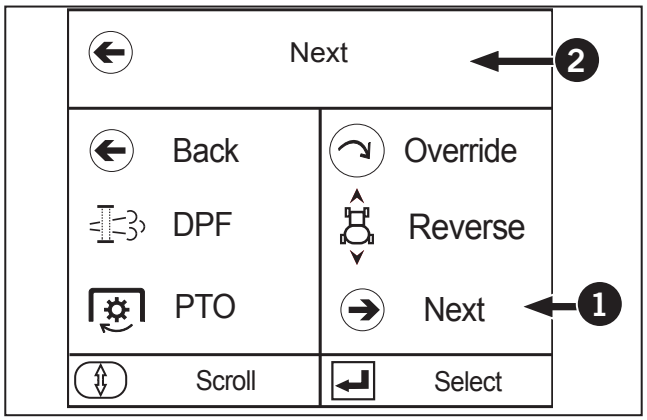


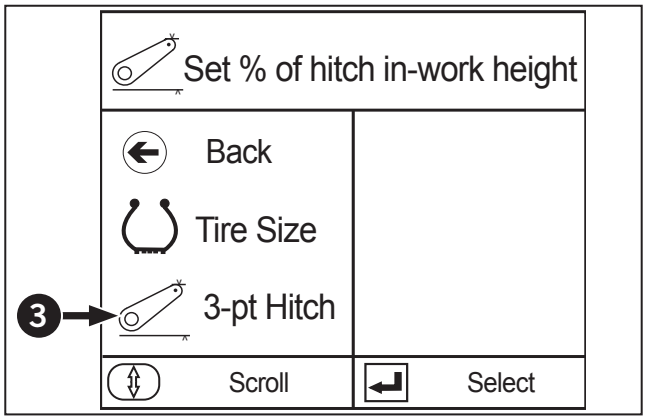



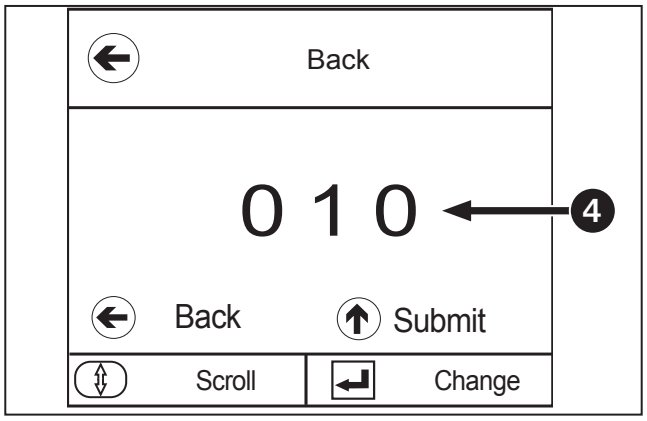



## 3PT Hitch Configuration

Select the Next (1) function on the EIC screen (2) for the 3PT Hitch function (3). This allows the operator to manually enter the hitch in-work height (4).



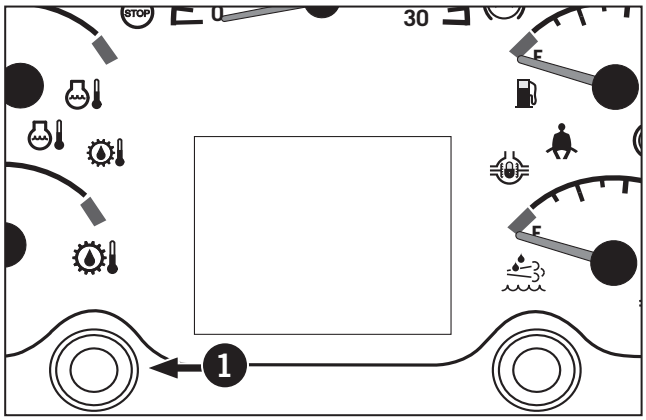
## Steering Angle Calibration

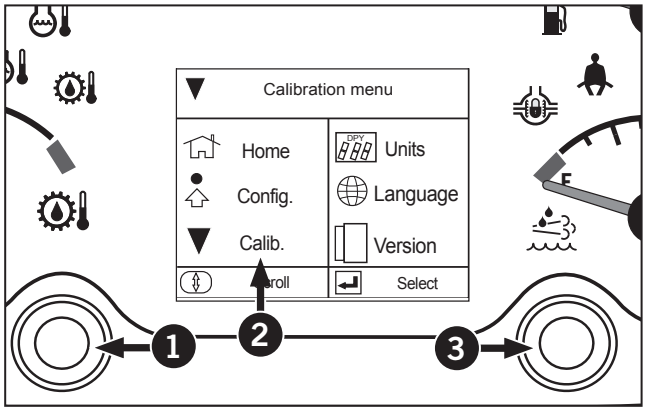
***NOTE: If the steering angle sensor is replaced, a calibration must be performed.***

To perform a STEERING ANGLE Calibration, perform the following instructions:

Park the tractor on a level area, shut the engine off and apply the parking brake.

1. Start the engine.
2. Press the left button (1) once on the EIC to access the main menu.

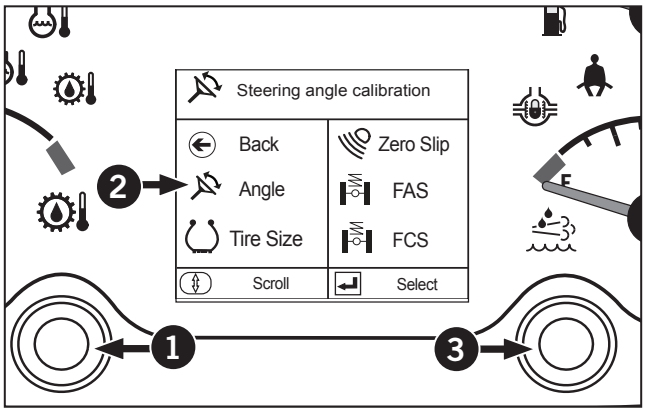



3. Press the left button to scroll down till the “CALIB” (2) is highlighted
4. Press the right button (3) to select the sub-menu.

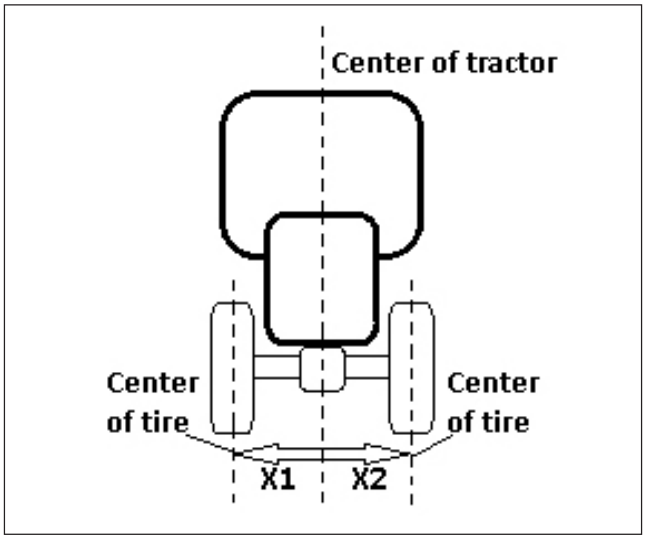
***NOTE: If VCU software or angle sensor is replaced. Perform a calibration.***

5. Press the left button (1) to scroll down till ANGLE Calibration (2) is highlighted.
6. Press the right button to select the STEERING Calibration sub-menu (3).

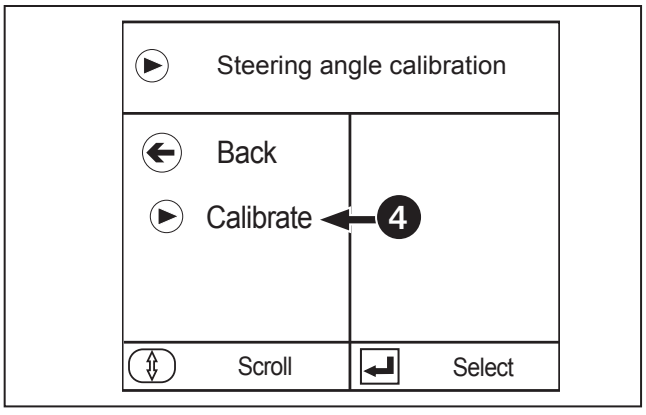



7. Turn the steering wheel till the front wheels are straight and parallel with the centerline of the tractor. Drive in a straight line to ensure the wheels are straight before continuing.

***NOTE: A tape measure can be used to measure from the center of the tractor to the center of each tire to ensure the wheels are straight. Make sure X1 and X2 are around the same measurement within a ¼".***



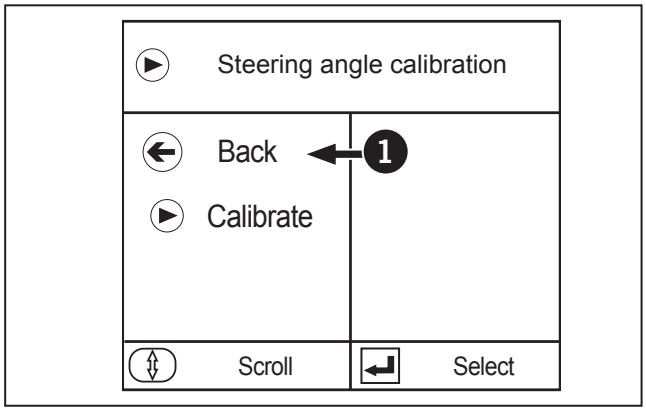

8. Press the left button to scroll down till CALIBRATE (4) is highlighted
9. Press the right button to calibration.
10. Once the right button has been pressed the controller will store the sensors valve for center and the calibration is complete.

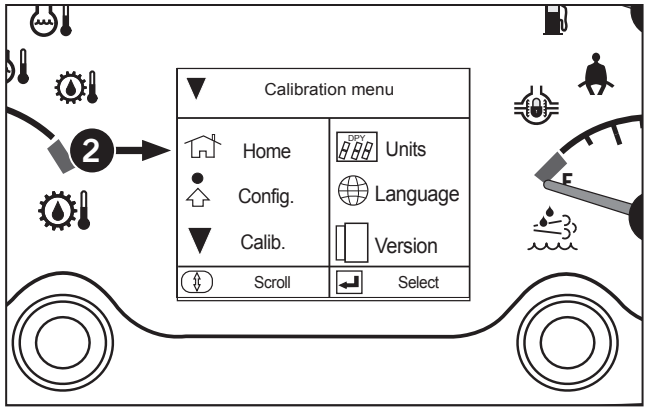


11. Press the left button to scroll till BACK (1) is highlighted.
12. Press the right button to exit the calibration and go back to the calibrations menu. Using the left button scroll till BACK is highlighted again; press the right button to get back to the main menu.
13. Press the left button to scroll till HOME (2) is highlighted.
14. Press the right button to exit the main menu and back to the main screen.

***NOTE: There is no indicator to tell you that the calibration has been completed or was successful. To see if the calibration worked engage the auto FWA and diff lock. Turn the steering wheel all the way to the left and see if diff lock and FWA turn off. If they do the steering angle sensor is working. If they do not turn off then there maybe something wrong with the sensor.***

***NOTE: Key cycle should be done to properly store calibration.***



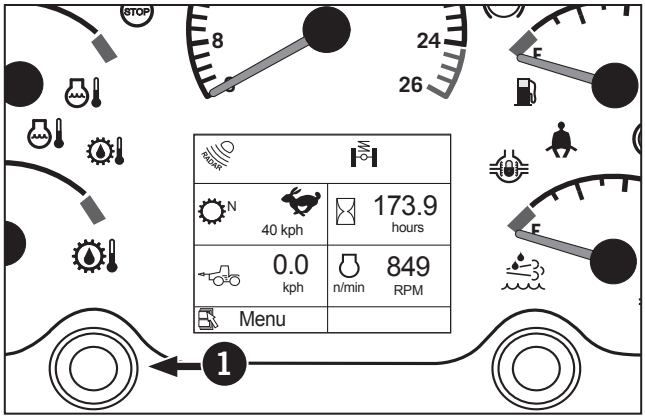



## Tire Size Calibration

To perform a TIRE SIZE Calibration, perform the following instructions:

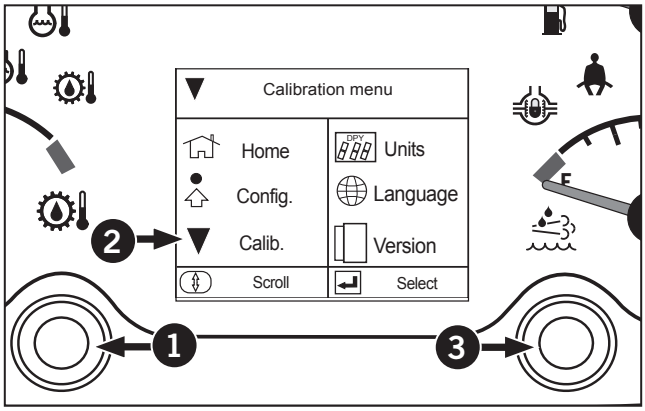
Park the tractor on a level area, shut the engine off and apply the parking brake.

1. On a smooth, hard surface, mark off a 100 m (328 ft) distance in a straight line. Make sure the start and finish lines are clearly marked.
2. Start the engine.
3. Press the left button (1) once on the EIC to access the main menu.

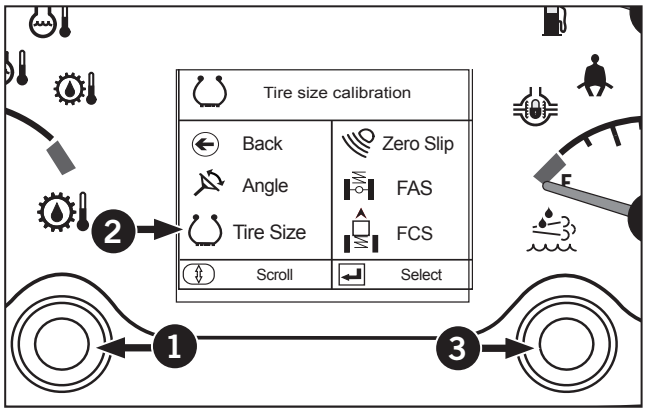



4. Press the left button to scroll down till the CALIB (2) is highlighted
5. Press the right button (3) to select the sub-menu.

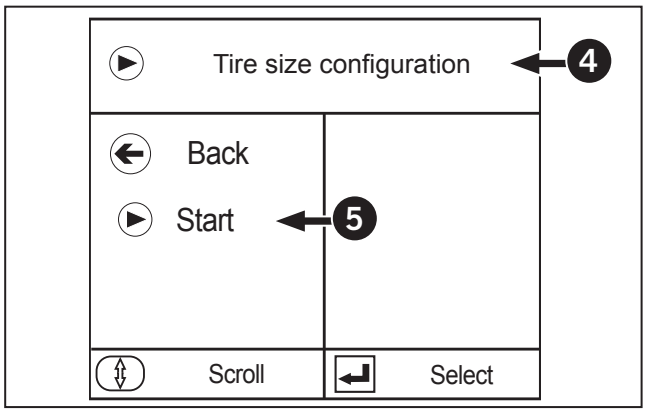
***NOTE: If VCU software is changed. Perform a calibration.***



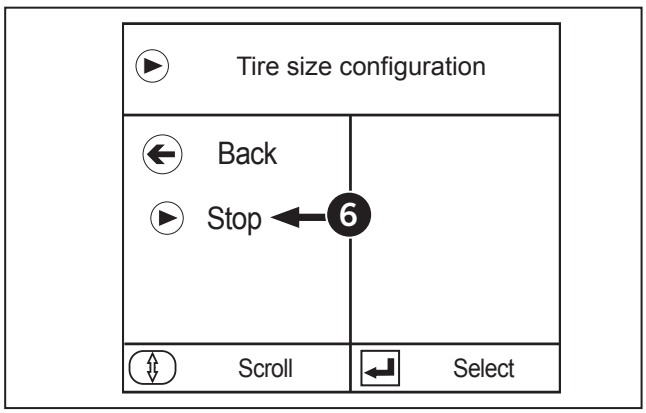
6. Press the left button (1) to scroll down till TIRE SIZE Calibration (2) is highlighted.




7. Press the right button (3) to select the TIRE SIZE Calibration sub-menu (4).
8. Select a low gear and range and drive the tractor forward.
9. Press the left button to highlight START (5).
10. As the tractor crosses the start line, press the right button to start the calibration.




11. Press the left button on the EIC to highlight STOP (6).
12. As the tractor crosses the finish line, press the right button on the EIC to end the calibration.
13. Once the tire size calibration is complete, key off and wait till the vehicle controller is off. This will let the calibrated tire size to be stored in the vehicle controller.

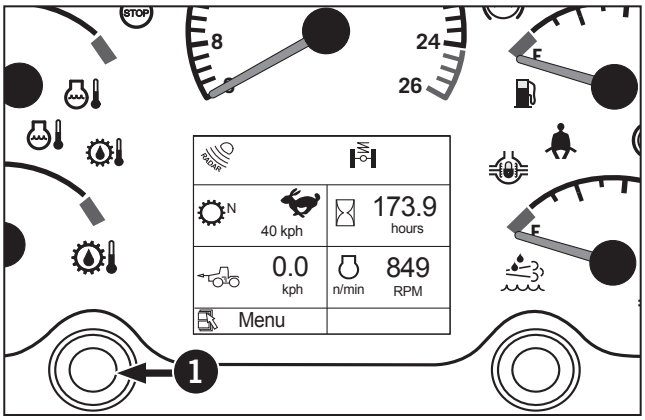


## Zero Slip Calibration

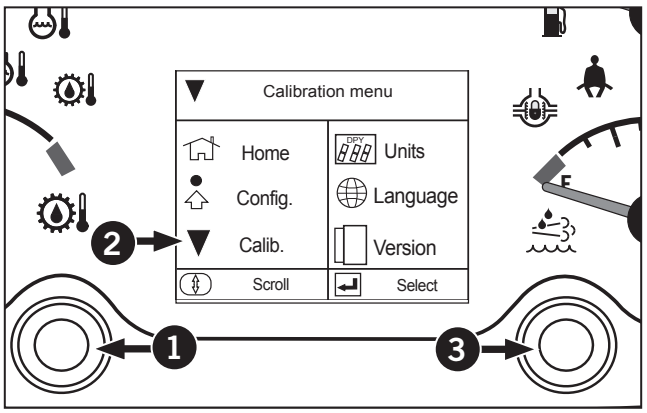
To perform a ZERO SLIP Calibration, perform the following instructions:

Park the tractor on a level area, shut the engine off and apply the parking brake.

1. Start the engine.
2. Press the left button (1) once on the EIC to access the main menu.

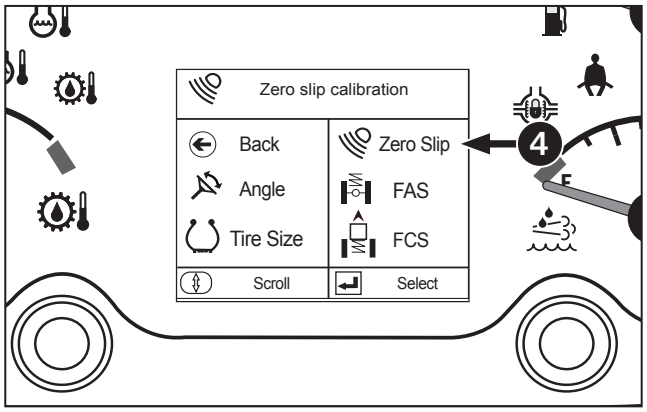



3. Press the left button to scroll down till the CALIB (2) is highlighted
4. Press the right button (3) to select the sub-menu

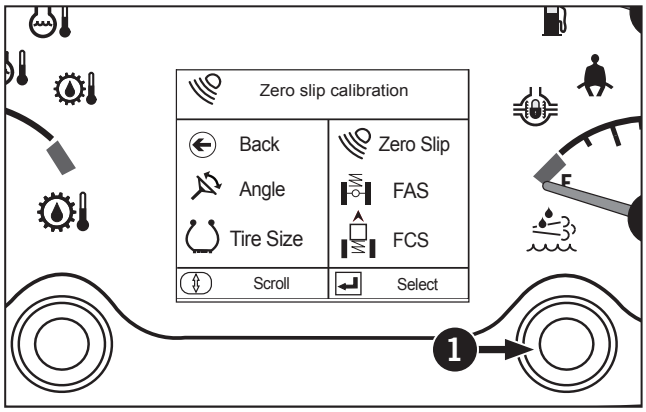



5. Press the left button to scroll down till ZERO SLIP Calibration (4) is highlighted.

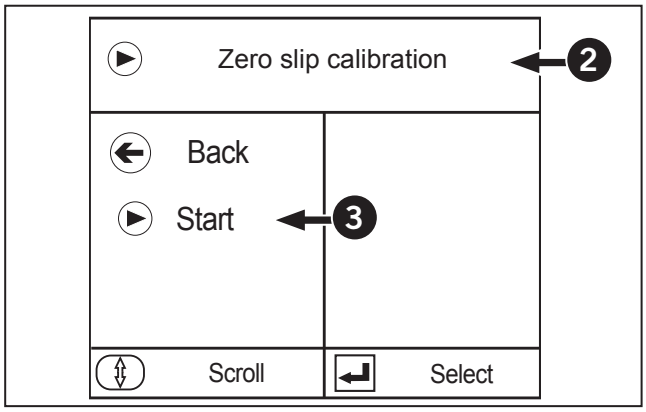
***NOTE: If VCU software is changed. Perform a calibration.***



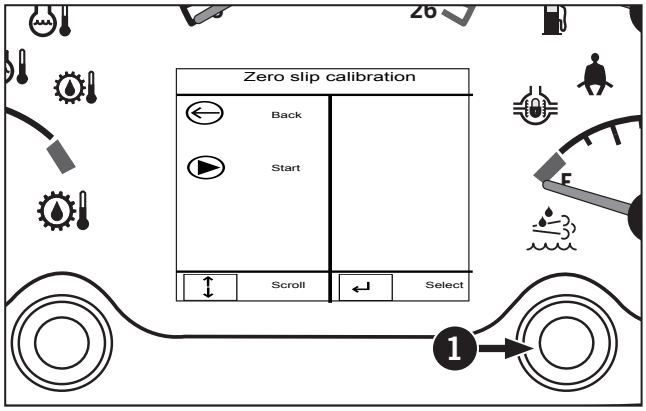
6. Press the right button (1) on the EIC to select the ZERO SLIP Calibration sub-menu (2).
7. Press the left button to highlight START (3).




8. Select a low gear and range and drive the tractor forward.




9. Press the right button (1) to start calibration.
10. This will take 100 m of travel distance to complete. Once calibration is completed cycle the power OFF and ON to save the new tire size in the VCU.
11. Zero Slip Calibration will automatically stop after the 100m has been reached. Make sure the full 100m was driven or calibration will not be saved.



## Front Axle Suspension Calibration

***NOTE: If the [!] appears on the front suspension button or on the indicator symbol the system must now be calibrated.***

***NOTE: If the position sensor is replaced, perform a calibration.***

To perform a Front Axle Suspension Calibration, perform the following instructions:

Park the tractor on a level area, shut the engine off and apply the parking brake.

## Calibration State

The calibration state is entered when the operator activates the calibration through the EIC and and monitor. The system will command a raise to the upper mechanical stop and record position. Then it will then command a lower to the lower mechanical stop and record position. The algorithm will calculate the mid-position of the specific system. Therefore, removing mechanical and electronic tolerances. Once the caluclations are comlete the algorithm re-enters the start up state.

Calibration can occur concurrently for both cab and axle systems if selected through the EIC or monitor. The software will have two independent sub routines for cab and axle for fluctuation in calibration time. However the same procedure applies for both.

## Suspension State

The suspension state is the default state and the normal operating state which consists of 3 sub-states:

- Neutral State
- Raise State
- Lower State

***NOTE: System will not enter Suspension State until 2 kph (1 mph).***

## Lockout State (Axle only)

The lockout state is entered when the vehicle operator activates the Axle lockout switch and the suspension is in it's neutral position. In lockout state all Axle solenoid valves are off. Axle Leveling is disabled and the accumulator is segregated from the circuit eliminating cylinder movement. This is known as Axle Mid-position Lockout. The usage of this mode is foreseen when the operator want to precisely control the height of a front attachment.

***NOTE: To avoid system running in LockOut high speed (with potential safety issues), if 25 kph (15 mph) is reached will enter Suspension State and return to LockOut once speed drops below 25 kph (15 mph).***

***NOTE: The operator will not be able to exit LockOut mode until 2 kph (1 mph) is reached (to avoid unpredictable movement when stationary).***

## Error State

The error state is entered when position correction commands are active for more than 1 minute. This will cover errors due to cut wires, hydraulic errors and position sensor errors. Once the error state is entered all coils are de-energized. The error state can only be exited by entering the calibration state.

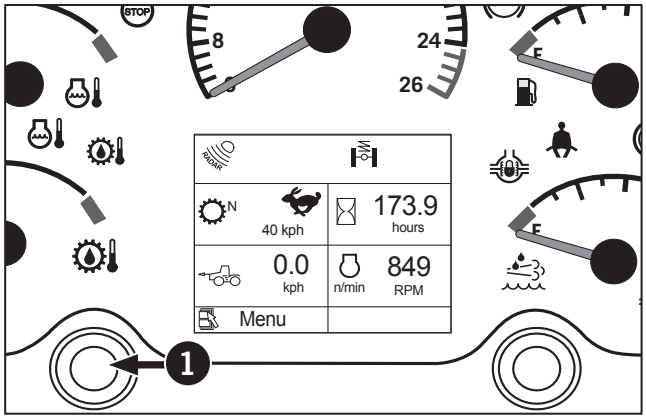
## Lockdown State (Axle only)

The LockDown state is the second axle suspension off state. The axle is lowered all the way to its mechanical stops and all the solenoid valves are off. This state is desirable if the front axle load is high enough to open the relief valve in lockout state.

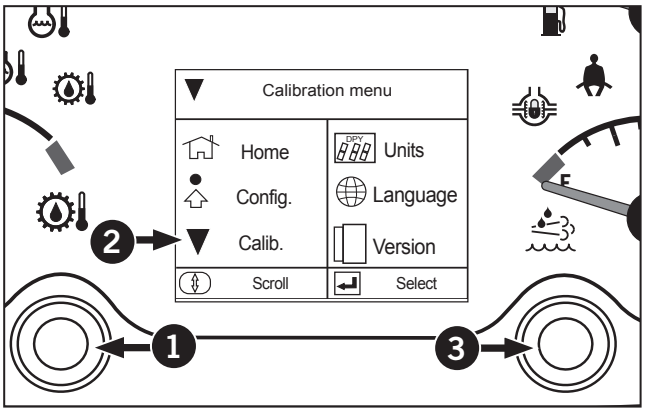
***NOTE: To avoid system running in LockDown high speed (with potential safety issues), if 25 kph (15 mph) is reached will enter Suspension State and return to LockDown once speed drops below 25 kph (15 mph).***

***NOTE: The operator will not be able to exit LockDown mode until 2 kph (1 mph) is reached (to avoid unpredictable movement when stationary).***

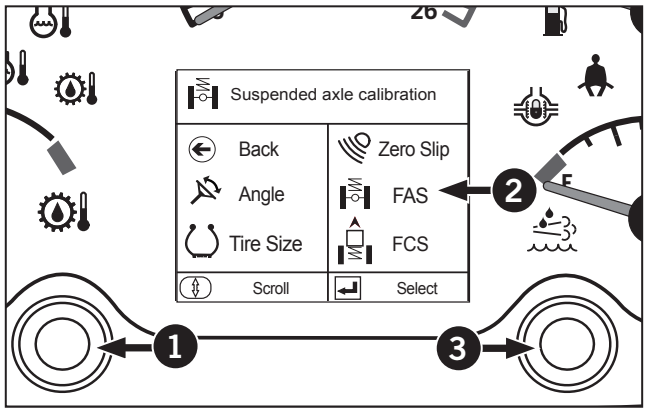
1. Start the engine.
2. Press the left button (1) once on the EIC to access the main menu.



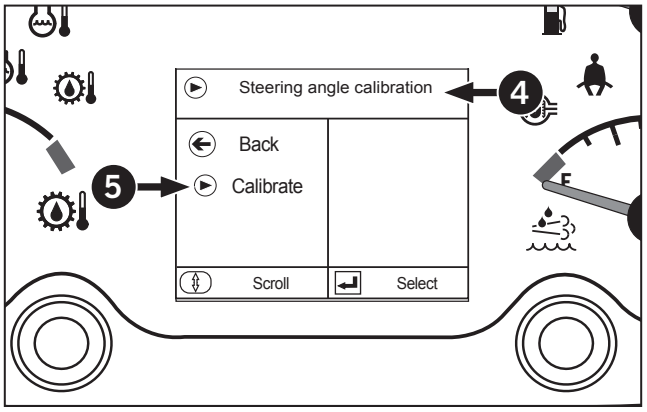

3. Press the left button to scroll down till the CALIB (2) is highlighted
4. Press the right button (3) to select the sub-menu.

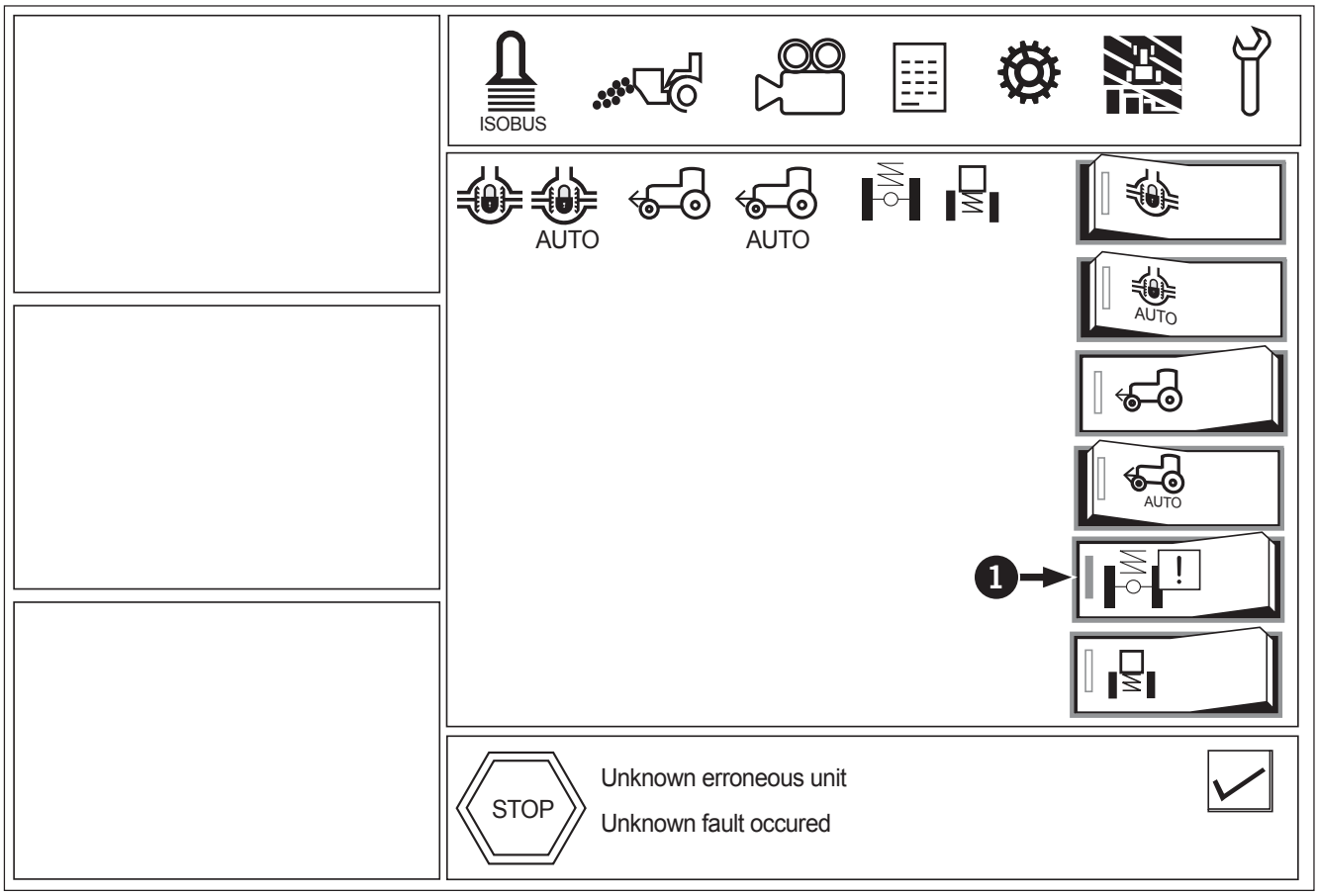


5. Press the left button (1) on the EIC to scroll down till FAS (2) is highlighted.
6. Press the right (3) button one the EIC to select the FRONT AXLE SUSPENSION CALIBRATION sub-menu (4).

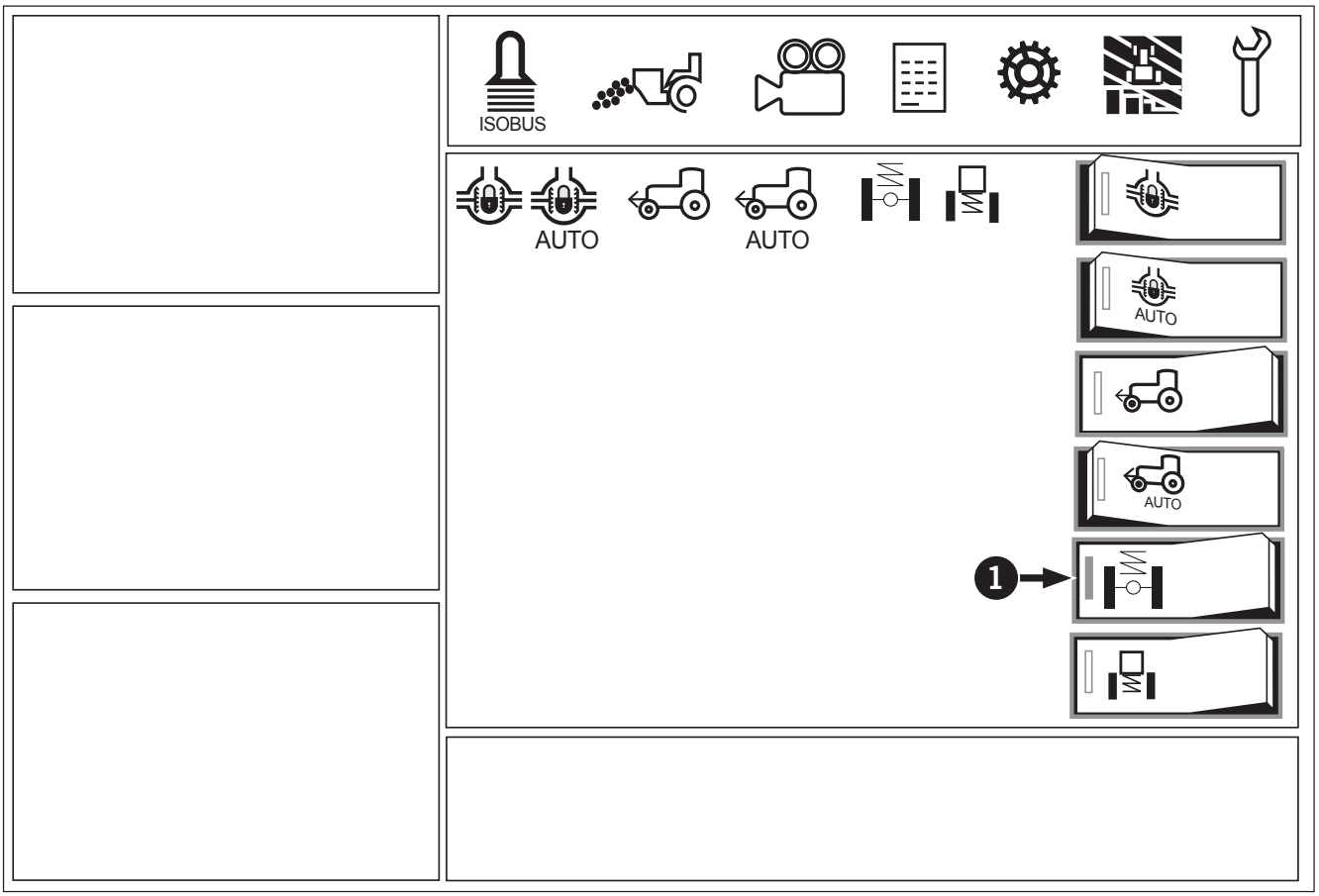



7. Press the left button till CALIBRATE (5) is highlighted
8. Press the right button to start calibration.





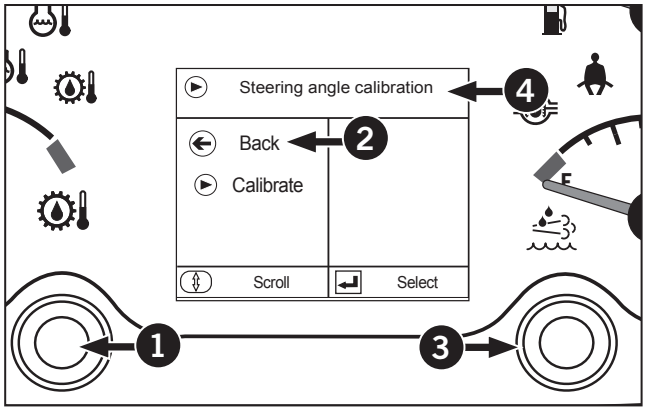

9. The [!] symbol (1) will be displayed beside the front suspension switch.
10. The controller will now bring the front suspension all the way up to its max position and record the value; this will take a few seconds. Once the upper value is recorded the controller will signal the suspension to go down all the way to its lowest position and record the value; this will take a few seconds. Once the lower value is recorded the controller will now bring the suspension to the middle of it travel position.



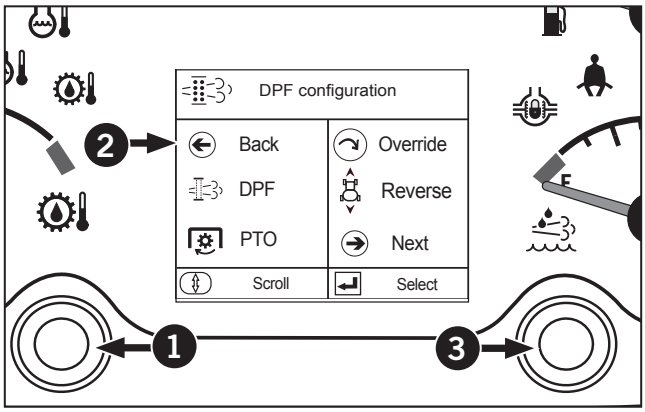

11. If the calibration was successful the system will now be active. The front suspension switch will be on and the symbol [!] (1) should have disappeared.

***NOTE: If suspension controller is replaced. Perform a calibration.***

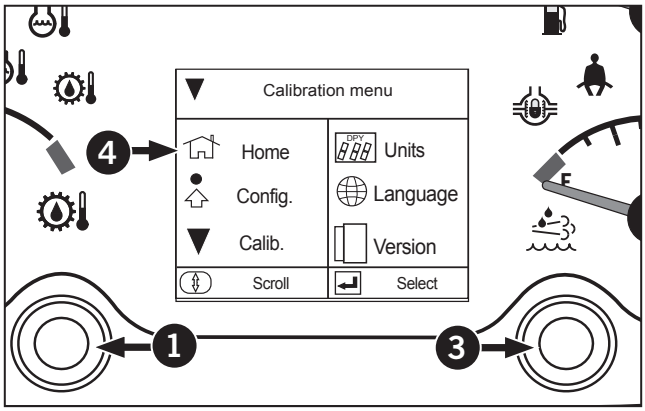
12. Press the left button (1) on the EIC to scroll till BACK (2) is highlighted.
13. Press the right button (3) on the EIC to exit the SUSPENDED AXLE Calibration sub-menu (4) and back to the calibrations menu.



14. Press the left button (1) on the EIC till BACK (2) is highlighted again
15. Press the right button (3) to get back to the main menu.




16. Press the left button to scroll till HOME (4) is highlighted.
17. Press the right button to exit the main menu and get back to the main screen .



## Cab Suspension Calibration

***NOTE: If the [!] appears on the indicator symbol, the system must now be calibrated.***

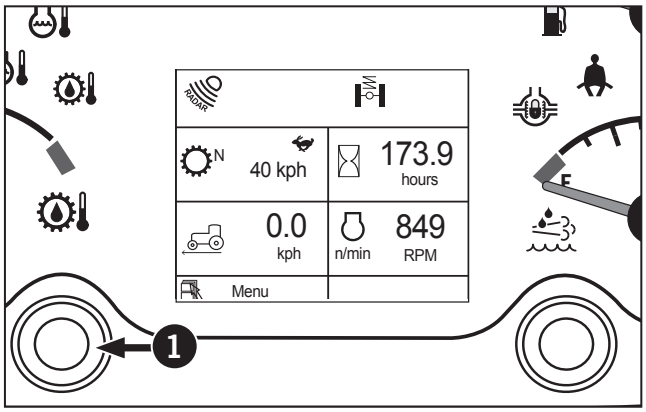
***NOTE: If the position sensor or control module is replaced, perform a calibration.***

***NOTE: Make sure all tire pressures are equal as it can cause the tractor to be unlevelled.***

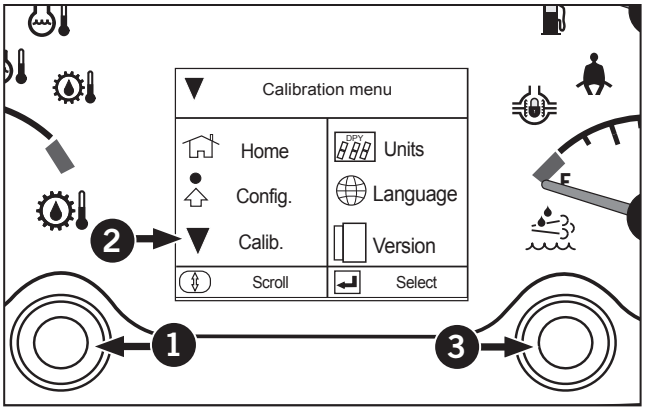
To perform a cab suspension calibration, follow the instructions below:

Park the tractor on a level area, shut the engine off and apply the parking brake.

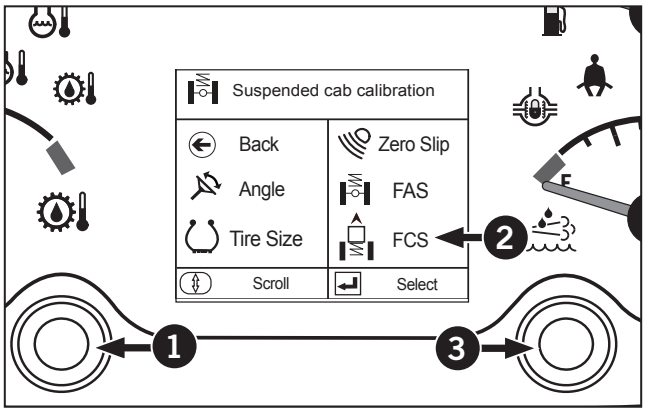
1. Start the engine.
2. Press the left button (1) once on the EIC to access the main menu.



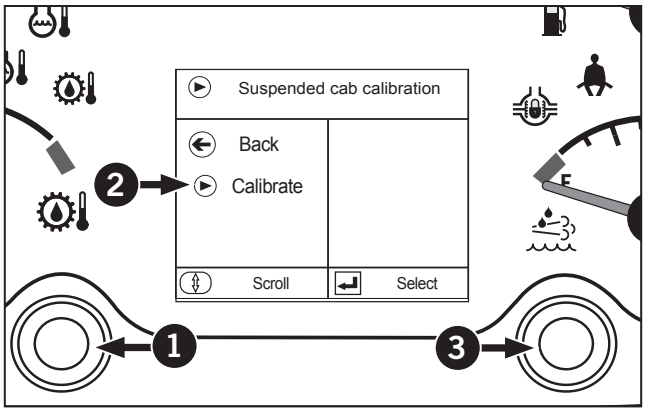

3. Press the left button to scroll down till the CALIB (2) is highlighted.
4. Press the right button (3) to select the sub-menu.

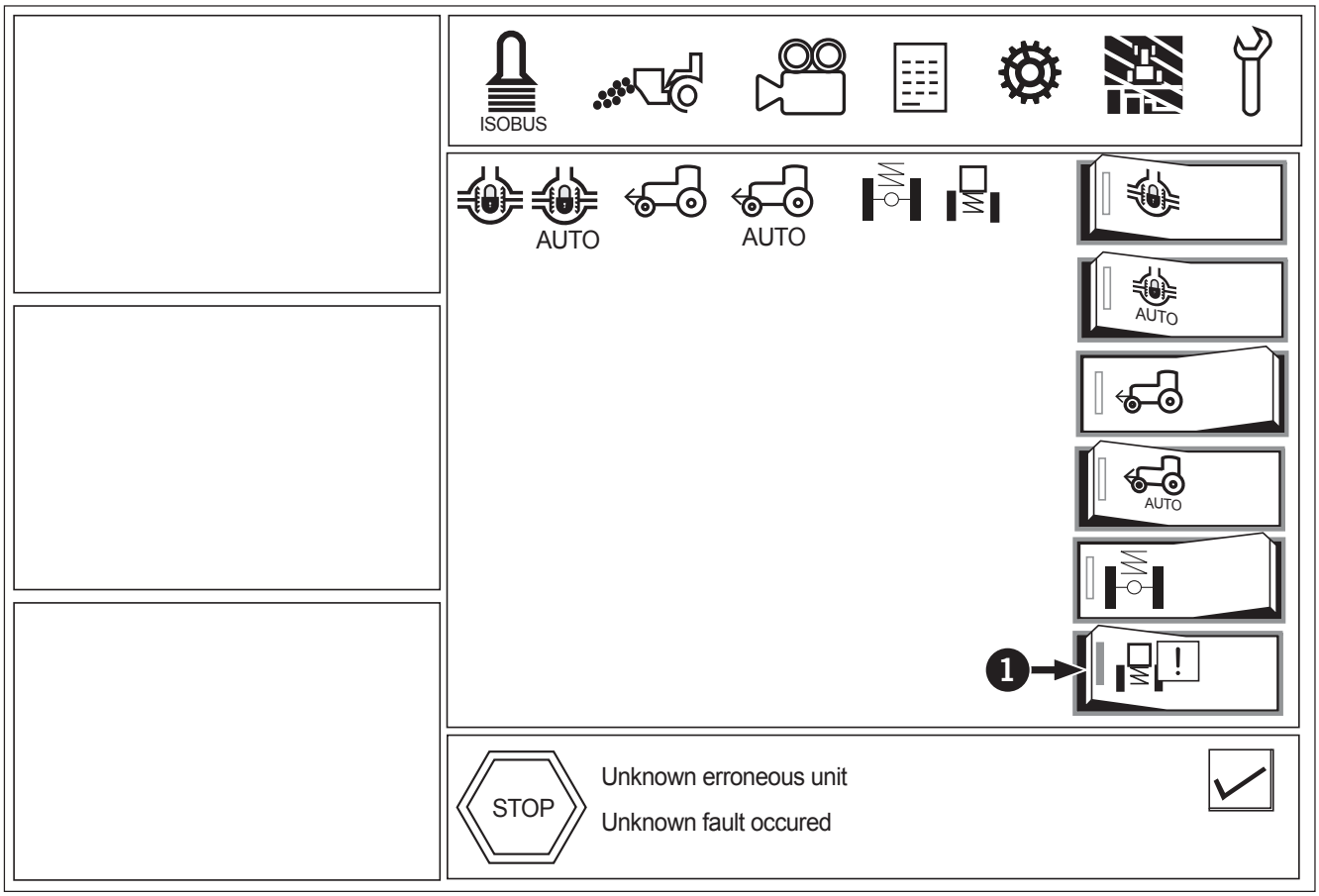


5. Press the left button (1) on the EIC to scroll down till FCS (2) is highlighted.
6. Press the right button (3) on the EIC to select the CAB SUSPENSION CALIBRATION sub-menu.



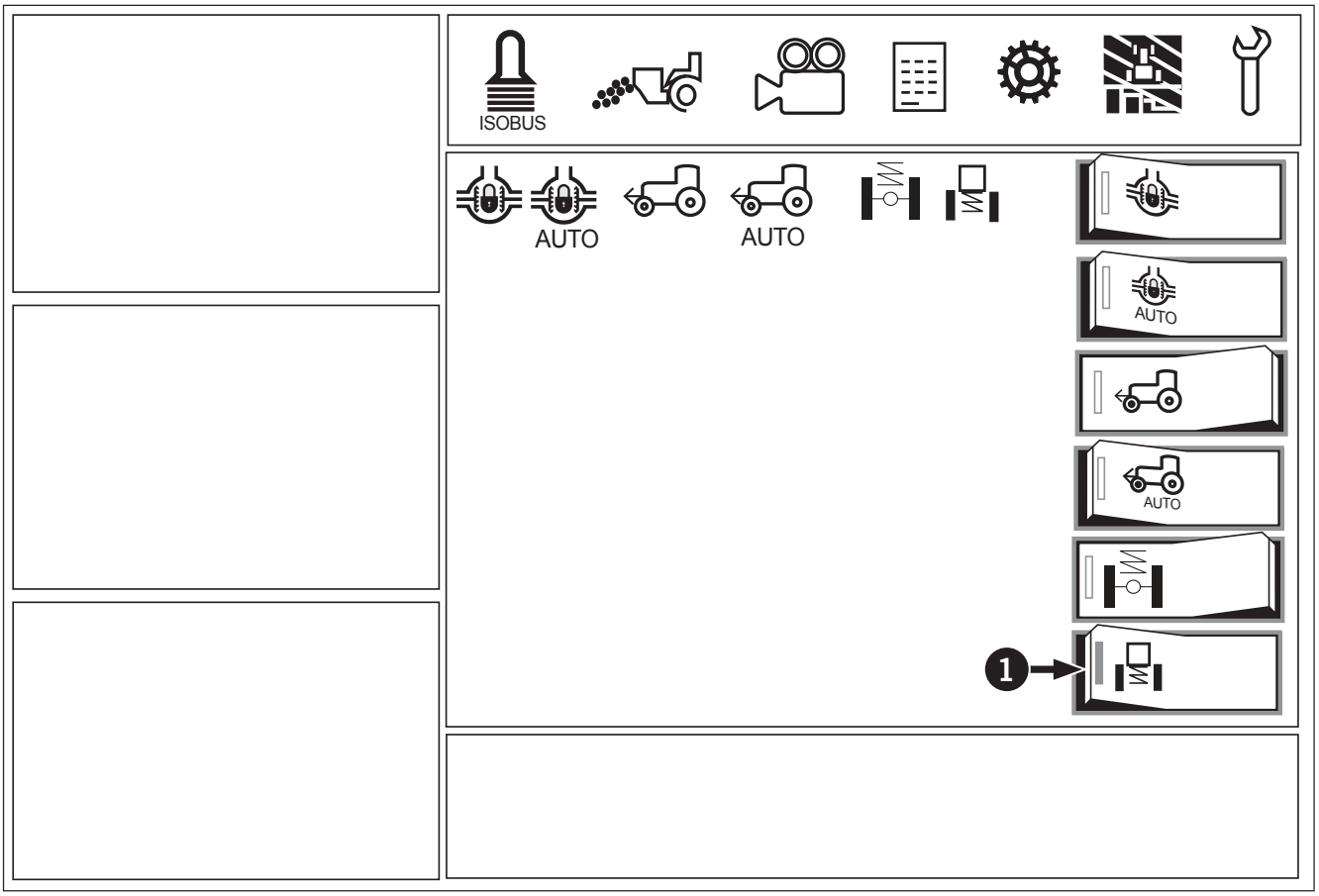

7. Press the left button on the EIC till CALIBRATE (2) is highlighted.
8. Press the right button (3) on the EIC to start calibration.





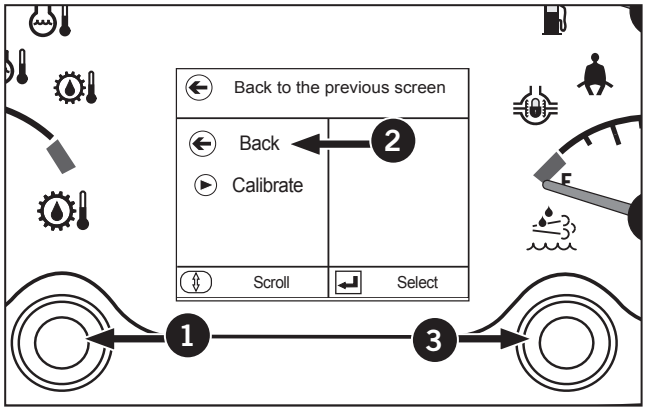

***NOTE: It takes 1 minute and 30 seconds to complete the calibration process. There is no indication that the calibration is complete.***

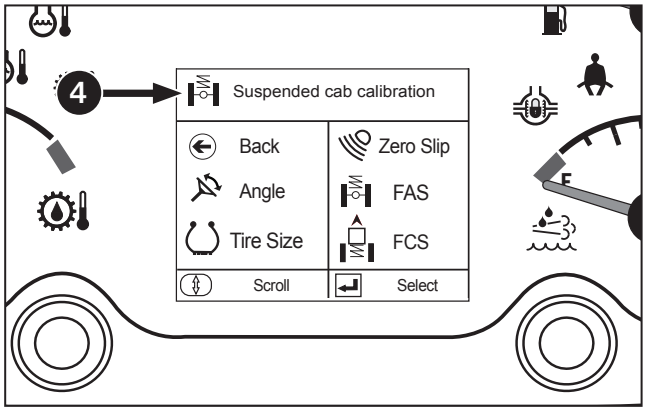
9. The [!] symbol (1) will be displayed beside the cab suspension switch.
10. The controller will now bring the cab suspension all the way up to its max position and record the value; this will take a few seconds. Once the upper value is recorded the controller will signal the suspension to go down all the way to its lowest position and record the value; this will take a few seconds. Once the lower value is recorded the controller will now bring the suspension to the middle of it travel position.



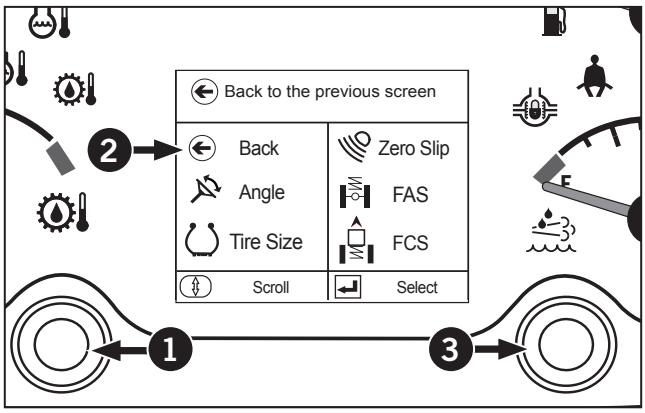

11. If the calibration was successful the system will now be active. The cab suspension switch will be on and the symbol [!] (1) should have disappeared.
12. Press the left button on the EIC to scroll till BACK is highlighted.

13. Press the left button (1) on the EIC to scroll until BACK (2) is highlighted.
14. Press the right button (3) to exit calibration and back to the calibrations menu (4).

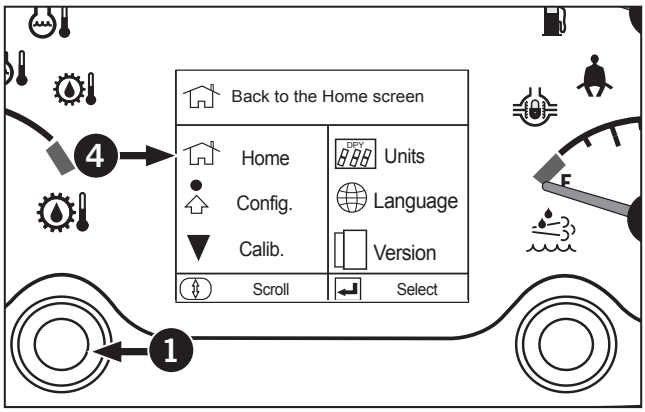


15. Press the left button (1) on the EIC till BACK (2) is highlighted again
16. Press the right button (3) on the EIC to get back to the main menu.



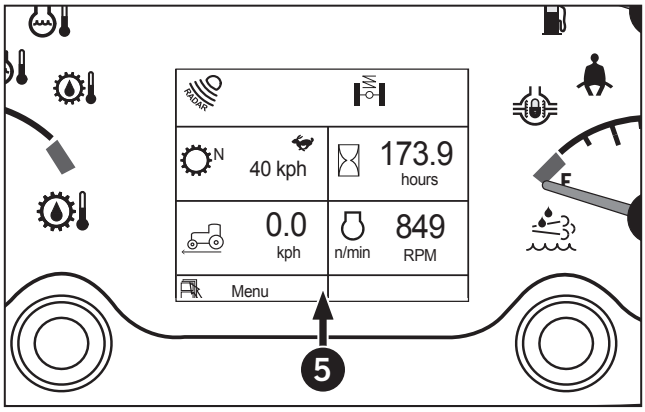

17. Press the left button (1) to scroll till HOME (4) is highlighted.




18. Press the right button to exit the main menu and get back to the main screen (5).

***NOTE: The values for the cab position sensor should be between 0.7v when the cab is at its lowest position and 4.0v when the cab is at its highest position. This will insure the connecting rod is at the correct length.***

***NOTE: Sensor range is from 0.5v to 4.5v, but the sensor reading must be below 4.3v or the suspension will not calibrate.***



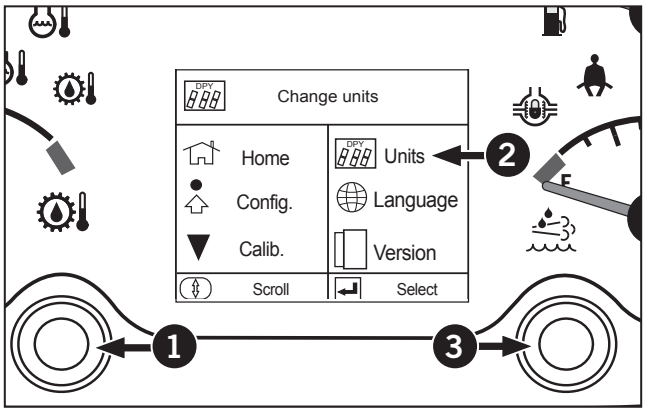
## Transmission Calibration

Contact a KUBOTA dealer for assistance.

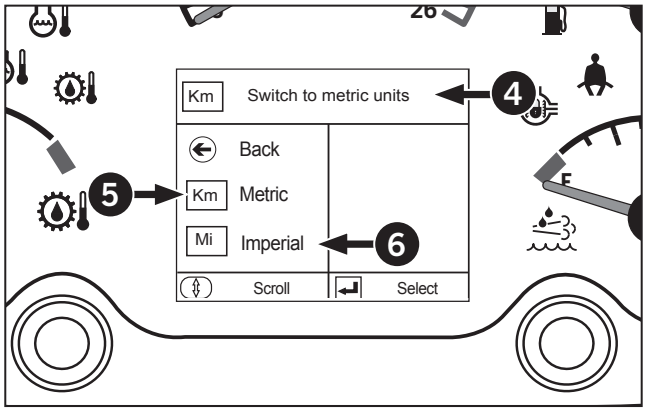
## EIC Overview: Unit of Measure Screen

Use the Unit of Measure screen (1) to change the units to Metric or Imperial:

1. Press Press the left button to scroll down till the Units (2) is highlighted.
2. Press the right button (3) to select the sub-menu.



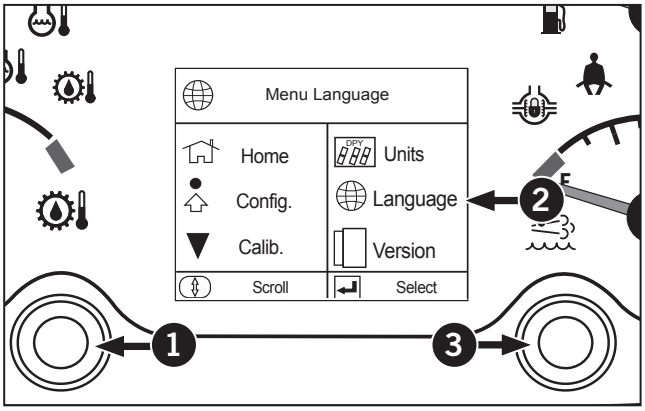

3. The subscreen (4) appears.
4. Press the left button (1) to select Metric (5) or Imperial (6).
5. Select Back to save the settings.



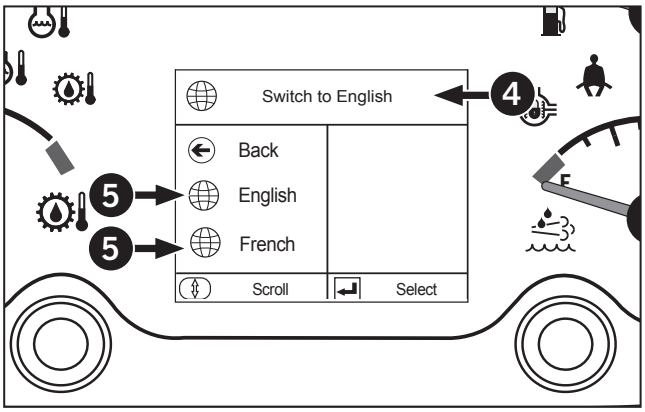
## EIC Overview: Language

Use the Language screen (1) to change the language to English or French:

1. Press the left button to scroll down till Language (2) is highlighted.
2. Press the right button (3) to select the sub-menu.



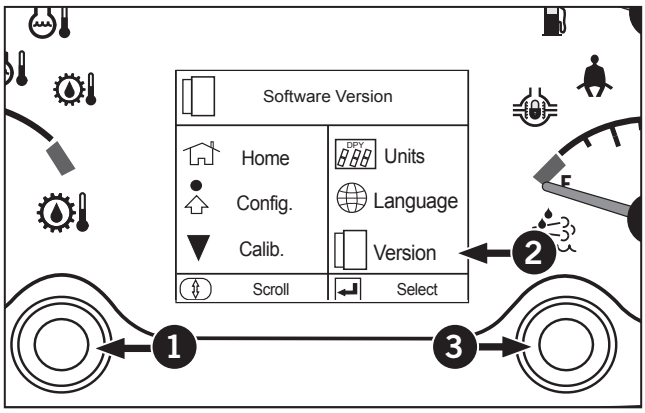

3. The subscreen (4) appears.
4. Press the left button to select English or French (5).
5. Select Back to save the settings.



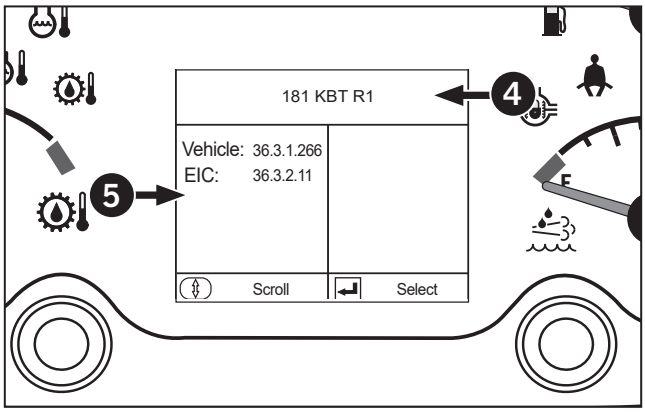
## EIC Overview: Software Version

Use the Version Information (1) screen to check software details and to confirm if the correct software is installed in the tractor:

1. Press the left button to scroll down till Version (2) is highlighted.
2. Press the right button (3) to select the sub-menu.




3. The subscreen (4) appears.
4. The software version appears (5).
5. Select Back to save the settings.



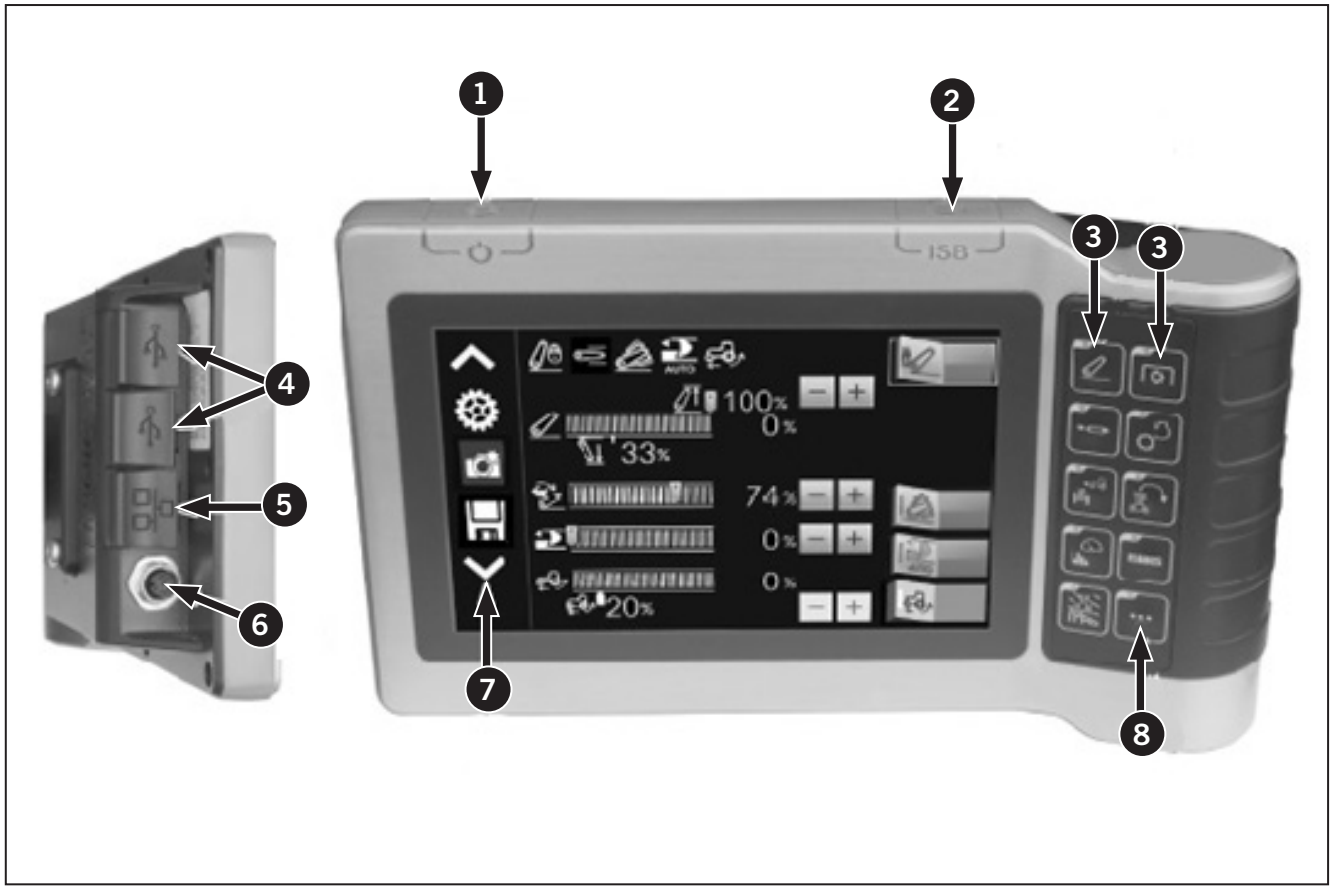
## K Monitor

The K-monitor features

- Screen switch (1)
- ISOBUS emergency shut-off switch (2)
- Main menu select switch (3)
- USB port (4)
- LAN port (5)
- External camera input terminal (“S” terminal) (6)
- Sub-menu select icon (7)
- Sub-menu display switch (8)

### Screen switch

Touch the screen switch to change between screen ON and screen OFF. Turn the screen OFF for night driving, etc.



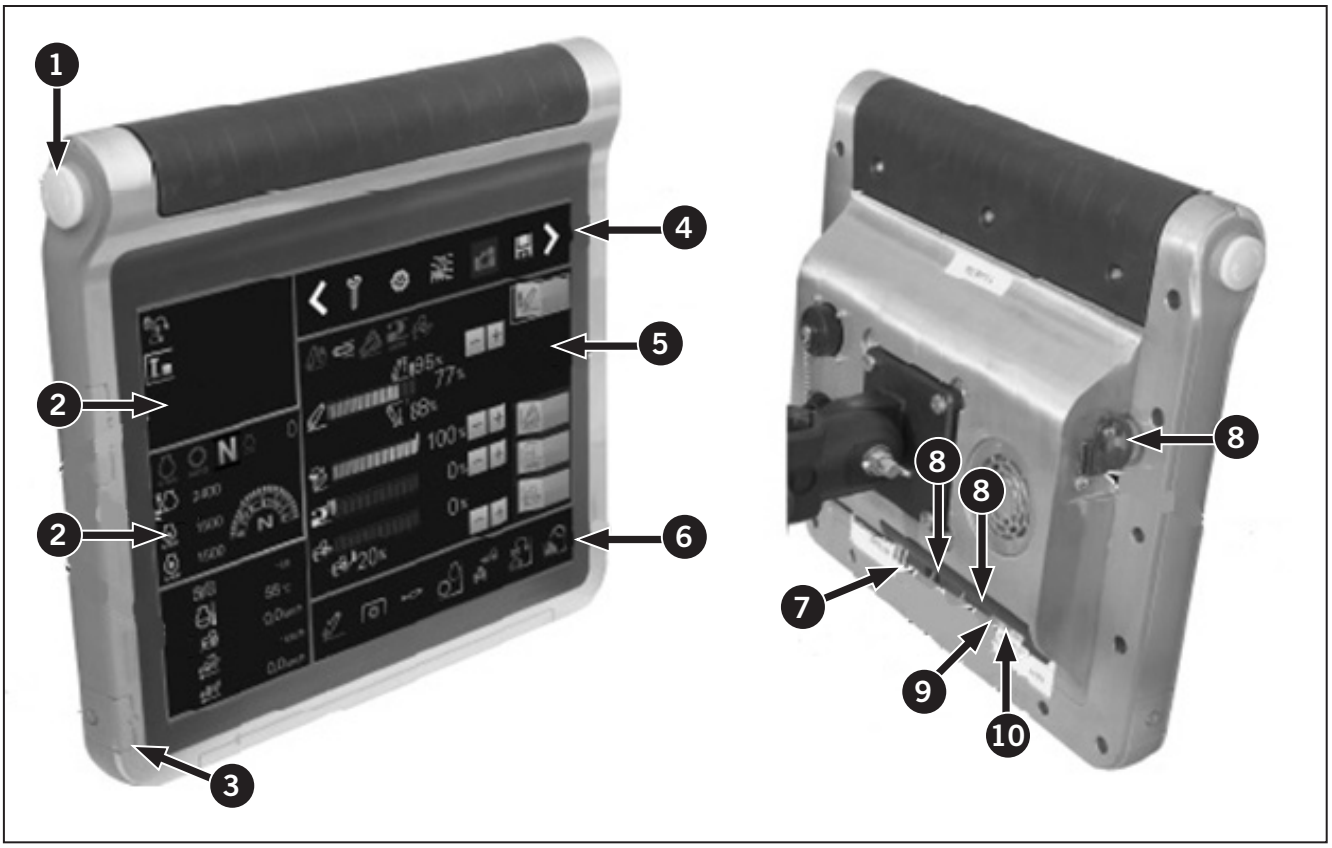
## K Monitor Pro

The  K-monitor Pro features

- ISOBUS emergency shut-off switch (1)
- Sub-display screen (2)
- Screen switch (3)
- Sub-menu select icon (4)
- Main display screen (5)
- Main menu select icon (6)
- LAN port (7)
- USB port (8)
- External camera input terminal (S terminal) (9)
- Microphone/earphone terminals (10)

### Main menu display

On the screen there are 4 different switchable main menus that are routinely used can be displayed.



## Touch-based Operation

To use the monitor:

1. Turning the ignition key only to RUN will also turn on the monitor but will limit the functionality of the monitor.
2. A splash screen will temporarily appear (not shown).

Touch the monitor screen to operate it:

- Menu bar (1).
- Main screen (2). Use this screen to configure settings for the option selected.

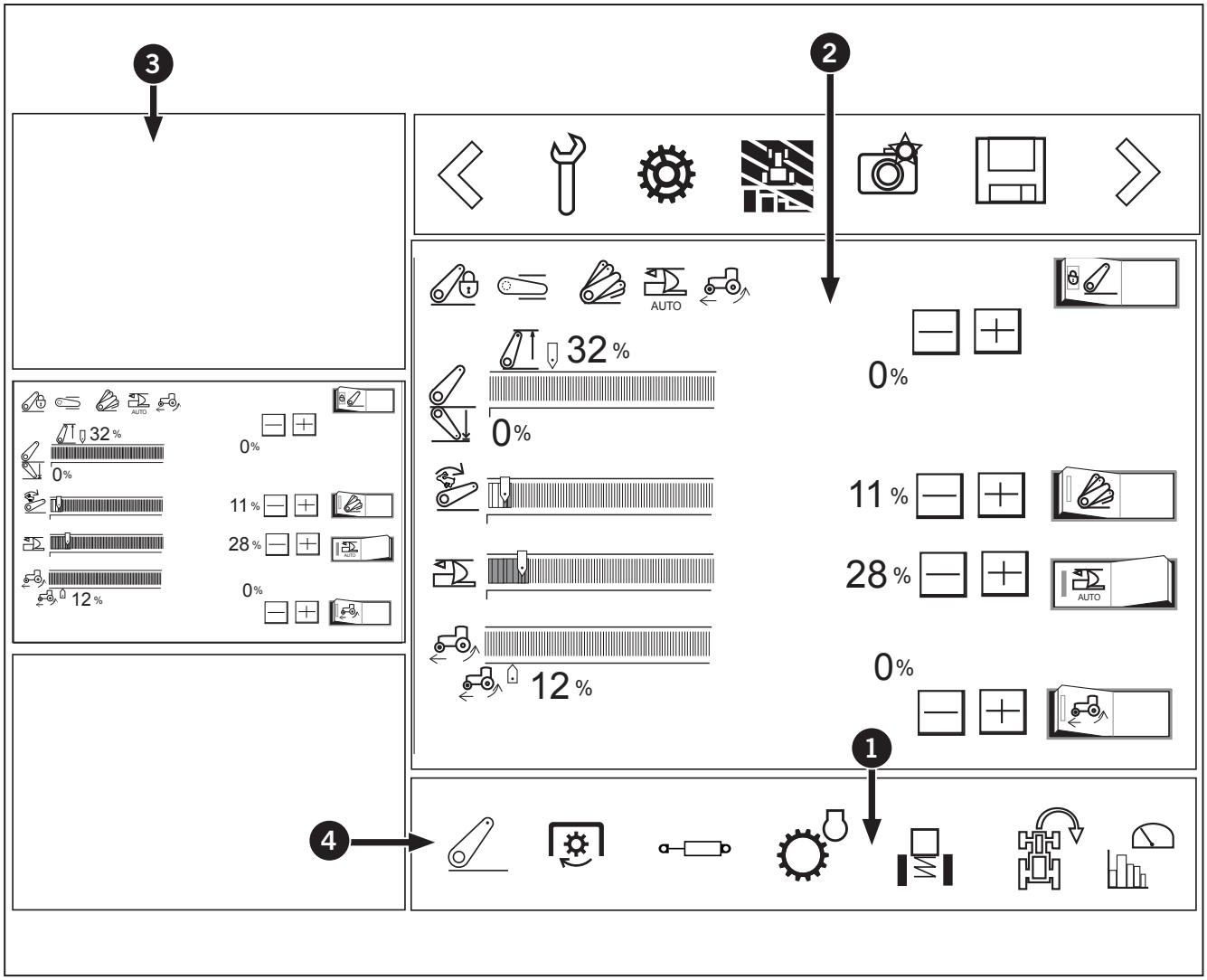
  ***NOTE: Settings can only be configured using the main screen (2). The sub-display screens (3) are for watching information only.***

**To display a main screen icon to the main screen:**

- Touch one of the main screens icons (1) and touch the main display screen (2).

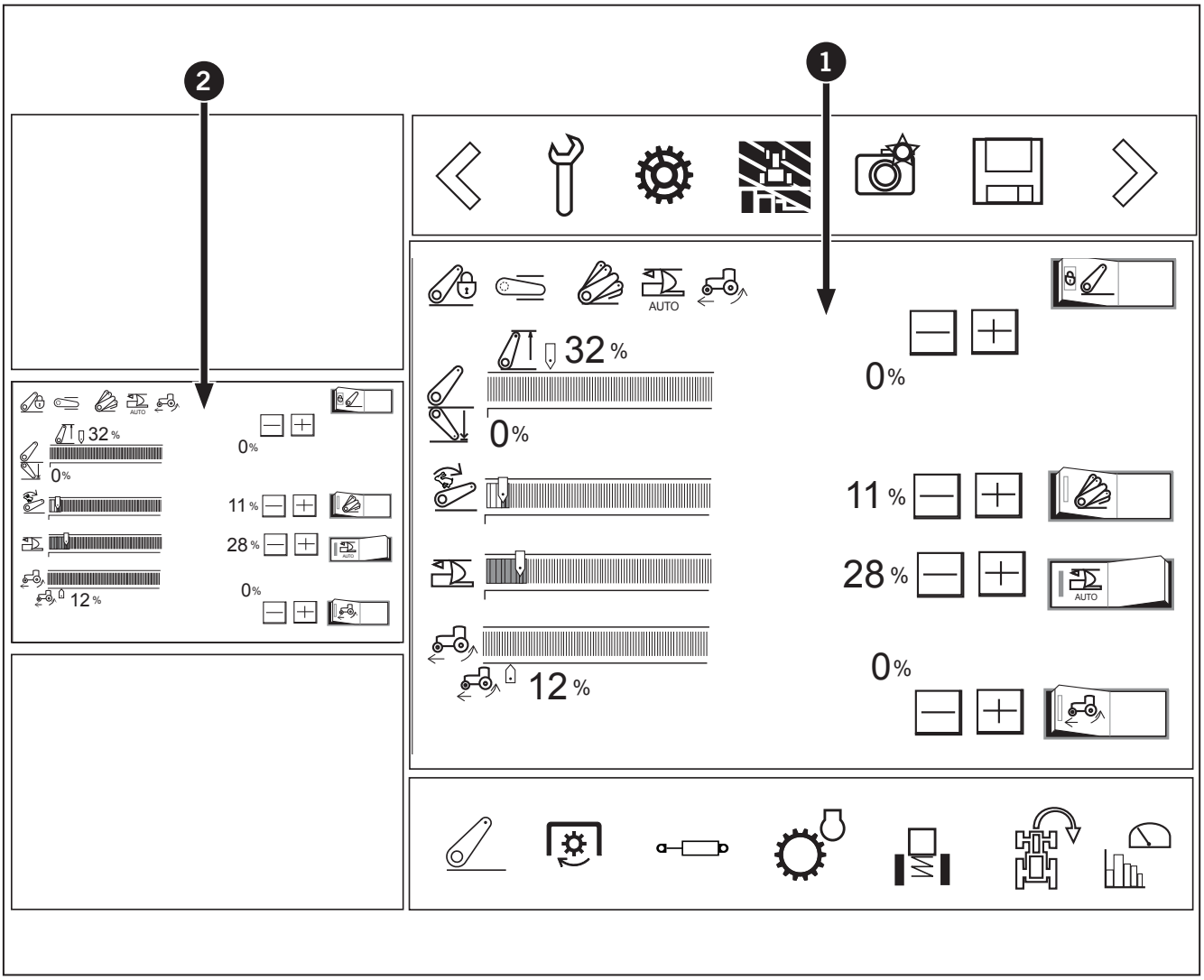
**To display a main screen icon to the sub-display screen:**

- Touch one of the main screen icons (1) and touch the sub-display screen (2).
- Side panels (3) (12-inch model only): Use these screens to monitor information from 2 other menu options at all times. If available, press and drag the side panel icon (4) from the main screen onto 1 of the side panels. Dragging a main screen onto a side panel that is already populated with information will cause the screens to swap positions.



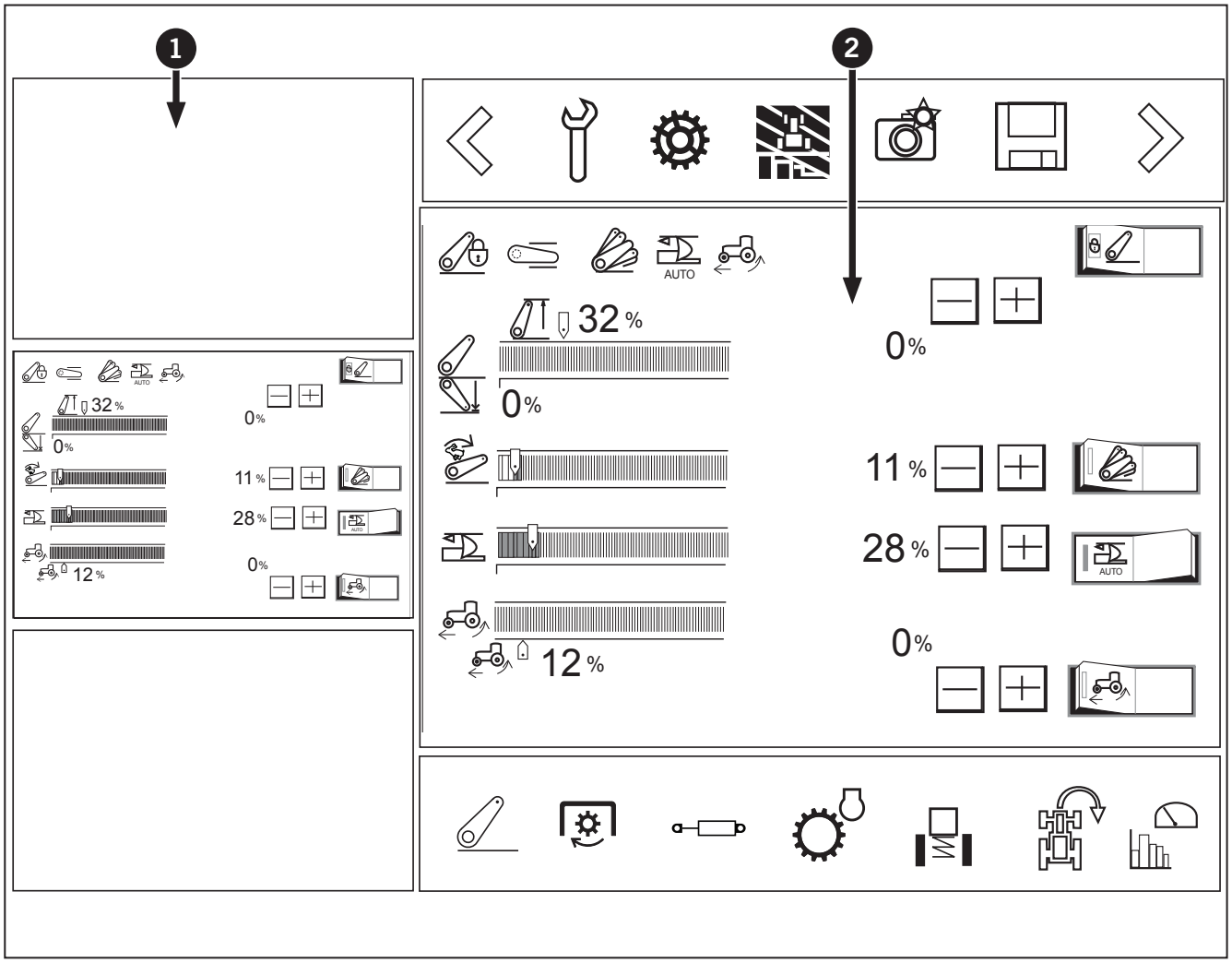
**To switch main display screen to sub-display screen:**

- Touch the main display screen (1) and touch the sub-display (2).



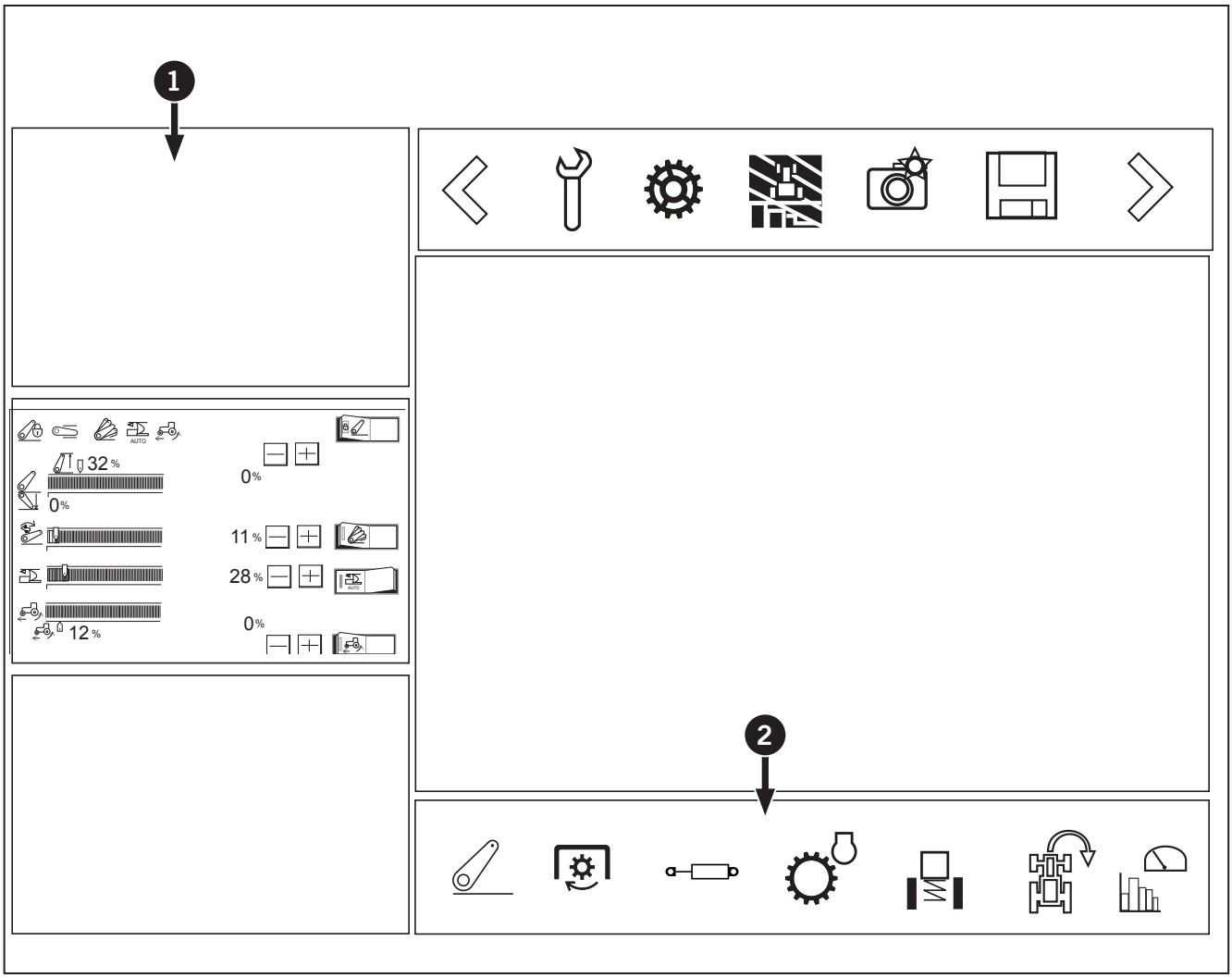
**To switch between sub-dsplay screen to main display screen:**

- Touch the sub-display (1) and touch the main display screen (2).



**To switch between sub-dsplay screen to menu bar:**

- Touch the sub-display (1) to store and touch the menu bar (2).




## Screen switch

1. Touch the switch to switch between screen ON and screen OFF.
2. Turn the screen OFF for night driving, etc

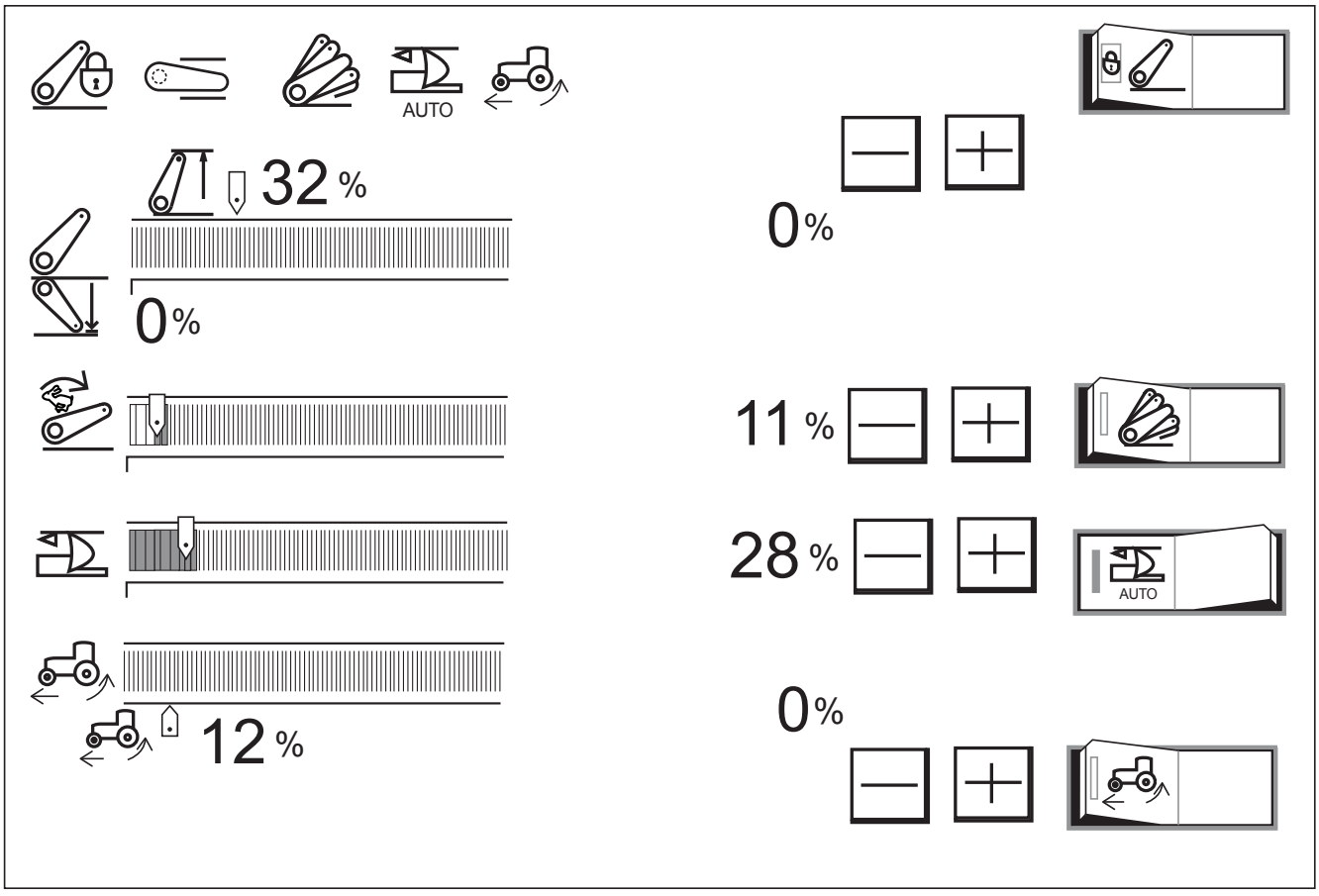
## ISOBUS emergency shut-off switch

With an ISOBUS compatible implement in motion, press this switch to stop the implement in case of emergency. Emergency stop methods vary according to the type of implement. For details, check with the instruction manual of the implement in question.

## Basic Operation

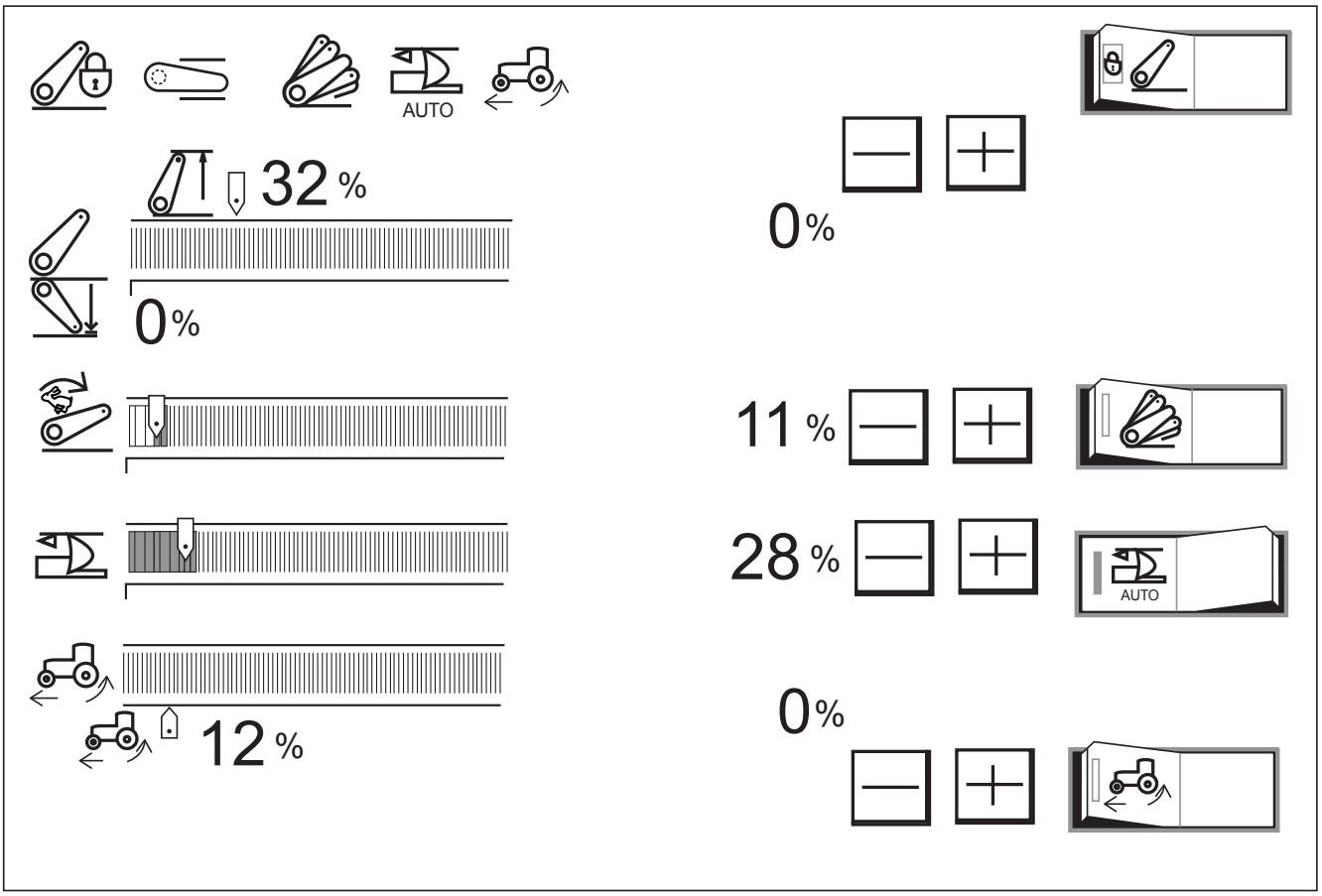
The figure below shows an example in which “3-point hitch” is selected from the main menu.

Familiarize yourself with the basic procedures, such as changing the settings, as discussed below.

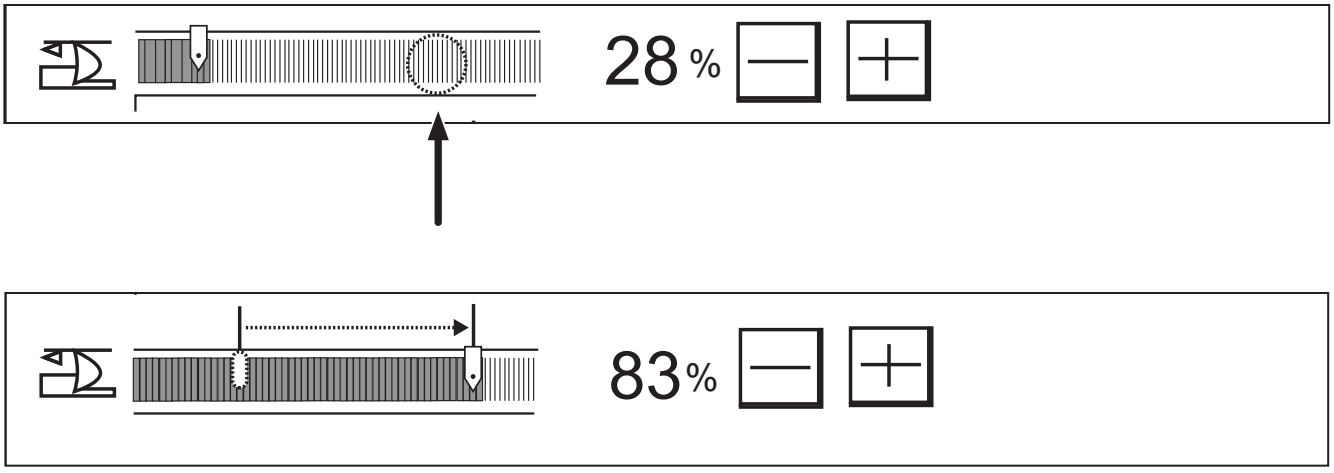


To change the settings on each screen, use any of the following procedures.

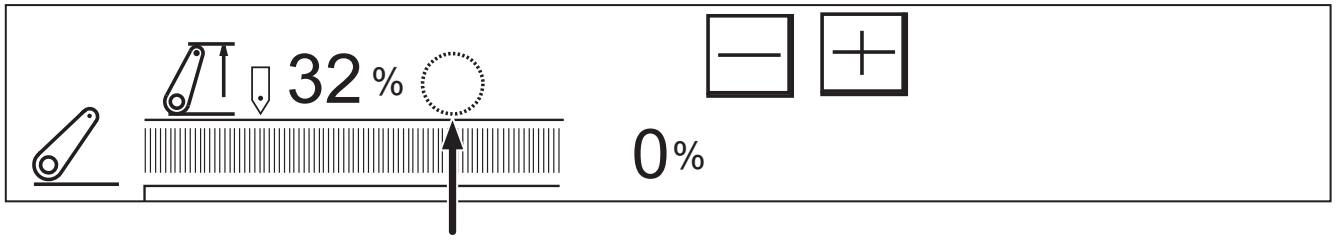
1. Touch the "-" or "+" button.

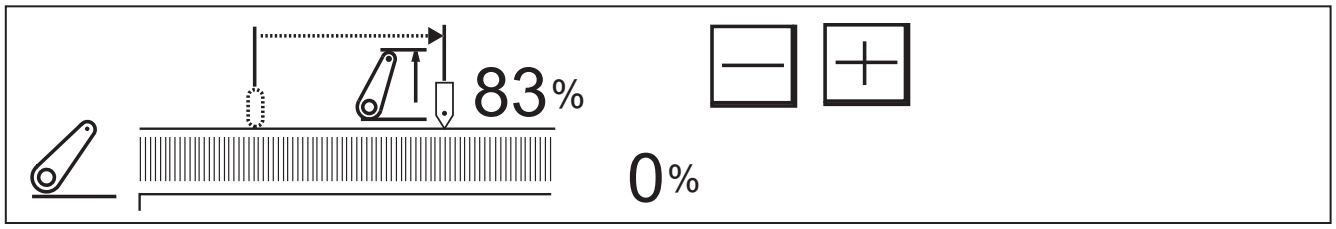



2. Touch a target point on the bar graph and the slider of the graph will move to the touched point.



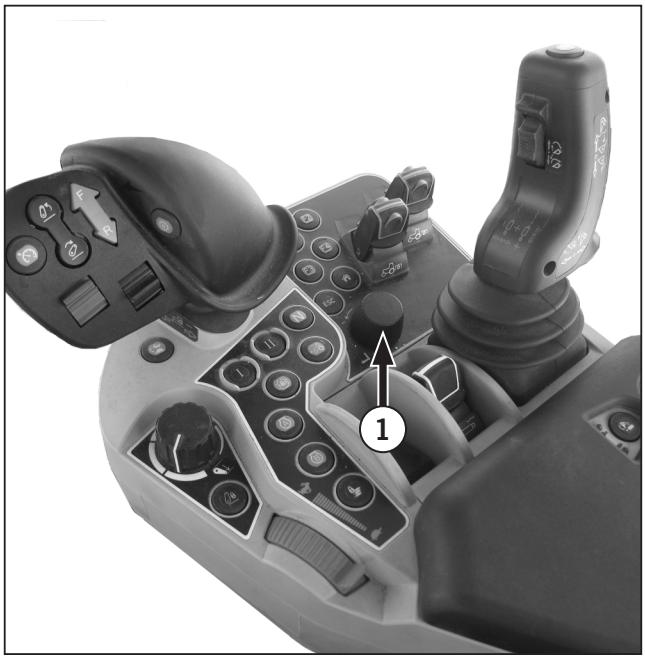
3. Touch the right or left side of the setting-pointing slider and the slider will move to the touched point.



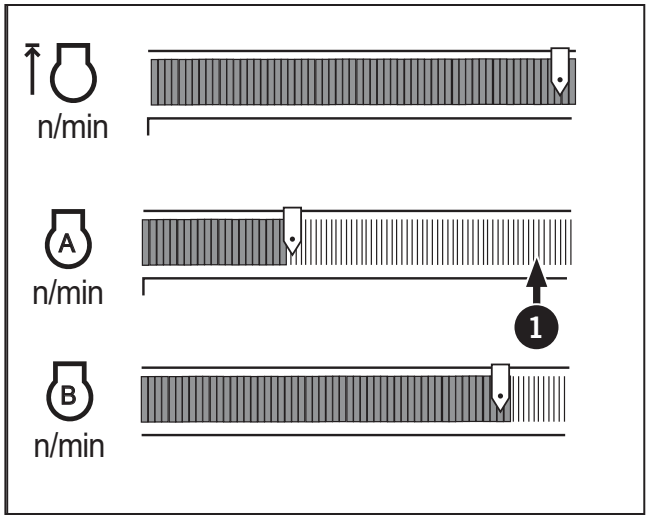



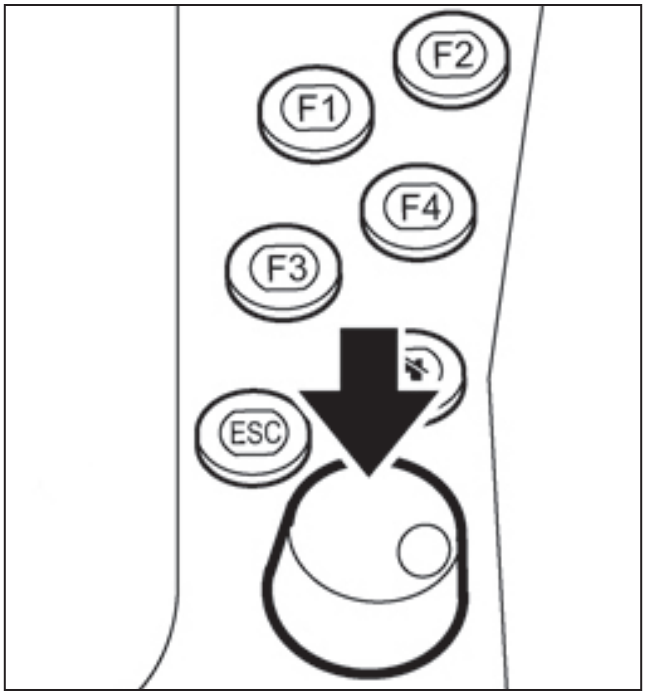
### Selection Dial Button

1. Turn the selection dial button (1) until the orange selected frame reaches the desired item.

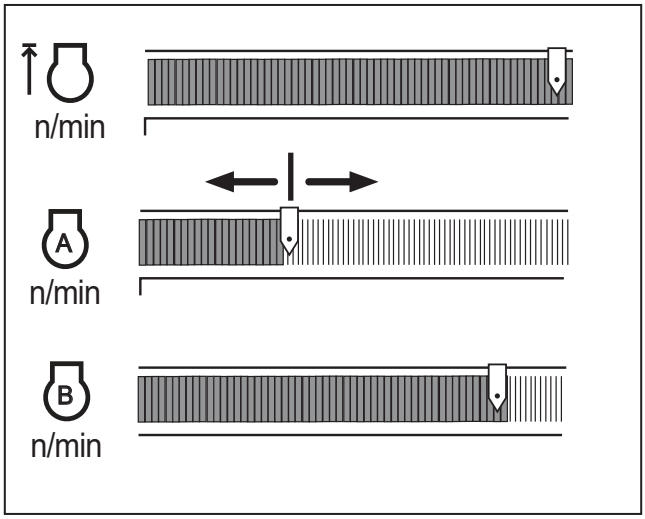


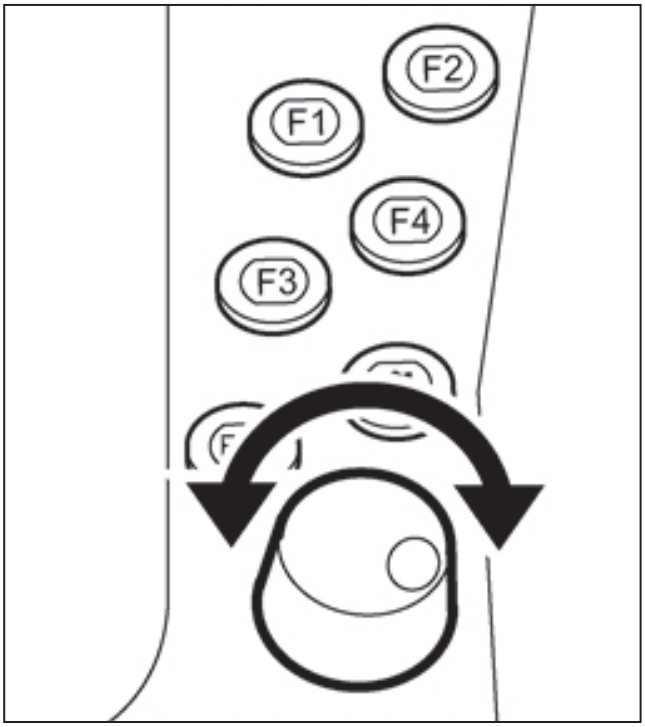

2. Press the selection dial button to make a selection. The orange selected frame turns yellow-green (1), which means the editing mode.



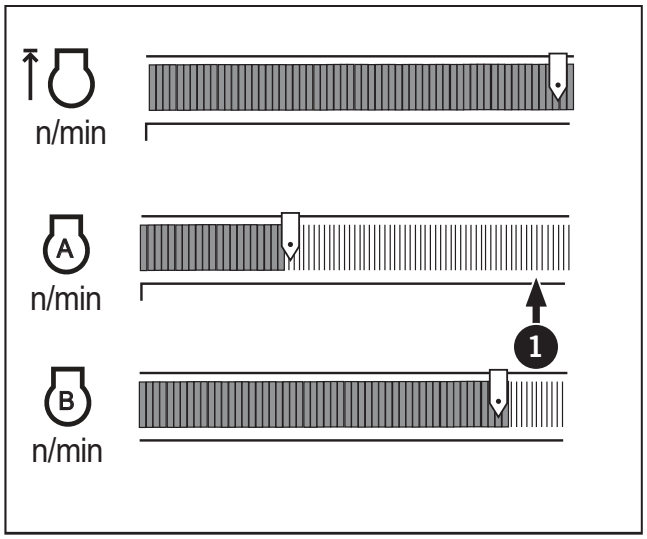



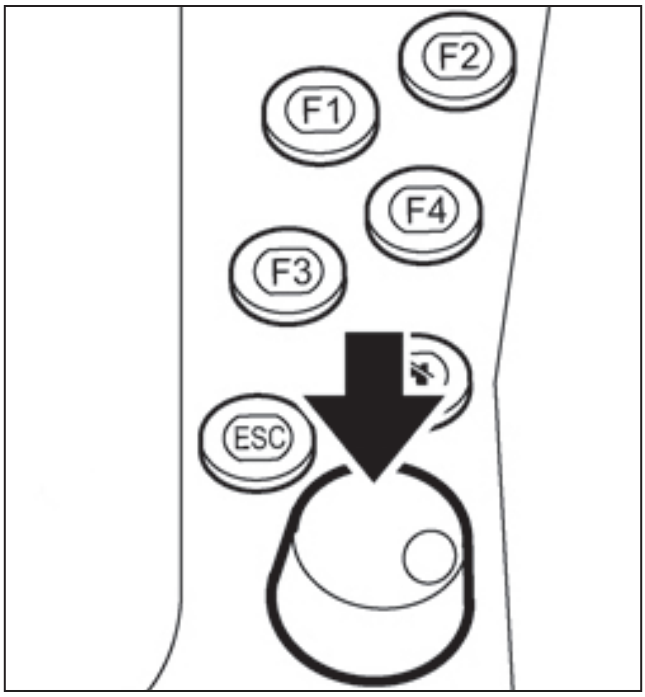
3. Turn the selection dial button clockwise or counterclockwise to change the setting.



4. Press the selection dial button to complete the setting (1). Now the new setting is effective.
5. To cancel a new item or a new setting, just press the ESC button.



### Function of the F buttons

Routinely-used setting screens can be programmed to the buttons F1 thru F4 (1).

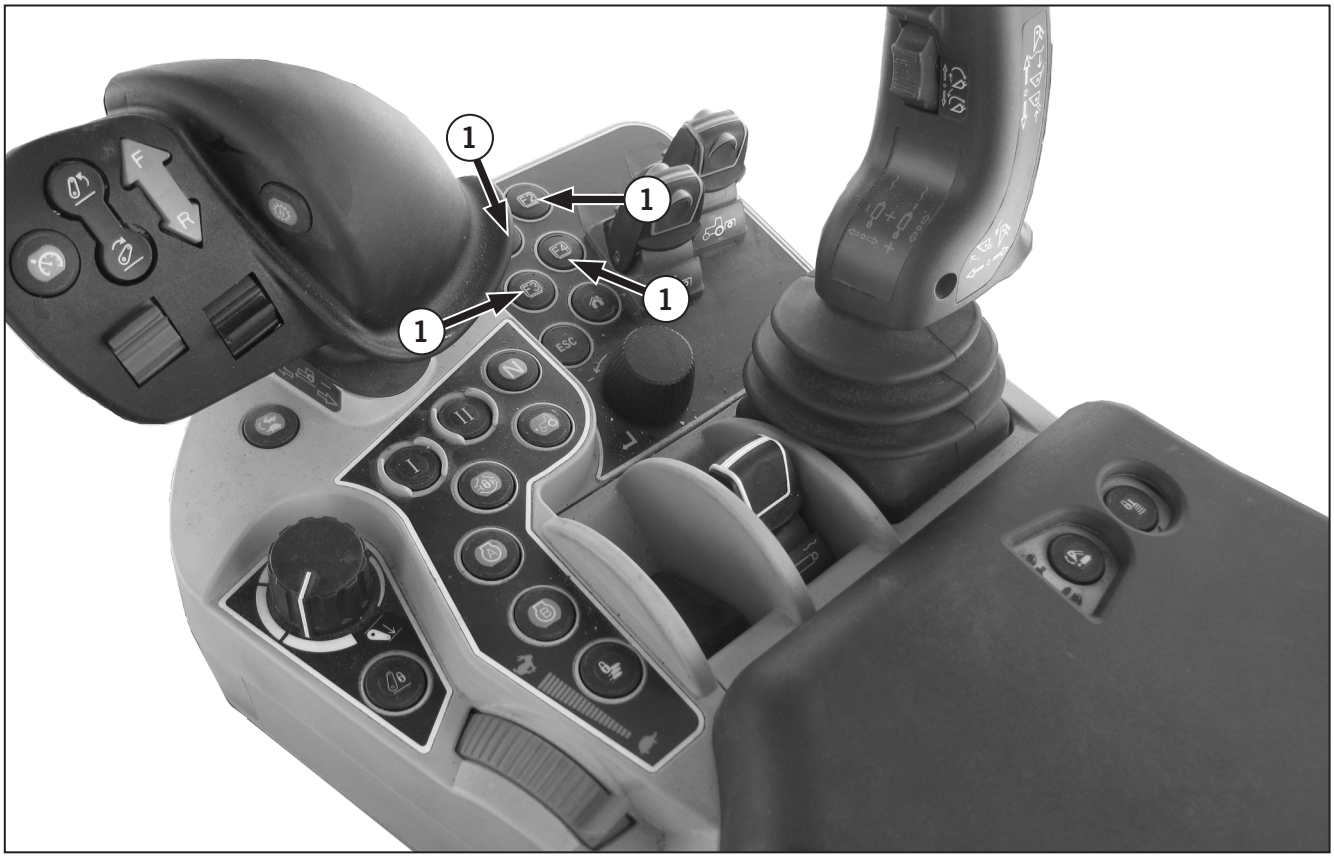
Regardless of the information currently displayed, press an F button and the allocated setting screen appears.

The operator can modify and check the settings quickly.

Press the F button again and the previous screen comes back.

### Allocating the F buttons

Select the setting screen for allocation and hold down any of the F1 thru F4 buttons 2 seconds or longer to allocate that screen.



### Function of the HOME button

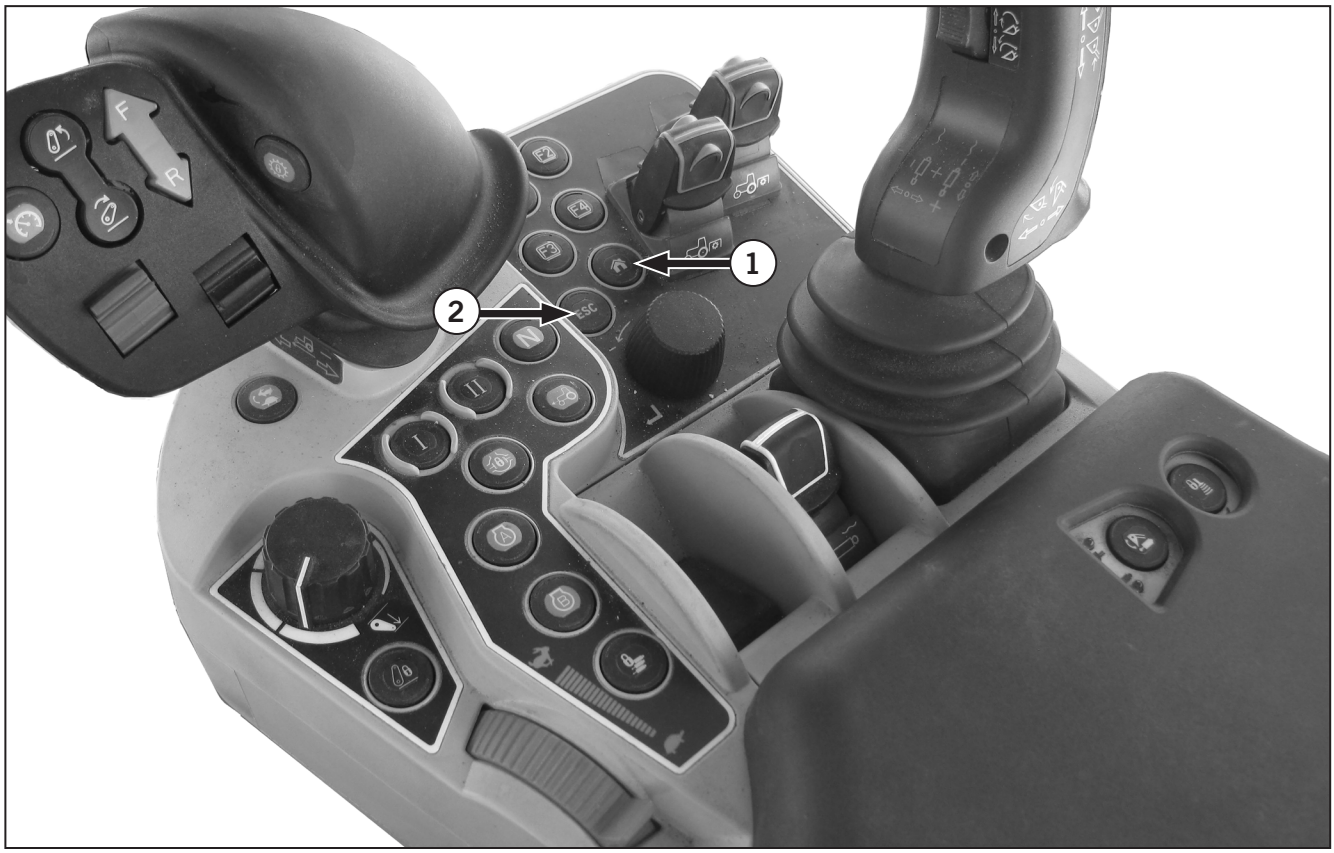
Hold down the home button (1) for 2 seconds and the preset HOME screen appears again. If the HOME screen has not been made yet, the factory-set “Engine, transmission” screen reappears.

Hold down the home button between 2 and 4 seconds and the currently shown screen replaces the HOME screen.

Hold down the home button for more than 4 seconds and the same HOME screen as at the time of purchase is resumed.

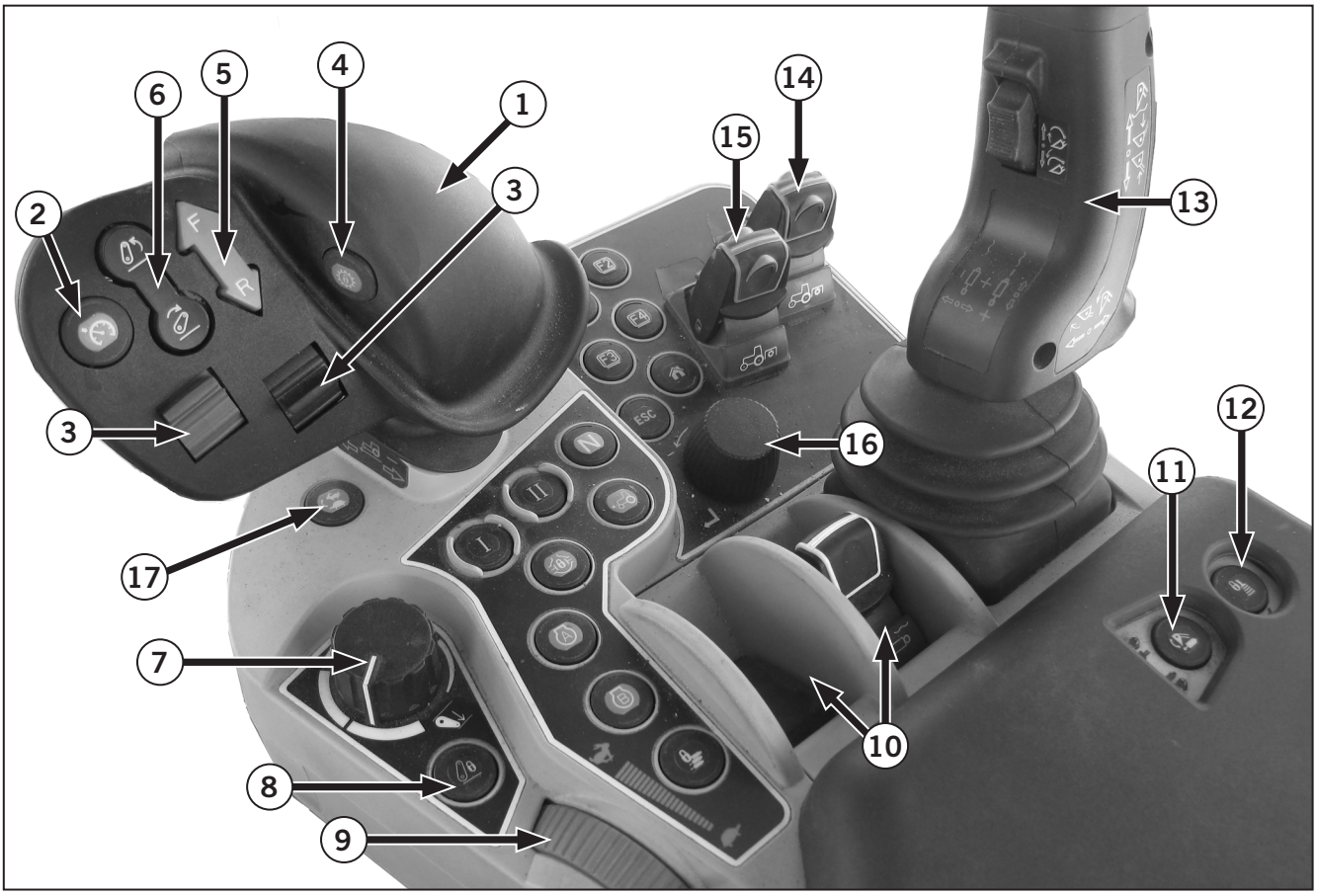
### Function of the ESC button

Press the ESC button (2) and the previous screen reappears. This works in the same way as with the “Previous screen resume” switch.



## Operator Console (CVT)

The operator console is located to the right of the driver's seat. It supports the following controls:




| Table 2-12: Operator Console CVT | |
|---|---|
| **Ref** | **Description** |
| 1 | EZ-command center |
| 2 | Cruise button |
| 3 | Remote control valve switch |
| 4 | Ratio lock button |
| 5 | Forward and Reverse buttons |
| 6 | 3-pt hitch quick raise/lower switch |
| 7 | Depth control dial |
| 8 | 3-pt hitch lock buton |
| 9 | Hand throttle |

| Table 2-12: Operator Console CVT | |
|---|---|
| **Ref** | **Description** |
| 10 | Remote control valve controls |
| 11 | Selection button for remote control valve and loader (Loader type) |
| 12 | Joystick lock button (Loader type) |
| 13 | Joystick for remote control valve and loader (Loader type) |
| 14 | Front PTO clutch control switch (if equipped) |
| 15 | Rear PTO clutch control switch |
| 16 | Selection dial button |
| 17 | Speed Mode shift (Turtle and Rabbit speed modes) |

## Operator Console

Each button has indicator lights that light up depending on the function and state of that button. See Table 2-13 below.

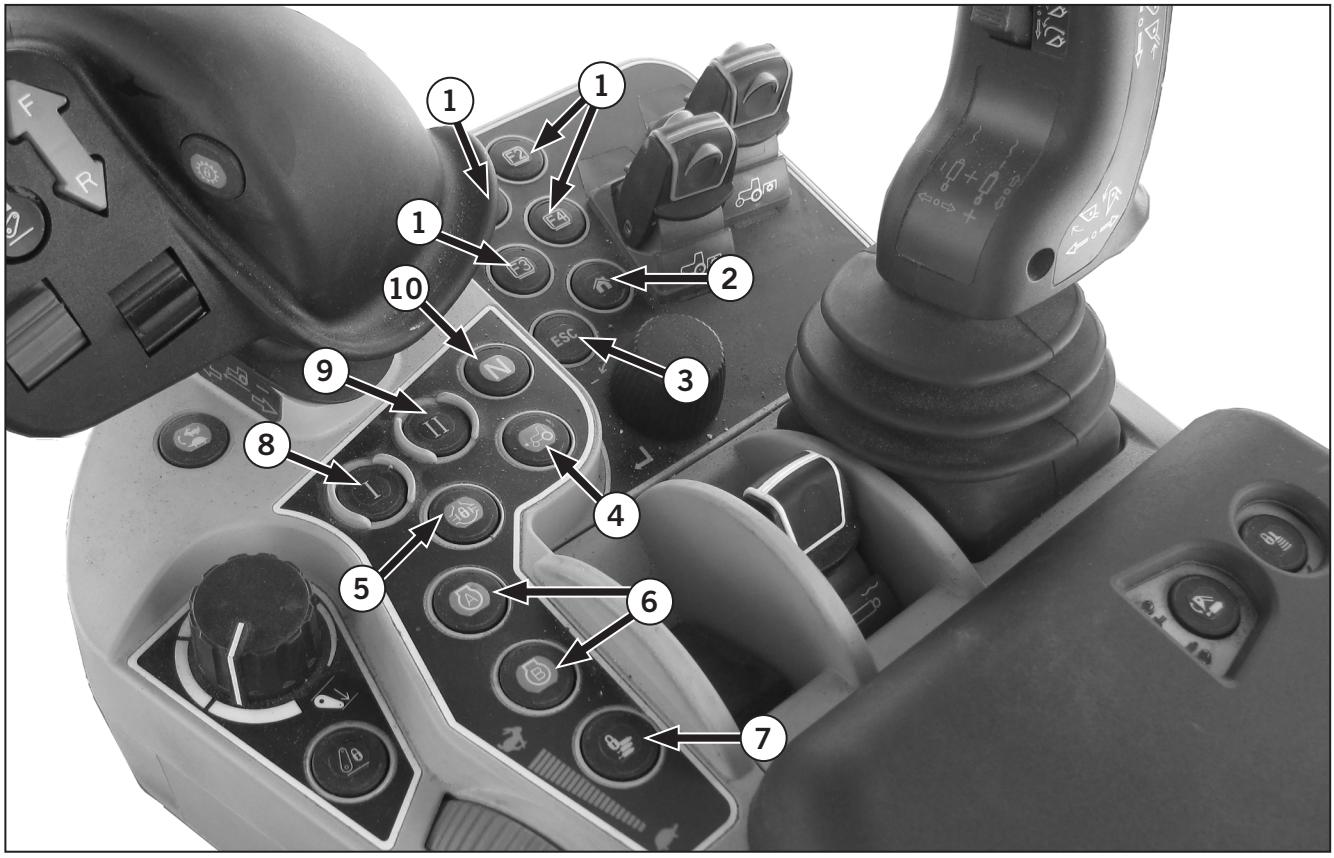



**Table 2-13: Operator Console**

| Ref | Description |
|---|---|
| 1 | Function buttons (4 in total) |
| 2 | Home button |
| 3 | Esc button |
| 4 | 4WD button |
| 5 | Differential button |
| 6 | Engine RPM memory button |
| 7 | Remote control valve lock button |
| 8 | Headland Management System field out button |

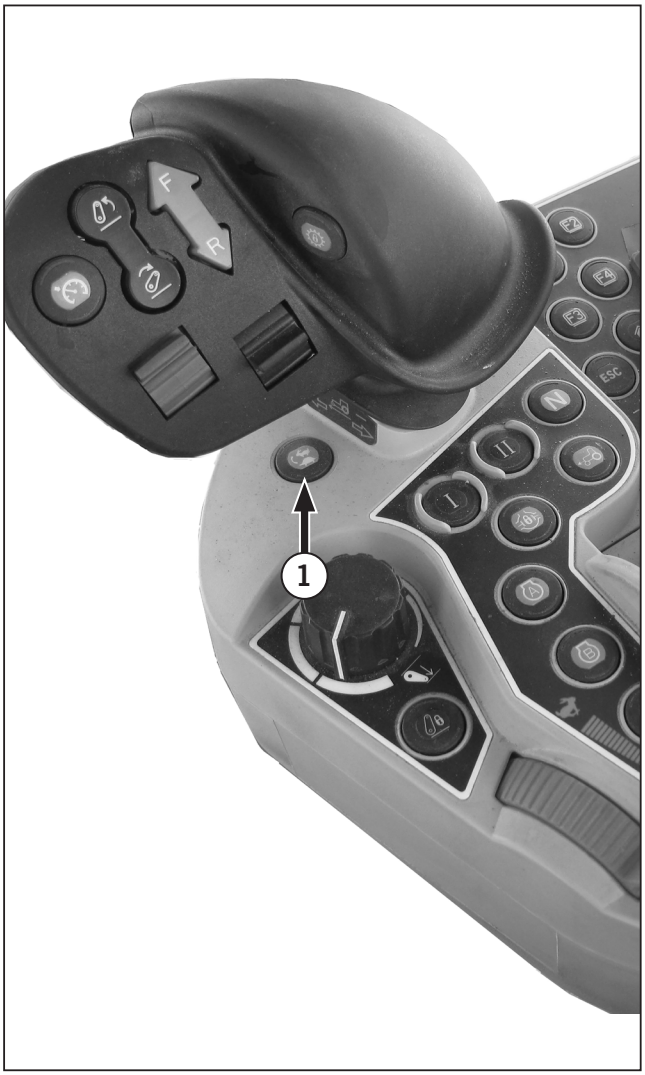
**Table 2-13: Operator Console**

| Ref | Description |
|---|---|
| 9 | Headland Management System field in button |
| 10 | Shuttle neutral button |

### Speed Mode shift

Press the speed mode shift button (1) to toggle between Turtle and Rabbit speed modes.

- Turtle speed mode will allow speeds up to 20 km/h (12 mph).
- Rabbit speed mode will allow speeds up to 40 or 50 km/h (31 mph).



## Hand Throttle

The hand throttle (1) provides the operator with instantaneous throttle control over the engine.

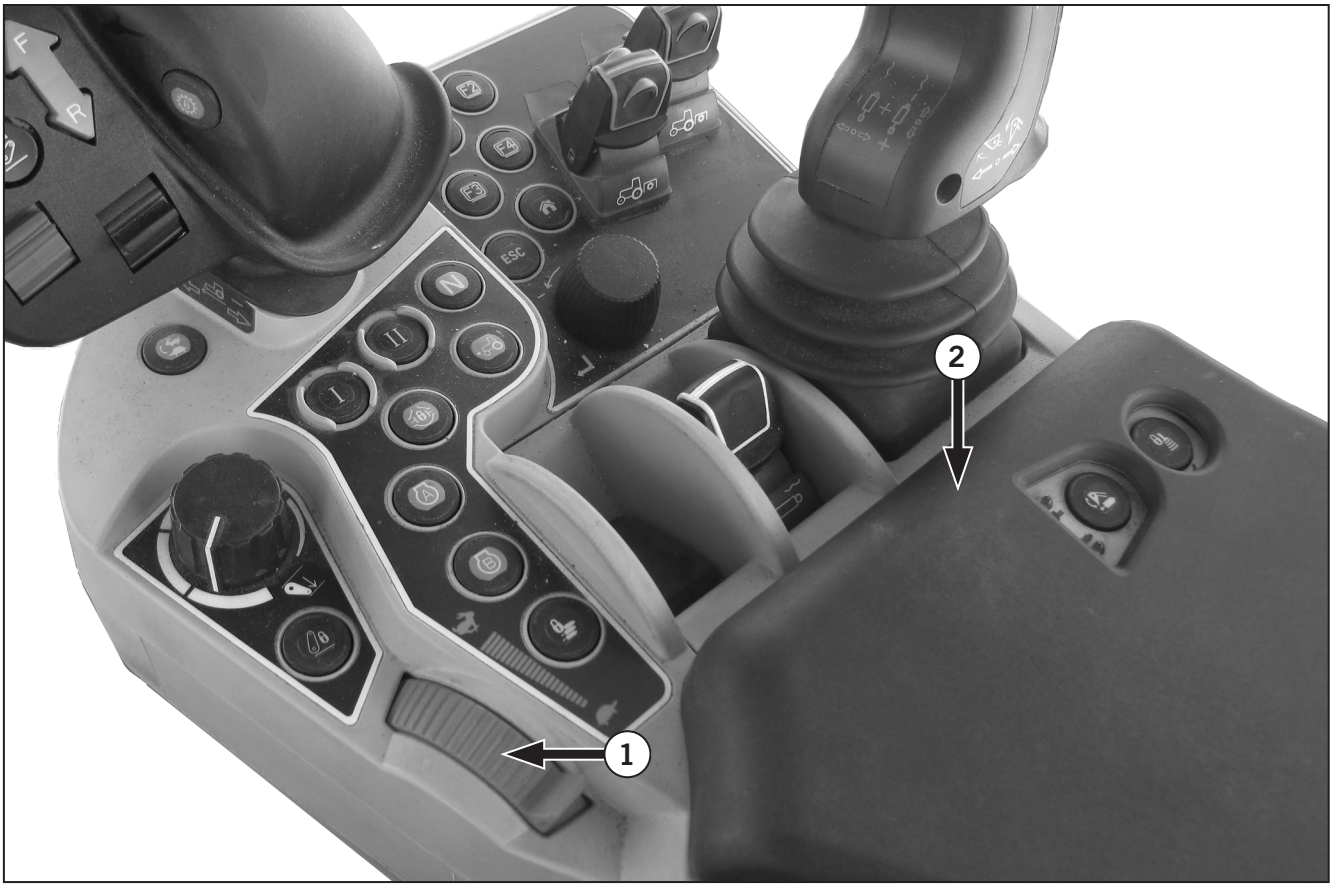
1. Push the throttle forward to progressively increase the engine speed
2. Pull the throttle back to reduce engine speed.

Complete instructions for adjusting speed: See “Adjusting Speed” on page 3-25.

## Arm Rest/Option Controls

An operator’s arm rest (2) is provided with the side operator console. Rest the right forearm on the arm rest to easily control the auto shift controller and the hand throttle.

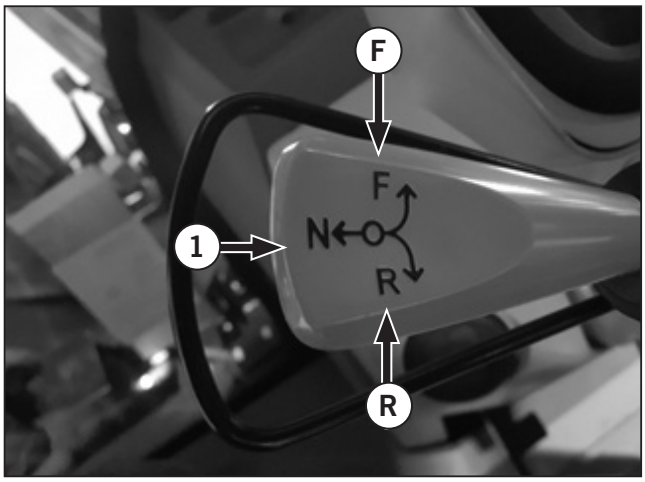
Lift the arm rest to open the storage compartment and provide access to optional controls if installed.



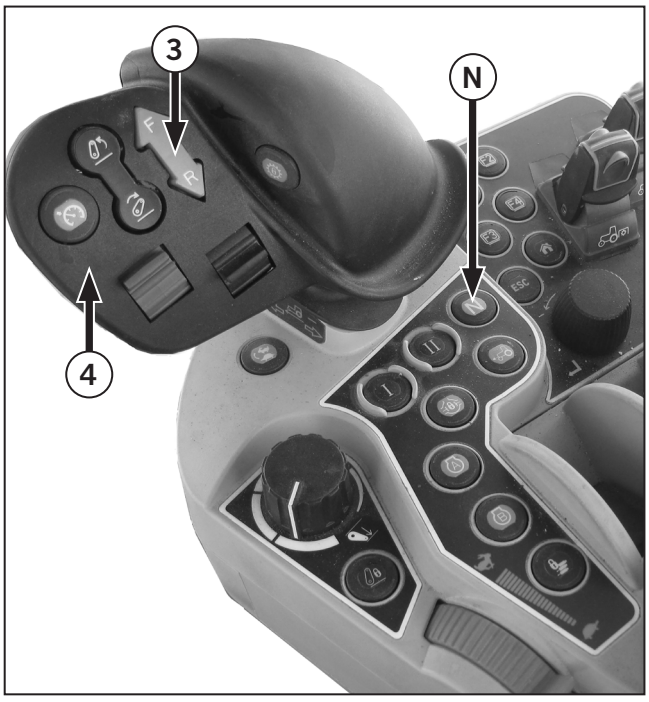
## Transmission Operation

Transmission operation can be performed in 2 ways, either by the FNR lever (1) on the steering console or by pressing and holding down the shuttle enable button (2) and pressing F or R on button (3) on the EZ-command center (4).

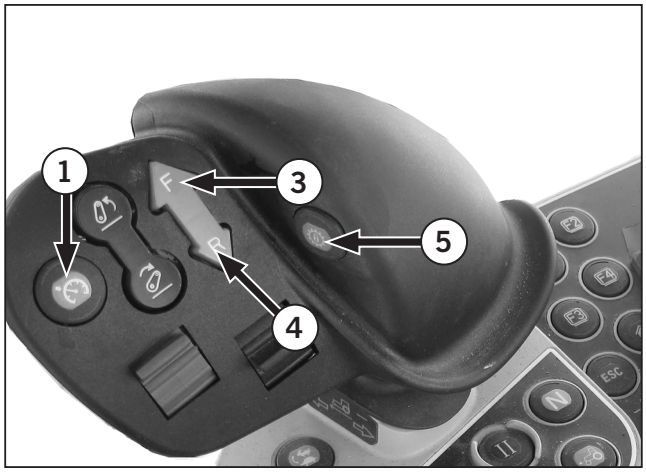
| Table 2-14: Transmission Operation with FNR Lever | |
|---|---|
| F | **Forward:** Lift the FNR lever and push the lever forward to engage forward motion. |
| R | **Reverse:** Lift the FNR lever from neutral and pull the lever back to engage revese motion. |
| N | **Neutral:** Push and hold down the FNR lever or press the neutral button on the armrest console. |







| Table 2-15: Transmission Operation with EZ-Command Center | |
|---|---|
| 1 | **Cruise:**<br>To activate cruise, press the button (1) once this will activate the last saved settings. |
| F | **Forward:** Press and hold the shuttle enable button (2) on the back of the EZ-Command Center. Then press the Forward button (3). |
| R | **Reverse:** Press and hold the shuttle enable button (2) on the back of the EZ-Command Center. Then press the Reverse button (4). |
| 5 | **Ratio Lock:** To activate ratio lock button, press the button (5). For more information. refer to "Operating Ratio Lock Button" on page 3-44. |
| Push the EZ-Command Center to speed up, the longer it's held the faster the travel speed will be. Release the lever to stay at the correct speed. | |
| Pull the EZ-Command lever back to reduce speed, the longer it's held, the slower the slower the travel speed will be. Release the lever to stay at current speed. | |




## Remote Valve Controls

The tractor is equipped with 3 or 5 hydraulic levers that control the movement of the implement. Depending on different-destination models and mounted options, however, the number of ports varies.

Carefully check the relation between each valve and control switch before connecting the hydraulic hoses.

(1) Remote control valve switch 1.

(2) Remote control valve switch 2.

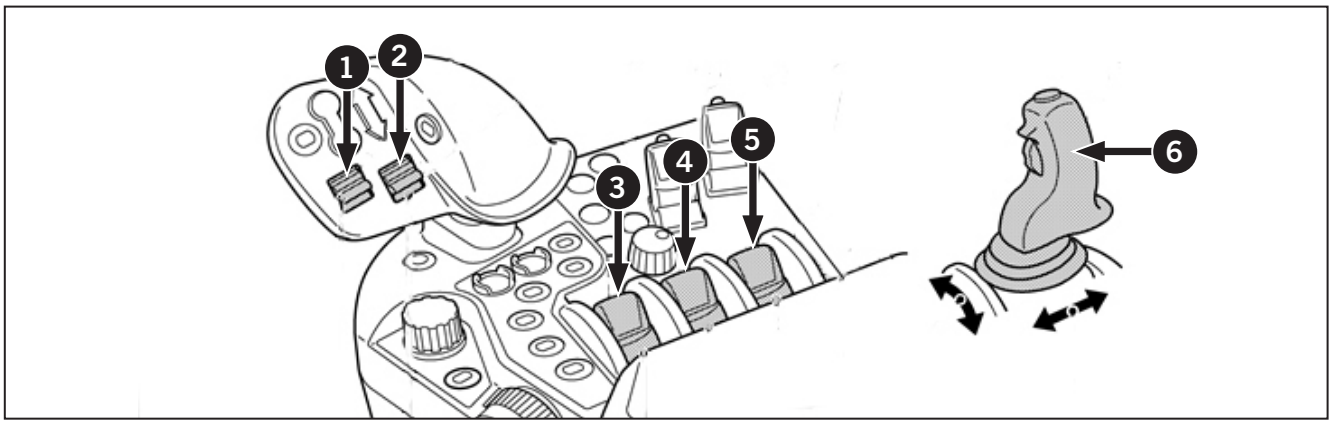
(3) Remote control valve switch 3.

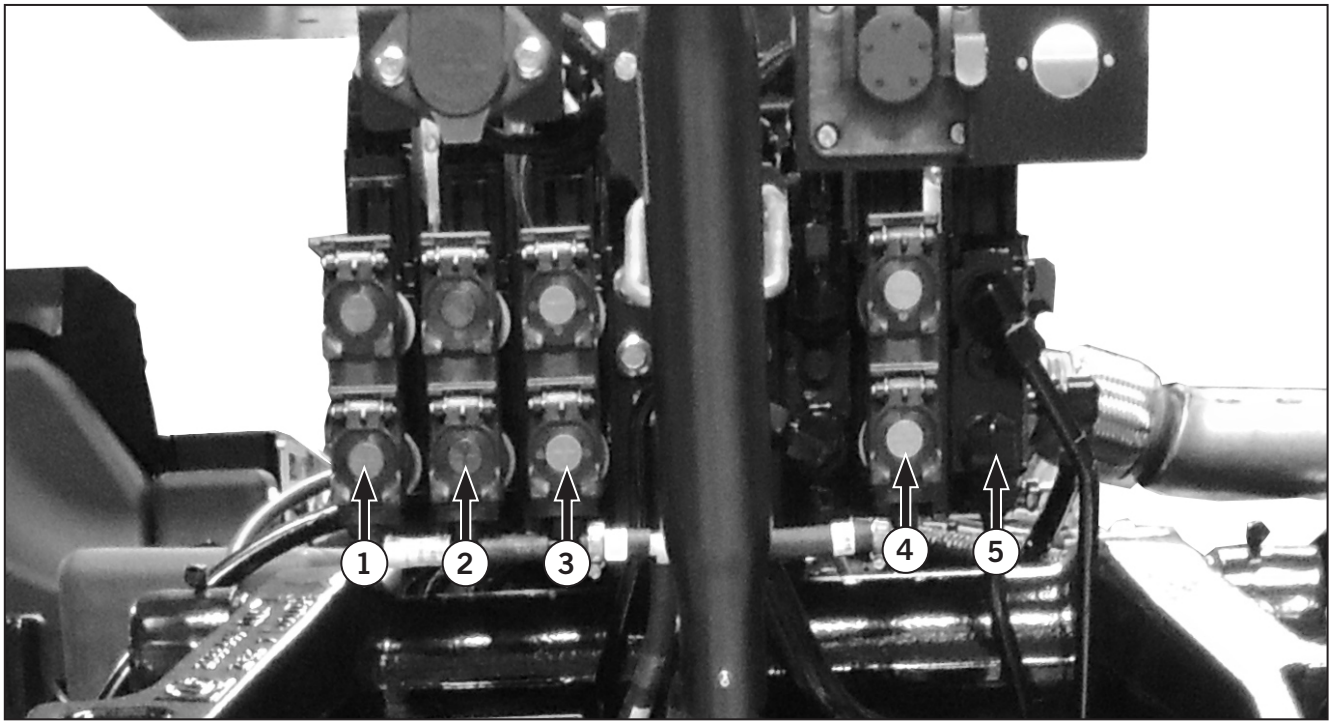
(4) Remote control valve switch 4.

(5) Remote control valve switch 5.

(6) If Loader is installed - Remote control valve switch (5)/Loader joystick.

Refer to “Remote Valve Controls” on page 4-8 for complete instructions.



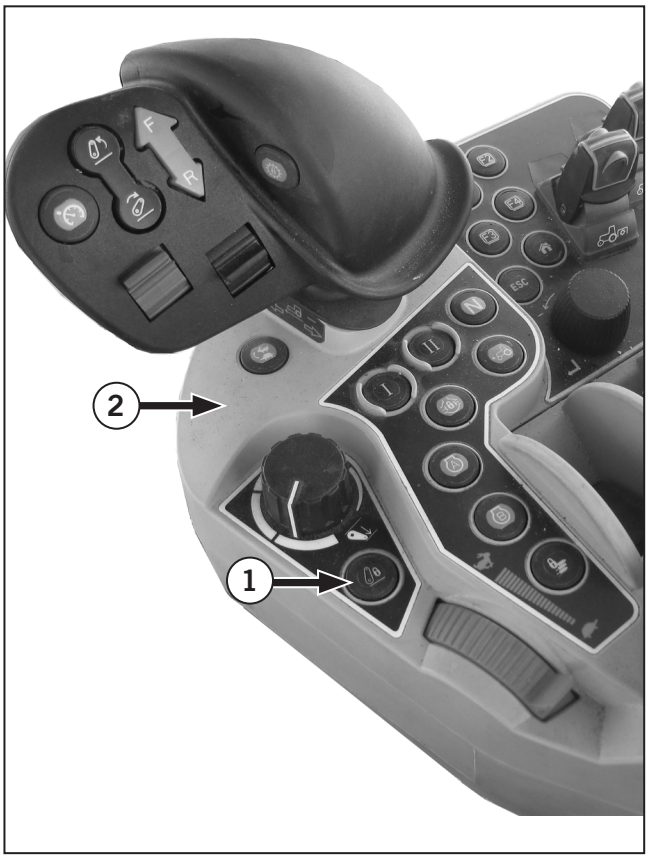



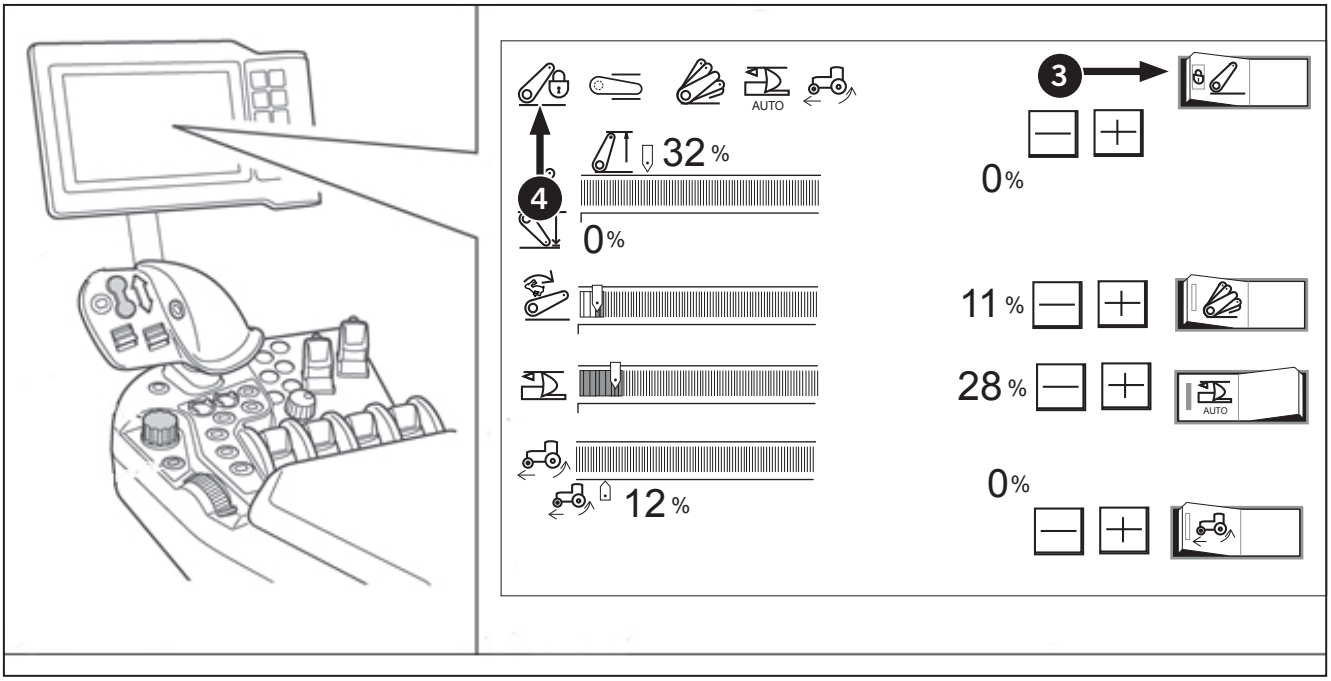
### 3pt Hitch Lock Button

The 3pt hitch lock button (1) locks the 3-pt hitch out for travel if not in use.

Press the 3pt hitch lock button (1) on the operator console (2) to enable/disable the 3pt hitch. Alternatively press the right side of 3pt hitch button (3) on the monitor to unlock 3pt hitch and press the left side to lock.

The 3pt hitch lock buttton (3) and icon (4) will be illuminated when 3pt hitch is locked and off when it is unlocked.



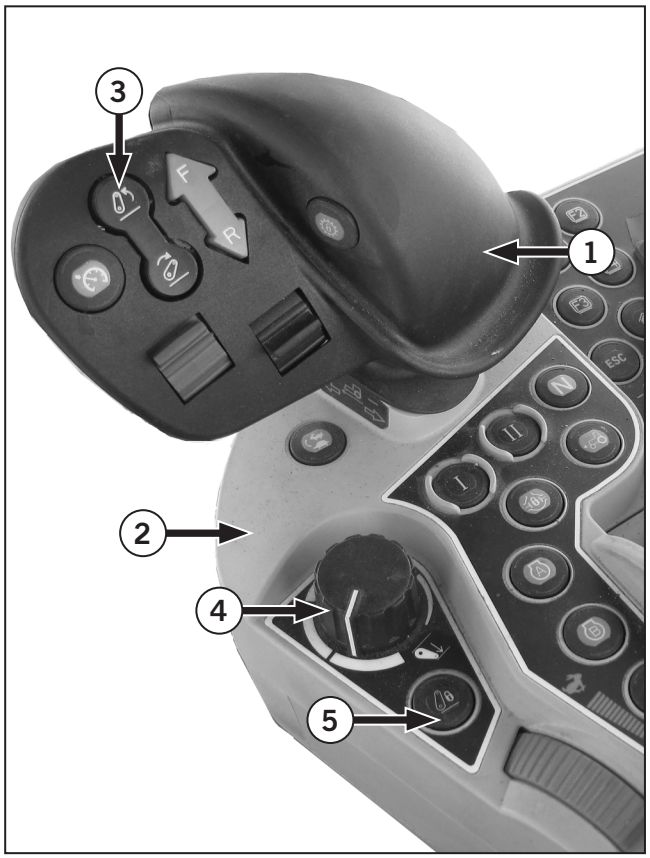



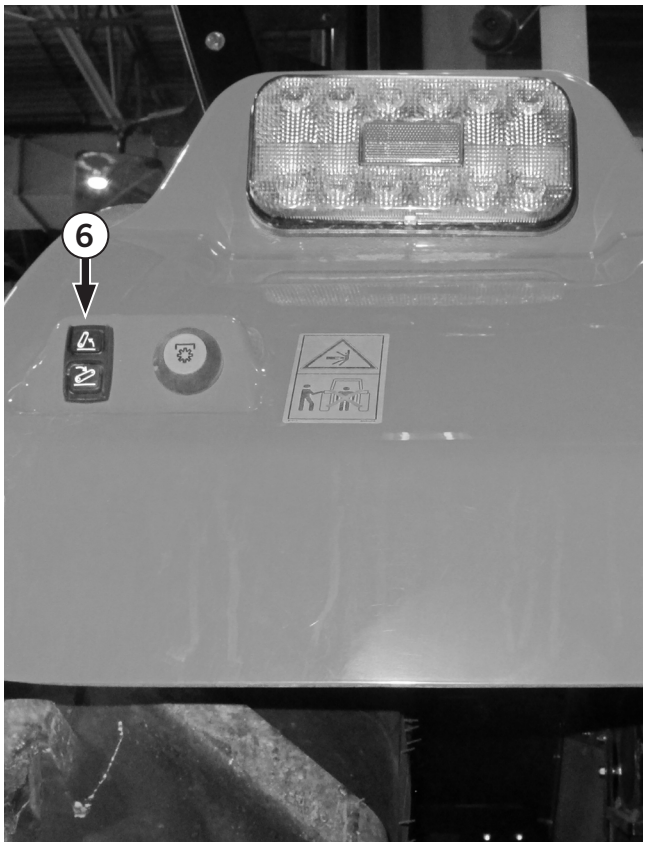
## 3-pt Hitch Controls

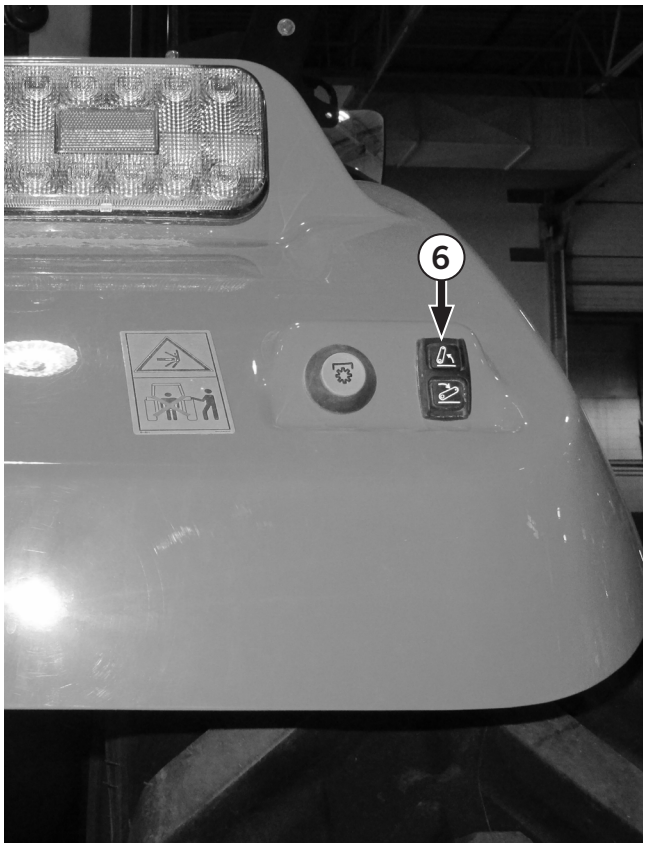
The 3-pt hitch controls is located on the EZ-Command Center (1) and Operator Console (2).

- Fast raise and lower switch (3)
- Depth control dial (Hydraulic dial) (4)
- 3-pt hitch lock button (5)
- External Raise/ Lower Switches (6) (Located on each rear fender).
- The rear 3-pt will only drop or raise to the height set in the dials or on the monitor.
- The upper limit can only be set using the sliding bar in the monitor.
- The lower limit can only be set with the dials on the armrest.
- Drop speed can only be changed in the monitor, with the rabbit image, no dial to control drop speed.

***NOTE: Fender switches override height and lower settings.***



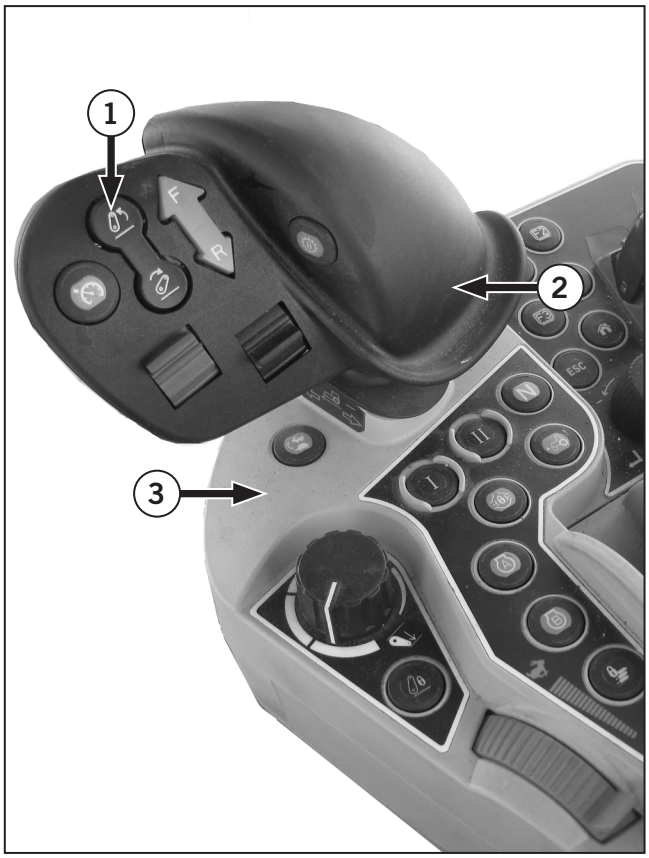
### 3-pt Hitch Quick Raise/Lower Switch

The 3-pt hitch quick raise/lower switch (1) is located on the EZ Command Center (2). This brings the 3-pt hitch to working depth or travel height.

### Depth Control Dial (Hydraulic Dial)

The manual control lever (3) controls the working depth of the hitch.

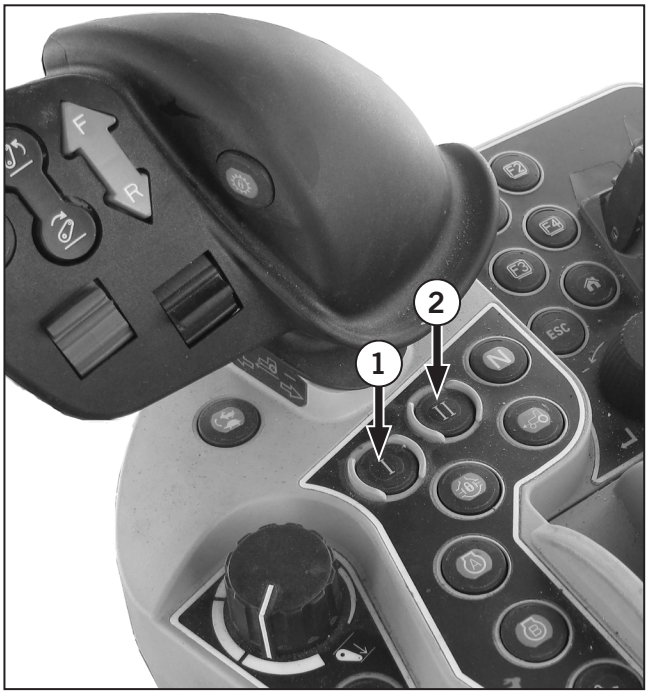
- The implement height (plowing depth) can be adjusted.
- For traveling on public roads, keep the implement raised with the dial.
- When the dial is preset for the implement to get to the lower limit, the 3-pt hitch quick raise/lower switch can be used to raise and lower the implement.




### Field in and out buttons

When the indicators of both buttons are on, press either the Field out (1) or Field in (2) buttons to activate the Headland Management System.

| Table 2-16: Field in and out button operation | |
|---|---|
| With the Headland Management System lock/unlock switch at lock position | Indicators of both buttons: OFF |
| With the Headland Management System program ready to run | No indicators for Out and In field buttons |
| With the field out button pressed and the program running | Indicator of field out button: ON<br>Indicator of field in button: OFF |

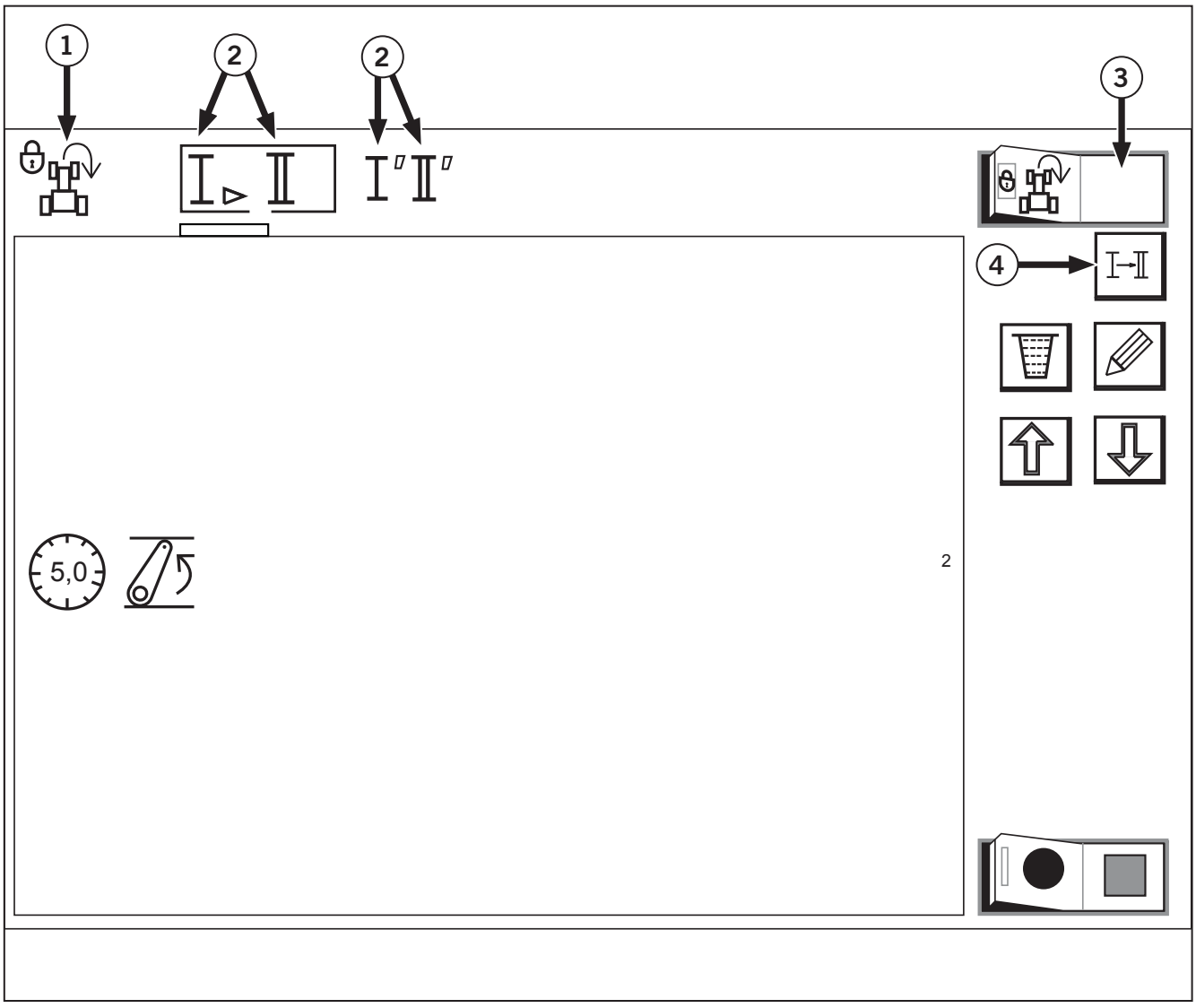


### Headland Management System Display Icons

The following icons are the “HMS Icons” displayed on the monitor when HMS is enabled. Refer to “Headland Management System” on page 3-186.

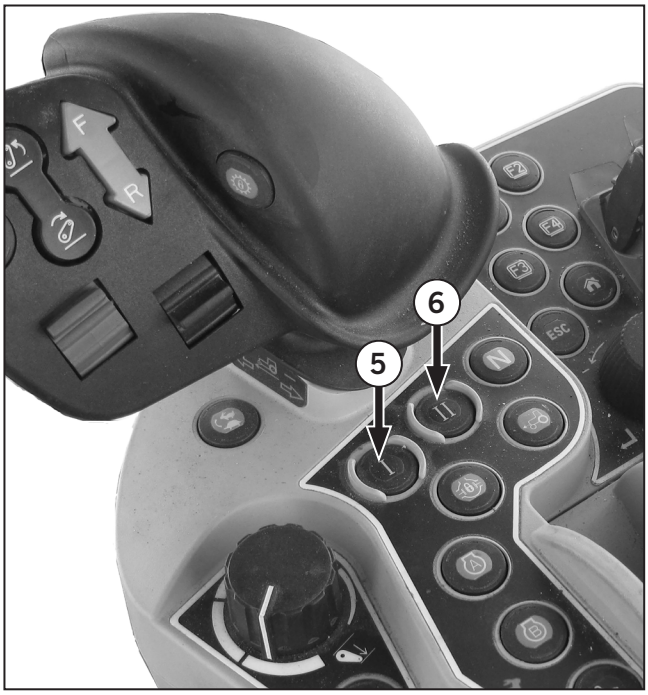
**Table 2-17: Road Mode Screen Icons**

| Icon | |
|---|---|
| 1 | Headland Management System lock indicator |
| 2 | Program code display indicator |
| 3 | Headland Management System lock/unlock switch |
| 4 | Program select switch |



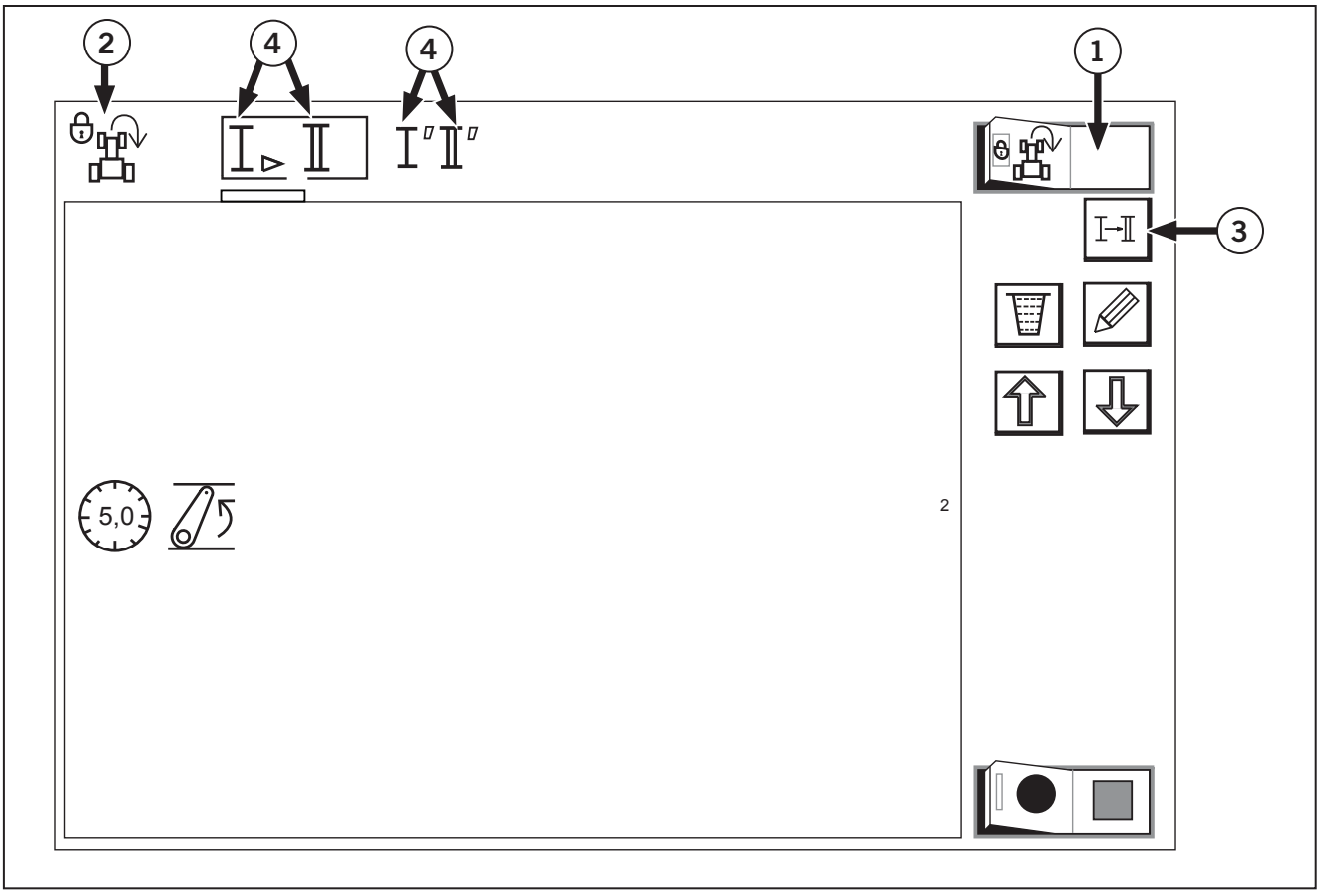
## Headland Management System

The purpose of the Headland Management System (HMS) is to reduce the number of actions performed by the operator while turning the vehicle at the end of the field. This is accomplished by recording the actions performed during the first turn and then replaying those actions during subsequent turns.



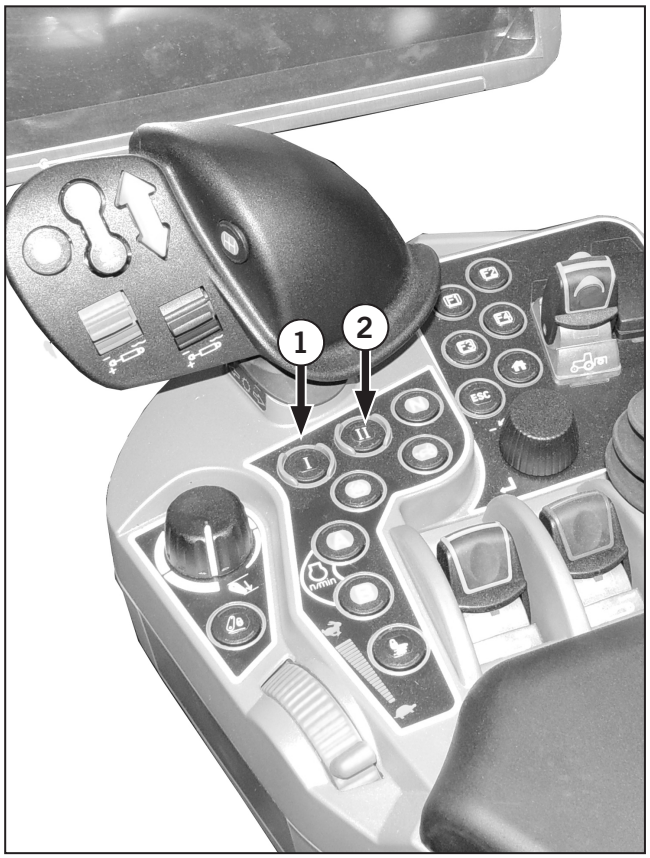

## Headland Management System Operation

1. Get the engine started and touch the right half of the Headland Management System lock/unlock switch (1) to unlock the system. Once unlocked, the indicator (2) goes off.
2. Using the program select switch (3), choose the recorded program code (I or II) (4). Once selected, the program code display indicator (4) lights up and stays on.
3. When the headland has been reached, press the Field out button (5). The recorded program will be carried on. After swiveling the machine, press the Field in button (6).
4. To interrupt the program execution, press the Field out or Field in button, for which the indicator stays on.



## Field out and in buttons

When indicators of the Field out (1) and Field in button (2) are on, press either of the buttons to activate the Headland Management System.



## PTO Controls

Use the PTO switches (1) inside the cab to operate the front or rear power take-off (PTO).

Lift and push the rocker switch forward to activate only when the engine is running.

Refer to PTO Operation in Section 3: Tractor Operation.


### PTO Speed Control Levers

**WARNING**

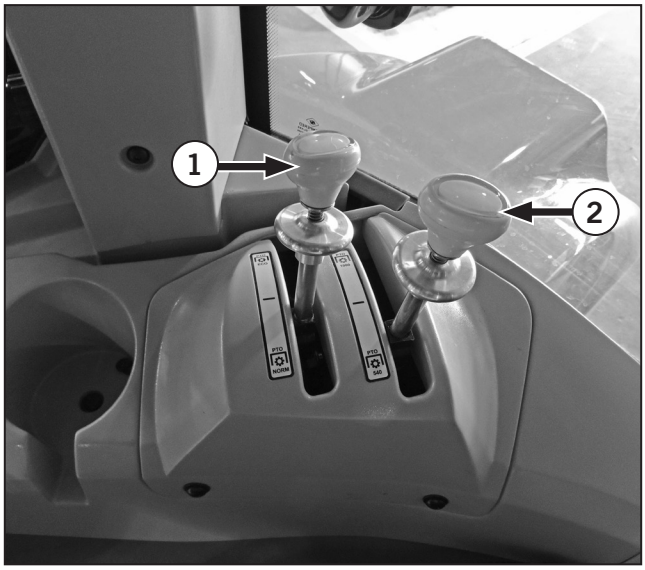
The PTO lever release locks are to be lifted to move the lever forward or backward and released immediately after this movement. Failure to release can cause the over-travel of the lever past the end of travel detent.

Choose from the following 4 PTO operating modes according to the type of implement or the workload.

Set the Mode Selector Lever (1) to the NORMAL mode for general work and the ECONOMY mode for light-duty work only.

In the ECONOMY mode, the engine runs at a lower speed for energy saving operation.

Use PTO Speed Lever (2) to select either a 540 or 1 000 rpm to suit the implement in use.



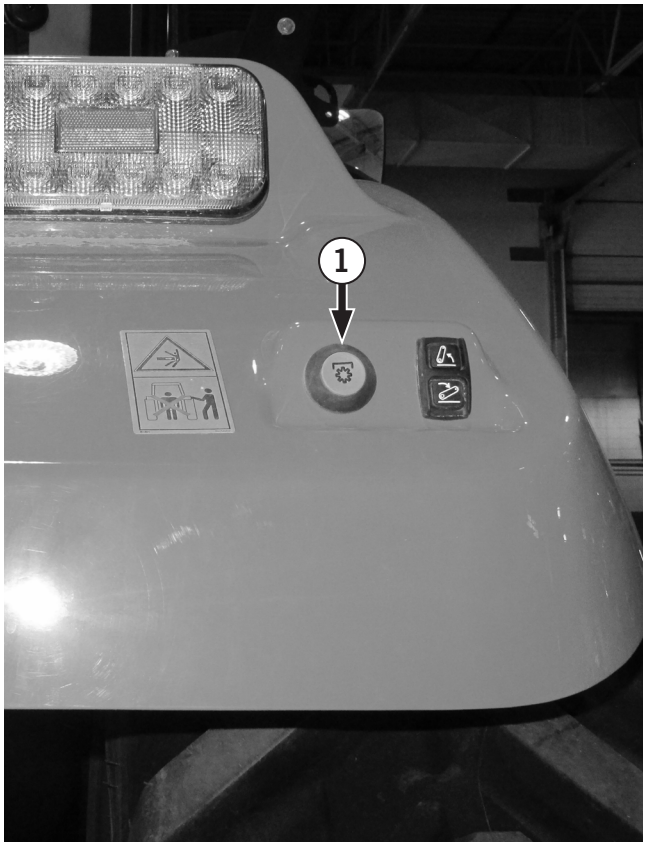
## Fender-mounted PTO Switches

The fender-mounted PTO switches (1) are located near the rear brake lights.

- Press the external PTO switches to turn off the PTO.

  ***NOTE: PTO fender switches are shut-off switches only and does not engage the PTO. They are only use to turn the PTO off. These functions are for both the front and rear PTO.***

Refer to PTO Operation in Section 3: Tractor Operation.

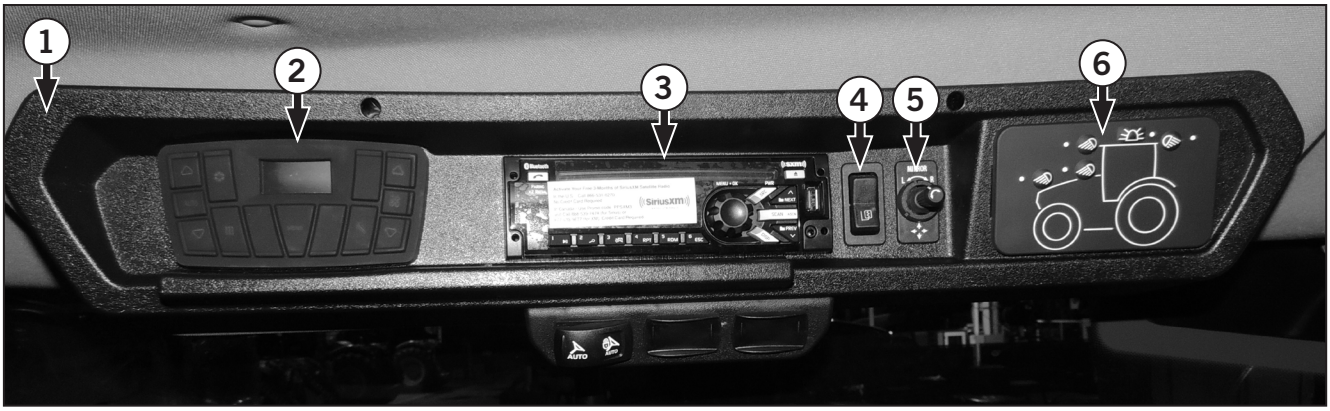



## Cab Accessory Panel

The cab accesory panel (1) contains controls for the following:

- (2) Heating and cooling controls (ATC).
- (3) Radio.
- (4) Heated mirrors.
- (5) Power mirrors.
- (6) Exterior Lights.

See the following pages for details.



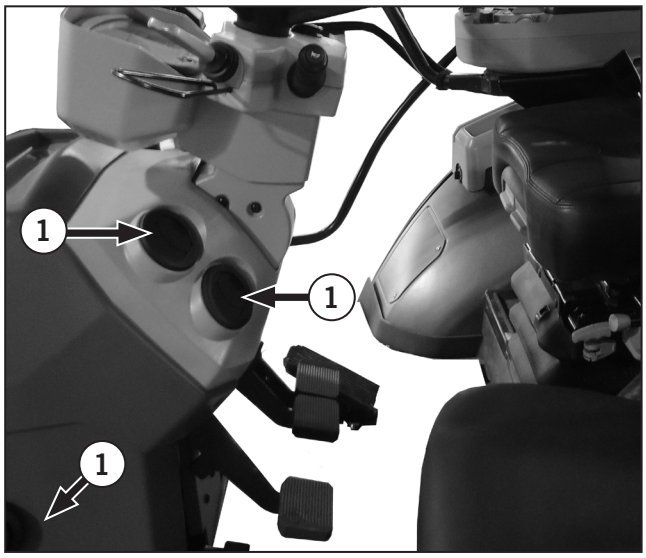
## Cab Air Vents

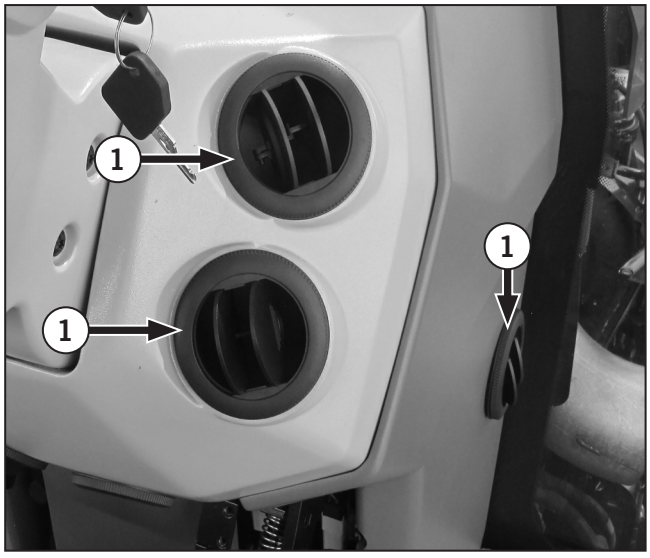
There are 10 air vents (1) in the inside of the cab located in the following locations:

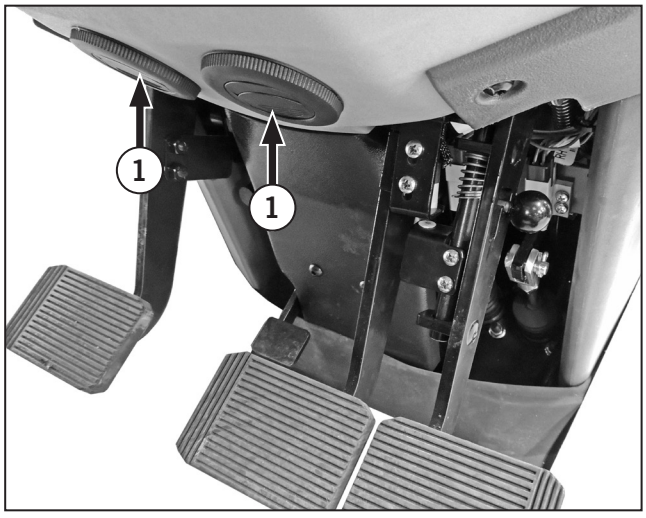
- Steering column (4 in total)
- Lower part of steering column (2 in total)
- Left side of the cab (1 in total)
- Right side of the cab (1 in total)
- Front window of the cab (2 in total)

These vents deliver heated or cooled air and can be rotated and adjusted to operator preference.

1. Air vents can be closed and air directed down or up by pushing down on the louvered vent
2. Air can be directed 360° degrees by rotating the exterior ring except the 2 at the top of the steering console.



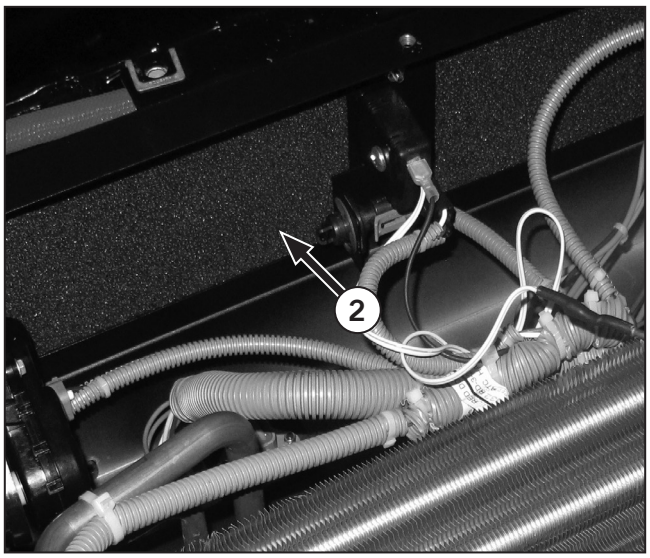



## Cab Roof Outside Air Filter

There is 1 air filter (1) located on the left side of the cab roof which filters the outside air coming into the cab.


## Inside Cab Air Filter

There is 1 cab air filter (2) located behind the operators seat on the right side which filters the recirculated air in the cab.

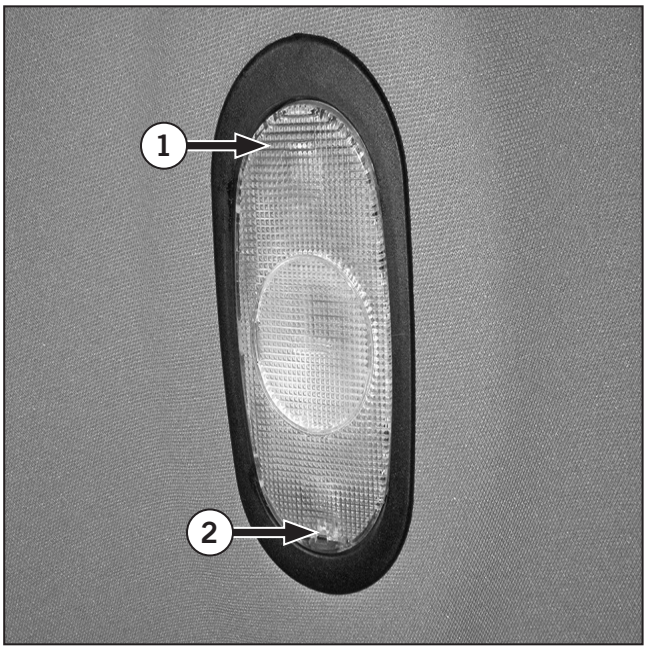


## Interior Dome Light

An interior dome light is located above the driver on the left side of the headliner. It is either activated manually by pushing the switch to position (1) or can be activated when the door is opened by switching it to position (2).

1. Push on either side of the light (2) to turn the dome light on or off. This overriding the door switch.

***NOTE: In this position if the door is left open the light will stay on. If switch is left in the center the light wont come on.***




## Sun Blinds (option)

Front and rear sun blinds are available as factory-installed options or as dealer-installed accessories.

The sun blind can be pulled down to provide shade from the direct glare of the sun. Push up to retract.

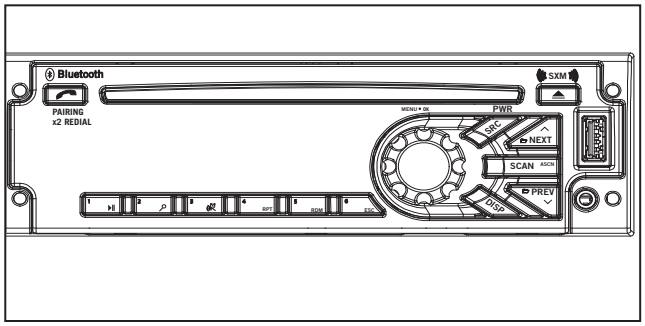
## Radio Options

Depending on the options selected, the tractor will come equipped with a AM/FM radio with CD and MP3 or satellite radio with CD, MP3 and USB.

***NOTE: Satellite radios require either an XM or Sirius satellite radio subscription and antenna.***

The radio (1) is located above the operator seat. Speakers are behind the headliner at the rear of the cab above the operator. The radio can be controlled using the fade option. Follow the supplied radio instruction manual for correct radio operation. Contact a KUBOTA dealer for more information.

***NOTE: The appearance of the radio varies depending on the type. The below image is an example.***




## Heating and Cooling Controls (Manual)

**CAUTION**

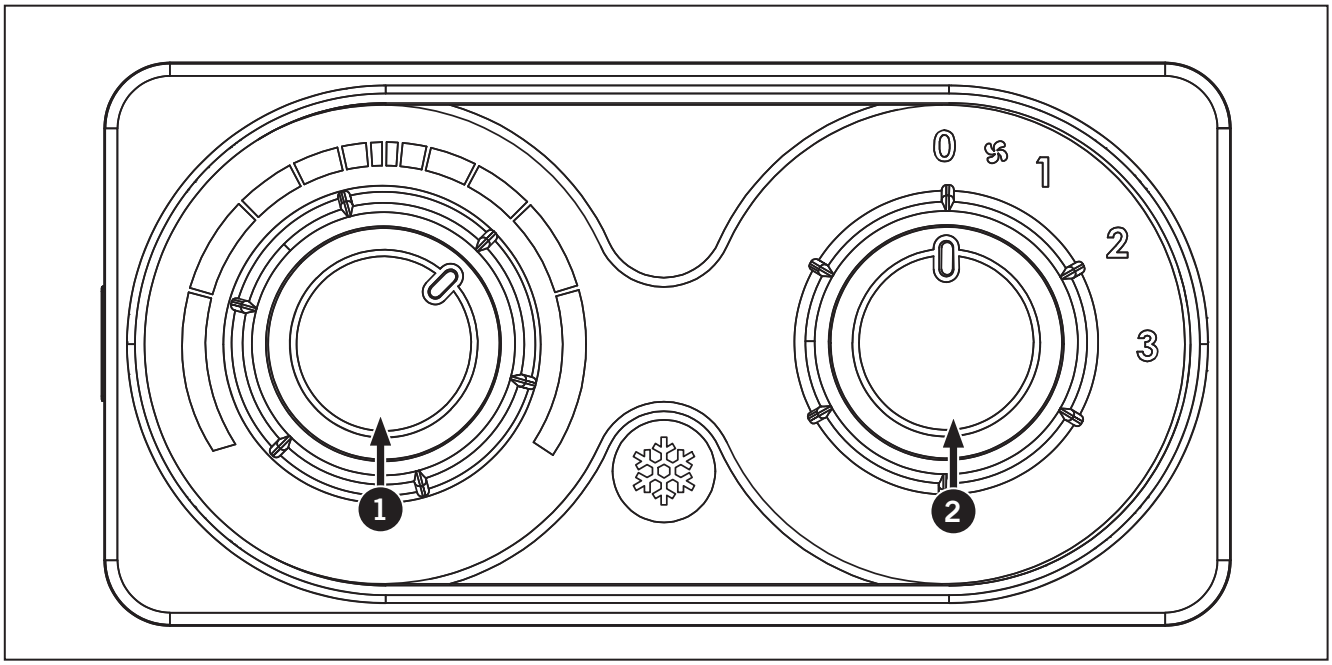
The air conditioning system (A/C) uses R-134A refridgerant. Do not mix with other refridgerants. Consult a qualified technician for all air conditioning repairs.

Cab heating and cooling controls are located above the driver seat, on the right side, to the left of the radio.

***NOTE: The appearance of the controls may vary slightly from the illustrations but the operating instructions remain the same.***

### Manual Controls

1. Rotate the temperature control (1) to the right to turn on the temperature.
2. Adjust temperature by rotating the temperature control.
3. Adjust fan settings using the control knob located on the left (2).



## Heating and Cooling Controls (ATC) Identification

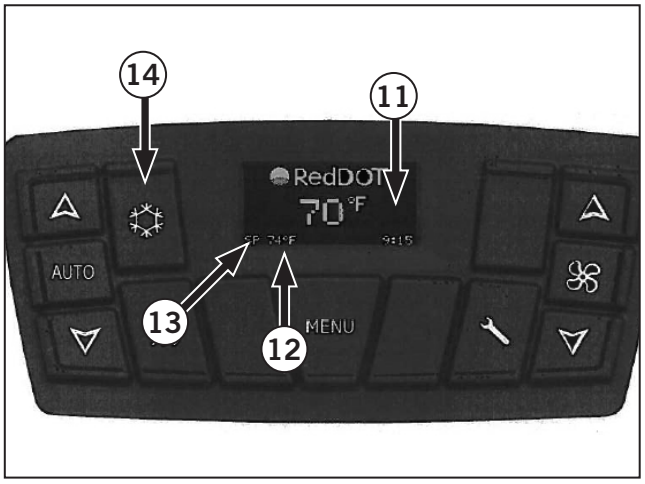
**CAUTION**

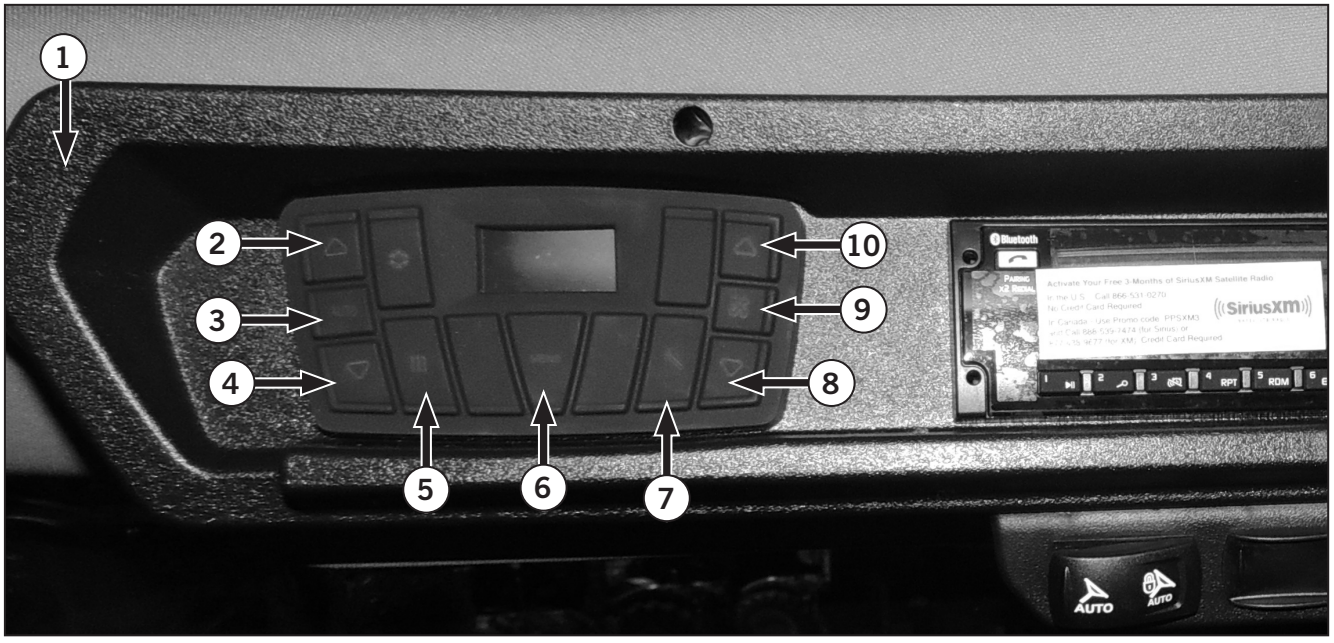
The air conditioning system (A/C) uses R-134A refridgerant. Do not mix with other refridgerants. Consult a qualified technician for all air conditioning repairs.

Cab heating and cooling panel (1) are located above the driver seat, on the right side, to the left of the radio. The control panel consists of a keypad and a display for viewing parameters, operating status and temperature.

***NOTE: The appearance of the controls may vary slightly from the illustrations but the operating instructions remain the same.***

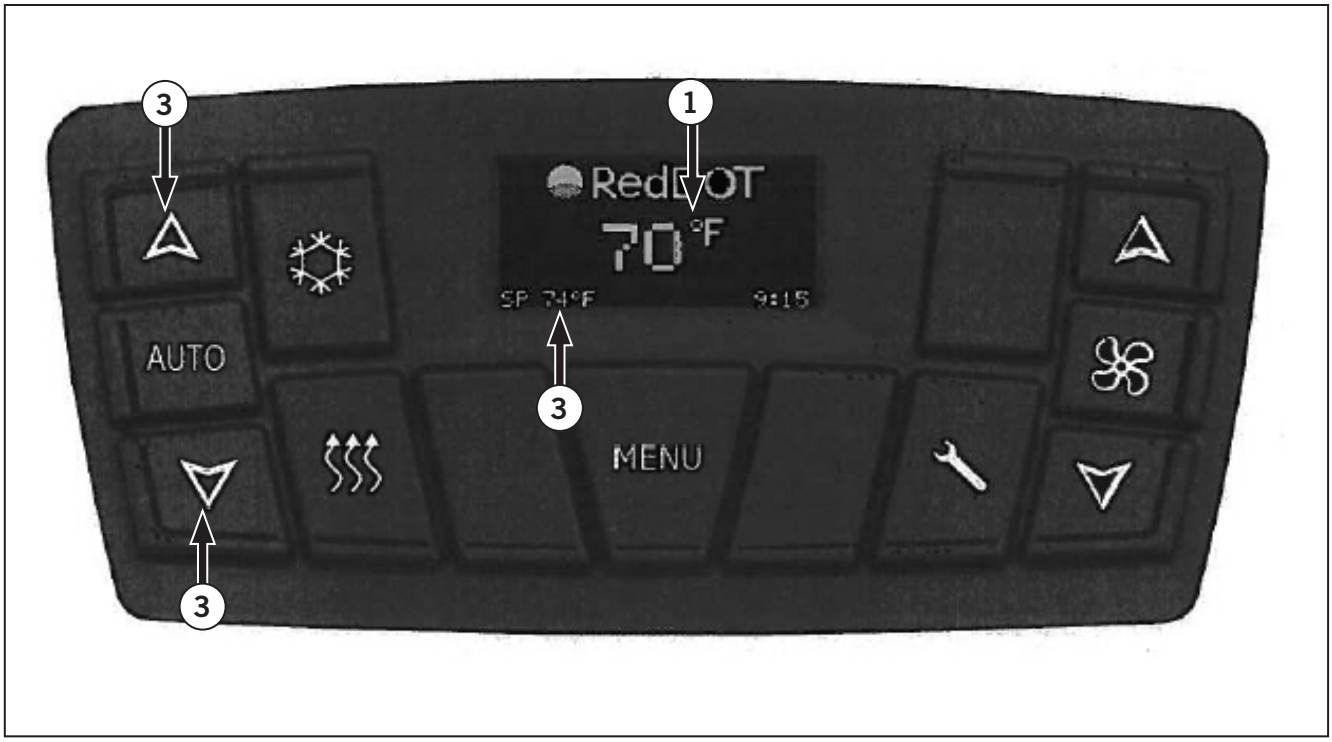
- Up key (2)
- Auto key (3)
- Down key (4)
- Heating/Back key (5)
- Menu (6)
- Maintenance/Enter key (7)
- Vent Down key (8)
- Vent key (9)
- Vent Up key (10)
- Main (11)
- Auxiliary (12)
- Coil Defrost (13)
- Cooling (14)



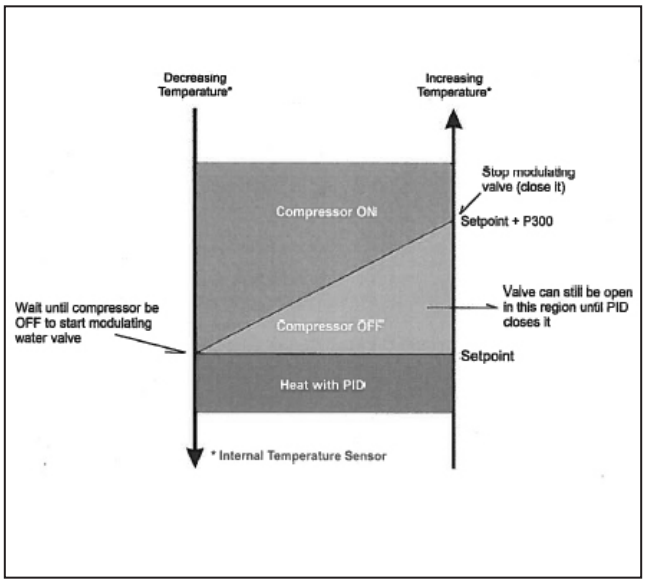



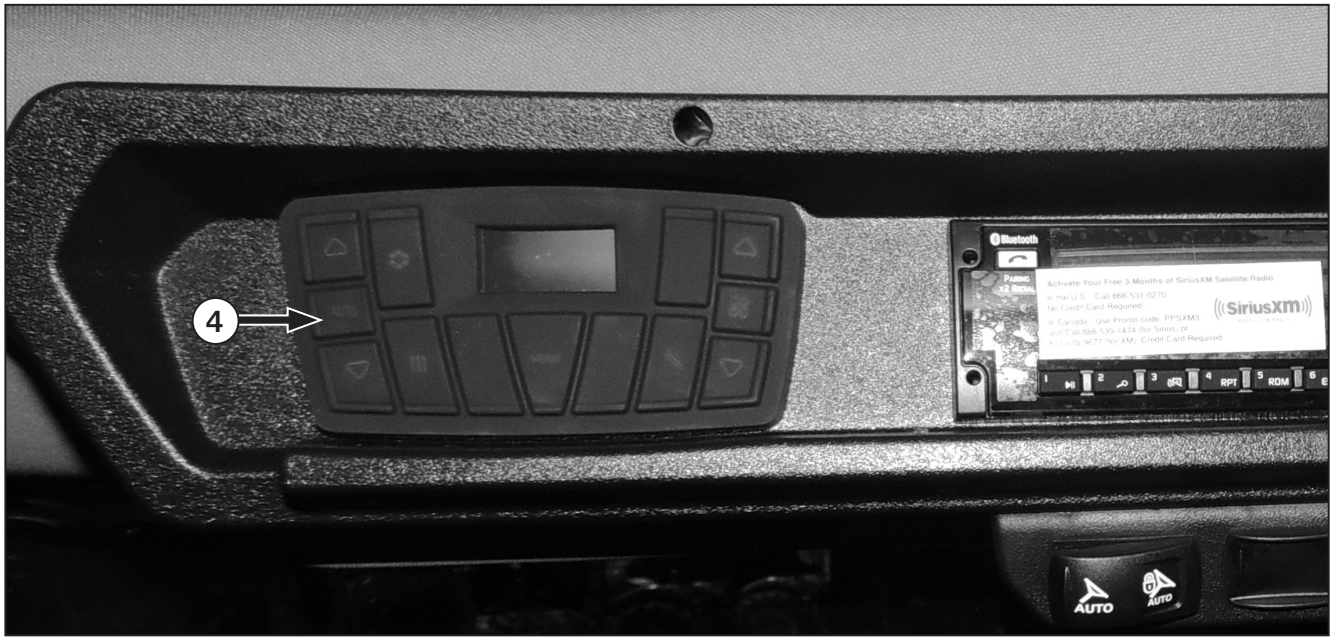
## Heating and Cooling Controls (ATC)

- **Power** - When the panel is powered at 12VDC/ 24 VDC, the main screen appears displaying the set point or internal temperature value in the main field. The control will assume the last option selected before shutdown when the P217 paramenter is set to “Last State”. If P217 is set to “ON”, automatic mode will be assigned both for control and ventilation. And finally, if P217 is set to “OFF”, control and ventilation are intialized in OFF status.
- **Main Screen (1)** - On the main screen, the display shows two values in the main and auxiliary fields (2). Main can be set to display the setpoint or internal temperature depending on the value of P248 parameter. In this case, to display the setpoint, press Up and Down keys (3). Auxiliary can be set to display the external temperature or internal temperature by means of P249 parameter. The main screen also display the current time and coil defrost status.



- **AUTO Key (4)** - The AUTO key enables. automatic temperature control. It means that, depending on the internal temperature (see chart). The control could be only in ventilation, cooling or heating mode. The control status can be viewed by the colors of the indication bars in AUTO: if the color is green, this means the module is in ventilation mode only (water valve is closed and compressor is OFF); if blue, it is in cooling mode and red color indicates the control is in heating/warming mode. Note heating is achieved using a hot water valve, where its opening is controlled by a PID controller. The error signal for this PID is the difference between internal temperature and setpoint. The constants Kp, Ki and Ts (differential portion Kd is zero) are given by parameters P700, P701 and P703 respectively.
- **Setpoint** - Setpoint is the desired temperature inside the vehicle. To adjust, press Up or Down on the left side of the panel. The setpoint temperature will be displayed. Press one of the keys again until it reaches the desired temperature. If the parameter P248 is set to display the internal temperature, the respective value will be displayed after adjusting the setpoint. Otherwise, the setpoint value will remain exhibited on the screen.

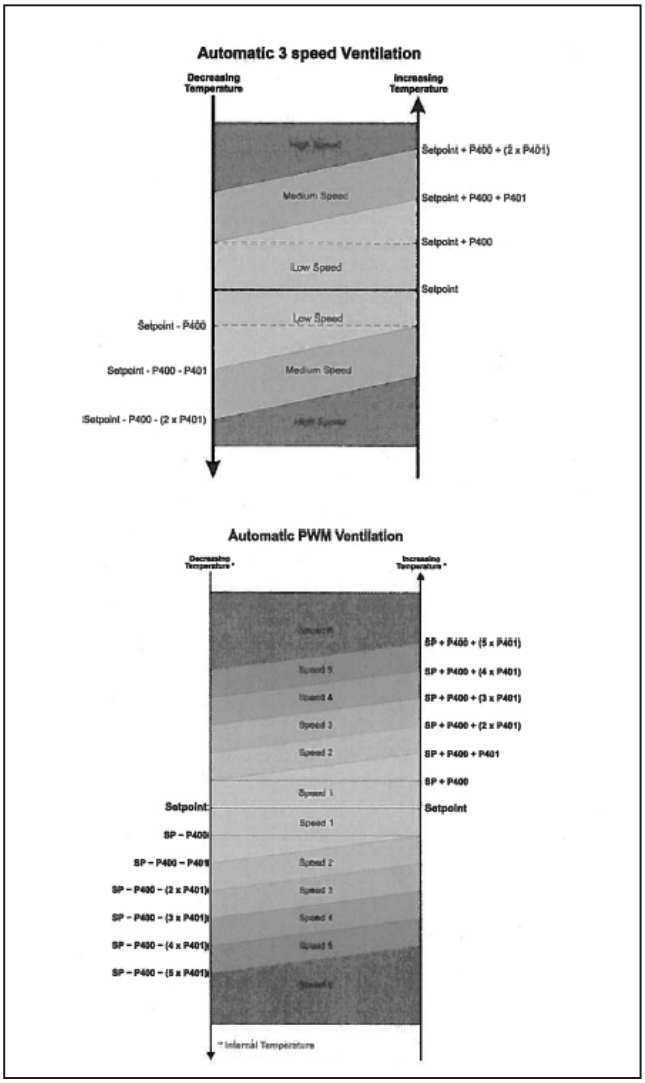


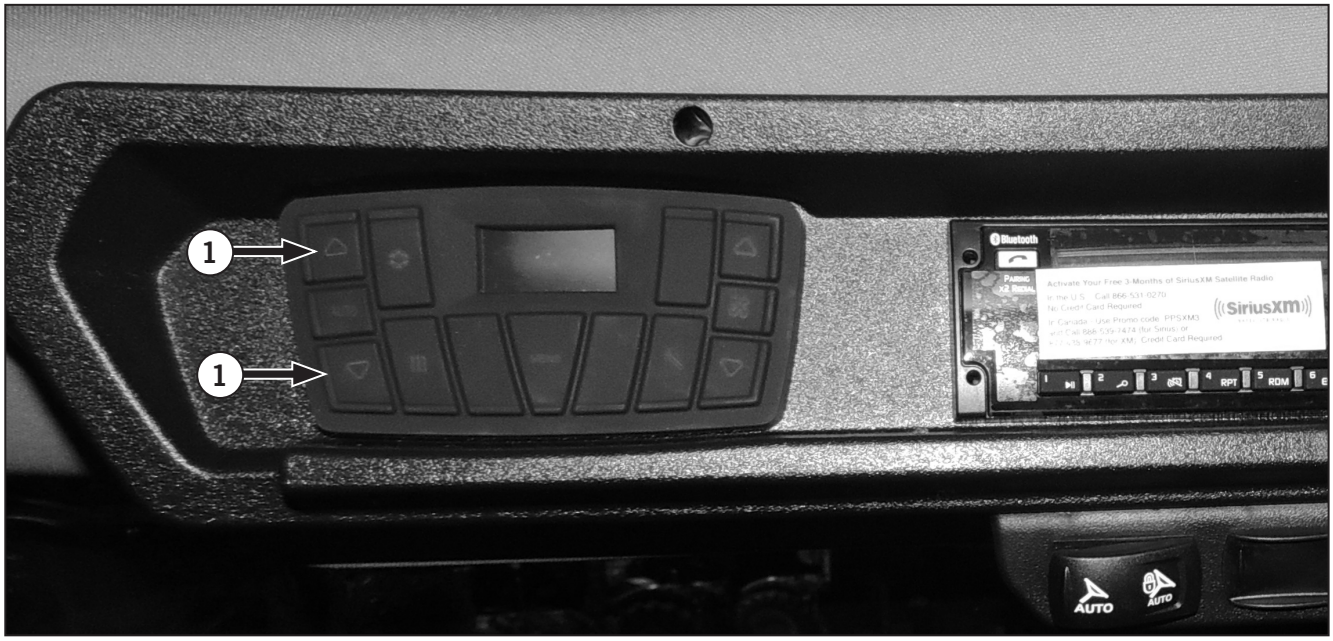



- **Ventilation (Manual)** - The panel as the manual ventilation option. This function has 3 speeds (low, medium and high) when the P261 parameter is set to “3 speed”. In this configuration, module GL-M1HRT001 activates 3 individual outputs corresponding to low, medium and high speeds. The system can be also set for PWM evaporator when P261 is set to “PWM”. In this case, we have 6 speed levels available, which can be adjusted via P402-P407 parameters. To change the speed, press Vent Up or Vent Down keys (1). When the buttons are pressed, a pop-up panel appears on the screen indicating the selected option. In addition, the color sidebar rolls up and down based on the selection or remians off if the speed is automatic or off.

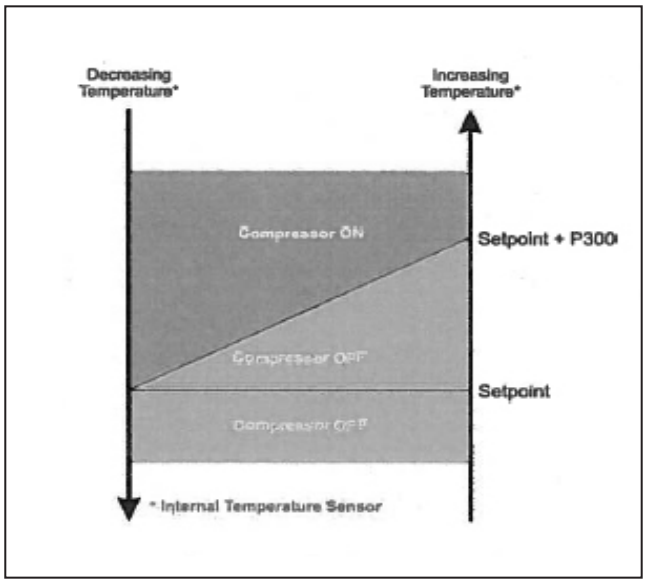
  ***NOTE: Manual ventilation can be activated even when the temperature control is off.***

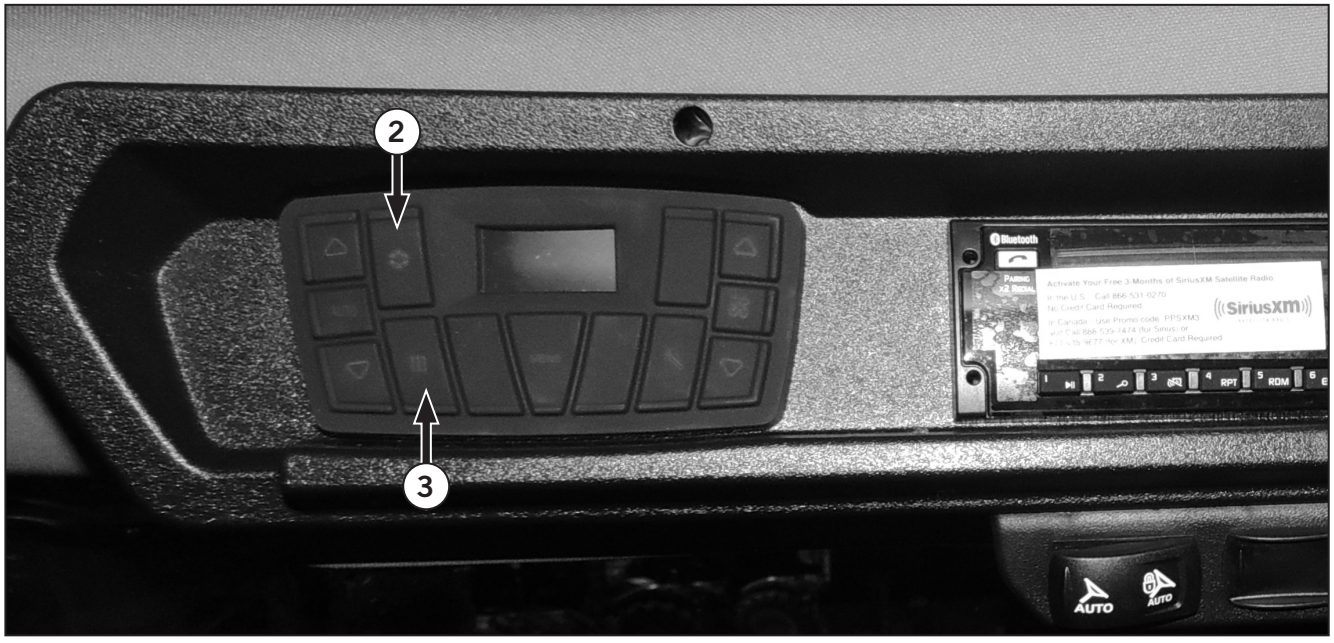
- **Ventilation (Automatic)** - Ventilation will always start in automatic mode when any of the (AUTO, HEATING or COOLING) functions is enabled. Its control depends on the setpoint and P400 and P401 parameters, as shown in the charts.
- The ventilation can be deactivated in heating mode by setting the P259 parameter. The manual ventilation mode stil remains available.



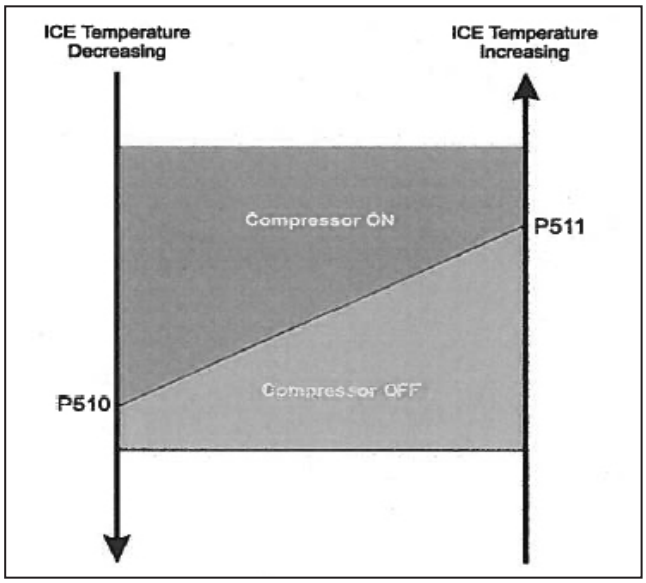



- **Cooling key (2)** - Cooling is enabled by the COOLING key and its operation is illustrated by the chart. The indication bar of the cooling key wil change to blue color. A 30 second hysteresis occurs for compressor to be turned off and turned on again.
- **"AC ON" Output** - The module GL-M1HRT001 has an output called "AC ON" that allows the vehicle's condenser blower be turned ON. This output is ON when the controller is in heating mode (either by HEATING key or AUTO mode) or in ventilation only mode. The "AC ON" is an independent output. Its state is not determined by pressure failure, coil defrost or even compressor state. It is turned ON/ OFF just considering the actual controller/system operating mode.
- **Heating key (3)** - Heating/warming is enabled by the HEATING key. The indication bar of the heating key will change to red color. The module GL-M1HRT001 actuates in a water valve to control the heating temperature. Similar to heating in AUTO mode, a PID controller is used to keep internal temperature as close as possible to the setpoint. The error signal for the PID is the difference between internal temperature setpoint. The constants K, Ki and Ts (differential portin Kd is zero) are given by parameters P700, P701 and P703 respectively.



- **Pressure Monitoring** - The cooling system pressure is monitored by a pressure switch inlet on the GL-M1HRT001 module where low and high pressure switches can be connected in series. After an out-of-range event, the compressor will take 3 min to restart if the pressure has been reestablished to normal values.
- **Coil Defrost** - The controller provides the coil defrost function, which is enabled via parameter P521. Parameters P510 and P511 define the defrost start and end temperatures with defrost enabled. When coil defrost is enabled, the compressor outlet will be turned off. The coil defrost on/off status is indicated by the "DEF" symbol on main screen.

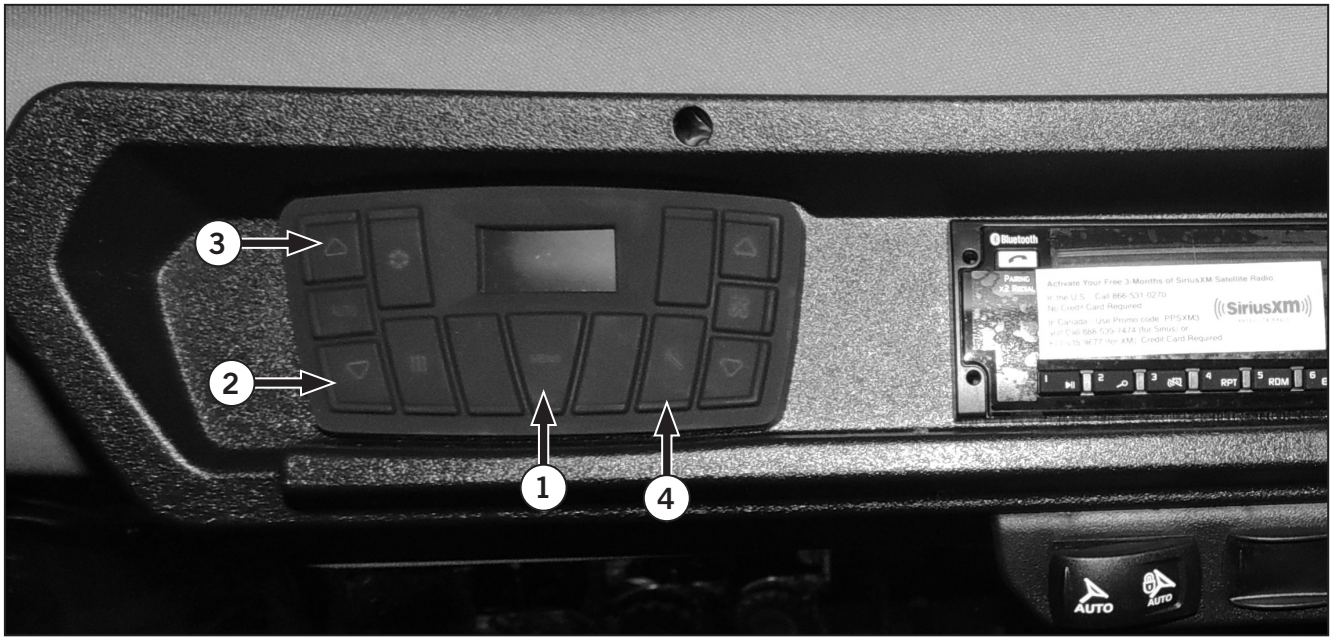


## System Parameters

To access the system parameters, perform the following instructions.

1. Press the Menu key (1).
2. Press the Vent Down key (2) to reach the Parameters option.
3. Enter password 1041 by using the Vent Down key (2) and Vent Up key (3). Confirm the password entry using the Enter key (4).
4. Select the desired parameter by using either Vent Down or Vent Up keys (2 and 3). Press the Enter (4) to edit the parameter.
5. Change the parameter by pressing Vent Down or Vent Up keys. Press Enter to confirm.
6. Return to the main screen by pressing the Back key.

***NOTE: The parameter values can be reset to their default values via Reset Parameters tab with password 0370.***

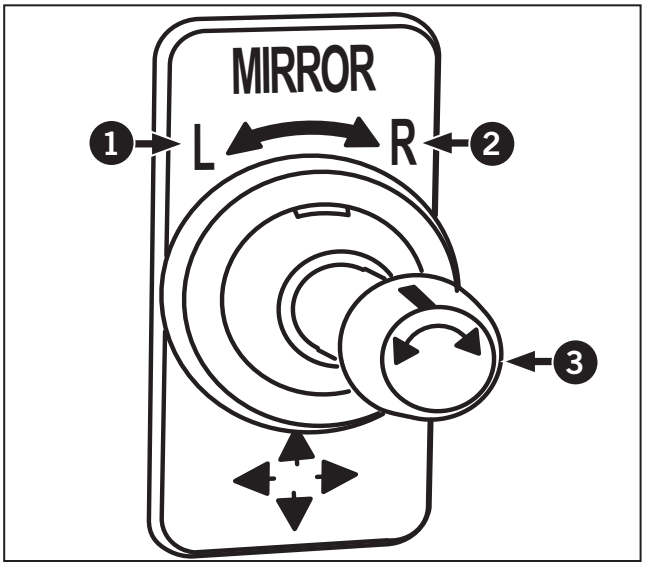


## Power Mirrors (option)

Power mirror control is located above the operator seat on the extreme right of the radio. The power mirror option allows the operator to adjust the position of the external mirrors without exiting the cab.

1. Switch the control lever (1) to L to control the left mirror
2. Switch the control lever (2) to R to control the right mirror
3. Move the control lever (3) up/down/left/right to control the pitch and yaw of the selected external mirror.

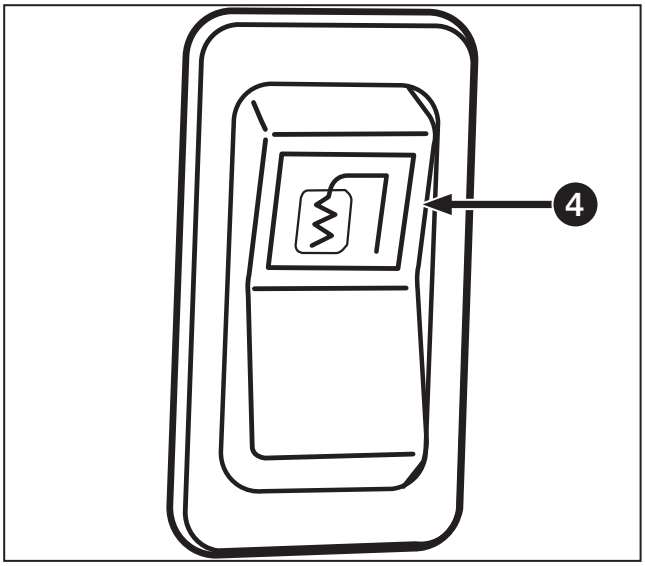
The power mirror option includes the heated mirror function.




## Heated Mirrors

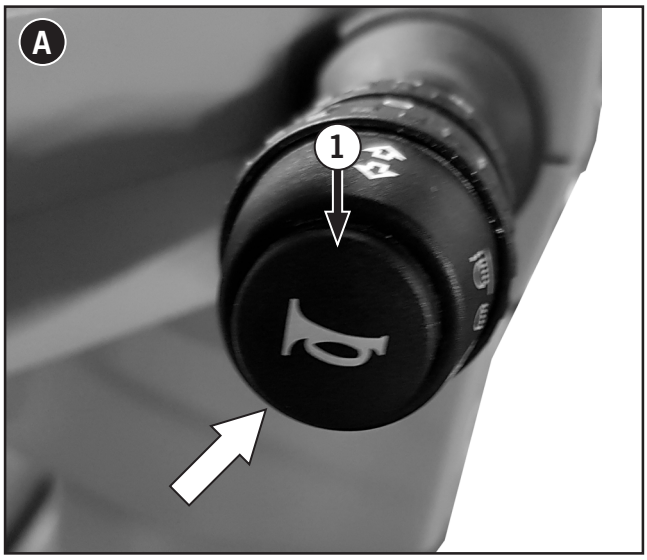
The heated mirror switch is located above the operator seat on the extreme right of the mirror controls. The heated mirror option allows the operator to heat the external mirrors without exiting the cab.

1. Push the rocker switch (4) to activate the heated mirror option. Green light indicates active.
2. Push the rocker switch (4) to deactivate the heated mirror option.




**Horn**

Push to activate the horn (1).



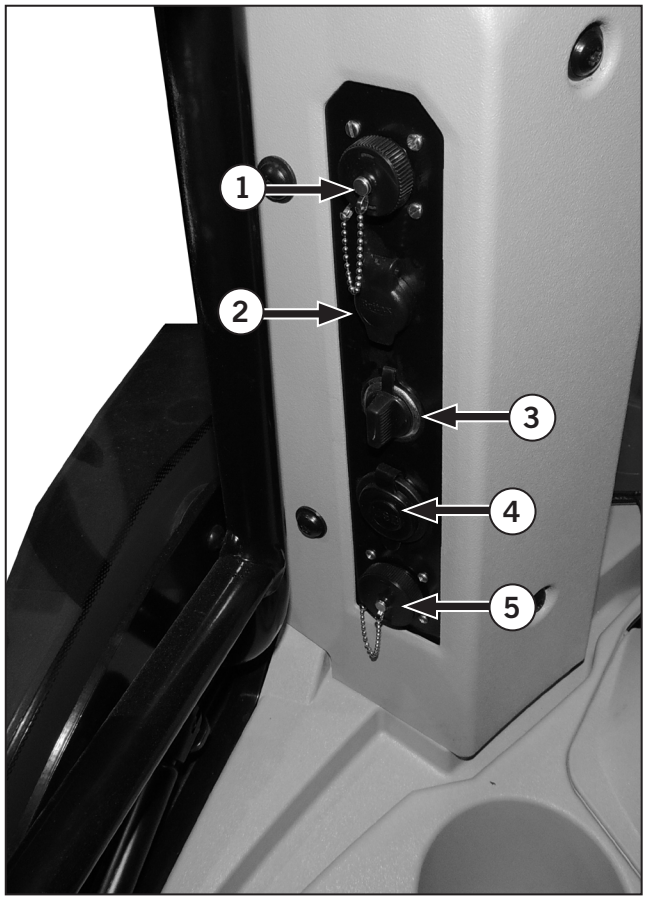
## Power Outlets

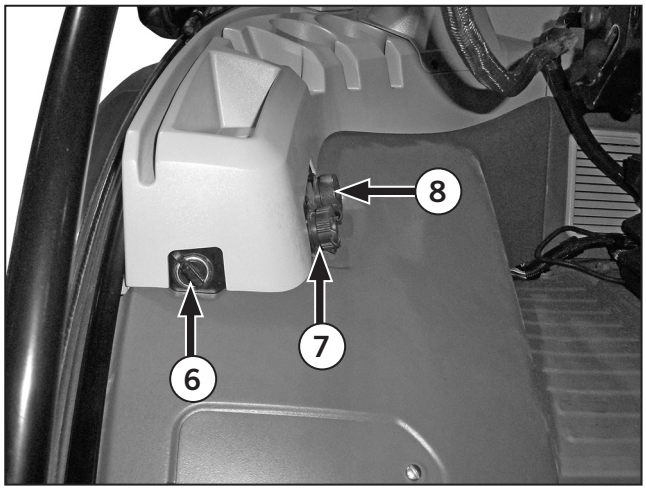
***IMPORTANT:*** *A mating plug assembly for the three-pin outlet is available from a KUBOTA dealer.*

Power outlets are installed on the pillars, located on the left and right sides of the cab to the rear of the operator's seat.

4 power outlets are located on the right pillar. One outlet is provided on the left pillar. Optional devices may also be installed at the bottom of the left pillar.

| Table 2-18: Power Outlet Locations | |
|---|---|
| 1 | **ISOBUS Connection** – Located on the main cab power bar on the right rear cab pillar. |
| 2 | **12V, 3-pin** – A 12V alternate power supply outlet is located on the main cab power bar on the right rear cab pillar. |
| 3 | **12V Alternative Power Connector** - Located on the main cab power bar on the right rear cab pillar. |
| 4 | **Dual 5V USB Power Outlets** – Located on the main cab power bar on the right rear cab pillar. |
| 5 | 1**2V 3-Pin Accessory Connector** – Located on the main cab power bar on the right rear cab pillar. |
| 6 | **12V Accessory Power Outlet** – Located above the main fuse/relay panel on the right side. |
| 7 | **9 Pin Diagnostic Connector** – Located above the main fuse/relay panel on the right side. |
| 8 | **14 Pin Diagnostic Connector** – Located above the main fuse/relay panel on the right side. |



## Rear Windshield Washer/Wiper Switches

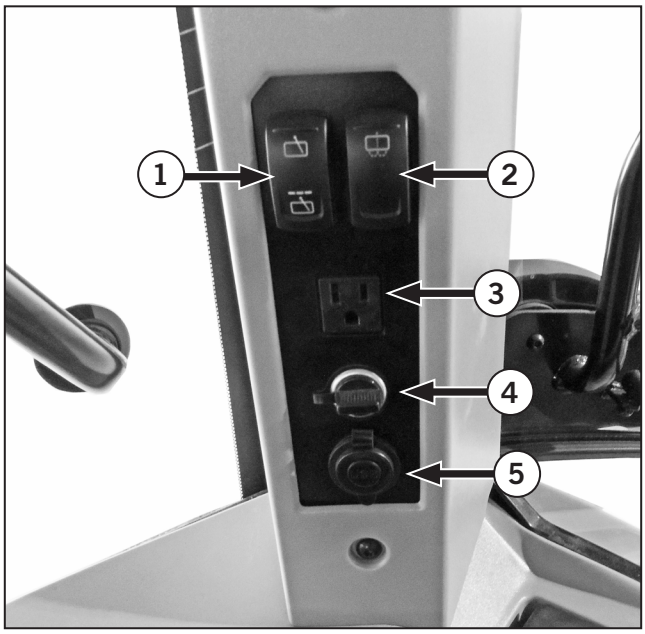
There are 2 switches for the rear washer/wiper control located on the left rear cab pillar.

**Rear windshield washer control:**

- Press the rear windshield washer momentary switch (1) to activate the rear windshield washer fluid pump.

**Rear windshield wiper control:**

- Press the rear wiper switch (2) up to activate the rear windshield wipers continuously, and down to activate the interval wiper speed desired.



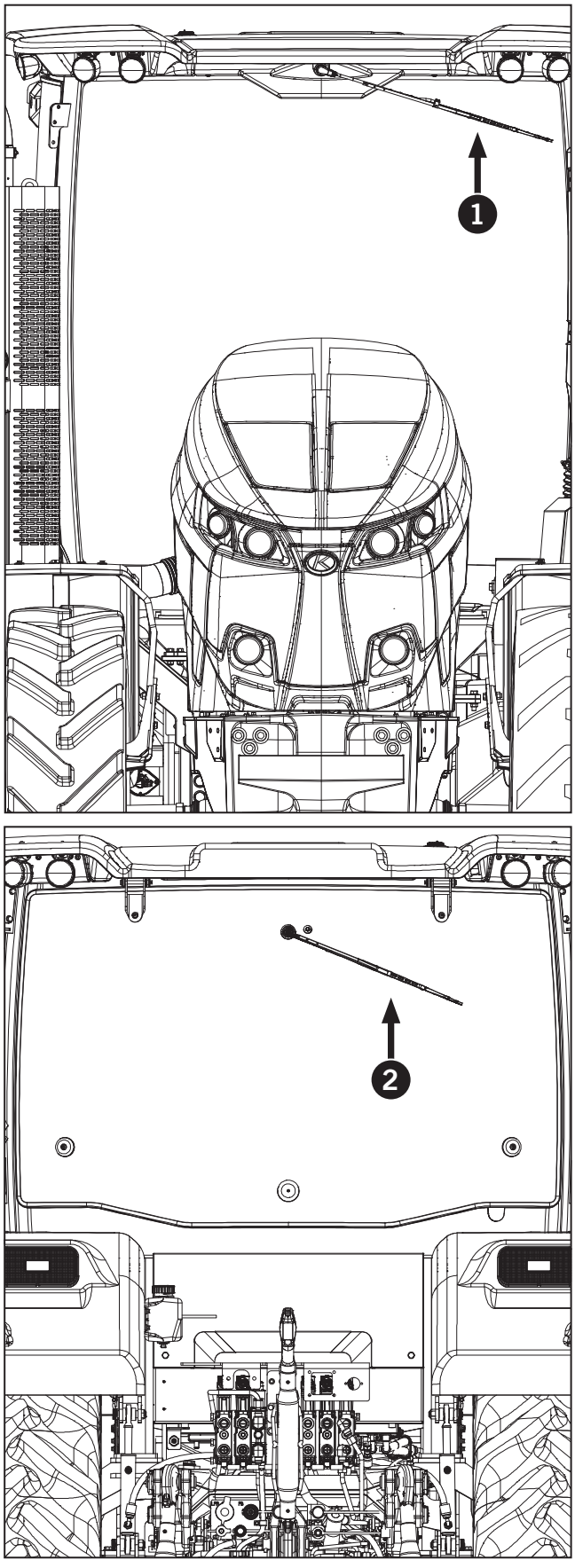

| Table 2-19: Power Outlet Locations | |
|---|---|
| 3 | **110V Power outlet** – Located on the main cab power bar on the left rear cab pillar. |
| 4 | **12V Plug** – A 12V alternate power supply outlet is located on the main cab power bar on the left rear cab pillar. |
| 5 | **USB port** - Located on the main cab power bar on the left rear cab pillar. |

## Windshield Wipers

Front (1) and rear (2) wipers are provided and they have a washer/spray attachment.

Wiper controls are located on the front wiper/washer switch.

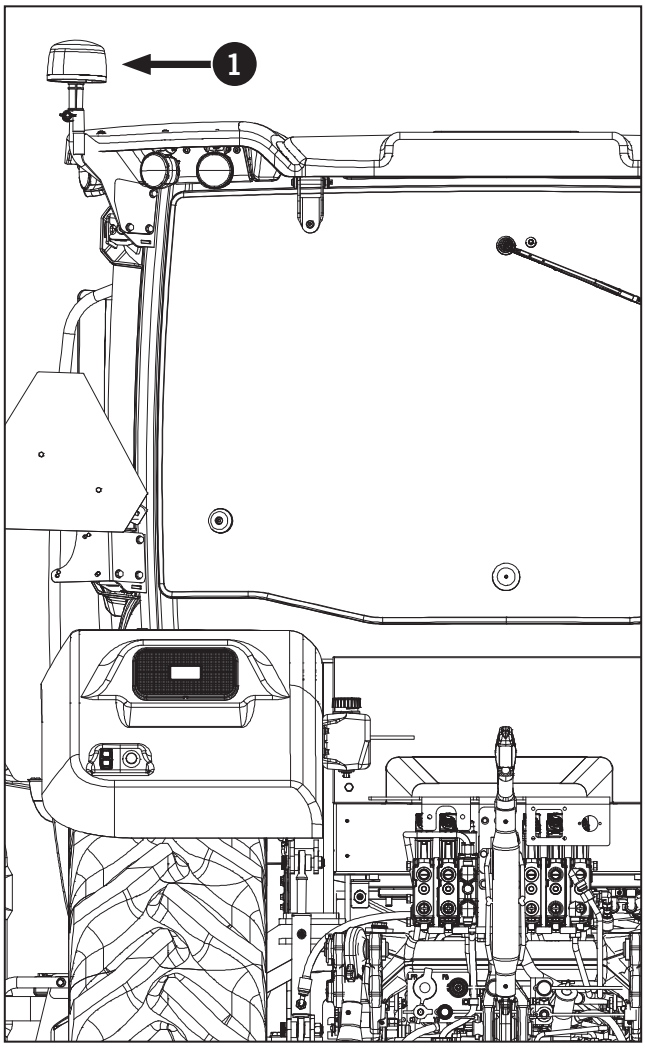
Refer to Section 3: Windshield Operation.



## Rotary Beacon

A safety beacon can be bolted onto the back of the cab base on the left and right sides.

The rotary beacon kit (1) is available from a Kubota dealer.



# Section 3: Tractor Operation – Contents

## Pre–operation Checks and Maintenance

Before starting the engine during daily operation always perform a walk around inspection of the tractor. Pay particular attention to the following items:

- Inspect and engage the parking brake. Open all engine access panels. Walk around the tractor and perform a visual inspection looking for possible signs of equipment failure.
- Inspect the condition of all belts, hoses, the fan and other engine accessories. Replace, tighten or repair as necessary.
- Make sure the following areas are clean of debris and obstructions:
  - Engine
  - Radiator and oil coolers
  - Front grille
- Check the following fluids. Make sure the fluid level is the correct type and is full. Inspect the fluids for contamination and quality. Replace as necessary:
  - Engine oil
  - Coolant
  - Hydraulic oil
  - Differential oil (NOTE: also check for leaks around the wheel hubs).
  - Transmission oil (NOTE: check oil level with the engine off). Check all hoses, lines and fittings for leaks or damage.
- Make sure all attached hardware is fastened tightly to the tractor.
- Check drive line and hydraulic pump areas for leaks or accumulated debris.
- Make sure the tractor is correctly ballasted for the work it will be doing. See “Ballasting and Tires” on page 3-112.
- Check tires for possible damage and correct tire pressure.
- Check wheel mounting nuts for correct torque.
- Inspect the drawbar and 3-pt hitch for wear, especially around metal-to-metal contact parts.
- Make sure all necessary repairs have been completed before operating the tractor.

### Safety Concerns

**WARNING**

Make sure all operators read this manual and are aware of all the safety precautions and operating controls before starting the engine. Otherwise damage to the tractor or serious injury to bystanders or operator may occur.

Safe tractor operation is essential to prevent injury to the operator and bystanders. Before operating the tractor consider the following:

- Do not operate the tractor in a closed building.
- Before starting the engine, make sure all operating controls are off or in neutral and the parking brake is engaged.
- Always operate the tractor from the operator’s seat.
- Stop the engine before servicing the tractor and raise engine side shields.
- Make sure all safety shields are in place and operational.
- Always use hand holds and steps when mounting and dismounting the tractor.
- Always use turn signals when turning or slowing the tractor.
- Always use proper safety devices to warn of slow–moving vehicle when driving on public roads. Check with local authorities concerning highway travel.
- Always use wide transport marker lights when required.

## Pre-start Considerations

Take the following into consideration before starting the tractor:

- Do not pull loads immediately after starting. Always allow the engine to warm up prior to pulling heavy loads.
- Do not apply excessive rpm. Avoid excessive idle speeds during warm up to extend engine life.
- Do not push the inching pedal down for at least 20 seconds after engine startup. This allows the transmission to purge air from the transmission clutches which will provide smoother gear shifting.
- Do not crank the engine for more than 30 seconds if the engine does not start. Wait two minutes to cool the starter motor before re-cranking if the engine does not start.
- Do not ignore warning lights. Pay attention to the warning light bar and electronic monitor for any indication of a problem. Stop the tractor immediately and investigate the problem.

## First 50-hour Service

The first 50 hours of tractor operation are the most critical for ensuring long and dependable tractor life. The tractor will provide long and dependable service given proper care during the initial 50 hour break-in period and if the recommended service operations are performed and the schedules followed.

Ensure the following steps are carried out during the first 50 hours of operation.

- Review the tractor Pre-delivery Checklist with the Kubota dealer and make sure all the items on the list have been inspected and checked off.
- Become familiar with the instructions for operation of the controls.
- Read and understand all safety warnings.
- Check all fluid levels and ensure the systems are filled with the correct fluids suitable for the tractor operating conditions.
- Check the engine, transmission and hydraulic oil levels hourly during the first 10 hours of operation.
- Inspect the tractor for leaks hourly during the first 10 hours of operation.
- Tighten the wheel hardware to the torque values provided in Section 5: Lubrication and Maintenance after the first hour of operation and at the end of each day for the first 50 hours of operation.
- Operate the engine at 3/4 load as much as possible during the first 50 hours (3/4 load is approximately one gear lower than would be normally used to pull a matched load).
- Do not operate the engine at idle speed or full throttle for more than five minutes at a time for the first 50 hours.
- Check the instruments frequently during operation.

## Break-in Precautions

The Cummins engine has been run on a dynamometer before installation but not enough to be considered broken in.

- Do not operate the engine at more than 3/4 load for the first 24 hours of operation. Hold a full load only for short intervals during the next 24 hours of operation.
- Check the oil level every 8 to 10 hours for the first 100 hours of operation.
- Follow the recommendations outlined in the Cummins owner's manual supplied with the tractor.

## Preventing System Contamination

To prevent contamination when changing oils and filters:

- Clean the area around the filler caps, level plugs, drain plugs, dipsticks and filters prior to removal.
- Check that the oil is clean and has not degenerated in storage before connecting remote cylinders.
- Wipe the grease fittings before greasing to prevent the entry of dirt.

## Flexible Maintenance Intervals

The intervals listed in the Lubrication and Maintenance Chart in this section are guidelines to be used when operating in normal working conditions. Adjust the intervals for environmental and working conditions. Shorten intervals under adverse (wet, muddy, sandy or extremely dusty) working conditions.

## Lubrication and Maintenance Chart

The chart lists the intervals for routine checks, lubrication, service and/or adjustments. Use the chart as a quick reference guide when servicing the tractor.

## Entering/Exiting the Cab

**CAUTION**

Always use the handrails and safety steps. Do not jump from the cab as it can cause serious personal injury. Use extreme care when entering and exiting the tractor.

**NOTICE**

Use extreme care when opening or closing the glass door. Avoid allowing the door to swing freely.

**WARNING**

Lower the machinery before leaving the tractor.

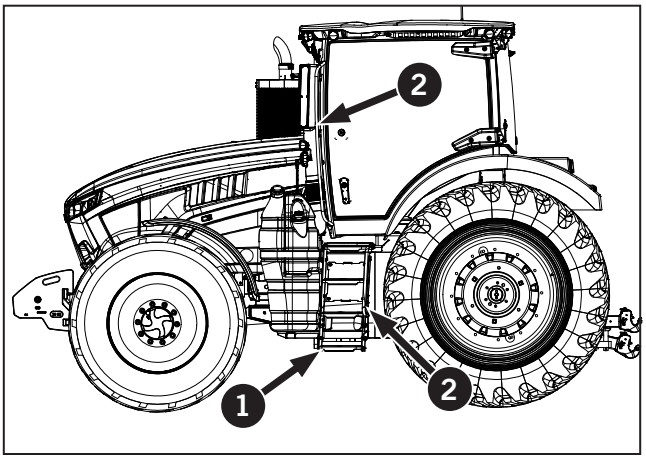
***IMPORTANT:*** *Use extreme care when opening or closing the glass door. Do not allow the door to swing freely.*

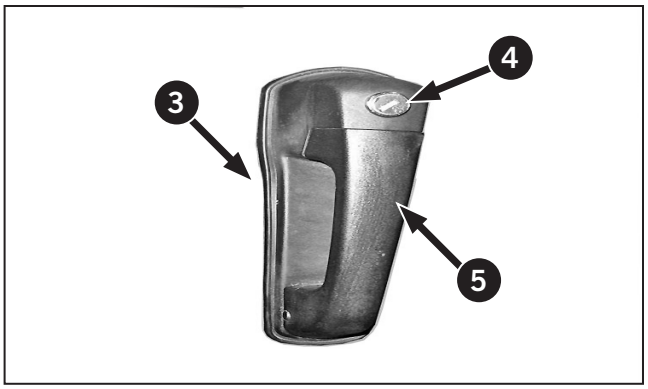
The cab is designed for the operator's comfort and convenience. Enter the cab through the door on the left side.

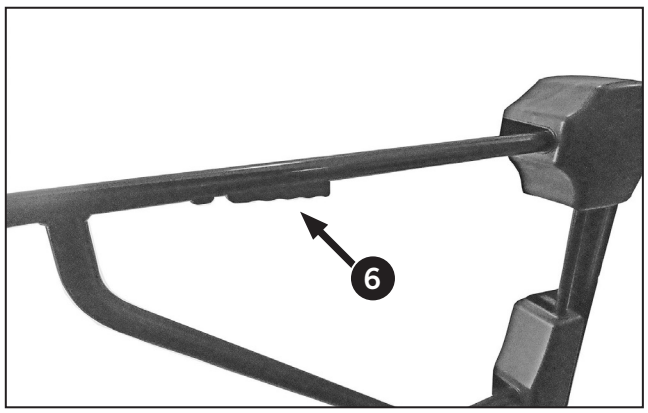
1. Climb on to the first step (1). Grab the hand rails (2) located on the left side of the tractor.
2. Hold the upper hand rail with your left hand, insert the ignition key into the door lock (4) in the handle (3) and turn the key clockwise to unlock the door.
3. Pull the latch handle (5) outward with your right hand. The lever will extend lifting the lock latch.
4. Pull the door outward and then enter the cab.

***NOTE: Do not let the door hit your head when it swings out.***

5. To exit the cab, put your hand on the horizontal bar inside the left-hand door, lift up the latch (6) and open the door.

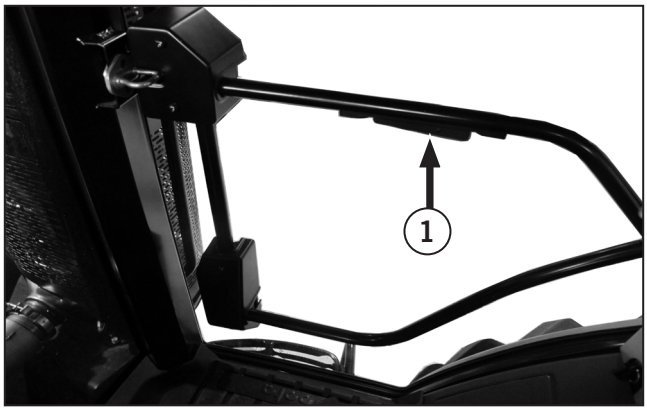



In the event of a major accident in which the driver's left side door is blocked, the tractor is equipped with an emergency exit on the tractor's right side.

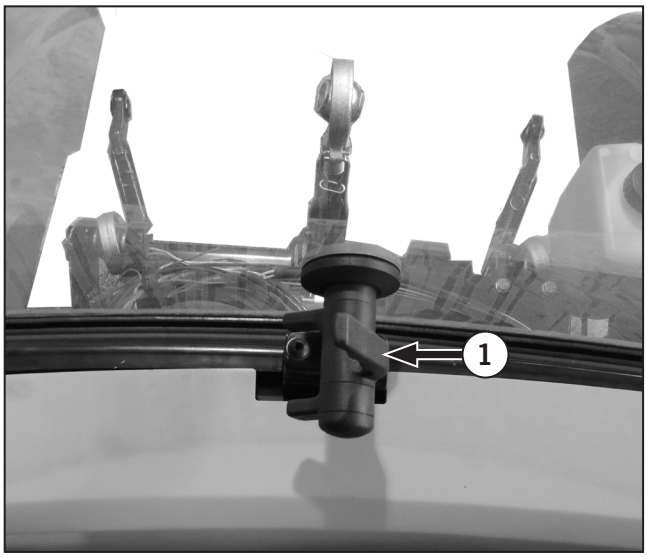
6. Open the right door (1) of the cab if the left door is blocked, and vice versa in an emergency situation.
7. Exit through rear window if cab doors are blocked in an emergency situation.



## Emergency Exit

**WARNING**

Do not operate the tractor with the emergency exit open.




The emergency exit handle (1) is located in the rear window of the cab.

To operate:

1. Turn the lever and allow the window to open fully.

## Tractor Start-up

**WARNING**

Do not start the engine by shorting across starter terminals. The engine can start and the machine can move causing possible injury and death if the starting safety switch is bypassed.

**WARNING**

Ensure that the cab door is fully closed before driving the tractor. Do not move the tractor with door open.

**CAUTION**

Inadvertent tractor or implement movement can cause possible machine damage and/or serious injury.

- Make sure all hydraulic control levers are in neutral and the 3-pt hitch is set to the lowest position before starting the tractor.
- Make sure that all persons are clear of the tractor before starting. The tractor can move as soon as the engine is started, even with the parking brake engaged and the transmission in neutral.

Model M8-181 and M8-201tractors are large machines that if misused can cause serious injury and/or death. Safe tractor operation starts every day and continues everyday throughout the life of the tractor. Before starting the tractor, ask yourself if you are ready today to safely operate this large machine.

**CAUTION**

Before starting the tractor, ensure that neither PTO (front or rear) is engaged before turning the key.

## Starter Motor Protection Switch

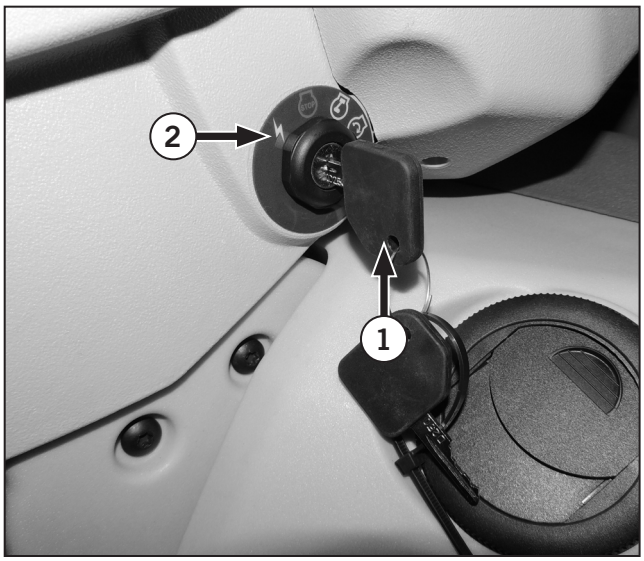
**NOTICE**

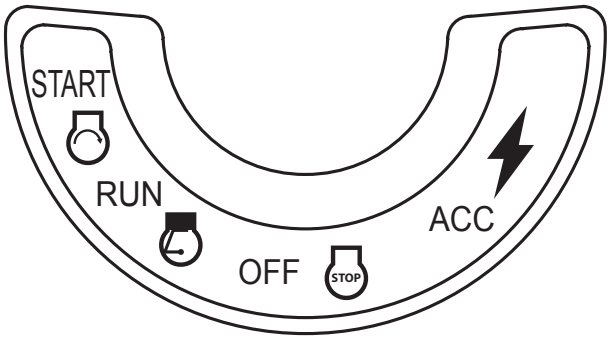
It is necessary to rotate the switch back to the OFF position before making another attempt to start the engine when the engine does not start after the switch has been rotated to the start position and then released to the run position.

The tractor has a built-in starter protection feature. This feature prevents accidental engagement of the engine starter motor when the engine is running.

### Starting the Tractor

1. Turn the battery shut-off switch to ON.
2. Fasten the seat belt and make sure the parking brake is engaged.
3. Place the transmission in neutral.
   - Make sure the PTO switch is in the OFF position
   - Make sure all remote hydraulic levers are in the neutral position
   - Make sure all hitch controls are set to the lowest position on tractors equipped with a 3-pt hitch.
4. Insert the ignition key (1) in the ignition (2) and turn the ignition key clockwise to the RUN position to activate the electrical accessories.
   - Visually check for warning lights and listen for audio alarms to make sure they are functioning. Carry out repairs if required. Refer to Electronic Instrument Cluster (EIC) in Section 2: Controls and Instruments.
   - Wait until the Inlet Heater/Ready to Start light goes off before operating the starter.
5. Turn and hold the ignition key fully clockwise to the START position to crank the engine. Release when the engine starts. Allow tractor to idle and warm up before adding a working load.

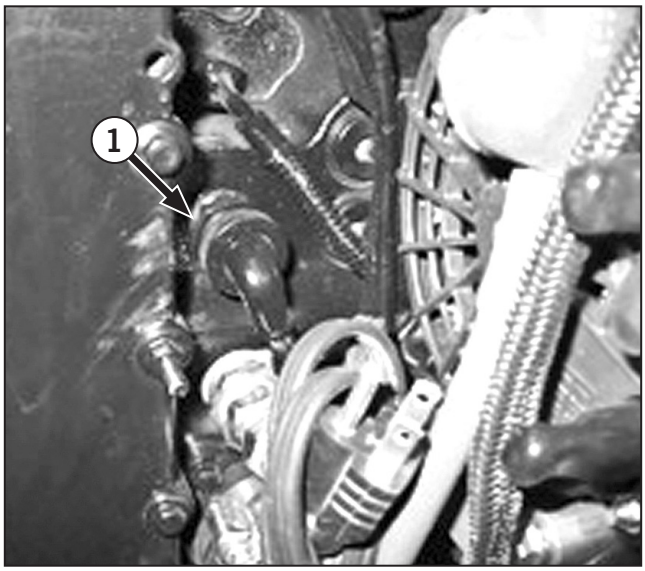



Ignition Switch Positions

## Engine Block Heater

Block heaters are shipped as standard equipment on Kubota tractors. The block heater is located on the right hand side of the engine beneath the turbocharger.




An extension cord with ground connection is required to plug the block heater to a grounded electrical outlet.

1. Attach the extension cord (1) to the block heater and plug the extension cord into an electrical outlet.
2. Wait four hours; this should be sufficient time for the coolant and block to warm.
3. Start the engine. Never crank the engine for more than 30 seconds. Wait 2 minutes between attempts to allow the starter motor to cool if the engine does not start within 30 seconds.

Voltage varies by region:

| Table 3-1: Voltage by Region | |
|---|---|
| **North America** | 115V |
| **Europe** | 220V |
| **Asia** | 220V |

**WARNING**

- Do not use ungrounded extension cords. Use a grounded three-wire extension cord rated for at least a 15A load, protected by a suitable fuse or circuit breaker.
- Do not handle block heater cords if wet.
- Do not plug in the block heater with low coolant levels. An overheated element can cause an electrical short circuit and electrocution hazard. An overheated element can burst the heater core causing engine damage.

## Cold Weather Starting

**WARNING**

Do not use starter fluid of any type to start a Cummins QSB6.7 engine. The use of highly flammable starter fluids is extremely dangerous and can lead to serious injury. Using a starter fluid will void your engine warranty.

**NOTICE**

The tractor is equipped with an engine warm-up protection system. The system employs sensors and an air inlet heater. This system operates from 3 to 25 seconds as required.

**NOTICE**

Do not engage the starting motor for more than 30 seconds to prevent damage to the starting motor. Wait two minutes between each attempt to start.

***NOTE: The cold start system does not eliminate the need for standard cold weather starting preparation. Follow recommendations for block heaters, transmission heaters, #1 diesel fuel and lower viscosity oil as described in Cummins maintenance recommendations.***

Cold weather starting aids may be required to assist engine start up at temperatures at or below 0 °C (32 °F). The 25 second preheat cycle will begin shortly as long as the predetermined conditions are measured by the sensors and the Engine Control Module (ECM).

The air inlet heater will also operate automatically after engine start up under control of the ECM.

***NOTE: The ECM will limit the speed of the engine during the warm up to 900 rpm.***

The throttle control will have no effect until the ECM determines that engine temperature and pressures are achieved. This helps to ensure reliable performance and service from the engine and to minimize start-up wear.

1. Review and complete steps 1 to 4 under Starting the Tractor in this section before proceeding with these steps.
2. Turn the ignition key to the On position with the PTO switch in the Off position and the parking brake applied. The Inlet Heater/Ready to Start icon (1) will illuminate on the EIC. Wait for this light to go out before you start the engine.
3. Stop immediately and investigate the cause of the problem if warning lights appear at any time during the cold weather start process.
4. Once the engine has started, allow it to warm up before putting it under load. Engine warm up idle speed is 1000 rpm. Normal idle speed is 900 rpm.

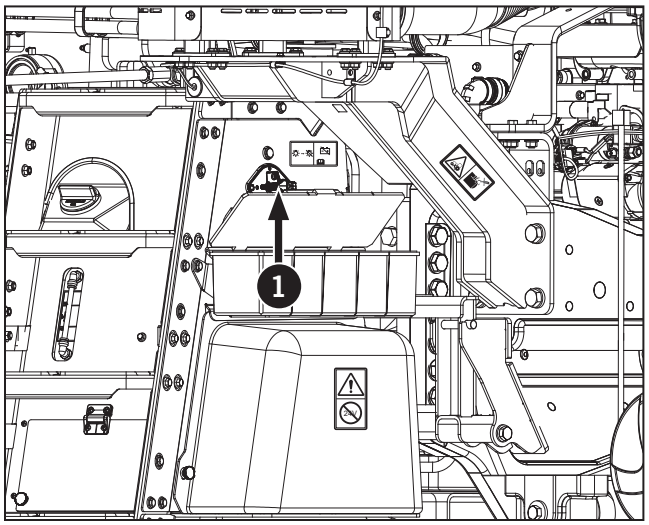
## Tractor Boosting

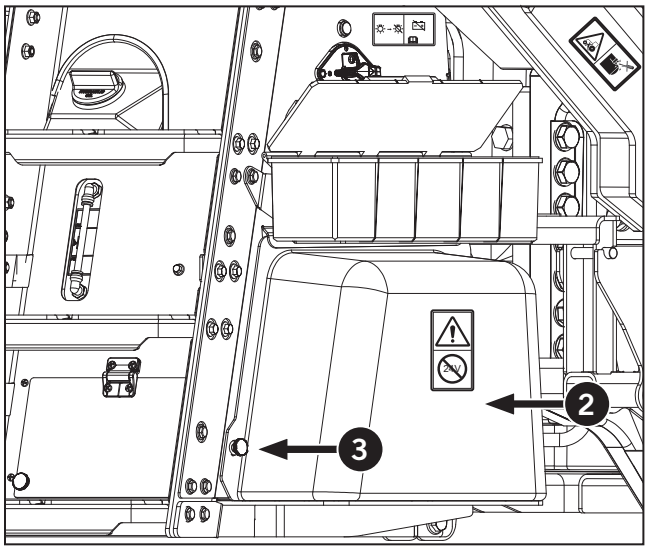
**CAUTION**

- Do not connect the jumper cable to the negative post of the discharged battery.
- Do not lean over the batteries while making the connections
- Do not allow the positive and negative jumper cable clamps to come in contact.
- Do not allow the vehicles to come in contact.

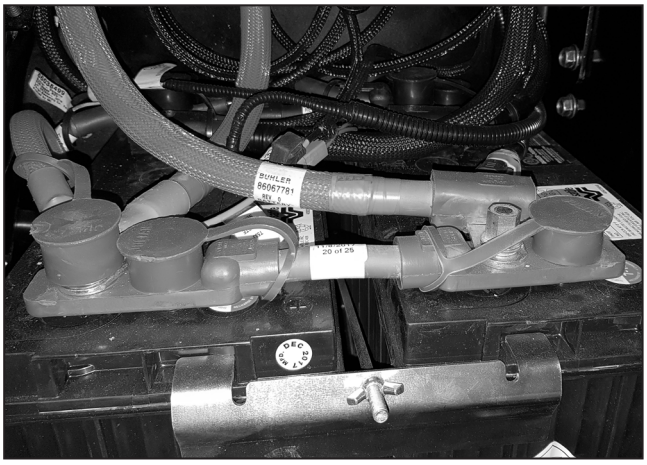
It is not necessary to remove the battery cover to boost the tractor. However, it is good practice to check starting and charging system connections before proceeding with the following steps.

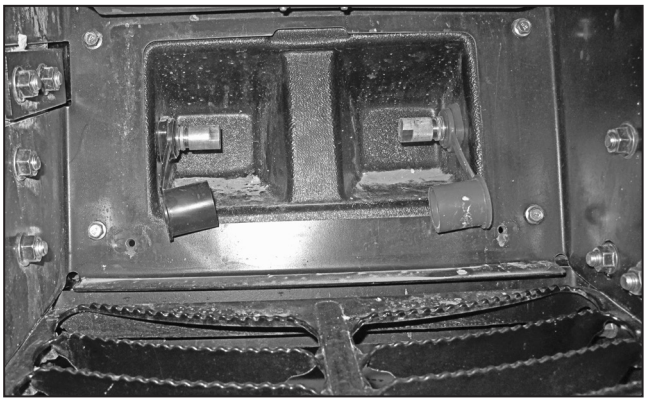
1. Engage the parking brake, put the transmission in neutral, turn off the PTO clutch control and all electrical accessories. Set the power disconnect switch (1) to the ON position.
2. Remove the battery cover (2) by removing a screw (3) on each side.



3. Attach one end of the positive jumper cable (red) to the positive terminal of the booster battery and the other end to the external booster.
4. Attach one end of the negative jumper cable (black) to the negative terminal on the booster battery and the other end to the external booster terminal.
5. Make sure that the clamps from one cable do not touch the other cable clamps or any other connectors. Do not lean over the battery when making connections.
6. Start the engine following normal engine starting procedures. Remove the booster cables when the tractor starts. Disconnect the negative cable (black), then the positive cable (red). Charge the batteries if the tractor fails to start.





## Check and Charge the Batteries

Check the battery voltage. The battery voltage should read over 13V when fully charged and 12V minimum.

To charge the batteries:

- Use an approved charging device with fast and slow charge settings. The charger must be rated for 12V batteries. A suitable charger should have charge indicators and automatic shut-off features.
- When a quick charge is needed to start and run the tractor, set the charger to the fast charge mode and attach the negative (-) lead to the negative (-) tractor battery post. Connect the positive (+) lead to the positive (+) battery post.
- Turn the charger on and allow the batteries to charge for at least one hour or until the charge indicator shows full charge.
- Connect the leads to the battery posts as described and set the charger to slow charge mode to fully charge the batteries.
- Turn the charger on and allow the batteries to charge for at least eight hours or until the charge indicator shows full charge.
- Replace batteries that will not fully charge and hold the charge.

**DANGER**

**EXPLOSIVE HAZARD**

Batteries generate hydrogen gas, which is highly flammable. If ignited by a spark or flame, the gas may explode causing a spray of battery acid and fragments causing severe personal injury.

- Always follow the proper connect and disconnect procedures. Always disconnect the negative (-) black cables before the positive (+) red cables. Always connect the positive (+) red cables before the negative (-) black cables to reduce the possibility of sparking and an explosion.
- Always wear protective clothing and safety glasses to protect eyes when working with batteries.
- Do not smoke or expose the battery to open flame.
- Do not boost with 24 V or electrical damage may occur.

## Stopping the Tractor

**DANGER**

- Do not leave the operator's seat without first bringing the tractor to a complete stop.
- Do not operate the tractor if the foot brake or parking brake does not function properly. Contact a Kubota dealer for assistance.
- Do not rely solely on the transmission to hold the tractor stationary when parked.
- Always engage the parking brake when stopping the tractor.

**CAUTION**

Always keep the cab floor area free and clean of debris or objects which may obstruct the operation of the brake pedal. Keep the brake pedal clean and dry to prevent the operator's foot from slipping off the pedal.

### Stopping under Normal Circumstances

To stop the tractor:

- First press the inching pedal (1), then the foot brake pedal (2 and 3)

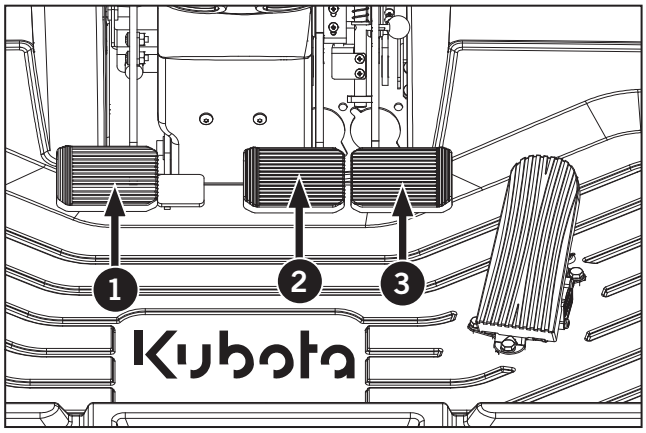
  or

- First shift the transmission into neutral and then press the foot brake pedals (2 and 3).

Under normal operations this will bring the tractor to a complete stop.

Apply the parking brake when the tractor comes to a complete stop. (see "Parking Brake" on page 3-24).

To shut the engine off, turn the ignition key to the OFF position.




### Stopping in an Emergency

- You can also use the parking brake to slow the tractor down. See next page for details.
- You can use the emergency exit to leave the cab without exiting through the main door. See page 3-24 for details.

## Service Brakes – Foot Brakes

**CAUTION**

Use extra caution when towing loads at transport speeds. Use slower speeds when the towed load approaches or exceeds tractor weight and when not equipped with brakes. Avoid hard braking situations. Refer to the implement operator's manual for recommendations and towing speeds.

**WARNING**

Always lock the service brake pedals for on road travel. Never attempt to use brakes for turning at road speeds.

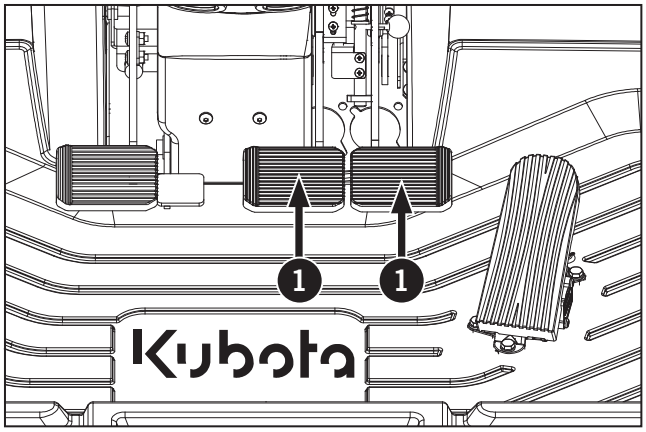
All tractors are equipped with hydraulic assisted self-adjusting power brakes. The hydraulic assist functions only with the engine running. The service brakes (1) will still function but with higher pedal effort if the engine is off. Use both the parking (emergency) brake and the service brakes if the engine is not running.

Service brake pedals may be operated independently to assist turning or in tandem for maximum effect.

When operating in the field it is recommended that the service brake pedals be unlocked.

**CAUTION**

Always keep the cab floor area free and clean of debris or objects which may obstruct the operation of the brake pedal. Keep the brake pedal clean and dry to prevent the operator's foot from slipping off the pedal.



## Service Brakes - Brake Interlock Switch

**WARNING**

If brakes are locked with the locking lever (1). The tractor is able to speed to 40 or 50 km/h (25 to 31 mph).

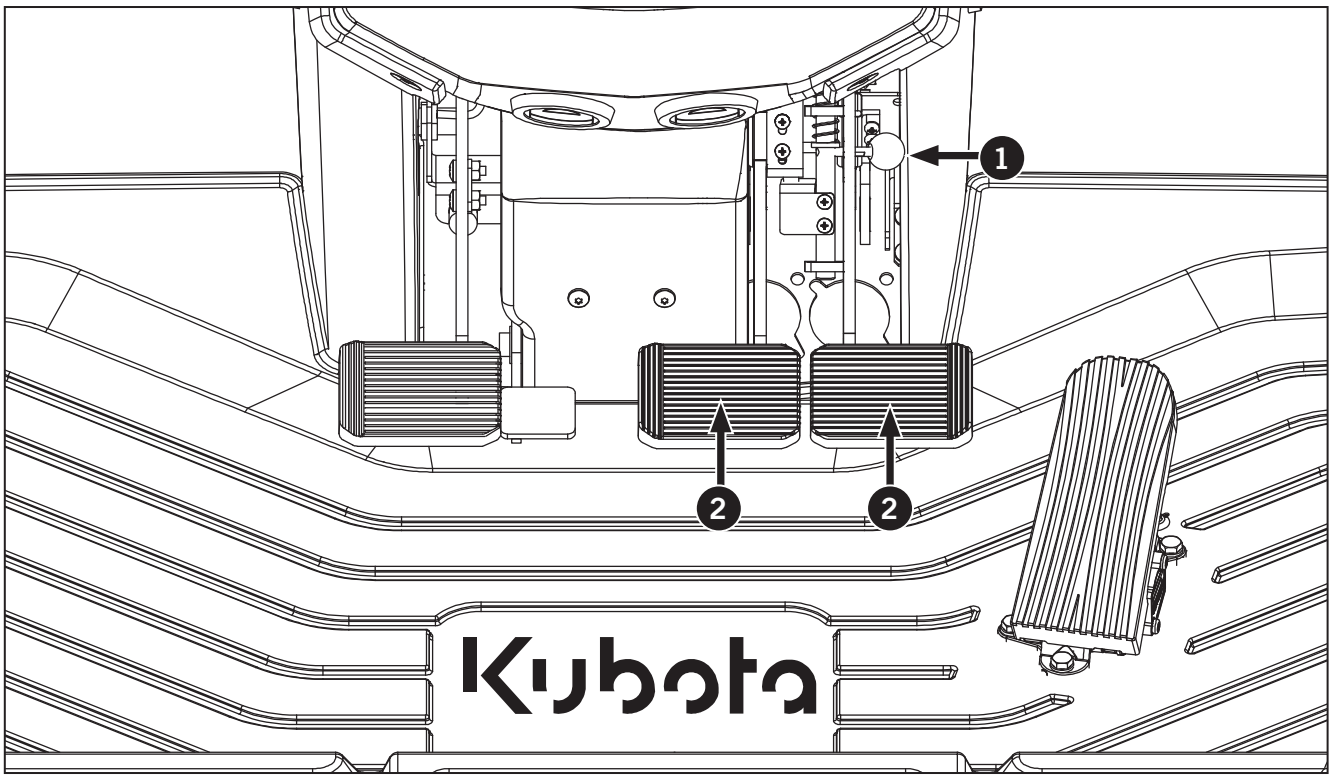
If brakes are unlocked, the max speed will be limited to 35 km/h (22 mph) for both 40 or 50 km/h (25 to 31 mph).

Move the brake interlock lever (1) up or down to engage and disengage the service brake pedals (2) together.

Rear brake lights will be illuminated when service brakes are applied.

Never ride the brakes by resting feet on the pedals as this causes undue wear on the brakes and wastes fuel.

Periodically test the service brake pedals by operating with the engine off to make sure that the manual brake system works.



## Parking Brake

**WARNING**

Always apply the parking brake when the tractor is not in operation. An alarm will sound and the parking brake light will flash If the engine is stopped without applying the parking brake and if the operator has left the seat

**DANGER**

Never leave the operator's seat without first bringing the tractor to a complete stop using the foot brake and engaging the parking brake.

Never operate the tractor if the foot or parking brake does not function properly.

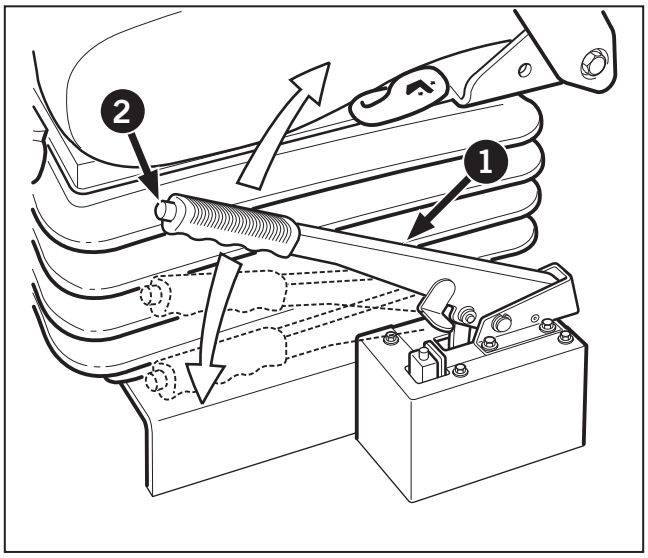
Never rely solely on the transmission to hold the tractor stationary when parked; always engage the parking brake.

**NOTICE**

The parking brake must be engaged before the engine will start.

Use the lever (1) located to the left of the operator's seat to apply the parking brake when the tractor is not moving or when the engine is stopped. The parking brake must be applied before the operator leaves the seat.

1. Pull the lever up to apply the parking brake.
2. Lift the lever up slightly, then press the button (2) and push the lever down to release the parking brake.




**NOTICE**

The transmission will not engage if the parking brake is applied. A flashing "P" will be displayed in the transmission LCD of the EIC and the parking brake warning light will flash along with a one second audible alarm.

## Emergency Stop

Transmission will engage if the park brake is on and the clutch pedal has been cycled once. If the tractor is put into forward or reverse with the park brake up, a 1 second audible alarm will sound.

***NOTE: The tractor will move with the park brake on.***

The tractor does not shift to neutral when the park brake is engaged. It will stay in the driving direction and an alarm will sound. The tractor will still move if it's not put in neutral.

## Adjusting Speed

You can control tractor speed with the hand throttle (1) and/or the foot throttle (see next page).

Rated operating speed is 2 100 rpm. Idle speed is 850 rpm. High-idle no-load speed is 2 200 rpm.

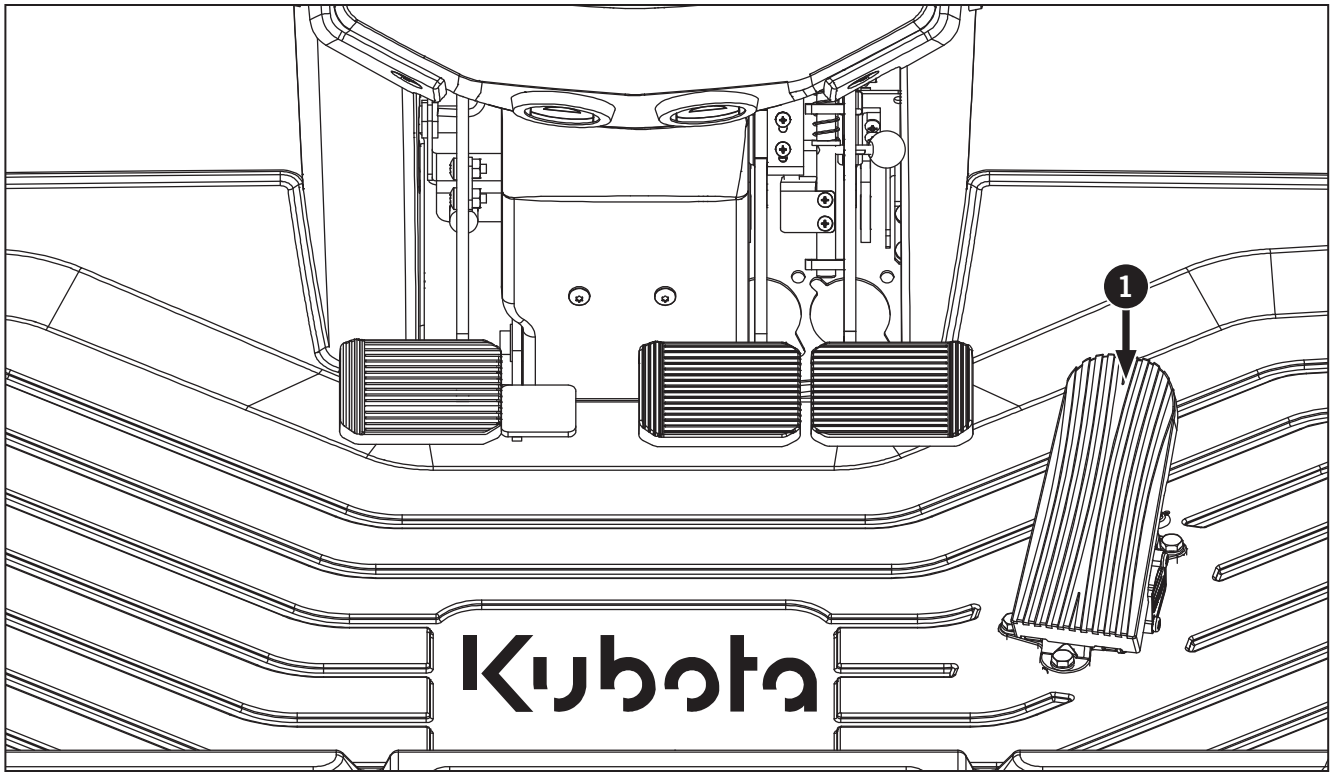
### Adjusting Speed with the Hand Throttle

1. To increase engine speed, move the hand throttle forward carefully.
2. To reduce engine speed, pull the hand throttle back carefully. Fuel consumption can be reduced by operating at lower engine speeds under light load.

### Adjusting Speed with the Foot Throttle

This tractor is equipped with a foot throttle pedal (1). Check with KUBOTA support before using this pedal because the pedal can be configured as follows:

- The foot throttle is as an accelerator pedal.



## Continuously Variable Transmission (CVT) Operation

**WARNING**

Do not operate the engine below 1 200 rpm when pulling a heavy load. Failure to observe this precaution may void engine warranty.

**NOTICE**

To avoid damage to the transmission, operators must read and understand the basic transmission options associated with this tractor.

### Introduction

This tractor is equipped with a Continuously Variable Transmission (CVT).

- The M8-181 and M8-201is equipped with a Continuously Variable Transmission (CVT) Control and is fully computerized stepless type. Depending on the type of work, there are 2 modes to choose: Automatic and Manual Engine Speed Setting.
- The shift lever (1) provides operating control for forward/reverse shifting and gear selection.
- The inching pedal (2) is used to control slow speed movement such as coupling or decoupling equipment or implements. The inching pedal allows the transmission to partially disengage when pressed. Speed matching is always active.

The transmission clutches are controlled by the transmission control module and the transmission shifts in response to operator inputs (direction selector position, upshift/downshift requests, inching pedal position, autoshift mode, etc).

The following pages explain:

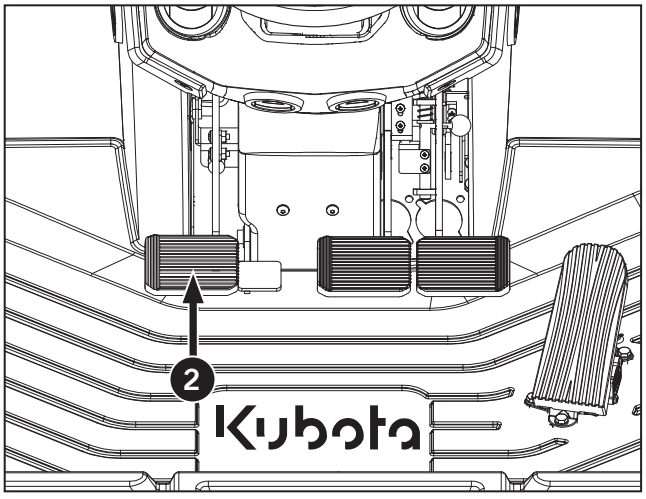
- Important notes before and during the initial startup of the engine.
- Conditions for using the inching pedal (2) and how to calibrate the pedal if required.
- Important shifting features.
- How to shift gears manually or automatically.

**WARNING**

The ez-command center has no neutral position. To bring the tractor to a complete stop, step on the brake pedal or set the shuttle lever to neutral.

**NOTICE**

- Calibration of the transmission directional clutches must be peformed by a KUBOTA dealer.

## Before Start Up

- Always refer to the Pre-operation Checks and Cab Features.
- Place shift lever in neutral.
- Fully apply parking brake.
- Make sure the PTO switch is in the disengaged position (option).

## During Initial Start Up

***NOTE: Do not press the inching pedal within 20 seconds after starting the engine. If you press the inching pedal during this time, proper clutch modulation will not be available. Cycle the inching pedal once to reset the pedal.***

During power up the transmission control system initializes and ensures that the machines does not move until the direction selector is first moved to or in neutral and then moved to a non-neutral gear. Following successful completion of all power-up function, normal operation is established.

## Cold Start Procedure

1. In the start temperature range of -30 °C (-22 °F) to -7 °C (-19 °F) a cold start procedure controls heating of the transmission. The hydrostatic unit is heated with limited speed and the directional clutches and range clutches of the first driving range are pulsed in succession.

All subsequent temperature values are measured by the TCU on the clutch control block.

**Table 3-2: Cold Temperature Operations**

| Temperature classes | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| Temperature range (°C) | -30 °C to -21 °C (-22 °F to -6 °F) | -20 °C to -16 °C (- 4 °F to -3 °F) | -15 °C to -8 °C (-5 °F to -18 °F) | >-7 °C (-19 °F) |
| Required total time for the cold start procedure | 10 min | 5 min | 3 min | No delay |

2. At low temperatures the range selection in the transmission is extended because of the extended filling times of the range clutches K1-K4 and the multi-disk brake BG.
3. Boundary conditions for the cold start procedure"
   - Parking brake engaged.
   - System pressure is available.
   - Engine speed range minimum 1 100 min-1 up to maximum 1 500 min-1.

***NOTE: Plastic, wiring, sensors, oil glass and seals must not be located directly in the warm air flow.***

***NOTE: High suction pressure, a reduced flow rate of the transmission filter and a temporary opening of the cold start limiting valve are to be expected.***

## Inching Pedal: Rules of Operation

**WARNING**

- Always keep the cab floor area free from debris or objects which may obstruct the operation of the brake and inching pedal.
- Keep the pedals clean and dry to prevent feet from slipping.
- The ez-command center has no neutral position. To bring the tractor to a complete stop, step on the brake pedal or set the shuttle lever to neutral.
- Do not release the inching pedal before completing a turn when using the pedal for deceleration.

**NOTICE**

- Excessive use of the inching pedal may cause excessive heat damaging the transmission.
- Use the inching pedal at low throttle settings. Light draft loads will extend clutch life.
- Only use the inching pedal for hooking and unhooking equipment.

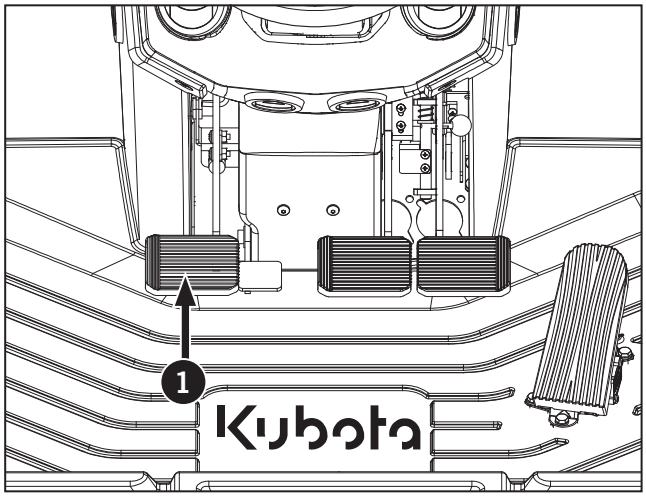
The inching pedal (1) operates like a clutch, for safe, accurate positioning of the tractor when attaching implements or operating in confined spaces, etc.

Pressing the pedal interrupts power flow from the engine to the transmission. Release the pedal slowly to restore power flow.

- Make sure the transmission is in neutral and the parking brake is not applied before using the inching pedal.

## Inching Pedal: Calibration

***NOTE: Calibration only needs to be performed when the operation of the pedal becomes erratic.***



## Continuously Variable Transmission (CVT) Travel Operation

**WARNING**

The EZ-Command center has no neutral position. To bring the tractor to a complete stop, step on the brake pedal or set the shuttle lever to neutral.

The traveling speed control with CVT transmission can be operated with either the ez-command center or the foot throttle according to the type of work.

***NOTE: The control using the foot throttle requires the selection of "Automatic Mode". The operator can control both the speed and the engine power by how deeply the foot throttle is pressed. This enables convenient operation of the trailer.***

### Main shift (Speed Up and Slown Down) EZ-Command Lever

The tractor can be sped up and slowed down easily with the ez-command center.

1. Push the ez-command lever forward to increase the speed of the tractor. The longer the lever is pushed forward the higher the travel speed. The travel speed is fixed at the speed where the lever is released.
   - For example, if the command lever is pushed and held till 5 km/h (3 mph) is reached then the lever is released. The tractor will now travel at 5 km/h (3 mph) until the lever is pulled back to decrease speed.
2. Pull the command lever backward to decrease the speed of the tractor.

***NOTE: Every time the command lever is moved to speed up or slow down, an audible beep will be heard to inform the operator a change to the driving operation has been made.***

### Main shift (Speed Up and Slown Down) Foot Throttle

1. Press the foot throttle down to increase the speed of the tractor. The farther the foot throttle is pushed, the higher the travel speed. If the foot throttle is released the travel speed will drop down to default of 0.5 km/h (0.3 mph)

### Automatic mode

1. The optimum travel speed and engine power are obtained according to the speed settings made with the command center or foot throttle.
2. This mode is mainly used for road travel and towing plows and other implements where speed needs to be maintained and engine rpm is not as critical.
3. Engine speed will increase or decrease based on load to maintain the desired speed.

### Setting Automatic mode

1. Set the transmission to neutral by either pressing the FNR lever down or pressing the neutral button on the armrest.
2. Set the hand throttle to the "Minimum" setting. Automatic mode is now selected.

### Foot throttle operation in automatic mode

1. Press the foot throttle down to increase the tractor speed and engine power. The deeper the pedal is pressed the faster the tractor will go and higher the engine RPM will be. Like a car with an automatic transmission.
2. Release your foot from the pedal and the tractor slows down and engine RPM decrease.
3. To come to a complete stop, step on both brake pedals. When the brake pedals are released, the tractor will start to move again at default speed setting of 0.5 km/h (0.3 mph).

### Command lever operation in automatic mode

1. Push the command lever forward till the desired travel speed is reached. The engine rpm will automatically increase to keep up with speed setting.
2. To stop, pull back on the command lever to slow down the tractor then press both brakes to come to a complete stop. Alternatively, if both brake pedals are pressed while at set travel speed, the tractor will come to a complete stop. Once the brake pedals are released in both cases, the tractor will start to move at default speed setting at 0.5 km/h (0.3 mph).
3. If the clutch pedal is used to stop the tractor. Once the clutch pedal is released the tractor will continue to drive at the preset travel speed.

***NOTE: If the brake pedals were activated as well during the stop, the travel speed will default to 0.5 km/h (0.3 mph).***

***NOTE: The default travel speed of the tractor is 0.5 km/h (0.3 mph). If both brake pedals are applied while driving, the tractor will to a complete stop and the preset speed setting will go back to default. If only one brake pedal is pressed, the tractor will not stop or decrease speed as it thinks the tractor is trying to turn. Make sure both brake pedals are locked together when traveling down the road.***

### Manual mode

1. The optimum travel speed and engine power are obtained according to the engine RPM settings made with hand throttle.
2. This mode is mainly used in PTO applications were engine RPM must be maintained and speed is not as critical. Towed implements may also be used in this mode.
3. Travel speed will increase or decrease based on load to maintain the desired engine RPM.

### Setting Manual mode

1. Set the transmission to neutral by either pressing the FNR lever down or pressing the neutral button on the armrest.
2. Use the hand throttle to set the desired engine RPM setting. Manual mode is now selected.

### Operation

1. Set the desired engine RPM and travel speed for the work being done.
2. If the load is increased or decreased, the constant engine RPM will be maintained. If load is too great to maintain engine RPM at current speed, the speed will drop to maintain the engine RPM.

### Enhance deceleration

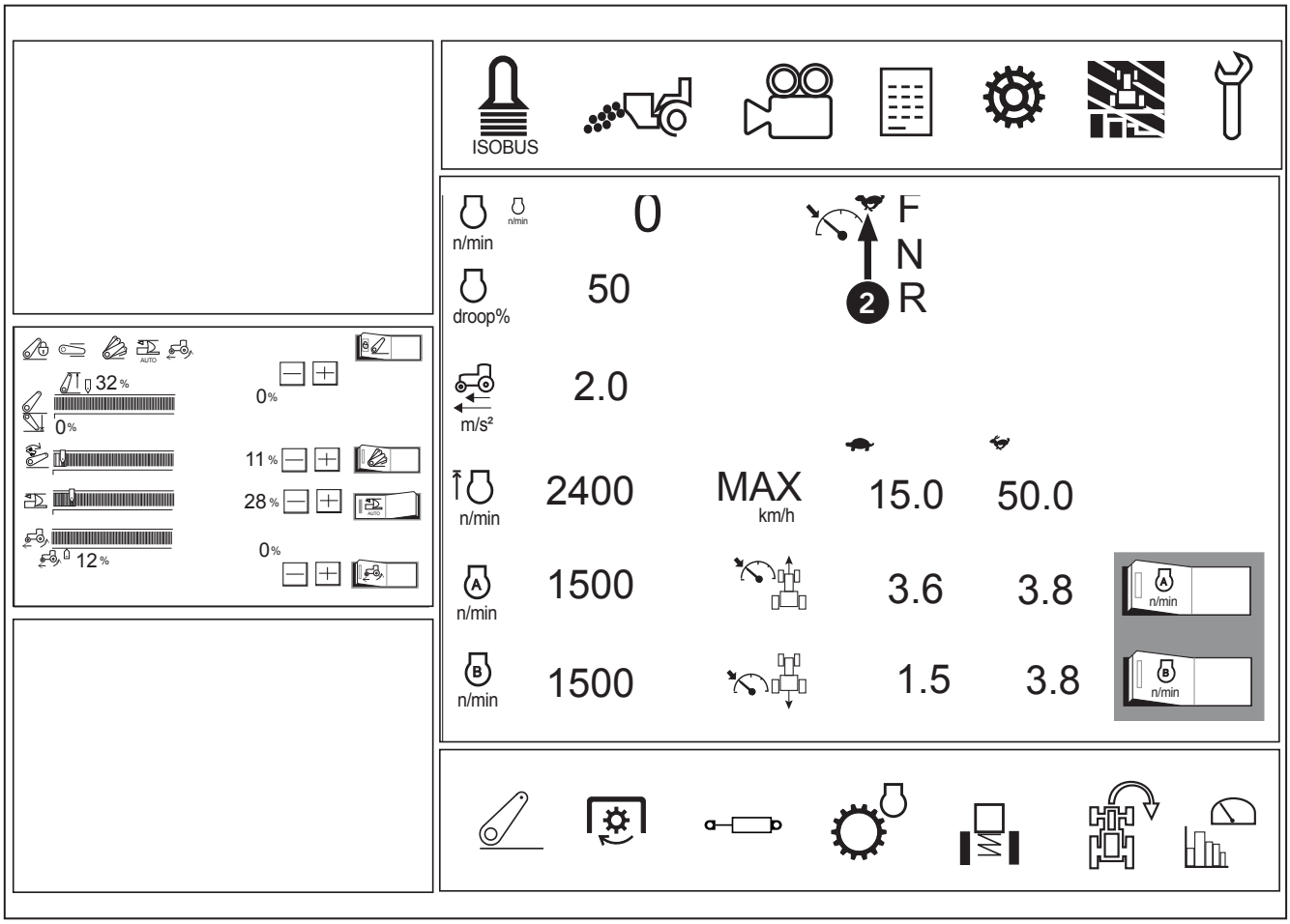
1. This feature turns on the FWA while decelerating with the command lever to help slow down the tractor by brake or diminishing power through the driveline. FWA will stay engaged until the command lever is pushed forward to being accelerating again at which time the FWA will turn off.

## Speed Mode shift

Press the speed mode shift button (1) to toggle between Turtle and Rabbit speed modes. Depending on the selection will be shown on the K-Monitor (2).

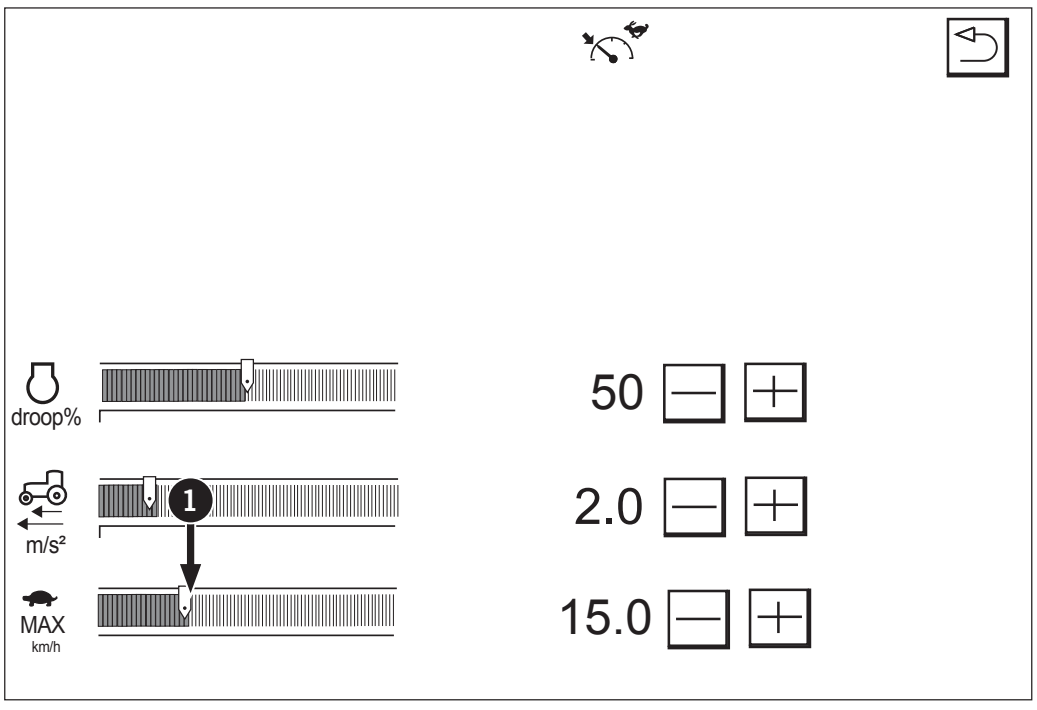
- Turtle speed mode will allow speeds up to 20 km/h (12 mph).
- Rabbit speed mode will allow speeds up to 40 or 50 km/h (31 mph).

***NOTE: Switching from the Rabbit speed mode to the Turtle speed mode is not possible if the current traveling speed is higher than the maximum traveling speed set in the low speed mode; a buzzer will sound if this is tried.***

### Turtle Max Speed Adjustment

To adjust Turtle MAX speed either touch and drag the slider to the desired km/h. Or used the + or – switches to move to the desired km/h.



## Transmission Operation

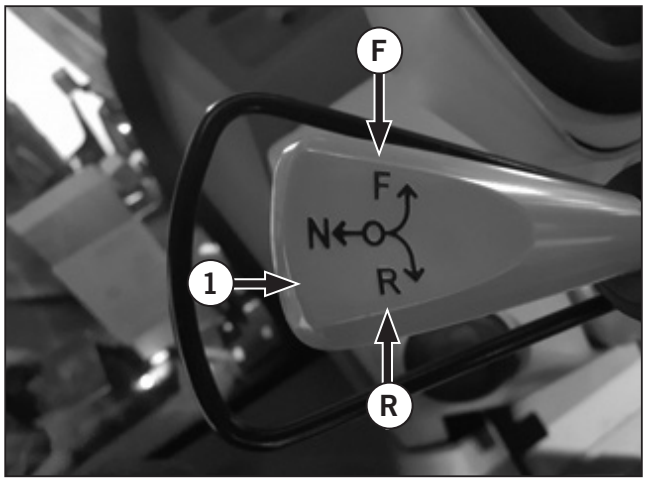
Transmission operation can be performed in 2 ways, either by the FNR lever (1) on the steering console or by pressing and holding the shuttle enable button (2) then F or R on button (3) on the EZ Command center (4).

| Table 3-3: Transmission Operation with FNR Lever | |
|---|---|
| F | **Forward:** Lift the FNR lever and push the lever forward to engage forward motion. |
| R | **Reverse:** Lift the FNR lever from neutral and pull the lever back to engage revese motion. |
| N | **Neutral:** Push and hold down the FNR lever or press the neutral button on the armrest console. |

***NOTE: When in operation mode, It will not switch to neutral when the operator pulls on the parking brake.***

## Park Brake Operation

If the park is on and the operator shifts to F or R, an audible alarm will sound. Park brake will not shift transmission frm F or R to Neutral.





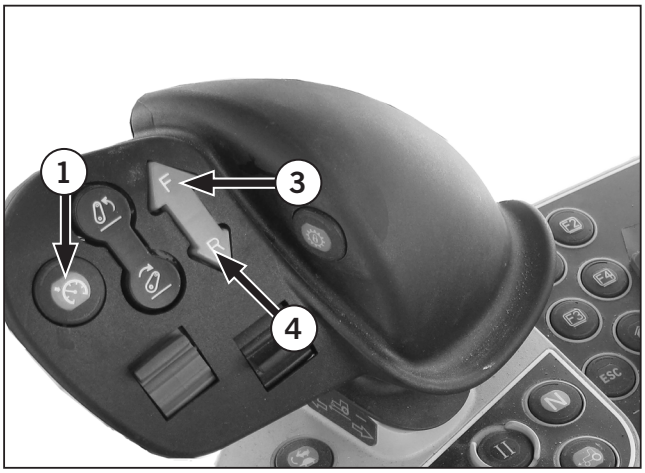
## Forward and Reverse Operation

***NOTE: Change of driving direction is only possible below speeds of 15 km/h (9.32 mph).***

- If the driving speed transmitter fails, it is possible to change driving direction at speeds above 15 km/h (9.32 mph) however there is a risk of damage to the transmission since a failure of the speed sensor enables a higher reversing speed.
- When changing driving direction above 15 km/h (9.32 mph) the transmission automatically shifts to Neutral. This is indicated to the driver on the display and an acoustic warning signal
- Driving direction will not change until kept speed has fallen below the reversing speed limit 15 km/h (9.32 mph).
- If the operator accidently selects a direction change above 15 km/h (9.32 mph) and immediately shifts back to the original direction the transmission restores power flow.

## Shifting Gears: Overview

| Table 3-4: Transmission Operation with EZ-Command Center | |
|---|---|
| 1 | **Cruise:**<br>To activate cruise, press the button (1) once this will activate the last saved auto shift mode. |
| F | **Forward:** Press and hold the shuttle enable button (2) on the back of the EZ-Command Center. Then press the Forward button (3). |
| R | **Reverse:** Press and hold the shuttle enable button (2) on the back of the EZ-Command Center. Then press the Reverse button (4). |
| 5 | **Ratio Lock:** To activate ratio lock button, press the button (5). For more information. refer to “Operating Ratio Lock Button” on page 3-44. |
| Push the EZ-Command Center to speed up, the longer it’s held the faster the travel speed will be. Release the lever to stay at the correct speed. | |
| Pull the EZ-Command lever back to reduce speed, the longer it’s held, the slower the slower the travel speed will be. Release the lever to stay at current speed. | |

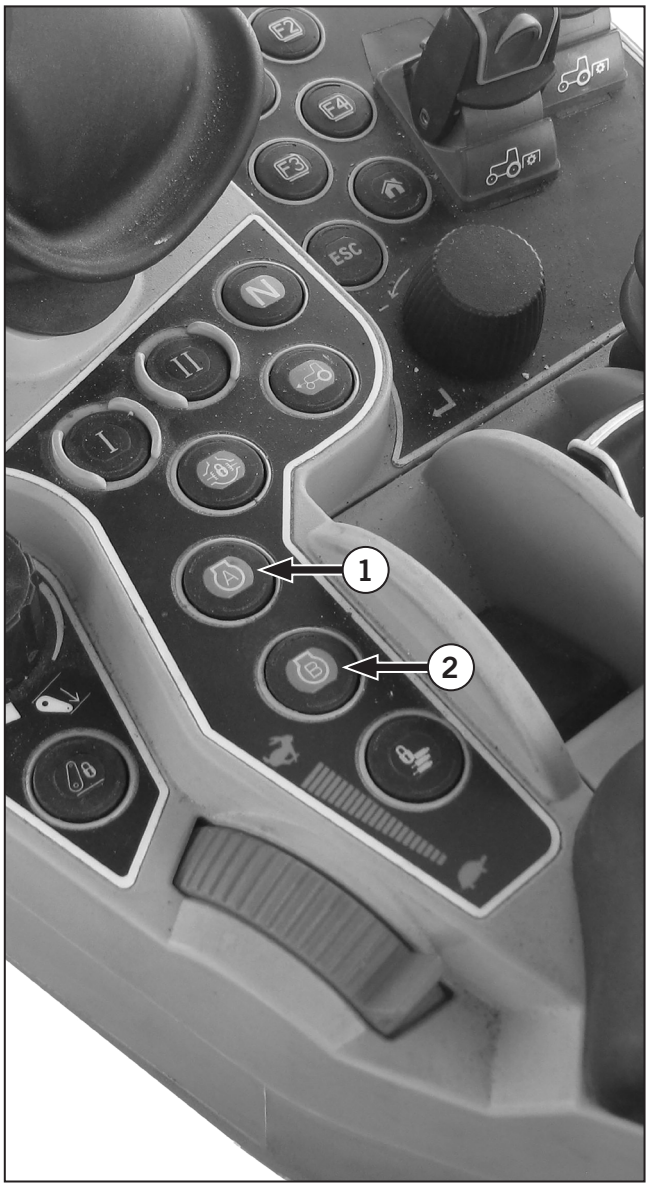



## Engine Rpm Preset

Buttons A (1) and B (2) are the engine rpm presets, which allow you to preset a desired engine rpm.

The operator can also use the virtual switches in the monitor.

- You cannot use the engine presets if the unit is at low idle as the presets will be locked out. To enable the engine rpm presets you must increase the engine rpm with the hand throttle to at least 1000 rpm.
- Once the engine rpm reaches 1000 rpm and one of the preset buttons is selected the engine rpm will increase to the desired rpm.

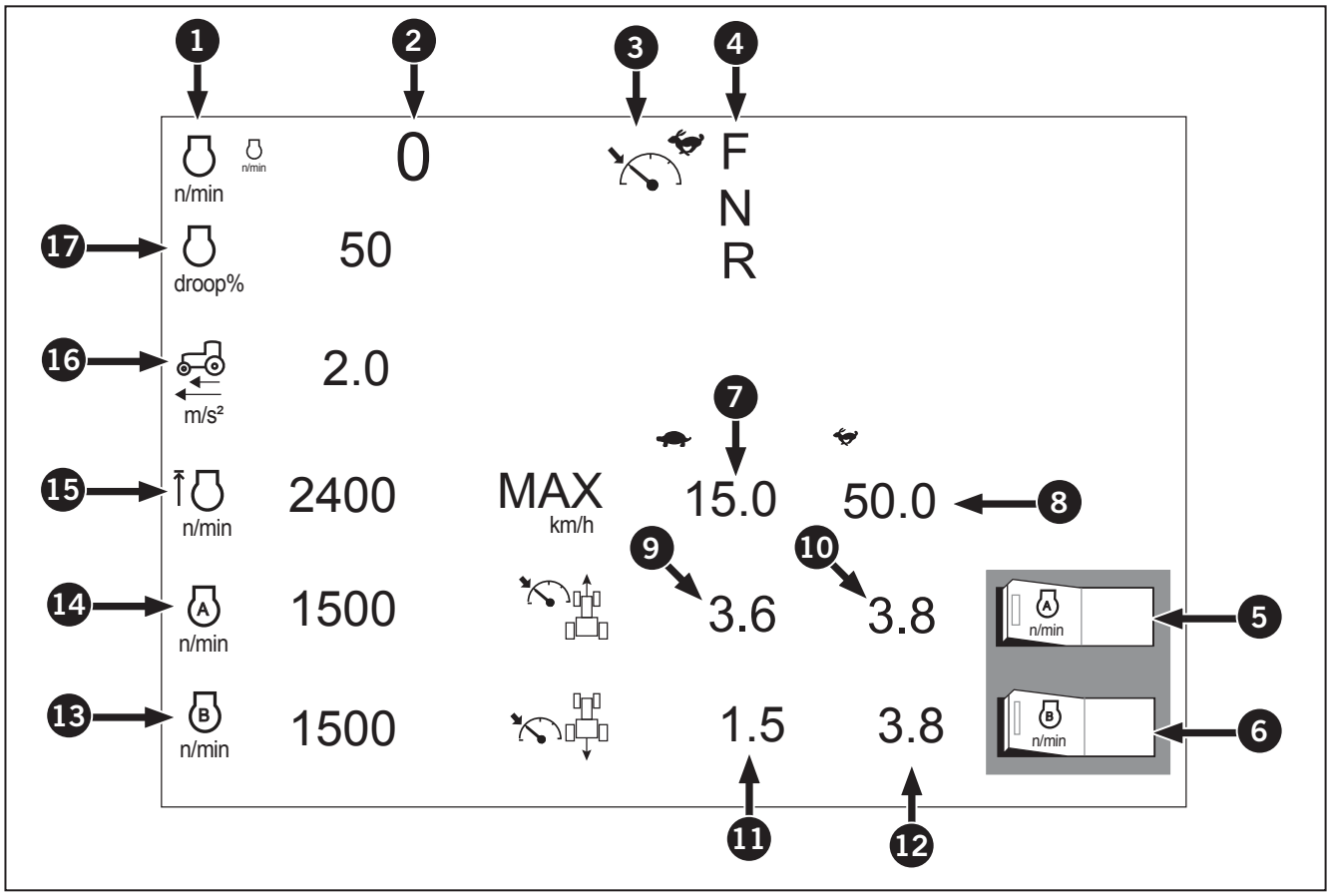


## Engine/Transmission Continuously Variable Transmission (CVT) Settings

Various settings of the Continuously Variable Transmission (CVT) can be made and checked. The engine rev-limiter, engine rpm memory and other settings can also be set.

**Table 3-5: Engine/Transmission (CVT) Icons**

| Icon | Description |
|---|---|
| 1 | Engine RPM (A/B indicator) |
| 2 | Engine rpm |
| 3 | Mode shift (Hi/Lo) indicator |
| 4 | Shuttle lever Indicator |
| 5 | Engine RPM memory (B) control |
| 6 | Engine RPM memory (A) control |
| 7 | CVT low-range max. speed |
| 8 | CVT high-range max. speed |
| 9 | Cruise control low-range set speed (Forward) |
| 10 | Cruise control high-range set speed (Forward) |
| 11 | Cruise control low-range set speed (Reverse) |
| 12 | Cruise control high-range set speed (Reverse) |
| 13 | Engine RPM memory (B) control |
| 14 | Engine RPM memory (A) control |
| 15 | Engine rev-limiter control |
| 16 | CVT response control |
| 17 | CVT droop control |



## CVT (Continuously Variable Transmission) Control

**WARNING**

To avoid personal injury or death:

The ez-command center has no neutral position. To bring the tractor to a complete stop, step on the brake pedal or set the shuttle lever to neutral.

The CVT (Continuously Variable Transmission) is a fully computerized stepless type. Depending on the type of work, there are two modes to choose from: “Automatic” and “Manual Engine Speed Setting”.

Other settings are also possible at will, including CVT droop in response to engine load, response control for start and stop, and cruise control among others.

### Traveling Operation

Traveling speed control for a tractor with CVT transmission can be operated with either the ez-command center or the foot throttle. Choose between them according to the job.

Note that control using the foot throttle requires the selection of “Automatic Mode” as discussed below. The operator can control both the speed and the engine power by how deeply you step on the foot throttle, as with an automatic transmission car; this enables convenient operation of the trailer and so on.

### Main shift

With the ez-command center (1), the machine can be “sped up” and “slowed down” easily.

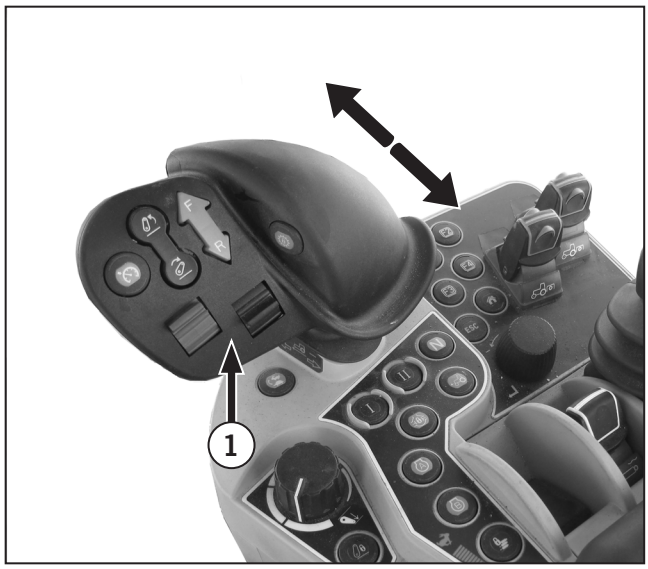
Push the lever forward and pull it backward, and the traveling speed will increase and decrease respectively.

The traveling speed is fixed at the position where you release the lever.

The traveling speed changes in proportion to the duration of moving the lever. The longer the lever is pushed forward, for instance, the higher the traveling speed becomes.

***NOTE:***

- The ez-command center has no neutral position. Even when the lever is set at the lowest speed position, the machine runs at the creep speed (about 0.5 km/h (0.3 mph). To bring the tractor to a complete stop, step on the brake pedal or set the shuttle lever to neutral.
- Allowing for conditions, use the “Cruise Mode” discussed below when you want to make fine adjustments to the traveling speed, or to keep the traveling speed steady for a job with a high traction load on the tractor.
- When the ez-command center is pushed forward during the tractor driving by using foot throttle, the traveling speed is set at the time of ez-command center operation. But this setting is effective for only when the tractor has a light load.

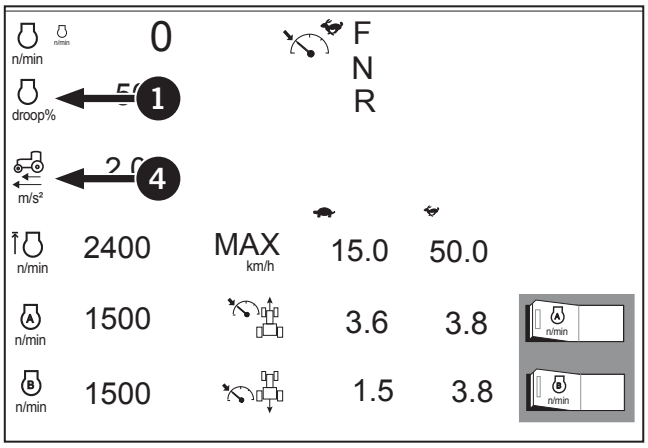


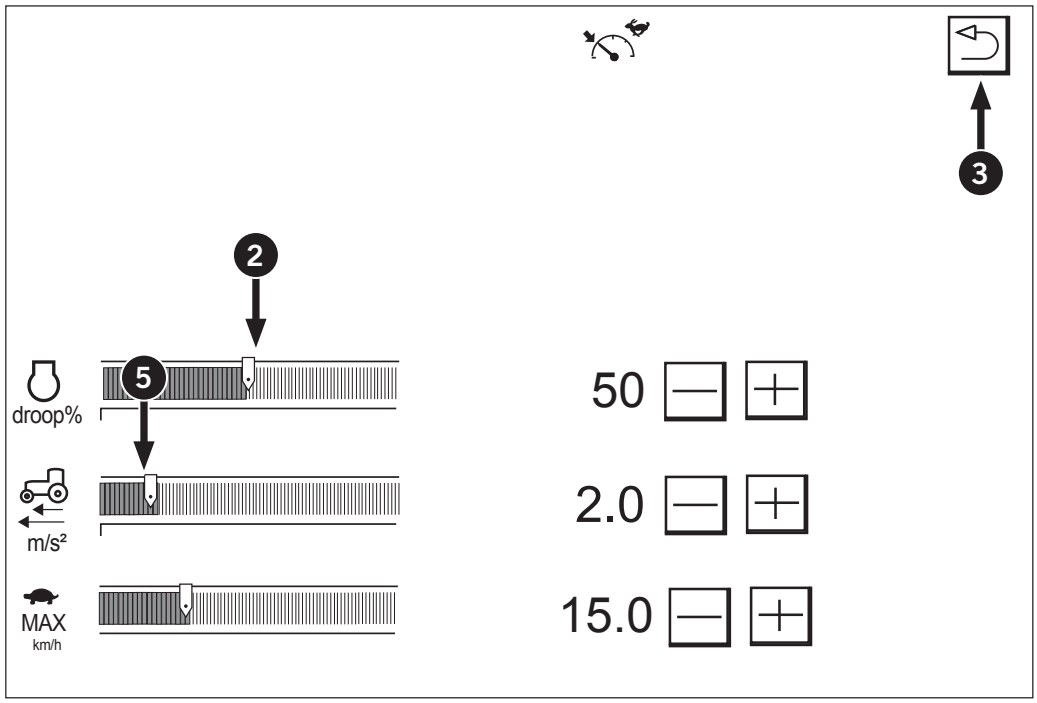
### Modifying the CVT Droop setting

1. Touch the CVT droop control (1) and the setting screen shows up.
2. To adjust CVT response droop either touch and drag the slider (2) to the desired number. Or used the + or – switches to move to the desired number.
3. Press the switch (3), and the setting is saved and the previous screen reappears.

### Modifying the CVT Response setting

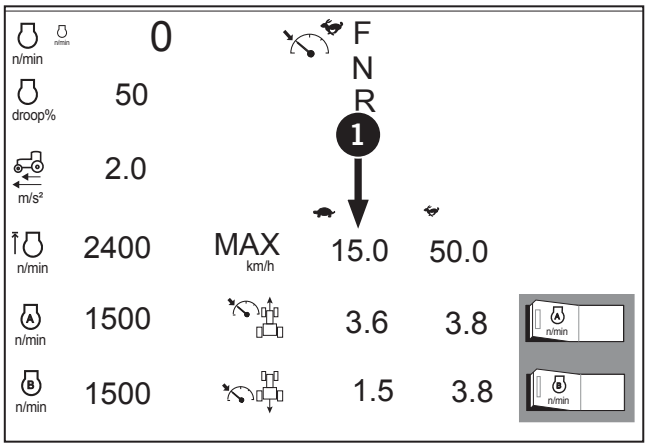
1. Touch the CVT response control (4) and the setting screen shows up.
2. To adjust the CVT response setting either touch and drag the slider (5) to the desired number. Or used the + or – switches to move to the desired number. Ideally, set the response level to low for towing heavy-duty implements and operating on slopes.)
3. Press the switch (3), and the setting is saved and the previous screen reappears.

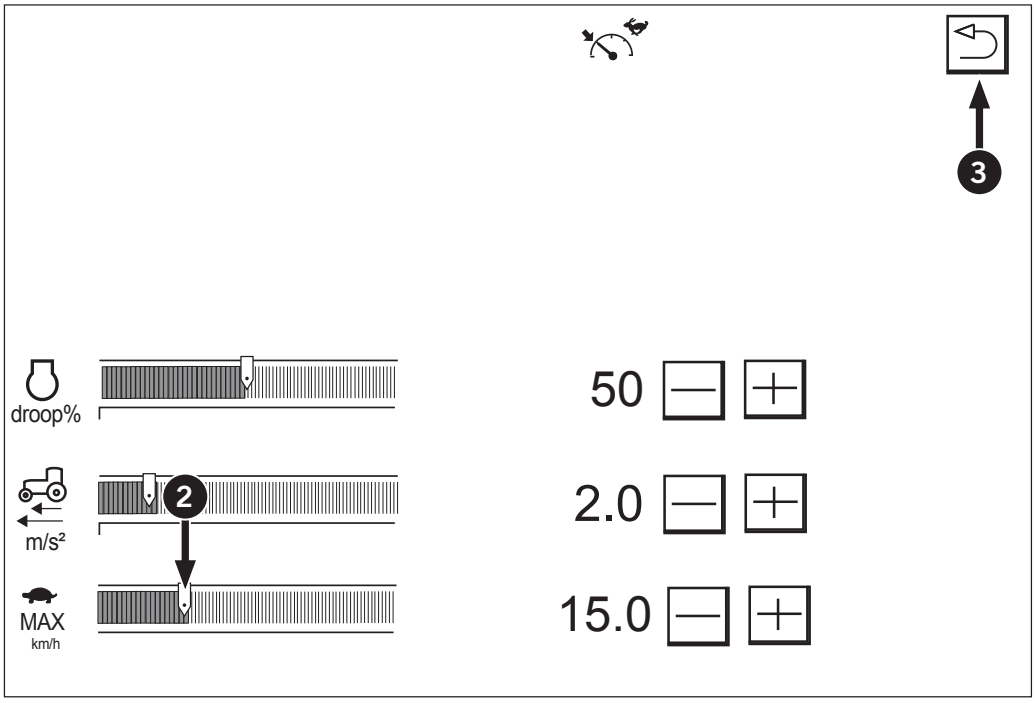


## Modifying the CVT Low-range max. speed setting

1. Touch the CVT Low-range max. speed control (1) in the above figure, and the setting screen shows up.
2. Slide the graph (2) farther to the right (increasing value) to increase the traveling speed available in the lowspeed range. The traveling speed in the low-speed range may be preset up to 20 km/h (12.4 mph). This setting cannot be modified for the high-speed range.
3. Press the switch (3), and the setting is saved and the previous screen reappears.



## Operation of the Manual Engine Speed Setting Mode

This mode mainly serves for PTO-driven implements like harvesters. The optimum traveling speed and engine power are obtained according to the engine rpm setting made with the hand throttle as well as the setting made in “Setting the CVT (Continuously Variable Transmission) droop”.

### Switching to the manual engine speed setting mode

1. Set the shuttle lever to neutral. Or press the shuttle neutral button.
2. Accelerate the engine using the hand throttle, and the manual engine speed setting mode is selected.

### Operation

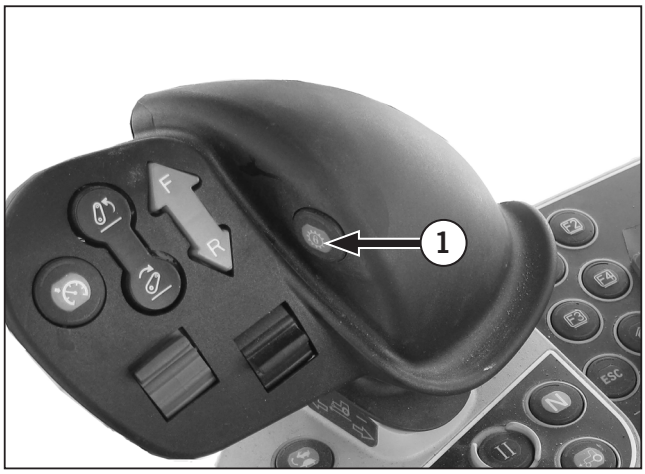
1. Select the PTO shaft rpm and traveling speed according to the implement in question.
2. Even if the load is increased or decreased, a constant PTO shaft rpm is kept up.
3. Needless to say, towed implements without any PTO shaft rotation may also be used in this mode.

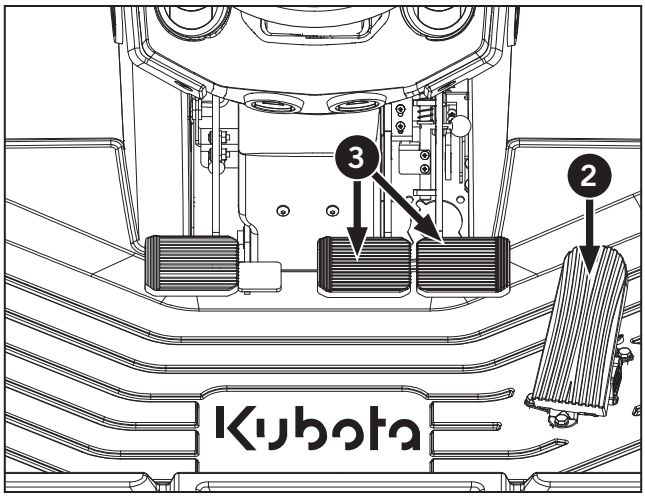
## Operating Ratio Lock Button

The ratio lock is used to lock the transmission ratio to aid in preventing the tractor from losing control when deceleration down a hill with a heavy load being towed behind the tractor. On a steep incline a sudden deceleration of the tractor via the foot throttle slows down the transmission abruptly. As a result due to the heavy load the tractor can be pushed down the hill and control can be lost. To prevent this:

Press the ratio lock button (1) to lock the transmission gear shift before releasing the foot throttle (2). This will allow the transmission and engine to slow down the load to some extent.

Afterwards press ratio lock button again to disengage the ratio lock and allow the transmission to gear shift down. Step on the brake pedals (3) to bring the tractor and load to a stop.



## CVT (Continuously Variable Transmission) Droop Setting

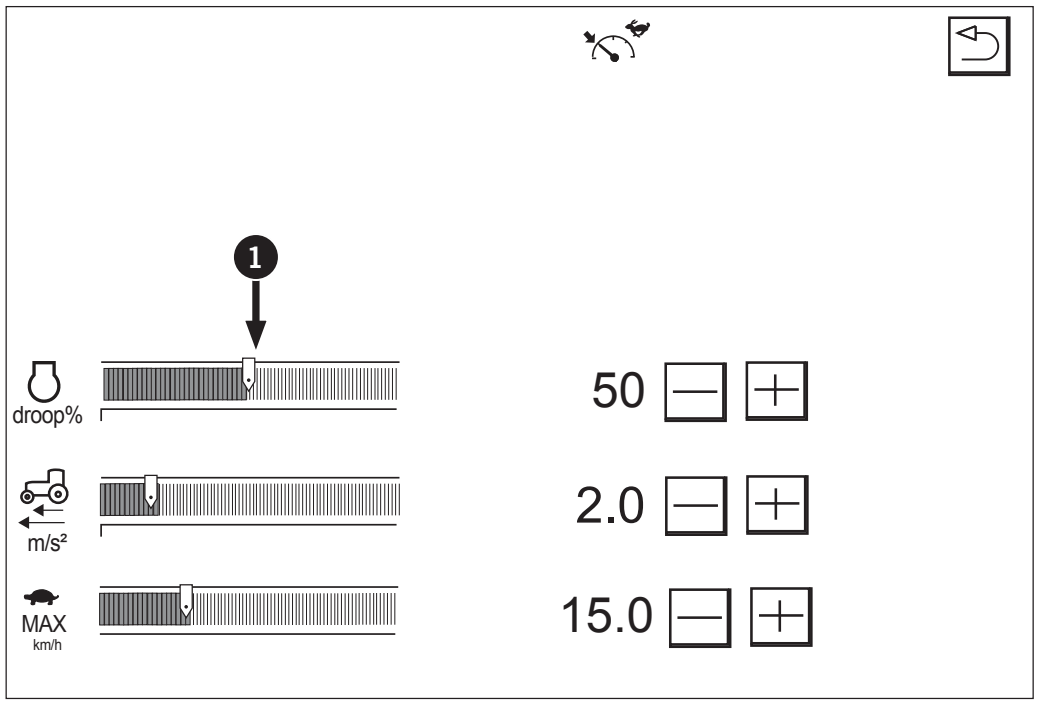
The CVT droop setting (1) varies with a selected mode, “Automatic” or “Manual Engine Speed Setting”.

### Automatic mode

1. As the droop setting in the graph below is increased, the machine can be sped up or slowed down in the low-level engine rpm range. In case of light-duty loads, high-speed energy-saving run is allowed even in the low engine rpm range.
2. As the droop setting in the graph is decreased, the machine can be sped up or slowed down in the highlevel engine rpm range. This is suited for heavy-duty operations.

### Manual Engine Speed Setting mode

1. As the droop setting in the graph below is increased, the traveling speed is also controlled, even in the engine rpm range below the range preset with the hand throttle. In case of light-duty loads, high-speed energy-saving run is allowed even in the low engine rpm range.
2. As the droop setting in the graph is decreased, the traveling speed is controlled so as to remain within the rpm range of the hand throttle. This is suited for heavy-duty PTO-driven implements, such as harvesters, which are adversely affected by rpm fluctuations.

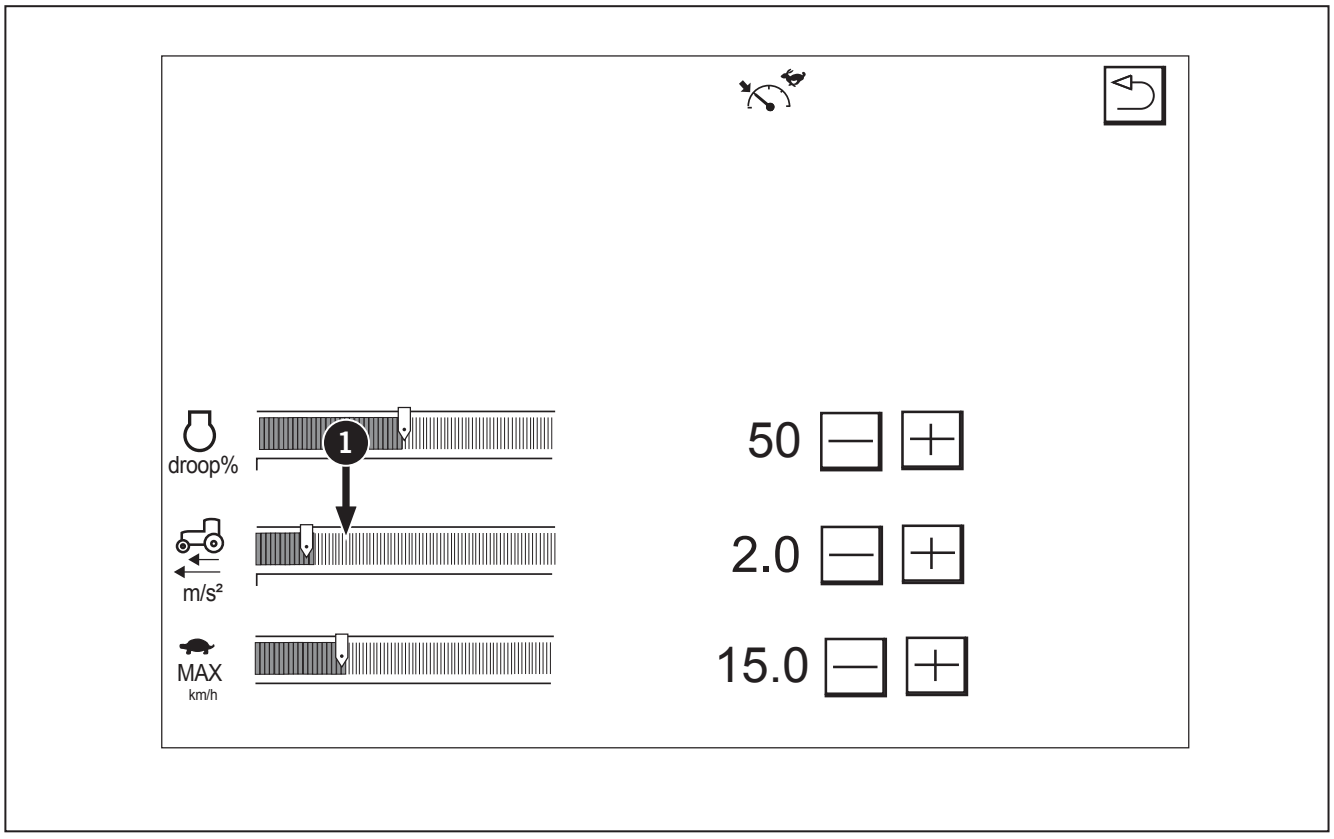


## CVT (Continuously Variable Transmission) Response Setting

**WARNING**

While the trailer is running, the ez-command center cannot be used for a sudden slow down. For a sudden slow down, step on the brake pedals.

1. Touch the CVT response setting graph (1) and the slider in the graph moves to the touched point. Then the “+” or “-” to adjust the setting.
2. Slide the graph farther to the right to enable more responsive rev-up and slow-down. When the working efficiency is enhanced in light duty jobs, increase the response droop. For heavy duty jobs with a trailer or on a grassland, decrease the response droop.



## Cruise Control

The traveling speed may be flexibly preset with the ezcommand center. To keep the traveling speed at a constant level, however, make the cruise control setting. The cruise control can be preset in 4 different conditions for high range speed and low range speed as well as for forward and reverse respectively. The respective preset speed value is memorized when the cruise control is activated once. Thus, the set speed is not memorized if there is no record for cruise activating. Set the cruise control to “ON”, and “CRUISE” and “Cruise preset speeds” appear in the LCD indicator on the instrument panel.

### Setting the cruise control

To set cruise control, use either of the following procedures.

### Setting cruise control with ez-command center

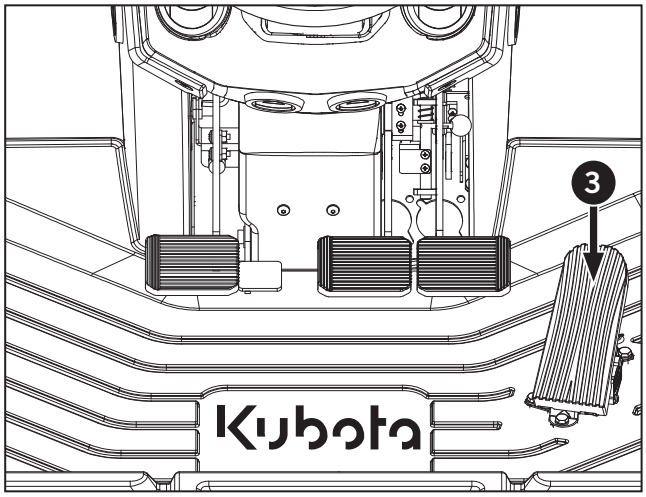
1. Push the ez-command center (1) forward until a desired traveling speed is reached.
2. Press and hold down the cruise button (2) (for 3 seconds), and the cruise control is enabled. 2 audible sounds will be heard to inform the operator that the current speed is saved and the machine runs at this speed.


### Calling the memory speed

A single touch on the cruise button (2) while in motion makes the machine run at the previously set cruise speed. Hold down the cruise button, and the current speed is recorded as cruise speed.

### Setting the traveling speed with the foot throttle

1. Step on the foot throttle (3) until a desired traveling speed is reached.
2. Press and hold down the cruise button (2) (for 3 seconds), and the cruise control is enabled. 2 audible sounds will be heard to inform the operator that the the current speed is saved and the machine runs at this speed.



### Increasing/Decreasing cruise once set

Once cruise is set, the operator can increase or decrease the set cruise speed with the ez-command center (1).

1. To increase cruise speed setting, bump the ez-command center (1) forward. The set cruise speed will increase.
2. To decrease cruise speed setting, bump the ez-command lever backward. The set cruise speed will decrease.

   ***NOTE: The new cruise speed will not be automatically saved. To save the new cruise speed, press and hold the cruise button for 3 seconds till the audible beep is heard.***


### Re-calling saved cruise speed setting

Put the tractor in motion. Press the cruise control button (2) once on the ez-command center to activate the previously saved cruise setting. Press once again to de-activate cruise control. An audible beep will be heard when cruise is engaged

1. Cruise control can be for turtle and rabbit speed modes and can also be set for forward and reverse.
2. Cruise control can only be activated when the tractor is in motion and traveling at, at least 10% of the saved cruise setting.
   - For example: If cruise preset speed is 20 km/h (12.4 mph) then tractor must be travelling faster the 2 km/h (1.2 mph) before cruise can be activated and tractor will travel at the cruise speed.

3. Cruise can be cancelled by performing one of the following:
   - Stepping fully on both brake pedals (1).
   - Pressing the cruise button (2).
   - Putting the transmission into neutral (3).

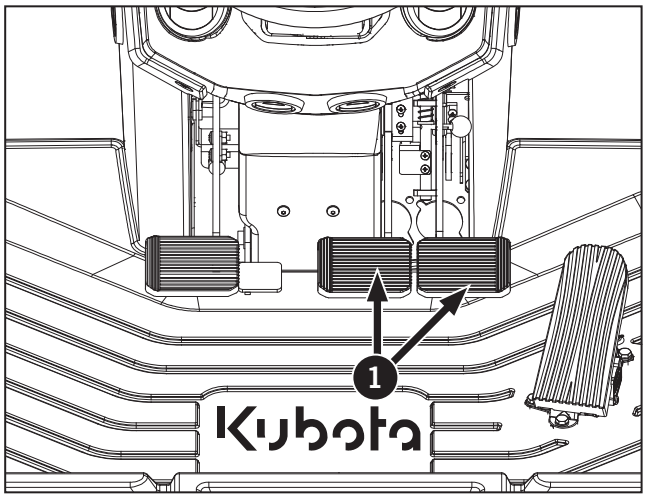
   ***NOTE: When cruise is cancelled the saved cruise setting is NOT erased.***

   ***NOTE: While cruise is active, if the foot throttle is pressed past the set point of cruise. The tractor will increase its speed till the foot pedal is release and the previous cruise speed is resumed.***

   ***NOTE: The memory value will not be deleted whichever method you use to clear cruise control. Even if you turn the key switch off, the memory value remains.***

   ***NOTE: Press the cruise button again while running, and the cruise control turns on. The machine can be run at the preset traveling speed.***

   ***NOTE: When the cruise control is activated in the state as which speed is not memorized, the tractor will stay at creep speed (approx. 0.5 km/h (0.3 mph)).***





## Exterior and Interior Lights

This section explains how to operate all of the lighting on the tractor.

Exterior lighting:

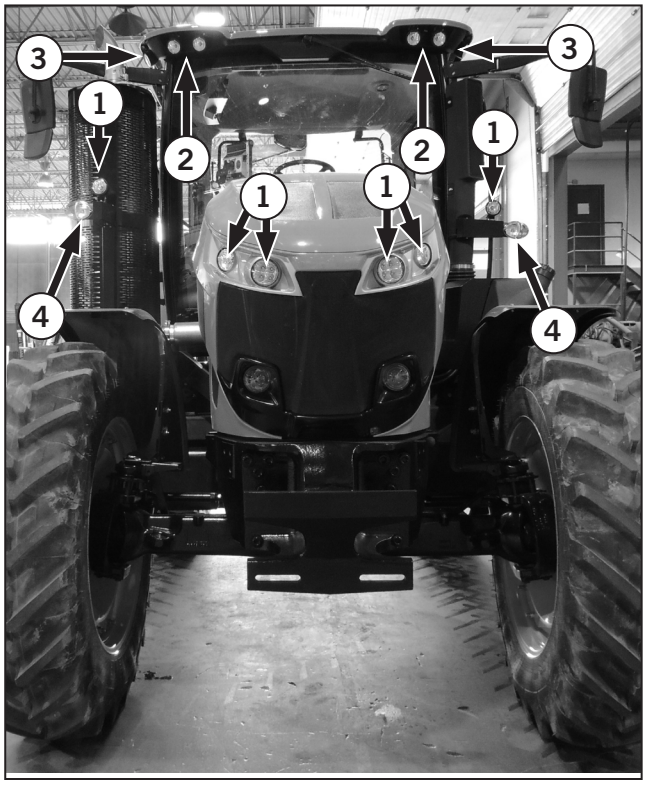
- Worklights (Halogen or LED if equipped)
- Turn signals / Hazard / Extermity lights
- High / Low Beams
- Brake lights (also rear turn signals)

Interior cab lighting:

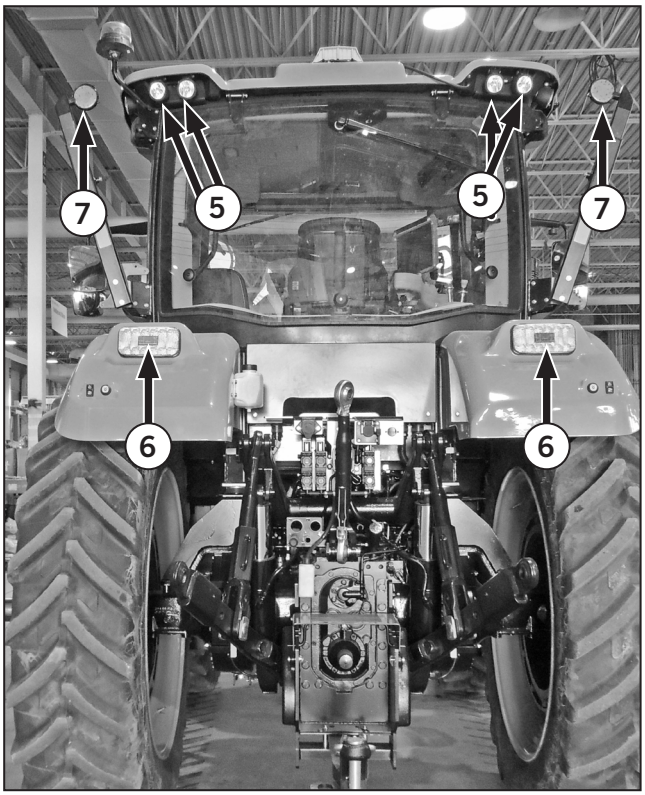
- Dash lighting
- Ceiling dome light
- Overhead console light

***NOTE: The brake and signal lights flash at double-speed if they are malfunctioning. See Section 5: Lubrication and Maintenance for information on replacing lights.***

## Exterior Light Identification




| Table 3-6: Exterior Worklights | |
|---|---|
| 1 | Front worklights x 6 |
| 2 | Front cab worklights x 4 |
| 3 | Cab side worklights x 4 |

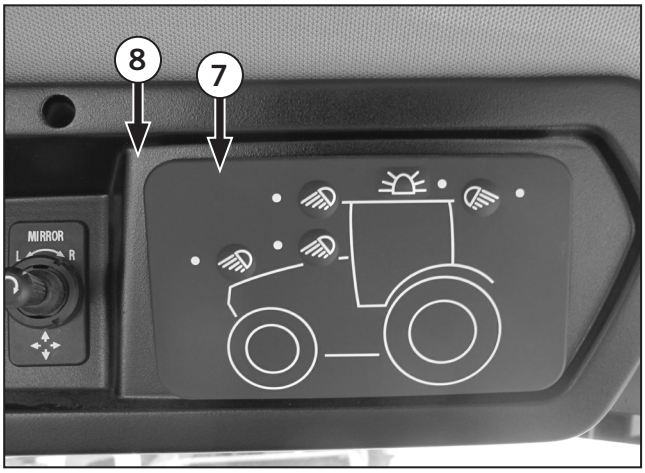



| Table 3-6: Exterior Worklights | |
|---|---|
| 4 | Front Extremity / Hazard / Turn Signal Lights x 2 |
| 5 | Rear cab worklights lights x 4 |
| 6 | Brake lights/turn signal/hazards |
| 7 | Rear Extremity/Hazard Lights x 2 |

### Exterior Worklights

Exterior worklights are controlled by worklight switch (7) located on the cab accessory panel (8) above the driver's seat. Press the button to activate front or rear worklights.

An indicator light will appear beside the button when to indicate active status.



## Multifunction Switch

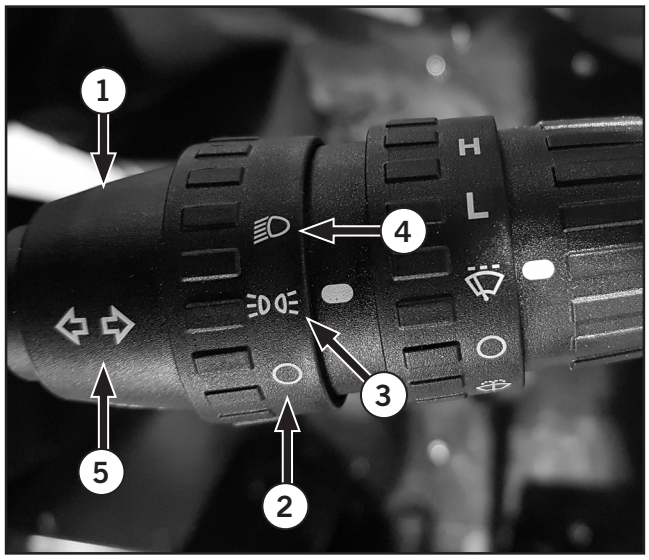
The multifunction switch (1) is located on the left side of the steering column. Table 3-7 explains how to operate the switch.

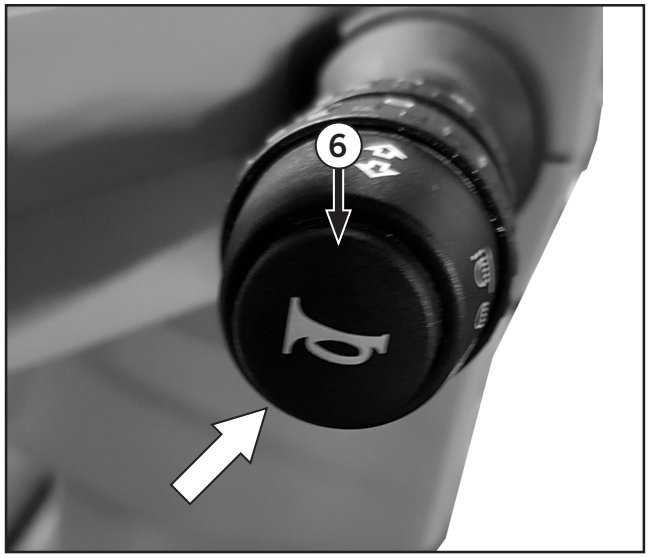
**Table 3-7: Multifunction Switch Operation**

| Ref | Description |
|---|---|
| 2 | **OFF:** To deactivate the lights, rotate the multifunction to Off ◯. |
| 3 | **Worklights:** Rotate the switch forward once to activate road lights and back lighting. |
| 4 | **Low beams/Night Mode EIC: To** activate the low beams and night mode on EIC, rotate switch into position. |
| 5 | **Signal Left Turn:** Lift the switch up. The left turn flasher on the EIC will flash in unison with the left turn signal light. |
| | **Signal right turn:** Push the switch down. The right turn flasher on the EIC will flash in unison with the right turn signal light. |
| 6 | **Horn:** Push to activate the horn. |

**To activate high beams:**

- Pull the multifunction switch up to momentarily activate high beams.
- Push the multifunction down to keep high beams on.



## Hazard Warning Lights

**WARNING**

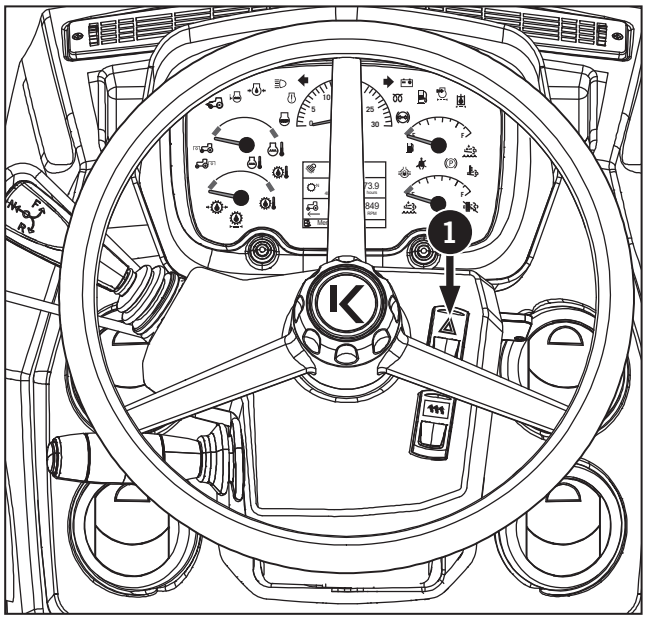
Always look before exiting the cab on a public roadway. Turn hazard warning lights on to signal other motorists to give the tractor a wide berth when passing or to slow down.

The hazard warning lights switch (1) activates the tractor hazard warning lights located on the extremity bar.

- To activate the lights, press the rocker switch forward.
- To deactivate the lights, press the rocker switch backwards.

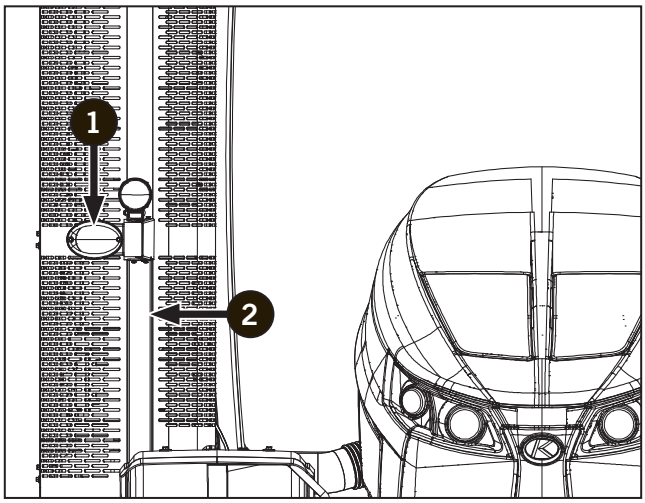
The hazard warning lights warn other drivers the tractor is experiencing a problem. The hazard warning lights are designed to warn other drivers that the tractor is experiencing a problem. This could mean the tractor is traveling at a reduced speed on a public road, is pulling off to the side of the road or is already on the shoulder.

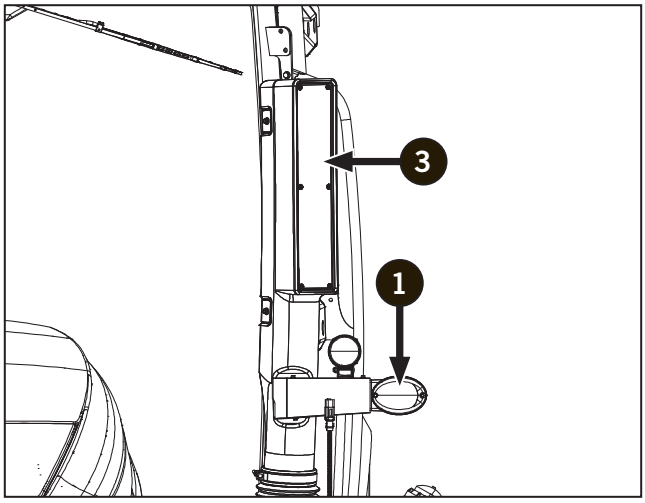
The turn signal light indicators on the dash will flash (when key switch is on).



## Extremity/Hazard and Turn Signal Lights

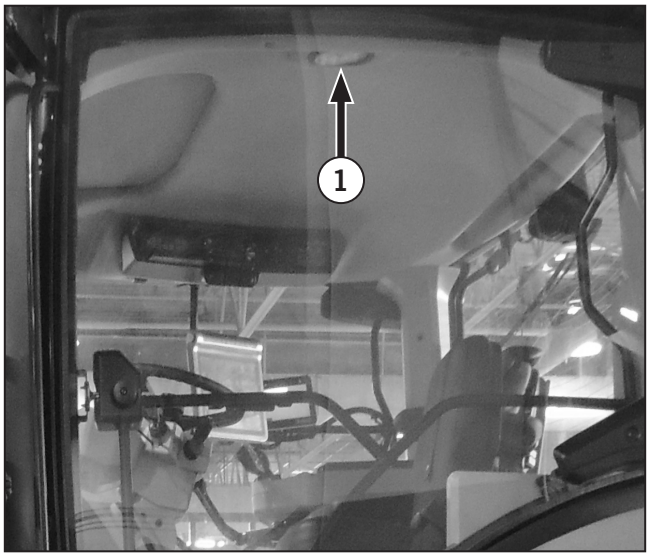
The extremity lights (1) are installed on light bracket covers on the aftertreatment shield (2) and onto the air intake snorkel (3).




## Interior Cab Lights

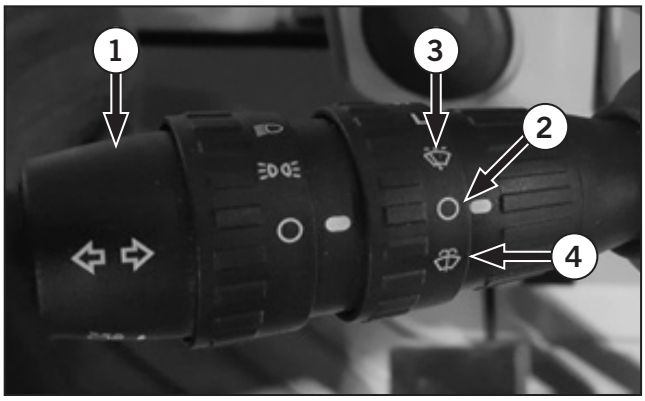
- An interior cab dome (1) light is activated by pressing the ends of the light.
- The console light is activated when the cab door is opened and remains on whenever the key switch is on.
- The interior dash display lighting is activated on the multifunction switch.

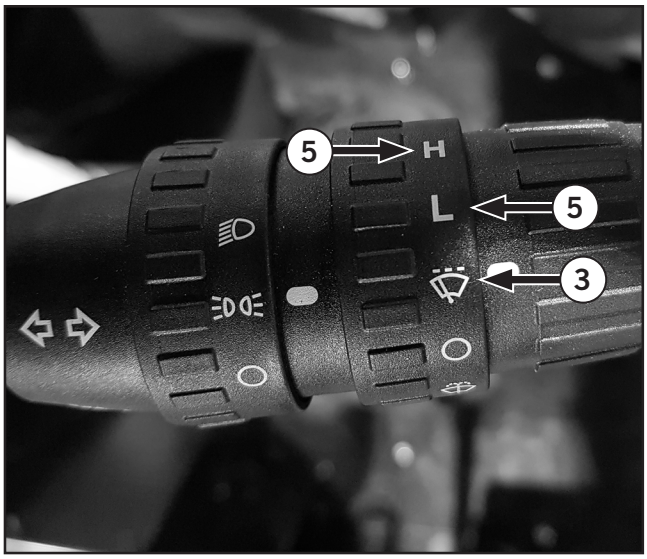


## Windshield Wiper – Operation

The windshield wiper controls are controlled on the multifunction switch (1) located on the left side of the steering column.

- **OFF ( ◯ ):** To deactivate the wipers, rotate the multifunction to Off ◯ (2)**.**
- **Front wiper control :** Rotate multifunction switch forward to activate front wiper (3). This activates intermittent wiper timing.
- **Front windshield washer control :** Rotate multifunction backward to activate front windshield washer (4).
- **Wiper settings L and H:** Rotate to adjust intermittent wiper timing (low or high) (5).
- **Rear wiper control :** Press the rear wiper rocker switch up to activate the rear wipers (6).
- **Rear intermittent wiper control :** Press the rear wiper rocker switch down to activate the rear wiper intemittent setting (7).
- **Rear windshield washer control :** Press the rear windshield washer rocker switch to activate the rear windshield washer (8).



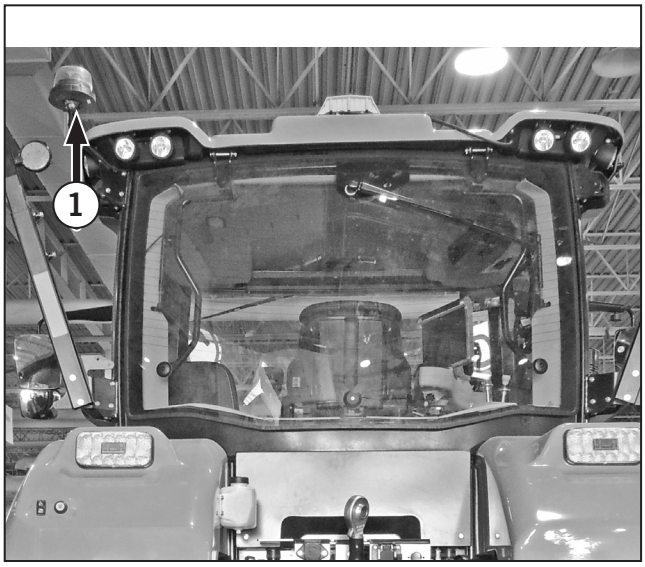

## Auto Steer

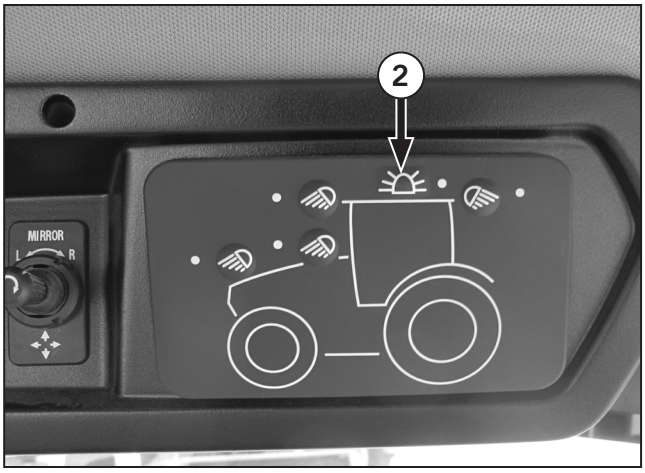
Consult the Auto Steer operator's manual for more information on Auto Steer operation and features.

## Rotary Beacon (option)

Make sure the rotary beacon (1) is installed and operational:

- The rotary beacon can be mounted on the left or right side of the cab.
- To activate, press the button once (2).
- To deactivate, press the button again.



## Differential Lock

The M8-181 and M8-201 tractor are equipped with front and rear axle differential locks. Differential locks improve traction on hillsides or wet ground.

**CAUTION**

Do not use the differential lock when driving the tractor on roads or steering may be impaired.

**NOTICE**

- Do not engage the differential lock when the tractor wheels are spinning or when the wheels are turning at different speeds, such as an end of the field turn. Drivetrain damage may result.
- Reduce engine speed before engaging the differential lock to avoid shock loads to the driveline if a rear wheel spins at high speed.
- Always disengage the differential lock when not required, such as during high speeds and road travel, turning and parking or when additional traction is not needed.

A self-holding differential lock is installed in the rear axle to lock the rear wheels together in conditions where wheel slip is encountered.

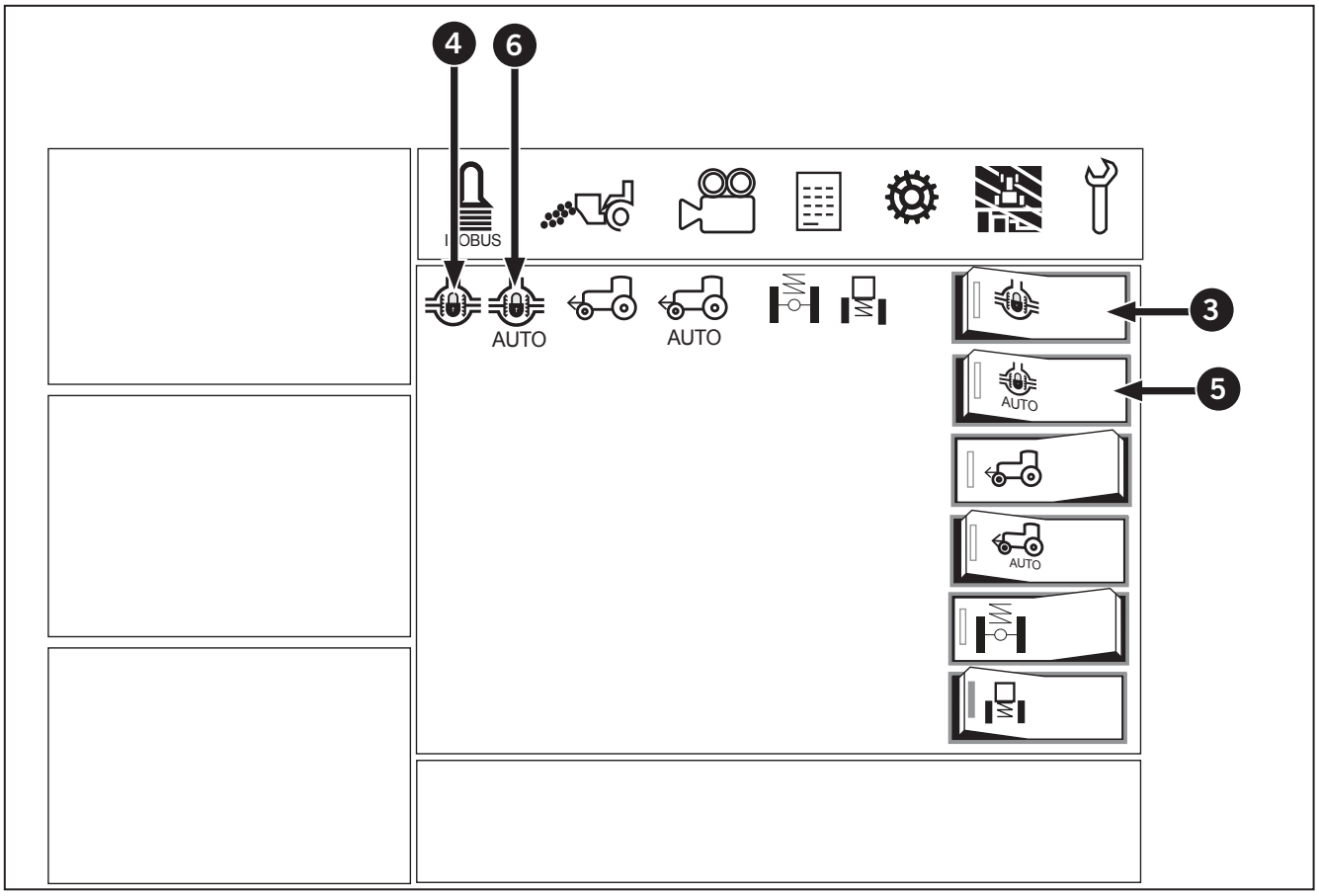
Units equipped with Traction Control System (TCS) traction management four-wheel drive also come with a fully locking electro-hydraulic engagement front axle differential lock.

The differential lock will lock the rear differential only in two-wheel drive mode. Both front and rear differentials will lock when the differential lock is engaged with the MFWA.

***NOTE: In the auto operation mode, the differential lock will disengage if one brake is applied or if the unit is operated above 20 km/h (12.4 mph). In manual operation mode, the differential lock will not disengage.***

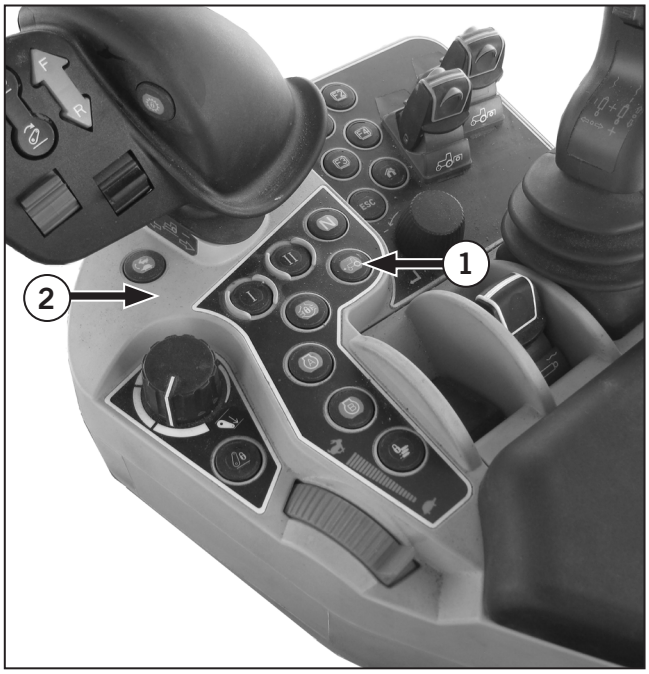
## Differential Lock Operation

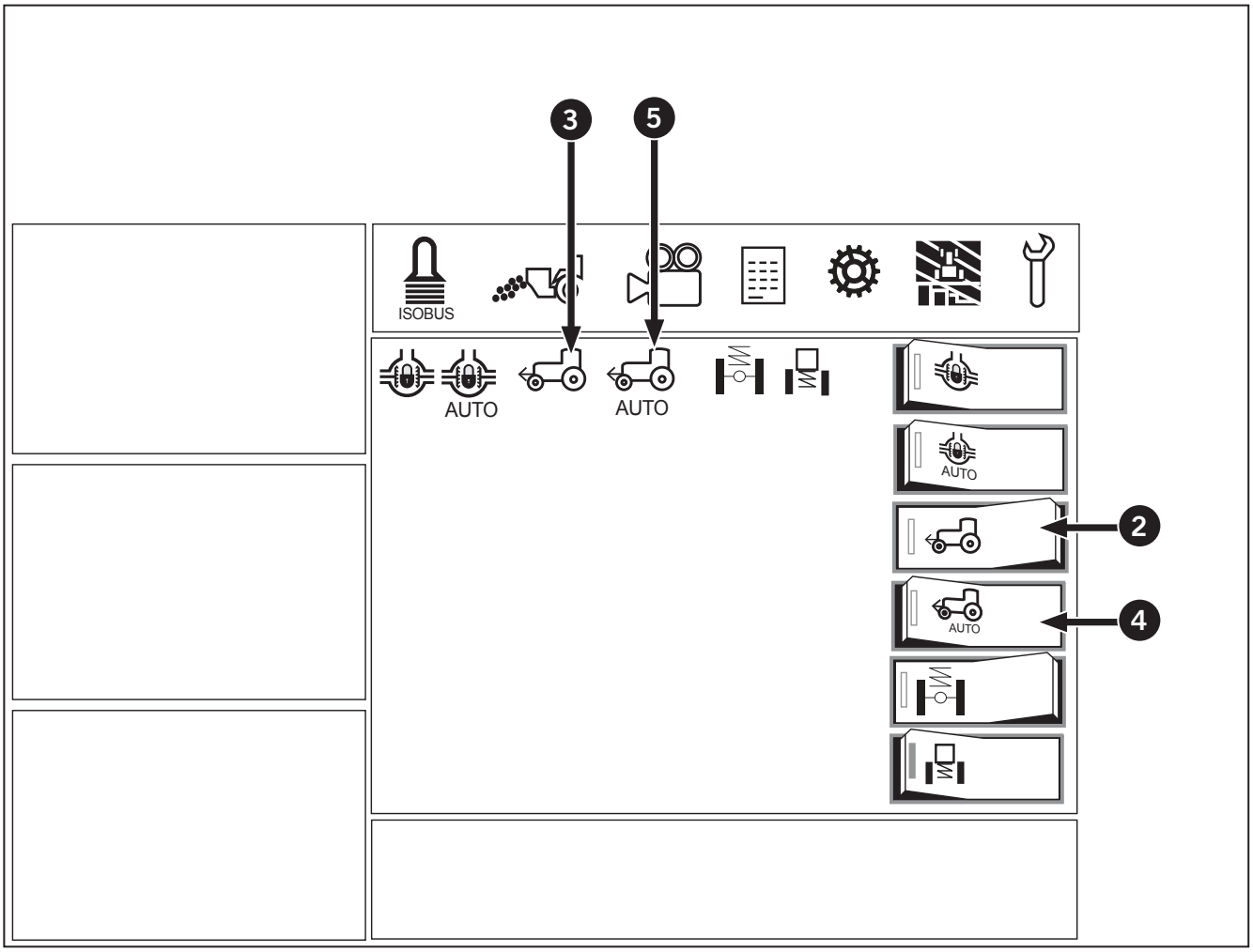
1. Press the differential button (1) on the operator console (2) to enable/disable the differential lock.
2. Touch the left half of the differential lock switch (3) and the differential of the full-time front (if equipped) and rear wheels gets locked. The indicator (4) lights up and stays on.
3. Turn off the differential lock switch (3) and the differential gets unlocked and the indicator (4) goes off.
4. Touch the left half of the auto differential lock switch (5) and both indicator lights (3) and (6) lights up. Same procedure for disengaging.

## Front Wheel Drive Setting

1. Press the differential button (1) on the operator console (2) to enable/disable the differential lock
2. Touch the left half of the 4WD switch (2) and the front and rear wheels are driven. The indicator (3) lights up and stays on.
3. Turn off the 4WD switch (2) and the front-wheel drive is disabled and the indicator (3) goes off.
4. Touch the left half of the Auto 4WD switch (4) and the automatic 4WD and both indicator lights (3) and (5) lights up. Same procedure for disengaging.



## TCS – Steering Angle and Speed Charts

The TCS system uses the steering angle sensors and the ground speed to help keep the tractor within safe operating limits.

The TCS will switch off the mechanical front wheel assist and differential lock based on the steering angle measured at the front axle and the speed of the tractor.

***NOTE: The differential lock and the MFWD are subject to different conditions and limits.***

- MFWA will disengage when the tractor's speed is between 0 - 10 km/h (6.2 mph) in auto operation mode when the steering angle is at 18˚ to the left or to the right.
- MFWA will disengage when the tractor's speed is is between 10 (6.2 mph) - 20 km/h (12.4 mph) in auto operation mode when the steering angle is at 13 ˚ to the left or to the right.
- MFWA will disengage permanently when the tractor's speed is more than 20 km/h (12.4 mph) in manual or auto operation mode.
- Differential lock will disengage when the tractor's speed is between 0 - 10 km/h (6.2 mph) in auto operation mode when the steering angle is at 15˚ to the left or to the right.
- Differential lock will disengage when the tractor's speed is between 10 - 15 km/h (9.3 mph) in auto operation mode when the steering angle is at 10˚ to the left or to the right.
- Differential lock will disengage permanently when the tractor's speed is above 15 km/h (9.3 mph). whether in manual or auto mode.

Turn off MFWA when a tight turn will be made. This will increase front tire life, decrease force put on the front axle and let the tractor turn more tightly.

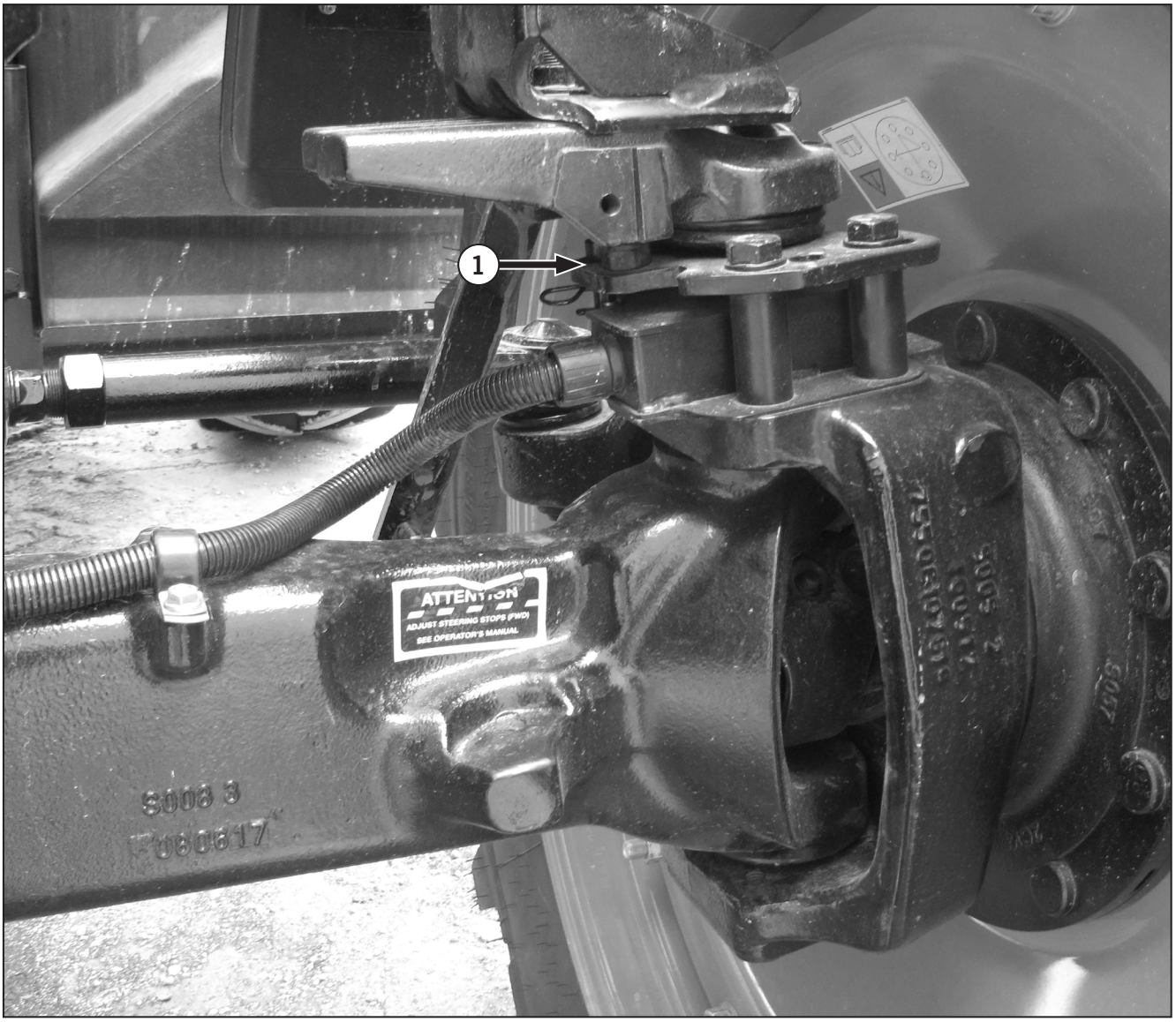
## Steering Angle Sensor

The M8-181 and M8-201can be equipped with a steering angle sensor (1). This sensor measures the turning angle so that the differential locks disengage properly and FWA disengage and engage properly in auto mode.

If the locks are not disengaging when you turn the sensor 20 °, then you need to:

- Check that the steering angle sensor (1) wiring harness is connected properly.
- Recalibrate the sensor. See "Steering Angle Calibration" on page 2-36.

***NOTE: Recalibrate the sensor after updating any software.***



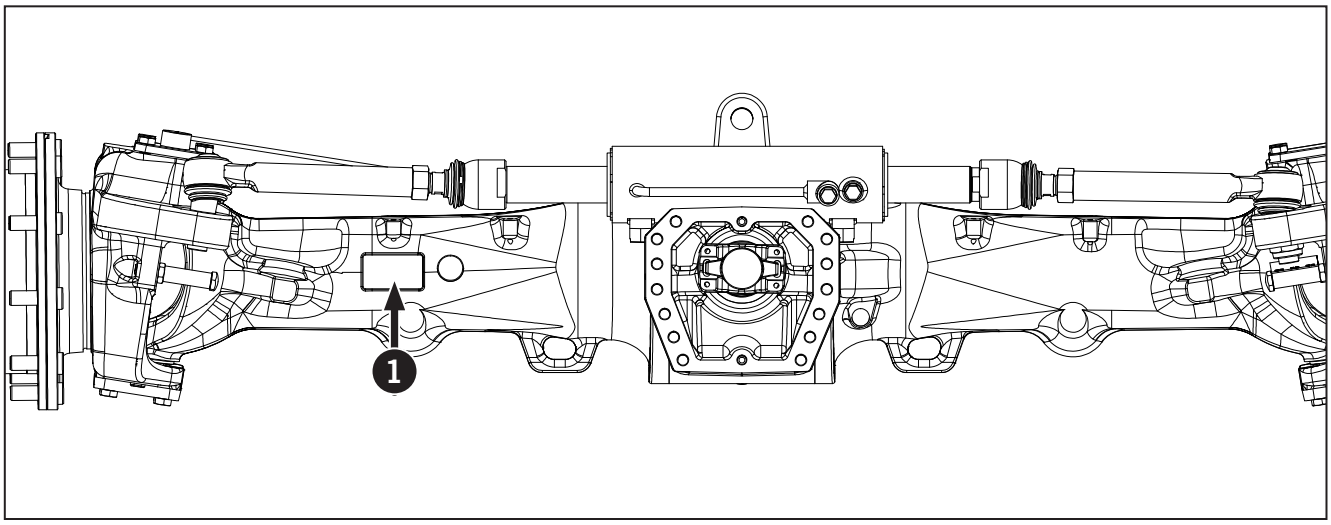
## Suspended Axle

The M8-181 and M8-201can be equipped with a front suspended axle

The front axle consists of an axle housing, differential assembly and a final drive assembly at each end.

### Identification Plate

The front axle identification plate (1) is located on the left rear of the front axle.



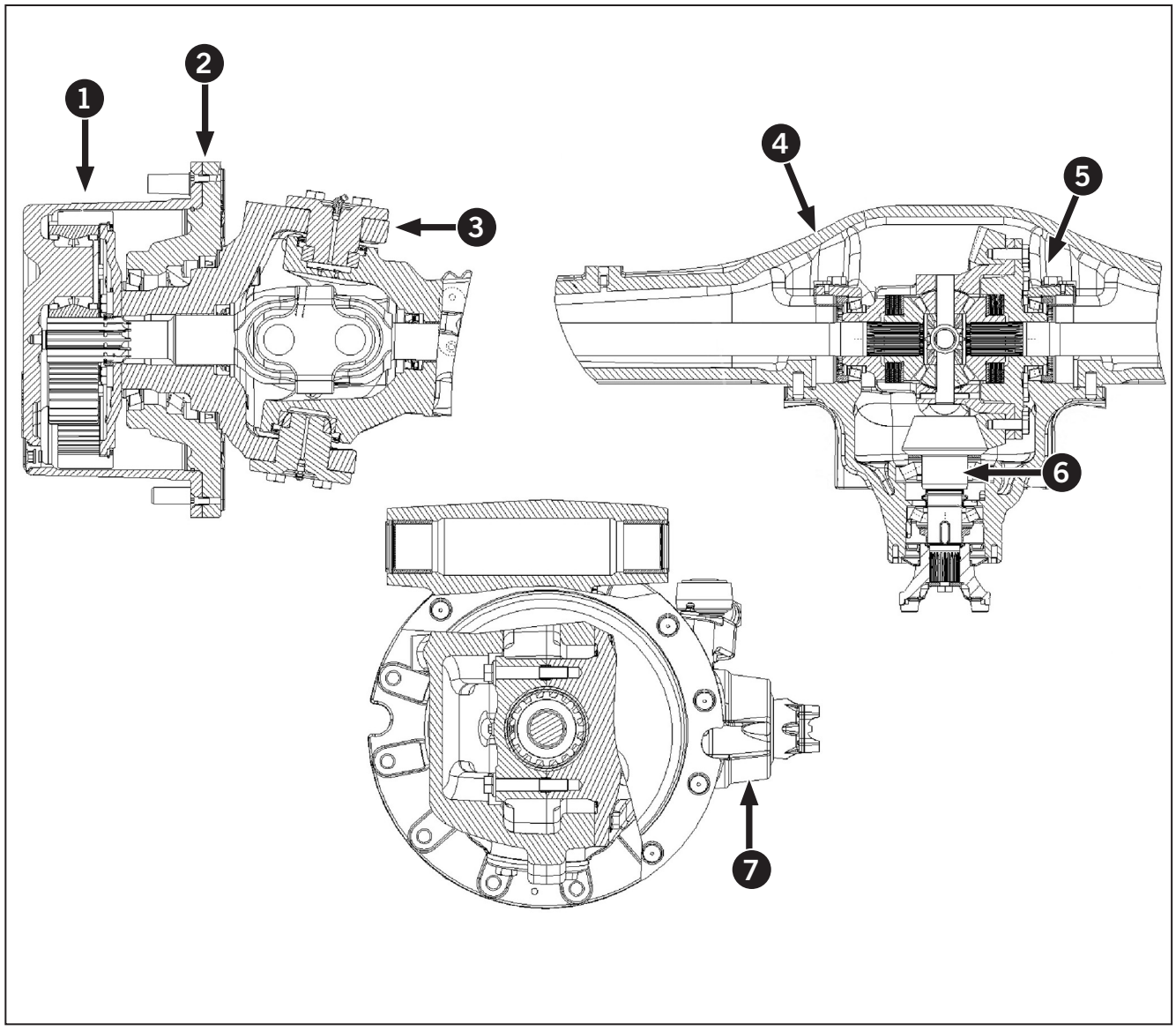

The following information is found on each identification plate (1):

- Axle Type
- Total Ratio
- Serial Number
- Model Number

## Component Identification and Function

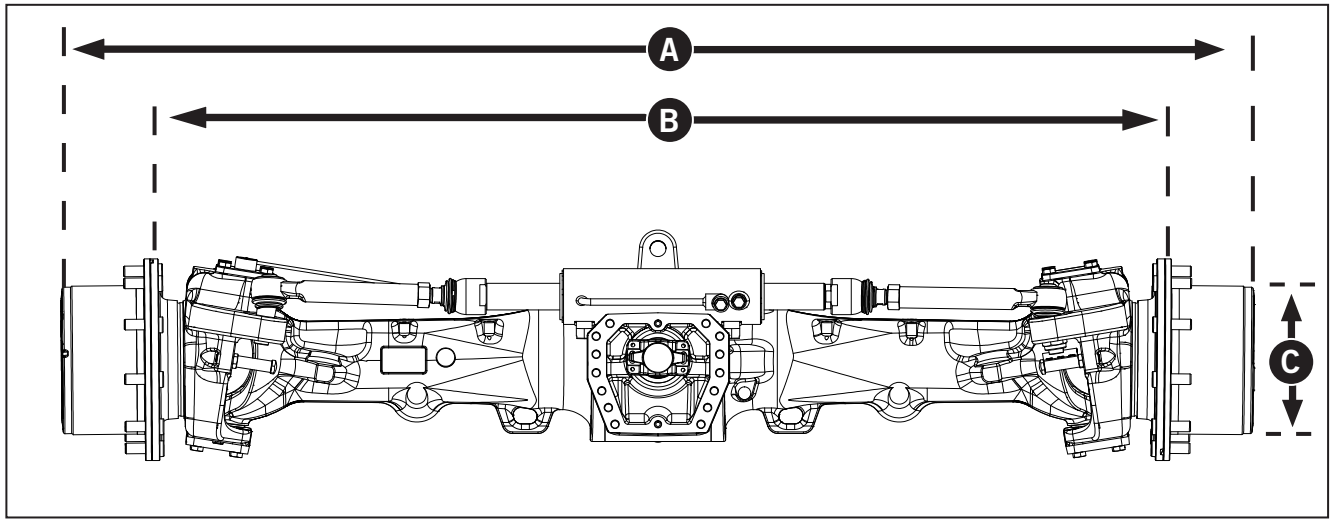
### Front Axle (Lockable Differential shown)

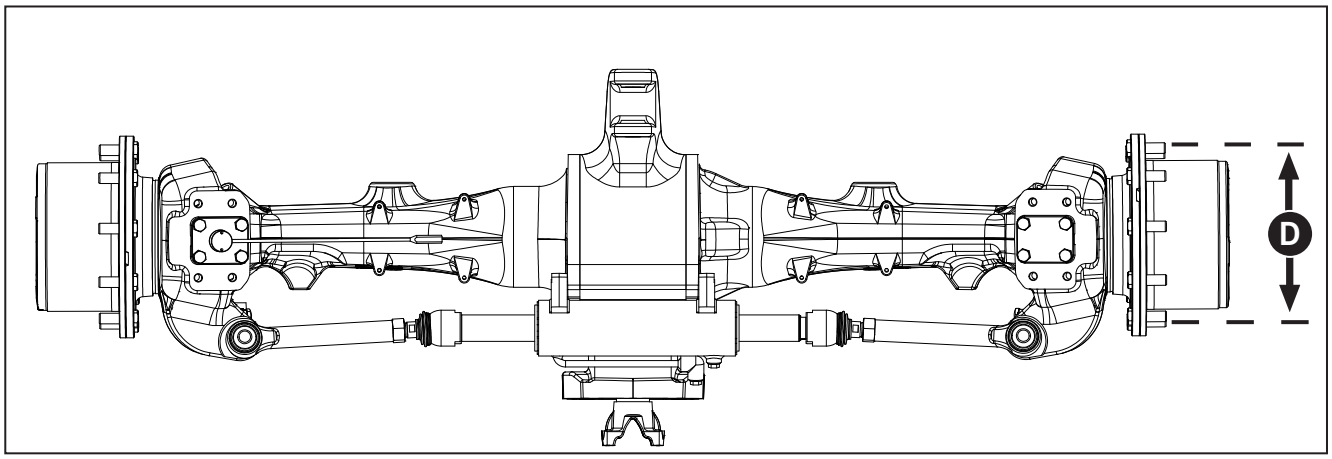
- Final Drive Assembly (1)
- Wheel Hub (2)
- Swivel Housing (3)
- Axle Housing (4)
- Differential Assembly (5)
- Pinion Gear (6)
- Differential Housing (7)



## Front Axle Dimensions

| Table 3-8: Suspended Axle Dimensions mm (in) | | |
|---|---|---|
| **Ref** | **Description** | **mm (in)** |
| A | Planetary Carrier to Planetary Carrier | 2253 (88) |
| B | Swivel Housing to Swivel Housing | 1930 (76) |
| C | Planetary Cover Diameter | 279 (11) |
| D | Wheel Stud to Wheel Stud Diameter | 305 (12) |



## Front Axle Specifications

| Table 3-9: Dana Axle Code | |
|---|---|
| Standard Steer/Limited Slip Differential | CA140490 |
| Standard Steer/Lockable Differential | CA140491 |

| Table 3-10: Dana Axle Model | |
|---|---|
| Standard Steer/Limited Slip Differential | 20.80 ACP |
| Standard Steer/Lockable Differential | 20.80 ACP |

| Table 3-11: Dry Weight | |
|---|---|
| Standard Steer/Limited Slip Differential | 770 kg (1697 lb) |
| Standard Steer/Lockable Differential | 778 kg (1715 lb) |

| Table 3-12: Lubrication Fluids | |
|---|---|
| Oil | SAE80W/90 (API GL4 or GL5) |
| Grease | Lithium–based EF High Temperature with Moly |

| Table 3-13: Lubrication Fluid Capacity | |
|---|---|
| Differential Oil | 14.5 L (3.83 gal) |
| Final Drive Oil | 5 L (1.32 gal) Each |

| Table 3-14: Measurements | |
|---|---|
| Final Drive Reduction | 7.000/1 |
| Bevel Gear Reduction | 3.083/1 |
| Total Reduction | 21.583/1 |
| Input Rotation | Counterclockwise (CCW) |
| Steering Angle | Max 55 |
| Toe-In | 0 mm plus or minus 2mm (0–0.079 in.) |
| Ring and Pinion Gear Backlash | 0.25–0.33 mm. (0.009–0.012 in) |
| Input Flange End Play | 0.00–0.10 mm (0.00–0.004 in) |
| Swivel Housing Backlash | 0 |
| Pinion Bearings “P” Rotation Pull<br>(measured D = 39.7 mm (1.59 in) (without seal) | 2–4 N•m (1.4–2.9 lb-ft) |
| Total Pinion-Ring Gear Bearing Pull “T”<br>(measured D = 39.7 mm (1.59 in) (without seal)<br>Standard Steer/Lockable Differential | 6–6.5 N•m (4.4–4.7 lb-ft) |

***NOTE: 1daN = 1kg = 2.2lb***

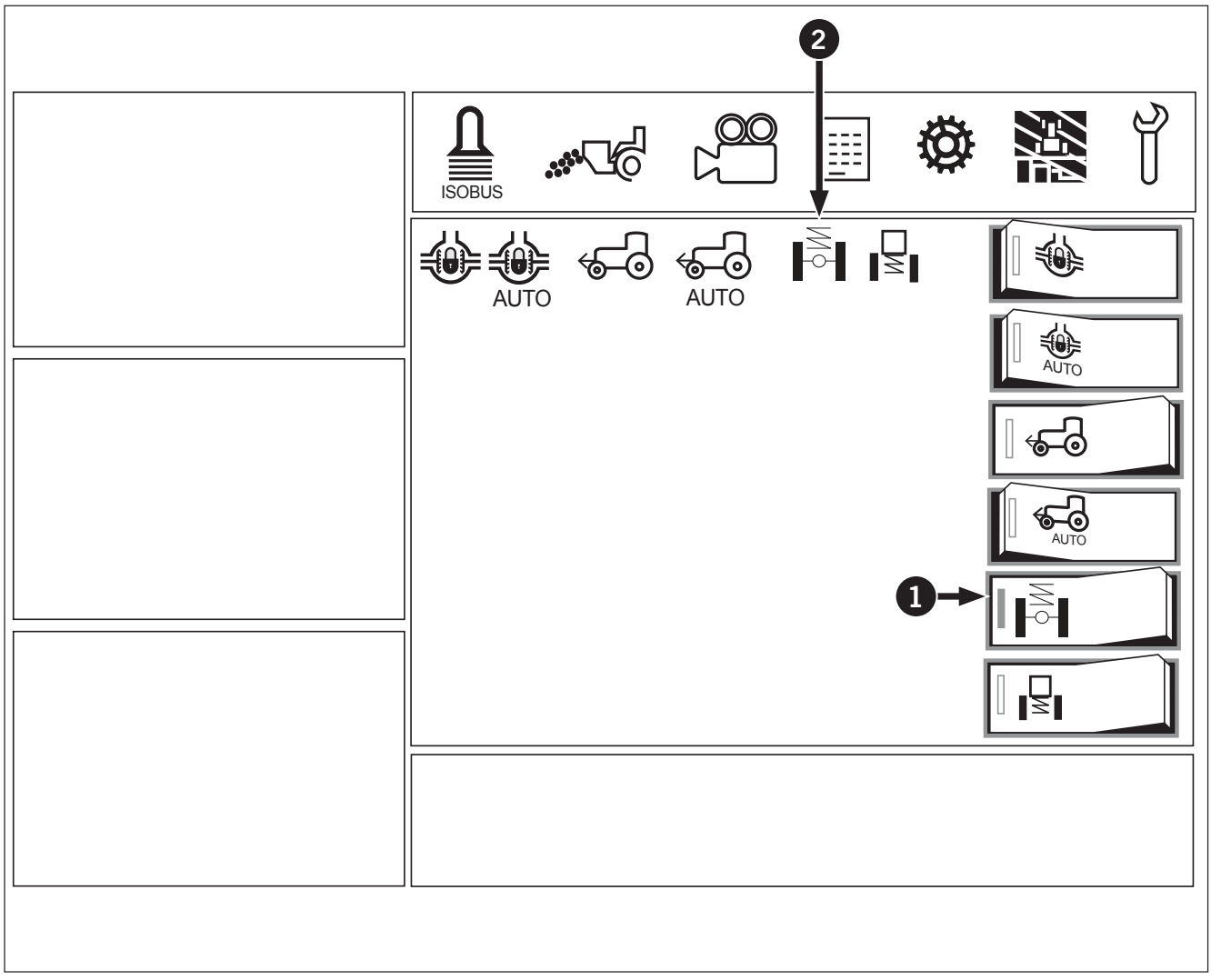
## Front Axle Lubricants

| Table 3-15: Recommended Front Axle Lubricants | |
|---|---|
| **Brand** | **Type** |
| Imperial Oil Esso | GX |
| Shell | Spirax S3 AX |
| Texaco | Multigear |
| Petro Canada | TRAXON |
| Exxon Mobil | Mobilube |

| Component | Fluid Type | Type |
|---|---|---|
| Differential | Gear Oil | SAE 80W/90 (API GL5) |
| Final Drive | Gear Oil | SAE 80W/90 (API GL5) |
| Miscellaneous | Grease | Lithium–Based EP High Temperature |

## Front Suspension Setting

1. The front suspension has the “Block” or “Active” modes.
2. Active mode is like auto mode, when the block switch (1) is pressed to the left and is turned on, the suspension is now in active mode and the indicator light (2) will turn on.
3. Press the block switch (1) to the right and the suspension is now blocked and the indicator light (2) will turn off. The axle will now act like a rigid axle.



## Language and Units of Measurement

Using either the display monitor or the electronic instrument cluster (EIC) you can:

- Change the display language
- Change the units of measurement to metric or imperial

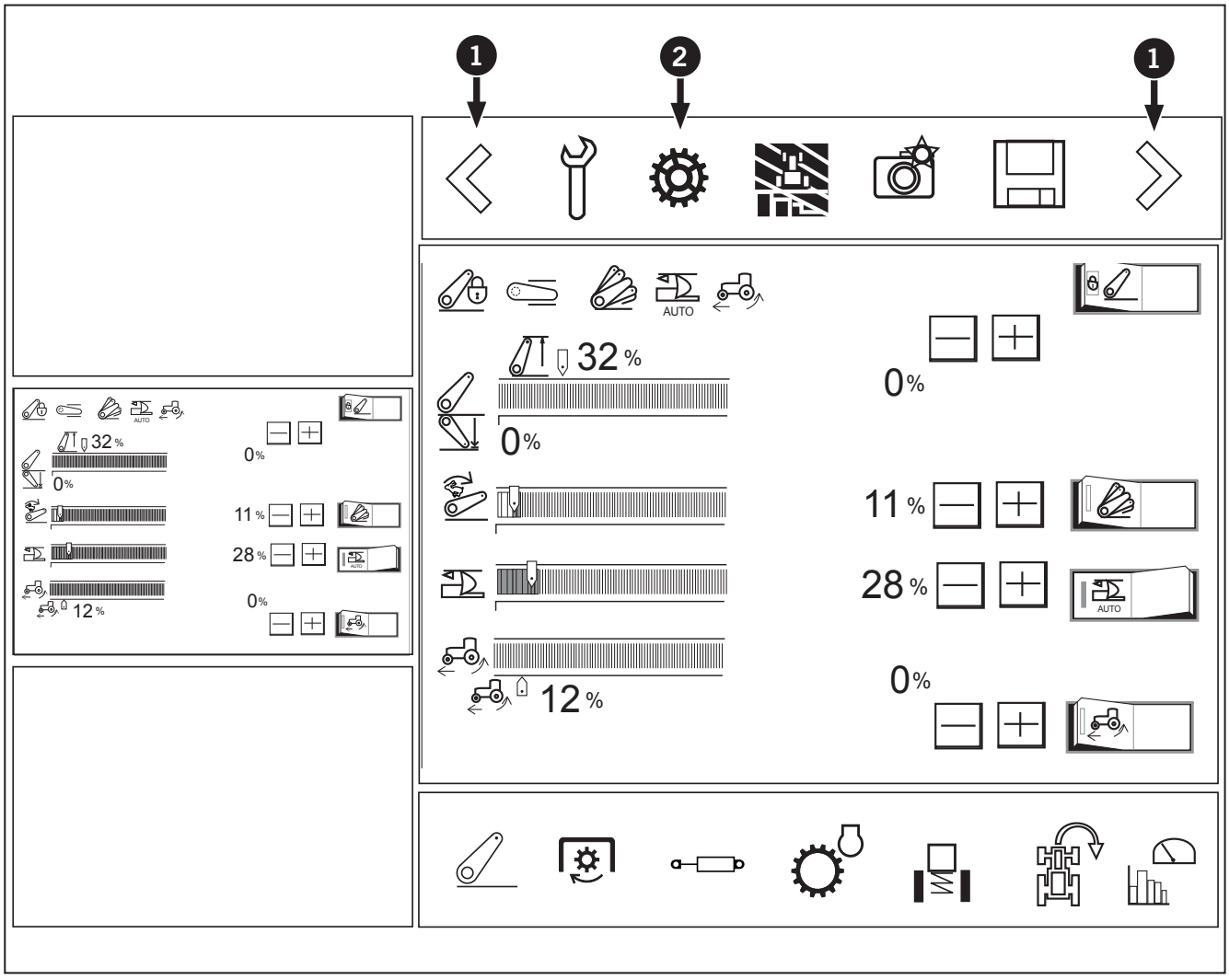
See the following pages for details.

### Method 1: Use Display Monitor to Change Language, Units of Measurement or Display Brightness

***NOTE: This only changes the setting int he monitor not on the EIC.***

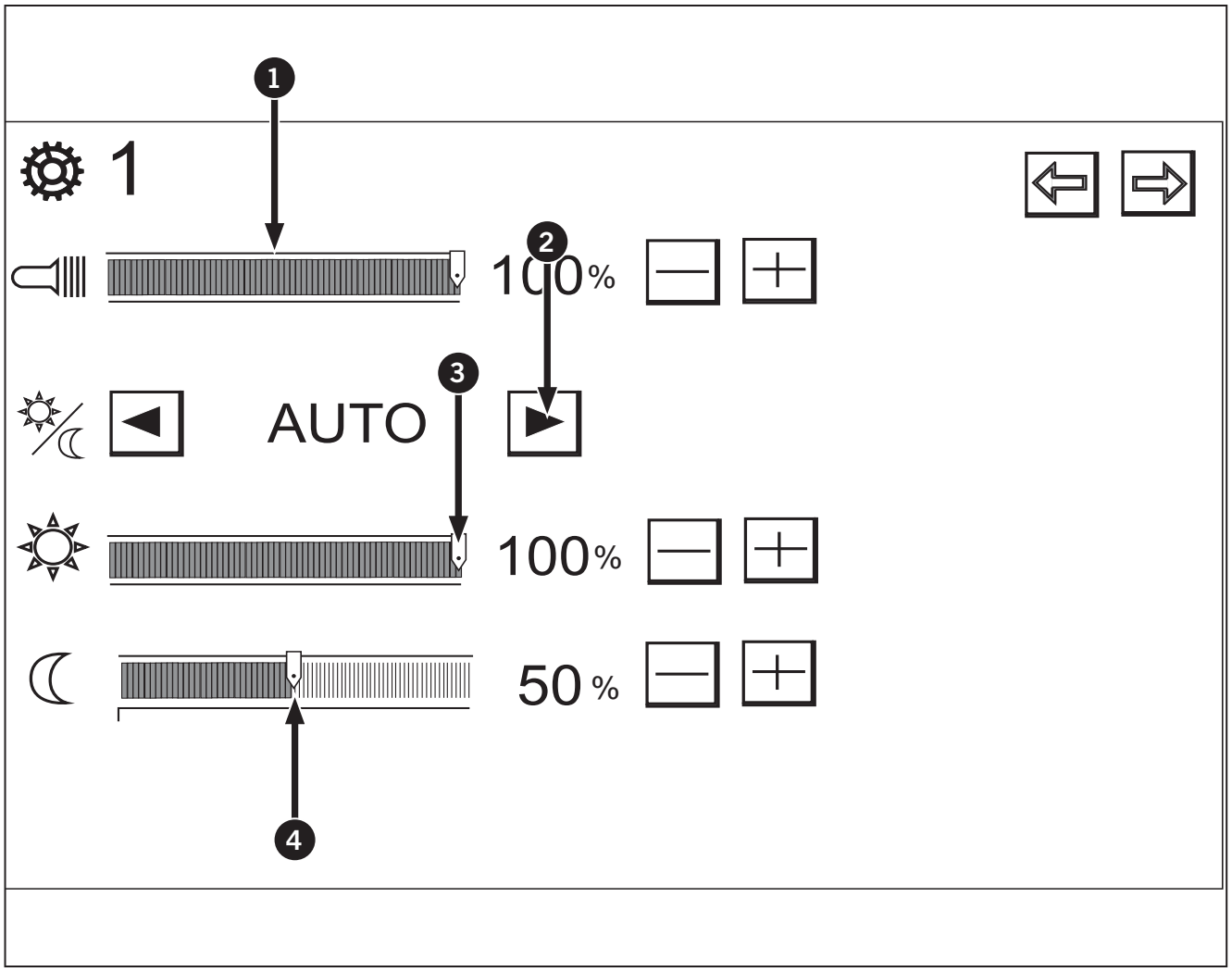
To adjust display settings, press the arrows buttons (1) and select the gear mark icon (2).

To switch from System settings screens 1 and 2, press the arrows buttons.



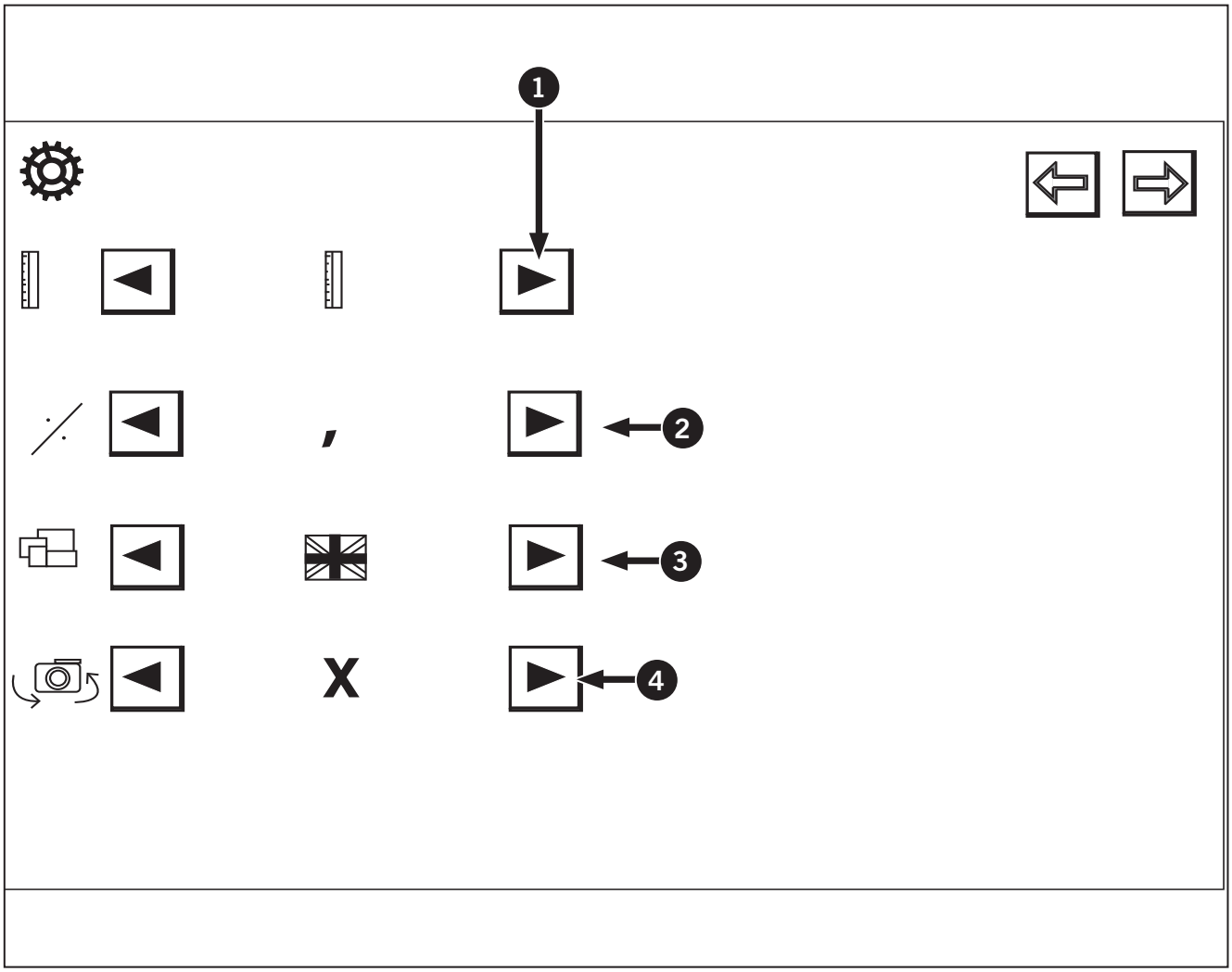
**System settings screen 1**

- Sound volume (1): Slide the graph farther to the right to increase the volume.
- Screen brightness (2): The brightness level can be selected from the following settings:
  - Sun icon: Daytime mode
  - Moon icon: Night time mode
  - AUTO: Automatic daytime/night time switching mode.
- Daytime mode screen brightness (3): Slide the graph farther to the right to increase the brightness.
- Nighttime mode screen brightness (4): Slide the graph farther to the right to increase the brightness.



### System settings screen 2

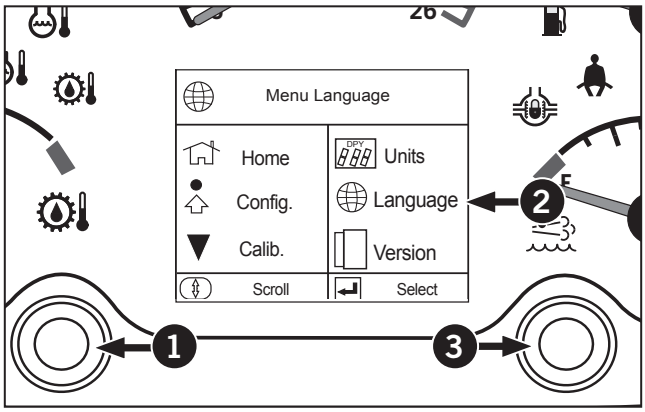
- Units of measurement (1): Press the arrow buttons to change the units of measurement to metric or imperial.
- Decimal marker setting (2): Press the arrow buttons to change between (comma) and (period).
- Language (3): Press the arrow buttons to change the languages to 8 different languages
  - English, Dutch, German, French, Italian Spanish, Polish and Portuguese.
- Live view camera display switching (4):
  - Live view camera can be chosen from the following:
    - "X": When the camera is installed for front view.
    - "V": When the camera is installed for rear view.



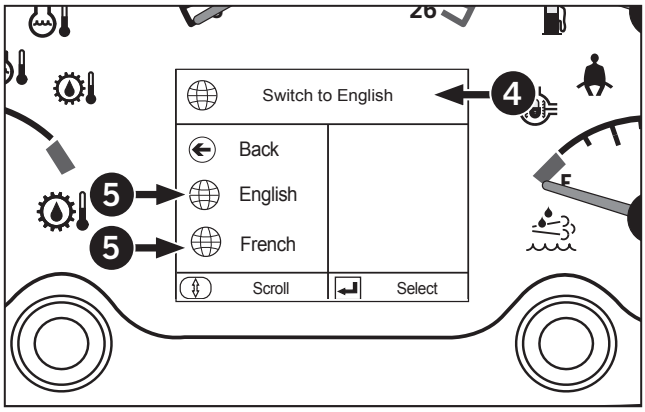
## EIC Overview: Language

Use the Language screen to change the language to English or French:

1. Press Press the left button (1) to scroll down till Language (2) is highlighted.
2. Press the right button (3) to select the sub-menu.



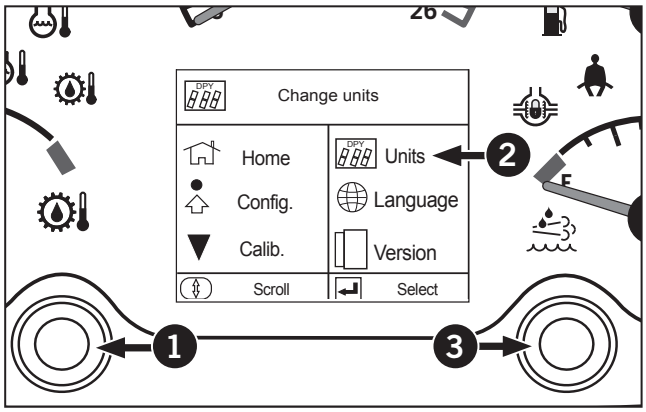

3. The subscreen (4) appears.
4. Press the left button to select English or French (5).
5. Select Back to save the settings.



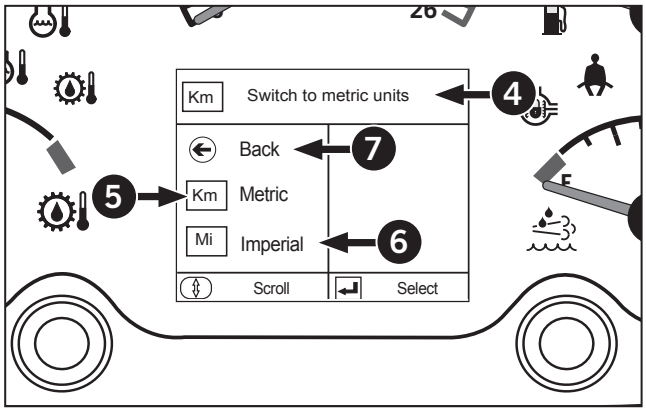
## EIC Overview: Unit of Measure Screen

Use the Unit of Measure screen to change the units to Metric or Imperial:

1. Press Press the left button (1) to scroll down till the Units (2) is highlighted.
2. Press the right button (3) to select the sub-menu.




3. The subscreen (4) appears.
4. Press the left button (1) to select Metric (5) or Imperial (6).
5. Select Back (7) to save the settings.



## Software

Check the software currently installed on the EIC and VCU using the electronic instrument cluster (EIC).

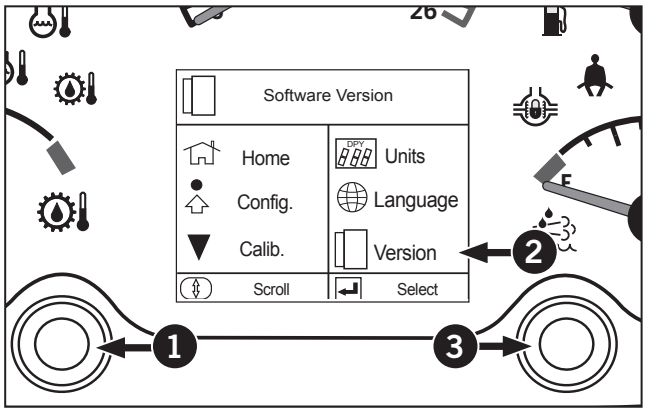
- Check with a Kubota dealer for information on software updates.

See the following pages for details.

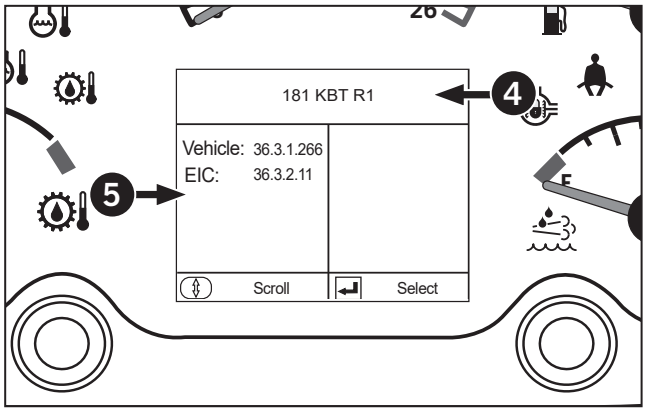
## Use EIC to Check Software

Use the Version Information (1) screen on the EIC to check software details and to confirm if the correct software is installed in the tractor:

1. Press the left button to scroll down till Version (2) is highlighted.
2. Press the right button (3) to select the sub-menu.




3. The subscreen (4) appears.
4. The software version appears (5).
5. Select Back to save the settings.



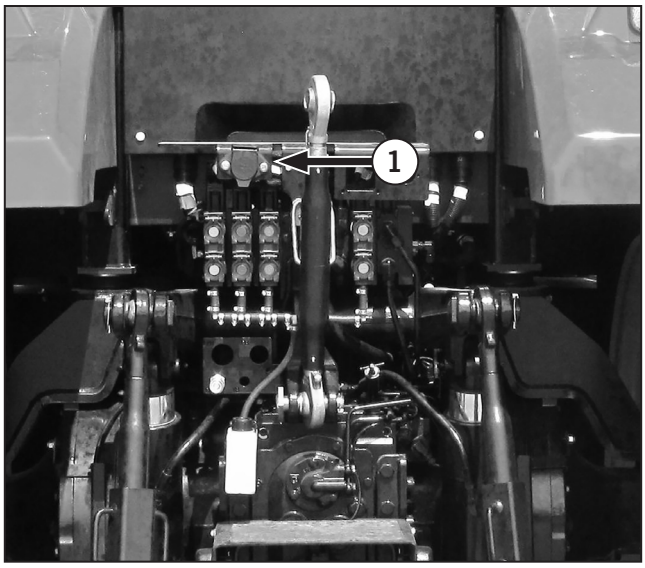
## Trailer Socket

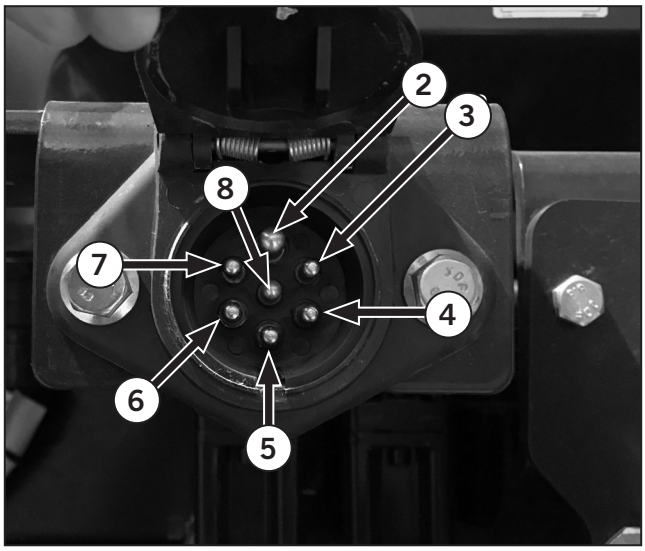
The trailer socket (1) is attached to the hydraulic remote coupler bracket at the rear of the tractor. It is a 7-pin (ISO 1724) connector that can be used for a trailer light hookup. The accompanying 2-pole (ISO 4165) socket can be used as a convenient auxilliary power source.

All circuits have a maximum of 15A. The pins in the socket and the 2-pole socket are identified as follows:

| Table 3-16: Trailer Socket Overview | |
|---|---|
| 2 | Pin 1 – Ground |
| 3 | Pin 2 – Work Lights |
| 4 | Pin 3 – Left Flasher |
| 5 | Pin 4 – Stop Lights |
| 6 | Pin 5 – Right Flasher |
| 7 | Pin 6 – Tail Lights |
| 8 | Pin 7 – Auxiliary (key switched 12 V source protected by a 20 A fuse). |

Contact a KUBOTA dealer to purchase a male connector to accommodate a trailer wire harness.



## Tires

Check the tire air pressure and recheck every 50 hours or weekly.

Inspect for damaged tread and side walls when checking tire pressure.

**WARNING**

Inflating or servicing tires can be dangerous. Use trained personnel to service or install tires whenever possible. Follow the safety precautions below to avoid the possibility of serious or fatal injury:

Tractor wheels are very heavy. Handle with care and make sure that they cannot topple and cause injury when stored.

Never attempt tire repairs on a public road or highway.

Make sure the jack is placed on a firm, level surface.

Make sure the jack has adequate capacity to lift your tractor.

Use jack stands or other suitable blocking to support the tractor while repairing tires.

Do not put any part of your body under the tractor or start the engine while the tractor is on the jack.

Never hit a tire or rim with a hammer.

Make sure the rim is clean and free of rust or damage. Do not weld, braze, otherwise repair or use a damaged rim.

Do not inflate a tire unless the rim is mounted on the tractor or is secured so that it will not move if the tire or rim should suddenly fail.

When fitting a new or repaired tire, use a clip-on valve adaptor with a remote gauge that allows the operator to stand clear of the tire while inflating it. Use a safety cage, if available.

Tire air pressure affects the amount of weight that a tire may carry. Locate the tire size for your tractor in the Tire Pressure and Permissible Loads tables in Section 3. Do not exceed the load for the pressures listed. Do not over or under inflate the tires.

**WARNING**

Do not inflate a steering tire above the manufacturer's maximum pressure shown on the tire or beyond the maximum shown in the Tire Data Combinations Pressures and Loads tables in Section 7 if the tire is not marked.

Never inflate a traction tire (front tire on a four-wheel drive tractor or any rear tire) over 241 kpa (35 psi). Deflate the tire, re-lubricate the bead with a soap/water solution and reinflate if the bead does not seat on the rim by the time this pressure is reached,. Do not use oil or grease. Inflation beyond 241 kPa (35 psi) with unseated beads may break the bead or rim with explosive force sufficient to cause a serious injury.

Adjust inflation pressure to the recommended operating pressure after seating the beads.

Do not re-inflate a tire that has been run flat or seriously under inflated until it has been inspected for damage by a qualified person.

Torque wheel hardware after driving the tractor for 200 m, after one hour and 10 hours operation and thereafter at the 50-hour service intervals.

Refer to Ballasting and Tires in Section 3.

## Tire Selection

**WARNING**

Always make sure the tires and wheels are properly spaced and do not interfere with other tractor components. Make sure the steering stop angle is within the turning range of the tires.

**NOTICE**

Do not attempt to mount tire sizes other than those factory listed for your tractor model. Unauthorized tire sizes will void your warranty and can cause damage to the drivelines.

Selecting tire size and type is important for achieving maximum tractor efficiency. Various tire size and types are available for the tractor. Refer to the tire selection table for approved tire sizes.

Tires selected for your tractor must be able to support the weight of the tractor and attached equipment. Tires must also supply adequate traction, yet minimize soil compaction, while maintaining an acceptable wheel slip when towing various implements with the drawbar.

Tire combinations, tire pressure, ballast and weight distribution need to be adjusted to achieve the best ride and performance. Soil condition and the type of work the tractor will perform will also affect tire choice and tractor adjustments.

Always maintain the proper air pressure. The tire must be able to safely support the load. Do not over inflate the tires. Radial tires work best with lower air pressures compared to bias ply tires. Radial tires will show up to 20% sidewall deflection (bulge) when properly inflated.

The force that enables the tires to drive the tractor must be transmitted through the sidewalls. The tractor will perform best when all the tires on the same axle have identical tire pressure. Spread the load from the implement evenly across the whole tractor so that the front and rear axles both support the same load.

Think of tires as shock absorbers. They must be able to respond equally to share and distribute your load.

### Tire Maintenance Procedures

- Always maintain the proper air pressure in the tire to carry the load.
- Do not over inflate radial or bias ply tires.
- Radial tires will work with lower air pressures.
- Various tire types and sizes are available for the tractor. There is no such thing as the best tire for every job. Select tires according to their specific use. Selecting the correct tire ensures maximum tractor efficiency.

### Factors Determining Best Tire Performance

**Good Performance**

- Proper air pressure for the load
- Proper sidewall deflection
- 8%–15% wheel slip
- Proper tire size for expected load
- Less than 50% fill of liquid ballast
- Maintaining equal tire pressure in all tires on a given axle

**Poor Performance**

- High or low air pressure
- Stiff sidewalls
- High or low wheel slip
- Overloaded or under loaded tire
- Treating tires on an axle differently

Refer to Ballasting and Tires later in this section for proper tractor weight procedures once the tire size has been selected.

## Tire Combinations

The tires fitted to tractors with optional four-wheel drive have been carefully selected to match the gearing of the transmission and axles. When replacing worn or damaged tires, always install tires of the same make, model and size as those removed. The installation of other tire combinations may result in excessive tire wear, loss of usable power or severe damage to driveline components. If in doubt, contact a Kubota dealer.

### Radial Tire Identification

Radial tires are identified by a star code on the tire sidewall:

1. Tires with ☆ are inflated to a maximum of 1.2 bar (18 psi).
2. Tires with ☆☆ are inflated to a maximum of 1.6 bar (24 psi).
3. Tires with ☆☆☆ are inflated to a maximum of 2.0 bar (30 psi).

### Tire Pressures and Permissible Loads

**NOTICE**

The figures in the following tables are for guidance only. Tire specifications vary by tire manufacturer. For exact tire loading information, refer to the information provided by the manufacturer of the tires on the tractor.

To avoid the possibility of tire to rim creep, do not use tire pressures below 0.4 bar (6 psi) with radial tires and 0.8 bar (12 psi) with bias ply for operations having a high torque requirement (e.g., subsoiling, plowing, heavy cultivation, etc.).

Tire loading values in the following tables are for a single wheel. To determine the maximum tire loading for single wheel applications, multiply the load figure in the table by two and the total number of wheels on the axle.

Example:

Two rear wheels (singles) x table figure = maximum tire load

To determine the maximum tire loading for units with duals, multiply the load figure in the table by the total number of wheels on the axle, then multiply by 88%.

Example:

Four rear wheels (models with duals) x table figure x 88% = maximum tire load

Axle loading must be within the capacities listed in this manual.

Remember the information in the tables and the examples cited are for guidance only. For exact information regarding tire air pressures and tractor loading, contact a Kubota dealer or the tire manufacturer.

When front-mounted implements are fitted, front tire loads may be increased by up to 35% with no increase in inflation pressure when operated at speeds not exceeding 20 km/h (12 mph).

At speeds not exceeding 8 km/h (5 mph), the load on the front tires may be increased by 50% provided the tire air pressures are increased by 25%.

| Table 3-17: Front Tire Pressures and Permissible Loads (four-wheel drive) Metric Units | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflation Pressure (bar) | | | | | | | | | | | | | | | | | | | |
| Radial Tire Size | Ply | ☆Rating | 0.40 | 0.50 | 0.55 | 0.60 | 0.70 | 0.80 | 1.00 | 1.10 | 1.20 | 1.40 | 1.50 | 1.60 | 1.80 | 1.90 | 2.00 | 2.20 | 2.30 |
| Load Capacity (kg) | | | | | | | | | | | | | | | | | | | |
| 14.9-28 | 10 | 3 | 800 | 870 | 945 | 1010 | 1075 | 1195 | 1305 | 1415 | 1500 | 1615 | 1705 | 1800 | 1880 | 1960 | 2060 | | |
| 16.9-28 | 8 | 2 | 965 | 1055 | 1145 | 1225 | 1300 | 1450 | 1590 | 1715 | 1850 | 1960 | 2070 | 2240 | | | | | |
| 14.9-30 | 10 | 3 | 820 | 900 | 970 | 1045 | 1105 | 1235 | 1345 | 1460 | 1550 | 1660 | 1760 | 1850 | 1940 | 2025 | 2120 | | |
| 480/70-30 | | - | 1180 | 1285 | 1400 | 1550 | 1650 | 1800 | 1900 | | 2120 | 2360 | | 2575 | 2800 | | 3075 | 3350 | 3550 |
| 16.9-30 | 8 | 2 | 1000 | 1095 | 1180 | 1265 | 1345 | 1495 | 1640 | 1770 | 1900 | 2015 | 2130 | 2300 | | | | | |

| Table 3-18: Front Tire Pressures and Permissible Loads (four-wheel drive) Imperial Units | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflation Pressure (psi) | | | | | | | | | | | | | | | | | | | |
| Radial Tire Size | Ply | ☆Rating | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 |
| Load Capacity (lb) | | | | | | | | | | | | | | | | | | | |
| 14.9-28 | 10 | 3 | 1760 | 1920 | 2080 | 2230 | 2370 | 2630 | 2880 | 3120 | 3300 | 3560 | 3760 | 3960 | 4140 | 4320 | 4540 | | |
| 16.9-28 | 8 | 2 | 2130 | 2330 | 2520 | 2700 | 2870 | 3200 | 3500 | 3780 | 4080 | 4320 | 4560 | 4940 | | | | | |
| 14.9-30 | 10 | 3 | 1810 | 1980 | 2140 | 2300 | 2440 | 2720 | 2970 | 3220 | 3420 | 3660 | 3880 | 4080 | 4280 | 4460 | 4680 | | |
| 480/70-30 | | - | 2600 | 2830 | 3080 | 2420 | 3640 | 3960 | 4180 | | 4680 | 5200 | | 5680 | 6150 | | 6800 | 7400 | 7850 |
| 16.9-30 | 8 | 2 | 2200 | 2410 | 2600 | 2790 | 3300 | 3620 | 3900 | 4180 | 4440 | 4700 | 5080 | | | | | | |

| Table 3-19: Rear Tire Pressures and Permissible Loads Metric Units | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Inflation Pressure (bar) | | | | | | | | | | | | |
| Bias Ply Tire Size | Ply | ☆Rating | 0.80 | 1.00 | 1.10 | 1.20 | 1.40 | 1.50 | 1.60 | 1.80 | 1.90 | 2.00 | 2.20 | 2.30 | 2.40 |
| | | | Load Capacity (kg) | | | | | | | | | | | | |
| 16.9-26 | 10 | - | 1409 | 1541 | 1664 | 1786 | 1895 | 2005 | 2109 | 2214 | 2309 | | | | |
| 18.4-26 | 10 | - | 1686 | 1845 | 1991 | 2136 | 2273 | 2400 | 2527 | 2650 | 2764 | 2877 | 2991 | | |
| 14.9-28 | 10 | - | 1195 | 1309 | 1418 | 1518 | 1614 | 1705 | 1795 | 1882 | 1964 | 2045 | 2123 | | |
| 16.9-28 | 10 | - | | | 1718 | 1841 | 1959 | 2072 | 2181 | 2286 | 2386 | | | | |
| 18.4-30 | 8 | - | | | 2122 | 2277 | 2422 | | | | | | | | |

| Table 3-20: Rear Tire Pressures and Permissible Loads Imperial Units | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Inflation Pressure (psi) | | | | | | | | | | | | |
| Bias Ply Tire Size | Ply | ☆Rating | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 |
| | | | Load Capacity (lb) | | | | | | | | | | | | |
| 16.9-26 | 10 | - | 3100 | 3390 | 3660 | 3930 | 4170 | 4410 | 4640 | 4870 | 5080 | | | | |
| 18.4-26 | 10 | - | 3710 | 4060 | 4380 | 4700 | 5000 | 5280 | 5560 | 5830 | 6080 | 6330 | 6580 | | |
| 14.9-28 | 10 | - | 2630 | 2880 | 3120 | 3340 | 3550 | 3750 | 3950 | 4140 | 4320 | 4500 | 4670 | | |
| 16.9-28 | 10 | - | | | 3780 | 4050 | 4310 | 4560 | 4800 | 5030 | 5250 | | | | |
| 18.4-30 | 8 | - | | | 4670 | 5010 | 5330 | | | | | | | | |

| Table 3-21: Rear Tire Pressures and Permissible Loads (Metric Units) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflation Pressure (bar) | | | | | | | | | | | | | | | | | |
| Radial Tire Size | Ply | ☆Rating | 0.40 | 0.50 | 0.55 | 0.60 | 0.70 | 0.80 | 1.00 | 1.10 | 1.20 | 1.40 | 1.50 | 1.60 | 1.80 | 1.90 | 2.00 |
| Load Capacity (kg) | | | | | | | | | | | | | | | | | |
| 18.4-38 | 8 | 2 | 1345 | 1470 | 1590 | 1705 | 1805 | 2015 | 2205 | 2385 | 2575 | 2715 | 2880 | 3000 | | | |
| 20.8-38 | 10 | 2 | 1625 | 1780 | 1925 | 2060 | 2195 | 2440 | 2665 | 2880 | 3075 | 3290 | 3470 | 3650 | | | |
| 710/70-38 | | - | 2430 | 2650 | | 2900 | 3150 | 3350 | 3875 | | 4375 | 4875 | | 5300 | | | |
| 18.4-42 | 10 | 2 | 1415 | 1550 | 1680 | 1795 | 1905 | 2125 | 2320 | 2515 | 2725 | 2860 | 3015 | 3150 | | | |
| 20.8-42 | 10 | 2 | 1715 | 1880 | 2030 | 2175 | 2315 | 2575 | 2810 | 3040 | 3250 | 3470 | 3675 | 3875 | | | |
| 14.9-46 | 8 | 3 | 1025 | 1120 | 1210 | 1295 | 1380 | 1535 | 1680 | 1815 | 1950 | 2070 | 2195 | 2300 | 2415 | 2520 | 2650 |
| 420/80R46 | | - | 1320 | 1450 | | 1600 | 1750 | 1850 | 2220 | | 2430 | 2650 | | 2900 | 3250 | | |
| 480/80R46 | 10 | 3 | 1490 | 1635 | 1760 | 1885 | 2005 | 2230 | 2450 | 2640 | 2800 | 3015 | 3175 | 3350 | 3515 | 3675 | 3875 |

| Table 3-22: Rear Tire Pressures and Permissible Loads (Imperial Units) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflation Pressure (psi) | | | | | | | | | | | | | | | | | |
| Radial Tire Size | Ply | ☆Rating | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
| Load Capacity (lb) | | | | | | | | | | | | | | | | | |
| 18.4-38 | 8 | 2 | 2960 | 3240 | 3500 | 3760 | 3980 | 4440 | 4860 | 5260 | 5680 | 5980 | 6350 | 6600 | | | |
| 20.8-38 | 10 | 2 | 3580 | 3920 | 4240 | 4540 | 4840 | 5380 | 5880 | 6350 | 6800 | 7250 | 7650 | 8050 | | | |
| 710/70-38 | | - | 5360 | 5840 | | 6400 | 6950 | 7400 | 8550 | | 9650 | 10700 | | 11700 | | | |
| 18.4-42 | 10 | 2 | 3120 | 3420 | 3700 | 3960 | 4200 | 4680 | 5120 | 5540 | 6000 | 6300 | 6650 | 6950 | | | |
| 20.8-42 | 10 | 2 | 3780 | 4140 | 4480 | 4800 | 5100 | 5680 | 6200 | 6700 | 7150 | 7650 | 8100 | 8550 | | | |
| 14.9-46 | 8 | 3 | 2260 | 2470 | 2670 | 2860 | 3040 | 3380 | 3700 | 4000 | 4300 | 4560 | 4840 | 5080 | 5320 | 5560 | 5840 |
| 420/80R46 | | - | 2910 | 3200 | | 3520 | 3860 | 4080 | 4680 | | 5360 | 5840 | | 6400 | 7150 | | |
| 480/80R46 | 10 | 3 | 3280 | 3600 | 3880 | 4160 | 4420 | 4920 | 5400 | 5820 | 6150 | 6650 | 7000 | 7400 | 7750 | 8100 | 8550 |

| Table 3-23: Rear Tire Pressures and Permissible Loads (Metric Units) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflation Pressure (bar) | | | | | | | | | | | | | | |
| Bias Tire Size | Ply | ☆Rating | 0.80 | 1.00 | 1.10 | 1.20 | 1.40 | 1.50 | 1.60 | 1.80 | 1.90 | 2.00 | 2.20 | 2.30 |
| Load Capacity (kg) | | | | | | | | | | | | | | |
| 480/80R46 | 8 | - | | | 2387 | 2559 | 2718 | | | | | | | |
| R1 20.8-38 | 10 | - | | | 1663 | 3100 | 3295 | 3486 | | | | | | |
| R2 30.5L-32 | 12 | - | | | 4145 | 4440 | 4722 | | | | | | | |
| R2 20.8-38 | 10 | - | | | 2980 | 3100 | 3295 | 3486 | | | | | | |

| Table 3-24: Rear Tire Pressures and Permissible Loads (Imperial Units) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflation Pressure (psi) | | | | | | | | | | | | | | |
| Bias Tire Size | Ply | ☆Rating | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 |
| Load Capacity (lb) | | | | | | | | | | | | | | |
| 480/80R46 | 8 | - | | | 5250 | 5630 | 5980 | | | | | | | |
| R1 20.8-38 | 10 | - | | | 6360 | 6820 | 7250 | 7670 | | | | | | |
| R2 30.5L-32 | 12 | - | | | 9120 | 9770 | 10390 | | | | | | | |
| R2 20.8-38 | | - | | | 6360 | 6820 | 7250 | 7670 | | | | | | |

# Wheels and Tires

## Tire Selection

***IMPORTANT: See page 3-85 for approved tire sizes and combinations. Do not attempt to install any size or combination that is not listed.***

***NOTE: The size of tire shipped with the tractor is recorded into the electronic instrument cluster (EIC) to correctly measure ground speed (wheel speed). If you change the size of tire at anytime, record the new size into the EIC. For instructions see "Recording Tire Size to Measure Ground Speed: Introduction" on page 3-86.***

**To optimize tractor performance, follow these principles:**

- Choose a tire size and type appropriate for the expected load. See "Tire Selection" on page 3-78.
- Wheel slip shall be between 8 % - 15 %. Too little wheel slip may indicate the drivetrain is working too hard. Too much wheel slip indicates the wheels are spinning too much. Adjust the ballast, tire combination, tire pressure and/or load on the tractor as required.

  The optional ground speed sensor (radar) measures wheel slip and will display the wheel slip on the EIC WHEEL SLIP screen. A slip threshold can be set up to warn the operator if there is too much wheel slip. If the tractor is not equipped with the optional ground speed sensor then the wheel slip has to be measured manually.
- Distribute the weight properly across the tractor. For drawbar applications, distribute 55 % of the weight across the front axle and 45 % of the weight across the rear axle. For 3-pt hitch applications, distribute 65 % of the weight across the front axle and 35 % of the weight across the rear axle.

  Ballast the tractor using weight kits and/or liquid ballast added to the tires to adjust the weight distribution. Distribute liquid ballast evenly across all tires installed on the same axle.
- Make sure the air pressure is equal on all tires installed on the same axle. Adjust all tire pressures to the manufacturer's specification.

## Approved Tire Sizes and Combinations

Selecting tire size and type is important for achieving maximum tractor efficiency. Various tire size and types are available for the tractor. Refer to the tire selection table for approved tire sizes.

***IMPORTANT:*** *Tires selected for your tractor must be able to support the weight of the tractor and attached equipment.*

**Table 3-25: Tire Selection**

| Front | Rear | |
|---|---|---|
| | Single | Dual |
| 380/85R34 | 380/90R50 | 380/90R50 |
| 380/85R34 | 480/80R46 | 480/80R46 |
| 420/85/R30 | 480/80R46<br>520/85R42<br>620/70R42 | 480/80R46<br>520/85R42 |
| 480/70R30 | 520/85R42 | 520/85R42 |
| 480/70R30 | 620/70R42 | 620/70R42 |
| 600/65R28 | 710/70R38 | N/A |

## Recording Tire Size to Measure Ground Speed: Introduction

The size of tire shipped with the tractor is recorded into the electronic instrument cluster (EIC) to correctly measure ground speed (wheel speed). If you change the size of tire at anytime, record the new size into the EIC using 1 of these calibration procedures:

- Tire Size Adjustment

Use the subscreen to set the tire size manually. The tractor can be stationary while you set the tire size. See “Recording Tire Size to Measure Ground Speed Method 1: Tire Size Adjustment Screen” on page 3-87.

- Wheel Speed Calibration

Use the subscreen to detect ground speed more accurately than a manually-set tire size. See “Recording Tire Size to Measure Ground Speed Method 2: Wheel Speed Calibration Screen” on page 3-89.

- Zero Slip Calculation (Ground Speed Sensor)

If the tractor is equipped with the ground speed sensor then calibrate the sensor to automatically detects the tire size, ground speed and wheel slip conditions. See “Recording Tire Size to Measure Ground Speed Method 3: Zero Slip Calculation (Ground Speed Sensor)” on page 3-91.

### Recording Tire Size to Measure Ground Speed
### Method 1: Tire Size Adjustment Screen

Use the Tire Size Adjustment screen to set the tire size without having to move the tractor. This data is used to calculate ground speed. Ground speed is used as a reference for other Tractor Performance Monitor settings.

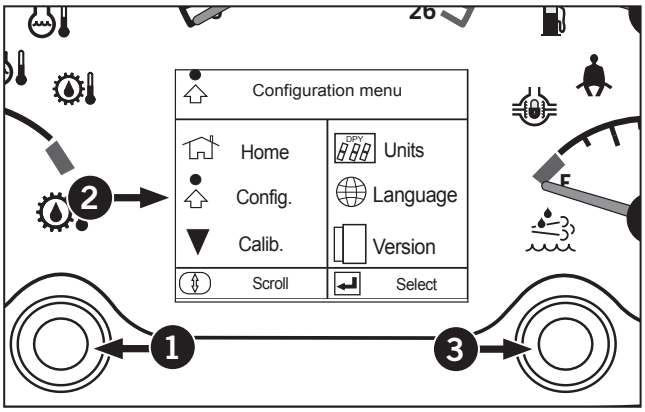
Calibrating the tire size manually will replace tire size and ground speed data automatically calculated through the wheel speed calibration process or by the ground speed sensor (if equipped).

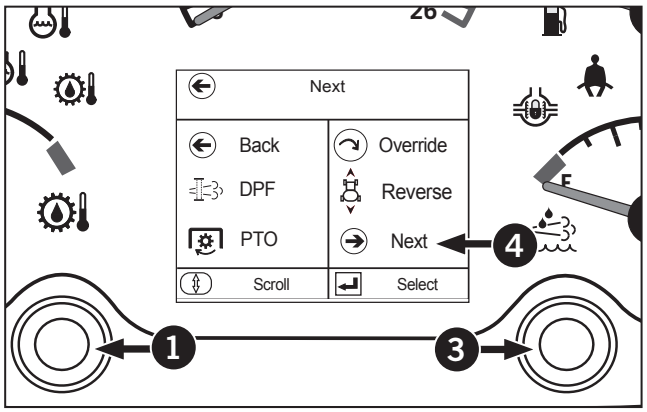
***NOTE: Detecting the ground speed through the Wheel Speed Calibration or Zero Slip Calculation subscreen gives a more accurate ground speed reading and will automatically re-adjust the tire size data. This requires the tractor to be moving.***

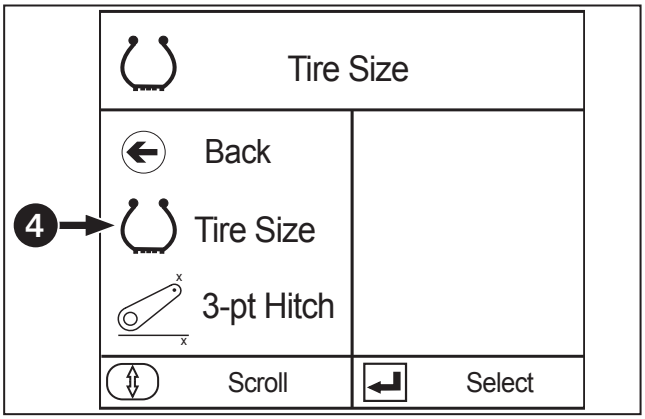
To record the tire size:

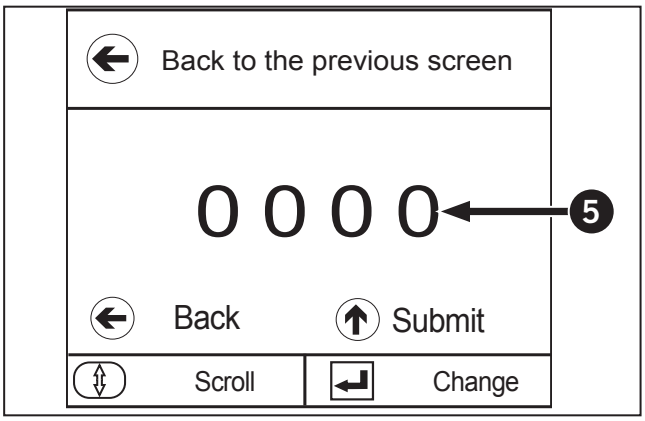
1. Press the scroll ◯ (1) to cycle through the menu on the EIC until the CONFIG menu (2) appears. Press the select ◯ (3).
2. Press the scroll ◯ (1) to cycle through the menu on the EIC until the Next menu (4) appears. Press the select ◯ (3).
3. Press the ◯ (1) to cycle to Tire Size Adjustment (4).
4. Press the select ◯ (3). The subscreen (5) appears.
5. Know the tire size. The tire size is the circumferance calculated from the:
   - Tire width (example: 710/70R38).
   - Aspect ratio (710/70R38).
   - Rim diameter (710/70R38).
   - Select Submit to save the setting.

Tire Size entered into the Config screen is not the circumference.



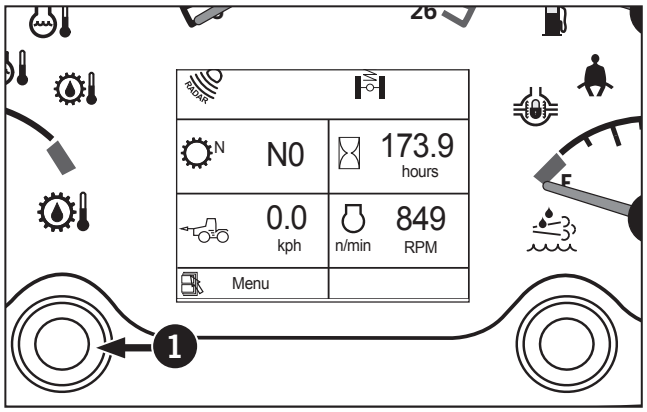
### Recording Tire Size to Measure Ground Speed Method 2: Wheel Speed Calibration Screen

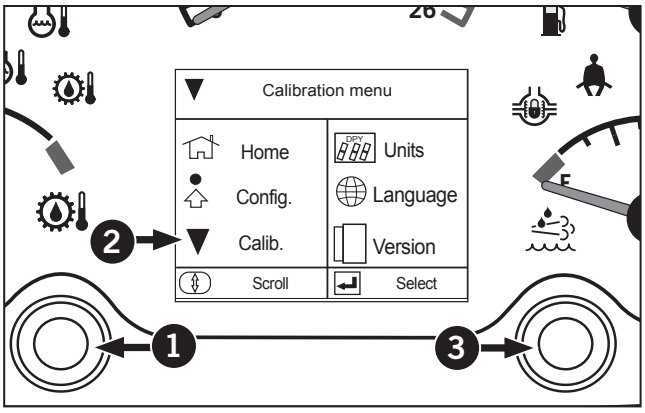
Use the Wheel Speed Calibration screen to accurately determine tire size and ground speed. This data is used as a reference for the TPM functions.

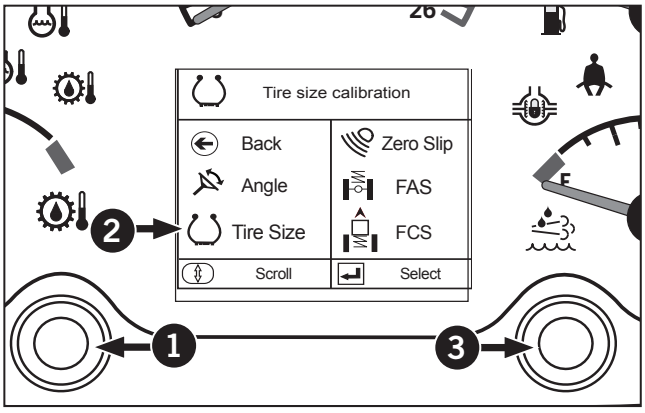
Using the wheel speed calibration process will replace any tire size and ground speed data calculated by a manually-set tire size or by the ground speed sensor (if equipped).

To record the tire size:

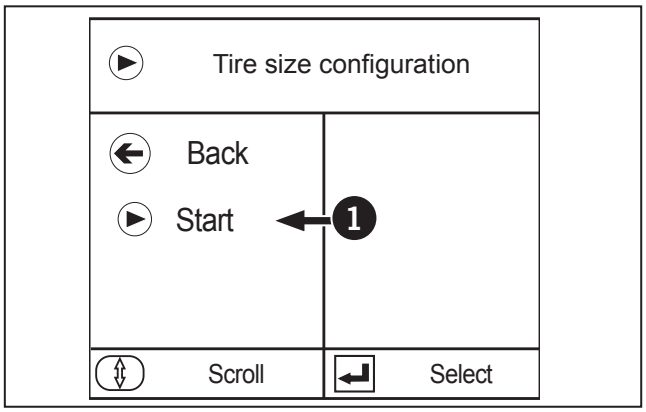
1. Press the scroll ◯ (1) to cycle through the menu on the EIC until the CALIBRATION menu (2) appears. Press the select ◯ (3).
2. Press the scroll ◯ (1) until the TIRE SIZE is highlighted (2). Press the select ◯ (3).
3. Press the select ◯ until “Start” is highlighted and press the select ◯ to start the calibration.
4. On a smooth, hard surface, mark off a 100 m (328 ft) distance in a straight line. Make sure the start and finish lines are clearly marked.



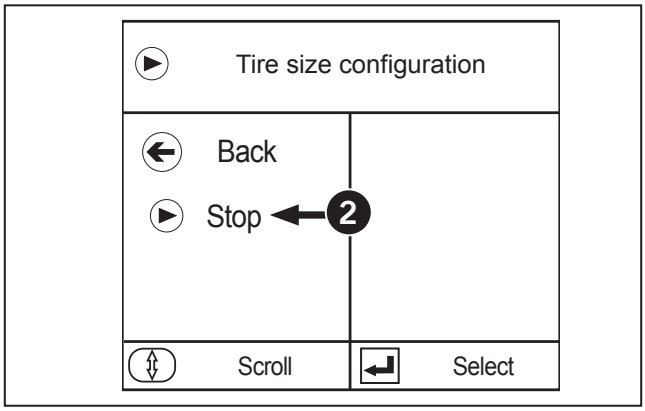
5. Select a low gear and drive the tractor forward.
6. As the tractor crosses the start line, select Start (1) to start the calibration.




7. As the tractor crosses the finish line, select Stop (2) to stop the calibration.

   ***NOTE: If calibrated wheel speed is out of range, the default setting will remain.***
8. Press to return to the Wheel Speed Calibration top screen.

To return to the top screen at any time, select Back.



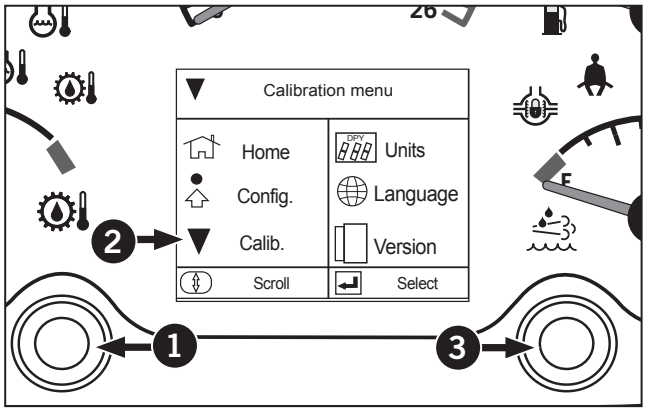
### Recording Tire Size to Measure Ground Speed Method 3: Zero Slip Calculation (Ground Speed Sensor)

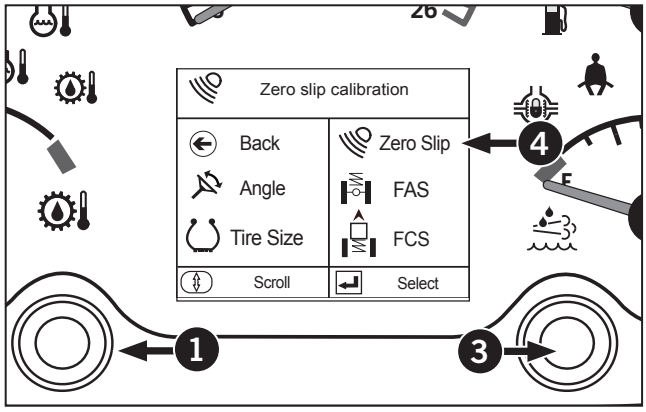
On a smooth, hard surface, with a distance of at least 100m (328 ft) in a straight line, start the tractor and move the tractor so it is lined up straight were you are going to perform the calibration. Place the tractor is in neutral and apply the park brake. Do not turn off tractor.

***NOTE: The tractor will need to be running and driven to perform calibration.***

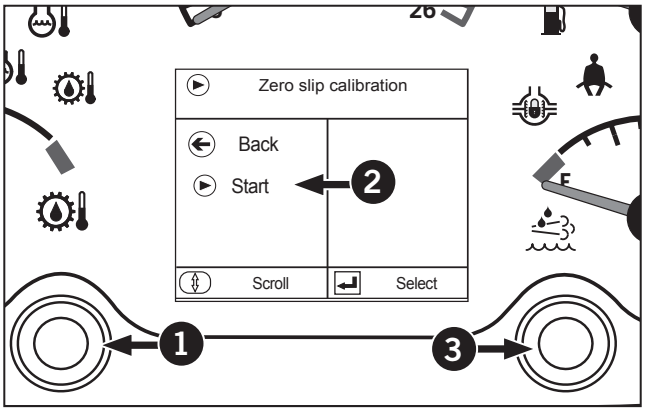
To perform Zero Slip Calibration:

1. Press the scroll ◯ (1) to cycle through the menu on the EIC until the CALIBRATION menu (2) appears. Press the select ◯ (3).
2. Press the scroll ◯ (1) until the Zero Slip Calibration is highlighted (4). Press the select ◯ (3).



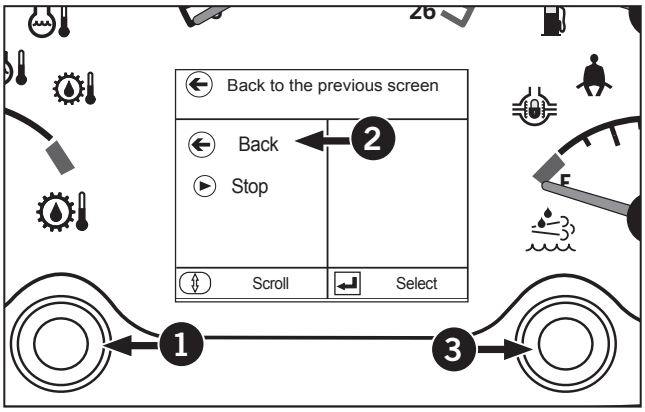



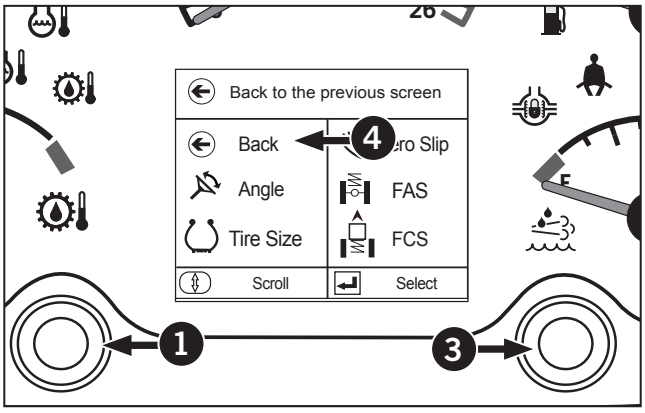
3. Press the select ◯ (1) until “Start” (2) is highlighted and press the select ◯ (3) to start the calibration.
4. Push down the clutch pedal, release the park brake, select a low gear and range and slowly drive the tractor forward.
5. Press the select ◯ (3) to start the calibration. Drive the tractor in a straight line for at least 100 m (328 ft). The calibration will automatically STOP once it has finished.




6. Press the select ◯ (1) until “Back” (2) is highlighted and press the select ◯ (3) to return to the Wheel Speed Calibration top screen.
7. Select “Back” (4) to exit the calibrations menu and return to the home screen.
8. Once the tire size calibration is complete, key off and wait till the vehicle controller is off. This will let the calibrated tire size to be stored in the vehicle controller.

***NOTE: It only takes 10 seconds for the VCU to power down but wait till the EIC has completely twin of before keying back on.***



## Mechanical Front Wheel Drive (MFWD) Front Axle Track Spacing

Mechanical front-wheel drive (MFWD) tractors have fixed axle assemblies. However, the track width is adjustable to eight different settings by changing the wheel rim relative to the center disc, the rim and/or disc relative to the axle hub or by interchanging both front wheels.

The chart to the right shows the track spacings available by changing the wheel rim and disc positions relative to the hub.

Each drawing represents either a left hand wheel viewed from the rear or a right hand wheel viewed from the front.

**NOTICE**

Adjust the steering stops to maintain turning diameter and to provide clearance between the tractor, the tires and the fenders when the track adjustment is changed.

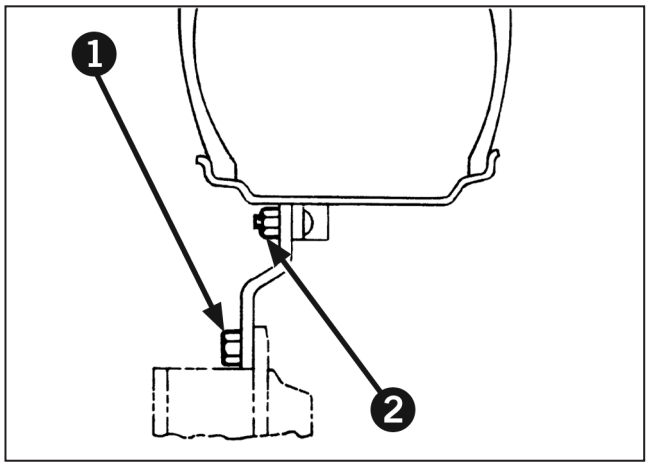
**Table 3-26: Track Settings Hub and Wheel Placement**

| Track Settings Hub and Wheel Placement | Tire Size |
|---|---|
| 1549.4 mm (61 in) | 380/85R34 |
| 1651 mm (65 in) | 480/70R30<br>380/85R34 |
| 1752.6 mm (69 in) | 480/70R30<br>380/85R34 |
| 1854.2 mm (73 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 1955.8 mm (77 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2057.4 mm (81 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2159 mm (85 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2260.6 mm (89 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2057.4 mm (81 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2159 mm (85 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2260.6 mm (89 in) | 600/65R28<br>480/70R30<br>380/85R34 |

## Front Wheel Positions

**WARNING**

Do not rotate the wheel or start the engine when a front wheel on a four-wheel drive tractor is supported on a stand. The rear wheels may move and cause the tractor to fall off the stand. Always support wheels so that the tires are only just clear of the ground.




Use the following procedure to position the front wheels to obtain the desired track adjustment:

1. Position the front wheels straight ahead
2. Apply the parking brake and place blocks at the front and rear of the rear wheels
3. Jack up the front axle and place on jack stands
4. Remove the front wheel
5. Position the wheel disc and rim as required to achieve the desired track adjustment
6. Reinstall the wheel and torque the hardware in a diagonal pattern to the following:

   Disc to hub (1) – 700 N·m (515 ft-lb)

   Disc to rim (2) – 345 N·m (255 ft-lb)

***NOTE: Torque all rim, disc and wheel bolts as specified. Operate for 200 m (218.72 yd) and re-torque. Repeat torque check after one hour, then at 10 hours or daily intervals until bolt torque remains constant. Check torque at 50-hour intervals thereafter.***

***NOTE: Make sure the V of the tire tread remains pointing in the direction of forward travel when interchanging left and right hand wheel assemblies.***

7. Check the front wheel toe-in and steering stops for correct adjustment.

## Wheel Toe-in

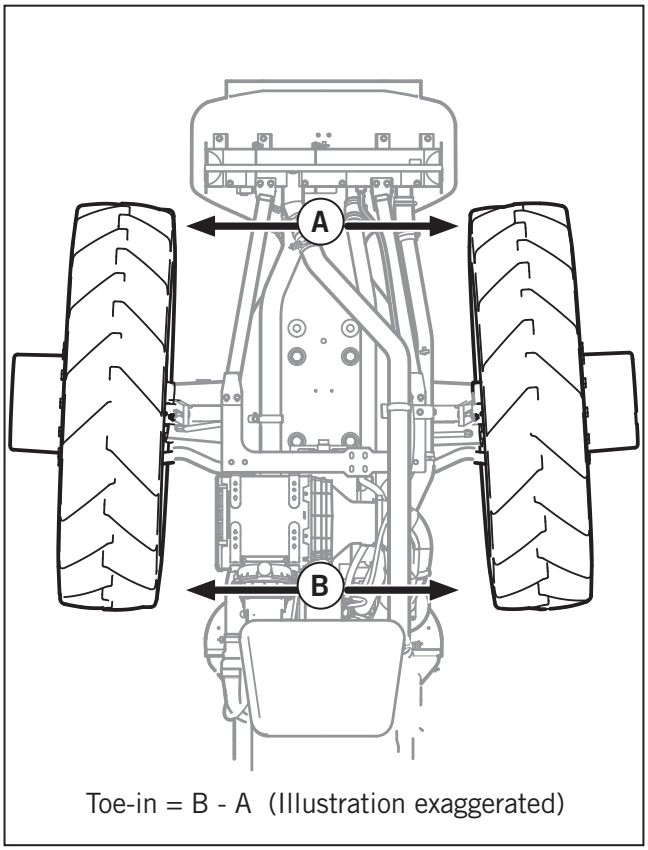
### Checking Toe-in on Axles

Use the following procedure to check and adjust toe-in:

The correct toe-in is 0 to 6 mm (0 to 0.25 in).

1. Position the front wheels straight ahead
2. Mark the inside front of each rim at hub height; mark the rim where the tire and rim meet
3. Measure the distance (A) between the two marks
4. Drive the tractor forward until the tires rotate 180 degrees and the marks are at hub height at the rear of the wheels
5. Measure the distance (B) between the two marks
6. Subtract the front measurement from the rear measurement to get the toe-in
7. Ensure the toe-in is 0 to 6 mm (0 to 0.25 in).

Follow the procedure for the MFWD axle adjustment if adjustment is required.

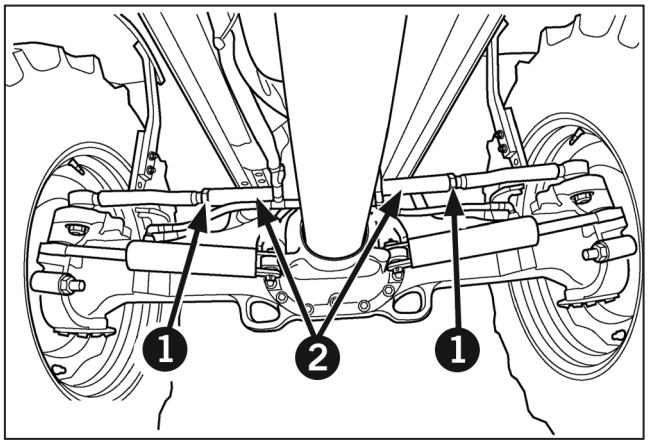


Toe-in = B - A (Illustration exaggerated)

## Adjusting Toe-in – Standard Steer MFWD

To adjust the toe-in:

8. Loosen the jam nuts (1) on each side of the tie rod
9. Turn the tie rod tube (2) to adjust the toe-in to 0 to 6 mm (0 to 0.25 in)
10. Tighten the jam nuts (1) on each side of the tie rod
11. Check the adjustment of the steering stops.



## MFWD Steering Stops

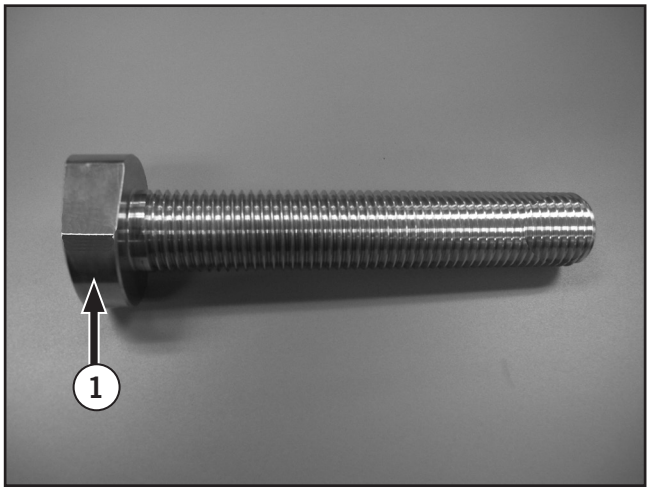
**WARNING**

Maintain all steering components in a reliable and satisfactory condition to ensure they operate safely and comply with legal requirements.

***NOTE: The new type steering angle stop has a tapered head. Install these stops with the thick side (1) at the top.***

A steering stop is incorporated at each end of the axle. The stops are adjustable and must be set to provide a minimum clearance of 38 mm (1.5 in) between the tires or fenders if installed and any part of the tractor with the wheels turned full left and right with the axle fully oscillated.

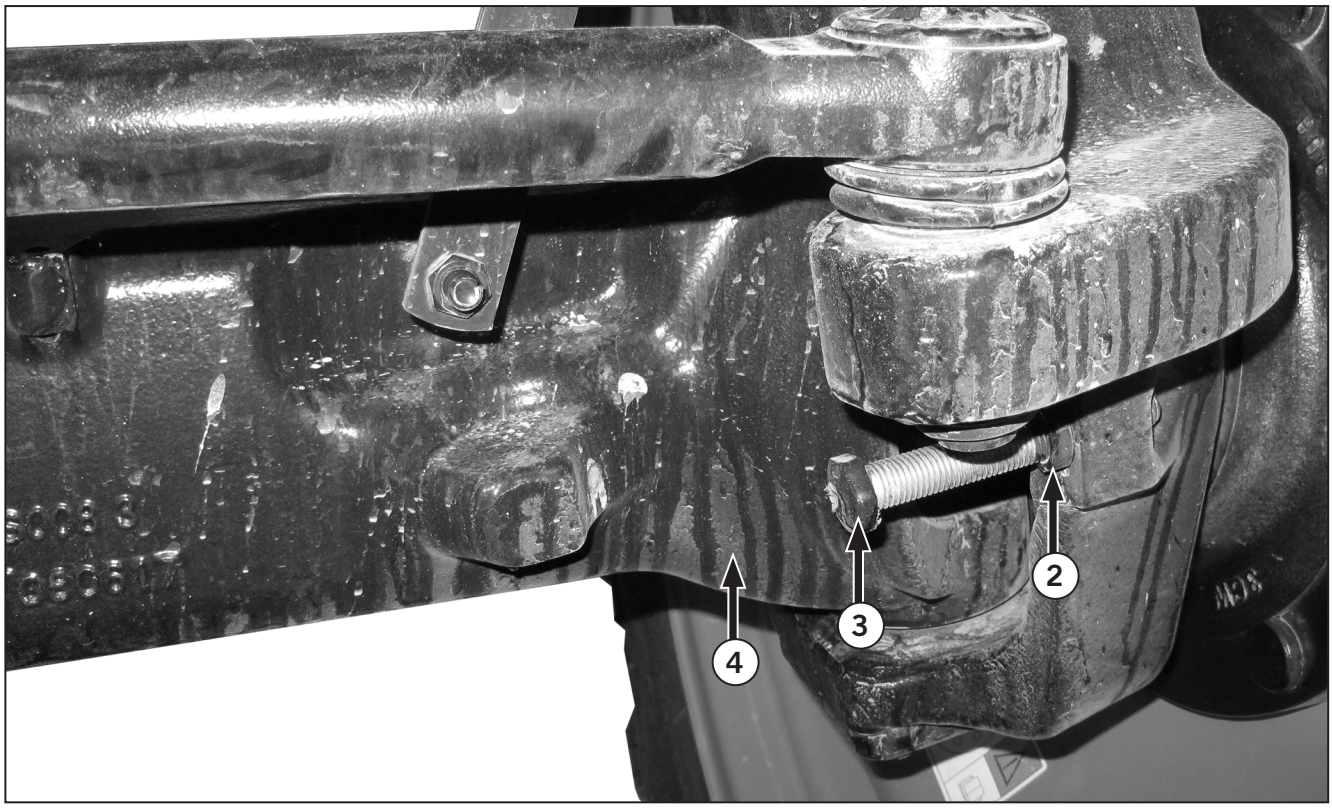
***NOTE: If your tractor is equipped with optional front fenders, make sure there is adequate clearance under all operating conditions. Adjust the steering stops, as necessary. Fenders may have to be removed for 1 524 mm (61 in) track spacing.***




Adjust the steering stops at both ends of the axle to the same turn angle.

Loosen jam nut (2). Use a wrench on the head (3) of the steering angle stop and thread the stop in or out so it will contact the fixed axle stop (4) when there is at least 38 mm (1.5 in) clearance between the tire and tractor as previously described to adjust the steering angle stop. Lock the jam nut to maintain the adjustment.

Adjust the steering stop on the opposite side to the same turn angle. Check that both stops are adjusted to provide the specified clearance.



## Rear Wheel Track Spacing

**WARNING**

Never operate the tractor with a loose wheel rim, disc or hub. Always tighten hardware to the specified torque and at the recommended intervals.

Tractor wheels are very heavy. Handle with care and make sure that they cannot fall and cause injury when stored.

The tractor is produced with lights that meet lighting regulations when operating or traveling on the public highway. You may be required to reposition the lights to comply with legal requirements. Before traveling on the highway, ensure that the overall tractor width does not exceed the local maximum permitted.

***NOTE: Read this section completely before adjusting track width.***

***NOTE: The track width dimensions (width from tire center to center) shown may vary from actual measurements depending on specific wheel and tire combination and tire manufacturer.***

### Axle Lengths

Model M8-181 and M8-201tractors are supplied with 2 rear axle specification:

Straight type axle 105 mm (100 in) in diameter, 2489 mm (98 in) overall length.

Straight type axle 105 mm (100 in) in diameter, 2997 mm (118 in) overall length.

***NOTE: The rear wheel track spacings are shown in the following charts. Each drawing represents either a left-hand wheel viewed from the rear or a right-hand wheel viewed from the front.***

A range of track settings are available by moving the wheel assembly in or out on the axle shaft at each disc-to-rim position.

Spacing dimensions indicate the distance between the center points of the tire tread.

**Model M8-181 and M8-201 Tractors**

**Table 3-27: Track Settings Hub and Wheel Placement**

| Track Settings Hub and Wheel Placement | Tire Size |
|---|---|
| 1549.4 mm (61 in) | 380/85R34 |
| 1651 mm (65 in) | 480/70R30<br>380/85R34 |
| 1752.6 mm (69 in) | 480/70R30<br>380/85R34 |
| 1854.2 mm (73 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 1955.8 mm (77 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2057.4 mm (81 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2159 mm (85 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2260.6 mm (89 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2057.4 mm (81 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2159 mm (85 in) | 600/65R28<br>480/70R30<br>380/85R34 |
| 2260.6 mm (89 in) | 600/65R28<br>480/70R30<br>380/85R34 |

**Table 3-28: Track Settings (Rear Tires 98" bar axle Estimate)**

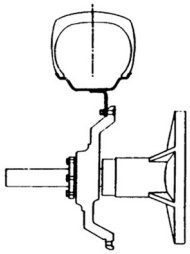
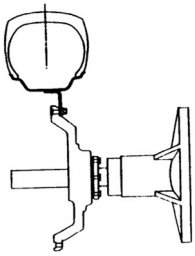
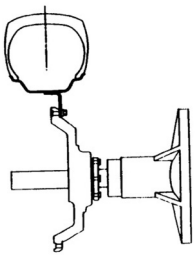
| Track Settings Hub and Wheel Placement | Tire Size | Minimum Track Setting | Maximum Track Setting |
|---|---|---|---|
|  | 380/90R50<br>480/80R46 | 1 549.4 mm (61in) | 1 701.8 mm (67 in) |
|  | A380/90R50<br>480/80R46<br>520/85R42<br>620/70R42 | 1 750 mm (68.8 in) | 1 968.5 mm (77.5 in) |
|  | 380/90R50<br>480/80R46<br>520/85R42<br>620/70R42<br>710/70R38 | 2 354 mm (92.6 in) | 2 489.2 mm (98 in) |

**Table 3-29: Track Settings Hub and Wheel Placement (Rear Tires 118" bar axle Estimate)**

| Tire Size | Minimum Track Setting | Maximum Track Setting |
|---|---|---|
| 380/90R50<br>480/80R46 | 1549.4 mm (61in) | 2209.8 mm (87 in) |
| 380/90R50<br>480/80R46<br>520/85R42<br>620/70R42 | 1750 mm (68.8 in) | 2476.5 mm (97.5 in) |
| 380/90R50<br>480/80R46<br>520/85R42<br>620/70R42<br>710/70R38 | 2352 mm (92.6 in) | 2794 mm (110 in) |
| 380/90R50<br>480/80R46<br>520/85R42<br>620/70R42<br>710/70R38 | 2667 mm (105 in) | 2794 mm (110 in) |

## Rear Wheel Track Adjustment

**WARNING**

Take suitable precautions, including the use of safety glasses, against the possibility of flying metal particles.

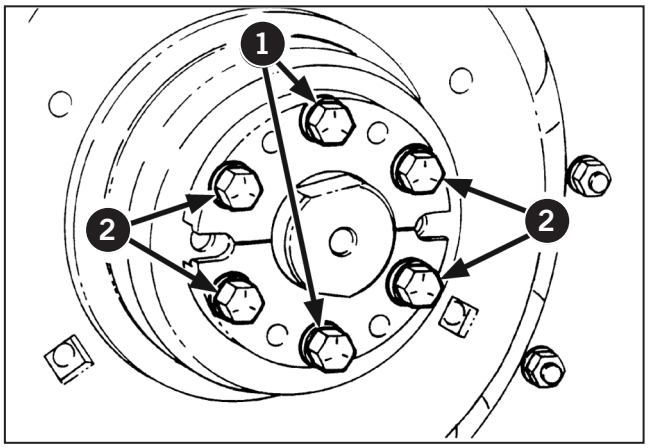
**NOTICE**

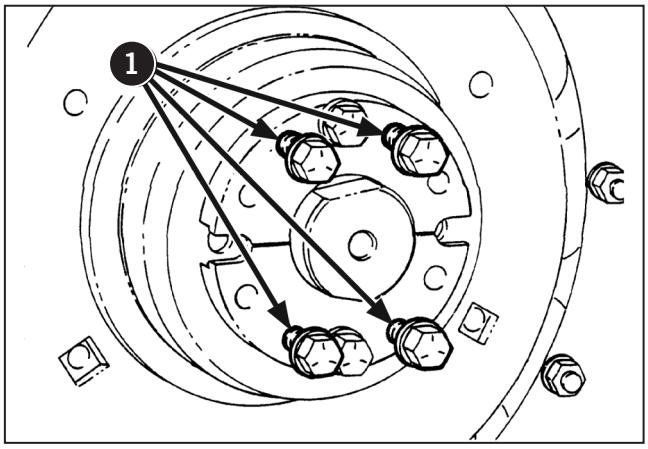
Do not use a torque greater than 407 N·m (300 ft-lb) on the pusher bolts. The use of penetrating oil between the wedge and axle shaft will be of benefit. Place a shaft protector over the end of the axle shaft and strike with a hammer to shock the wedge free if difficulty is experienced.

Adjustment of track spacing is achieved by sliding the complete wheel assembly on the axle shaft and/or by changing the rim and disc position.

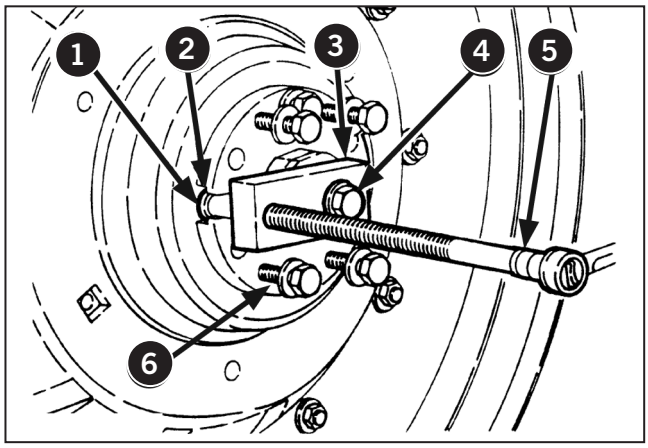
To reposition the wheel on the axle shaft or to completely remove the wheel:

- Block the front wheels, front and rear and jack up the rear of the tractor until both rear wheels are off the ground. Support the rear of the tractor with blocking or stands. Position wheels with hole in the rim at the top.
- Loosen the two center wedge bolts (1) about 12 mm (0.5 in). Remove the four outer wedge bolts (2).
- Clean the bolts and threaded holes in the wedges before lubricating and installing the outer wedge bolts (1) for pushing the wedges. Tighten the outer wedge bolts evenly until the wedges loosen on the axle shaft. The wheel assembly will now be free to slide in or out on the axle shaft.



An optional wheel adjustment tool is available to move the loosened wheel in or out as required. Slide the stepped end (1) into the notch (2) between the wedges to use the tool. Attach the block (3) to the axle with one of the removed wedge bolts (4). Turn the adjusting bolt (5) in or out to move the wheel assembly.




***NOTE: The tool is available through a Kubota dealer.***

Set the wheel to the desired position on the shaft. Remove the pusher bolts and replace them in the outer holes (6).

Tighten the six wedge retaining bolts in increments of 68 N·m (50 ft-lb) until a final torque of 391 N·m (290 ft-lb) is achieved.

**NOTICE**

Tighten the wedges evenly.

Repeat the procedure on the other wheel, ensuring that both rear wheels are the same distance from the ends of the axle shafts.

***NOTE: Check the torque of all six wedge retaining bolts on each wheel after driving the tractor for 200 m (218.72 yd), after 1 hour and 10 hours of operation and thereafter at the 50-hour service intervals.***

## Adjusting Rear Wheels

**WARNING**

Tractor wheels are very heavy. Handle with care and make sure that they cannot fall and cause injury when stored.

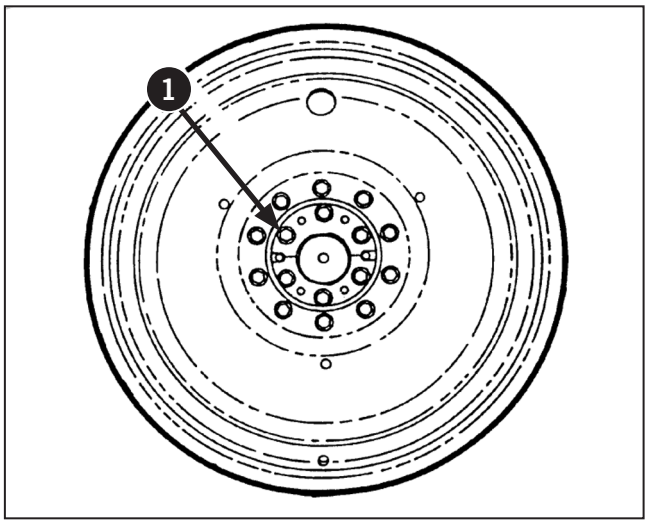
***NOTE: It may be necessary to interchange the left- and right-hand wheel assemblies when changing from one track width setting to another. If so, be sure that the V of the tire tread remains pointing in the direction of forward travel.***

Rear wheel track adjustment is effected by changing the position of the disc and/or wheel rim, relative to the rear axle.

In each position, a range of track settings may be achieved by moving the wheel assemblies in or out on the axle shafts.

Follow all steps outlined in Rear Wheel Track Adjustment to change wheel position.

## Adjusting Pressed Steel Wheel




Remove the disc to hub bolts (1) after the rear axle is jacked up and blocked. Use a suitable lifting device to remove the wheel and store the wheel and tire where it won't fall over. Repeat the procedure on the opposite wheel and install where the first wheel was removed.

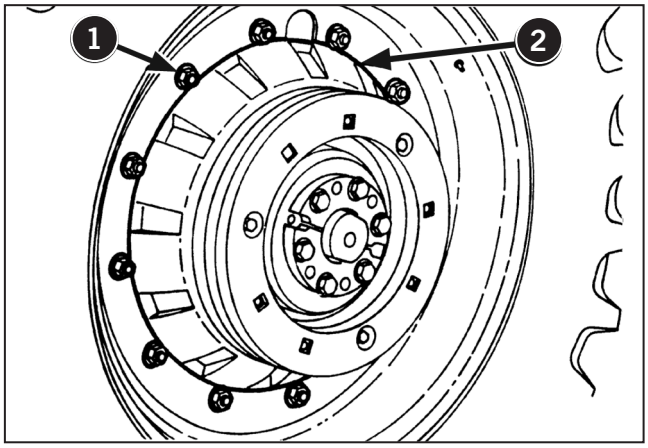
Torque the disc to hub bolts to 407 N·m (300 ft-lb) in 68 N·m (50 ft-lb) increments using a diagonal pattern.

***NOTE: Check bolt torque after driving the tractor for 200 m (218.72 yd), after 1 hour and 10 hours of operation and thereafter at the 50-hour service intervals.***

## Adjusting Cast Center Wheel

**WARNING**

Never operate the tractor with a loose wheel or rim. Always tighten the bolts to the specified torque and check them frequently.




Remove the disc to rim attaching hardware (1) after the rear axle is jacked up and blocked. Remove the wheel using a suitable lifting device and store where it won't fall. Repeat this procedure on the opposite rim and install on the first disc. Remove wheel weights first, then position discs as required if the discs (2) are to be switched.

Reinstall the rim and weights and tighten all bolts and nuts.

Repeat the procedure on the other wheel.

Tighten the rim to disc retaining nuts uniformly in an alternate pattern, 68 N·m (50 ft-lb) at a time, until a torque of 597 N·m (440 ft-lb) for Grade 8 bolts is obtained.

***NOTE: Check hardware torque after driving the tractor for 200 m (218.72 yd), after 1 hour and 10 hours operation and thereafter at the 50-hour service intervals.***

## Dual Rear Wheels

**WARNING**

Tractor wheels are very heavy. Handle with care and ensure, when stored, that they cannot fall and cause injury.

***NOTE: Dual rear wheels may only be installed on tractors with 2336 mm (92 in) or 3048 mm (120 in) rear axles.***

The outer wheel track spacing can be adjusted to a maximum of 3251 mm (128 in) and the inner wheel to a minimum of 1524 mm (60 in). Position the wheels on the axle to achieve the desired track spacing. Refer to Outer Wheels and Inner Wheels in this section.

Dual rear wheels may be installed on tractors equipped with the 2336 mm (92 in) or 3048 mm (120 in) axle.

View A shows inner small hub pressed steel dual wheel configuration.

View B shows inner large hub cast hub dual wheel configuration.

### Outer Wheels

The outer wheels (6) are pressed steel wheels. They are bolted to extension hubs (7) that are clamped to the axle shafts using wedges (8).

The hub to wedge attaching hardware can be installed in either of two positions to make removal easier depending on wheel spacing.

**Option 1**

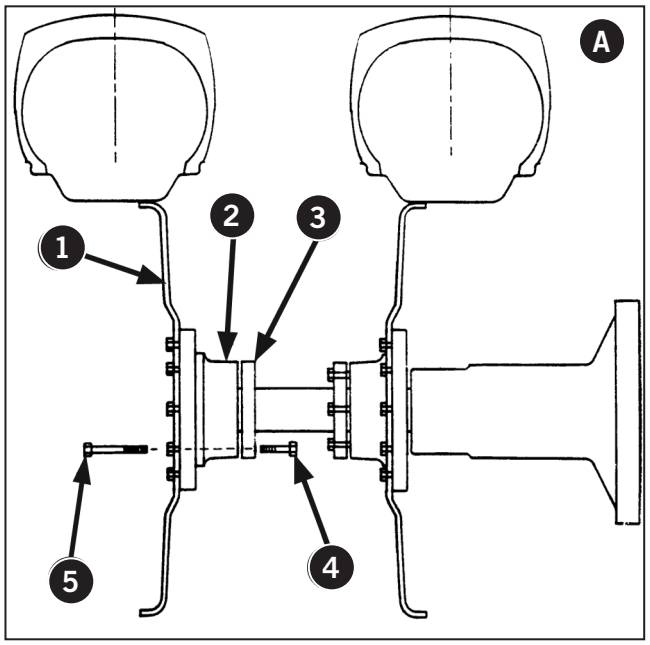
Install six 76 mm (3.0 in) long wedge-to-hub bolts (9) from the wedge side as shown.

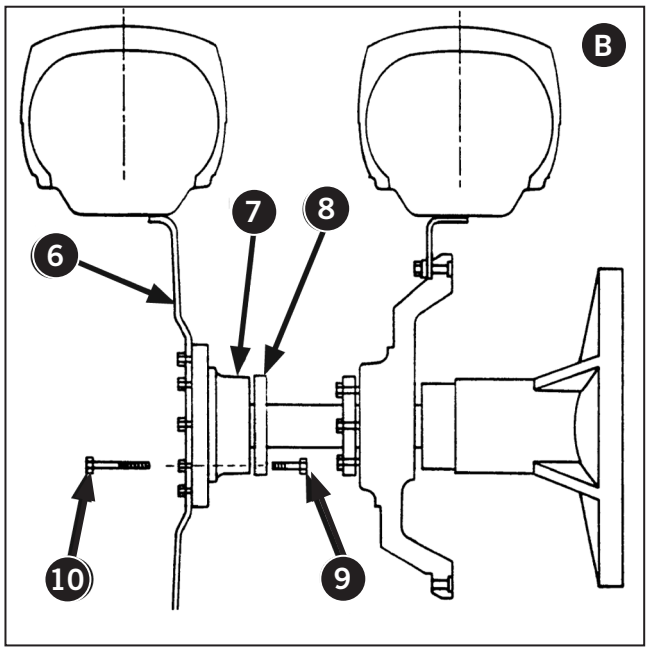
Torque bolts to 391 N·m (290 ft-lb).

**Option 2**

Install four 178 mm (7.0 in) long wedge-to-hub bolts (10) from the hub side as shown.

Torque bolts to 391 N·m (290 ft-lb).



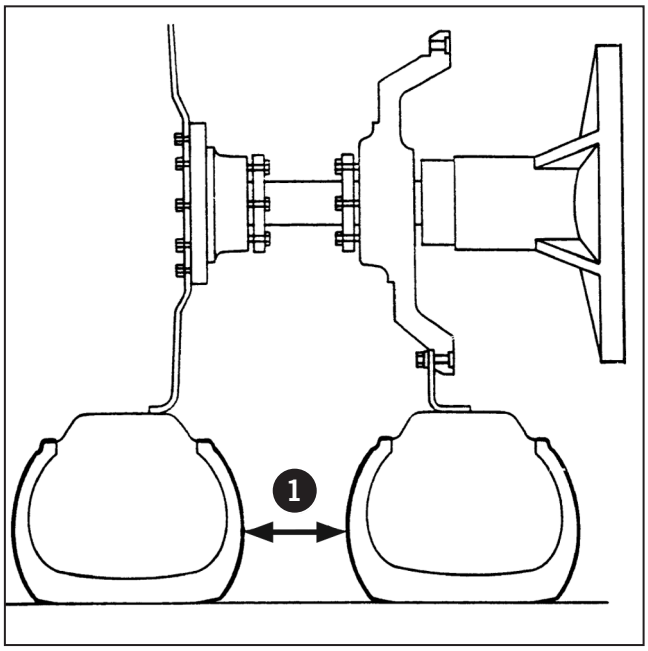




**NOTICE**

These 178 mm (7.0 in) long bolts are included in the optional dual wheel kit available from a Kubota dealer. Do not use the standard (shorter) wedge bolts.

## Tire Clearance

A minimum clearance of 102 mm (4.0 in.) must be maintained between the sidewall of the tires measured at the closest point (1). Make sure the tractor is properly ballasted and the implement attached to accurately measure the tire clearance.




**WARNING**

Make sure it is securely supported before removing a wheel.

## Wheel Removal/Installation

Proceed as follows to remove the outer wheel:

- Block the front wheels, front and rear, then jack up and support the rear axle.
- Remove the 10 wheel-disc-to-hub bolts from the wheel and lower the wheel to the ground using a suitable lifting device. Repeat on the other wheel.

When reinstalling the outer wheels, torque the disc to hub bolts in an alternate pattern to 800 N·m (590 ft-lb).

## Inner Wheels

The manual adjust inner wheels can be adjusted in the same way as manual adjust single wheels. However, limited track settings may be achieved due to interference between inner and outer tires or between the inner tires and the fenders.

Before adjust the inner wheels remove the outer wheels as described under Outer Wheels.

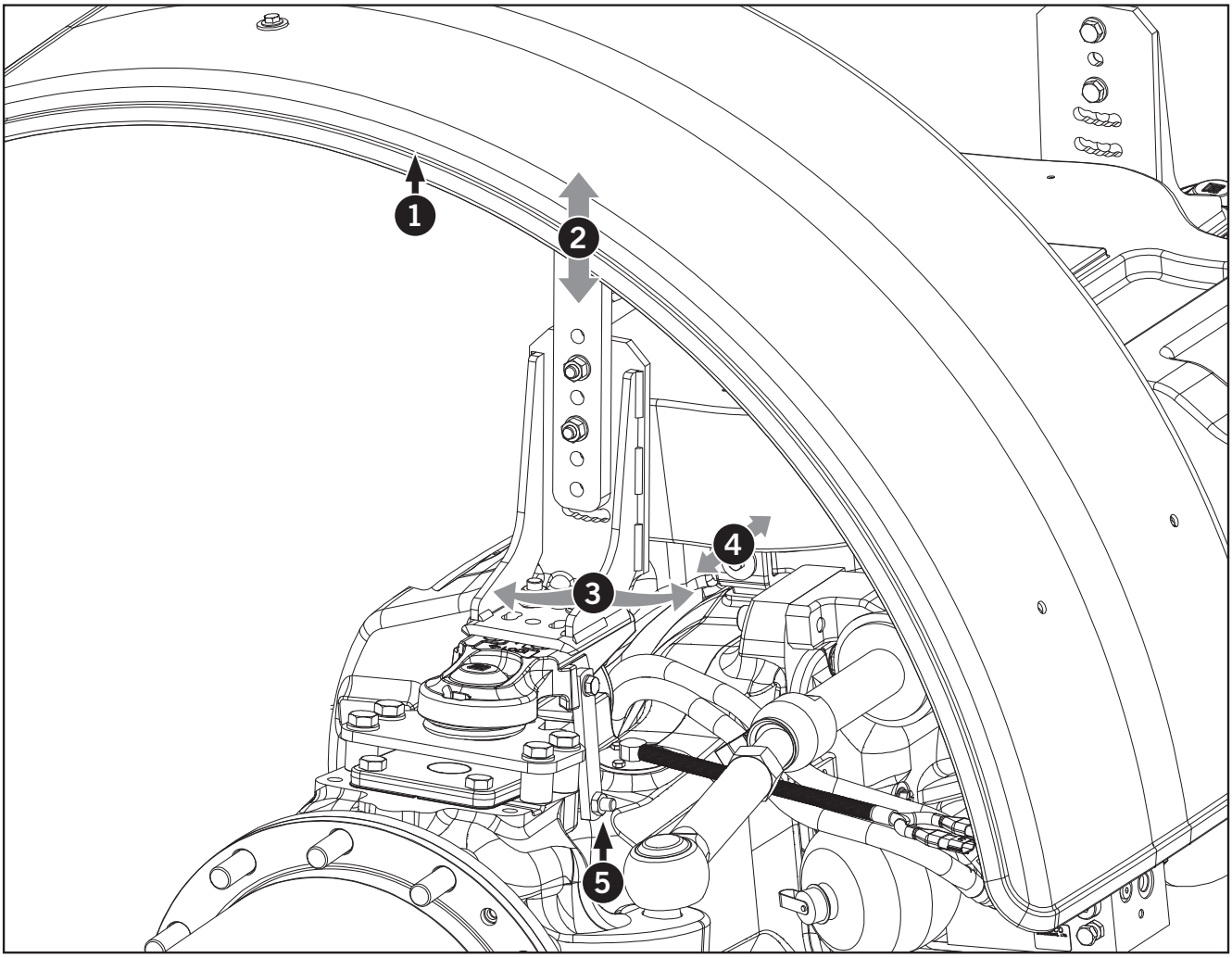
Follow the instructions under Rear Wheels Track Adjustment earlier in the section to adjust the track width of the inner wheels.

***NOTE: Drive the tractor for 200 m (218.72 yd) then check the wheel hardware torque. Check the wheel hardware torque daily for the next 50 hours of operation and then at each 50-hour service interval.***

## Adjusting Front Fenders (Suspended Axle)

Suspended axles are equipped with dynamic front fenders (1). The spacing (height, pitch, fender swivel stop and distance from side of tractor) is specific to the size of tire and fender.

- The following pages explain how to adjust the height (2), pitch (3), distance from the side of the tractor (4) and fender swivel stop length (5).
- Match your front tire size to the corresponding spacing position listed in Table 3-30 on page 3-109.



## Adjust Fender Height and Pitch

- Follow the pitch and height specifications for your size of tire if available (see Table 3-30 on page 3-109).
- Remove the 2 nuts (1, Figure 1) and bolts (2) and lock washers securing the support arm (3) to the bracket (4).
- Adjust the height and pitch of the support fender. Secure the support arm (3, Figure 2) to the bracket (4) with a bolt (2) in one of the slotted holes (5) and in one of the 3 top holes (6).
- Secure bolts with lock washers and nuts. Tighten nuts.

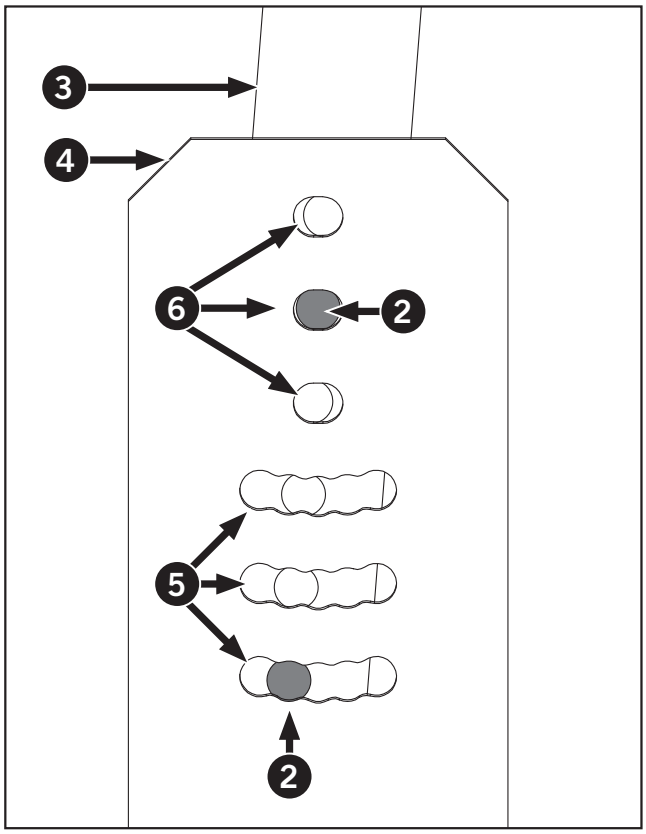
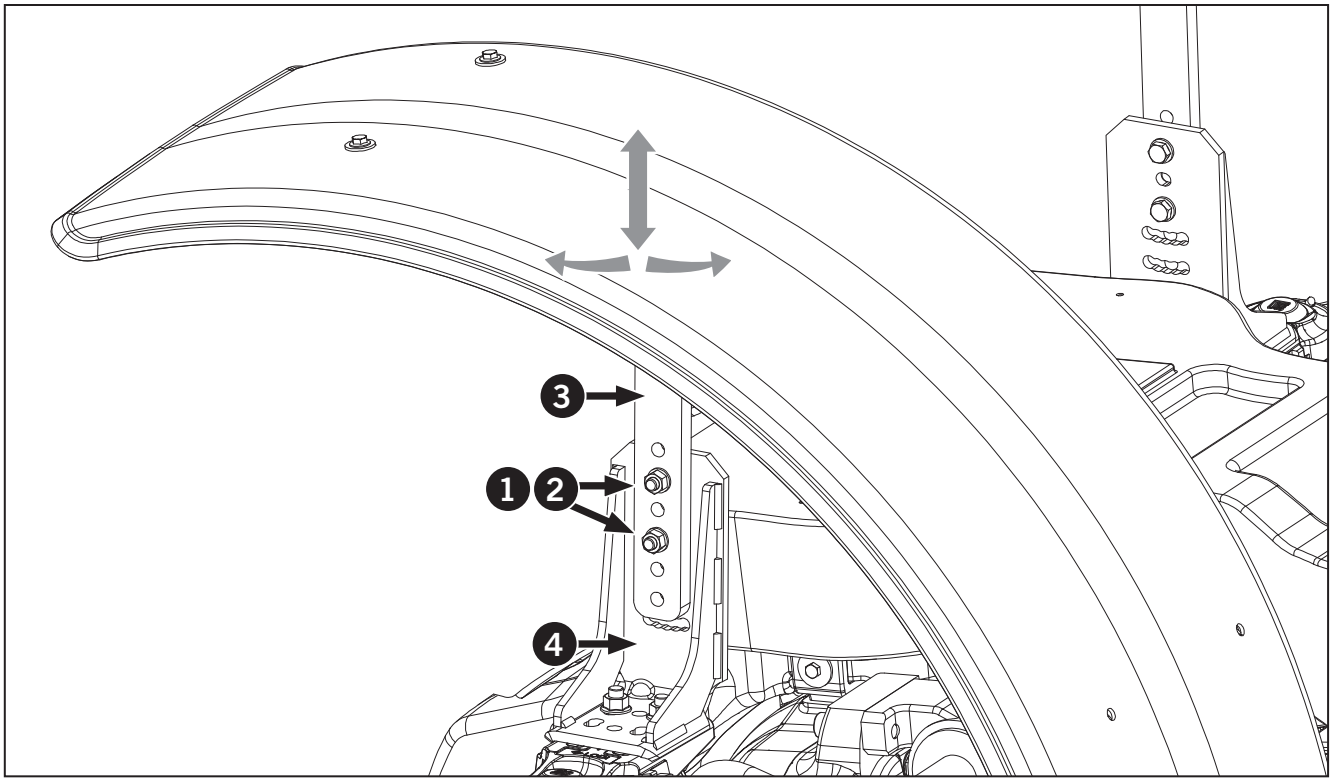



Figure 2: Showing the bolts (1) nuts (2) securing the support arm (3) to the bracket (4).

Figure 1: Showing the bolts (1) nuts (2) securing the support arm (3) to the bracket (4).



### Adjust the Distance between the Fender and the Side of the Tractor

- Follow the distance specification for your size of tire if available (see Table 3-30 on page 3-109). Distances are marked by distance location numbers 1–5 etched into the swivel support (1). Figure 1 shows the first hole (X) in the bracket (2) set to distance location 4.
- Remove the 2 nuts and bolts (3, Figure 1) on the swivel support. Position one of the holes (X or Y) in the bracket over one of the distance location numbers.
- Secure the bracket to the swivel support with bolts and nuts. Tighten nuts.

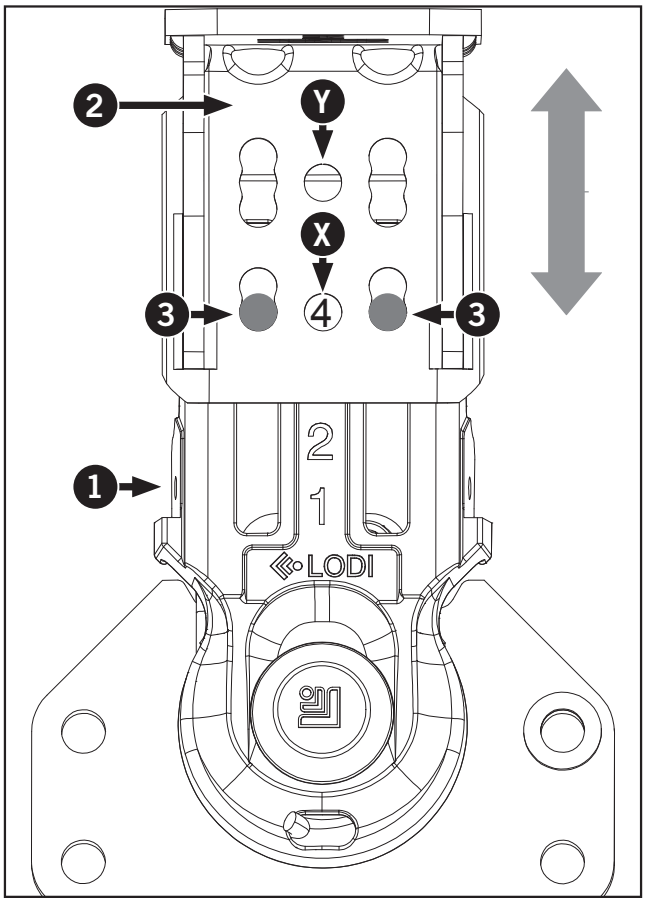
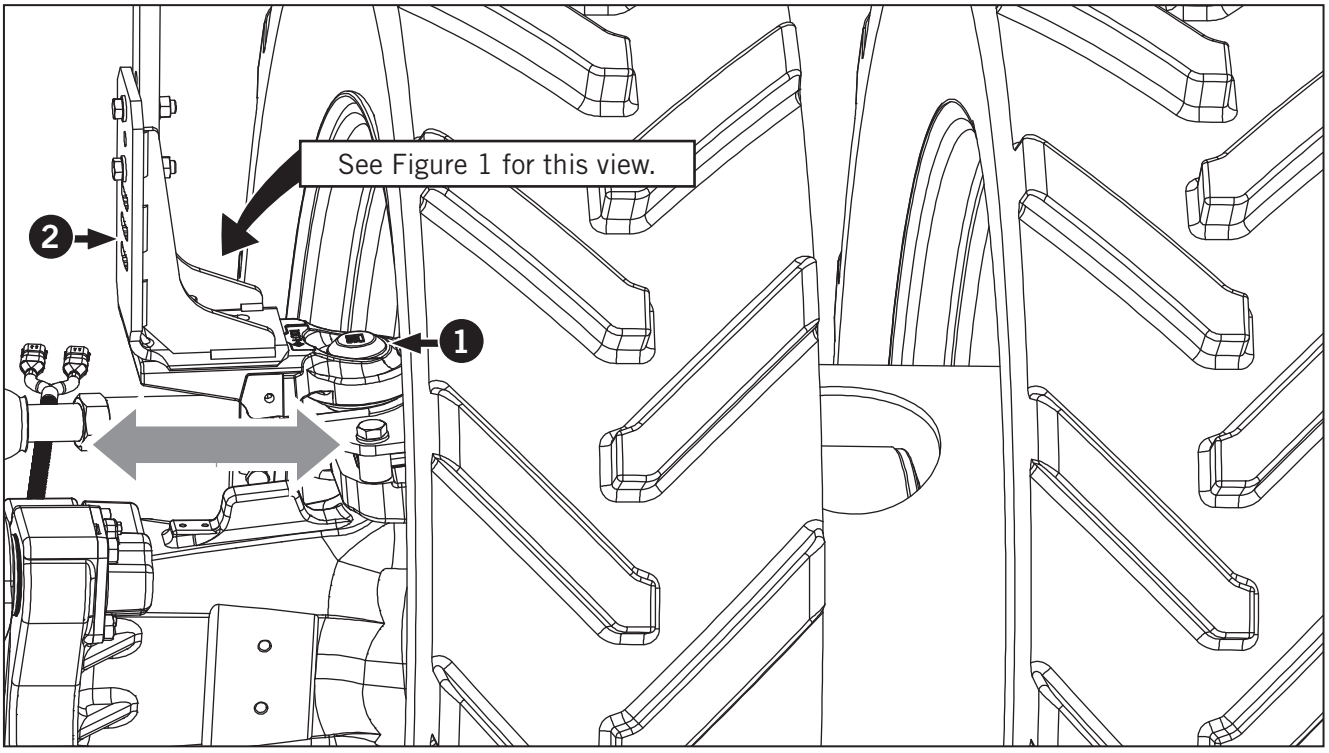



Figure 1: First hole (X) in the bracket (2) set to distance location 4.

Figure 2: Showing the bracket (2) secured to the fender swivel support (1).



## Fender Spacing Specifications

Match your front tire size to the corresponding spacing position listed below.

**Table 3-30: Front Fender Spacing Specifications for Suspended Axle**

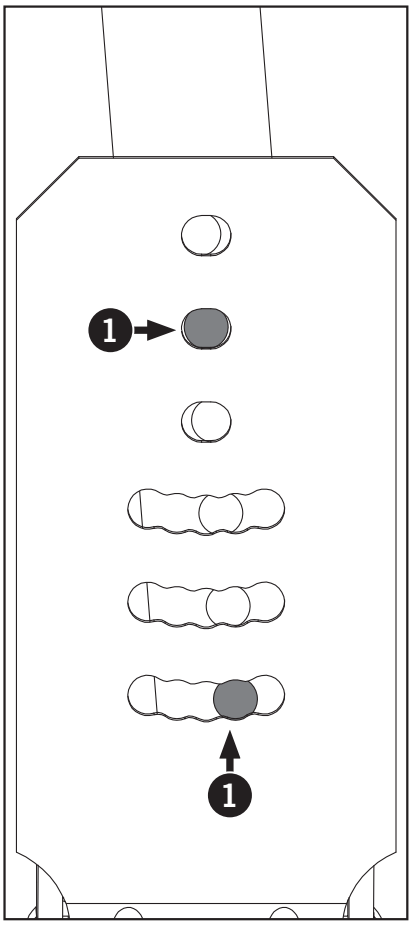
| | FENDER | |
|---|---|---|
| **Tire Size** | **Fender Size** | **Spacing Position for Single Tires** |
| **Front (380/80R38)_ Rear (380/90R54)** | 480 mm | A |
| **Front (380/80R38)_ Rear (480/80R50)** | 480 mm | A |
| **Front (380/80R38)_ Rear (520/85R46)** | 480 mm | A |
| **Front (380/85R34)_ Rear (380/90R50)** | 480 mm | A |
| **Front (380/85R34)_ Rear (480/80R46)_R1W** | 480 mm | A |
| **Front (380/85R34)_Rear (480/80R46)_R1** | 480 mm | A |

**Spacing Position A (480 mm Fender, Single Wheels)**

- For correct height and pitch: Install bolts (1) to the bracket holes as shown below. Install lock washers onto bolts.
- For correct distance: Move the first bracket hole (X) to location 4 and secure with bolts (2) as shown below.
- Tighten all nuts.

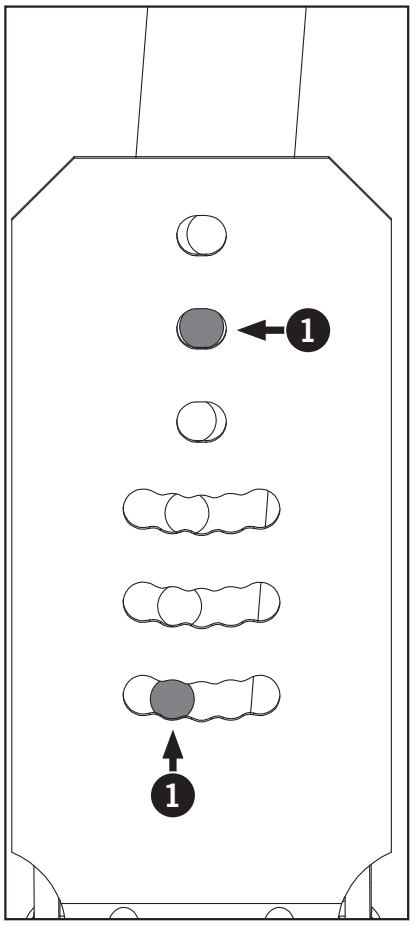
**LEFT FENDER**

**Front of Tractor**

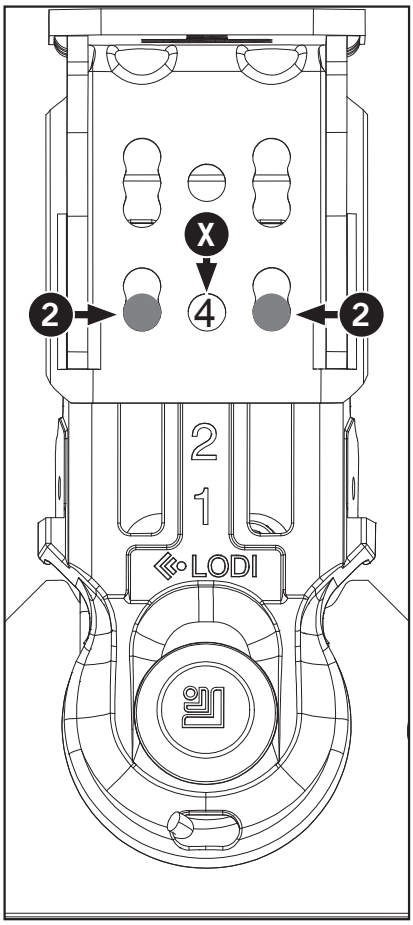



**RIGHT FENDER**

**Front of Tractor**




**DISTANCE SET TO 4**

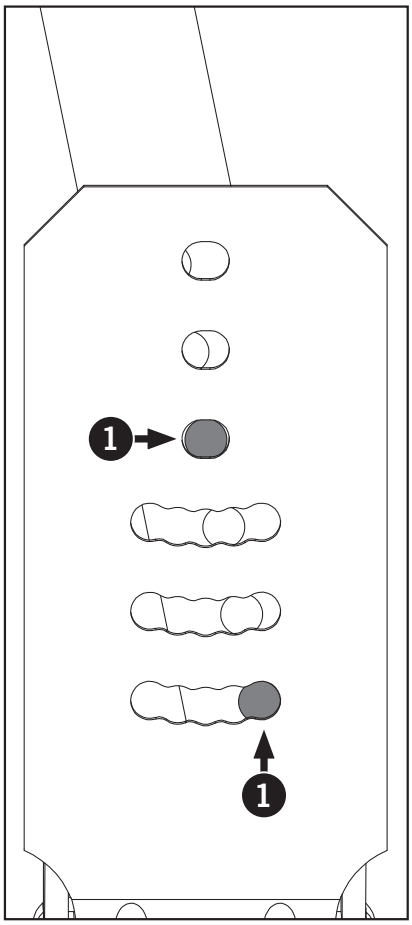


**Spacing Position B (480 mm Fender, Single Wheels)**

- For correct height and pitch: Install bolts (1) to the bracket holes as shown below. Install lock washers onto bolts.
- For correct distance: Move the first bracket hole (X) to location 4 and secure with bolts (2) as shown below.
- Tighten all nuts.

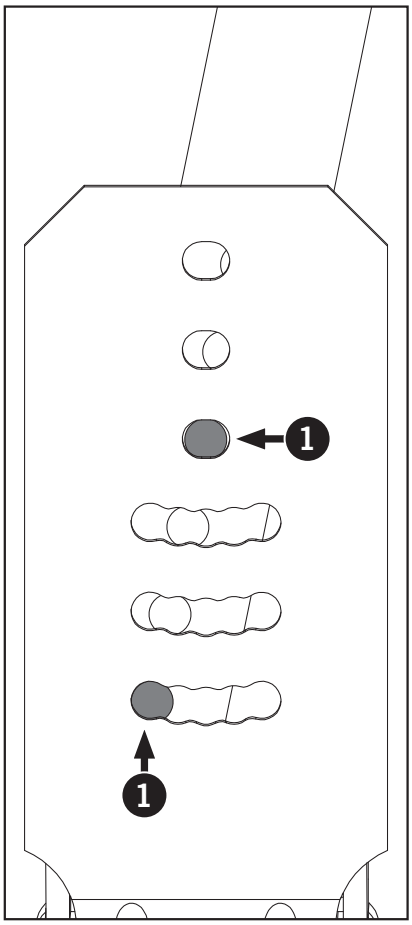
**LEFT FENDER**

**Front of Tractor**

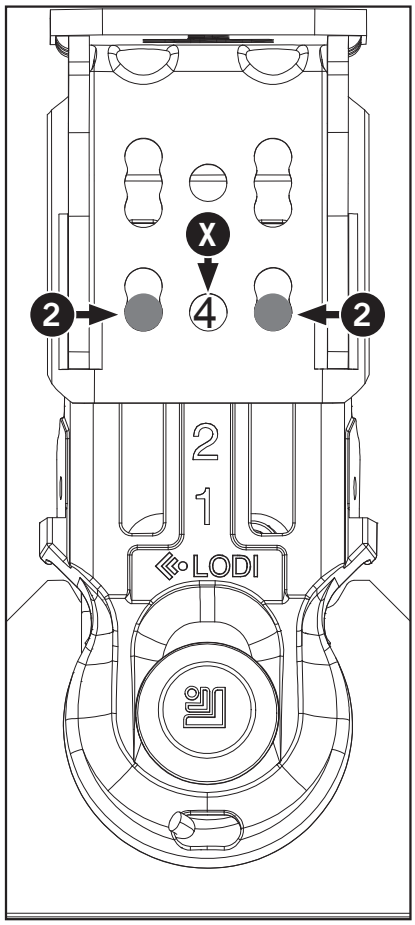



**RIGHT FENDER**

**Front of Tractor**

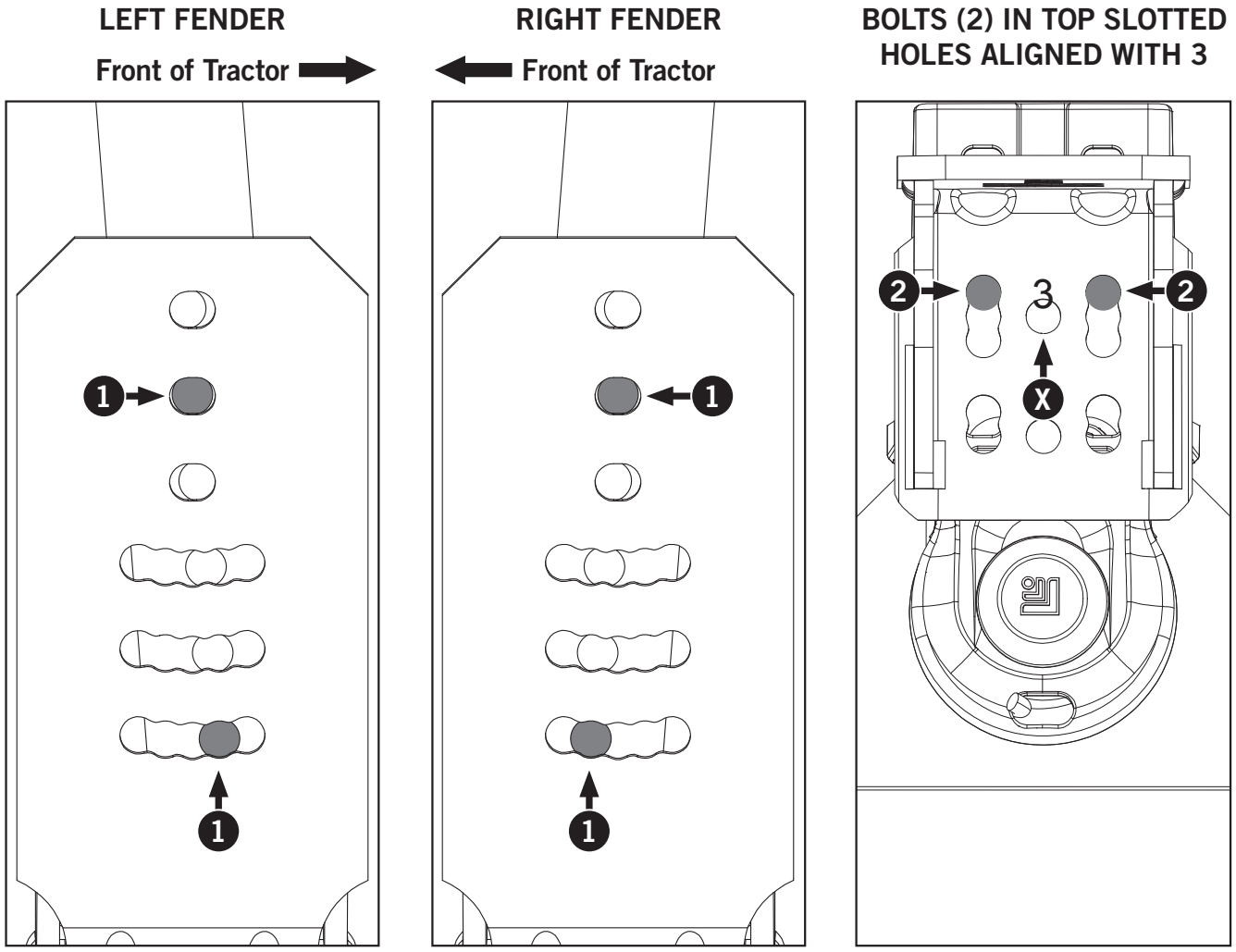



**DISTANCE SET TO 4**



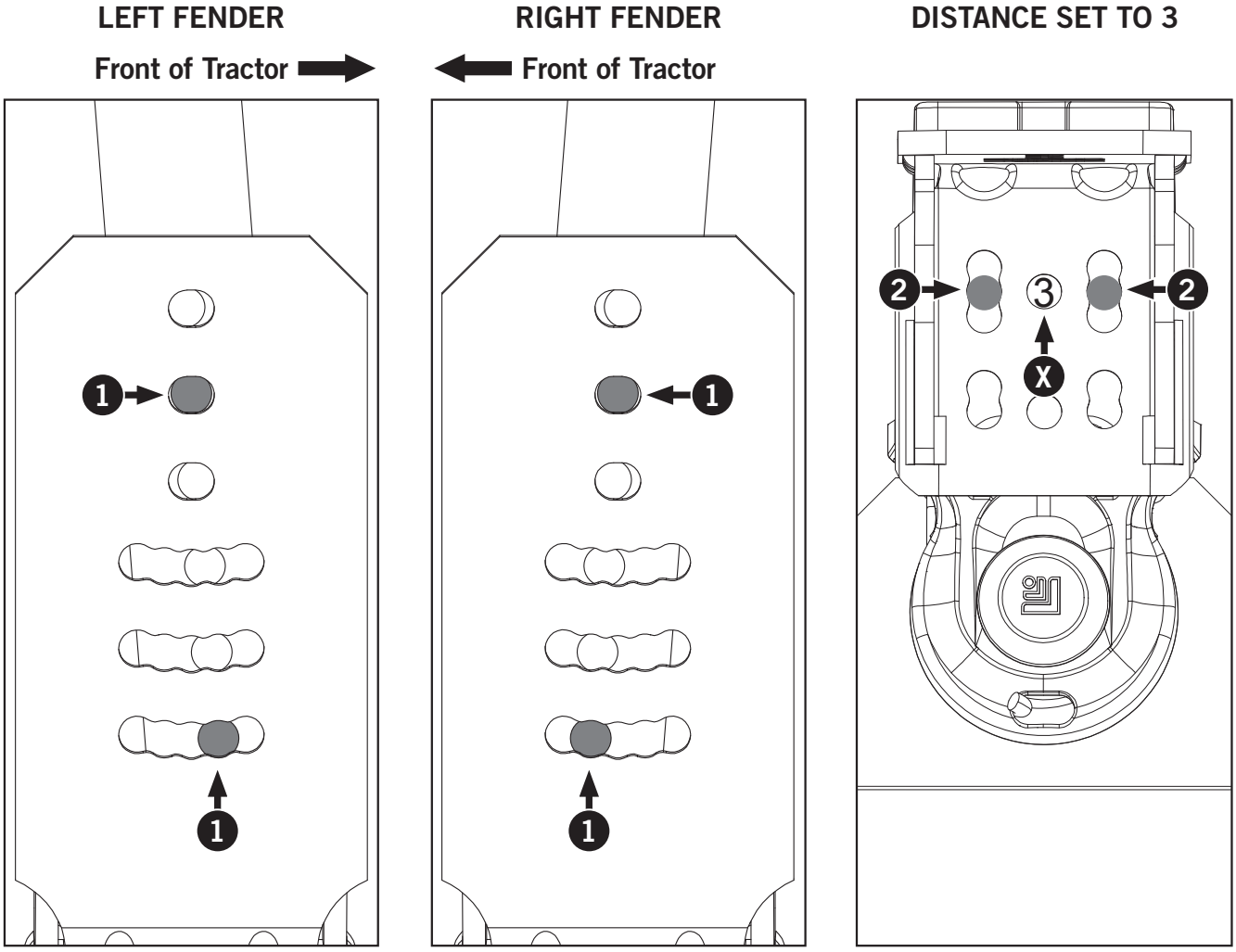
**Spacing Position C (540 mm Fender, Single Wheels)**

- For correct height and pitch: Install bolts (1) to the bracket holes as shown below. Install lock washers onto bolts.
- For correct distance: Install bolts (2) to the top slotted holes as shown. Align these slotted holes with location 3. The second bracket hole (X) will be offset of location 3 as shown.
- Tighten all nuts.



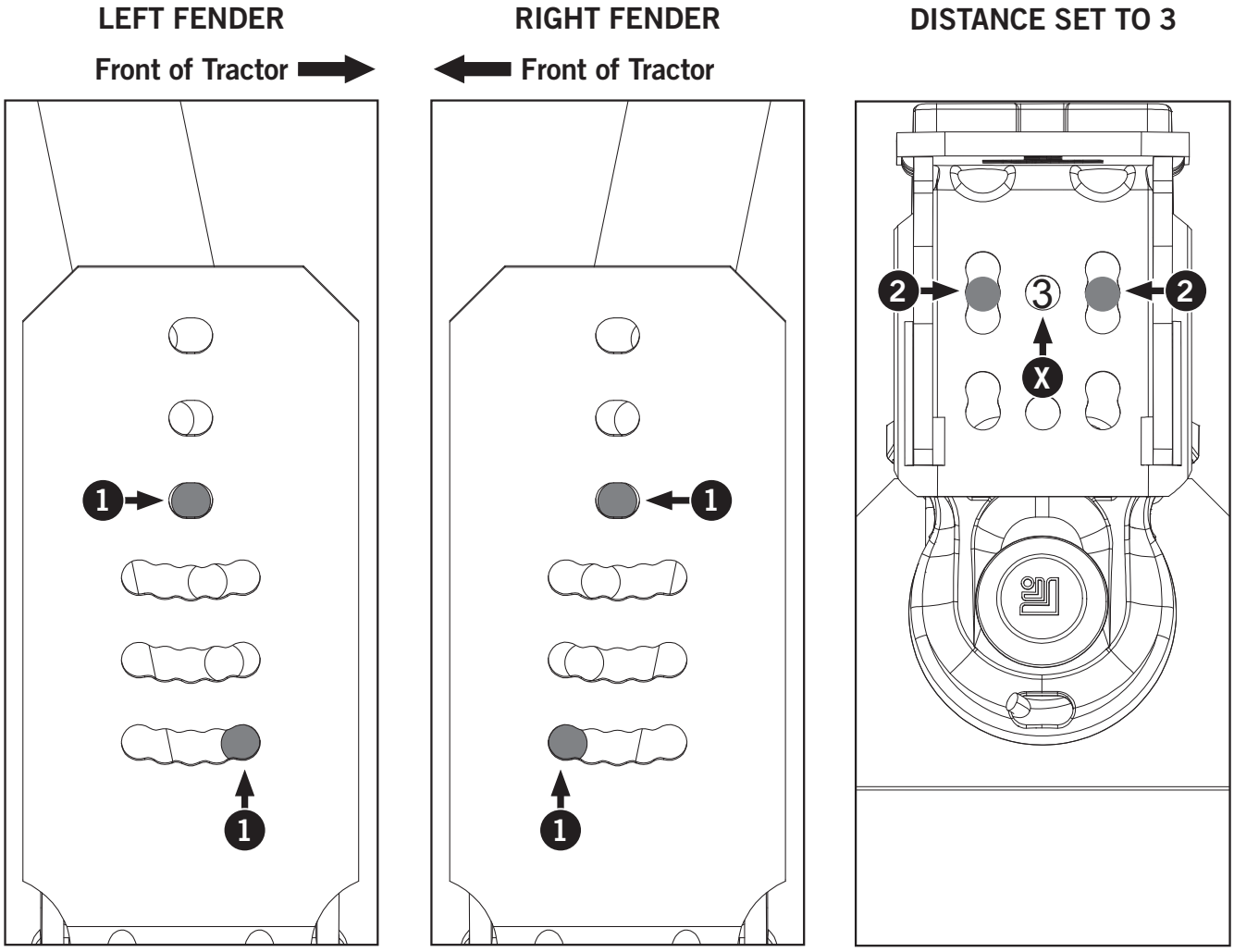
### Spacing Position D (620 mm Fender, Single Wheels)

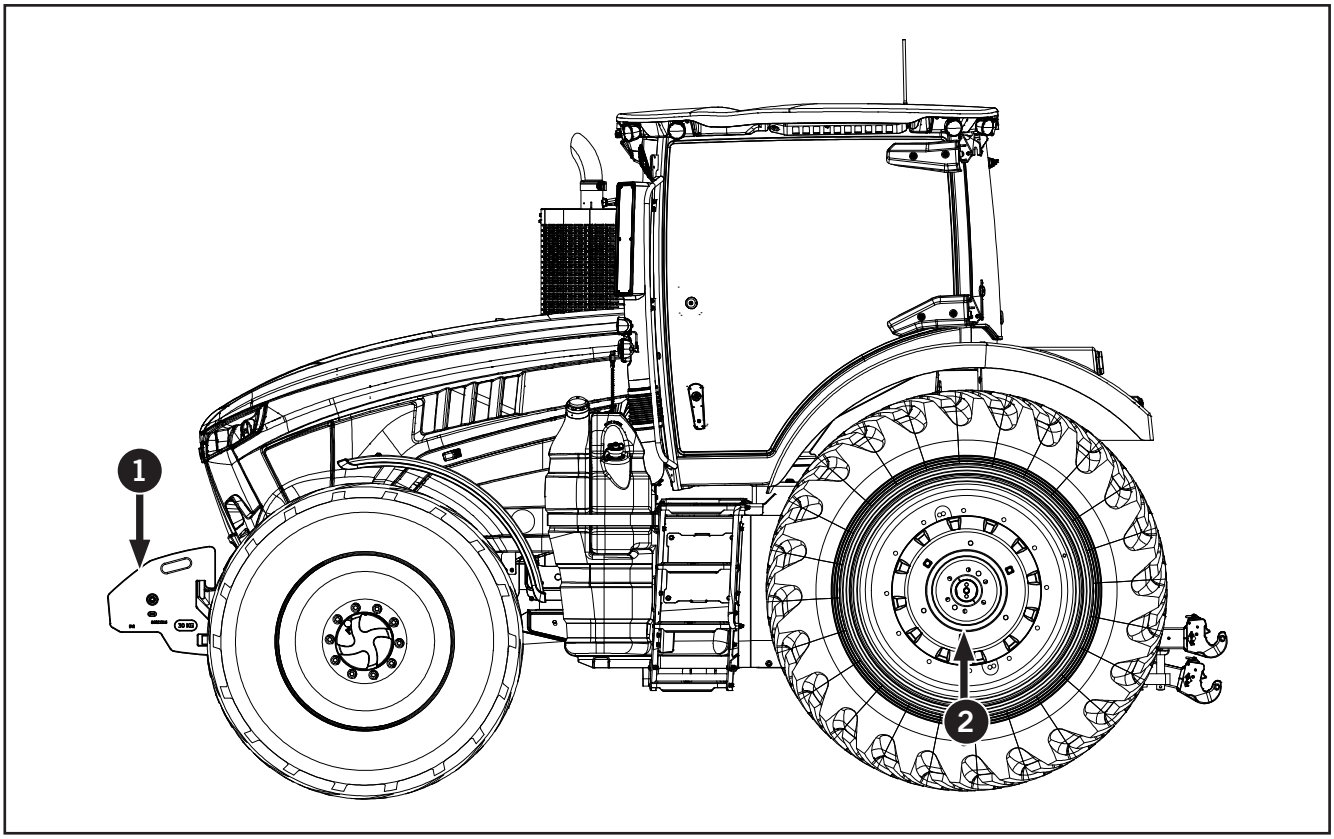
- For correct height and pitch: Install bolts (1) to the bracket holes as shown below. Install lock washers onto bolts.
- For correct distance: Move the **second bracket hole** (X) to location 3 and secure with bolts (2) as shown below.
- Tighten all nuts.



### Spacing Position E (620 mm Fender, Single Wheels)

- For correct height and pitch: Install bolts (1) to the bracket holes as shown below. Install lock washers onto bolts.
- For correct distance: Move the second bracket hole (X) to location 3 and secure with bolts (2) as shown below.
- Tighten all nuts.






1. Front weight pack
2. Rear wheel weight discs

## Ballasting and Tires

Maximum tractor performance is dependent upon proper ballasting and tire selection.

Selecting the proper size and type of front and rear tires is also important in achieving maximum tractor efficiency. Various tire sizes and types are available for the tractor. A KUBOTA dealer can assist with this subject.

The tires selected for the tractor must be able to support the weight of the tractor and equipment. The tires must also be able to provide adequate traction to utilize the tractor horsepower and turn it into useful drawbar horsepower.

You will have to adjust the ballast, tire pressure and tractor weight split between the front and rear axles for various loads and conditions to achieve the best ride and performance.

### Ballast

Ballast is mass that is added to the tractor chassis or wheels to increase the total weight and to balance the weight distribution.

### Total Weight

The total weight is the combined weight of the tractor and any load added at the hitch.

### Static Weight Distribution

Static weight distribution is the percentage of the total weight under the front and the rear tires when the tractor is not moving.

The tractor is designed to have 60% of the weight under the rear tires and 40% under the front tires.

***NOTE: Ballasting is a matter of adjusting all of the factors for best tractor performance in the field.***

## Tire and Ballast Factors

***NOTE: The information and practices in these notes must be followed for proper operation of the tractor and best performance.***

Tire specifications: Be aware of the tire manufacturer's specifications and follow the manufacturer's guide for use of the tires. Do not exceed the maximum load rating of the tires.

Tire inflation: Ensure that tires are properly inflated at all times. Do not over inflate tires. Do not operate the tractor on under inflated tires or tires that do not hold pressure.

Tire condition: Tires must be in good condition to achieve the desired performance from the tractor.

Wheel spacing: Ensure that tires and rims are properly installed to allow for tire deflection and steering limitations.

Tractor power: The rated tractor power (PTO horsepower) is provided in the tractor specifications.

Allowable amount of ballast: Maximum tractor weight is a range from 54 to 64 kg (120 to 140 lb) per PTO hp.

Maximum weight: The maximum loaded weight of the tractor must not be exceeded.

Tractor front axle: These weights are provided in the tables found in this section.

Type of implement: The type of implement contributes to the load on the tractor and the balance of weight.

Type of operation: The type of operation being performed affects the balance of the tractor and the loads on the tires.

Type of soil and terrain: The type of soil being worked and the terrain affect the loads on the tractor.

Travel speed: Travel speed must be adjusted for tractors that carry more weight and/or when pulling loads. Use only safe and correct operating speeds. Higher speeds mean reduced drag. Follow the recommendations for ground speed.

**CAUTION**

Adjust travel speed for increased braking distances and safe cornering. Road speeds must be reduced.

**Table 3-31: Tire and Ballast Factors**

| Not Enough Ballast | Too Much Ballast |
|---|---|
| Too much wheel spin | Soil compaction |
| Poor handling and lack of control | Waste of fuel |
| Tire wear | Extreme mechanical wear |
| Waste of fuel | Possible engine damage |
| Reduced productivity and efficiency | Reduced productivity |
| Possibly unsafe | Possibly unsafe |

***NOTE: Always maintain the proper air pressure in the tire to carry the load. Do not over inflate radial or bias ply tires. Radial tires will work with lower air pressures. Radial tires will show up to 20% sidewall deflection or bulge when properly inflated.***

***NOTE: The force that enables the tires to drive the tractor must be transmitted through the tire sidewalls. The tires work best when all the tires on a given axle are working at the same rate. Think of them like a shock absorber; they must respond the same way to share the load equally.***

## Ballast Benefits and Limitations

**WARNING**

Never operate the tractor or equipment outside the specified safe limits for slopes and inclines. Read your operator's manuals or check with the manufacturer for specifications.

Ballast Limitation: Tractors have limitations to the loads they can pull. Using too much ballast will not compensate for implements that are too large or too heavy for the tractor.

Mechanical Front Wheel Drive: The MFWD to the front wheels is important for efficient operation of the tractor and depends on proper weight distribution. Overloading the front axle or improper balancing of the tractor may damage the front steering and drive components.

***NOTE: Intentionally exceeding recommended ballast limits may damage the drive line and structure of the tractor. This damage will not be covered by your warranty.***

Performance and Productivity: A properly set up tractor and equipment will use less fuel and cover more ground in the time available.

Pulling lighter loads at increased ground speed is more efficient than loading a tractor to the maximum.

Steering and Wheel Hop: The front wheels must be in contact with the ground at all times. Proper weight bias keeps the wheels in contact with the ground and provides the right amount of pressure without bounce and with normal steering response.

Tractor Horsepower: Horsepower limits the amount of ballast that can be used. Ratings for the tractor are provided in the specifications. The standard for calculating ballast limitations is to use the specified PTO horsepower rating.

***NOTE: PTO horsepower can be estimated as 80% of the rated horsepower.***

The engine must be operated in the proper power/rpm range.

The specified weight per horsepower is given as 54 to 64 kg (120 to 140 lb) using the total combined weight of the tractor and ballast added.

Tractor Weight: The base weight of the tractor limits the amount of weight that can be added.

Specified weights for the tractor are estimates based on the design specification and a basic set of options. The actual weight of any tractor is more closely represented by the shipping weight documentation.

Note that the shipping weight may include ballast already installed. The best way to determine tractor weight is to use truck weigh scales or get axle weights from a suitable set of scales or load cells. Make note of any ballast installed at the time of weighing.

Soil Conditions and Terrain: Variable soil conditions such as moisture or hardness, compaction or looseness and presence of stones, affect the ability of the tractor to maintain a constant ground speed and wheel slip.

It is recommended that the machine ballast be set up for the typical or average field conditions and adjusted only as required.

It may be necessary to adjust the ballast for the worst case or most difficult situation when terrain is variable, such as inclines, slopes, depressions and contours.

***NOTE: Do not exceed ballast and tractor weight limits.***

## Selecting Ballast

When tractor horsepower loads vary, the optimum weight of the tractor will change. This means that ballast may have to be added or removed to maintain the best tractor performance. Proper ballast will greatly improve tractor operation and ride.

***NOTE: Using these procedures will result in radial ply tires and bias-ply tires having different ballast.***

***NOTE: Radial tires require less overall weight to achieve the same traction as bias-ply tires. Proper ballasting of radial tires is commonly achieved with cast iron weights alone. Bias-ply tires may require both cast iron weights and liquid ballast in the tires.***

***NOTE: Liquid ballast is not recommended for radial tires.***

Always treat all the tires on a tractor axle equally when selecting ballast and tire pressure.

The amount of ballast required is affected by:

- Shipping weight of tractor
- Soil and traction conditions
- Type of implement: fully-mounted or semi-mounted or trailed type
- Working speed
- Tractor horsepower load
- Tires: type, size and number of tires
- Tire pressure.

## General Weight-Split Guidelines

Maintaining stability and grip is vital to safe and efficient operation. The type of equipment used affects the weight-split calculations.

The target 60% rear 40% front weight split is a starting point for general use; adjust the split for specific applications and equipment loads.

Increased weight on the drawbar removes downward pressure at the front axle and can be compensated by added front weight.

## Towed Draft Implements

Equipment that places small vertical forces on the tractor drawbar, discs, cultivators, chisel plows, etc.:

- Reduce front axle load to 35% of the total weight to control traction and rear wheel hop.

## Trailers and Towed Tanks

Implements that place high vertical loads on the tractor drawbar:

- Increase the front axle load to a maximum of 55% of the total weight to maintain stability and steering control.

## Integral and Semi-integral Implements

Rollover plows and large depth controlled implements place large vertical loads on the tractor at the 3-pt hitch:

- Increase the front axle load to a maximum of 55% of the total weight to maintain stability and steering control.

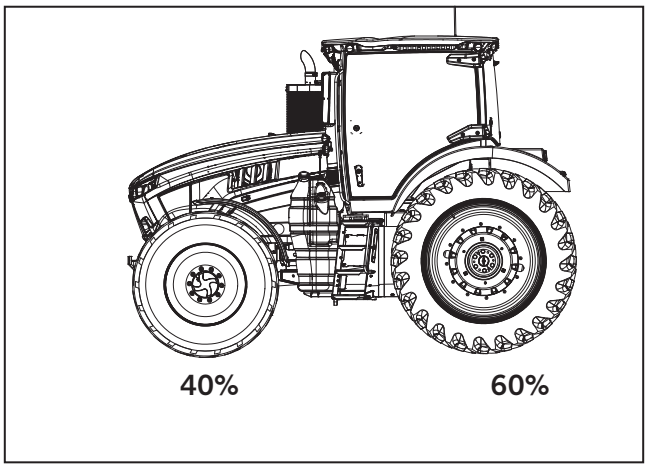
## Adapting Ballast to Work Load and Ground Speed

Do not use more ballast than needed. Remove excess ballast when it is not required.

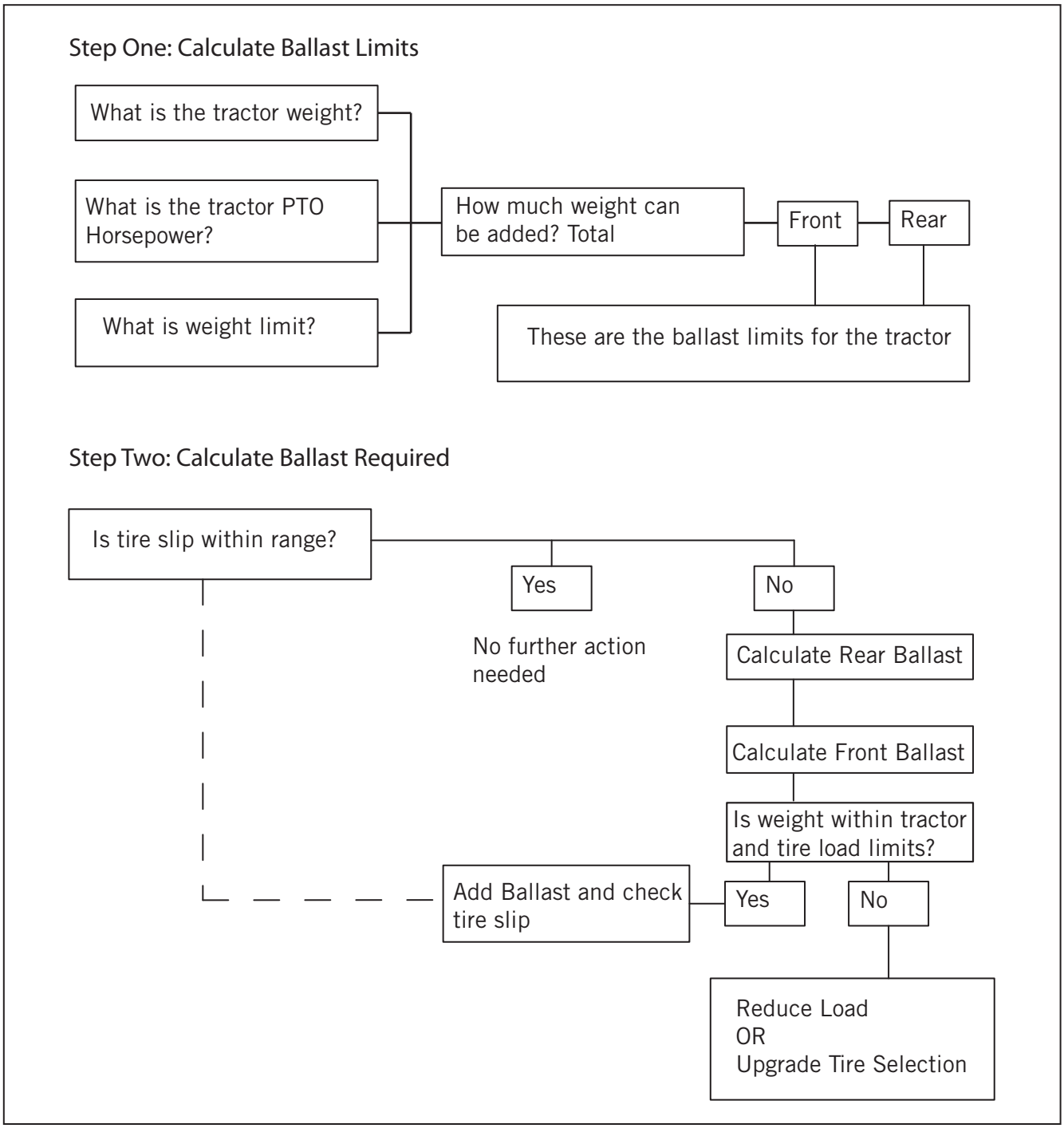
Do not add excessive weight to the tractor to pull heavy loads. Reduce the load because pulling a lighter load at a higher ground speed is more efficient and easier on the tractor.

The recommendations in this manual are based on a 8 to 10 kph (5 to 6 mph) ground speed.

***NOTE: Avoid operating in a gear that results in laboring the engine at ground speeds below 8 kph (5 mph). Keep the engine in the operating power rpm range. Reduce the load as required to achieve recommended ground speeds.***



## Ballasting Decisions




Use this chart as a guide and follow the instructions that are provided in this section of the manual to determine how much ballast to use.

***NOTE: For every adjustment in weight and load there is a change in bias and traction of the tractor. Ballasting is about finding the best compromise to maintain peak performance and efficiency.***

***NOTE: Do not over ballast or under ballast the tractor. Try to keep the tractor set up close to what works for the most common conditions and applications. Ballasting is always a compromise of choices and results.***

## Checking Wheel Slippage

A good way to monitor ballasting requirements is to check the drive wheel slippage. Keep slippage to 8 - 15% under normal field conditions.

More weight may be required if the drive wheels slip excessively. However, remember that excessive load and/or poor traction conditions will also cause excessive wheel slip.

Always check slippage several times and average the results wheel slippage will vary as field conditions change. Remove weight if slippage is less than 8%.

## Automatic Wheel Slip Monitor

Slippage is measured automatically when the optional ground tracking radar is installed.

## Manual Wheel Slip Measurement

Wheel slippage can also be measured manually.

1. Move the tractor and the equipment to the field where the work will be done. Disconnect the equipment and drive the tractor forward for 30 m (100 ft). Mark one rear tire on the sidewall where the tire meets the ground and place a stake in the ground as the start point for the test.
2. Drive the tractor forward until the tire completes 10 full revolutions and place a stake at this location to mark the end point of the test run.
3. Drive the tractor back and attach the equipment.
4. Engage the equipment to working depth and drive forward to the start point. Re-mark the sidewall at the stake location then proceed.
5. Drive back over the course again at working speed, with implement fully engaged. Count tire revolutions between the same two marks. This is N2.
6. Adjust the ballast or load for correct wheel slip.

**Table 3-32: Wheel Slippage Chart**

| Wheel Revolutions from Step 5 | Approximate % Slip | Result |
|---|---|---|
| Less Than 10 - 3/4 | Too low | Remove Ballast |
| 10 - 3/4 | 8 | Proper Ballast |
| 11 | 10 | |
| 11 - 1/2 | 15 | |
| More Than 11 - 1/2 | Too High | Add Ballast |

(N2/10) X 100% = Wheel Slip

**NOTICE**

Do not exceed the tractor gross vehicle weight (GVW) shown below. This can cause an overload condition that may void the warranty and may exceed the load rating of the tires and ROPS structure.

## Ballast Limitations

Ballast is limited by the tire capacity or tractor capacity. Do not exceed the recommended carrying capacity. If a greater amount of weight is needed for traction, use either a larger single tire or duals.

Ballast can be added by bolting on cast iron weight or by adding liquid calcium chloride in the tires. Bolt-on cast iron weight is recommended because it can easily be removed when not needed.

***IMPORTANT:****The GVW is:*

- For M8-181 and M8-201 = 10929 kg (24094 lb)

***IMPORTANT:****Do not exceed tire load limits. Refer to the tire load charts in Section 5: Lubrication and Maintenance or refer to the manufacturer's specifications.*

## Estimating Ballast Requirements

It is possible to estimate the tractor's operating weight and to calculate the amount of front and rear ballast required. These calculations are general starting points.

Contact a KUBOTA dealer or local tire distributor for more information.

## Points to Remember

Operate the tractor in a weight range of 54 to 64 kg (120 to 140 lb) per PTO horsepower to efficiently develop drawbar horsepower.

Ballast tractors with MFWD to achieve 60% rear and 40% front weight distribution with towed high draft implements and 3-pt hitch mounted implement.

***NOTE: All weights provided from KUBOTA are approximations and the calculations described provide results that are within an acceptable margin of error.***

***These results can be used to establish a baseline for further adjustment.***

**Table 3-33: Typical Shipping Weights Without Cast Ballast for KUBOTA M8-181 and M8-201 Tractors**

| Model | Total Weight | Rear | Front |
|---|---|---|---|
| M8-181 and M8-201 | 10 890 kg (23 950 lb) | 6 316 kg (13 891 lb) | 4574 kg (10 059 lb) |
| ***NOTE: Includes weight of fuel with tanks filled (approximately 318 kg (700 lb)).*** | | | |

| **Example 1** | | | | |
|---|---|---|---|---|
| M8-181 and M8-201, 200 PTO hp - Desired 60%/40% weight split | | | | |
| | | **Total Maximum** | **Rear 60%** | **Front 40%** |
| 208 PTO hp x | 60 kg (130 lb.) per hp = | 12480 kg (27513 lb) | 7488 kg (16508 lb) | 4992 kg (11005 lb) |
| | | | | |
| Shipping weight in kg (lb) | | 10890 kg (23 950 lb) | 6534 kg (14404 lb) | 4356 kg (9603 lb) |
| | | | | |
| Weight to be added in kg (lb) | | 1590 kg (3 505 lb) | 945 kg (2083 lb) | 636 kg (1402 lb) |
| ***NOTE: All weights are approximations.*** | | | | |
| The rear weight needed can be accomplished by adding a set of duals and hubs which weigh approximately 600 kg (1320 lb) plus two 539 kg (1188 lb) weights to the rear wheels. And also 10 x 39 kg (86 lb) weights. | | | | |
| | | | | |
| The front weight can be added by using 20 of the 30 kg (66 lb) plates = 630 kg (1388 lb) | | | | |

## Weighing the Tractor

The most accurate way to determine the weight of the tractor is to have it weighed using suitable scales or equipment.

Obtain the front and rear wheel loads and use those figures in the calculations as actual weights.

Commercial truck scales or loading facilities may offer access to their scales for a fee.

There are also portable load cells that may be purchased or leased and may be used by some equipment service providers in your area.

When weighing the tractor, the preferred method is to obtain the total weight on both front and rear axles.

If dual wheels are used, place blocks to drive the inner tires onto. This removes the load from the other tires.

There may be a record of bill of lading with the delivery weight if the tractor was delivered by truck to the KUBOTA dealer.The charts earlier in this section give the load carrying capacity per tire.

## Calculating Tire and Axle Loads

***NOTE: Include the weight of fully raised three-point hitch implements when calculating rear axle load when operating at road speeds for an extended period.***

**NOTICE**

Do not overload tires. Reduce the load, install higher rated ply tires or reduce road speed if maximum tractor weight exceeds the load rating of the tire as listed in the tire chart.

***NOTE: Example Calculation for Tire Load:***

Starting with a Model M8-201 with rear axle weights and dual wheels.

- Rear axle shipping weight = 6 316 kg (13 891 lb)
- Plus rear axle weights 539 kg (1 188 lb)
- Plus dual wheels 600 kg (1 320 lb)
- Plus 3-pt hitch load 2 727 kg (6 000 lb)
- Total rear axle load without additional ballast = 10 051 kg (22 158 lb)
- Total rear axle load supported by 4 tires = 10 495 kg (23 137 lb)
- Therefore, load supported by each rear tire with 3-pt hitch fully raised = 2 512 kg (5 538 lb).

## Rear Tire Weighting

***NOTE: Install cast iron weight first. Use liquid ballast only as required.***

**CAUTION**

Installing liquid ballast requires special equipment and training. Have liquid ballast added by a KUBOTA dealer or a qualified tire specialist.

**NOTICE**

With radial tires never fill past the 40% to 50% range. Reduced air volume limits the ability of the tire to carry loads and shocks resulting in tire damage if this rule is exceeded. Bias ply tires can be filled to 75%. Contact a KUBOTA dealer.

***NOTE: Do not use any other liquids than a calcium chloride and water solution to ballast tires. Other types of liquids pose hazards and may damage the tires. Do not use alcohol or ethylene glycol.***

The following chart shows how much ballast can be held at 40% to 50% full.

***IMPORTANT:****Maximum recommended vehicle weight might be exceeded if tires are filled over 50%. Never fill radial tires past 50%.*

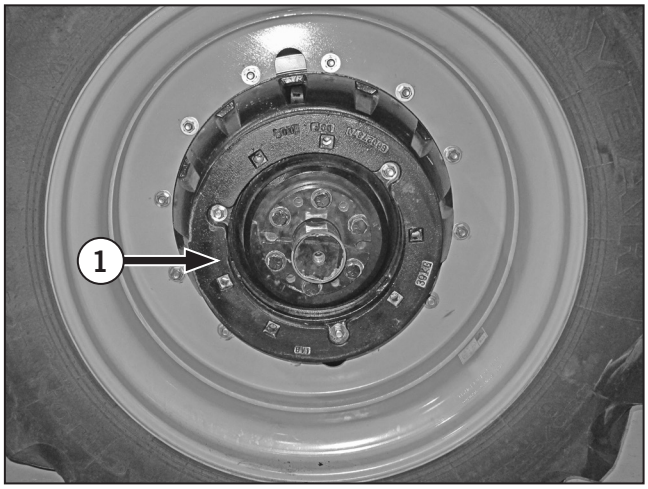
***NOTE: Sloshing may be felt and heard in liquid ballast tires. This is normal.***

***NOTE: Check manufacturing manual for tire ballast information.***

## Rear Wheel Cast Iron Weights

Cast iron weights (1) are available in 39 kg (86 lb) sets. These weights will be installed on the axles either inside or outside of the wheels.

The following table lists the maximum number and location of rear wheel weights:

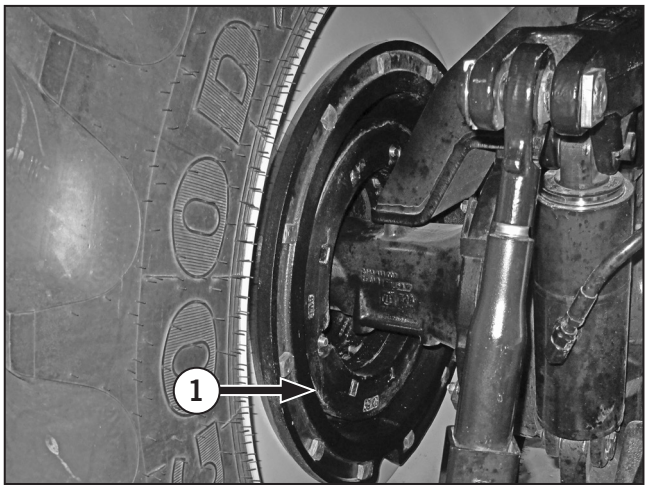



| Table 3-34: Maximum Rear Wheel Weights | | |
|---|---|---|
| Model | 240 kg (450 lb) Weight | |
| | Inside | Outside |
| M8-181 and M8-201 | 3 | 2 |

## Installing Cast Iron Rear Wheel Weights

**CAUTION**

Wheel weights are heavy and require appropriate lifting equipment or have the job done by a KUBOTA dealer.




The wheel must be removed to install weights (1) on the inside of a wheel. Refer to Rear Wheel Track Adjustment Section for wheel removal information.

Attach the first weight to the wheel disc and tighten the attaching bolts to 258 N·m (190 ft-lb).

***NOTE: Check the torque of all attaching bolts on each wheel after driving the tractor for 200 m (218.72 yd) after 1 hour and 10 hours operation and thereafter at the 50-hour service intervals.***

Tighten attaching bolts securely to 258 N·m (190 ft-lb). Retighten every two hours of service until bolt torque stabilizes. Check tightness every 250 hours thereafter.

Check to make sure the weights are centered. Excessive runout can cause an unbalanced condition when operating at high speed.

## Ballasting Front End for Transport

**CAUTION**

Additional front ballast may be needed when transporting large 3-pt hitch mounted equipment.

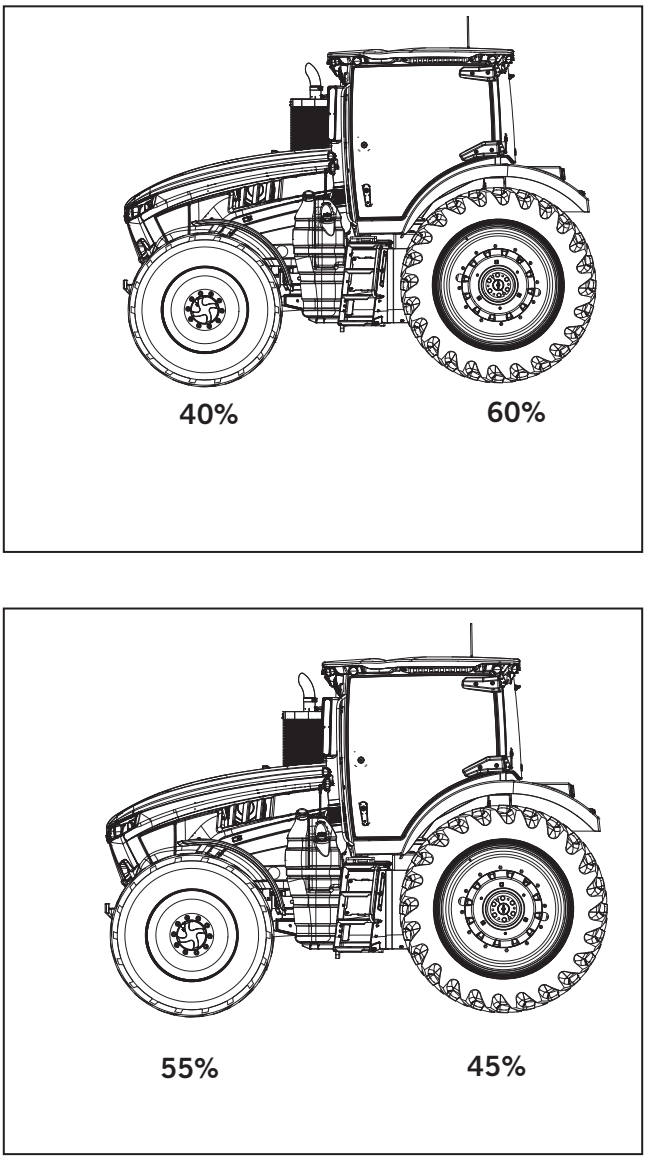
The 40% to 60% front-to-rear split is a baseline for proper traction and control under field conditions.

When pulling an implement on the road for transport the vehicle speeds will be higher than in field operations. With higher speed there is less need for rear ballast and the front drive will not be engaged.

Implements that place downward force on the hitch when being transported require added front bias.

Additional front bias is necessary when 3-pt hitch attachments are raised for transport. Add front-end ballast when it is needed for stability and steering control.

The front weight bias can be increased to a maximum of 55% of the total weight, if the tractor and tire load ratings are not exceeded.




**NOTICE**

Do not exceed axle weight rating.

**DANGER**

Never allow the tractor to operate with the front wheels off the ground.

Tractor front-end ballast may not always maintain satisfactory stability if the tractor is operated at high speed on rough or hilly terrain. Reduce speed and exercise caution under these conditions.

## Determining Maximum Front Ballast

**NOTICE**

Do not overload front tires. Reduce ballast or install heavier tires if maximum weight shown in the tire chart is below ballasted weight.

Use adequate front weight as required for the operating condition. Make sure MFWD tractors have adequate ballast to properly load front wheels. This is especially important when pulling heavy loads. Remove ballast when it is no longer needed.

The tire inflation chart in Section 3 shows the load carrying capacity for the front tires.

***NOTE:***

- ***Do not exceed total tractor weight limit***
- ***Do not exceed front axle weight limit***
- ***Do not exceed tire load limit.***

## Front Weights – Cast Iron

Front weights are available as follows:

Cast steel plates weigh 30 kg (66 lb) each.

Weight kits are available as packages of 20 weights.

Weights are available from a KUBOTA dealer.

The following table lists the maximum recommended front weights by model number:

**Table 3-35: Maximum Number of Cast Iron Front-End Weights**

| Model | 20 X 30 kg (66 lb) Weights |
|---|---|
| M8-181 and M8-201 | 600 kg (1 320 lb) |

## Adjust for Type of Load

Determine the type of load the pulled equipment places on the hitch.

- High vertical loads on the tractor drawbar from trailers and towed tanks.
- Large vertical loads on the tractor at the 3-pt hitch from rollover plows and other large depth controlled implement.
  - Front axle bias may be adjusted to 55% (maximum) of the total tractor weight including the hitch load.
- Small vertical forces on the tractor drawbar from towed draft implements such as discs, cultivators, chisel plows, etc.
  - Front axle bias may be adjusted to 35% (minimum) of the total tractor weight including the hitch load.

## Installing Front Weights

**WARNING**

The tractor must not be operated unless both the tie bolts and attaching bolts are in position with the bolts tightened as specified. Recheck the bolt torques after one, eight and 50 hours of operation if the bolts have been disturbed for any reason.

**CAUTION**

Optional front weights are heavy. Use appropriate lifting equipment or have the job done by a KUBOTA dealer.

**NOTICE**

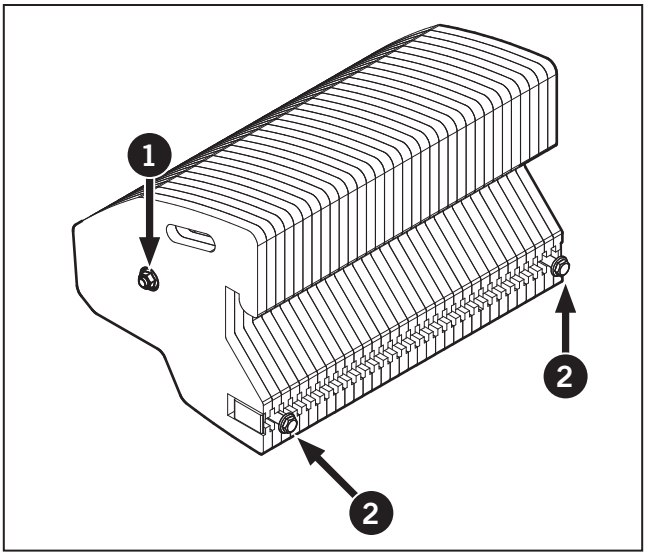
Retighten and check the torque of attaching hardware after each one hour of use until the first eight hours of use or until the torque is stable.

Observe the regular 50-hour service intervals.

Install the front weights on the weight bracket using a suitable lifting device.

To add or remove individual weights:

- Remove the flange nut from one end of the tie rod (1) and pull the rod out of the assembled weight pack.
- Loosen the mounting bolts (2) holding the bracket clamps.
- Add or remove individual weight plates as needed, then reinstall the tie rod and flange nuts. Make sure the weights are centered on the mounting bracket.
- Install the tie rod (1) so that the ends are even then install and tighten the flange nuts to 550 N·m (406 ft-lb) minimum.




- Tighten the mounting bolts (2) at the bracket clamps to 417 N·m (308 ft-lb) minimum.
- The complete weight assembly can be removed after both attaching bolts (2) are removed. Use a suitable lifting device to lift the assembly.

**NOTICE**

Total package weight is 600 kg (1 320 lb)

## Front Tires - Liquid Weight

**WARNING**

Improper use of liquid ballast can lead to unsafe operating conditions and mechanical damage to the tractor.

**CAUTION**

Installing liquid weight requires special equipment and training. Contact a KUBOTA dealer.

**NOTICE**

With radial tires never fill any tire up to more than 40% to 50%. More liquid ballast solution will leave too little air space to absorb shocks. Damage to the tire could occur. This occurs due to the lower inflation pressures that are used with radial tires. Bias ply tires can be filled to 75%.

**NOTICE**

If you are considering the use of liquid ballast, first check with the tire manufacturer to determine whether use of liquid ballast is either approved or recommended. Always follow the manufacturer's recommendations.

**Table 3-36: Liquid Tire Ballast**

| Tire Size | Water L (gal) | $CaCl_2$ kg (lb) | Total Wt. kg (lb) |
|---|---|---|---|
| Front (380/80R38)_ Rear (380/90R54) | 77 (20) | 42 (93) | 121 (267 |
| Front (380/80R38)_ Rear (480/80R50) | 88 (23) | 50 (110) | 139 (307) |
| Front (380/80R38)_ Rear (520/85R46) | 127 (33) | 76 (167) | 200 (440) |
| Front (380/85R34)_ Rear (380/90R50) | 197 (52) | 118 (260 | 315 (694) |
| Front (380/85R34)_ Rear (480/80R46)_R1W | 242 (64) | 145 (320) | 387 (854) |
| Front (380/85R34)_Rear (480/80R46)_R1 | 63 (43) | 98 (215) | 261 (574) |

***NOTE: The above weights are based on 75% fill. Fill radial tires to no more than 40% to 50%. Calculate weight as required.***

A solution of water and calcium chloride provides economical ballast and, if used properly, it will not damage tires tubes or rims. Some tire manufacturers do not approve the use of liquid ballast.

If an operator of the tractor decides to use liquid ballast, be aware of the risks and limitations and follow the guidelines provided:

- The use of alcohol as liquid ballast is not recommended.
- Liquid ballast is difficult to add and to remove
- Liquid ballast results in poor tire performance
- Liquid ballast in tires increases ground compaction
- Improper use of liquid ballast can lead to over loading tires and tractor.

## Tires

Check the tire air pressure and recheck every 50 hours or weekly.

Inspect for damaged tread and side walls when checking tire pressure.

**WARNING**

Inflating or servicing tires can be dangerous. Use trained personnel to service or install tires whenever possible. Follow the safety precautions below to avoid the possibility of serious or fatal injury:

Tractor wheels are very heavy. Handle with care and make sure that they cannot topple and cause injury when stored.

Never attempt tire repairs on a public road or highway.

Ensure the jack is placed on a firm, level surface.

Make sure the jack has adequate capacity to lift your tractor.

Use jack stands or other suitable blocking to support the tractor while repairing tires.

Do not put any part of your body under the tractor or start the engine while the tractor is on the jack.

Never hit a tire or rim with a hammer.

Make sure the rim is clean and free of rust or damage. Do not weld, braze, otherwise repair or use a damaged rim.

Do not inflate a tire unless the rim is mounted on the tractor or is secured so that it will not move if the tire or rim should suddenly fail.

When fitting a new or repaired tire, use a clip-on valve adaptor with a remote gauge that allows the operator to stand clear of the tire while inflating it. Use a safety cage, if available.

Tire air pressure affects the amount of weight that a tire may carry. Locate the tire size for your tractor in the Tire Pressure and Permissible Loads tables in Section 3. Do not exceed the load for the pressures listed. Do not over or under inflate the tires.

- Do not inflate a steering tire above the manufacturer's maximum pressure shown on the tire or beyond the maximum shown in the Tire Pressure and Permissible Loads tables in Section 5 if the tire is not marked.
- Never inflate a traction tire (front tire on a four-wheel drive tractor or any rear tire) over 241 kpa (35 psi). Deflate the tire, relubricate the bead with a soap/water solution and reinflate if the bead does not seat on the rim by the time this pressure is reached,. Do not use oil or grease. Inflation beyond 241 kPa (35 psi) with unseated beads may break the bead or rim with explosive force sufficient to cause a serious injury.
- Adjust inflation pressure to the recommended operating pressure after seating the beads.
- Do not re-inflate a tire that has been run flat or seriously under inflated until it has been inspected for damage by a qualified person.
- Torque wheel hardware after driving the tractor for 200 m after one hour and 10 hours operation and thereafter at the 50-hour service intervals.

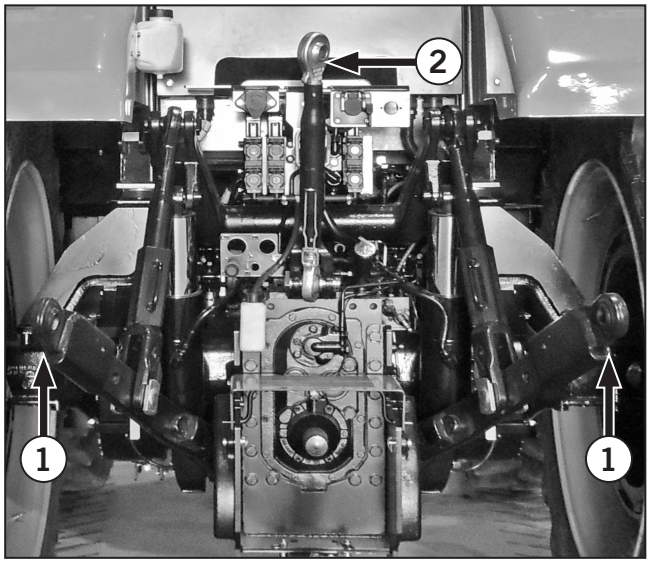
## 3-pt Hitch

**WARNING**

- Never stand directly behind the tractor, between the lower links or on or near the implement or 3-pt hitch.
- Never extend arms, legs, any part of the body or any object into the area near the linkage point of the implement while operating the external raise/lower control switch.

- Never have an assistant working the opposite set of controls. When moving to the opposite set of controls, move around the tractor or implement.

- Do not cross between the implement and tractor.




The 3-pt hitch (1) is classified as a Category 3 Implement attachment. It is an electro-hydraulic system that has an automatic position control feature to maintain implement depth as determined by the operator. The 3-pt hitch is designed to accept Category II, III, III-N and 4N implements.

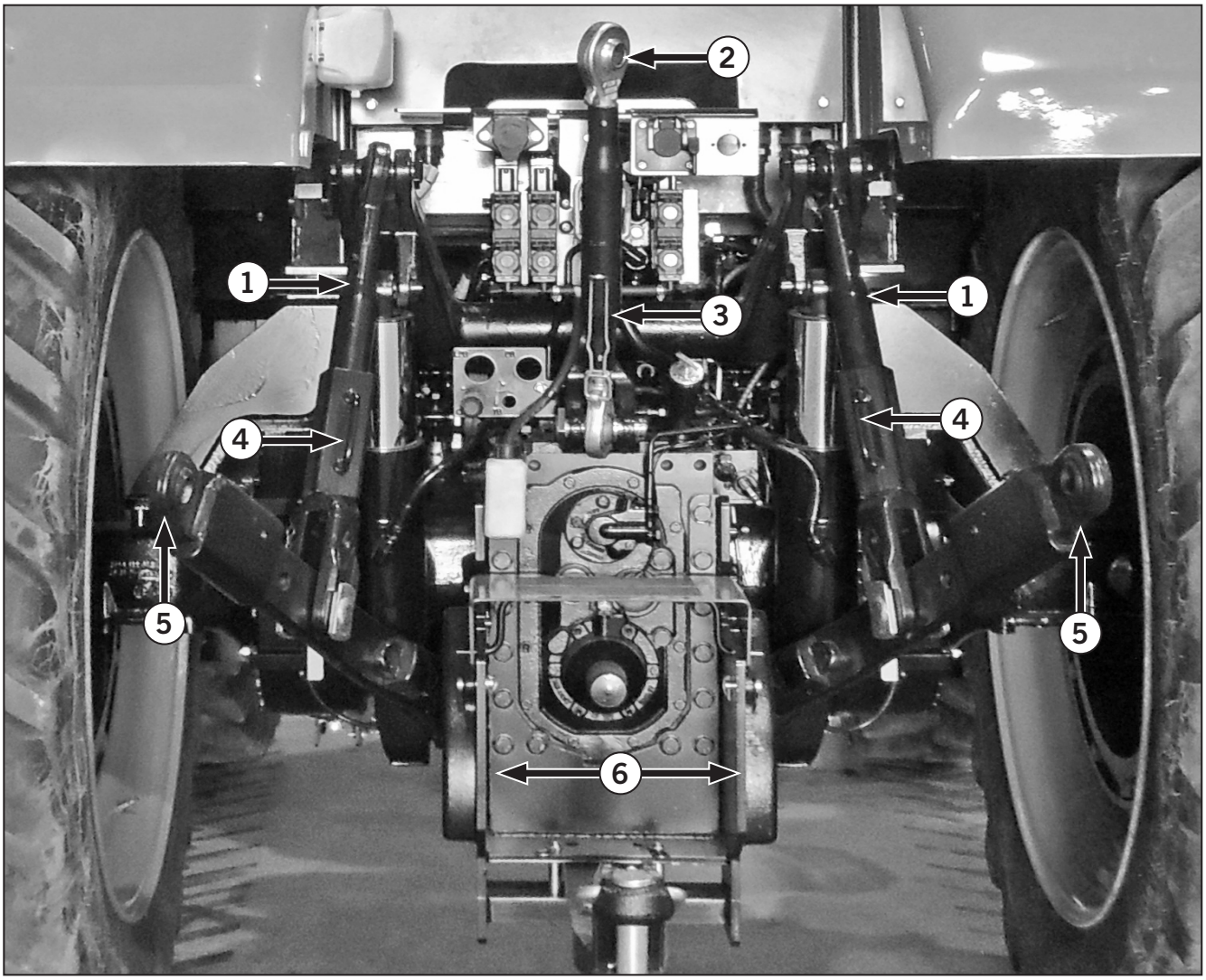
The 3-pt hitch consists of two lower links (1) to lift and lower the implement. The manually adjusted top link (2) is designated as a third mounting point.

The hitch is adjusted using the control panel on the operator console (see “3-pt Hitch Control System (Rear)” on page 3-131) or the external raise/lower switches (see “External raise/ lower switches” on page 3-139) located on the rear fender.

## 3-pt Hitch Overview

Use the diagram below to locate the parts of the 3-pt hitch that are mentioned throughout the instructions.

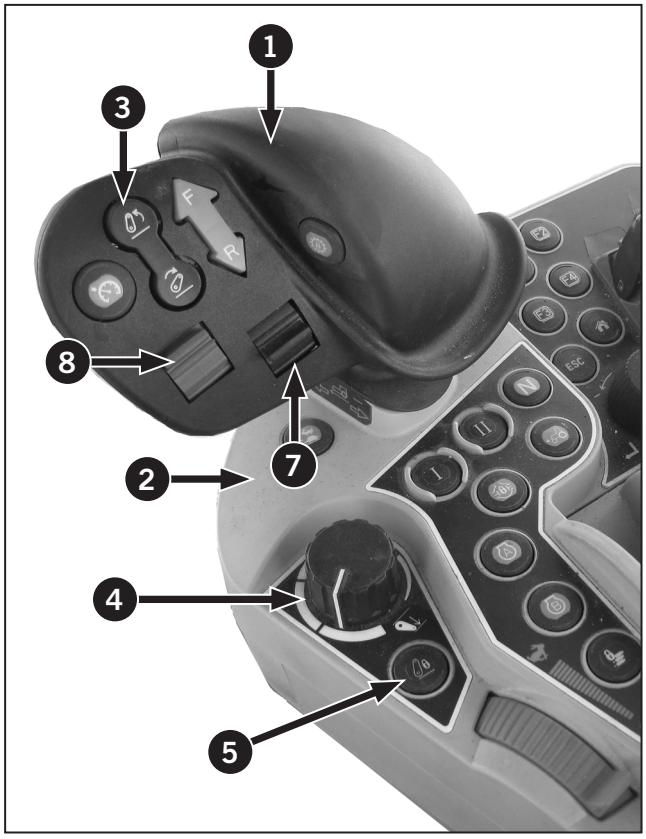
| Table 3-37: 3-pt Hitch Parts Overview | |
|---|---|
| 1 | Left and right lift rods |
| 2 | Top link |
| 3 | Top link transport hanger |
| 4 | Lift rod adjusting blocks |
| 5 | Lower links |
| 6 | Sway blocks |



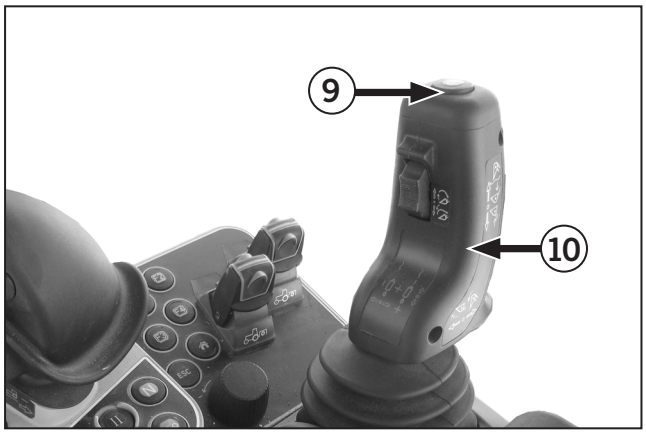
### 3-pt Hitch Control System (Rear)

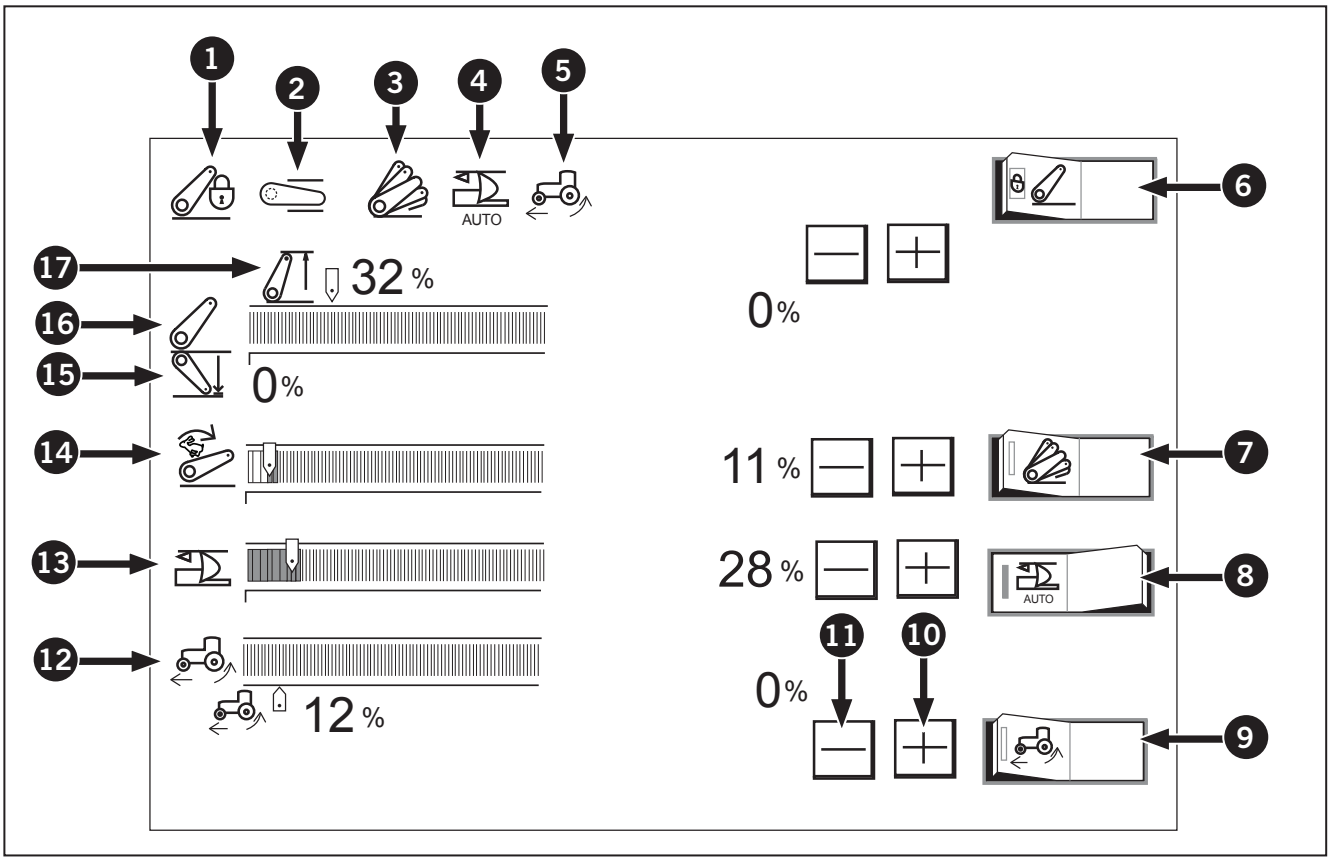
The 3-pt hitch controls is located on the EZ-Command Center (1) and Operator Console (2).

- Rear 3PTH Float mode: Press the fast lower button twice to enter float.
- 3-pt hitch raise/lower switch (3) (rear 3-pt hitch only)
- Depth control dial (hydraulic dial) (4)
- 3-pt hitch lock button (5)
- External Raise/ Lower Switches (6) (located on each rear fender) (rear 3-pt hitch only).
- The rear 3-pt will only drop or raise to the height set in the dials or on the monitor. The lower limit can only be set by the dial and the upper limit can only be set on the monitor.
- The speed at which the 3-pt will go down is controlled by the 3-pt speed dial or the 3-pt lower image with the rabbit in the monitor.
  - If front 3-pt is equipped there is a hydraulic couplers in the front for hydraulic operations. The front hydraulic valve/couplers are controlled by the #5 hydraulic lever (8), the #5 hydraulic lever is located on the MFH and is the blue lever. Hydraulic coupler is now #5 hydraulic lever which is on the loader joystick left and right. Left to extend and right to retract all the way to activate float.
  - If front 3-pt is equipped, the front 3PTH is lifted and lowered by pressing and holding the 4th function button (9) on the joystick (10) and pushing the joystick forward to lower and back to raise. The loader joystick must be unlocked and the loader mode selected to use the front 3PTH. Front 3PTH is in mechanical float. See “3-pt Hitch” on page 3-129
- Front 3PTH has no indicators on height or control to drop speed. It only has an up and down control.










### 3-pt Hitch Settings (Rear) Display Screen

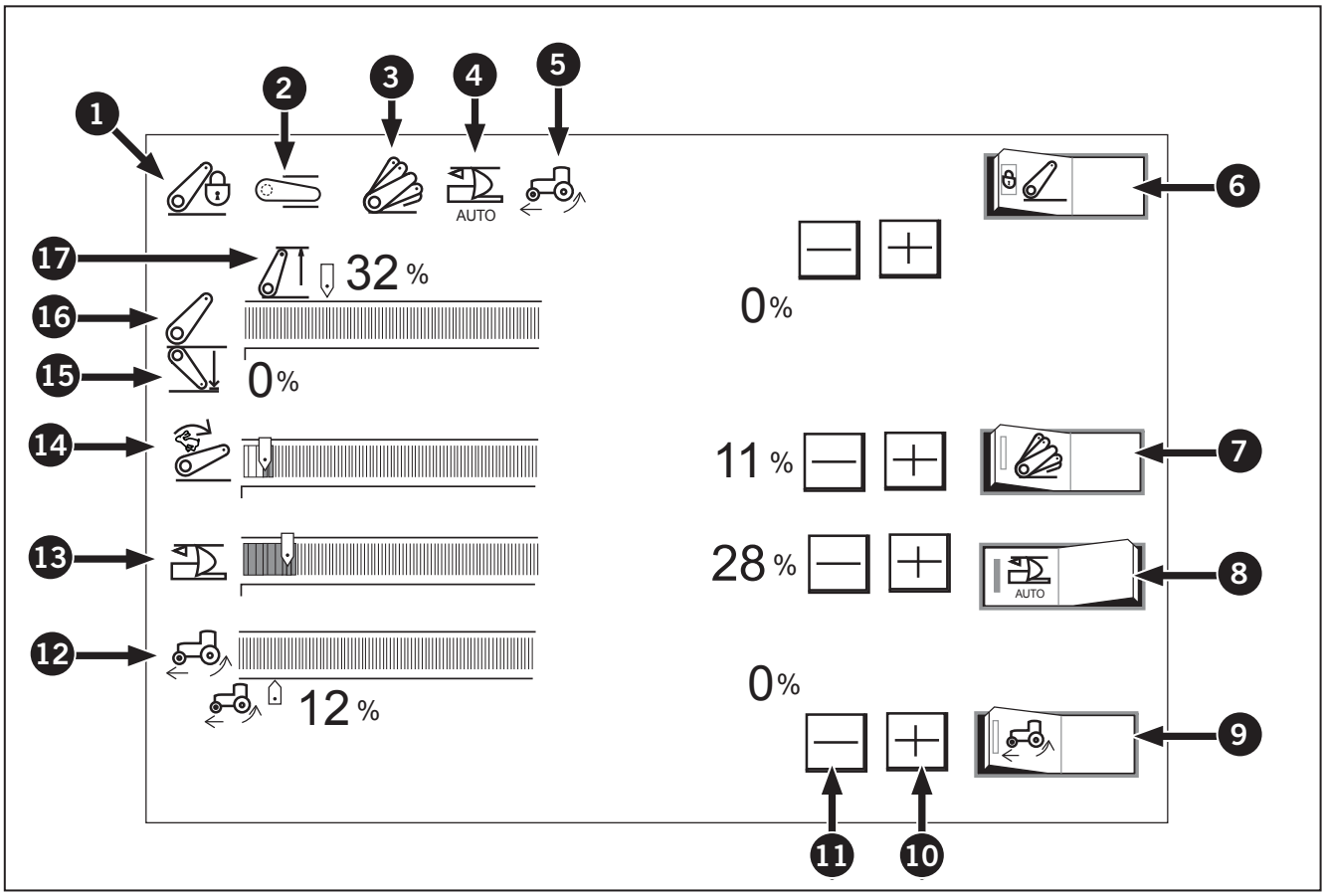
The menu below displays the 3-pt hitch settings with the optional radar installed and slip control enabled.

**Table 3-38: Overview of Steering Column and Pedals**

| Ref | Description |
|---|---|
| 1 | 3-point hitch lock indicator |
| 2 | 3-point hitch status indicator |
| 3 | Ride control indicator |
| 4 | Draft control indicator |
| 5 | Wheel slip control indicator |
| 6 | 3-point lock switch |
| 7 | Ride control switch |
| 8 | Draft control switch |
| 9 | Wheel slip control switch |

**Table 3-38: Overview of Steering Column and Pedals**

| Ref | Description |
|---|---|
| 10 | Positive switch |
| 11 | Minus switch |
| 12 | Wheel slip indicator and set point |
| 13 | Draft control setting |
| 14 | 3-point hitch drop speed control |
| 15 | Lift arm bottom limit set point |
| 16 | Lift arm current position |
| 17 | Lift arm top limit control |




### Switching between 3-point hitch lock and unlock

Touch the left half of the 3-point hitch lock switch (6) and the 3-point hitch gets locked. A touch on the right half unlocks the 3-point hitch. While it is locked, the indicator (1) lights up and stays on.

### Adjusting the lift arm top limit control (17)

Touch the (+) switch (10) or the (-) switch (11) on the right side of the lift arm top limit control (17) to readjust the top limit height.

Raise the percentage to increase the top limit. When it has reached 100%, the top limit setting is cancelled.

### Adjusting the lift arm bottom limit control (15)

Using the depth control dial (hydraulic dial), the bottom limit height can be readjusted.

Lower the percentage to decrease the bottom limit. When the draft control switch (8) is ON, the lower link lowering position varies according to the draft sensitivity control (13) setting value.

### Displaying the lift arm height (16)

The current lift arm position (height) is automatically displayed with the bar graph and percentage. A higher percentage shows a higher 3-point hitch height.

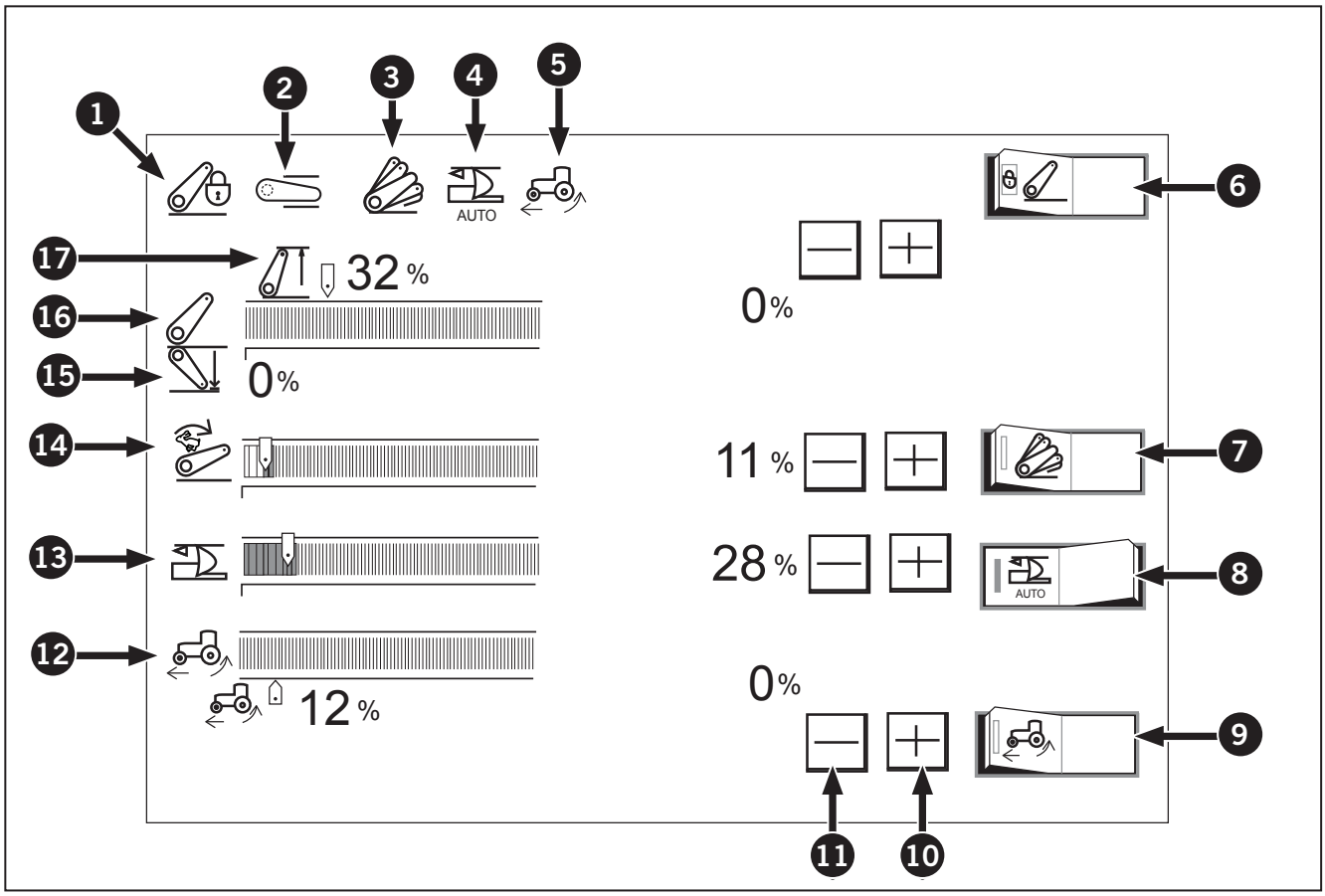
### Adjusting the 3-point hitch lowering speed control (14)

Extend the graph farther to the right (raise the percentage) to increase the lowering speed.

### Switching the automatic draft control

Touch the left half of the draft control switch (8) and the automatic draft control gets activated. A touch on the right half deactivates it.

If a “lowering” action is made with the depth control dial (hydraulic dial) or the 3-P. quick lower switch in the automatic draft control mode, the indicator (4) lights up and stays on.




### Adjusting the draft sensitivity control (13)

Extend the graph farther to the right (raise the percentage) to increase the draft sensitivity. Depending on the type of job, readjust the draft sensitivity. If the draft sensitivity is set at 0%, the position control works instead.

### Setting the ride control

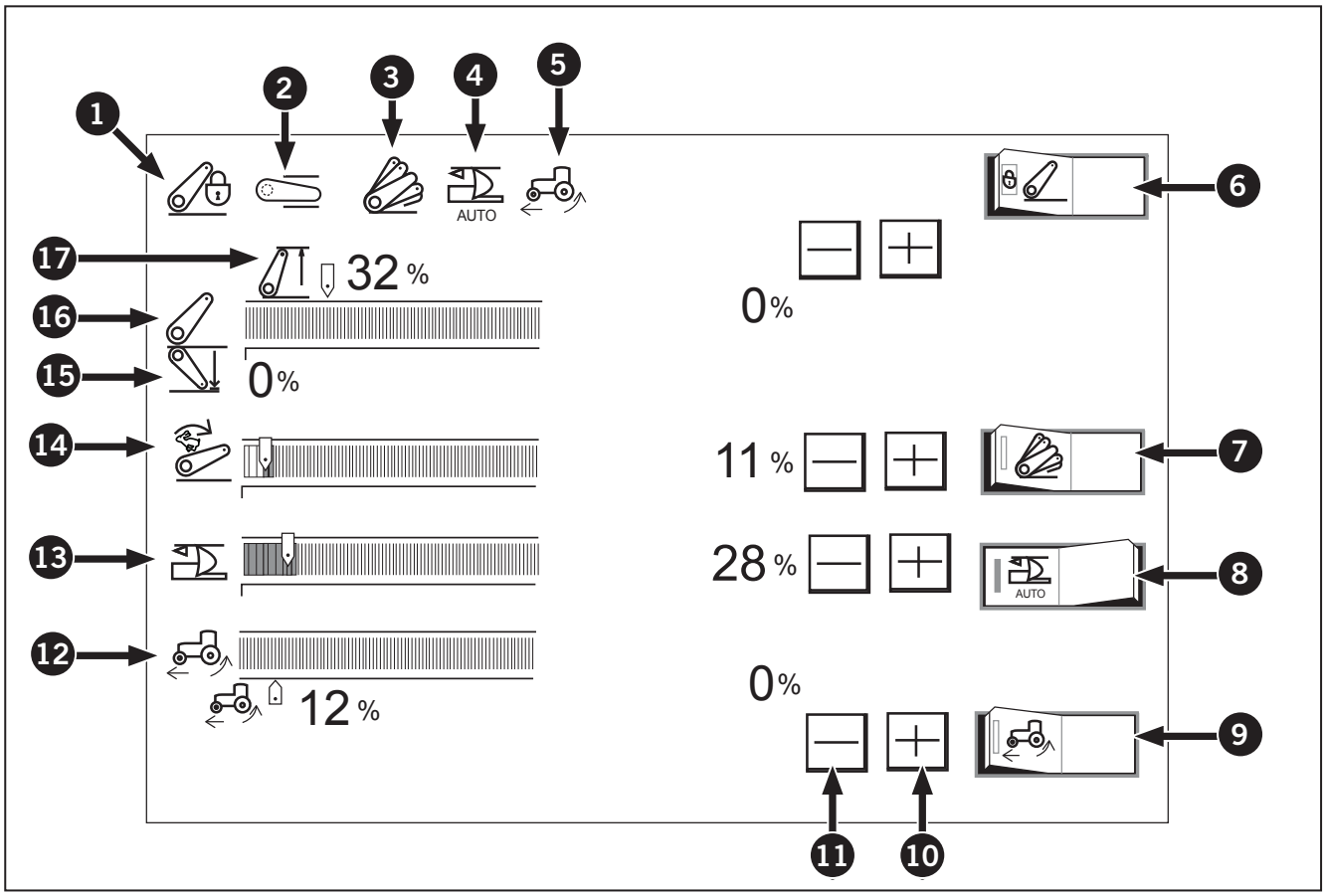
Touch the left half of the ride control switch (7) and the ride control gets activated. A touch on the right half deactivates it.

The ride control unit serves to absorb vibrations and shocks upon the tractor, when the machine is moved equipped with a 3-point-hitched implement.

(The ride control unit activates itself if the 3-P. quick raise switch is pressed to bring the rear hitch up to its top limit and the traveling speed rises above 6 km/h (3.7 mph).)

### Setting the wheel slip control (9)

Used together with the optional radar device, the tractor can be constantly kept under the best control. This helps to improve your productivity. (For details, contact your local Kubota Dealer.)




### 3-Point hitch status indicator (2)

The control status of the 3-point hitch is displayed all the time with the following indicators.

**Table 3-39: 3-pt hitch status indicators**

| Ref | Indicator | Description |
|---|---|---|
| 1 |  | Blocked (Neutral) |
| 2 |  | Float |

**Table 3-39: 3-pt hitch status indicators**

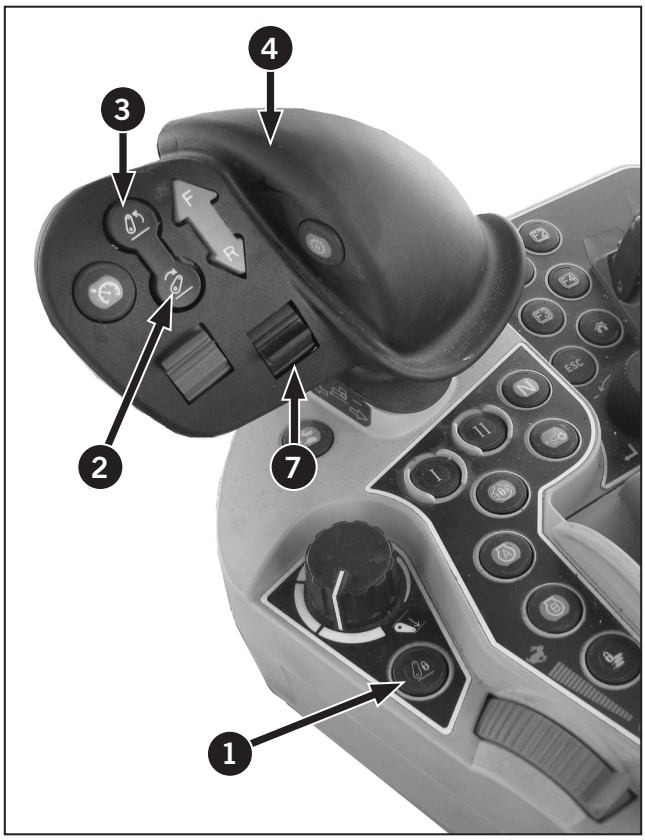
| Ref | Indicator | Description |
|---|---|---|
| 3 |  | Transport |
| 4 |  | Work |

## Calibrate 3PT Hitch

The 3PT hitch will be calibrated at the factory or KUBOTA dealership prior to delivery to the operator.

***NOTE: A calibration must be done if the position sensor is unplugged for longer than seconds.***

1. Press the 3PT hitch unlock button (1) on the operator console to unlock the 3PT hitch. Make sure the indicator icon in the display screens displays that the 3PT hitch is in the stop position .
2. Press and hold the 3PT hitch unlock button for 10 seconds or until it starts to flash.
3. Press the raise (2) or lower button (3) on the EZ-Command Center (4) to start the calibration. Wait until the calibration is complete.
4. If the calibration is successful the 3PT lock button will be illuminated indicating the 3PT hitch is locked. If the calibration is unsuccessful the 3PT hitch lock button will not be illuminated indicating the 3PT hitch is unlocked.



## Fender-mounted 3-pt Hitch Switches

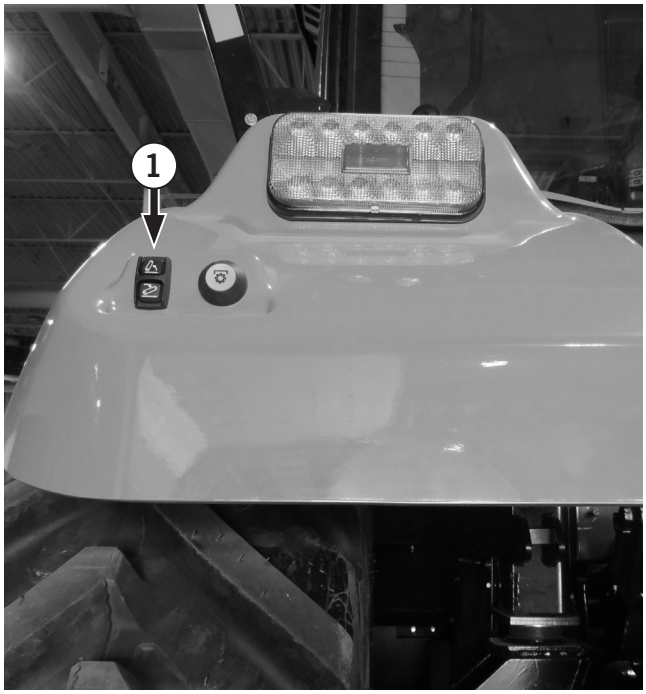
**DANGER**

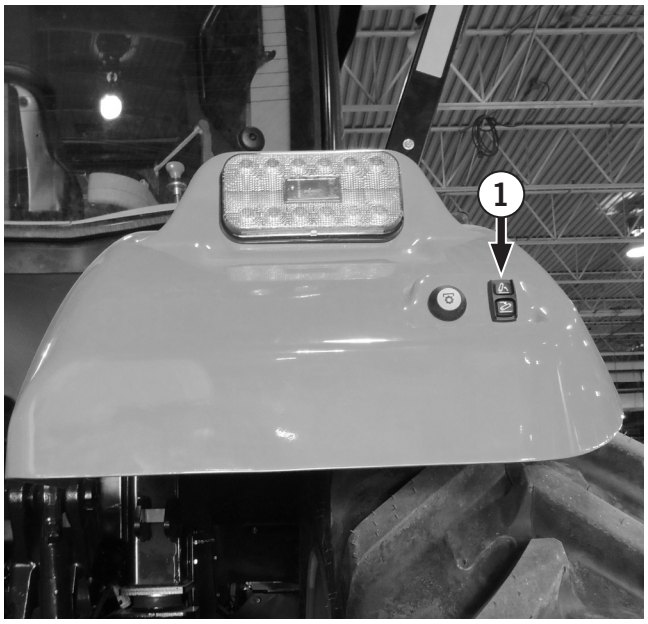
Do not stand on or near an implement or between an implement and the tractor.

The fender-mounted 3-pt hitch switches (1) are located on the rear fenders below the fender-mounted work lights.

The fender-mounted switches are used to raise and lower the 3-pt hitch.

Refer to External Raise/Lower Switch in Section 3: Tractor Operation for more detailed instructions on using the fender- mounted 3-pt hitch controls.



## Enable 3-pt Hitch

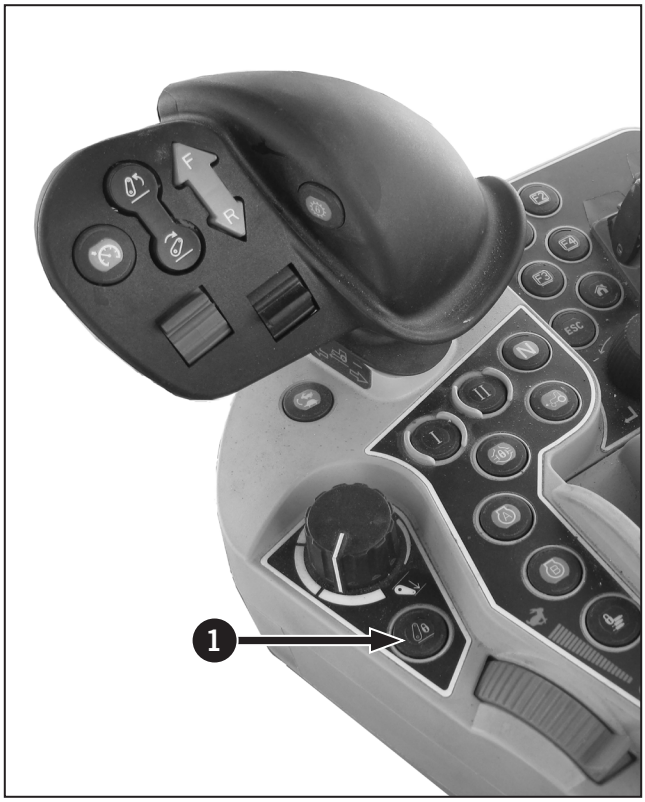
**WARNING**

- Never stand directly behind the tractor, between the lower links or on or near the implement or 3-pt hitch.
- Never extend arms, legs, any part of the body or any object into the area near the linkage point of the implement while operating the external raise/lower control switch.

- Never have an assistant working the opposite set of controls. When moving to the opposite set of controls, move around the tractor or implement.
- Do not cross between the implement and tractor.

The 3-pt hitch is locked in place until is it enabled using th EZ-Command Center. The 3-pt switch indicator will stay lit when it is enabled. While locked, the controls and the manual control lever will not function. If any buttons are pressed or the lever is moved, the display panel will flash an indicator.

- Press the 3-point hitch lock button (1) to unlock, thelock and unlock status switch and the switch indicator goes on while the lock status is on.
- Before traveling on public roads, be sure to get the 3-point hitch locked to avoid accidental drop of the implement.
- If traveling with the ride control on, unlock the 3-point hitch lock button.



## External raise/ lower switches

**WARNING**

- Never stand directly behind the tractor, between the lower links or on or near the implement or 3-pt hitch.
- Never extend arms, legs, any part of the body or any object into the area near the linkage point of the implement while operating the external raise/lower control switch.
- Never have an assistant working the opposite set of controls. When moving to the opposite set of controls, move around the tractor or implement.
- Do not cross between the implement and tractor.

**CAUTION**

Before leaving the tractor to operate the external raise/lower switch carry out the following procedures:

- Apply the parking brake.
- Shift the transmission into neutral.
- Disengage the PTO.
- Move the hand throttle lever to the low idle position (fully rearward).

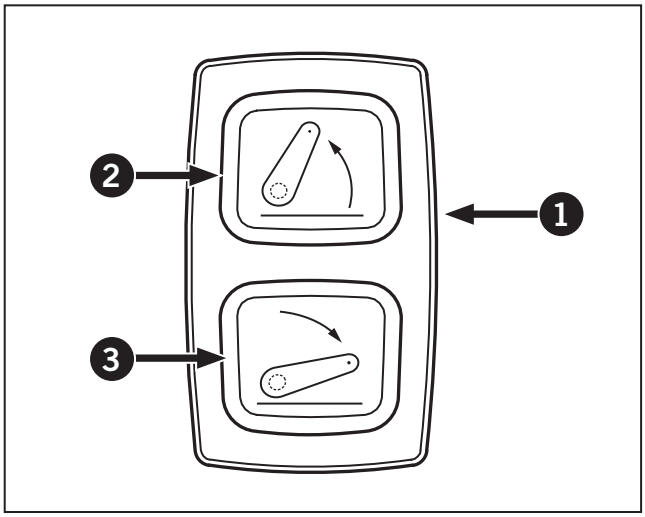
The external raise/ lower switches (1) are located on each rear fender. It can be used to manually raise and lower the hitch at a slow, controlled rate.

***NOTE: The external raise/ lower switches will not operate if the tractor is moving.***

Before using the external raise/lower switch, make sure no person or object is in the area of the 3-pt hitch or the implement.

- Push and hold the upper part (2) of the switch to raise the hitch. Release when the desired height is reached.
- Push and hold the lower part (3) of the switch to lower the hitch. Release when the desired height is reached.

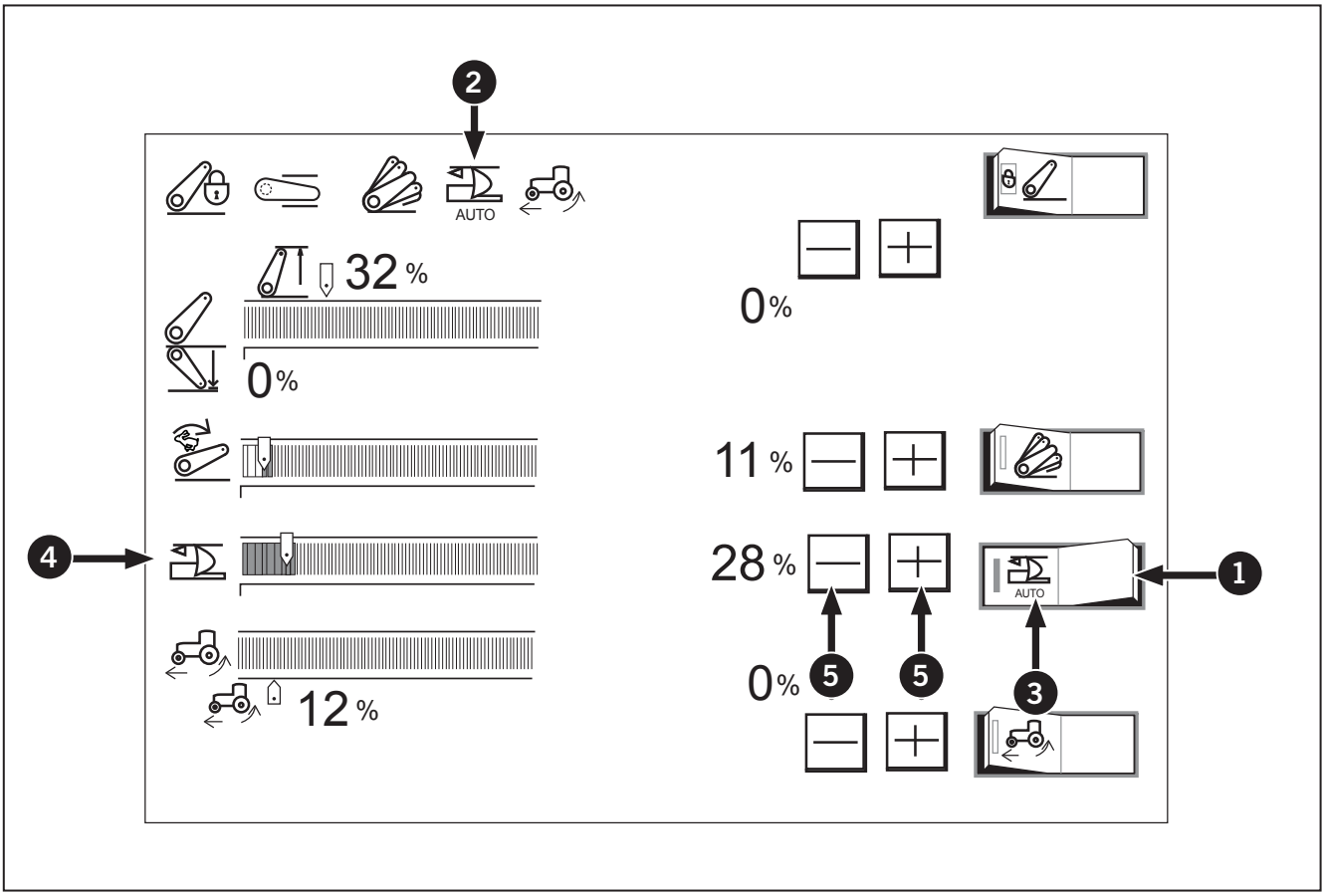
The lower links should align with the implement before attempting to attach the implement to the 3-pt hitch.



## Position/Mix Draft Mode Select

Select the position control or the draft control depending on the types of work. Choose the draft control for jobs requiring traction such as plowing and sub-soiling.

| Table 3-40: Position/Mix Draft Mode Select | |
|---|---|
| Position control mode in use | Touch the right half of the draft control switch (1) and the position control mode is selected and the draft control (2) indicator goes off. |
| Mix draft control mode in use | Touch the left half of the draft control switch (3) and the mix draft control mode is selected and the draft control indicator (4) lights up. Extend the draft sensitivity adjustment (5) graph farther to the right to increase the percentage of work done in draft control versus that in position control. |

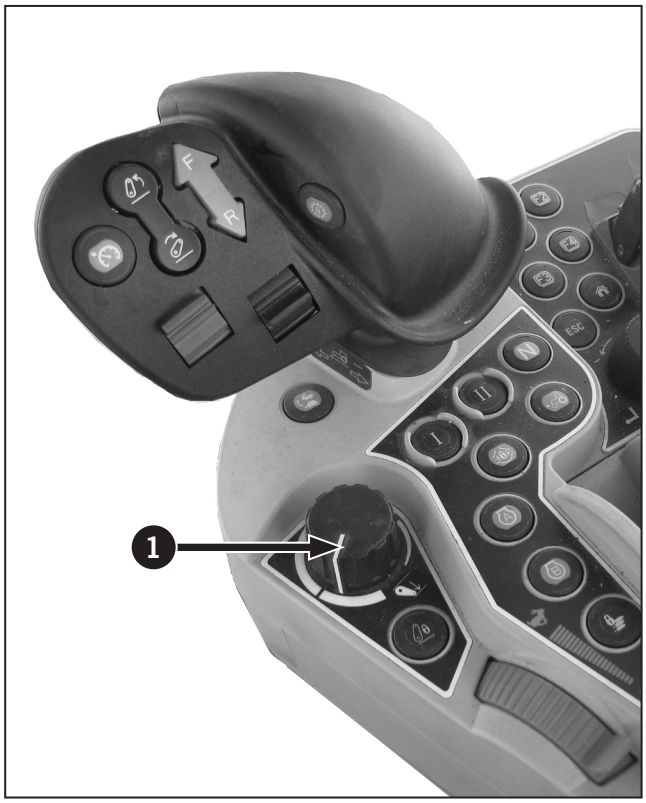


## Depth Control Dial (Hydraulic Dial)

1. The depth control dial (hydraulic dial) (1) is used to adjust the implement height (plowing depth).

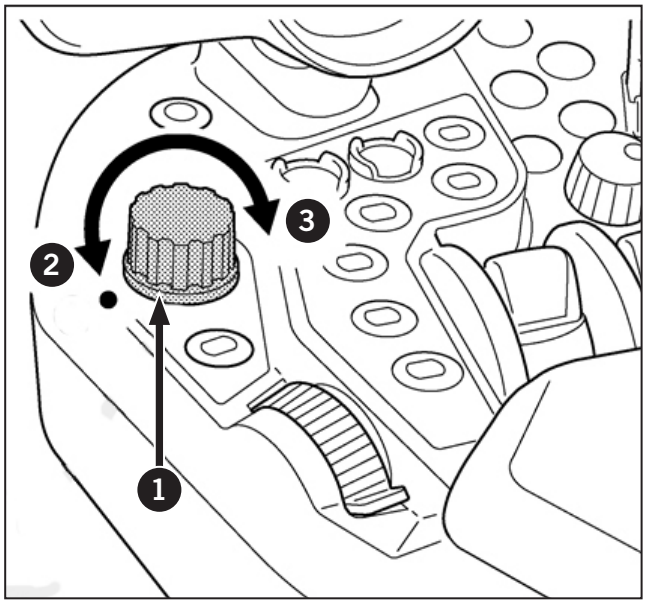
For details, refer to the descriptions of the following position, mix draft and flow controls.

2. For traveling on public roads, keep the implement raised with the depth control dial.
3. When the dial is preset for the implement to get to the lower limit, the 3-Pth. quick raise/lower switch can be used to raise and lower the implement.




## Position Control Mode

1. This will control the working depth of the 3-point hitch mounted implement regardless of the amount of pull required.
   - Down (2)
   - Up (3)



## Mix Draft Control Mode

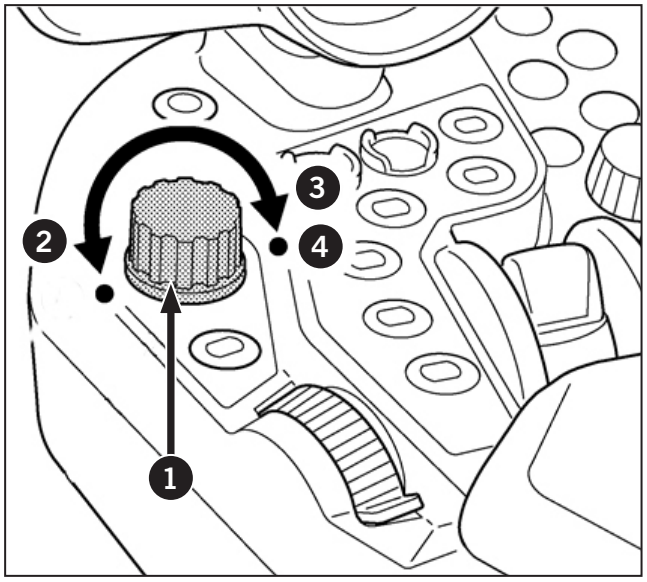
The mix draft control mode (1) will control the pull of the 3-point implement. As the load on the 3-point hitch changes due to various soil conditions, the draft control system automatically responds to these changes by either raising or lowering the implement slightly to maintain a constant pull.

Set the implement pull with the depth control dial (hydraulic dial).

1. For traveling on public roads, keep the implement raised with the dial.
2. When the dial is preset for the implement to get to the lower limit, the 3-P. quick raise/lower switch can be used to raise and lower the implement.


## Position Control Mode

1. This will control the working depth of the 3-point hitch mounted implement regardless of the amount of pull required.
   - Down (2)
   - Shallow (3)
   - Up (4)



### Draft sensitivity adjustment switch

During work in the draft mode, readjust the sensitivity with switch according to the plowing depth, the type of soil and other factors. Refer to Table 3-41.

**Table 3-41: Draft Sensitivity Adjustment Switch**

| Draft sensitivity adjustment switch | Retract the bar graph leftward with the (-) switch. | Extend the bar graph rightward with the (+) switch. |
|---|---|---|
| Plowing depth | Shallow | Deep |
| Type of soil | Light | Heavy |
| Field (ruggedness) | Little | Much |
| (Sensitivity) | (Low) | (High) |

### Float Control

Press the fast lower button on the MFH twice to enter float mode.

### Lift Arm Top Limit Adjustment

Set for work in which a 3-point hitch top limit is required.

- Using the (+) and (-) switches, the setting can be changed. (The setting is variable in the 30-100% range.) Slide the slider to the right (increasing the value) to raise the top limit of the 3-point hitch.
- When the setting has reached 100%, the top limit control is turned off.

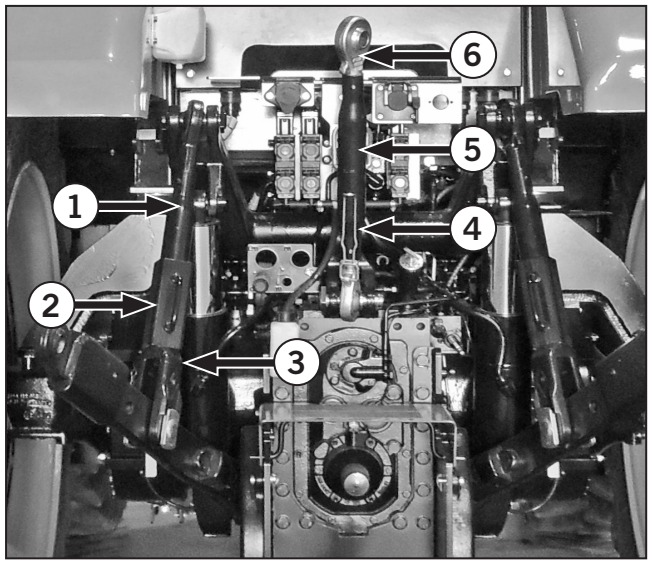
For the setting procedure, refer to “3-pt Hitch Settings (Rear) Display Screen” on page 3-132.

## Adjust Lift Rods

**WARNING**

Before the lift rod is disconnected from the lower link:

- Lower attached equipment to the ground and make sure it is properly supported
- Make sure the hydraulic control lever is fully down
- Stop the engine
- Remove the lift rod securing pin.




1. To adjust the lift rods (1), raise the adjusting block (2) and rotate it to lengthen or shorten the lift rod assembly.
2. Slide the adjusting block down to engage the locking boss (3) on the lift rod end to prevent rotation of the adjusting block.
3. For most implements, adjust both lift rods so the centers of the lower link balls are 254 mm (10 in) above the ground when the hitch is fully lowered.
4. Adjust the lift rods to level the equipment in the operating position.

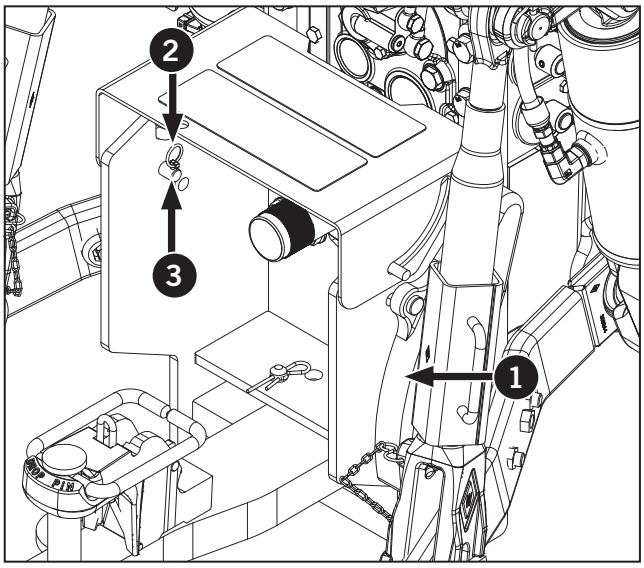
### Adjust Top Link

5. Raise the handle/locking latch (4) and then turn the sleeve (5) to adjust the top link (6).
6. Push the handle/locking latch down to engage the locking tab in the end of the top link assembly to prevent further rotation of the sleeve.
7. Adjust the top link to 724 mm (28.5 in) measured between the center of the attaching points for most equipment. Readjust to level the equipment as required.
8. Remove and store the top link or use the transport hanger to lock it in a vertical position when not in use.

## Sway Blocks

The sway blocks (1) control lower link side movement to prevent the equipment swaying from side to side in both the transporting and operating positions. This is especially important when operating on slopes near fences, walls or ditches.

The sway blocks can be mounted in a rigid or sway position.




## Rigid Position

To prevent side movement of the equipment in both the operating and transporting positions, rotate the sway blocks (1) to the forward position and use the pins (2) and the clips (3) to secure in the forward hole (rigid position).

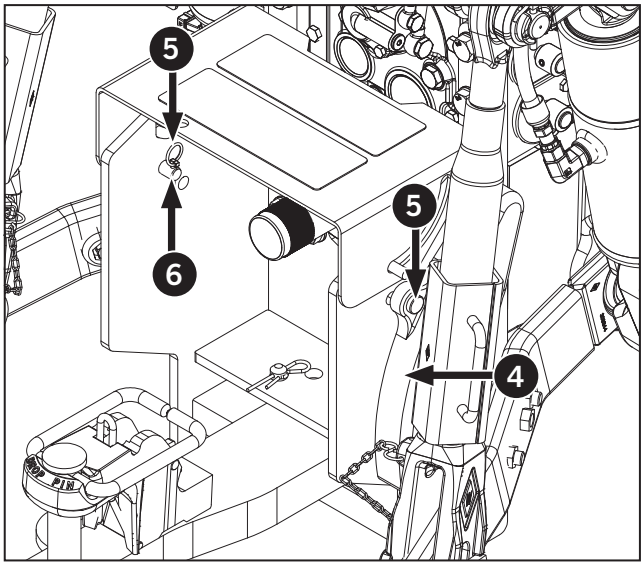
***NOTE: Install the pin with the clip on the inside of the drawbar support.***

## Swing Position

To allow side movement of the equipment in the operating position but remain rigid in the transporting position, rotate the sway blocks (4) rearward and secure them. Install pins (5) and clips (6) in the rear hole (swing position).

***NOTE: Install the pin with the clip on the inside of the drawbar support.***

***NOTE: When setting the sway blocks to permit side-to-side movement, make sure the rear tires cannot contact the sway blocks, lower links or implement.***

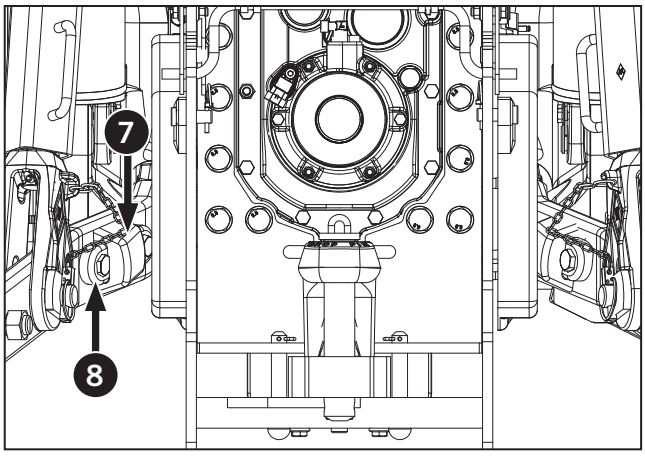



## Guide Blocks, Spacers and Shims

The guide blocks and spacers can be positioned so the 3-pt hitch will accept category II, category III or category III-N implements.

## Category II or Category III Position

Install the guide blocks (7) on the inside of the lower links. Add shims (8) if required.

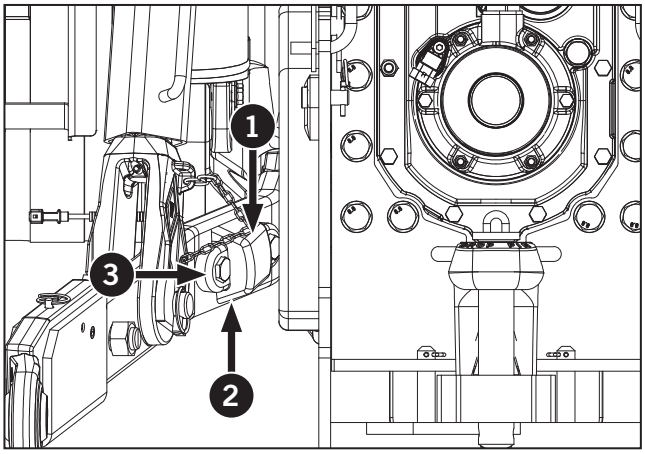


## Category III Position

Position the guide blocks (1) and spacer (2) on the inside of the lower links. Add shims (3) if required.

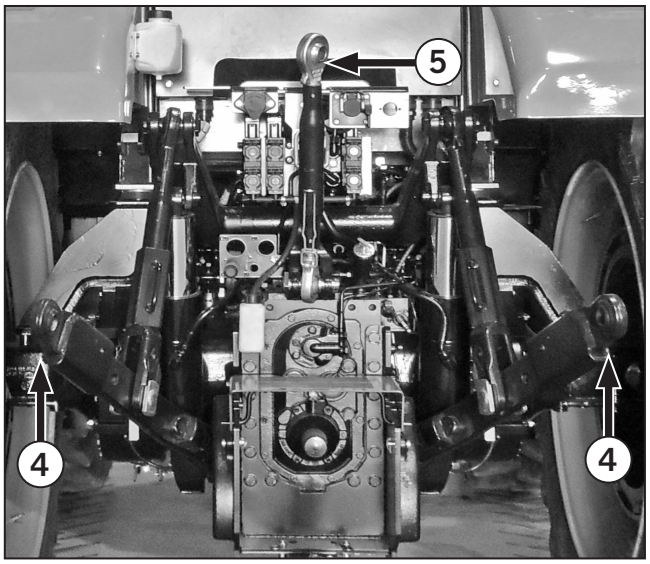
Shims are available to adjust the amount of lateral movement between the sway blocks and the lower links when the hitch is in the raised (transport) position or when the sway blocks are in the rigid position.

Make the adjustment with the sway blocks in the rigid position by placing an equal number of shims on each lower link. Install the shims so the linkage can be fully raised and lowered without binding with an implement attached.




## Linkage Category Conversion

Tractors are equipped with category III linkage. To convert from category III to category II, insert bushings into the top link and lower link implement connections. Reposition the guide blocks and spacers as described previously.

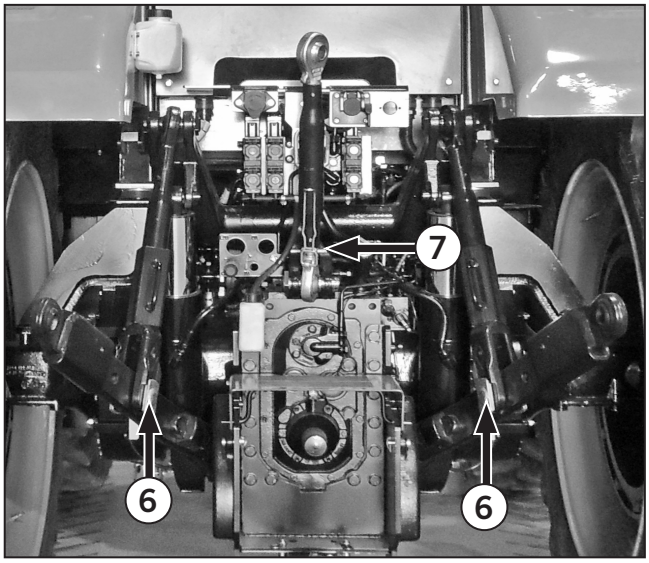



## Hook-end Hitch

The hook-end hitch has 2 lower links (4) and one adjustable top link (5). The 3 links have open claw ends to permit fast coupling and uncoupling of implements. The claws have self-locking latches to connect the implement securely to the tractor's hitch.

Stabilizers keep the 2 lower links at the width setting required for the implement.

Ball bushings are supplied with the tractor. Install these ball bushings on the implement's lower hitch pins (6) and upper hitch pin (7).



## Stabilizers

Stabilizers may be fitted in place of the sway blocks.

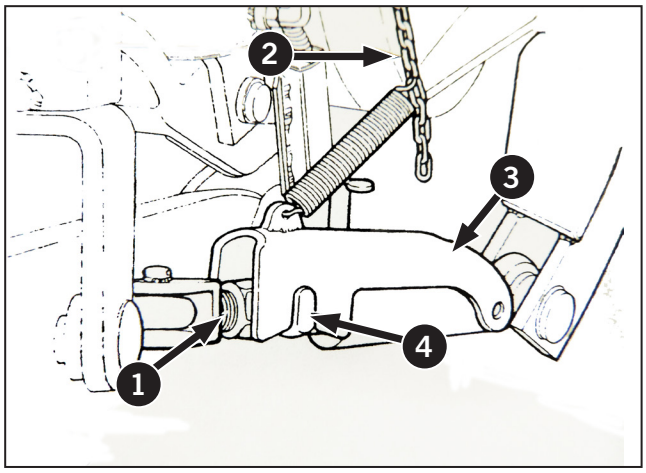
**WARNING**

Do not operate steerable equipment unless the stabilizers are installed and correctly adjusted to prevent excessive lateral movement.

The stabilizers will control the sway of the lower links and attached equipment when in work or when being transported. This is especially important when operating on slopes or near fences, walls or ditches and with certain implements.

An externally threaded rod (1) is attached to the lower links. The threaded rod engages with the screwed thread in the tube assembly. The overall length of the assembly is determined by screwing the rod in or out, as required.

An adjustable chain (2) is attached at one end of the rear cab and the other end via spring to a hinged cover (3). A lug (4) engages a notch in the cover.



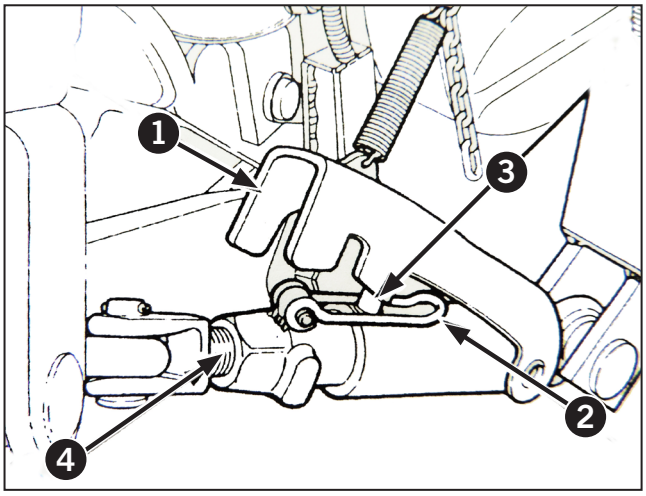

### Adjusting the Stabilizers

The implement should be attached to the 3-point linkage with the cover (1) on both stabilizers raised to allow the stabilizers to telescope freely.

Lift the locking/adjusting lever (2) over the peg (3) so that the lever is at a right angle to the stabilizer. Turn the lever to screw the threaded section (4) in and out of the stabilizer. When the length is statisfactory, align the notch in the cover with the lug on the stabilizer and lower the lever back down over the peg and close the cover.

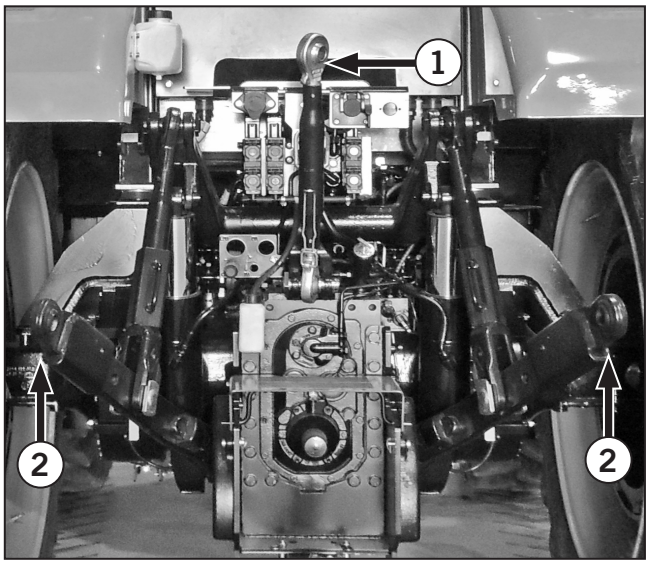
The chain should then be adjusted by placing the appropriate link over the attaching hook to lift the cover on the stabilizer when the implement is lowered into work.

***IMPORTANT:****When setting the stabilizer length to provide sway, make sure that there is no possibility of the rear tires fouling the stabilizers.*



## Implement Hook-up

1. Use the stabilizer or sway blocks to set the lower links of the 3-pt hitch the correct distance apart to align with the 2 lower ball bushings installed on the implement.
2. Drop the 3-pt hitch to the lowest position, make sure the self-locking latches are closed and raise the top link. Reverse the tractor until the lower link claw couplers (1) are under the implement hitch pins. The large claw openings and the guide cones on the implement ball bushings make it easy to align the tractor to the implement.
3. Use the hydraulic control to raise the 3-pt hitch and listen for the sound when the self-locking latches connect to the implement ball bushings.
4. Lower the top link claw (2) onto the upper implement ball bushing and press down until the latch connects.
5. Rotate the sleeve on the top link to adjust the length of the top link to the initial 724 mm (28.5 in) setting.
6. Remove or retract the implement supports.
7. Attach remote equipment as required.
8. Check these items before proceeding:
    - Make sure there is no interference with tractor components.
    - Drop the hitch to the lowest position and make sure the top link does not contact the PTO guard.
    - Use the lift control lever to carefully raise the 3-pt hitch and check for clearances with the implement in the raised position.
    - Perform a series of left and right hand turns to check the swing clearance with the tractor and implement combination.




**NOTICE**

- Make sure that the PTO driveline will not over-extend and disengage, bottom out or be at an excessive angle before operating PTO driven equipment.
- Make sure that the driveline shield does not contact the PTO guard or drawbar. See PTO Operation for more information.
- Make sure there is adequate clearance between the implement and the tractor when attaching mounted or semi-mounted equipment to the 3-pt hitch or when attaching trailed equipment to the drawbar or hitch.
- If the tractor is equipped with an UltraSteer front axle, adjust the steering stops, sway blocks or stabilizers to make sure that semi-mounted or trailed equipment will not interfere with the tractor's rear tires.

## Hydraulic Trailer Brake Coupling

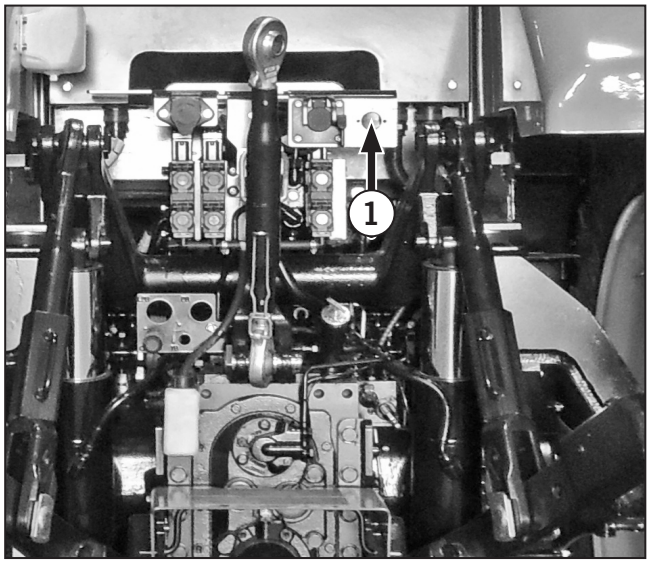
**WARNING**

Always lock the service brake pedals together before hitching a trailer with hydraulic brakes to the tractor. With the service brake pedals locked together apply the parking brake, stop the engine and immediately block the wheels.

When parking a tractor/trailer combination apply the tractor and trailer parking brakes with the engine running. Hydraulic pressure cannot be applied to the trailer braking system with the tractor engine off.

Connect hydraulic trailer brakes to the quick-release coupling (1) at the rear of the tractor. The coupling (1) conforms with ISO 5676. When the trailer brake hose is connected to the quick-release coupling the trailer brakes will be automatically applied when the service brakes are used to stop the tractor.

***NOTE: Always keep the dust-cap in place on the quick-release coupling for hydraulic trailer brakes when not in use. It is a legal requirement in some countries that the trailer brakes may only be connected to the tractor coupling by means of a compatible female coupling.***



## Towing Attachments and Drawbar Operation

**NOTICE**

Refer to the data plate of attachments, as well as the D-value (theoretical horizontal force between tractor and trailer) and permissible S-value (maximum vertical load) of the hitch coupling frame. If different, only the lowest value of each is allowed. See Figure 1 for a sample data plate.

**DANGER**

Drawbar height and length are fixed and must not be altered. Altering the height or length of the drawbar will change tractor characteristics and will result in death or serious injury to the operator and/or bystanders.

**DANGER**

Never allow the tractor to operate with the front wheels off the ground.

Tractor front-end ballast may not always maintain satisfactory stability if the tractor is operated at high speed on rough or hilly terrain. Reduce speed and exercise caution under these conditions.

Efficient drawbar operation is critical to optimum tractor performance. Drawbars are designed to produce maximum traction for the wheelbase, tire size, weight distribution and ballast of the tractor and are integral to overall tractor performance.

## Swinging Drawbar

**WARNING**

Always secure the drawbar to prevent swinging when transporting the tractor or when operating any equipment except ground engaging equipment.

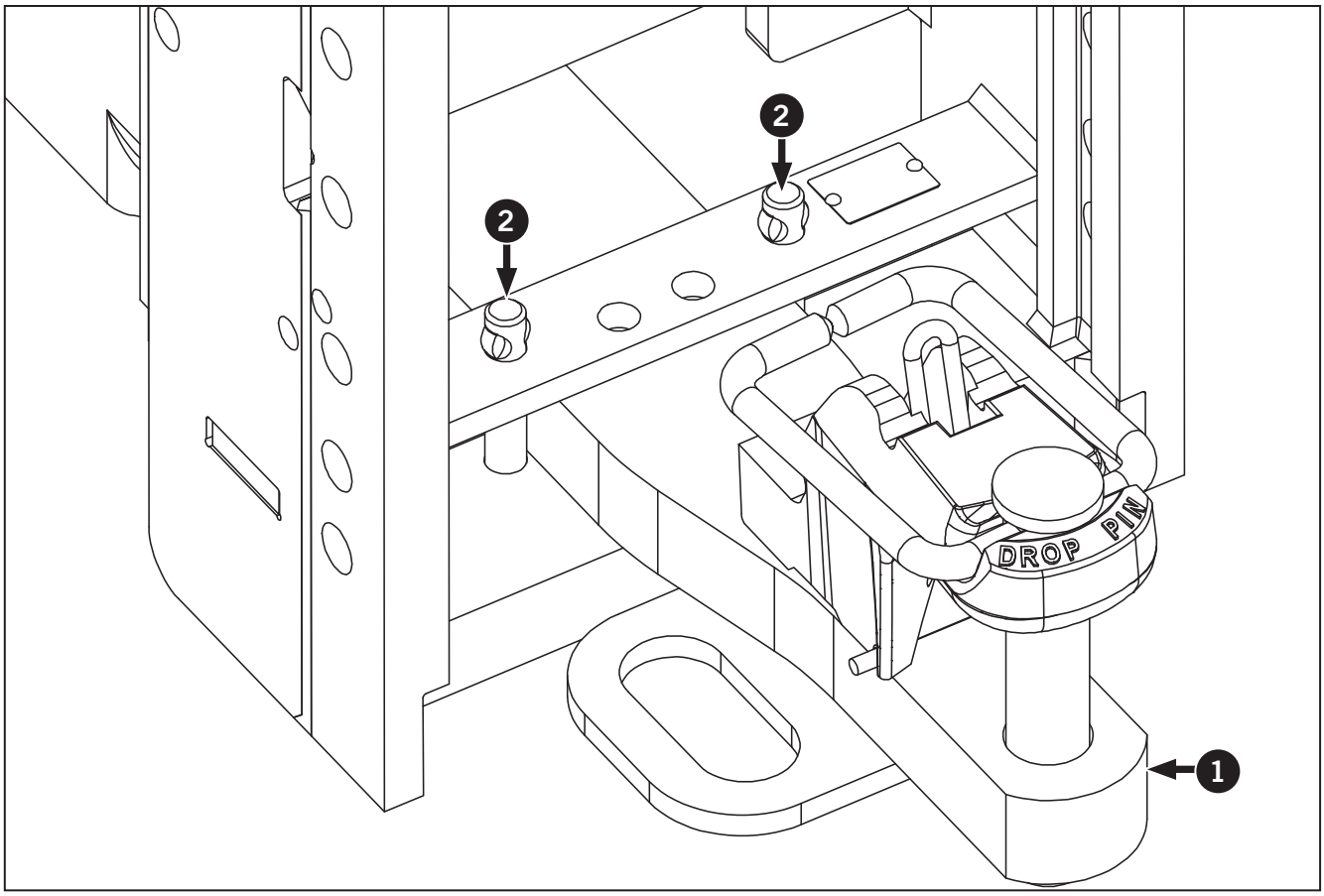
The swinging drawbar (1) is compatible with the coupling frame.

Two swing limiter pins (2) secure the drawbar in the fixed position.

Fasten the drawbar in position using the swing limiter pins when pulling equipment which requires accurate positioning and when transporting equipment.

Allow the drawbar to swing when pulling ground engaging equipment which does not require accurate positioning. This will make steering and turning easier.

See the following pages for details on adjusting the length and height of this drawbar and for attaching a trailer.



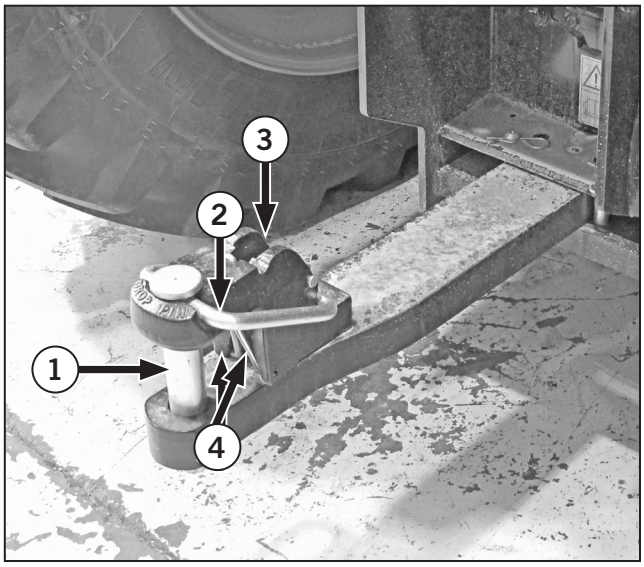
## Automatic Hitch Pin

**WARNING**

Never allow anyone to stand between the tractor and implement while backing the tractor to the implement. Always bring the tractor to a complete stop and engage the parking brake before allowing anyone behind the tractor to hitch the implement.

**WARNING**

Always secure the drawbar to prevent swinging when transporting equipment or when operating any equipment except ground engaging equipment.




The drawbar is equipped with a hitch pin that will automatically drop in place when hitching up to implements.

To operate:

Place the hitch pin (1) in the raised position.

Retaining ring (2) fits in the upper notch (3) of the clevis to hold the hitch pin in the raise position.

Release strap (4) must be positioned in front of the retaining ring as shown. The drawbar is now prepared to hitch to the implement.

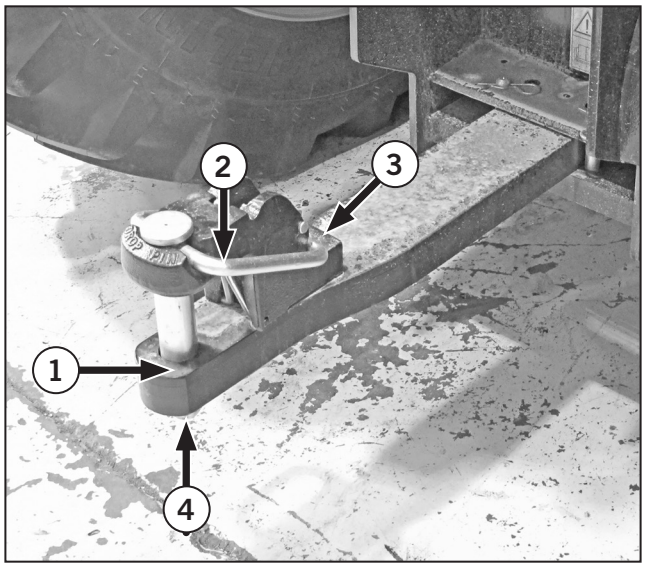
The implement hitch will contact the release strap (4) when aligning the drawbar when backing the tractor to attach the implement. As the release strap is pushed forward it dislodges the retaining ring (2).

The hitch pin (1) will drop as the retaining ring slides down the incline on the front of the clevis. The implement is now attached to the tractor without requiring the operator to leave the cab of the tractor or the help of a second operator.

The retaining ring (2) locks into the lower notch (3) of the clevis after the hitch pin (1) drops into place. Notch (3) holds the retaining ring in the lower position preventing the hitch pin from inadvertently unhitching.

To manually unhitch the implement:

1. Pivot the retaining ring (2) up away from notch (3).
2. Pull the hitch pin from the clevis.



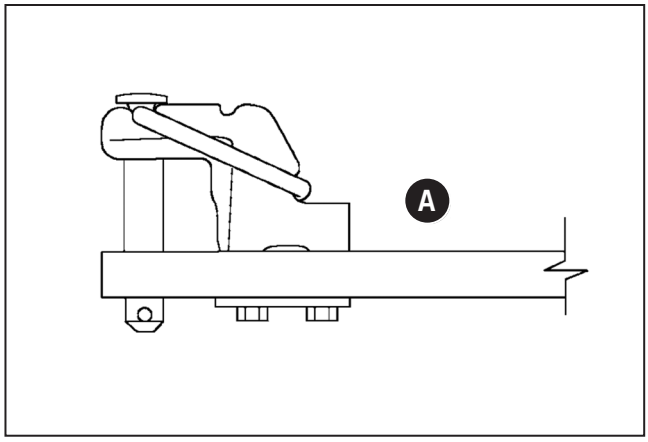

**NOTICE**

Always install a safety retaining pin in the hitch pin (4) to secure the hitch pin and prevent any accidental unhitching of the implement.

## Drawbar Length Adjustment

**Model M8-181 and M8-201(equipped with 2-speed PTO)**

This model has a straight drawbar (A). The drawbar is not height adjustable but has 3 length adjustments. Refer to the tables below.




### Drawbar Length

Three holes are provided at the front of the drawbar for adjusting length. The front locating pin may be inserted in any of the 3 holes to vary the PTO shaft to hitch point distance.

**NOTICE**

The clevis and hitch pin retainer must be moved to the top when the drawbar is inverted.

Always use the close-coupled position for equipment exerting high downward forces, such as 2-wheeled trailers, etc.

Use the PTO Type 1 for 540 rpm PTO equipment, the PTO Type 2 for 1 000 PTO operation with 21-spline 35 mm (1.375 in) shaft and the PTO Type 3 for 1 000 rpm operation with the 20-spline 45 mm (1.75 in) shaft.

***NOTE: Refer to "ANSI/ASABE AD6489-3:2004 JUL2017".***

**Table 3-42: Standard Duty Drawbar Length Adjustment**

| PTO Type | Distance from Hitch Point to PTO Shaft | | |
|---|---|---|---|
| | Short | Regular | Extended |
| 1 (540 rpm) | 240–260 mm (approx. 10 in) | 340–360 mm (approx. 14 in) | N/A |
| 2 (1 000 rpm) | 240–260 mm (approx. 10 in) | 390–410 mm (approx. 16 in) | N/A |
| 3 (1 000 rpm) | 340–360 mm (approx. 14 in) | 490–510 mm (approx. 20 in) | 640–660 mm (approx. 26 in) |

**Table 3-43: Heavy Duty Drawbar Length Adjustment**

| PTO Type | Distance from Hitch Point to PTO Shaft | |
|---|---|---|
| | Short | Regular |
| 1 (540 rpm) | 240–260 mm (approx. 10 in) | 340–360 mm (approx. 14 in) |
| 2 (1 000 rpm) | 240–260 mm (approx. 10 in) | 390–410 mm (approx. 16 in) |
| 3 (1 000 rpm) | 340–360 mm (approx. 14 in) | 490–510 mm (approx. 20 in) |

## Adjusting Drawbar Length

**WARNING**

Always secure the drawbar to prevent swinging when transporting equipment or when operating any equipment except ground engaging equipment.

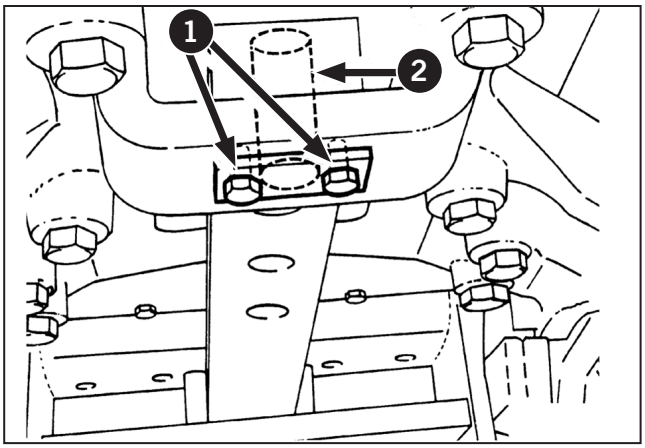
**NOTICE**

Make sure that the total weight on the rear axle does not exceed the maximum rear axle loading or the rear tire load capacity, whichever is the lower when supporting equipment on the drawbar. See Tire Load and Inflation tables in this section.

***NOTE: The drawbar is shipped in the shortest position. Reposition as required by the attachment.***

To change the drawbar length:

1. Remove the 2 bolts (1) that retain the front pin (2).
2. Adjust the drawbar length as required and re-install pin and bolts. Torque bolts to 60 N·m (44 ft-lb).



## Towing Operations

**WARNING**

Always be aware of and observe vehicle operation regulations and statute. Know rhe operating limits of the tractor.

The operation of tractors as tow vehicles for agricultural trailers and equipment creates additional responsibilities for the operator and for anyone in the area of operation. Additional loading increases strain on equipment and risks of accidents. For this reason it is highly recommended that additional precautionary measures be taken.

- Adjust/reduce speed to allow for the nature of the towed equipment.
- Never exceed the recommended capacities of the tractor for GVW (gross vehicle weight) and towing.
- When highway towing always lock the drawbar in the center position for best stability.
- Use all safety restraints provided including pin retainers and safety chains.
- Use safety warning equipment as required by law.

## Safety Chain

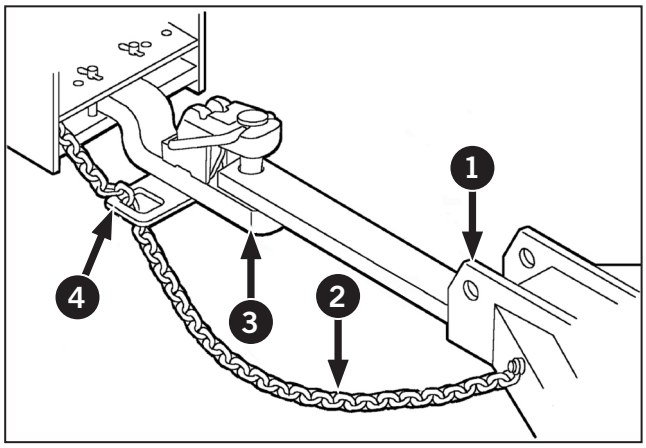
Use a safety chain (2) with tensile strength equal to or greater than the gross weight of the implement to be towed by the tractor when towing implements (1) on the highway. This will control the implement in the event the drawbar (3) and implement disconnect.

A chain guide (4) is provided to support the chain.

Make a trial run by driving the tractor to the right and to the left for a short distance to check the safety chain adjustment after attaching the safety chain. Readjust to eliminate a tight or loose chain if necessary.

Check the implement operator's manual for implement weight and attaching hardware specifications.

Safety chains, attaching hardware and chain guide are available from a Kubota dealer.



## Attaching and Detaching Trailed Equipment

**NOTICE**

Regulations in some areas require brakes on towed equipment when operating on public highways. Ensure you comply with legal requirements before traveling on public highways.

To attach the tractor to trailed equipment and implements:

1. Make sure implement is at the drawbar height.
2. Slowly inch rearwards to allow the drawbar and implement hitch to intersect (steering sharply left and right will aid in hitch alignment).
3. Set parking brake and stop engine.
4. Insert hitch pin and make sure the retainer is in the latched position.

   ***NOTE: For implements that require hitch extensions or interfere with the tractor clevis, remove and store the clevis and hitch pin.***

Always use a safety chain installed between the tractor and implement hitch when transporting equipment on public highways.

North American standards recommend the following precautions for towing equipment not equipped with brakes:

- Do not tow equipment weighing more than twice the tractor weight.
- Do not exceed 16 km/h (10 mph) if towed equipment weighs more than the tractor.
- Do not exceed 32 km/h (20 mph) while towing equipment that weighs less than the tractor.

When detaching equipment:

- Support the equipment to prevent uncontrolled dropping.
- Block the equipment wheels to prevent unwanted rolling.
- Make sure that all power sources on the tractor and on the equipment are turned off.
- Detach all electrical and hydraulic connections between the tractor and the equipment. Use proper care in safe handling of hydraulic connections. Refer to Hydraulic Operations in Section 4.
- Remove the coupling pins and safety chains and then pull the tractor away from the equipment.

## Power Take-off (PTO) (Front and Rear)

**DANGER**

Before operating the PTO always make sure that all safety shields and guards are in place. These safety shields are designed for the protection of the operator and bystanders.

**NOTICE**

Excessive clutch slippage can cause premature clutch failure. Do not attempt to unplug a jammed implement by repeatedly engaging and disengaging the PTO clutch.

**WARNING**

The PTO lever release locks are to be lifted to move the lever forward or backward and released immediately after this movement. Failure to release can cause the over-travel of the lever past the end of travel detent.

The independent power take-off (PTO) transfers engine power directly to mounted or trailed equipment. “Independent” means that the PTO may be engaged, operated and disengaged with the tractor stopped or while moving.

The PTO drive is a wet disc type clutch with an integral brake, controlled by a solenoid operated valve.

When engaged the PTO warning light on the side operator console will appear. Refer to Engine Warning Lights in Section 2 for more information.

Rear PTO shafts can be interchanged from 1000 RPM shaft to 540 RPM shaft by removing the 8 hex bolts. Removing the shaft currently installed and install the new shaft of the desired speed and reinstall the 8 hex bolts.

The rear PTO can also be set into econo mode or normal mode for both the 1000 RPM shaft and the 540 RPM shaft with the 2 levers at the back right of cab. ECONO mode allows you to turn the PTO shaft at its max speed so 540 RPM or 1 000 RPM shaft but at a much lower engine speed and load to save on fuel and increase efficiency for lighter jobs that don’t require as much engine power

Rear PTO is equipped with an auto PTO feature which will allow you to have the PTO automatically turn off or on based on the height of the 3pt hitch. There are 2 settings in the monitor, one will allow to set the raise height at which the PTO will turn off, the other is to set the lower height at which the PTO will turn back on.

***NOTE: The PTO will automatically disengage when the engine is stopped.***

***NOTE: The PTO will only engage with the operator in the seat and will disengage if the operator leaves the seat.***

### PTO Requirements

The implement PTO drive shaft must have one of the 3 drive shafts.

- 21 spline 1 000
- 20 spline 1 000
- 6 spline 540

***NOTE: Do not use adapters for smaller or larger yokes.***

## Rear Power Take-off (PTO)

**NOTICE**

The PTO will only engage with the operator in the seat and will disengage if the operator leaves the seat.

**Non-Stationary mode:**

If the operator is to leave the seat there is a 10 second delay before the PTO will shut off. A beep will start right after the operator leaves the seat and if the park brake is not engaged.

**Stationary mode:**

- Allows the operator to Enable the rear PTO without being in the seat.
- Rear PTO safety override is available through the EIC under the configurations menu.
- Rear PTO safety override default state is OFF. Every time the tractor is started, the rear PTO armrest switch is switched to OFF position or the PTO fender switch is used. The rear PTO safety override will automatically change to OFF (disabled).

The following conditions must be meet:

- Safety override Enabled
- Park brake is On
- Transmission is in the Neutral position
- Speed of tractor is at 0.0 mph/kph

***NOTE: If any one of these conditions are not met, the rear PTO will no turn but the safety override will remain On (Enabled).***

**With the 540 shaft is installed:**

- 540 NORM is selected, normal operation occurs with no limitations or restrictions.
- 540 ECO is selected, PTO rpm will be limited to MAX 670 RPM. As soon as MAX RPM is reached, the engine speed will stay around 1950 rpm.
- 1000 NORM is selected, the PTO will disengaged when it reaches 670 RPM. The PTO switch will need to be turned OFF before the PTO will re-engage and Error code 5151 will appear on the monitor screen.
- 1000 ECO is selected and 540 shaft is installed, the PTO will disengaged when it reaches 670 RPM. The PTO switch will need to be turned OFF before the PTO will re-engage and Error code 5151 will appear on the monitor screen.

**With the 1000 shaft is installed:**

- 1000 NORM is selected, normal operations occurs with no limitations or restrictions.
- 1000 ECO is selected, PTO rpm will be limited to MAX 1170 RPM. As soon as MAX RPM is reached, the engine speed will stay around 1950 rpm.
- 540 NORM is selected, the PTO shaft will not reach operating speed. The PTO will continue to spin but at reduced RPM. No error code will appear.

## PTO Controls

**WARNING**

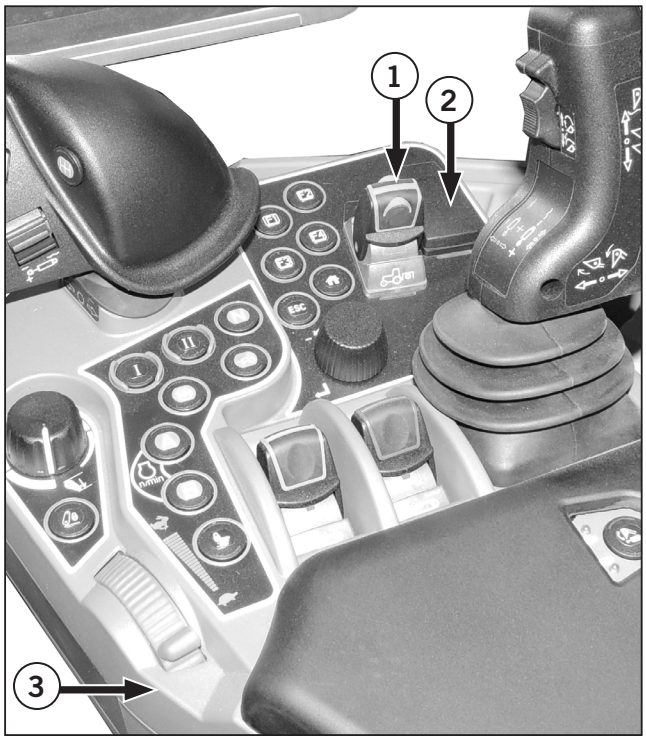
The PTO lever release locks are to be lifted to move the lever forward or backward and released immediately after this movement. Failure to release can cause the over-travel of the lever past the end of travel detent.

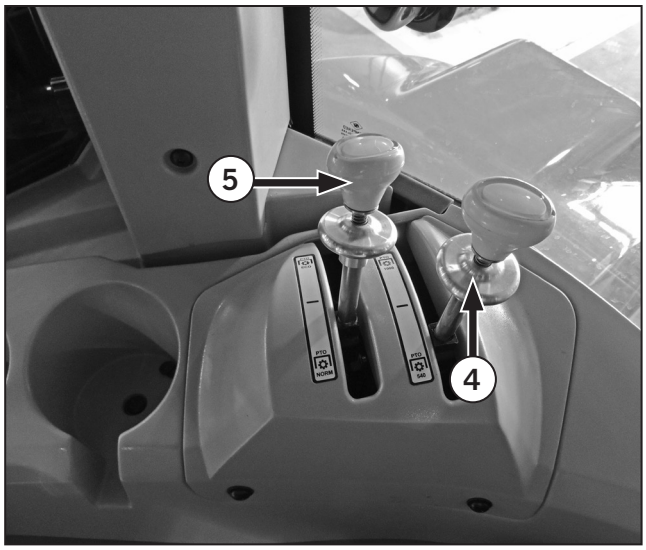
Push the rear PTO switch (1) or front PTO switch (2) (if equipped) on the operator console (3) to engage the Power-Take Off (PTO).

Use the PTO lever (4) 540 or 1 000 speed. Use the PTO lever (5) to select ECO o NORM mode.

Pull up the switch knob and tilt it forward and the PTO clutch comes ON (engage).

Tilt the switch knob backward and the PTO clutch comes OFF (disengage).



## Engaging the PTO

1. Understand the safe operation of the PTO. Read PTO Safety in Section 1.
2. Attach the equipment as described in Attaching Equipment to the PTO Shaft with the engine stopped.
3. Start the engine with the PTO disengaged.
4. Select the appropriate gear (ECO or NORM, 540 or 1000).
5. Pull up the switch knob (1) and tilt it forward (A) and the PTO clutch comes ON (engage).
6. Operate the PTO at lower rpm to make sure the equipment is free of obstructions.
7. Gradually bring the engine up to operating speed. Operate the engine at 1 900 rpm for 1 000 rpm PTO equipment and 1 880 rpm for 540 rpm equipment. Make sure the equipment is operating properly.

***NOTE: The independent PTO is controlled only by the PTO control switch. The operation of the inching pedal does not affect the PTO operation.***

## Disengaging the PTO

Reduce engine speed to 1 000 rpm and then tilt the switch knob backward (B) and the PTO clutch comes OFF (disengage).

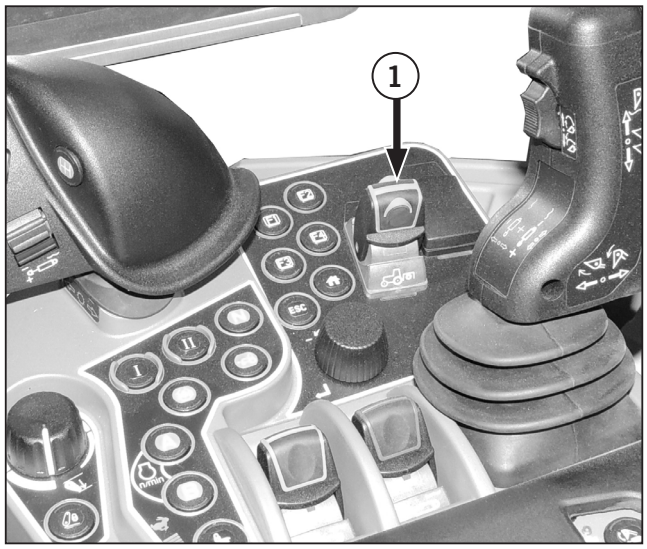
**NOTICE**

Tilt the knob back in emergency or push the PTO emergency shut off button on the rear fenders.

**NOTICE**

The PTO has a non-critical overspeed alert. The PTO ON light will flash and a one second audible alarm will occur during these conditions:

- The speed of a 540 rpm PTO is more than 630 rpm.
- The speed of a 1 000 rpm PTO is more than 1 152 rpm.

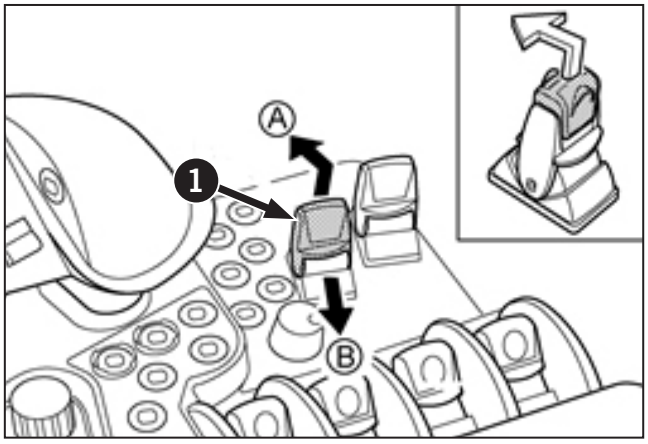



**NOTICE**

Always disengage the PTO before making sharp turns and before raising mounted equipment to its fully raised position. Stop the tractor and wait for the equipment to clear itself if PTO equipment becomes plugged. Immediately disengage the PTO by tilting the switch knob backward and then stop the engine if the equipment does not clear itself or if the PTO clutch slips. Wait until the PTO stops before exiting the tractor or working on the equipment.

**NOTICE**

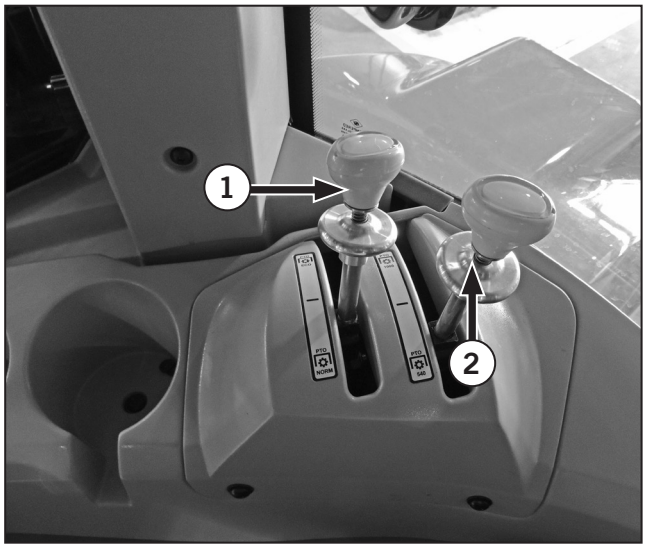
There is a PTO lockout feature that causes the PTO clutch to disengage when the tractor is shut off.



## Engaging the PTO with PTO Gear Shift Lever

**WARNING**

Be sure to observe the PTO shaft speed prescribed for the individual implements. It is extremely dangerous to run an implement at high speed that is meant to be operated at low speed. Use only when this higher rpm is specifically recommended by the implement manufacturer.




Choose from the following 4 PTO operating modes according to the type of implement or the workload.

Set the mode selector lever (1) to the NORM (normal) mode for general work and the ECO (economy) mode for light-duty work only.

In ECO mode, the engine runs at low speed for energy saving operation. Using the 540 OR 1000 rpm PTO gear shift lever (2), select a speed to suit the implement in use.

**Table 3-44: PTO with Gear Shift Levers**

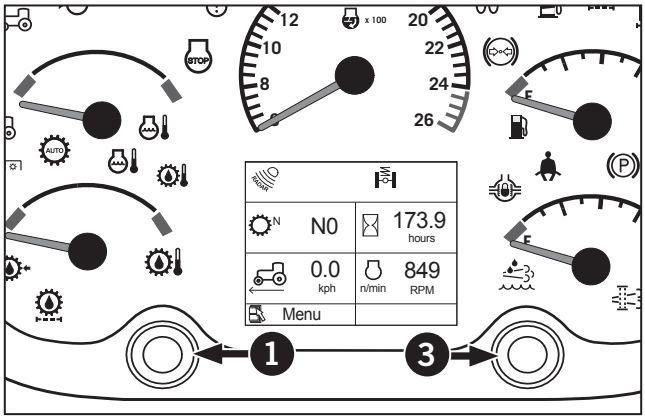
| PTO operating mode selector lever | PTO gear shift lever | |
|---|---|---|
| **Normal (PTO/ Engine speed)** | 540/2005 | 1000/1995 |
| **Economy (PTO/ Engine Speed)** | 540E/1608 | 1000E/1600 |

### Handling the levers

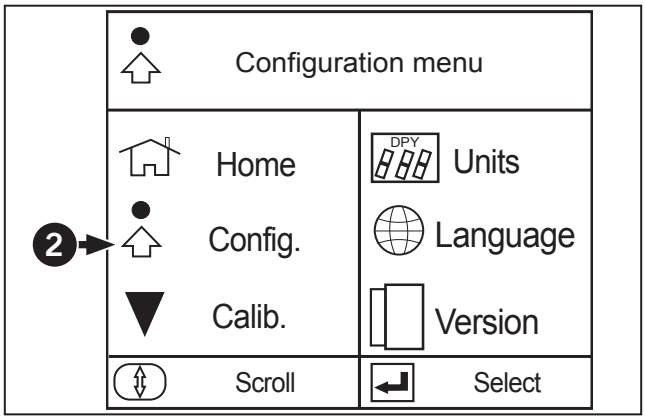
1. Before handling both the levers, set the PTO clutch control switch to the OFF (disengage) position.
2. To shift, lift the lever lock up to release from detent and move the lever slightly in the desired direction to ensure it is out of detent lock. Release the lever so the detent lock can re-engine automatically. Move the lever to the desired position and allow it to automatically lock into detent.
3. Must pull the lever lock up to move out detent to be able to move back to neutral.

## Enabling/Disabling Stationary PTO

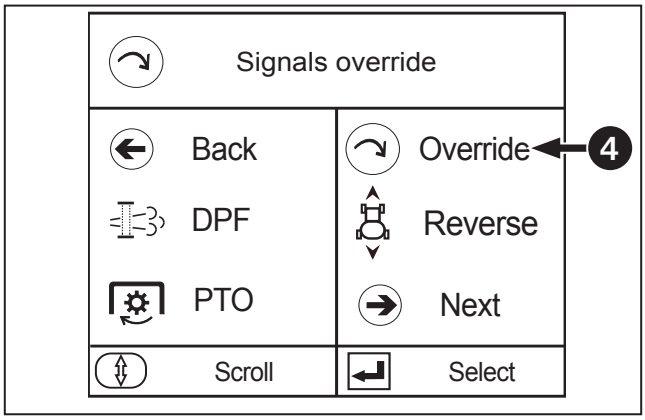
1. Press the left button (1) on the EIC to access the main menu.

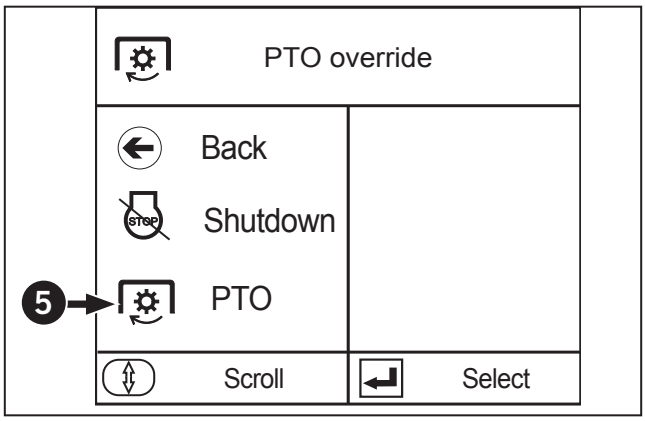



2. Use the left button (1) scroll till CONFIG (2) is highlighted. Press the right button (3) to access the menu.




3. Use the left button (1) scroll till OVERRIDE (4) is highlighted. Press the right button (3) to access the menu the PTO override (5).

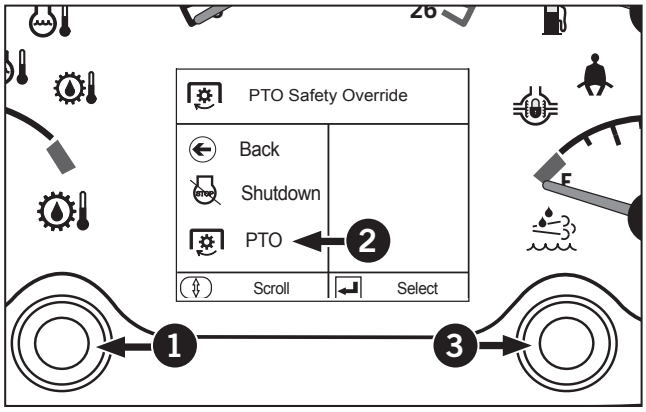


4. Use the left button (1) scroll till PTO (2) is highlighted. Press the right button (3) to ENABLE the rear PTO safety override.

   ***NOTE: A STAR next to PTO will appear when the safety override is enabled.***

5. To disable the rear PTO safety override. Key the tractor OFF or perform steps 1 thru 4 so that the STAR is no longer next to PTO.



## Front PTO Operation

**WARNING**

Disengage PTO, stop engine and allow all rotating components to come to a complete stop before connecting, disconnecting, adjusting or cleaning any PTO driven equipment.

Remove front PTO when not in use.

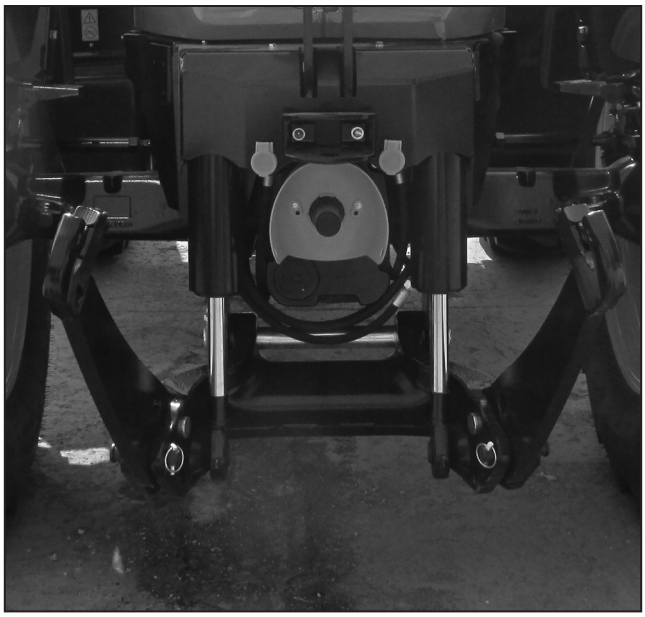
**Non-Stationary mode:**

If the operator is to leave the seat there is a 10 second delay before the PTO will shut off. A beep will start right after the operator leaves the seat and if the park brake is not engaged.

**Stationary mode:**

Not provided or applicable.

The front PTO and rear PTO are independent and both PTOs can be operated together or individually.



### Front PTO Clutch Control Switch

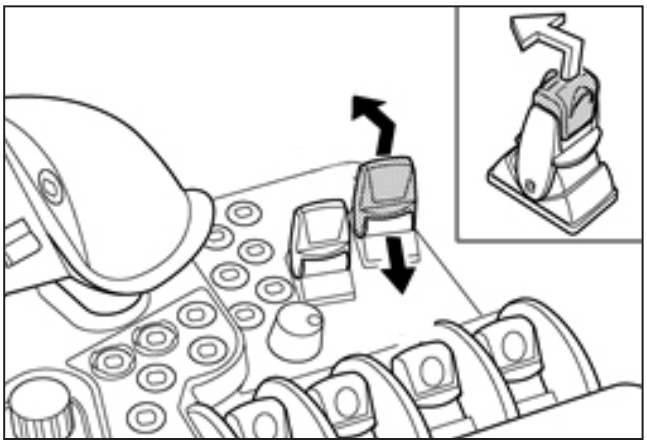
The PTO clutch control switch engages or disengages the PTO clutch which gives the PTO independent control.

Pull up the switch knob and tilt it forward and the PTO clutch comes ON (engage).

Tilt the switch knob backward and the PTO clutch comes OFF (disengage).

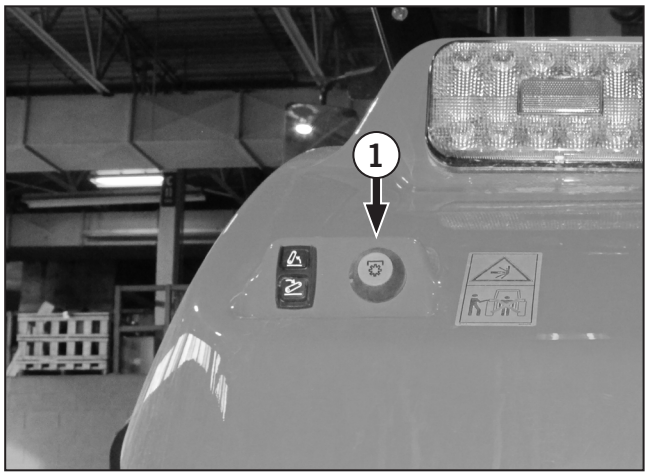
***IMPORTANT:****To avoid shock loads to the PTO, reduce engine speed when engaging the PTO, then open the throttle to the recommended speed.*

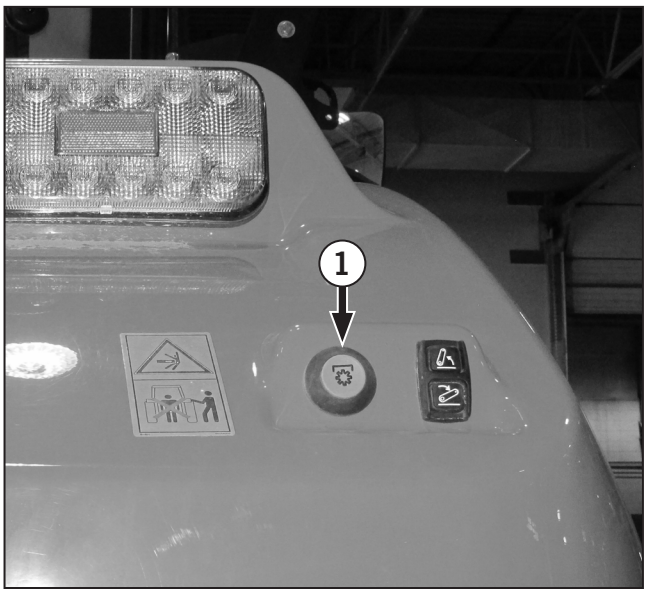
***NOTE: If the PTO system is engaged and you stand up from the seat, the warning buzzer will whistle for about 10 seconds after standing up. This is because the tractor is equipped with Operator Presence Control System. PTO turns off at this point in time if operator leaves seat.***



**NOTICE**

Tilt the knob back in emergency or push the PTO emergency shut off button (1) on the rear fenders.



## PTO Options

The model M8-181 and M8-201tractors are equipped with a standard 34.9 mm (1.375 in) 6-spline 540 rpm shaft for PTO operation.

An optional 20-spline 44.5 mm (1.75 in) output shaft is available for the 1 000 rpm operation. The alternative 20-spline shaft may be purchased from a Kubota dealer.

An optional 34.9 mm (1.375 in) output shaft is available for 1 000 rpm operation. The alternative 21-spline shaft may be purchased from a Kubota dealer.

Contact a Kubota dealer for more information on options.

***NOTE: The 6-spline shaft is used to operate equipment having a power requirement up to (65 hp). Couple equipment having a higher power requirement to the 21-spline shaft.***

**NOTICE**

Use the 35 mm (1.375 in) 540 rpm PTO shaft (Type 1) only on implements requiring less than 65 kW (87 PTO horsepower).

Use the 35 mm (1.375 in) 1000 rpm PTO shaft (Type 2) only on implements requiring less than 130 kW (174 PTO horsepower).

Use the 45 mm (1.750 in) 1000 rpm PTO shaft (Type 3) if heavier loads are expected.

## PTO Master Shield

**WARNING**

- Never stand on the PTO master shield or use the master shield as a step during PTO operation.
- Install the PTO shaft cover (3) provided whenever the tractor PTO is not in use. The PTO shaft cover is threaded into the housing.

**WARNING**

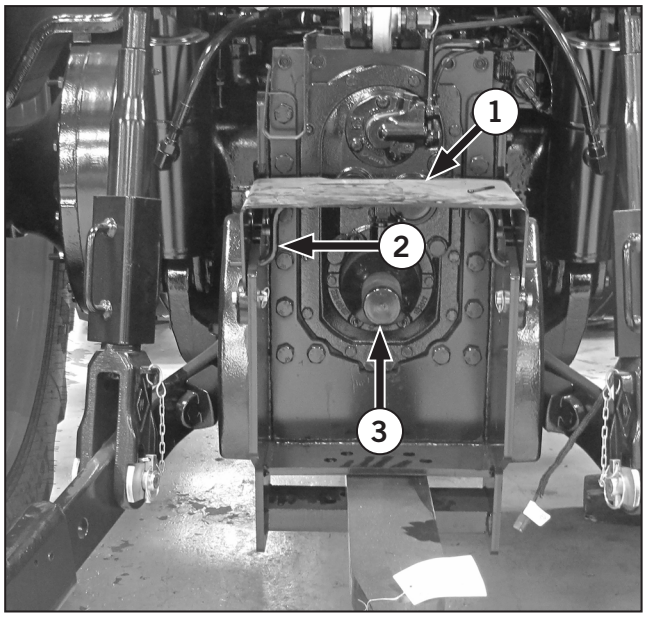
Never remove or alter the PTO master shield at any time to assist in attaching any type of implement.

The PTO master shield (1) is adjustable to three positions by placing the prop rod (2) in positions A, B or C.

**Position A:** Shield is level; use this position during normal PTO operation.

**Position B:** Shield is tilted upward; only use this position while attaching implement PTO shaft to the tractor. Lower the shield to position A after the shaft is attached.

**Position C:** Shield is tilted downward; use this position to provide clearance for the top link when non-PTO implements are attached.



## Changing the PTO Output Shaft

**WARNING**

Before changing the PTO shaft:

- Engage the parking brake and park the tractor so the rear end is approximately 10 cm (4 in) higher than the front end.
- Apply the parking brake
- Move the gear shift lever to Neutral
- Disengage the PTO by pushing the PTO selector knob down
- Stop the engine
- Make sure the PTO shaft has stopped turning.

**NOTICE**

Never operate the tractor with the PTO shaft removed.

To change the PTO stub shaft perform the following:

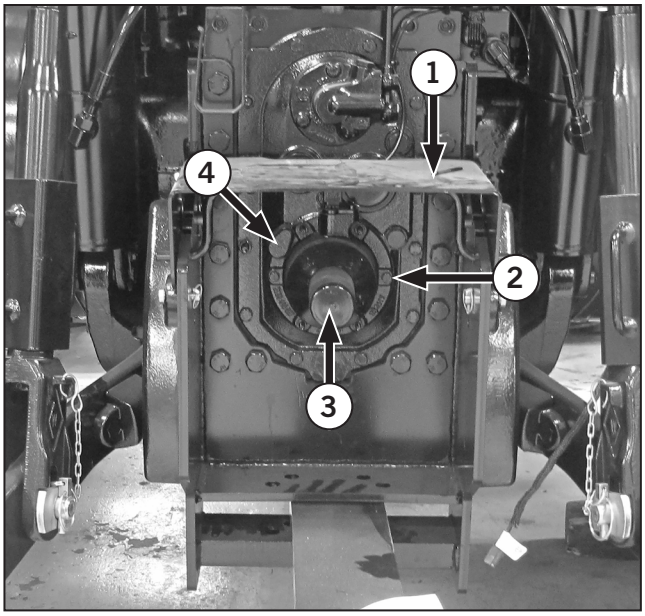
1. Remove the PTO shaft cover (1).
2. Remove the 8 retaining bolts (2).
3. Remove PTO stub shaft (3) from mounting face (4).
4. Install desire stub shaft onto mounting face.
5. Install the 8 retaining bolts and torque to 115 N·m (85 ft-lb).
6. Install the PTO shaft cover.

**CAUTION**

Make sure the rear axle oil is at or below the fill mark before removing the retainer to prevent oil loss.

**WARNING**

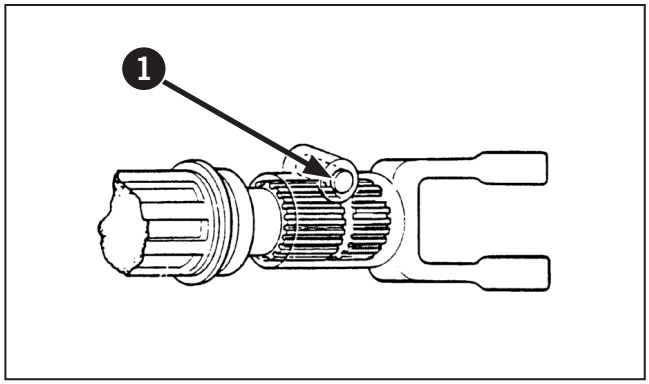
Never remove or alter the PTO master shield at any time to assist in attaching any type of implement.



## Attaching Equipment to the PTO Shaft

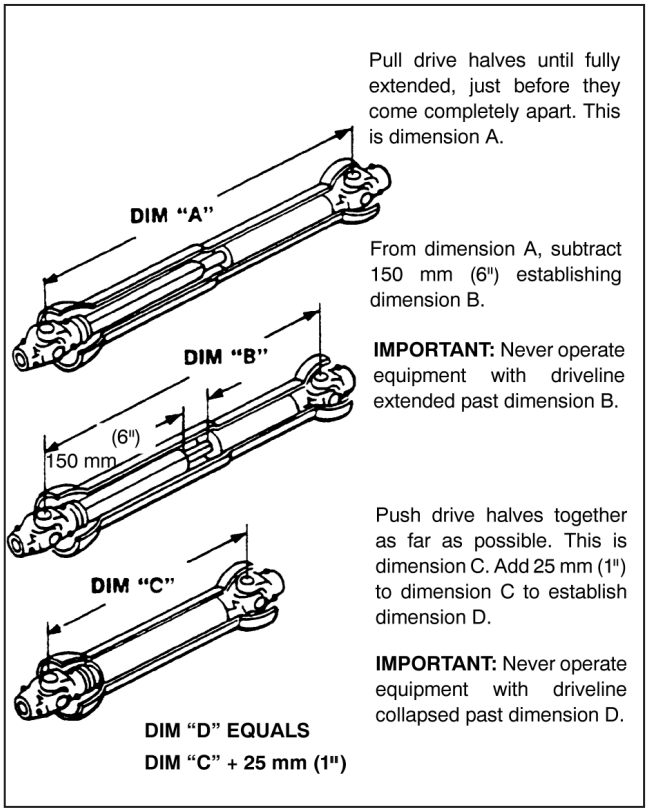
Mount or hitch the equipment to the tractor as outlined in either 3-pt Hitch Linkage in Section 4 or Towing Operations earlier in this section.

1. With the engine stopped, all equipment lowered and the PTO stopped, pull the PTO shaft cover as previously described.
2. Attach the equipment driveshaft to the tractor PTO shaft. Ensure that the equipment driveshaft coupler lock pin (1) engages the PTO shaft lock groove. Pin the coupler to the shaft if the coupler does not have a lock.
3. Mounted equipment only: Raise and lower the linkage and check for interference. Ensure the PTO shaft is not binding in the fully raised position. Set the height limit control knob on the right hand console to limit raising height if necessary. Also study the instructions in 3-Pt Hitch Controls in Section 4.
4. Trailing equipment only: Ensure that the drawbar is fixed in the center position and that the drawbar is set at the correct length for the PTO speed selected. Refer to Towing Operations earlier in this section.
5. Position the PTO master shield, as previously described, in the proper position before operating the PTO.
6. Check that the PTO driveline is not overextended, bottomed out or at an excessive angle and that the driveline shield does not contact the PTO guard or drawbar.




**NOTICE**

Check to make sure the driveline will not bottom out or become disengaged before operating PTO driven equipment. Use the following to determine PTO shaft engagement.




**WARNING**

Use of the PTO shaft adapters is not recommended due to risk of overspeeding the implement and also compromising the effectiveness of the PTO shield.

## PTO Operation

**WARNING**

Whenever operating PTO equipment observe the following safety precautions:

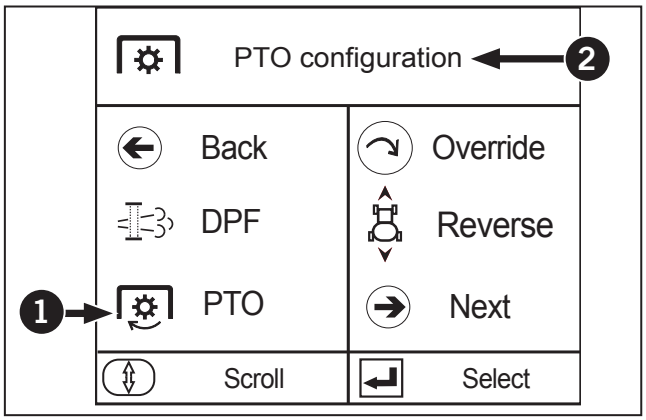
- Follow the equipment operator's manual instructions.
- Do not wear loose clothing when operating PTO equipment.
- Stop the engine and wait until the PTO shaft and equipment stops before getting off the tractor and working on the equipment when operating PTO-driven equipment.
- Do not clean or adjust PTO driven equipment while the tractor engine is running.
- Make sure that the PTO master shield is installed.
- Always apply the tractor parking brake and block the rear wheels front and back when operating stationary PTO equipment.
- Do not work under any equipment which is supported only by the hydraulic lift or remote cylinder. Always use suitable blocking or supports.
- Always replace the PTO shaft cover when the PTO is not being used.

***NOTE: The PTO operation will shut off if operator leaves the seat.***

***NOTE: The PTO brake will remain applied as long as the engine is running and the PTO is off. The brake will release so the PTO shaft can be turned by hand when attaching equipment when the engine is shut off.***

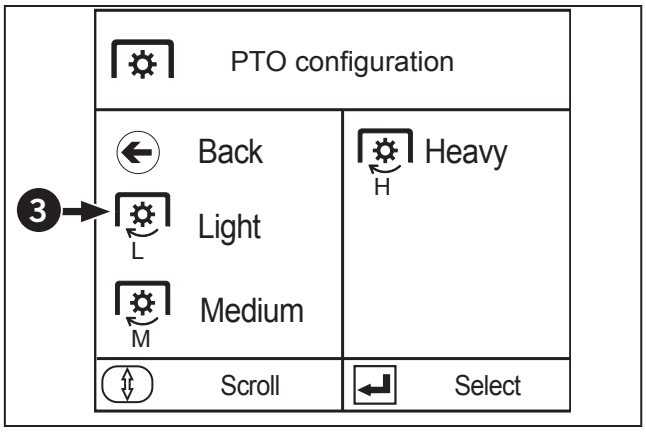
## PTO EIC Configuration

The PTO configurations (1) located in the EIC screen (2) allows the operator changes to the engagement characteristics of the PTO based on the size of implement load and type of soil.



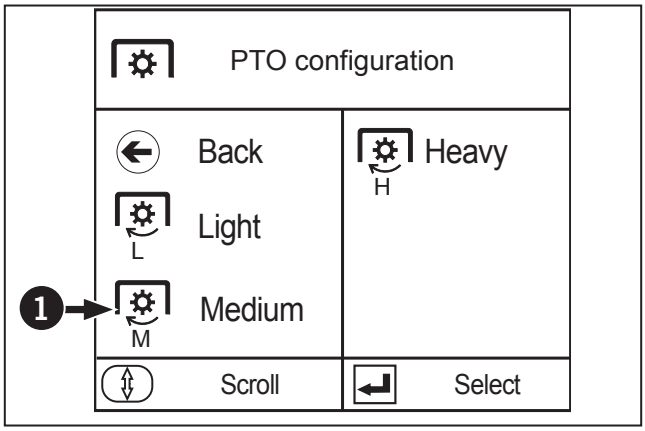

**Light Configuration (3):**

- Is meant for light PTO implement loads or light soil conditions where a harsh engagement of the PTO is not required. The application pressure is lowered during the filling phase for a smoother engagement.



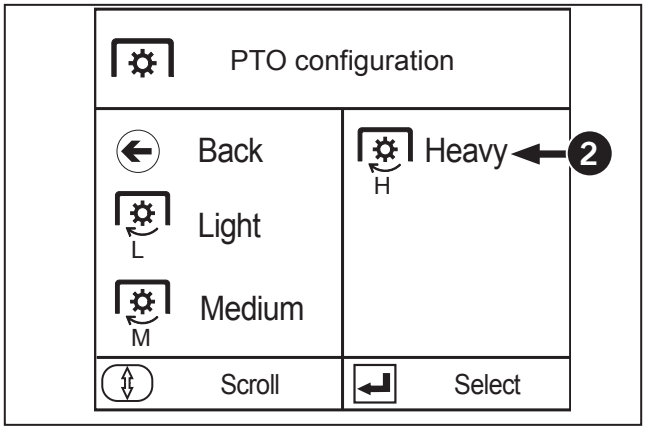
**Medium Configuration (1):**

- Is meant for normal PTO implement loads or normal soil conditions where an engagement of the PTO clutch will avoid clutch slippage. The application pressure is higher than the light pressure during the filling phase which provides a bit harsher engagement.




**Heavy Configuration (2):**

- Is meant for heavy PTO implement loads or heavy soil conditions where a harsh engagement of the PTO clutch is needed to avoid clutch slippage. The application pressure is high during the filling phase providing the harsh engagement.

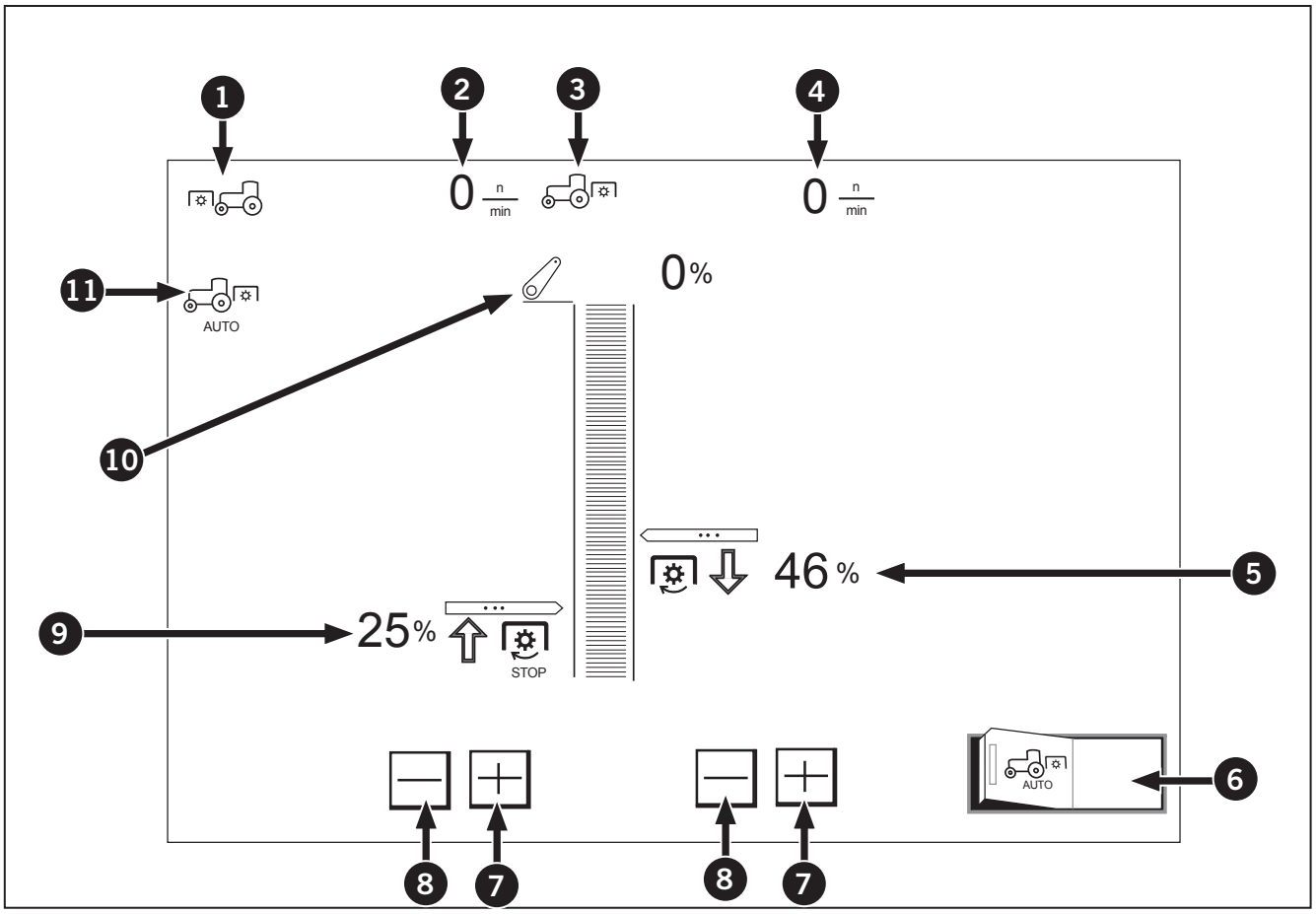


## PTO icon Settings

The following are icons of the PTO settings on the K-Monitor.

| Table 3-45: PTO Setting Icons | |
|---|---|
| Icon | Description |
| 1 | Front PTO indicator |
| 2 | Front PTO rpm |
| 3 | Rear PTO indicator |
| 4 | Rear PTO rpm |
| 5 | Height at which the PTO turns on when the implement is lowered |
| 6 | Auto PTO switch |

| Table 3-45: PTO Setting Icons | |
|---|---|
| Icon | Description |
| 7 | (+) switch |
| 8 | (-) switch |
| 9 | Height at which the PTO turns off when the implement is raised |
| 10 | Current lift arm height |
| 11 | Auto PTO indicator |



## PTO Settings

Automatic ON/OFF setting of PTO shaft revolutions, which is interlocked with the lifting height of the rear 3-point-hitched implement, can be made.

### Setting the 3-point-hitch-interlocked PTO function

- Start the engine and start PTO rotation.
- Touch the left half of the Auto PTO switch (1) and the 3-point-hitch-interlocked PTO function is enabled. A touch on the right half (2) disables this function. While the 3-point-hitch-interlocked PTO function is on, the indicator (2) lights up and stays on.

### Setting the height at which the PTO restarts turning when the implement is lowered

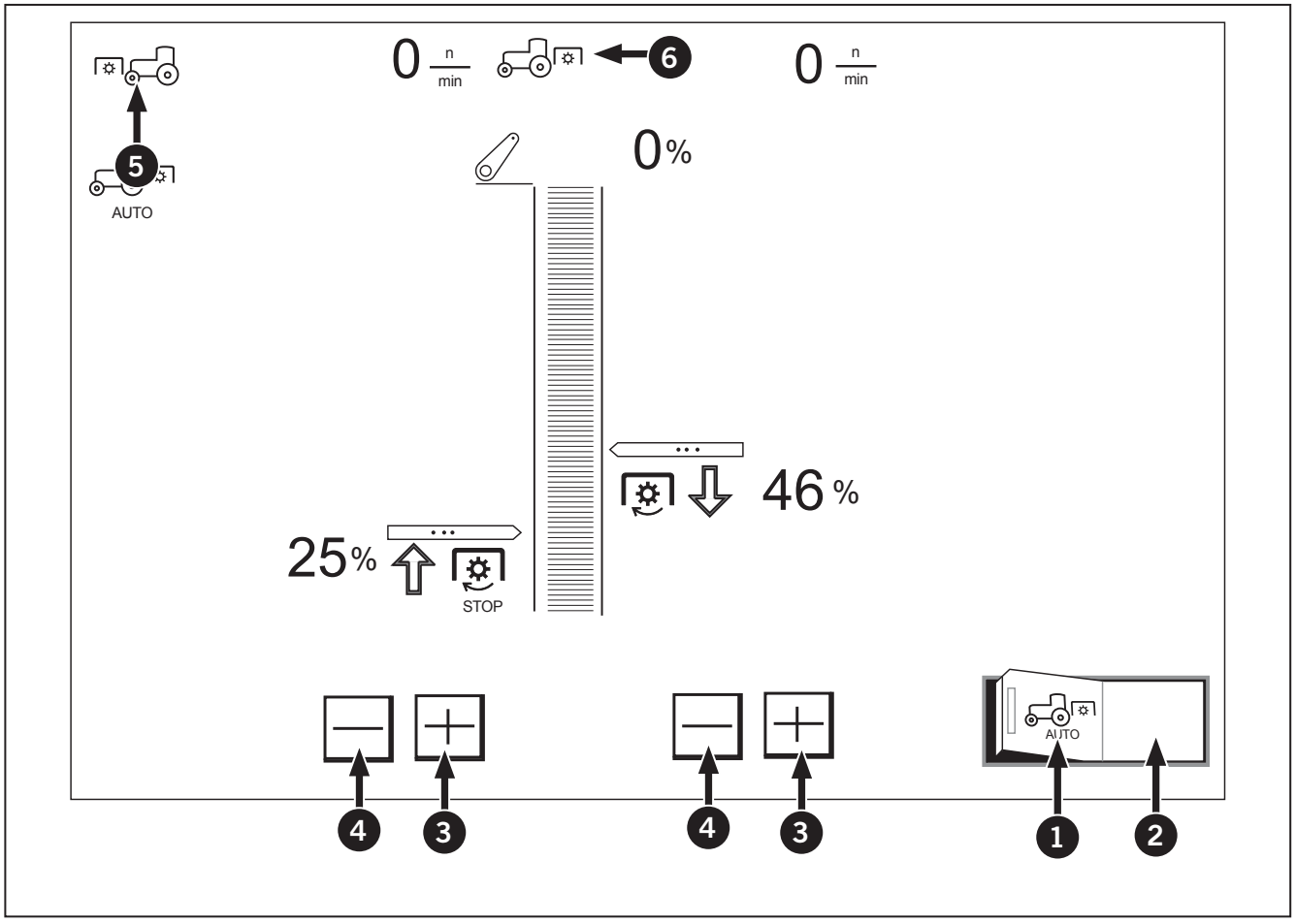
- Touch the (+) switch (3) or (-) switch (4) on the right side to readjust the height at which the PTO shaft restarts turning. Raise the percentage to raise the height at which turning restarts.

### Setting the height at which the PTO stops turning when the implement is raised

- Touch the (+) switch (3) or (-) switch (4) on the left bottom to readjust the height for the PTO shaft to stop turning. Lower the percentage to lower the height at which turning stops.

### Displaying the PTO rpm

- Engage the PTO switch at ON (engage), the front PTO rpm (5) as well as the rear PTO rpm (6) are displayed.



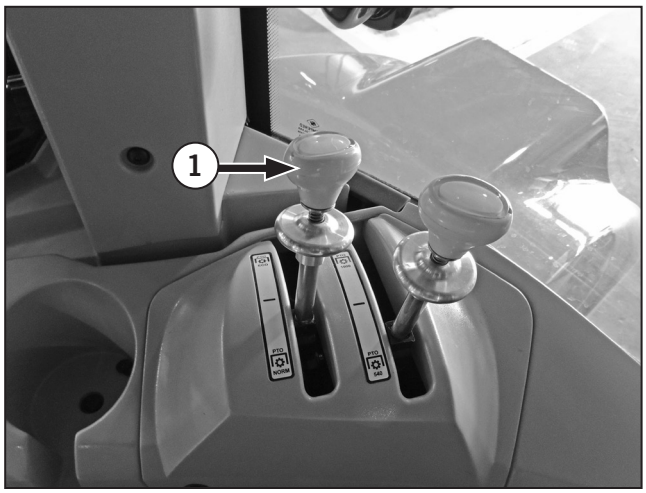
## Rear PTO Operation

The rear PTO has 4 modes:

- Normal
- ECO
- 1 000 RPM
- 540 RPM.

There are 2 PTO sensors:

- Shaft speed
- Shaft detection sensor




To operate the rear PTO:

1. The operator must select either Normal or ECO mode.
2. Push or pull the lever (1) to either Normal or ECO mode depending on the application.

Normal mode:

- The rear PTO runs at its normal operating speed at a higher engine RPM. For the shafts to reach full operating speed, the engine's RPM must be around 1 800 - 2 000 RPM. This mode is used for most PTO work.

ECO mode:

- The rear PTO must operate at a reduced engine RPM speed.
- The PTO has reached full operating speed at a much lower engine RPM to increase fuel savings but less PTO power. This mode is suited for light duty applications.


3. Once normal or ECO has been selected, the operator must select either 540 or 1 000 RPM.

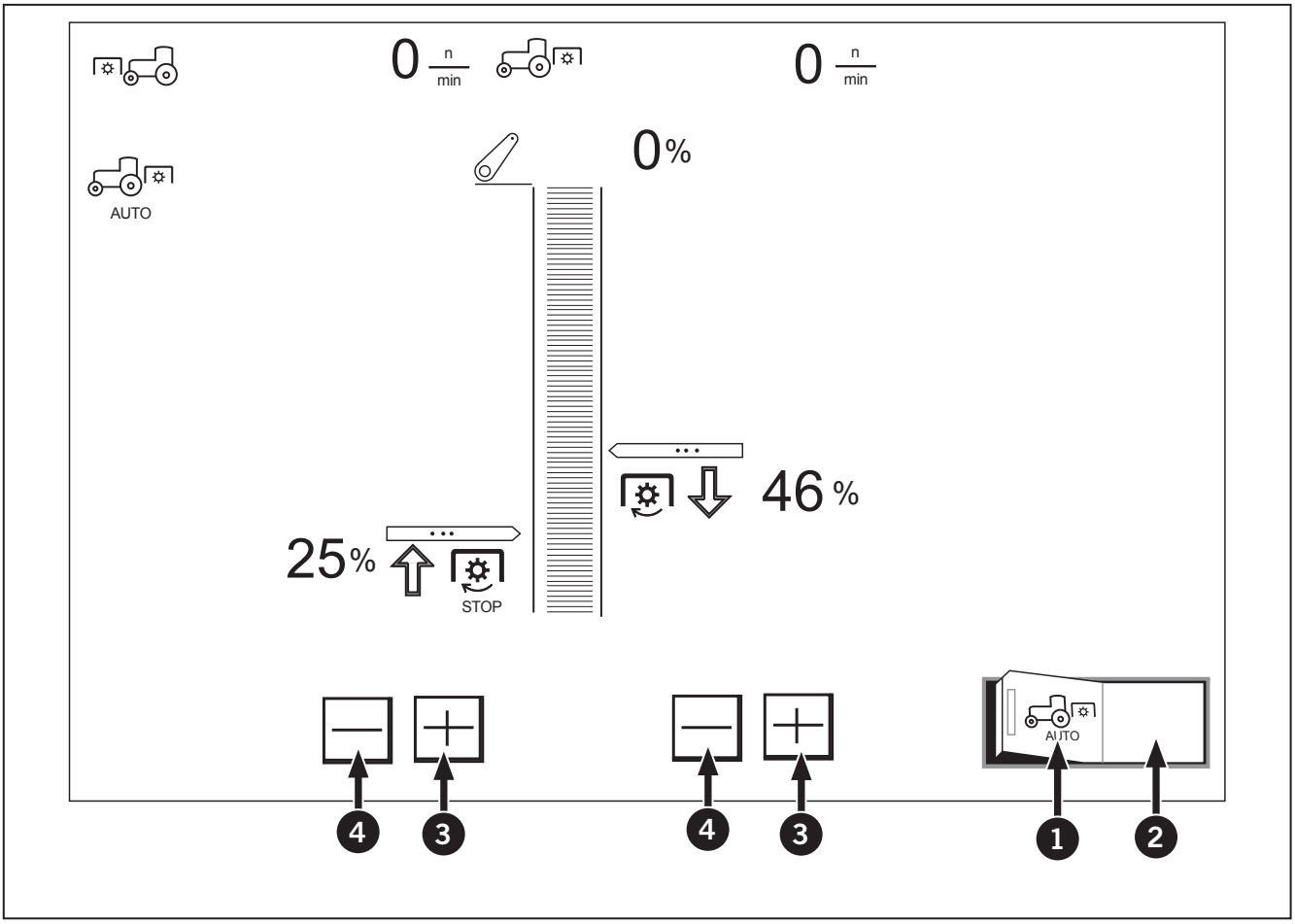
   ***NOTE: Make sure to check which shaft is installed on the tractor. 540 (6 spline shaft) or 1 000 (21 spline small shaft or 20 spline big shaft).***

   ***NOTE: An alarm will sound and the PTO will stop if the operator leaves the seat.***

4. If the PTO is activated and 1 000 shaft lever is selected but the 540 shaft is installed. The shaft detection sensor will read an over speed and shut the PTO down when the speed reaches above 650 PTO rpm.
5. The PTO will shut down if a 540 shaft and ECO mode is selected and the PTO shaft goes above 650 RPM.

6. The PTO will shut down if a 1 000 shaft and ECO mode is selected and the PTO shaft goes above 1 150 RPM.
7. To switch between ECO and Normal mode, the PTO must be turned off to avoid grinding the gears. There is no sensor to stop from switching between ECO and Normal Mode while the PTO is running.
8. To switch between 540 and 1 000, the PTO must be turned off to avoid grinding the gears and there is no sensor to stop from switching between 540 and 1 000 while the PTO is running.

## Auto PTO Operation




1. The rear-PTO can be preset to turn itself on and off, being interlocked with the lifting height of 3-point hitch mounted implement.
2. Touch the left half of the auto PTO switch (1) and the setting is enabled. By touching the right half (2) of the switch and the setting is disabled.
3. While the auto PTO switch is on, the indicator (2) lights up.
4. Use the switches (3 and 4) to readjust the height for turning on the PTO in lowering the implement and the height for turning it off in raising the implement.

***NOTE: If operation leaves the seat or PTO switch is turned off, the Auto PTO switch will turn off as and has to be re-engaged.***

## Rear PTO Calibration (TMT20)

Contact a Kubota dealer for assistance.

## Diesel Particulate Filter Regeneration

The model M8-181 and M8-201tractors are equipped with technology that meets the following standards:

- North American Tier 4F S5 clean emissions standards;
- Environmental Protection Agency (EPA) regulations which took effect in North America in January 2011;
- European Union Stage IIIB regulations; and
- Japanese Ministry of Land, Infrastructure and Transportation (JMLIT)/Japan Ministry of the Environment (JMOE) regulations expected to commence in 2013.

These standards regulate diesel sulfur emissions to 15 ppm for off-highway applications.

### DPF Regeneration Overview

- The internal composition of the DPF reduces exhaust noise.
- Regeneration is used in conjunction with the Variable Geometry Turbo system to tune engine performance and reduce fuel consumption.
- With DPF regeneration full engine performance can be realized even after startup in cold temperatures.

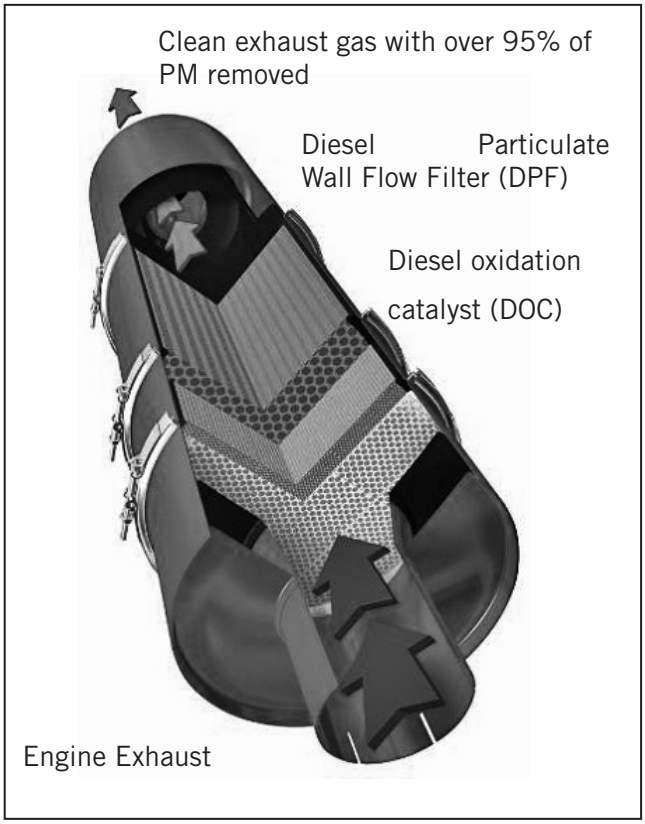
For more information on DPF regeneration, consult the Cummins engine owner's manual for the engine on the tractor.

### Regeneration process

Regeneration is the process of cleaning the particulate filter by using high exhaust to burn off the particulates. Regeneration is not required under normal loads. When regeneration is required, the process will commence automatically. No action on the part of the operator is required. This section is intended to help the operator become familiar with the basic technology behind the process.

The DPF uses a catalytic reaction to continuously burn up the carbon particles. This reaction occurs during normal tractor operations.

Carbon builds up in the DPF during operation. Running in cold weather or with low loads increases the amount of carbon building up. When this quantity reaches a critical number, the system momentarily injects a small amount of diesel fuel into the DPF in order to burn off this excess residue.



## Aftertreatment System Operation

The tractor is equipped with a Tier 4 final aftertreatment system. This system ensures that exhaust is nearly free of harmful emissions by injecting diesel exhaust fluid (DEF) into the exhaust stream and by burning off any soot trapped in the diesel particulate filter (DPF). The burning off of soot trapped in the filter is referred to as DPF regeneration.

In most cases the aftertreatment system operates automatically. As the operator, your basic responsibilities are:

- Making sure there is enough diesel exhaust fluid (DEF) in the DEF tank.
- Knowing how to respond to the aftertreatment indicator lights as they appear on electronic instrument cluster (EIC). There are separate sets of indicator lights for DPF and DEF warnings.
- Knowing how to force the system to perform a regeneration.
- Knowing how to inhibit (stop) the aftertreatment system from performing regeneration.
- Knowing how to re-enable the aftertreatment system after it has been inhibited.

Summary of everything you need to know about operating the aftertreatment system:

- Keep regeneration enabled when regeneration does not pose a safety hazard. Under normal working conditions this will allow the aftertreatment system to automatically clean the DPF filter.
    - Only inhibit regeneration when regeneration would cause a safety hazard. For example, inhibit regeneration when the tractor is in a shed or near material that can catch fire.
- Watch the electronic instrument cluster for aftertreatment indicator lamps. Respond to them immediately.
- Top-up the diesel exhaust fluid (DEF) tank every time you fill up the fuel tank. Never mix DEF with diesel. Always use clean DEF. Do not allow any contamination to the DEF tank or sensor. Even one or two drops of diesel fuel can affect the DEF sensor system.
- Wait for the Power-off Indicator (POI) lamp to shut-off before turning the battery shut-off switch to OFF. Aftertreatment system does not purge the DEF lines.

    ***NOTE: It does not take 5 mintures for the Power-off Indicator (POI) to turn off.***
- Have the aftertreatment system maintained at the correct service intervals.

## Selective Catalytic Reduction (SCR)

**NOTICE**

Do not tamper, modify or remove any component of the SCR system. Do not use DEF that does not meet the specifications provided or to operate the vehicle with no DEF.

The SCR system is used to decrease the mono-nitrogen oxides (NOx) emissions from the vehicle tailpipe. The system is composed of several main components:

1. Aftertreatment diesel exhaust fluid (DEF) dosing unit
2. Aftertreatment DEF dosing valve
3. Aftertreatment SCR catalyst
4. Aftertreatment DEF tank and header assembly

The model M8-181 and M8-201 tractors are equipped with the SCR system. It is used to decrease the mono-nitrogen oxides (NOx) emissions from the vehicle tailpipe. The system is composed of several main components:

### Diesel Exhaust Fluid (DEF)

DEF is required for an engine equipped with a SCR system. DEF is a fluid that is sprayed into the exhaust gas prior to the aftertreatment SCR catalyst. The DEF vaporizes and decomposes to form carbon dioxide and ammonia. The ammonia reacts with the NOx emissions over the aftertreatment SCR catalyst to form nitrogen and water

### Seductive Catalytic Reduction (SCR)

The SCR system consists of a SCR catalyst, AMOX and the Diesel Exhaust Fluid Tank. This system uses a small amount of Diesel Exhaust Fluid (DEF) to convert NOx emissions in the exhaust into nitrogen and water.

### Ammonia Oxidation Catalyst (AMOX)

In order to ensure sufficient NOx reduction, a small amount of excess Diesel Exhaust Fluid (DEF) is injected into the exhaust stream. This excess DEF may pass through the Selective Catalytic Reduction (SCR) catalyst as ammonia. To prevent excess ammonia from entering the atmosphere, the exhaust gas flows through an Ammonia Oxidation Catalyst (AMOX) where the ammonia reacts with oxygen in the presence of this catalyst to form nitrogen and water.

### Diesel Exhast Fluid Tank

The Diesel Exhaust Fluid Tank is responsible for storing, controlling and supplying the appropriate quantity of Diesel Exhaust Fluid from the DEF tank to the DEF injector. The Diesel Exhaust fluid is used by the SCR system to reduce NOx emissions in the exhaust.

**NOTICE**

Cummins Inc. supplies the aftertreatment DEF dosing unit, aftertreatment DEF dosing valve and the aftertreatment SCR catalyst. The vehicle manufacturer supplies the DEF tank, the DEF lines, the DEF tank temperature and level sensor, the DEF quality sensor and all wiring between the components, unless labeled with a Cummins® part number.

If the aftertreatment DEF components do not have a Cummins® part number, see equipment manufacturer service information.

## Diesel Exhaust Fluid

- Slight ammonia smell
- Colorless
- Non-toxic and non-polluting
- Non-flammable
- Naturally occurring and is biodegradable.

The aftertreatment DEF dosing valve is coolant cooled and sprays DEF into the exhaust.

The engine control module controls the amount of DEF sprayed into the exhaust. It also controls the DEF tank heater and DEF line heaters.

The aftertreatment SCR catalyst uses DEF to reduce the NOx emissions by converting the engine out NOx into nitrogen and water. The aftertreatment SCR catalyst itself requires no maintenance.

A vehicle with SCR will be equipped with an additional lamp on the dashboard, the aftertreatment DEF lamp. This lamp, along with the check engine lamp and stop engine lamp, alert the operator to the level of DEF in the tank. As the DEF tank level approaches empty, the aftertreatment DEF lamp will illuminate and engine power will be reduced. Attempting to operate the vehicle with no DEF in the tank will result in the vehicle speed being limited to 8 km/h (5 mph).

DEF is sprayed into the exhaust when the temperature in the aftertreatment SCR catalyst reaches approximately 250 °C (482 °F). The amount of DEF consumed will differ from vehicle to vehicle, as DEF consumption depends on engine speed and load.

The aftertreatment DEF dosing unit pumps DEF from the DEF tank to the aftertreatment DEF dosing valve. The aftertreatment DEF dosing unit and header unit is electrically heated and contains a filters that are maintenance items.

***NOTE: See Section 5: Lubrication and Maintenance Schedule for changing Diesel Exhaust Fluid (DEF) In-tank filter.***

Even though DEF freezes at approximately -12°C (11°F), the SCR system is designed to be frozen and thawed. The DEF tank is heated by engine coolant and the DEF lines and aftertreatment DEF dosing unit are electrically heated. No operator interaction is needed when operating in cold temperatures; heating and thawing are controlled automatically by the engine control module (ECM).

After turning the keyswitch OFF on a vehicle with SCR, a pumping sound may be heard from underneath the vehicle. This sound is the aftertreatment DEF dosing unit purging any unused DEF from the system and returning it to the tank. This is normal system operation. The purge process takes approximately 100 seconds to complete.

Under certain conditions (cold or very dry), water condensation, in the form of water vapor, can be seen coming from the vehicle tailpipe. This is normal operation and will clear within a few minutes of normal vehicle operation.

**NOTICE**

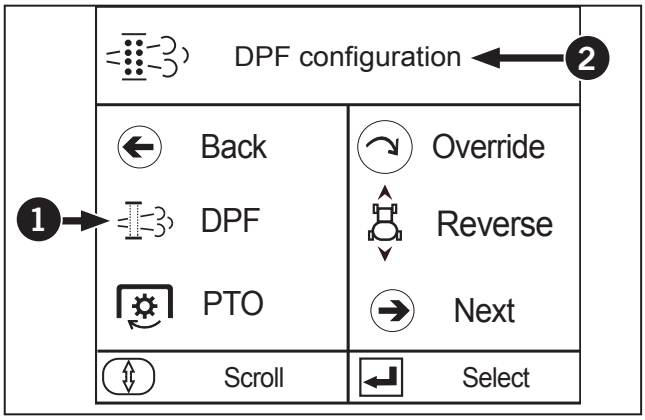
Do not disconnect the vehicle batteries during this process to avoid system damage.

For more information on DEF, consult the Cummins' engine owner's manual for the engine on the tractor.

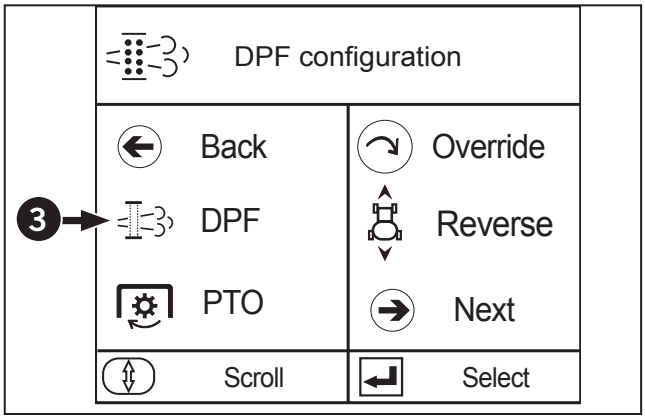
## Modes of Regeneration

The following configurations allows the operator to set the regeneration mode to either inhibit or forced the regeneration cycle or allow the automatic regeneration of the DPF.

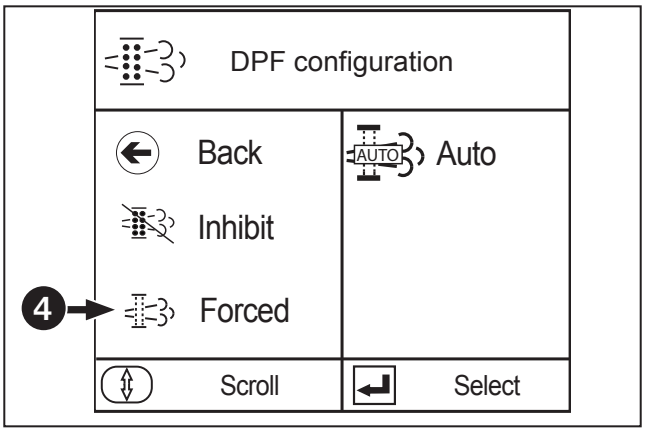
- Automatic: The Electronic Control Module (ECM) uses multiple inputs from the engine and the machine to determine the best time to perform an automatic regeneration. Automatic regenerations can take place throughout the operating cycle of the engine. The regeneration active indicator will be illuminated when a regeneration is being performed. Interruptions of the regeneration are acceptable. If a regeneration is in progress and needs to be stopped, it is permissible to use Inhibit the regeneration through the EIC.



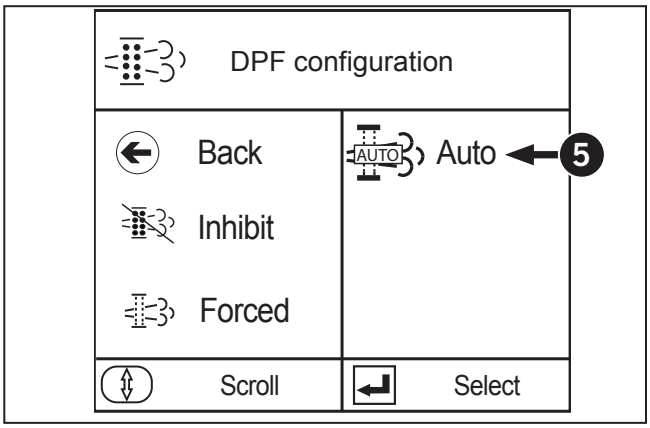

- Inhibit: The inhibit regeneration is used to stop a DPF regen cycle if the cycle is happening at an inopportune moment. Automatic and Manual renegeration modes are disabled. You must re-enable automatic or manual regen modes through the EIC.



- Forced: The forced regeneration is used to perform a manual DPF regen cycle if the the filter has become too plugged and the automatic regen has not taken place. It is recommended that a force regen is done outside due to the high exhaust temperatures and gases that are produced during the regen cycle.




- Automatic: The automatic regeneration allows the ECM to perform a DPF regen whenever conditions are met. Automatic regen does not affect the machine's operation or performance. The only indication of an automatic regen cycle is a warning light indicating the exhaust temperature is higher than normal.




## Regeneration Triggers

The engine management software controls the response of the engine. The tier 4 final system has several parameters may now cause the regeneration system to operate. A regeneration may be required for the following reasons:

- Soot: The DPF will collect soot production by the engine. An automatic regeneration will become active to reduce soot level.
- Start-Up Regeneration: A start-up regeneration is initiated by the ECM after a cold engine start. This regeneration is performed to heat the system to a required temperature for Diesel Exhaust Fluid (DEF) dosing to begin.
- SCR Maintenance: A regeneration is performed to maintain the SCR system.

***NOTE: For forced regeneration, ECM must request a regen meaning DPF lamp on. The tractor must be at idle with park brake on.***

***NOTE: Do not touch the throttle during operation or regen will be aborted.***

***NOTE: The tractor will go from idle to 1 000 rpm on its own.***

## What is Diesel Particulate Filter Regeneration?

**DANGER**

Never park the tractor under any material or surface that can combust. The regeneration process will cause high exhaust temperatures, which can cause fires.

To maintain clean emissions, the diesel particulate filter (DPF) traps soot and ash. The aftertreatment system uses hot exhaust to clean the diesel particulate filter of soot. This a process is called diesel particulate filter (DPF) regeneration.

Indicator lamps on the EIC (see next page) will show the status and activity of DPF process.

**Passive Regeneration**

Operating conditions such as **high engine loads during normal operation** make the exhaust hot enough to clean the diesel particulate filter. This type of DPF regeneration is called **passive regeneration**.

If the exhaust is not hot enough to clean the filter, the after treatment system will automatically increase the exhaust temperature by injecting fuel into the exhaust system. This type of DPF regeneration is called active (or automatic) regeneration.

Passive regeneration will occur automatically until you manually inhibit regeneration.

**Inhibited and Forced Regeneration**

You can stop the after treatment from automatically cleaning the filter. This is called **inhibiting DPF regeneration.** You would only inhibit the automatic system when high exhaust temperatures create a safety hazard. For example, if the tractor is in a shed and is surrounded by combustible materials.

You can only inhibit DPF regeneration and operate the tractor for a limited time before soot builds up in the filter. If the filter is not cleaned in time, the engine will eventually derate to idle speed, forcing you to manually start the cleaning process or else risk damaging the system. Manually starting the filter cleaning process is called **forced regeneration**.

Refer to page 3-197 for instructions on inhibiting, forcing and re-enabling regeneration through the EIC.

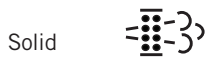
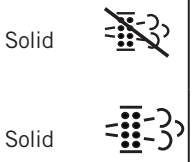
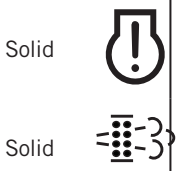
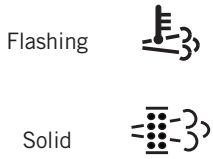
## What is Diesel Exhaust Fluid?

Diesel exhaust fluid (DEF) is a solution of about 1/3 urea 2/3 water that is injected into exhaust system to convert the emissions into harmless nitrogen and water.

## Aftertreatment Indicator Lamp Identification: Exhaust System Cleaning

Table 3-46 identifies warning lamps associated with the exhaust system cleaning and any action required from the operator.

**Table 3-46: Aftertreatment Warning Lamps for Exhaust System Cleaning**

| Indicator Lamps |  |  |  |  |  |
|---|---|---|---|---|---|
| **Indicator Meaning** | Cleaning request active: Allows automatic regen to take place or perform forced regen if automatic was inhibited. | Filter regeneration is recommended. Cleaning Requested Cleaning Inhibit Switch Active: | Forced regeneration required. Engine will derate. Cleaning Request Active: | Forced regeneration required. Engine will shut down. Cleaning Request Active: | Cleaning request active: Cleaning initiated. |
| **Required Action** | Filter regeneration is recommended. Cleaning requested:<br>• Provide Cleaning Oportunity.<br>• Alter Duty Cycle<br>• Perform start cleaning. | When Safe, Deactivate Cleaning Inhibit Switch. Perform Regeneration. | Requires cleaning.<br>• Perform start cleaning.<br>• Cummins Fault Codes: FC3714 & FC4863 will be displayed | Requires cleaning.<br>• Perform start cleaning. | • Response: Wait for cleaning to complete. |

## Aftertreatment Indicator Lamp Identification: High Exhaust Temperature (HEST) Lamp:

Table 3-47 identifies warning lamps associated with the High Exhaust Temperature (HEST) Lamp and any action required from the operator.

### Overview

The High Exhaust System Temperature (HEST) Lamp will illuminate during exhaust system cleaning. In addition, the HEST Lamp will also illuminate if the exhaust temperature exceeds the calibrated temperature threshold.

### Operation

When an exhaust system cleaning event is initiated or the exhaust temperature exceeds the calibrated value, the HEST Lamp will illuminate in a SOLID ON state. The HEST Lamp stays ON during the entire exhaust system cleaning. The HEST Lamp will then turn OFF when the temperature falls below the second calibrated temperature.

**Table 3-47: Aftertreatment Warning Lamps for the Diesel Exhaust Fluid (DEF) Level**

| | | |
|---|---|---|
| **Indicator Lamps** | Solid  | Flashing  |
| **Indicator Meaning** | Exhaust gas and part are extremely hot: | Exhaust gas and part are extremely hot. Regeneration is in progress. |
| **Required Action** | When stationary, keep tractor away from people, combustible material and vapors. | |

## Aftertreatment Indicator Lamp Identification: Exhaust System Cleaning Disable (Inhibit) Lamp

Table 3-48 identifies warning lamps associated with the Exhaust System Cleaning Disable (Inhbit) Lamp and any action required from the operator.

**Table 3-48: Exhaust System Cleaning Disable (Inhibit) Lamp**

| | |
|---|---|
| **Indicator Lamps** | Solid  |
| **Indicator Meaning** | The Exhaust System Cleaning Disable (inhibit) Lamp indicates that the Exhaust System Cleaning Disable (Inhibit) Switch is active, therefore automatic and manual (non-mission) exhaust system cleaning cannot occur. |
| **Required Action** | • Regeneration Inhibited: Automatic and Manual regeneration is disabled and cannot be performed. |

## Aftertreatment Indicator Lamp Identification: Diesel Exhaust Fluid (DEF)

Table 3-49 identifies warning lamps associated with the Diesel Exhaust Fluid (DEF) lamps and any action required from the operator.

**Table 3-49: Aftertreatment Warning Lamps for the Diesel Exhaust Fluid (DEF) Level**

| Indicator Lamps | Warning 1 | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| 3 | | | | Solid STOP |
| 2 | | Solid | Solid | Solid |
| 1 | Solid | Solid | Flashing | Solid |
| **Warning Level** | Warning 1 | Level 1 | Level 2 | Level 3 |
| **Indicator Meaning** | DEF level is low. Illuminates at 10% of tank level to 2.5%. | DEF level is critically low. If you do not add DEF immediately, 25% reduction in torque and engine speed will be reduced. Illuminates at 2.5% tank level to 0%. | DEF tank is empty. The warning runs for 30 minutes before final inducement, following the depletion of the DEF tank. There will be a 50% reduction in torque and engine speed will be reduced. Illuminates at 0% tank level. o<br>• Cummins Fault Codes: FC1673 & FC3547 | DEF tank has been empty for at least 30 minutes.The machine will be locked at idle and torque will be reduced. Illuminates at 30 minutes after tank level is at 0%.<br>• Cummins Fault codes: FC1673, FC3547, & FC3712 |
| **Required Action** | Fill DEF tank with DEF | Fill DEF tank with DEF immediately. Engine power will be restored once the DEF tank is filled. | Fill DEF tank with DEF immediately. Engine power will be restored once the DEF tank is filled. | Stop the tractor once it is safe to do so. Refill the DEF tank. Engine power will be restored once the DEF tank is filled. |
| | ***NOTE: If adding DEF to the DEF tank does not turn the indicator lamps off or restore engine power, contact a Cummins authorized repair location.*** | | | |

## Aftertreatment Indicator Lamp Identification: Diesel Exhaust Fluid (DEF) Quality Operation

Table 3-50 identifies warning lamps associated with the quality of operation for the Diesel Exhaust Fluid (DEF) and any action required from the operator.

## DEF Quality Operation

The DEF Lamp in conjunction with the Amber light warning, Red light warning and Fault codes are used to determine the level of inducement due to poor quality DEF. Below are the stages that will be triggered when poor quality DEF is detected.

**Table 3-50: Aftertreatment Warning Lamps for the Diesel Exhaust Fluid (DEF) Level**

| Indicator Lamps | | | | | |
|---|---|---|---|---|---|
| 3 | | | | | Solid STOP |
| 2 | Solid | Solid | Solid | Solid | Solid |
| 1 | Solid | Solid | Solid | Flashing | Flashing |
| **Warning Level** | Warning 1 | Warning 2 | Primary Inducement (Initial) | Secondary Inducement | Final Inducement |
| **Indicator Meaning** | DEF quality is poor. Appears within 30 minutes after the engine has been started. No limitations. DEF quality MUST be checked and corrected to prevent farther limitations. The DEF lamp is SOLID, Amber light warning is SOLID. | DEF quality is poor. Appears within 60 to 120 minutes after warning 1. No limitations. DEF quality issue MUST be checked and corrected to prevent farther limitations. The DEF lamp is SOLID, Amber light warning is SOLID. | Primary warning that DEF quality is poor. Appears 30 minutes after warning 2. A 25% reduction in torque and engine speed will be reduced. DEF quality MUST be checked and corrected to prevent farther limitations. The DEF lamp is SOLID, Amber light warning is SOLID.<br>• Cummins Fault codes: FC3714 | Secondary warning that DEF quality is poor. Appears 75 minutes after the primary inducement. A 50% reduction in torque and engine speed will be reduced. DEF quality MUST be checked and corrected to prevent farther limitations. The DEF lamp will FLASH, Amber light warning is SOLID.<br>• Cummins Fault codes: FC3714 | Final warning that DEF quality is poor. Appears 15 mins after the secondary inducement. 3 to 4 hours after warning 1 or fault detection is displayed before the final inducement is activated. The machine will be locked at idle and torque will be reduced. DEF quality issue MUST be corrected to gain engine speed and torque. The DEF lamp will FLASH, Amber light warning is SOLID, and Red STOP warning is SOLID.<br>• Cummins Fault codes: FC3712 |
| **Required Action** | Check DEF quality. Replace bad DEF with new good DEF and replace faulty component/ sensor. | Check DEF quality. Replace bad DEF with new good DEF and replace faulty component/sensor. | Check DEF quality. Replace bad DEF with new good DEF and replace faulty component/sensor. | Check DEF quality. Replace bad DEF with new good DEF and replace faulty component/sensor. | Check DEF quality. Replace bad DEF with new good DEF and replace faulty component/sensor. |
| | ***NOTE: Filling the DEF tank will not resolve the issue. Contact a Cummins authorized repair location.*** | | | | |

## Aftertreatment Indicator Lamp Identification: Diesel Exhaust Fluid (DEF)/SCR Malfunction Operation

Table 3-51 identifies warning lamps associated with the malfunctin operation for the Diesel Exhaust Fluid (DEF)/Selective Catalyst Reduction (SCR) and any action required from the operator.

### DEF/SCR Tampering or Malfunction Operation

The DEF Lamp in conjunction with the Amber light warning, Red light warning and Fault codes are used to determine the level of inducement due to tampering or malfunction of a component or components of the DEF/SCR system. Below are the stages that will be triggered when tampering or a malfunction is detected.

**Table 3-51: Aftertreatment Warning Lamps for the Diesel Exhaust Fluid (DEF)/SCR Malfunction Operation**

| Indicator Lamps | Warning 1 | Warning 2 | Primary Inducement (Initial) | Secondary Inducement | Final Inducement |
|---|---|---|---|---|---|
| 3 | | | | | Solid STOP |
| 2 | Solid | Solid | Solid | Solid | Solid |
| 1 | Solid | Solid | Solid | Flashing | Flashing |
| **Warning Level** | Warning 1 | Warning 2 | Primary Inducement (Initial) | Secondary Inducement | Final Inducement |
| **Indicator Meaning** | First warning that a component has been tampered with or malfunctioned. Appears within 1 hour after the engine has been started. No limitations. Diesel Exhaust Fluid Lamp is SOLID, Amber light warning is SOLID. | Second warning that a component has been tampered with or malfunctioned. Appears 60 to 120 mins after warning 1. No limitations. The Diesel Exhaust Fluid Lamp is SOLID, Amber light warning is SOLID. | • Primary warning that a component has been tampered with or malfunctioned. Appears 30 mins after warning 2. A 25% reduction in torque and engine speed will be reduced. The Diesel Exhaust Fluid Lamp is SOLID, Amber light warning is SOLID.<br>• Cummins Fault codes: FC3714 | Secondary warning that a component has been tampered with or malfunctioned. Appears 75 mins after the primary inducement. There will be a 50% reduction in torque and engine speed will be reduced. The Diesel Exhaust Fluid Lamp will FLASH, Amber light warning is SOLID.<br>• Cummins Fault codes: FC3714 | Final warning that a component has been tampered with or malfunctioned. Appears 15 mins after the secondary inducement. There is 3 to 4 hours after warning 1 or fault detection is displayed before the final inducement is activated. The machine will be locked at idle and torque will be reduced. The Diesel Exhaust Fluid Lamp will FLASH, Amber light warning is SOLID, and Red STOP warning is SOLID.<br>• Cummins Fault codes: FC3712 |
| **Required Action** | DEF/SCR MUST be checked for failed/tampered components and corrected to prevent farther limitations. | DEF/SCR MUST be checked for failed/tampered components and corrected to prevent farther limitations. | DEF/SCR MUST be checked for failed/tampered components and corrected to prevent farther limitations. | DEF/SCR MUST be checked for failed/ tampered components and corrected to prevent farther limitations. | DEF/SCR system failure MUST be corrected to gain engine speed and torque back. |
| | ***NOTE: If adding DEF to the DEF tank does not turn the indicator lamps off or restore engine power, contact a Cummins authorized repair location.*** | | | | |

## DEF/SCR System Override

When a DEF/SCR system fault is detected whether it is a DEF level, DEF quality, or tampering/malfunction issue the system can be overridden. If system is overridden the inducement will go back to the primary inducement and limitations. You will then have 30 minutes before final inducement is reached again. During the 30 minutes of the override you will go through the both the primary and secondary limitations. You can perform an override 3 times before the system will lock in the final inducement stage and the issue must be fixed to gain torque and engine speed back. Inducement override cannot be done if final inducement is reached. Inducement override can ONLY be done in the primary or secondary inducement stages. The SCR system override is done through the EIC (dash display).

## Final Inducement Overview/Summary

Final inducement is requested by ECM 3 to 4 hours after warning 1 or fault detection for DEF quality and Tampering/Malfunction. For DEF level final inducement is requested 30 minutes after the DEF level gage reads ZERO. When final inducement is requested engine speed is LOCKED to idle, the engine STOP lamp will be ON for two minutes to warn the operator after which engine speed will gradually ramp down to idle speed, engine STOP light remains ON. Once in final inducement engine power will not be restored until the fault condition is resolved. As soon as final inducement is requested inducement override switch functionality is disabled as soon as the STOP lamp is turned ON and derates are applied. After the fault condition has been resolved and the engine is running the ECM shall wait for operator activity to be detected after which the STOP lamp is turned OFF immediately and engine speed is ramped up slowly to commanded engine speed. The Amber light warning is turned OFF within 10 minutes of the engine running after the fault condition is resolved.

## PM Warning Level and Required Procedures

During Auto Regeneration Mode when the PM level has built up in the DPF, the regeneration cycle will begin automatically. If the regeneration cycle is interrupted or the regeneration conditions are not satisfied, the buzzer starts sounding and the indicator display changes in response to the PM level in order to prompt the operator to perform the required procedure listed below.

***NOTE: Once the regeneration level has been reached, immediately perform the required procedure for regeneration. Interrupting the regeneration cycle or continued operation by ignoring the warning signs may cause DPF and engine damage.***

**Table 3-52: Auto Regeneration Mode**

| | DPF system status | | Required Procedure |
|---|---|---|---|
| **PM warning level: 1 Buzzer: Not sounding** |  | The regeneration indicator starts flashing | A specific amount of PM has accumulated in the DPF muffler. Continue to work the tractor to raise the DPF temperature. Continue the work and increase the engine rpm until the indicator turns “OFF”.<br><br>The regeneration cycle begins and continues until cycle is complete then the indicator will turn “OFF”. |
| |  | The RPM increase indicator starts flashing. | |
| |  | The regeneration indicator will stop flashing and remain “ON” constantly. | |
| **PM warning level: 2-1 Buzzer: Sounding every 5 seconds** | If the regeneration cycle was interrupted or conditions are not satisfied for regeneration then DPF system is now in Level 2. | | |
| **PM warning level: 2-2 Buzzer: Sounding every 3 seconds** |  | The regeneration indicator starts flashing. | Start the regeneration, referring to PM warning level: 1 above. Now the parked regeneration indicator starts flashing and the parked regeneration can also be started. If the regeneration conditions are not met, perform the parked regeneration. For the procedure, refer to Operating Procedure for Parked Regeneration. |
| |  | The RPM increase indicator starts flashing | |
| |  | The parked regeneration indicator starts flashing. | |

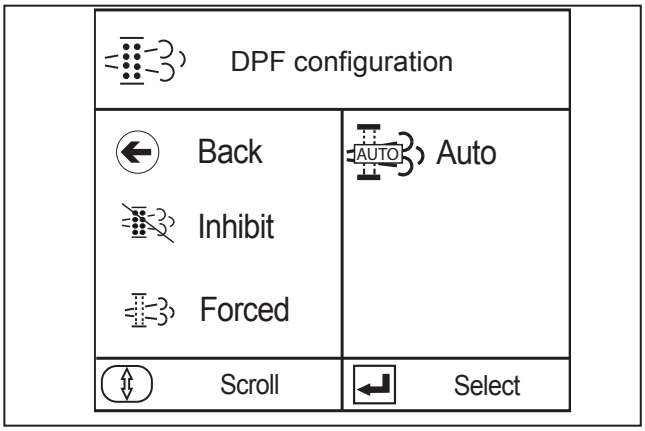
**Table 3-54: Auto Regeneration Mode**

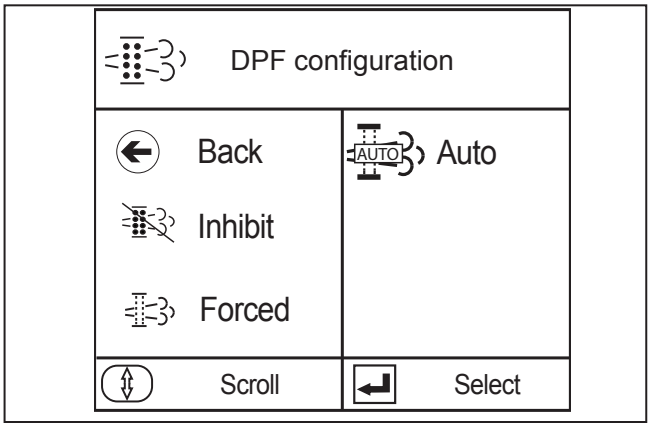
| | DPF system status | | Required Procedure |
|---|---|---|---|
| **PM warning level: 3**<br>**Buzzer: Sounding every 1 second**<br>**Engine output: 50%** | If the regeneration fails in the warning level 2: | | |
| |  | The engine warning indicator starts flashing. | Immediately discontinue working the tractor and begin the parked regeneration cycle process.<br>For the procedure, refer to Operating Procedure for Parked Regeneration.<br>At this PM warning level, the Auto Regeneration Mode does not function.<br>If the tractor is operated further, the regeneration cycle will be disabled. |
| |  | The parked regeneration indicator starts flashing. | |
| **PM warning level: 4**<br>**Buzzer: Sounding every 1 second**<br>**Engine output: 50%** | If the parked regeneration is interrupted or the tractor is continuously operated in the warning level 3: | | |
| **PM warning level: 5**<br>**Buzzer: Sounding every 3 seconds** |  | The engine warning indicator remains constantly “ON”. | Immediately move the tractor to a safe place and park it there and turn the engine “OFF”.<br>Contact your local Kubota Dealer.<br>At this level, never continue to operate the tractor otherwise damage will result to the DPF and engine. |

## Introduction to Inhibiting, Forcing and Re-enabling DPF Regeneration

By default, the aftertreatment system is enabled and will burn off soot in the diesel particualte filter automatically. While the aftertreatment system is enabled you have the option to inhibit (stop) the regeneration process or to force a regeneration.

See the following pages for instructions.



## Inhibiting DPF Regeneration

**WARNING**

Do not inhibit regeneration more than twice without performing the regeneration process. If the inhibit function is used a third time the Engine Control Module (ECM) will force the engine to shut down and generate a red engine alarm on the display panel. The engine cannot be restarted without the ECM being reprogrammed by an authorized Cummins technician.

Do not inhibit the automatic DPF regeneration process unless regeneration poses a safety hazard. For example, if the high exhaust temperatures might ignite nearby combustible materials, then inhibit the aftertreatment system and drive to a location where it is safe to re-enable the automatic aftertreatment system.

***NOTE: Make sure it is safe to postpone the regeneration and necessary to finish working without further interruption before inhibiting regeneration.***

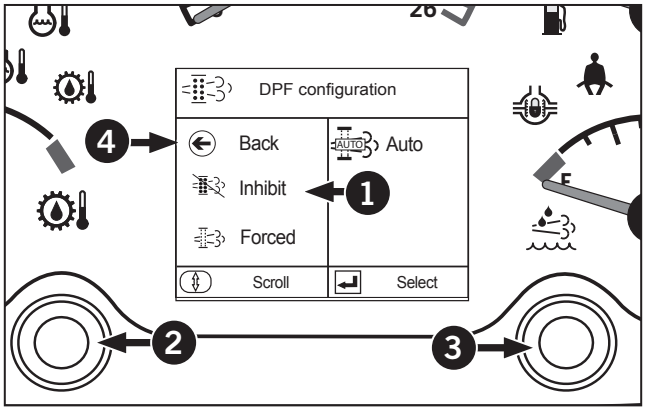
***NOTE: DPF regeneration must be performed at the earliest possible time and cannot be postponed indefinitely.***

The INHIBIT Mode (1) is available if the aftertreatment system is enabled.

To inhibit DPF regeneration:

1. Press the Scroll button (2) on the EIC dash until the INHIBIT is highlighted.
2. Press the Select button (3).
3. The aftertreatment system is now temporarily stopped.
4. Re-enable the aftertreatment system. See next page.

To return to the top screen at any time, use the Scroll button to select Back (4).



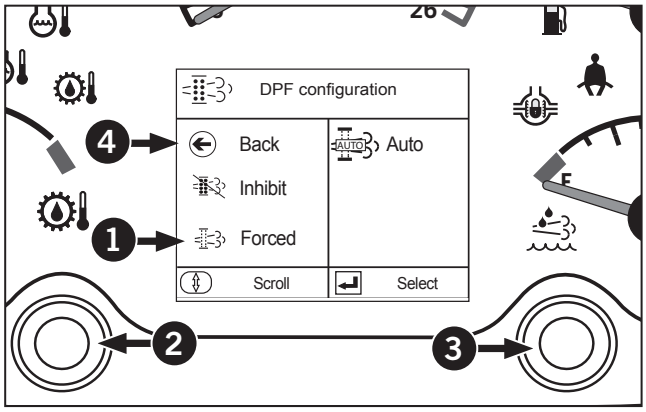
## Forcing DPF Regeneration

**WARNING**

Make sure the exhaust pipe is not directed at any surface or material that can combust due to exposure to high exhaust temperature.

A forced regeneration is also referred to a “parked” or a “manual” regeneration.

The Forced Regeneration Mode (1) is available if the aftertreatment system is enabled and the DPF Lamp will be on and tractor at idle. The tractor will go to 1 000 rpm meaning and the throttle can not be touched or it will jump out of regen.




To force a DPF regeneration:

1. Engage the parking brake. Make sure the engine is running.
2. If the aftertreatment system was inhibited, re-enable automatic mode.
3. Press the Scroll button (2) on the EIC dash until FORCED is highlighted.
4. Press the Select button (3). The aftertreatment system will now burn off soot in the diesel particulate filter. Once a forced regeneration is complete, the DPF system will return to automatic (enabled) mode.

To return to the top screen at any time, use the Scroll button to select Back (4).

***NOTE: To perform forced regen. Clean request must be active (DPF lamp on), park brake on and tractor at idle.***

***NOTE: If throttle is touched, forced regen will be aborted.***

## Auto Regeneration Mode

**WARNING**

Make sure the exhaust pipe is not directed at any surface or material that can combust due to exposure to high exhaust temperature.

The Auto Regeneraton Mode (1) is available if the aftertreatment system is enabled.

To automatic a DPF regeneration:

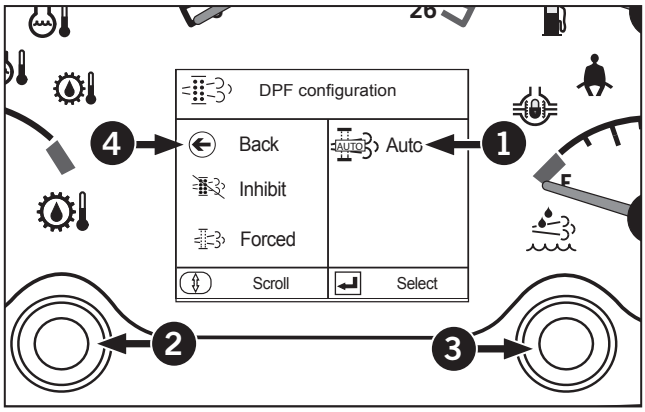
1. Engage the parking brake. Make sure the engine is running.

   ***NOTE: (Make sure that the DPF INHIBIT switch lamp is "OFF".)***

   ***NOTE: Switch lamp OFF: Auto Regeneration Mode activated.***

   ***NOTE: Switch lamp ON: Regeneration Inhibit Mode activated.***
2. If the aftertreatment system was inhibited, re-enable automatic mode.
3. Press the Scroll button (2) on the EIC dash until Auto Regeneration is highlighted.
4. Press the Select button (3).
5. When the regeneration indicator starts flashing: A specific amount of PM has built up in the DPF.
6. Continue to operate the tractor and the regeneration process will begin automatically, make sure the working place is in a safe area as DPF and exhaust temperature will rise.

To return to the top screen at any time, use the Scroll button to select Back (4).




***NOTE: If the Auto Regeneration Mode is selected, DPF regeneration may not begin because system requirements have not been satisfied.***

## Headland Management System

The purpose of the Headland Management System (HMS) is to reduce the number of actions performed by the operator while turning the vehicle at the end of the field. This is accomplished by recording the actions performed during the first turn and then replaying those actions during subsequent turns.

The HMS system has 2 main functions: recording and playback. In recording mode, eligible operator commands are stored in HMS memory. During playback, the stored commands are read from HMS memory and executed exactly as if they had been performed by the operator. The operator always has full control over the vehicle. New commands issued by the operator during playback will override the commands issued by the HMS.

Every sequence of commands stored in HMS memory is split into 2 stages: exit and enter. This 2-stage approach allows the operator to perform turns with different lengths or at varying speeds.

The recording process begins when the operator selects a sequence (A) and ends when the operator saves the recording (F). The exit stage occurs between (B) and (C), the enter stage occurs between (D) and (E).

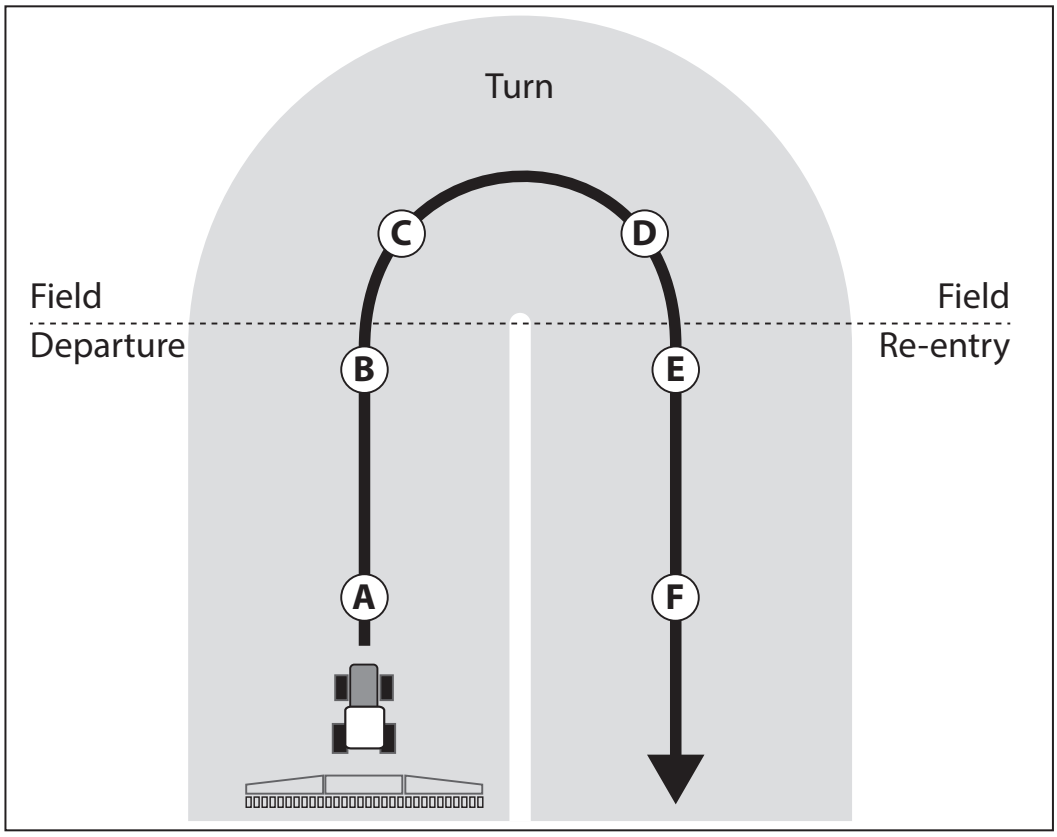
### Operating Restrictions

The HMS is designed only for operation in the field while the operator has control of the tractor. Several built-in restrictions in place prevent misuse of the HMS. Recording or playback will stop if any of these conditions are not met:

- The operator must be in the seat.
- The engine must be running at 900 rpm or higher and the tractor must be traveling at 0.5 – 10.0 km/h (0.6 – 6.2 mph).
- The parking brake and service brake must not be engaged.
- The transmission shift lever must be in forward.

  ***NOTE: Engaging the inching pedal terminates the HMS system.***
- Transmission auto shift mode must not be engaged.

The operator can also stop playback or override a command at any time by pressing the trigger button or any of the sequence buttons.

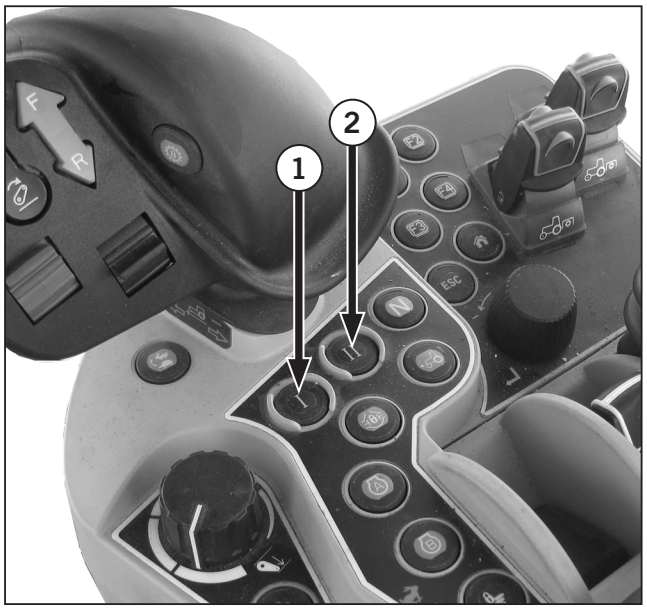


### Preprogram Operating Procedure sample

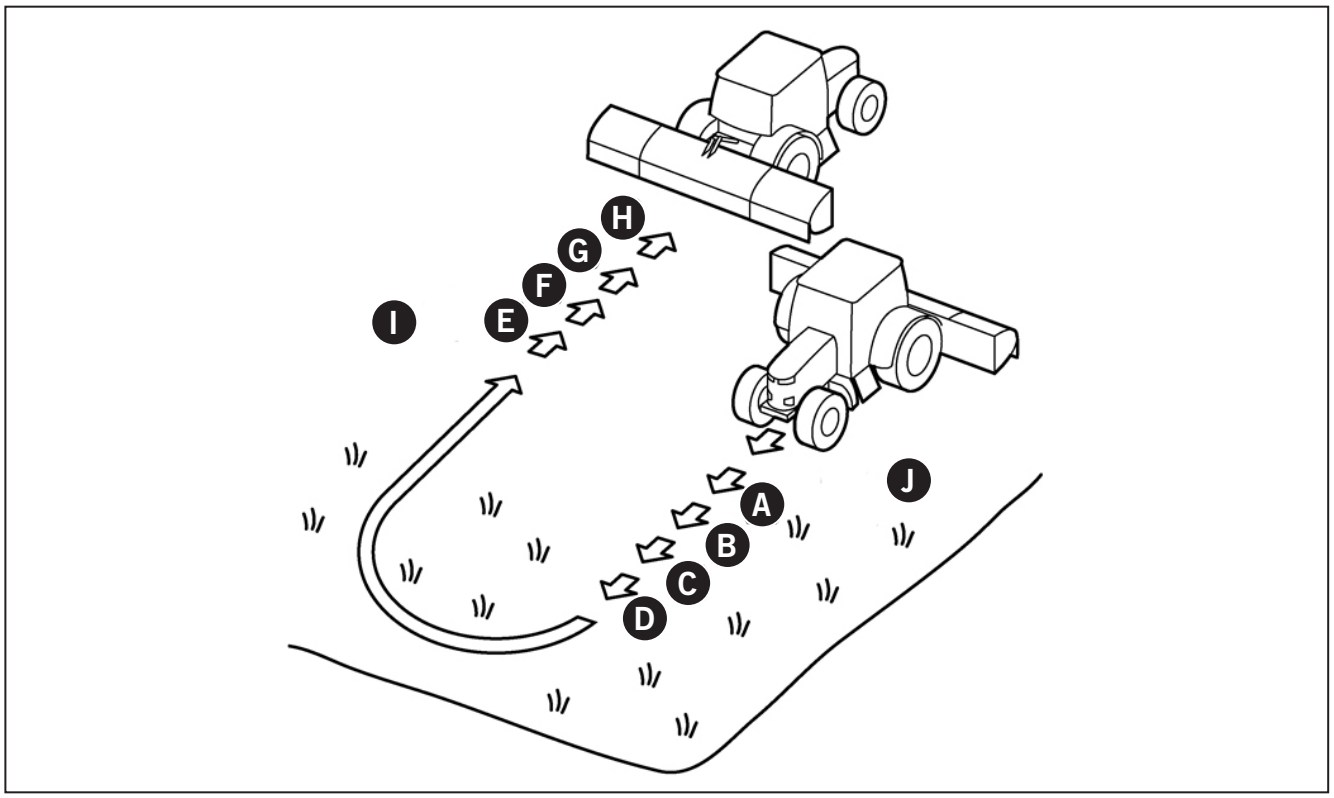
1. Press the field-out button (1) when you reach the headland, the steps (A) thru (D) are carried on in sequence.
2. After swiveling the machine, press the field-in button (2) the steps (E) thru (H) are carried on in sequence.

**Table 3-55: Headland Operating Example**

| Field out | |
|---|---|
| A | Implement (UP) |
| B | PTO (OFF) |
| C | Differential lock (OFF) |
| D | 4WD (OFF) |
| E | 4WD (ON) |
| F | Differential lock (ON) |
| G | PTO (ON) |
| H | Implement (DOWN) |




- (I) - Field In
- (J) - Field Out

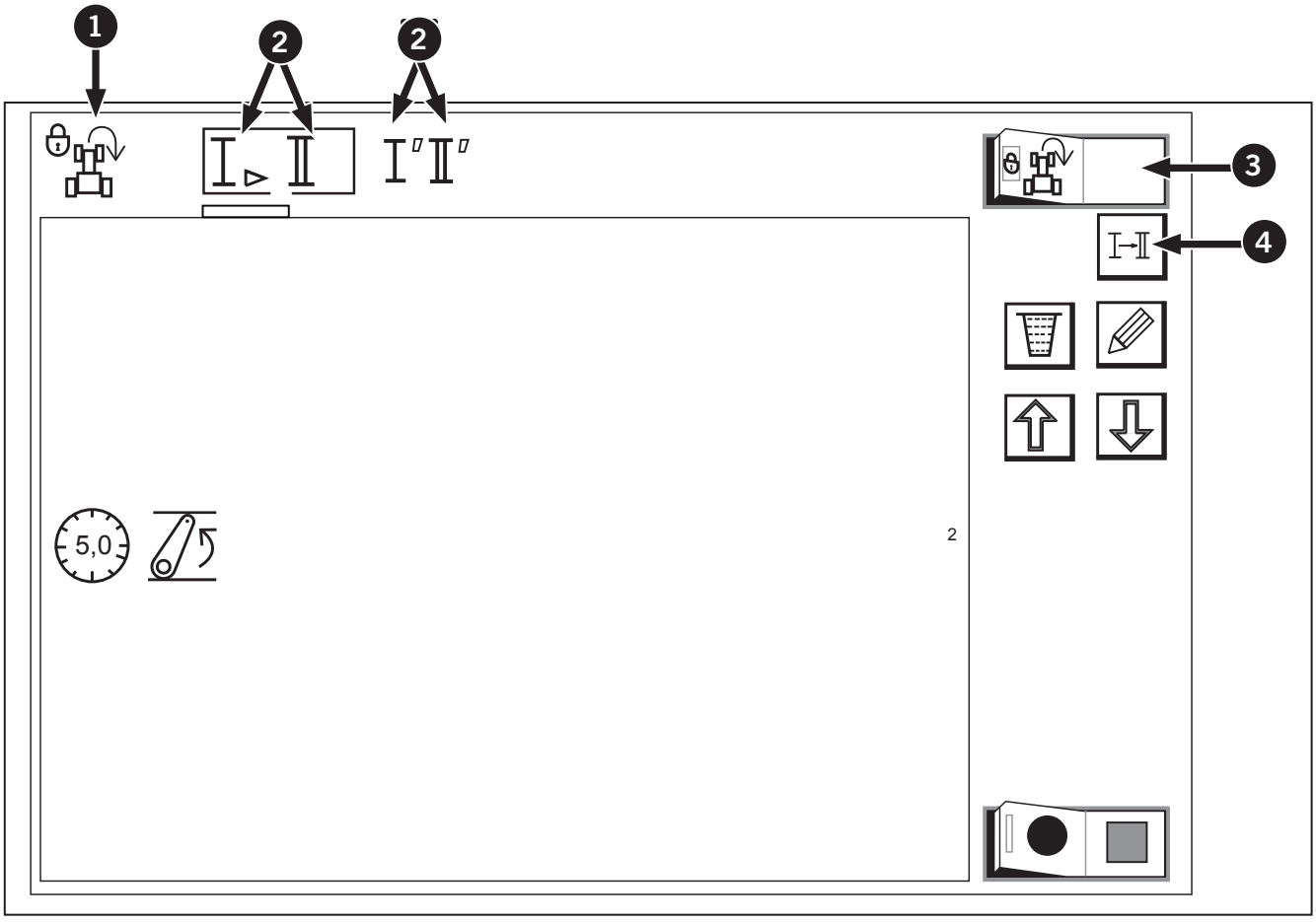


### Headland Management System Display Icons

The following icons are displayed on the monitor when HMS is enabled. Refer to Headland Management System on "Headland Management System" on page 3-201.

**Table 3-56: HMS Display Icons**

| Icon | |
|---|---|
| 1 | Headland Management System lock indicator |
| 2 | Program code display indicator |
| 3 | Headland Management System lock/ unlock switch |
| 4 | Program select switch |



## Headland Managament System Settings

Before recording this program, read Table 3-57 below to confirm programmable actions.

**Table 3-57: Recordable Program**

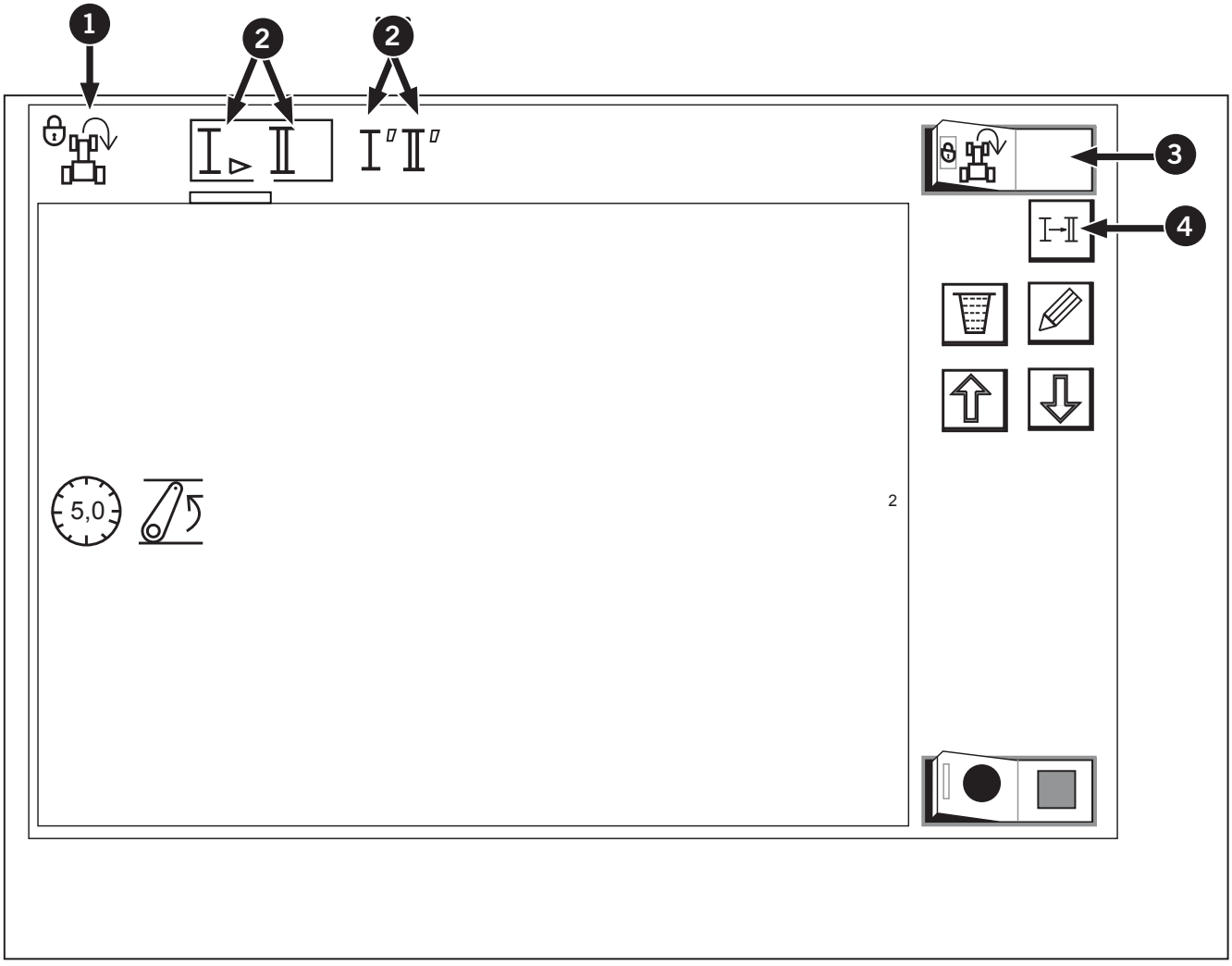
| Type of work | Program select switch | Program | Indicator | |
|---|---|---|---|---|
| A | Code: I | Field out | Indicator “I” lights up | ○ is displayed and indicates recording |
| | Code: II | Field in | Indicator “II” lights up | ○ is displayed and indicates recording |
| B | Code: I | Field out | Indicator “I$^{i}$” lights up | ○ is displayed and indicates recording |
| | Code: II | Field in | Indicator “II$^{i}$” lights up | ○ is displayed and indicates recording |

### Preparations for recording the program

The program consists of 2 different types of operation, “Field in” and “Field out”. The recorded entries can be overwritten any number of times.

1. Touch the right half of the Headland Management System lock/unlock switch (3) to unlock the program. A touch on the left half gets the program locked. When the program is unlocked, the Headland Management System lock indicator (1) goes off.
2. Using the program select switch (4), choose the program code “I“. Every time the select switch is touched, the program code alternates among “I, II, ”I’” and “II’” in that order.

The program code display indicator (2) lights up interlocked with the select switch (4).

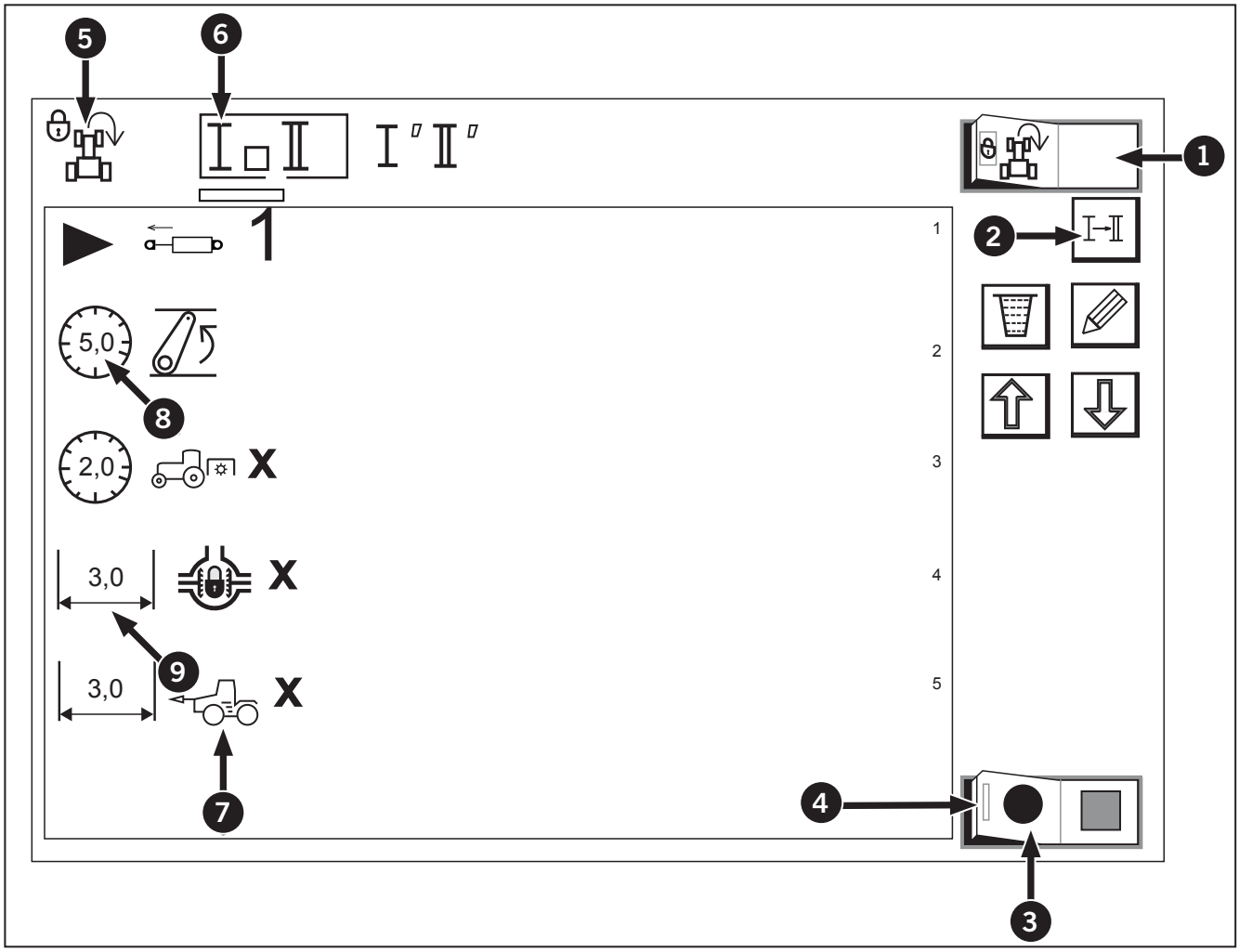


## Headland Management System Recording Icons

The following icons are displayed on the monitor when HMS is in recording mode. See Table 3-58.

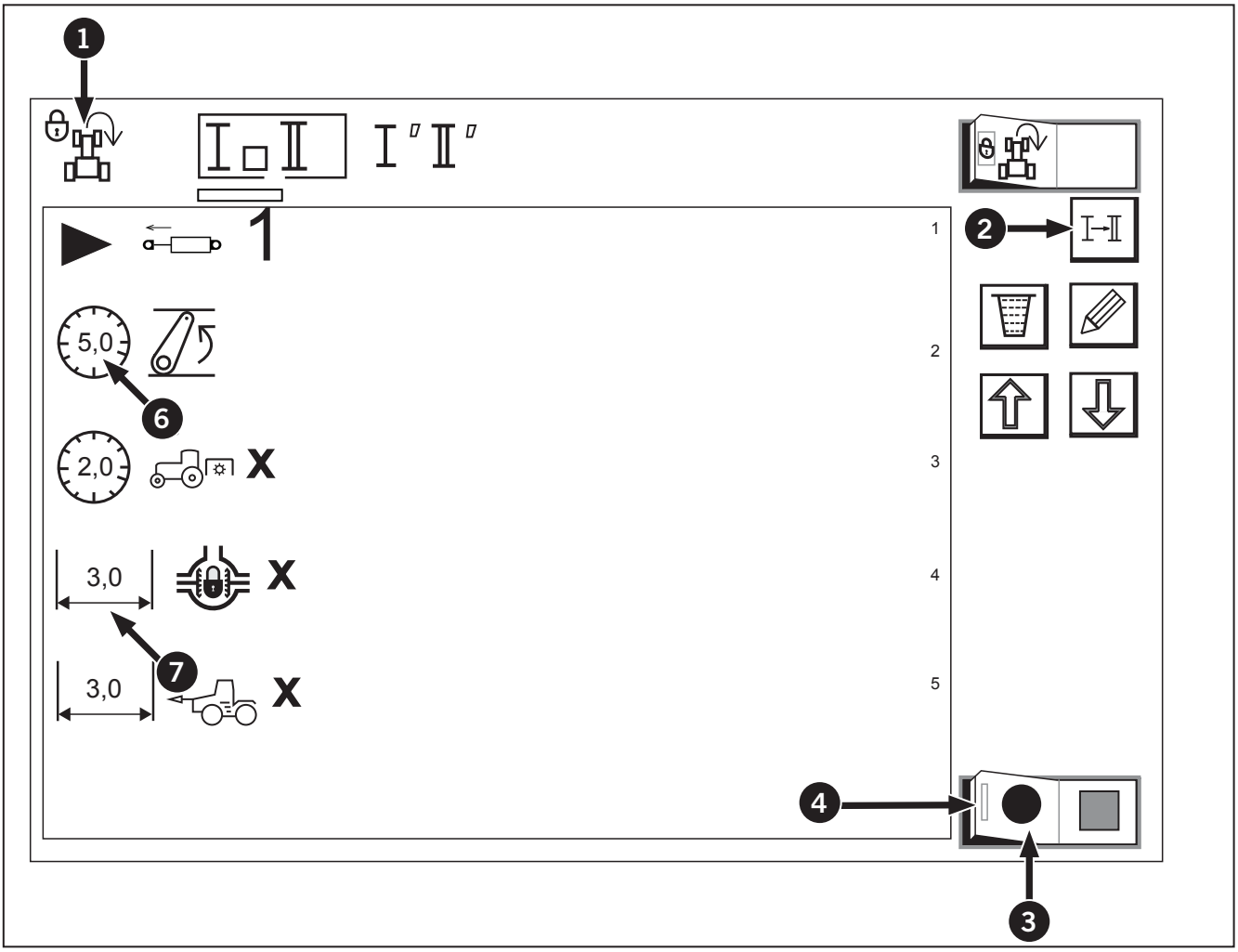
**Table 3-58: Recording Icons**

| Icon | |
|---|---|
| 1 | Headland Management System lock/ unlock switch |
| 2 | Program select switch |
| 3 | Record switch |
| 4 | Indicator |
| 5 | Headland Management System lock indicator |
| 6 | Program codes " indicator |
| 7 | Subcategory icon |
| 8 | Pre-program lead time |
| 9 | Pre-program travel distance |



## Recording Program

1. Make sure the Headland Management System lock indicator (1) is off.
2. Using the program select switch (2), be sure that the program code “I” (Field out) is selected.
3. Touch the left half of the automatic record switch (3) and the indicator (4) of this switch lights up to show that the program is ready to be recorded.
   - Carry out actual work in accordance with the field-out operation procedure to record in the program.
4. In the monitor’s LCD screen, the subcategory icons (5) get displayed one by one according to the program recording order.
   - If the tractor stops and the procedure is still used, the interrupt duration is recorded as lead time (6). If the tractor travels and the procedure is continued, the distance (7) is recorded.
5. With the field-out operating procedure completed, touch the right half of the record switch (3) to end the recording procedure.
   - Now the field-out operating procedure has been recorded.
6. Using the program select switch (2), choose the program code “II” (Field in).
7. Record the field-in operating procedure.
   - Now the recording for both the program codes “I” and “II” is completed.

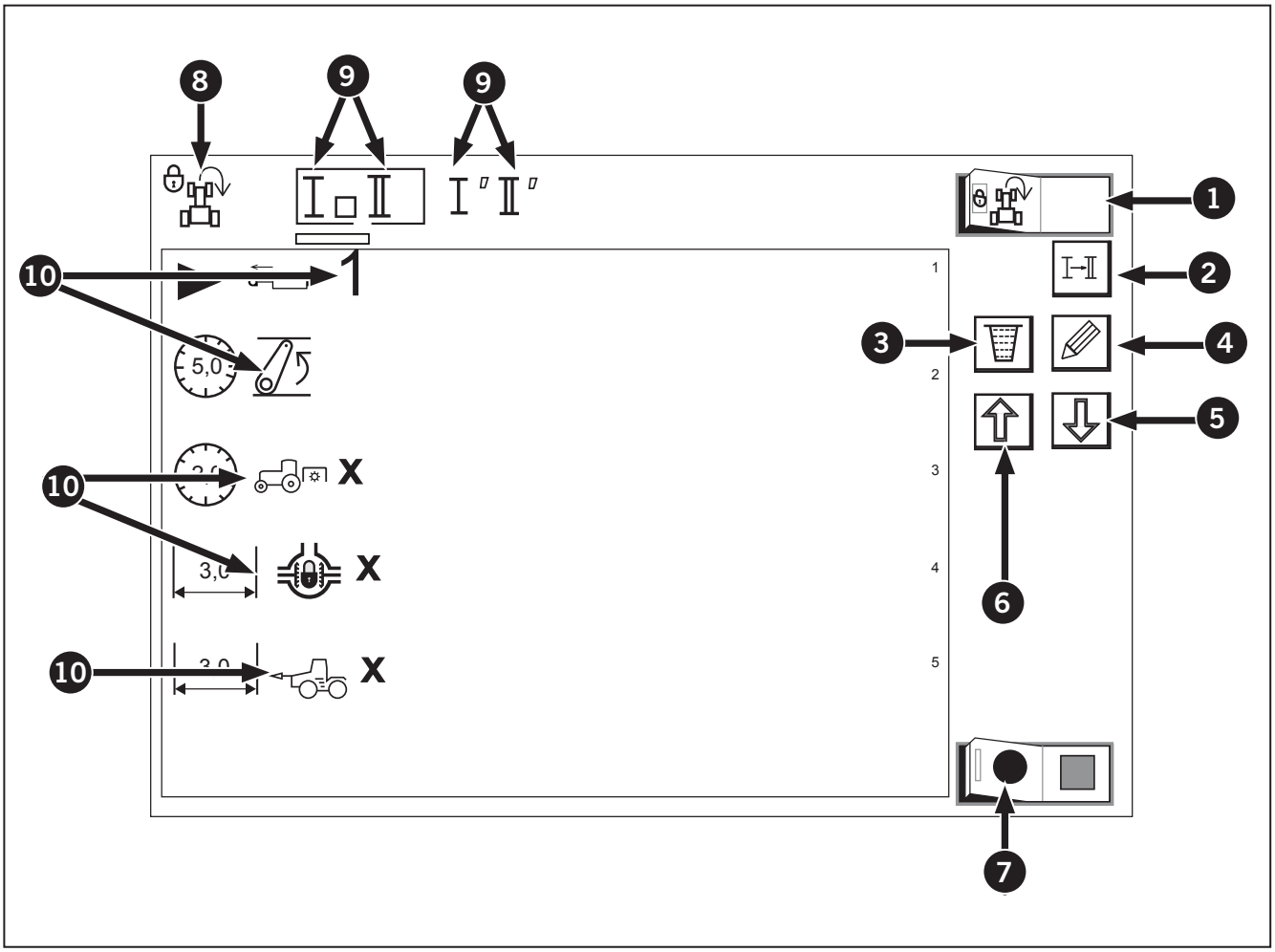


## HMS Delete Program Icons

The following icons are displayed on the monitor. See Table 3-59.

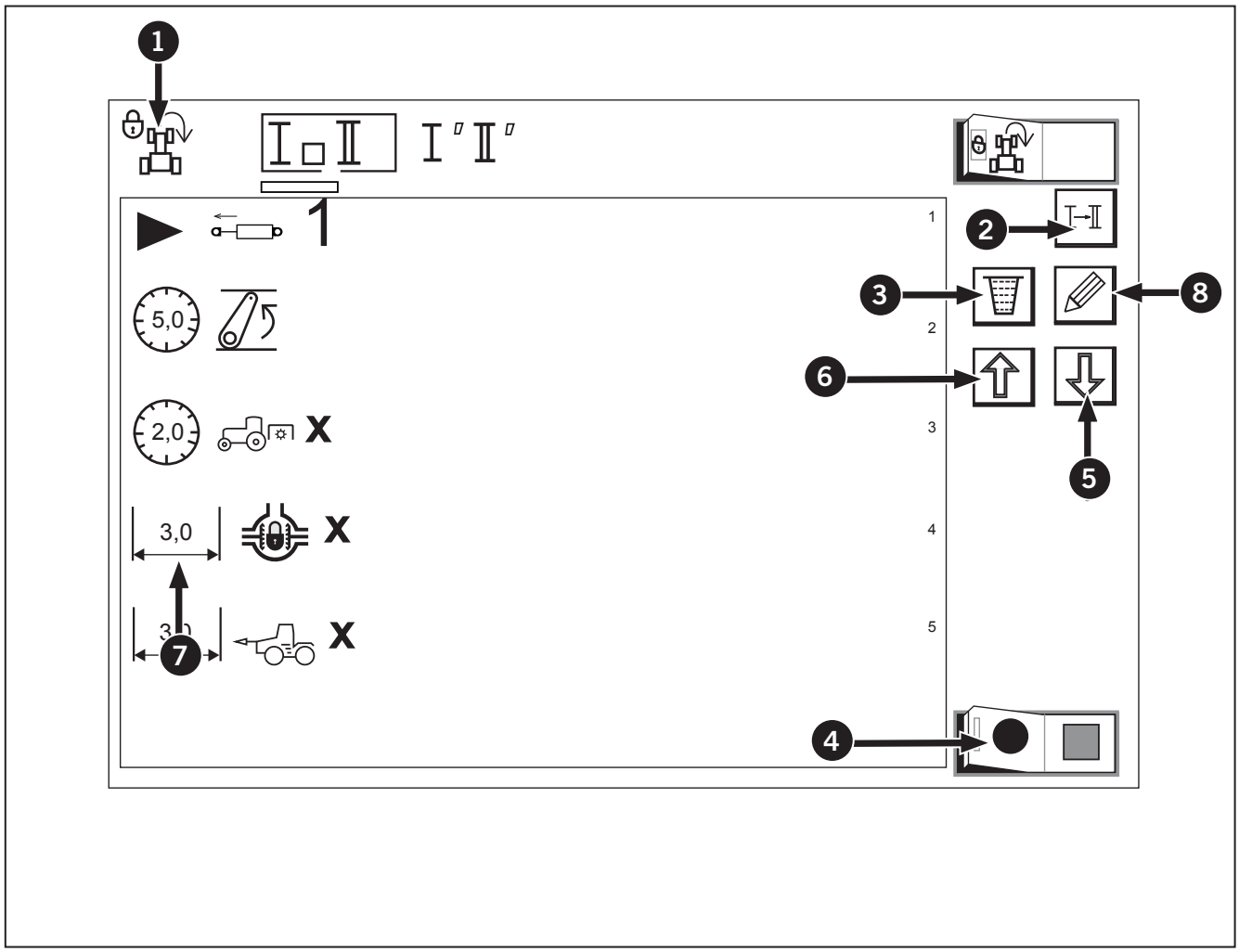
| Table 3-59: Delete Program Icons | |
|---|---|
| Icon | |
| 1 | Headland Management System lock/ unlock switch |
| 2 | Program select switch |
| 3 | Delete switch |
| 4 | Edit switch |
| 5 | Scroll switch (DOWN) |

| Table 3-59: Delete Program Icons | |
|---|---|
| Icon | |
| 6 | Scroll switch (UP) |
| 7 | Record switch |
| 8 | Headland Management System lock indicator |
| 9 | Program code indicator |
| 10 | Subcategory icon |



## Deleting Program

1. Make sure the Headland Management System lock indicator (1) is off.
2. Using the program select switch (2), choose the program code to delete.
3. To delete the entire program, touch the delete switch (3). (The deleting can also be done by turning on the record switch (4) first and then immediately turning it off.)
4. To delete part of a program:
   - Select the program you want to delete a step from by using the program select button (2).
   - Select the step you wish to delete by using the scroll up and down switches (5 and 6).
   - Press edit button (8) to access step editing.
   - While in step editing, press the delete button located on the right side of screen. See page 3-214 for image button (6).

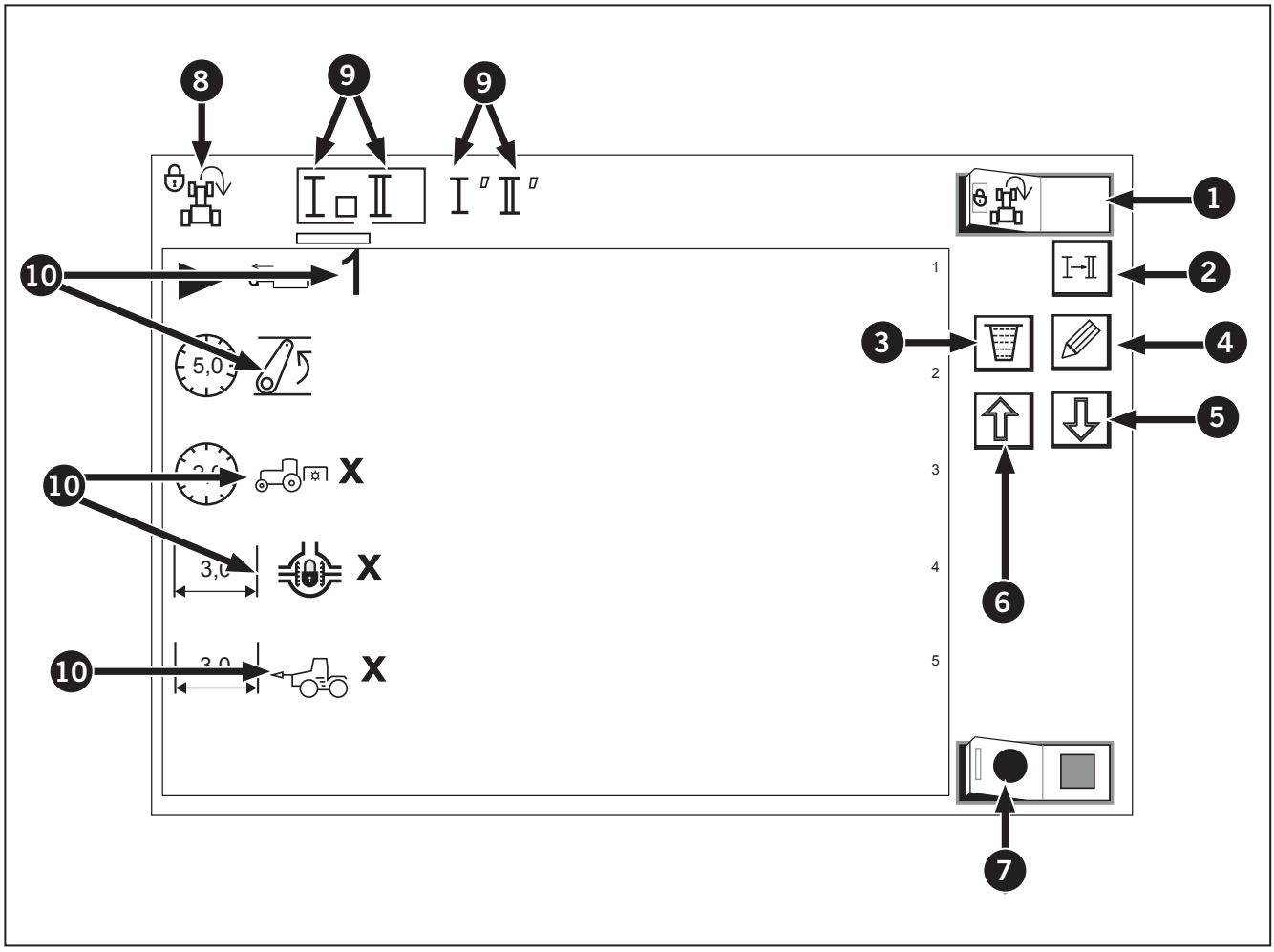


## HMS Modifying Program Icons

The following icons are displayed on the monitor. See Table 3-60.

| Table 3-60: Modifying Program Icons | |
|---|---|
| **Icon** | |
| 1 | Headland Management System lock/ unlock switch |
| 2 | Program select switch |
| 3 | Delete switch |
| 4 | Edit switch |

| Table 3-60: Modifying Program Icons | |
|---|---|
| **Icon** | |
| 5 | Scroll switch (DOWN) |
| 6 | Scroll switch (UP) |
| 7 | Record switch |
| 8 | Headland Management System lock indicator |
| 9 | Program code indicator |
| 10 | Subcategory icon |

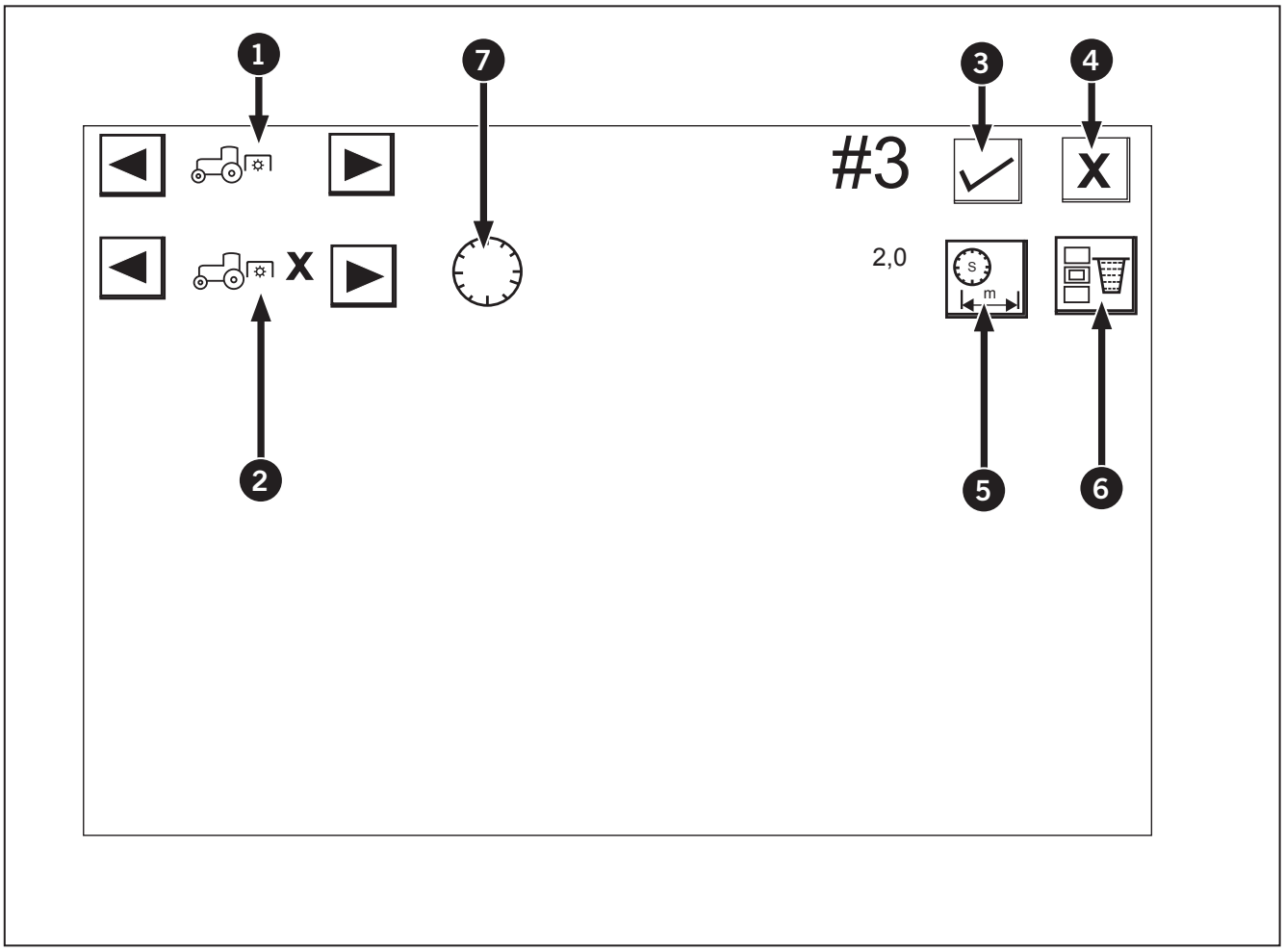


### HMS Modifying PTO to Differential Lock Program Icons

The following icons are displayed on the monitor. See Table 3-61.

**Table 3-61: Modifying PTO to Differential Lock Program Icons**

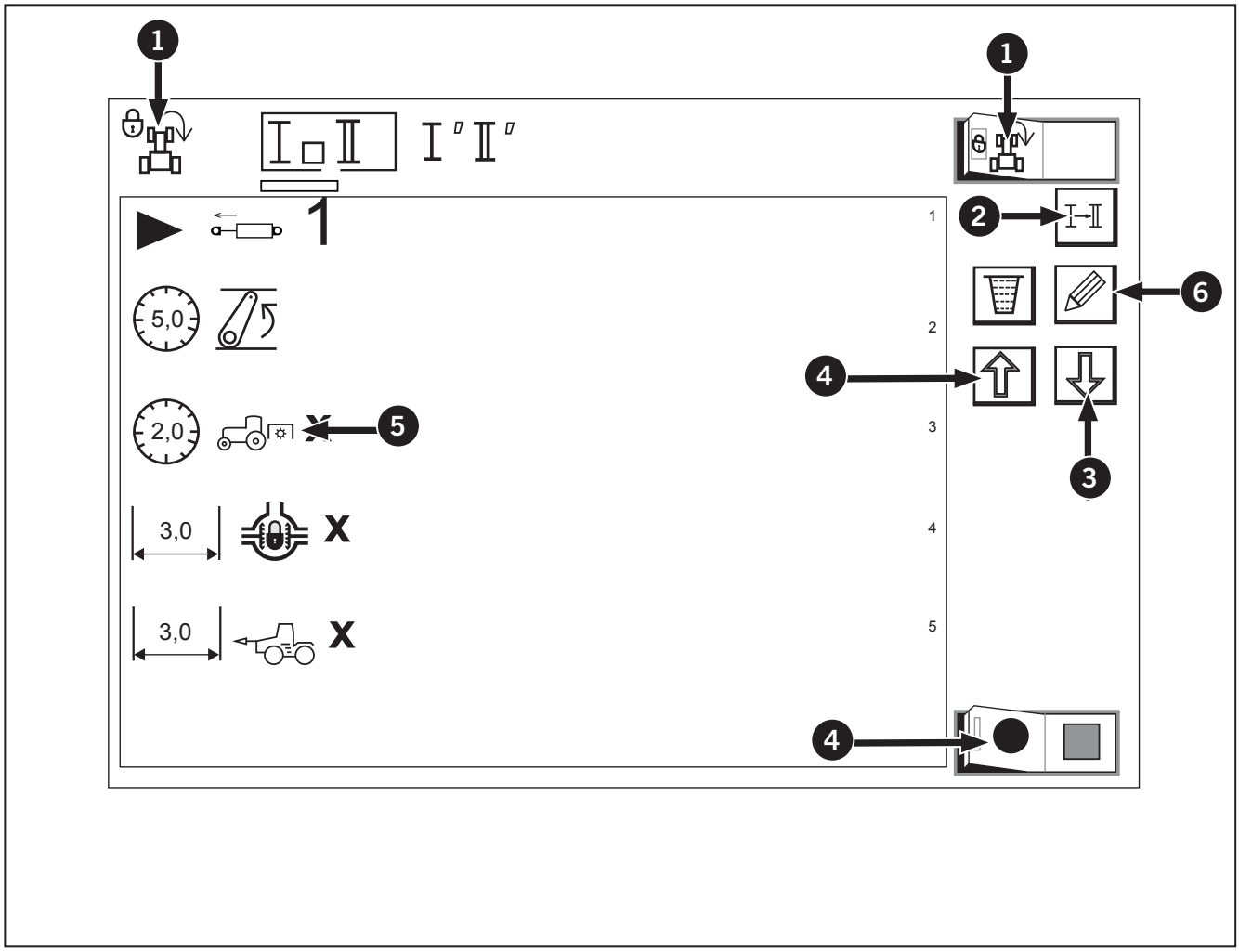
| Icon | |
|---|---|
| 1 | PTO-related main category icon |
| 2 | Subcategory icon |
| 3 | Save switch |
| 4 | Cancel switch |
| 5 | Distance/time select switch |
| 6 | Delete switch |
| 7 | Lead time icon (Timer) |



### HMS Modifying Program

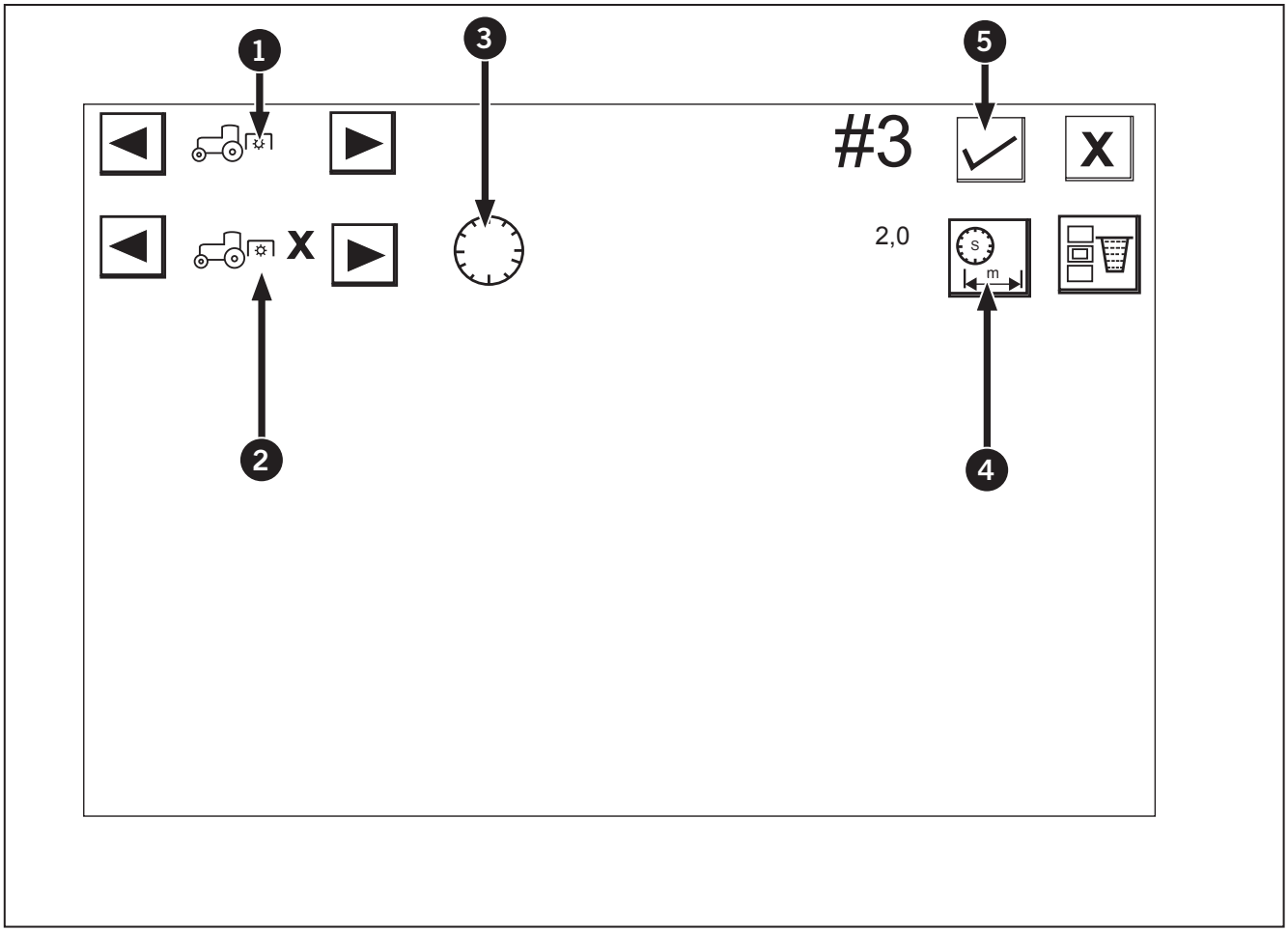
Example: Modifying the lead time for the PTO shaft to stop from the current 2-second entry to a 5-second entry.

1. Make sure the Headland Management System lock indicator (1) is off.
2. Using the program select switch (2), choose the program code to modify.
3. Using the scroll switch (3 or 4) to select the PTO-related subcategory icon (5) to modify. Then touch the edit switch (6).
   - Now the following editing screen appears.



4. On the editing screen, the PTO-related main category icon (1) and subcategory icon (2), selected in the above step 3, are automatically displayed. Refer to
   - Make sure the lead time icon (timer) (3) is on. Then touch this icon.
5. Enter a new lead time (5 seconds in this example) and save the entry using the Numeric Keypad.

   ***NOTE: To change the lead time to the pre-program distance, touch the distance/time select switch (4). The lead time icon (3) changes to the distance icon. The steps hereafter are the same as for the lead time setting.***
6. Touch the save switch (5).
   - The "Change settings. Are you sure?" message appears.
   - If “YES” is selected, the program will be modified and the previous screen will show up again.

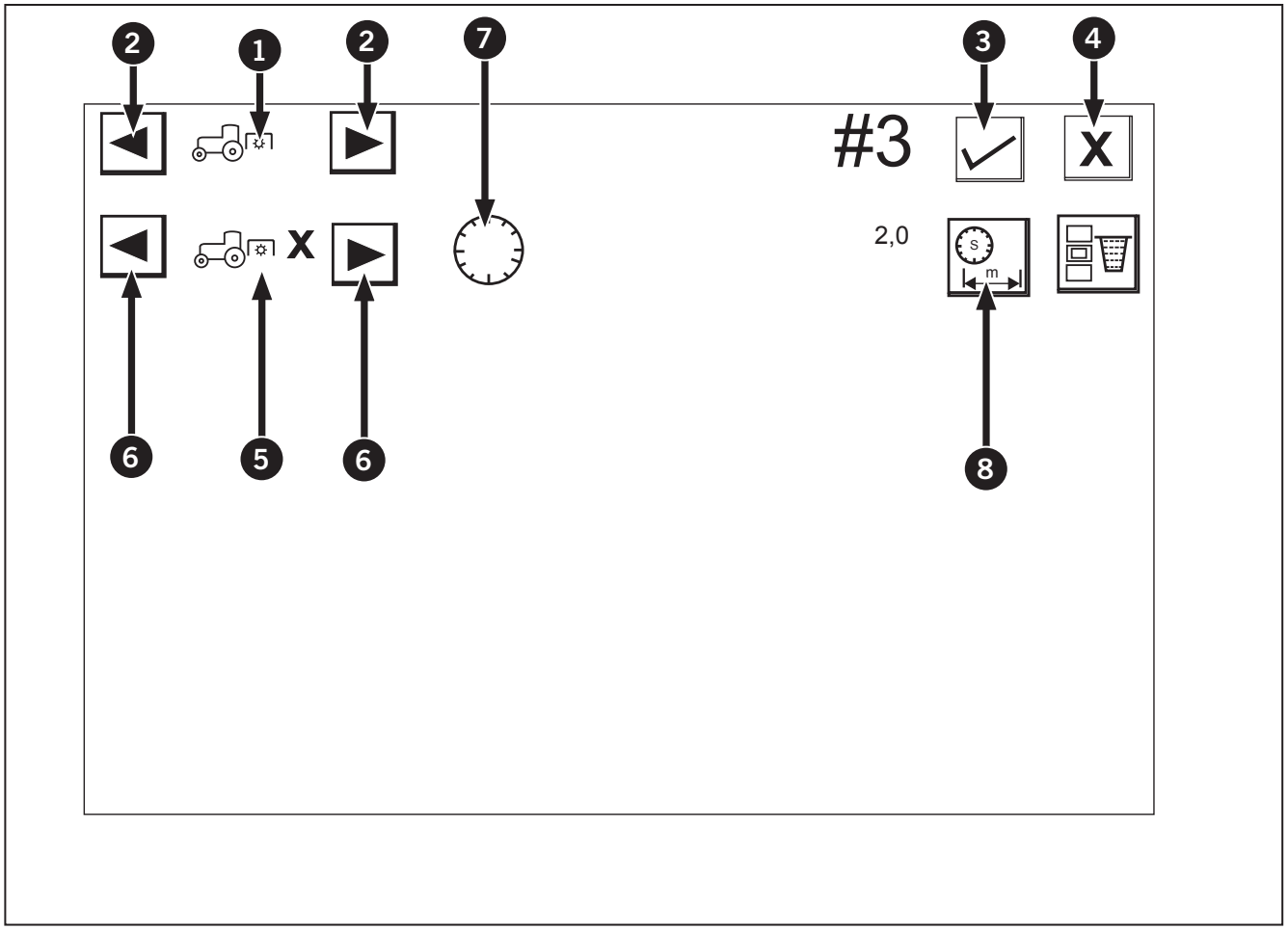


### HMS Modifying PTO to Differential Lock Program Icons

The following icons are displayed on the monitor. See Table 3-62.

**Table 3-62: Modifying PTO to Differential Lock Program Icons**

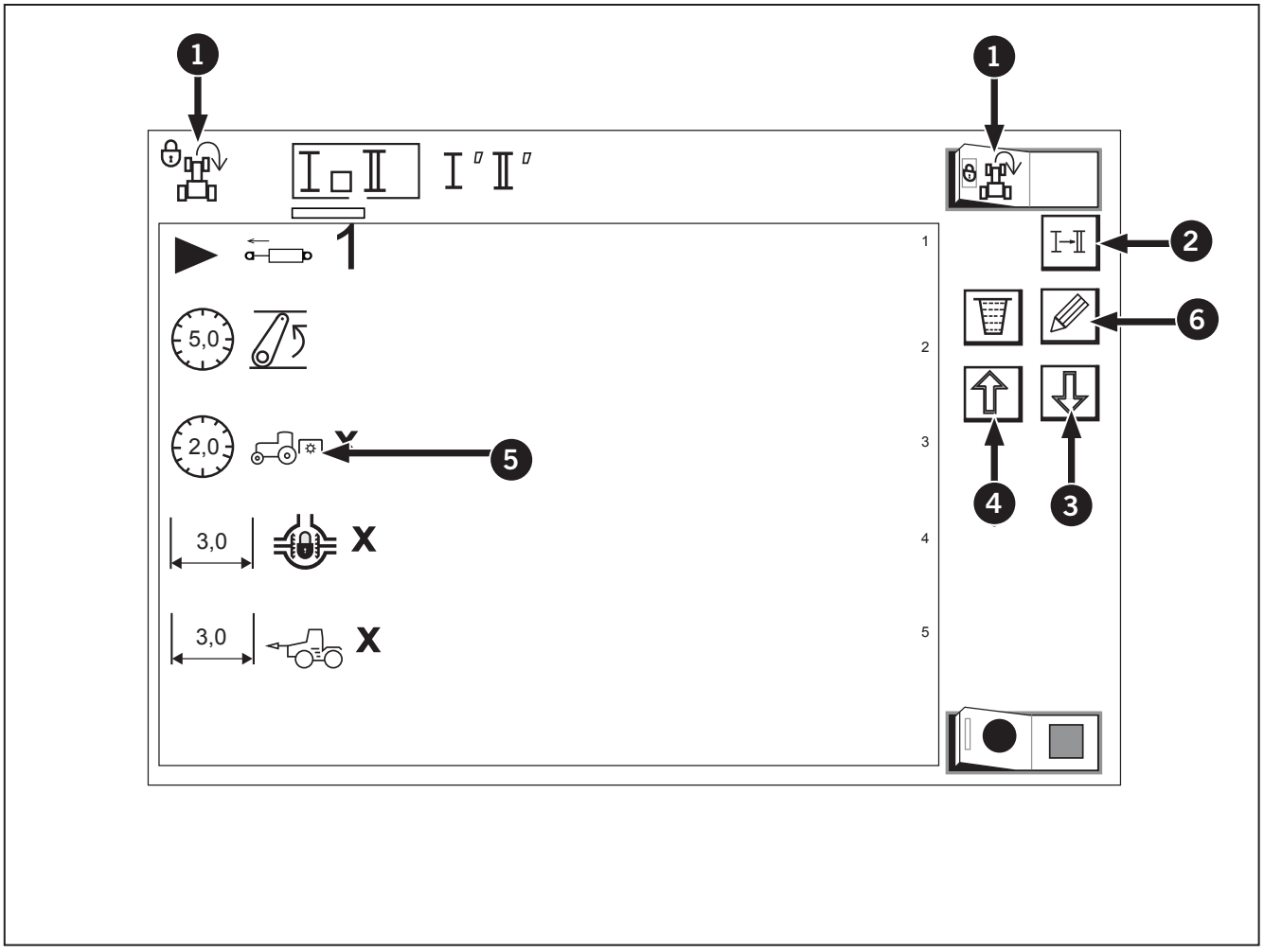
| Icon | |
|---|---|
| 1 | PTO-related main category icon |
| 2 | Main category scroll switch |
| 3 | Save switch |
| 4 | Cancel switch |
| 5 | Subcategory icon |
| 6 | Subcategory scroll switch |
| 7 | Pre-program distance icon |
| 8 | Distance/time select switch |



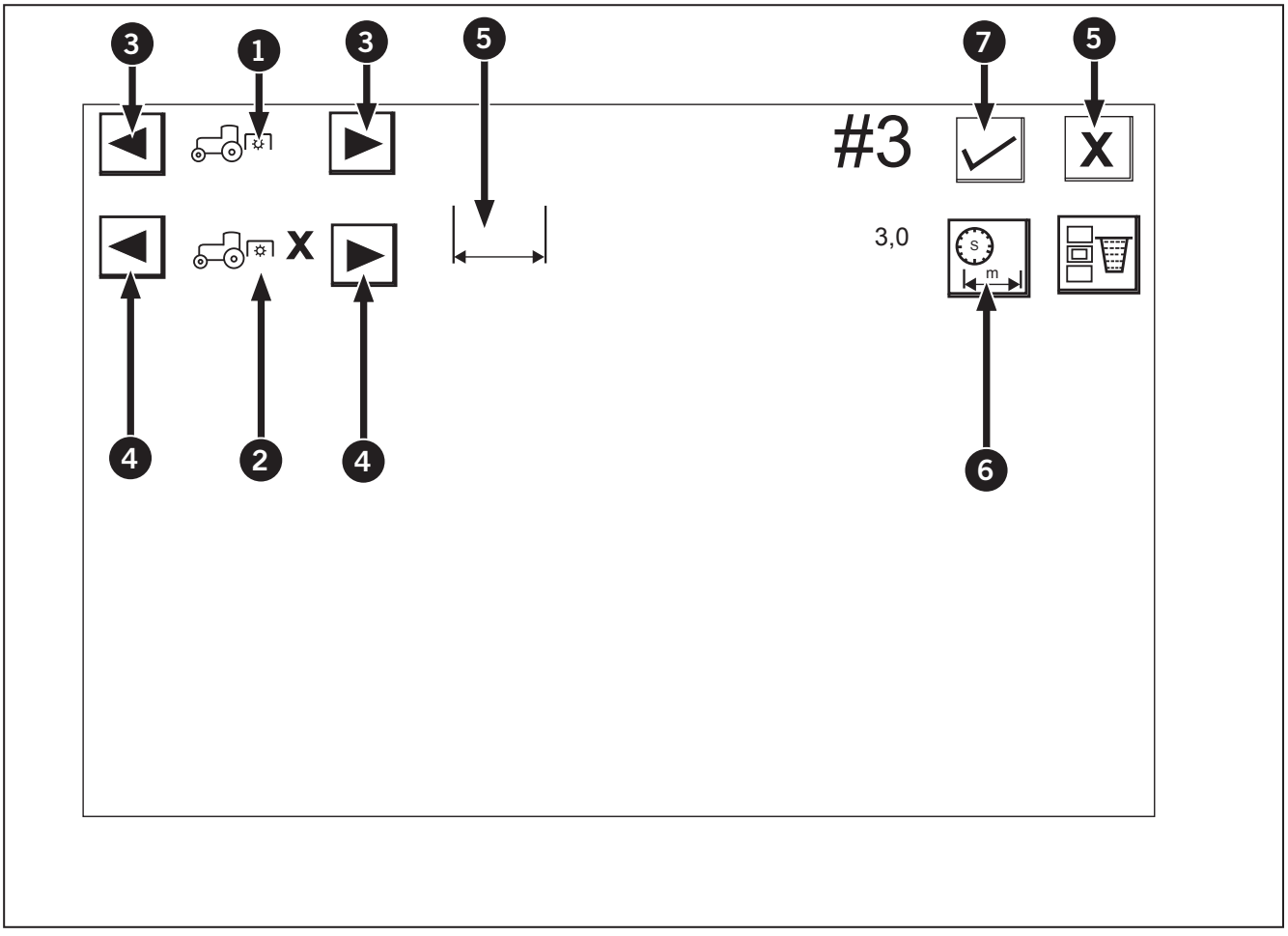
## HMS Modifying Differential program to PTO program

Example: Switching between the PTO program and differential lock program

1. Make sure the Headland Management System lock indicator (1) is off.
2. Using the program select switch (2), choose the program code to modify.
3. Using the scroll switch (3 or 4) to select the PTO-related subcategory icon (5) to modify. Then touch the edit switch (6).
   - Now the following editing screen appears



4. On the editing screen, the PTO-related main category icon (1) and subcategory icon (2), selected in the above step 3, are automatically displayed
5. Using the main category scroll switch (2), select the differential lock icon.
   - The subcategory icon (3) also changes itself to the differential lock icon.
6. Using the subcategory scroll switch (4), select the differential lock OFF icon.
7. Make sure the pre-program distance icon (5) is on. Then touch this icon.
   - (If the lead time icon stays on, change it to the pre- program distance icon with the distance/ time select switch (6).)
8. Using the appearing "NUMERIC KEYPAD", enter a new distance, for example 3.0 m (10 ft) and save the entry.
9. Touch the save switch (7).
   - The "Change settings. Are you sure?" message appears.
   - If “YES” is selected, the program will be modified and the previous screen will show up again.
10. To select the differential lock subcategory icon touch the edit switch (5). And use the scroll switch (3 or 4).
11. The editing screen shows up. Now change the differential lock program to the PTO program.



## Loader Introduction

**WARNING**

Careless or incorrect use of the loader/implement may result in serious injury or fatality for the driver or others. Observe the safety instructions.

---

The information provides the commissioning, operation and maintenance of agricultural loaders. Visit a Kubota dealer for additional information.

Read and apply the information to use the machine in a safe manner in combination with short stoppages.

Read the information thoroughly before starting the machine.

> ***IMPORTANT:****The loader and loader subframe combination is designed for a specific tractor model. Contact your dealer for the correct combination for a specific tractor model. Do not install incorrect combinations.*

## Loader Identification

***NOTE: Loader identification data shall be supplied to the dealer when requesting parts or service. This data is also needed to identify the equipment if it is ever stolen.***

Each loader has an identification plate (1) with an identification number. The plate is located on the inside of the left arm.

1. The plate specifies:
    - Product: Machine name
    - Type: Type/model
    - Made by: Complete address of manufacturer and country of manufacture.
    - Ref. No.: Reference number for loader
    - Serial No.: Serial number for loader
    - Date: Date of manufacture
    - Weight: Loader weight without implements, according to the factory delivery specification.

The type , serial number and date of manufacture must always be quoted during service questions or when spare parts are needed.

Cylinders, valves, control cables and hoses are equipped with machine signs or punched/printed order numbers.

## Description And Definitions

Not all accessories fit all loaders. Please contact your dealer for information on compatibility with your loader.

Not all accessories are available on all markets.

## Description

The front loader is adjusted to:

- The equipment installed on wheel-bound agricultural and forestry tractors.
- The equipment can handle various certified implements for lifting, carrying, cutting, scraping, grading, sweeping and plowing.

**WARNING**

Risk of crushing, pinching, tipping. In the event that one of the loader's hoses ruptures, the loader/ implement/load can fall down in an uncontrolled manner. If a pipe ruptures, correct the problem immediately according to section.

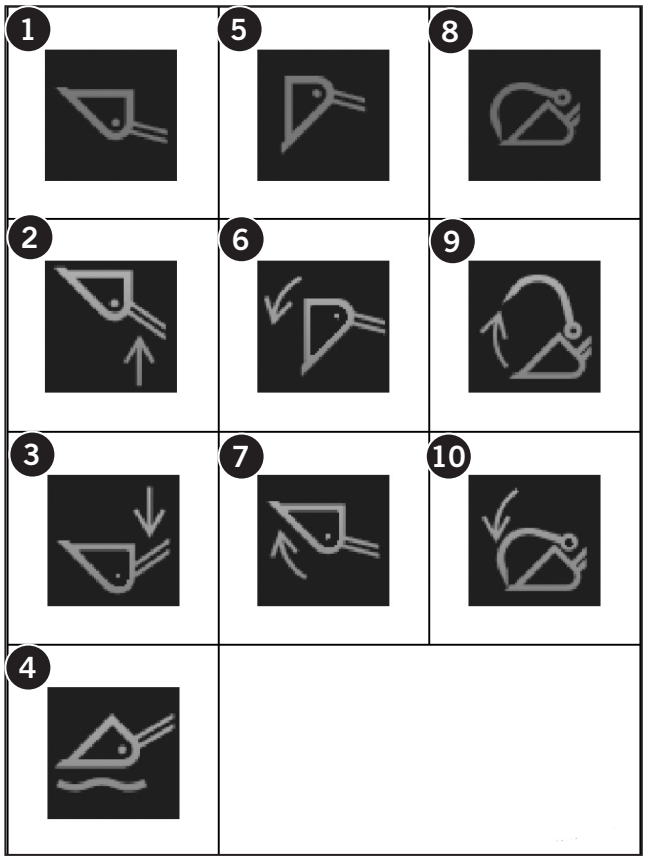
When replacing parts, only use original spare parts in order to restore the machine to its original design. Clear the land according to applicable requirements/legislation for the country or area where you are located.

***IMPORTANT:*** *Faults in the power supply to the loader's electrical and/or hydraulic systems may mean that certain functions cannot be activated. For example: Raising the loader, opening the implement, third and fourth hydraulic functions etc.*

## Loader Operating Status Icons

The following chart below is a list of loader operating icons.

- Boom neutral (1)
- Boom raising (2)
- Boom lowering (3)
- Boom floating (4)
- Bucket neutral (5)
- Bucket dumping (6)
- Bucket rollback (7)
- 3rd function neutral (8)
- 3rd function retract (9)
- 3rd function extend (10)



## Setting the Loader Control Valve

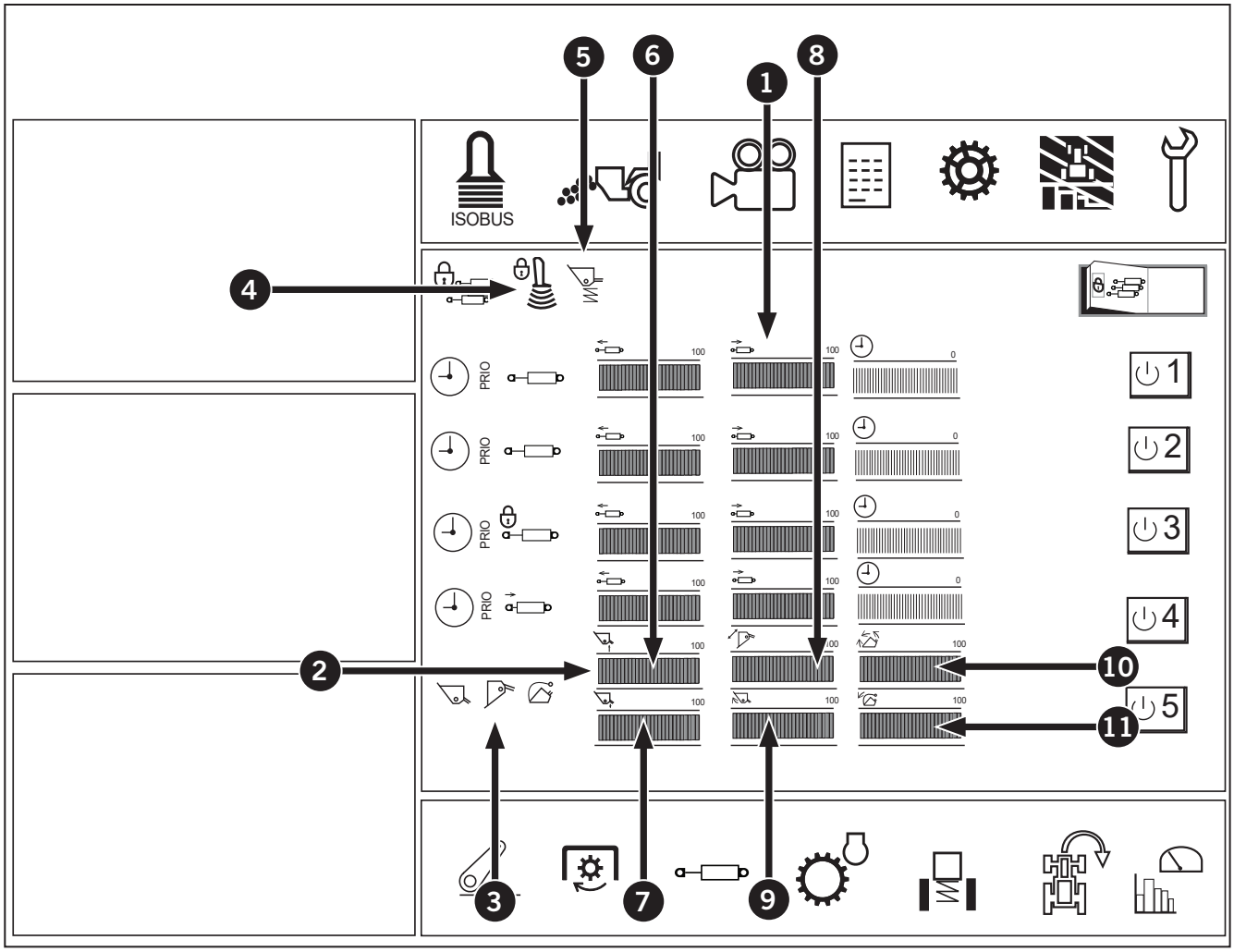
In the figure below, the settings of the loader control valve (if equipped) (1) can be checked.

1. To modify any of the settings, touch the “graph” of the loader control valve. The “detailed settings of loader control valve” screen will appear.

## How to use the screen

1. The preset oil flow rate (2) is displayed.
2. The loader operating status (3) is indicated with the icon shown.

- Lever lock indicator (4)
- Accumulator indicator (5)
- Discharge rate from raising (6)
- Discharge rate from lowering (7)
- Discharge rate from dumping (8)
- Discharge rate from rollback (9)
- Discharge rate from 3rd function (retract) (10)
- Discharge rate from 3rd function (extend) (11)



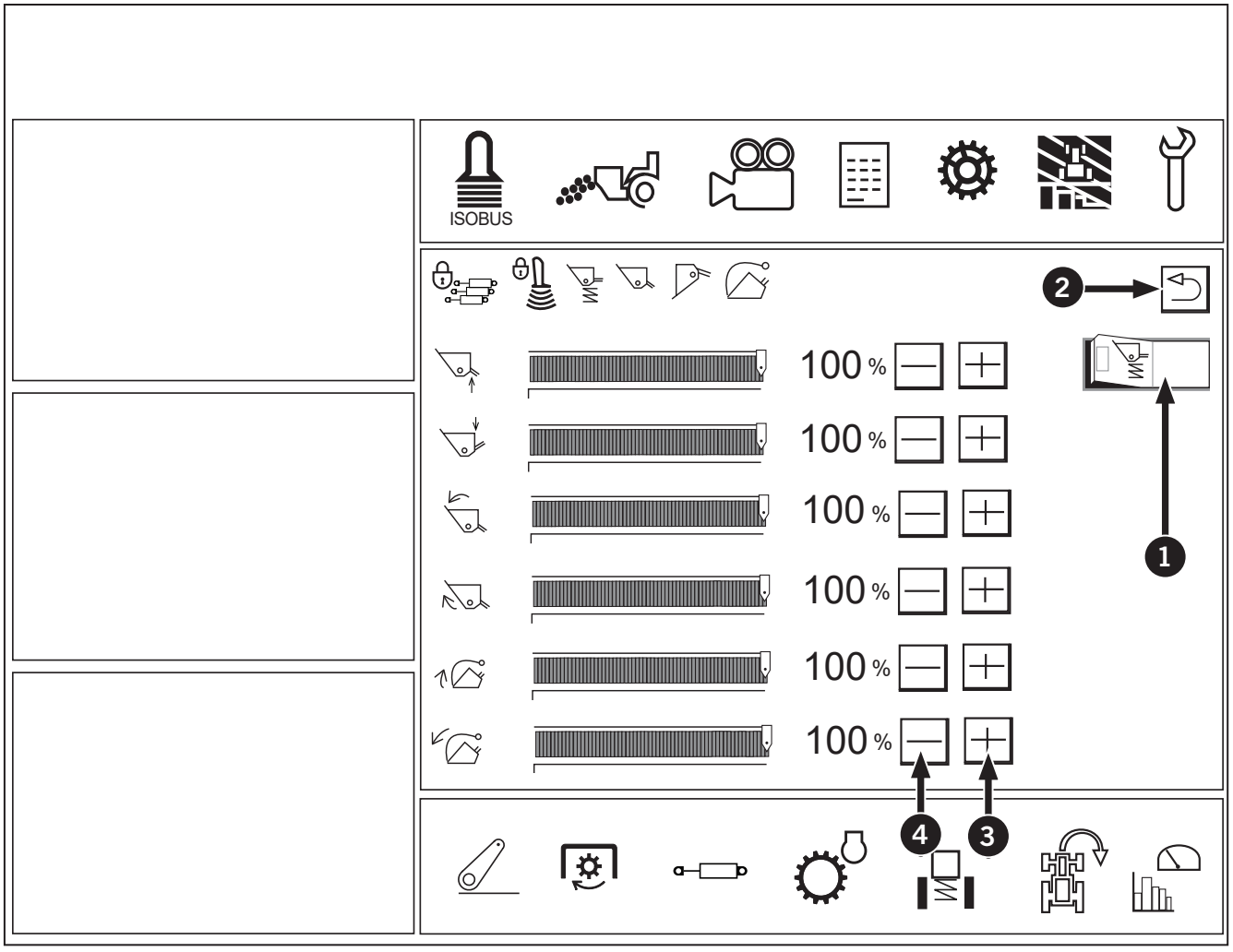
### Detailed Settings of Loader Speed

Each of the action can be individually preset in detail but only one can be set for priority flow.

1. To set accumulator, touch the switch (1).
2. Touch the switch (2), and the previous screen reappears.

### Setting the oil flow rate

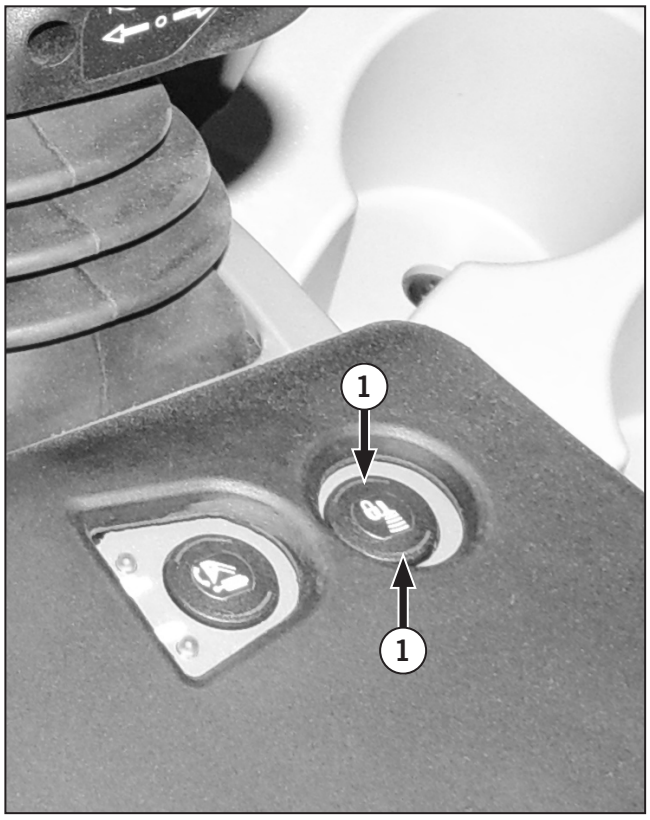
3. To adjust the oil flow rate for the loader, use the “Plus (+)” switch (3) and the “Minus (-)” switch (4).
4. Raise the percentage to increase the oil flow rate.



## Valve Lock

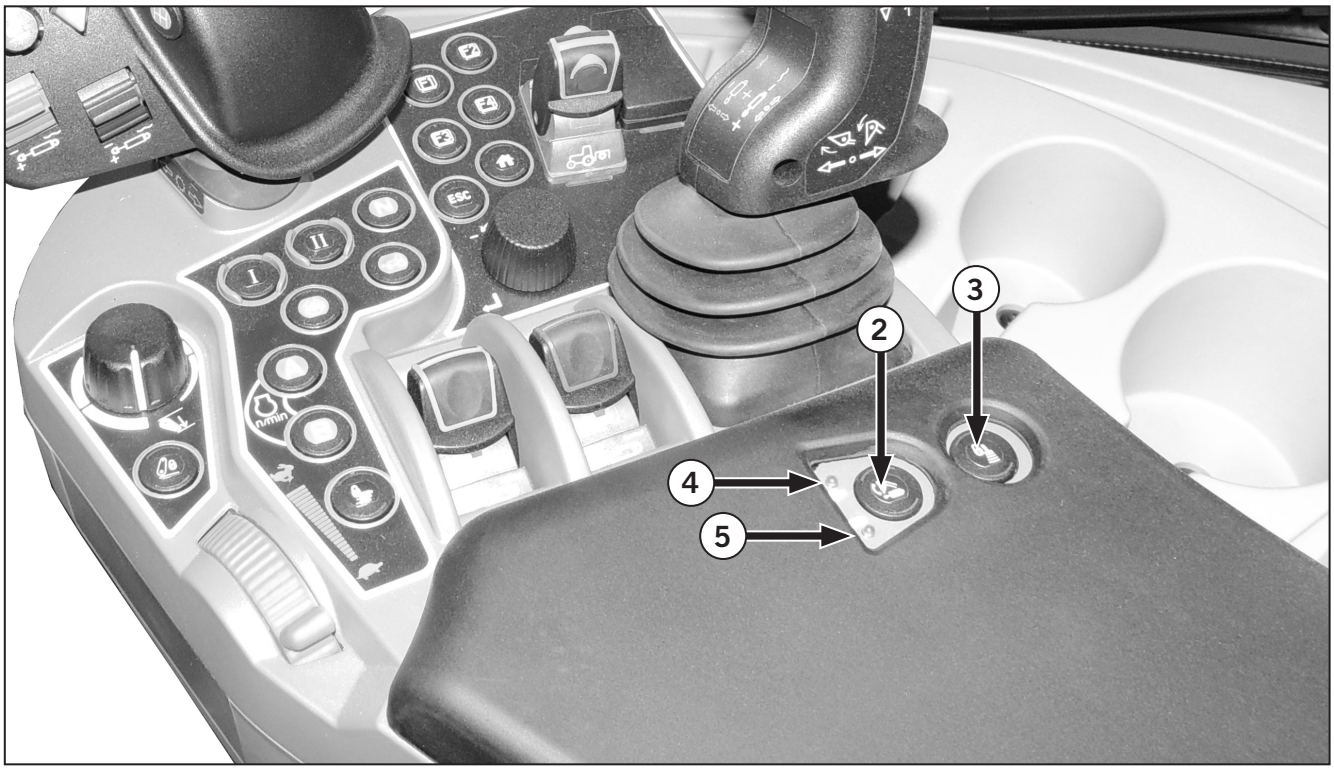
**WARNING**

Do not utilize the valve lock for machine maintenance or repair. The valve lock is to prevent accidental actuation when implement is not in use or during transport.




The control valve is equipped with a valve lock feature. The control valve is locked in the neutral position. The lock is not intended and will not prevent a leak down of the implement during the period of storage.

- Lighting (locked) (1)
- Off (Unlock) (1)
- Selection button for remote control valve and loader (2)
- Lever lock button (3)
- Loader mode indicator (4)
- Remote control valve mode indicator (5)



## Tractor Towing

**WARNING**

When using a chain, attach the chain with the hook open side facing up. If the hook slips, it will drop down instead of flying up.

**CAUTION**

Do not tow the tractor at a speed of more than 8 km/h (5 mph). Steering is much slower and the steering wheel is hard to turn when the engine is not running.

**NOTICE**

Only tow the tractor a short distance, such as out of a building. Do not tow it down roadways or as a method of transport.

**NOTICE**

Haul the tractor with all four wheels on a flatbed trailer or truck for transport purposes.

Use a chain or cable of sufficient capacity and length if towing the tractor is necessary. Tow the tractor from the rear using the drawbar or 3-pt hitch only. Have an operator steer and brake the tractor.

Observe the following to avoid damage to the transmission or other components that turn but are not lubricated during towing:

- Only tow a short distance.
- Keep speed below 8 km/h (5 mph).
- Run the engine to provide lubrication, power steering and power brakes if possible.

  ***NOTE: Mechanical front wheel drive (MFWD) will be engaged if the engine is not running, regardless of the position of the MFWD activation switch.***

## Freeing a Mired Tractor

**CAUTION**

Attempting to free a mired machine can involve safety hazards such as the mired tractor tipping rearward, the towing tractor overturning and the tow cable or tow bar failing and recoiling from a stretched condition.

**NOTICE**

Always use a low gear and avoid high engine rpm when attempting to free a mired tractor. Also, place the MFWD and differential in the lock mode.

Back tractor out if mired down in mud. If an implement is attached, unhitch the implement and move it away from the mired tractor area. Dig mud from behind the rear wheels. Place heavy boards behind the wheels to provide a solid base and try to back the tractor out slowly.

Pull rearward with another tractor if tractor cannot be freed under its own power.

**NOTICE**

The drawbar at the rear of the tractor is the correct point to connect a tow cable. Connect the tow cable to the drawbar of the mired tractor and pull rearward.

Connection of the tow cable to a different point can cause damage to the tractor or its frame.

Do not use a tow cable to attach two tractors together to try to pull a load that is more than the capacity of one tractor.

Inspect the tow cable and the drawbar pin for wear before use. Replace if necessary.

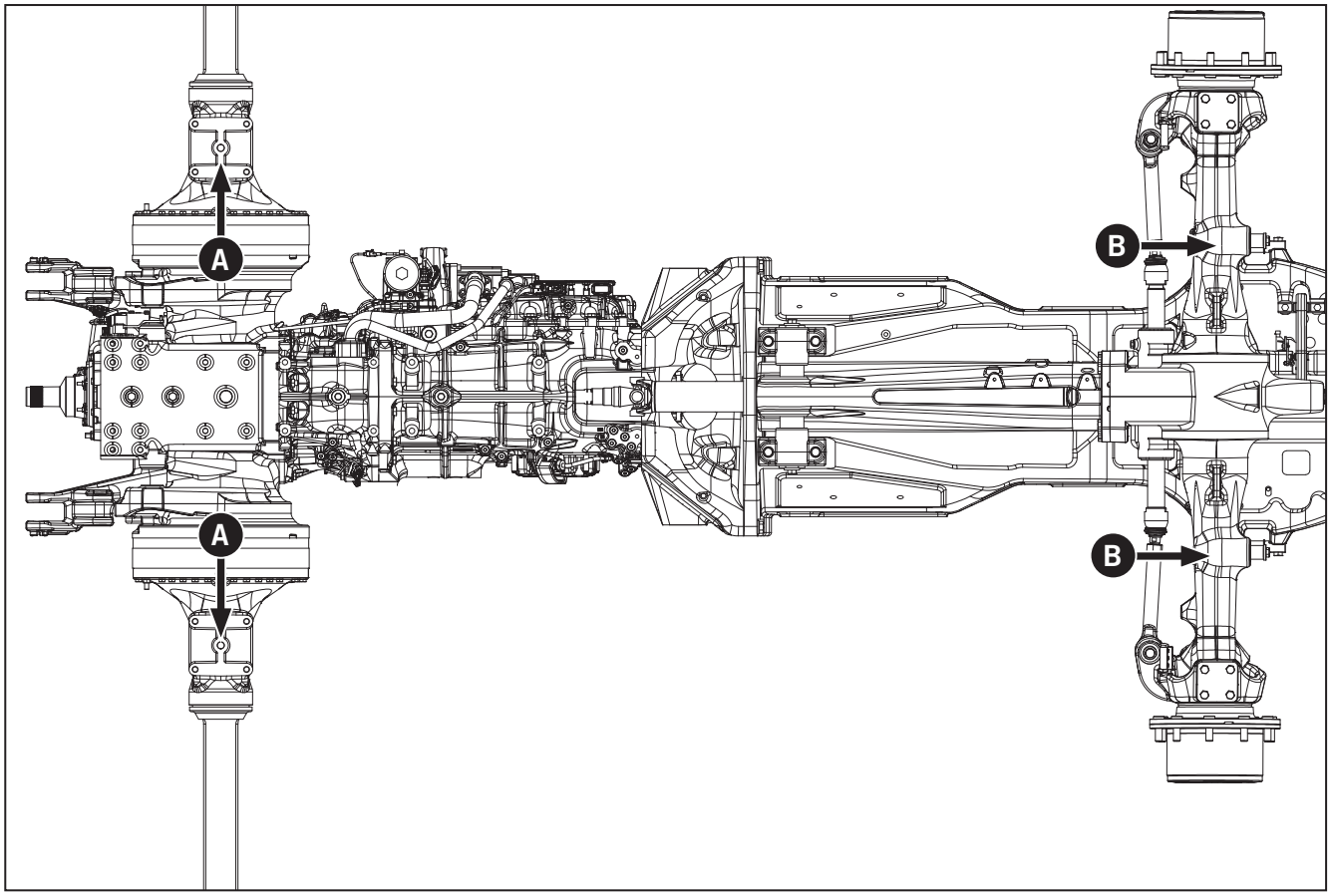
Remove all front weights from the mired tractor prior to pulling.

## Jacking Points

**CAUTION**

Always jack on a stable flat surface, ideally a concrete floor. Block all tractor wheels when jacking and use only approved safety stands.

- Secure the tractor on firm and levelled ground only.
- Secure using suitable jack stands. Jack stands are available from a Kubota dealer.
- To jack up the vehicle from the rear, apply vehicle jacks at points (A).
- To jack up the vehicle from the front, apply vehicle jacks at points (B).



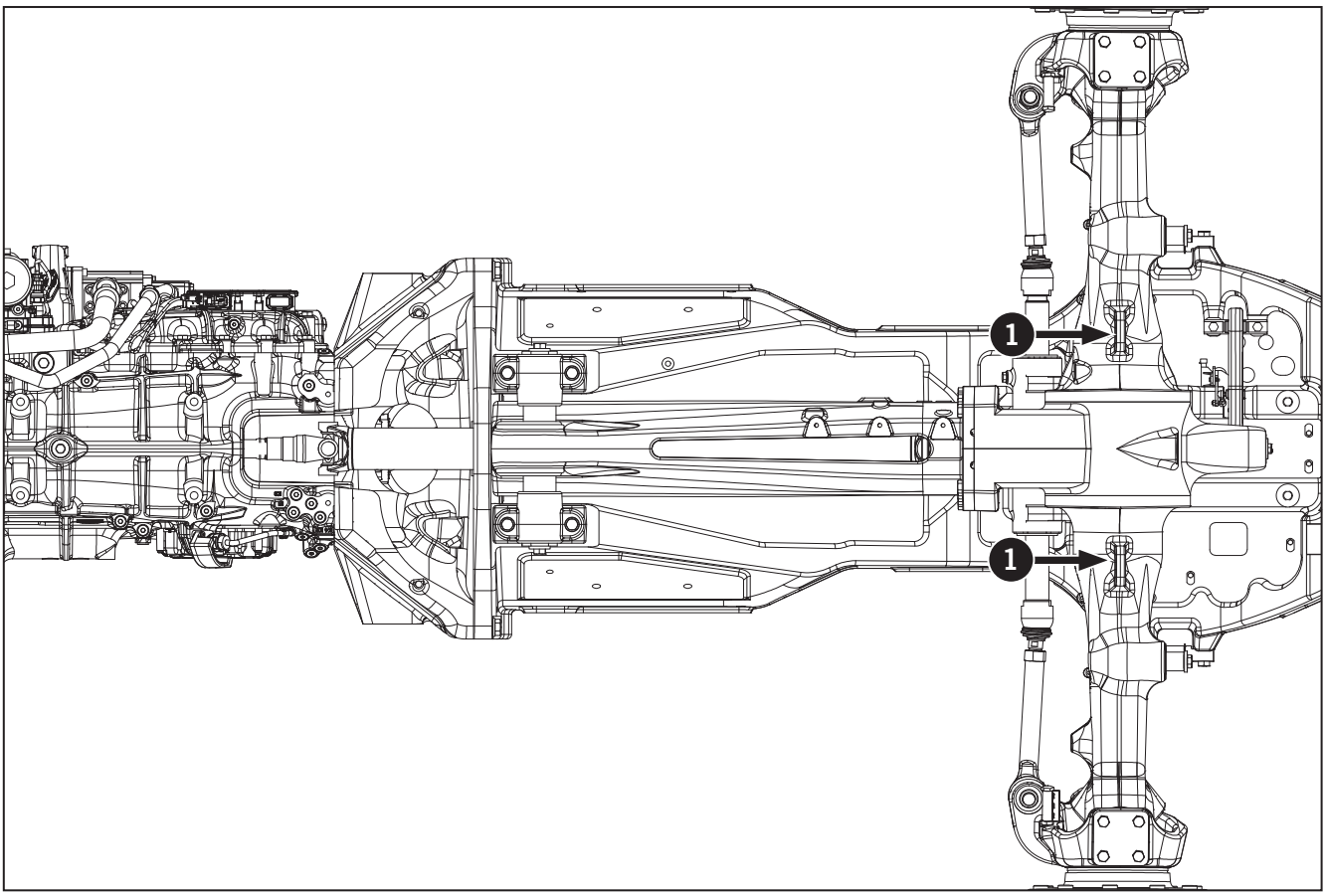
## Transporting the Tractor

**NOTICE**

Do not chain around the four-wheel drive shaft, steering cylinders, front wheel drive axle or other components that could be damaged by contacting the chain or by heavy loading

Haul the tractor with all four wheels on a flatbed trailer or truck.

- Securely chain the tractor to the transporter
- Use wheel blocks to prevent rolling movement
- Use the tie down brackets (1) provided on the front axle of the tractor
- Use the drawbar or drawbar cage for a rear tie-down point.



**This Page Is Intentionally Left Blank.**

# Section 4: Hydraulic Operation – Contents

## Hydraulic System Overview

KUBOTA M8 tractors are equipped with 117 lpm (31 gpm) standard pump or 159 lpm (42 gpm) high flow pump hydraulic system. Both consist of low and high pressure circuits that get their oil from either the transmission and rear axle housing reservoir oil or the right side hydraulic tank.

The low-pressure hydraulic circuit delivers hydraulic oil from the rear axle sump to the transmission hydraulics, brake system and external line. The external line supplies hydraulic pressure to the PTO clutch, PTO Brake, MFWD clutch and differential lock.

### Standard Flow and High Flow Pump System

The 118 lpm (31 gpm) standard flow pump and The 166 lpm (44 gpm) high flow pump system supplies oil to the rear implement valve, front and rear 3PT and front end loader (if equipped). Both the standard and high flow pumps receives oil from a separate hydraulic tank.

The hydraulic pumps are mounted to a drive housing that is driven off the PTO through shaft

***NOTE: Liter to gallon conversions are given in U.S. gallons. One U.S. gal ≈ 3.8 L.***

**WARNING**

During normal operation, the tractor may pressurize hydraulic fluid to extreme levels. Escaping fluids under high pressure can penetrate the skin and cause serious and life threatening injury.

- Never use your hands to check for fluid leaks. Use a piece of cardboard or paper to search for any suspected leaks.
- Always shut off the engine and relieve any residual pressure before connecting or disconnecting any hoses.
- Get immediate medical attention if any fuel, oil or hydraulic fluid penetrates your skin.

## Standard Flow Pump System Overview

This section opposite provides an overview of the tractors that are equipped with a standard flow, hydraulic system.

## Low-pressure Hydraulic System

The hydraulic system is split into 2 sections: the implement hydraulic system and the steering/brake systems. The implement hydraulic system is a high-pressure system that powers the implement valve, suspension systems, 3PT hitch systems, and the front end loader. The steering/brake system powers the steering (including autosteer), the service brakes, and the trailer brakes.

## Implement Hydraulics

Flow for the implement hydraulics is provided by the main piston pump. The pump drive is connected directly to the engine output, via the transmission. The pump draws oil directly from the hydraulic reservoir, and outputs flow to the implement valve. The optional features (Cab/Axle suspensions, front end loader, front 3PT hitch) have their supplies teed in directly at the pump outlet.

The implement valve and all optional features provide load sense signals to the piston pump via the load sense manifold. This manifold acts as a multi-way shuttle valve to output the highest load sense signal to the piston pump. It also leaves the load sense path open to the implement valve, as the implement valve acts as the drain for trapped load sense pressure.

The returns from the implement valve and all other optional features are returned to the cooler bypass manifold. From this manifold, flow is directed to the hydraulic cooler. Cool oil returns to this manifold from the cooler, goes through the return filter and back to the reservoir.

## Steering/Brake Systems – With Trailer Brake

Oil for the steering and brake system is supplied by the transmission. The service brake supply is provided by the transmission clutch supply circuit, and the steering and trailer brake are supplied by the dedicated steering pump.

The steering pump provides oil to the priority/charge manifold via the high pressure steering filter at the pump outlet. In this priority valve, priority is given to the steering system. The priority cartridge works to maintain a pressure 160 psi higher than the steering load sense at the steering valve inlet. Extra flow from the priority valve, when not required by the steering valve, is directed to charge the accumulator that is used to provide oil to the trailer brake valve. The accumulator will charge up to 2150 psi, at which point extra flow from the priority valve will be provided and open directly back to the tank. When accumulator pressure drops to 1700 psi, the accumulator will be recharged.

The priority valve also contains a pump outlet relief valve, set to 2300 psi, to protect the pump from over-pressure situations. It also contains a 2000 psi load sense relief, which limits load sense pressure from the steering valve to 2000 psi, resulting in a maximum steering valve inlet pressure of 2160 psi.

The service brake valve has a 290 psi boost signal provided by the transmission, via a check valve and an accumulator. The check valve and the accumulator serve to maintain a supply of boosted oil to the brake valve in the event of a loss of transmission pressure.

## Steering/Brake Systems – Less Trailer Brake

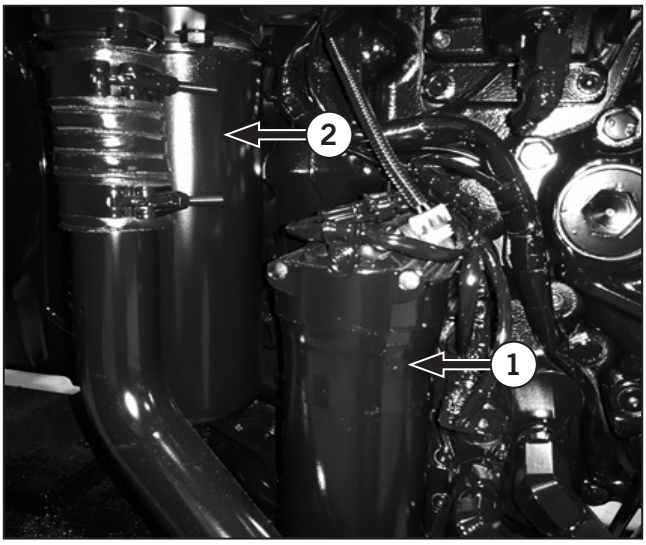
Oil for the steering and brake system is supplied by the transmission. The service brake supply is provided by the transmission clutch supply circuit, and the steering system is supplied by a dedicated steering pump.

The steering pump provides oil directly to the steering valve, via the high pressure steering filter at the pump outlet. The steering valve is an open center design, so any unused steering input flow is directed back to the transmission reservoir.

The steering valve includes a 2300 psi relief valve, which will protect the steering pump and valve from over-pressure situations, such as when the steering is dead-headed.

The service brake valve has a 290 psi boost signal provided by the transmission via a check valve and an accumulator. The check valve and the accumulator maintain a supply of boosted oil to the brake valve in the event of a loss of transmission pressure.

## Hydraulic Oil Filters



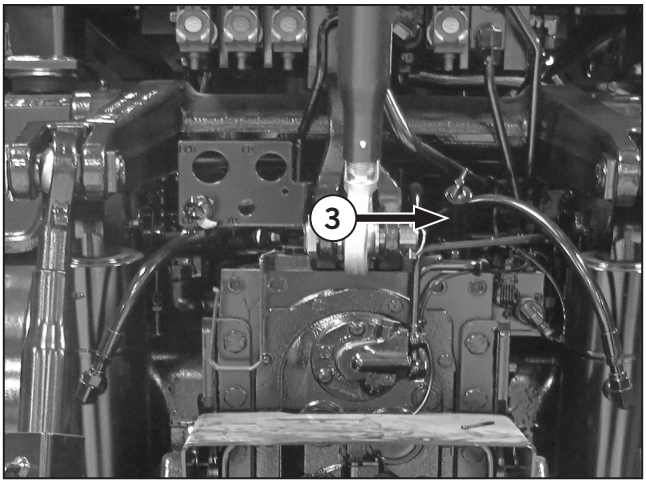

The transmission oil filter (1) is located on the right side of the range gear part of the transmission near the bottom and receives oil from the gear transmission pump then passes it to the transmission hydraulic block.

The hydraulic system oil filter (2) is located to the front of the bracket and receives oil from the gear charge section pump then passes the oil to the intakes of the piston pumps.

The transmission filter has a 9 bar (131 psi) and the hydraulic filter by-pass has a 6 bar (85 psi) (high and standard flow) on pump has to prevent oil starvation in the case of filter blockage. The bypass valves are fitted with sensor switches that send a signal to the EIC when the filter bypass is activated and the system warning lights are illuminated.

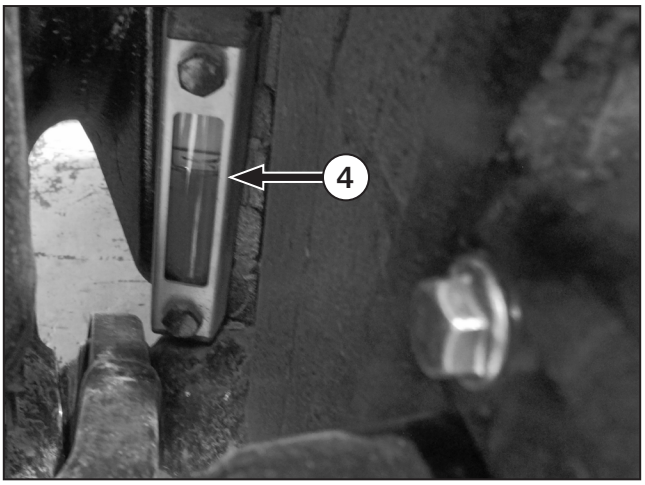
Refer to Replace the Transmission and Hydraulic Oil Filters in Section 5: Lubrication and Maintenance for more information.

## Transmission Oil Level




The transmission and rear axle are a common reservoir.

The fill tube on the transmission (3) is located at the right rear of the tractor.




The sight glass (4) indicating oil level in the rear axle and transmission is located beside the PTO stub shaft cover.

Refer to Change the Hydraulic Oil in Section 5: Lubrication and Maintenance for more information.

## Steering System Overview

M8 tractors have a hydraulically powered steering system. This system is composed of a steering control valve mounted at the front of the cab on the outer side of the main console pedestal housing and mechanically connected to the steering column inside the cab and a steering cylinder located at the front of the tractor.

The steering system oil pressure is provided from the pump farthest from the drive of the tandem gear pump stack and travels through the steering oil filter. The pressurized oil from filter enters the steering control valve and proportioned and directed to the left or right side of the double acting steering cylinder based on the position and movement of the steering column.

## Brake System Overview

M8 tractors are equipped with hydraulic-assisted power brakes. The brake system consists of the following components:

- Brake accumulator
- Brake pedals
- Power brake actuator valve
- Hydraulic lines
- Rear-axle brake assemblies

***NOTE: The hydraulic assist only functions with the engine running. With the engine off the brakes will still function but greater pedal effort will be required. Use both the parking (emergency) brake and the service brake pedals if the engine is not running.***

The service brake pedals operate the brake valves to apply direct hydraulic pressure to the rear axle brakes. The use of hydraulic boosters in the power brake valve assembly ensures only light pedal effort is required to operate the brakes.

A brake accumulator, mounted on the top of the transmission maintains a minimum pressure of 1207 kPa (175 psi) to the brake circuit.

The brake system consists of separate left and right wheel brake circuits operated by the left and right service brake pedals (2). Each service brake pedal operates a master cylinder and hydraulic booster in the power brake valve (3), allowing the left and right brake circuits to operate independently to assist with turning in tight spaces or to work in tandem for maximum braking effect.

The system balances the pressure to the left and right rear axle brake assemblies to compensate for uneven brake wear with the service brake pedals connected together.

### Four Wheel Drive Brakes

M8 tractors are classified as Front Wheel Assist vehicles.

The front wheel assist is automatically activated so that both front and rear wheels assist in braking when the service brake pedals are applied.

***NOTE: MFWD automatically engages when the parking brake is applied with the engine running regardless of the MFWD switch position. MFWD also automatically engages to assist in braking when both service brake pedals are applied.***

**WARNING**

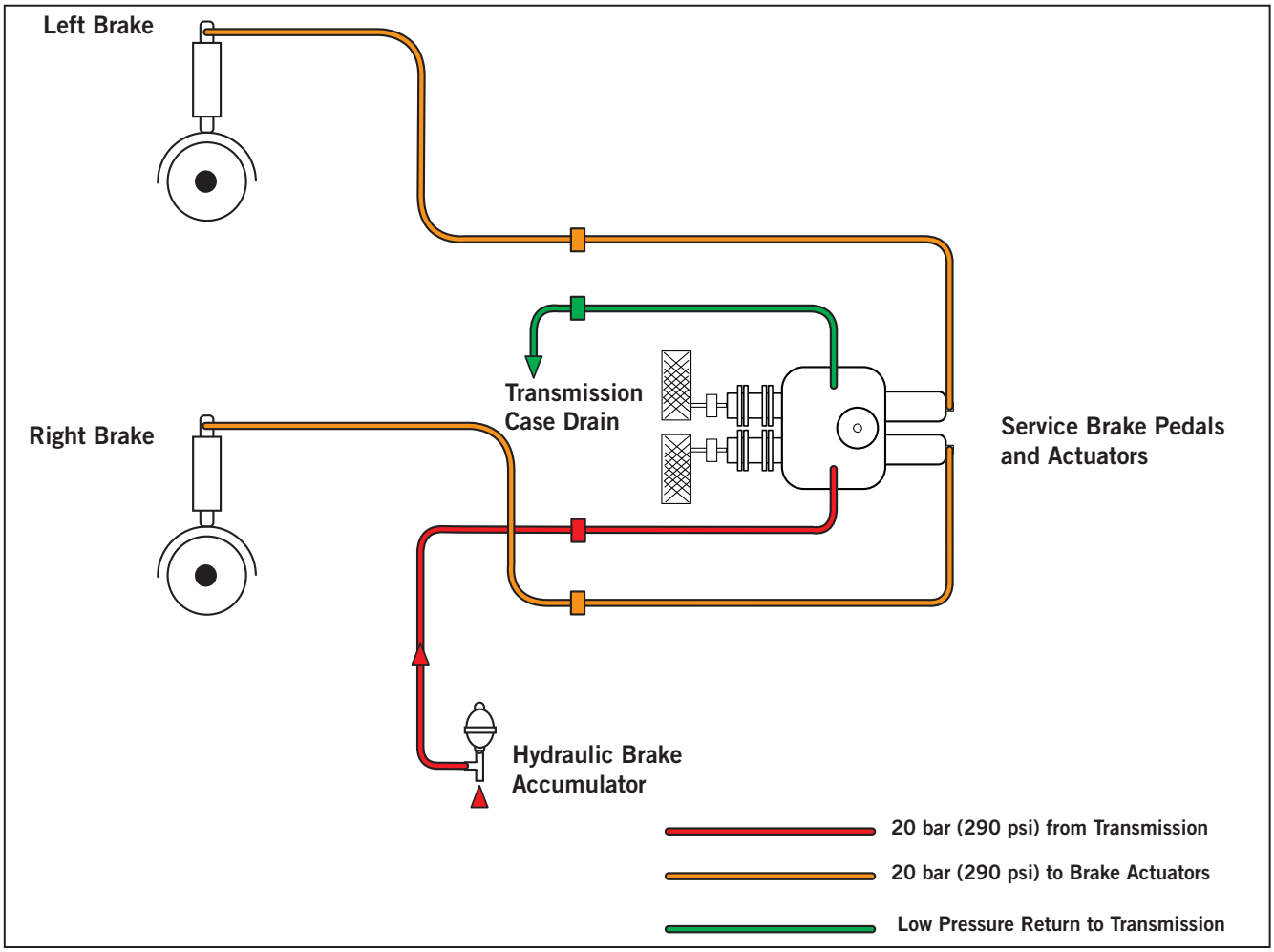
- Never leave the operator's seat without first bringing the tractor to a complete stop and applying the parking brake.

- Do not use the tractor if either the service brakes or the parking brake do not function properly.
- Do not use the transmission to keep the tractor stationary when parked. Always use the parking brake.
- Apply the parking brake whenever the tractor is not in operation.

**WARNING**

Always lock the service brake pedals together when traveling on the highway or when a hydraulically braked trailer is attached. Do not use the brakes to assist in high speed turns.

## Hydraulic Brake System




The hydraulic service brake operates in conjuction with the transmission circuit within the tractor hydraulic system.

A fixed displacement gear pump draws oil from the reserve and provides flow to both brake circuit and a transmission circuit.

The gear pump provides flow to the transmission where the pressure is limited by the transmission control relief valve. The oil then flows unimpeded through the transmission valve and on into a junction where it tees between the service brake valve, an accumulator and a low pressure switch. If the pressure in this circuit falls below 15 bar (217 psi), the low pressure switch will open and turn on a warning light on the dash.

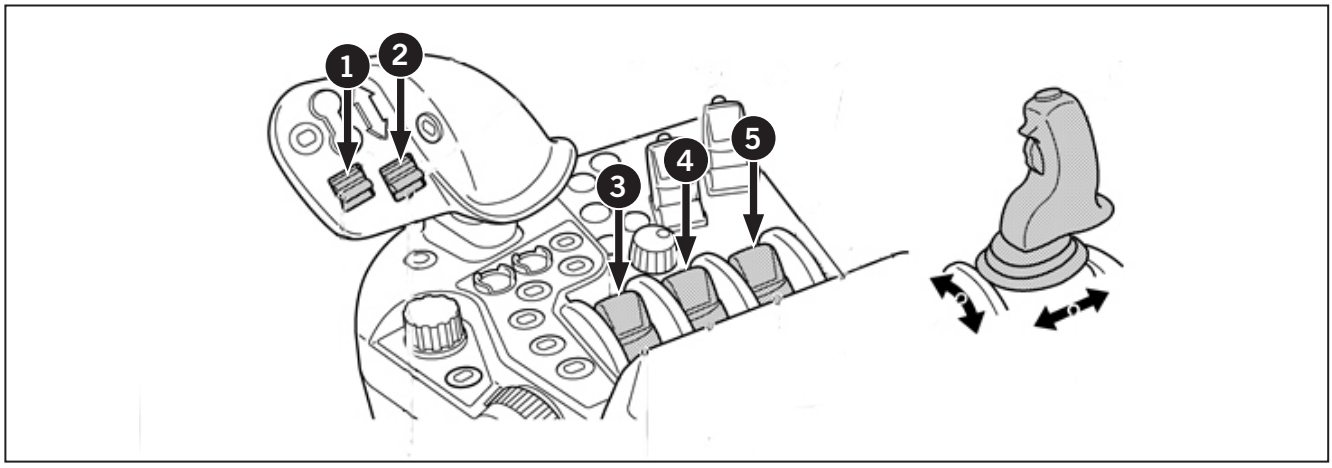
When the foot brake pedal is depressed, oil is forced from the valve to the rear service brakes (6) via the right and left brake lines. Pressure in the valve is also used to assist pedal effort.

## Remote Valve Controls

The external hydraulic power can be taken out of up to 5 segments. Depending on different-destination models and mounted options, however, the number of ports varies. In this manual, the 5-segment system is taken as an example.

Carefully check the relation between each valve and control switch before connecting the hydraulic hoses.

- Remote control valve switch 1 (1)
- Remote control valve switch 2 (2)
- Remote control valve switch 3 (3)
- Remote control valve switch 4 (4)
- Remote control valve switch 5 (5)
- If Loader is instaled - Remote control valve switch (5)/Loader joystick.



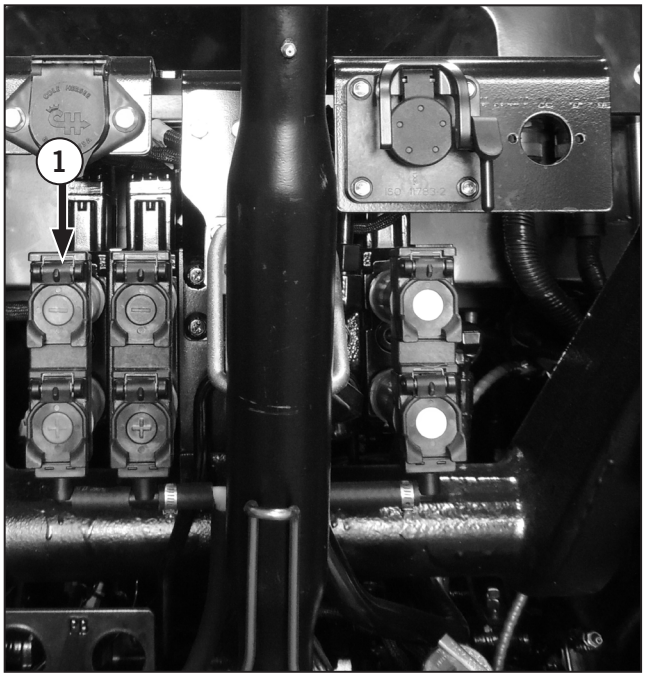
## Connecting and Adjusting Couplers

**WARNING**

- Always shut down the engine and relieve any residual pressure before connecting or disconnecting any hoses.
- Get immediate medical attention if any fuel, oil or hydraulic fluid penetrates your skin.

Each control valve has a pair of self-sealing, quick couplers to facilitate remote cylinder connection. These couplers also permit the disconnection of coupled hoses from an implement in an event that the implement accidently becomes detached from the tractor drawbar.

The couplers will accept standard 12.7 mm (0.5 in) SAE or ISO tips. The couplers can be connected or disconnected under pressure. Disconnect pressure is proportional to system pressure. Increased system pressure will require increased force to disconnect the couplers.




To connect a remote cylinder hose:

1. Open the coupler dust cover (1).
2. Clean, then insert the tip making sure the tip is correctly seated.

Activate the remote valve to supply hydraulic pressure which will complete the hydraulic coupling of the tractor and implement.

Move the applicable control switch to the float position with the engine running to relieve pressure of coupled hoses from an implement to the tractor valve. Use the implement locks to support the equipment when pressure is relieved from the cylinder(s) when applicable.

Shut the engine off with the control lever still in float. After the engine is shut down return the control lever to the neutral position. The couplers can now be connected or disconnected with minimal pressure and effort.

## Connecting Single-acting Cylinders

**WARNING**

- Always shut down the engine and relieve any residual pressure before connecting or disconnecting any hoses.
- Get immediate medical attention if any fuel, oil or hydraulic fluid penetrates your skin.

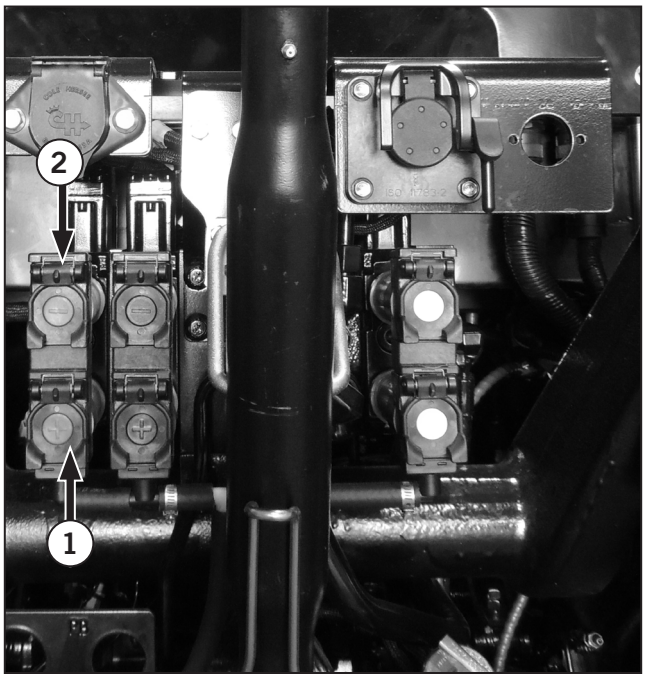
Connect the hose from a single-acting cylinder to the extend coupler (1) on the lower side of desired remote control valve.

Pull the control lever back to the extend position to extend a single-acting cylinder.

Manually return the lever to the neutral position to stop the cylinder before it is fully extended.

Move the lever fully forward to the float position to retract a single-acting cylinder.

***NOTE: Always use the float position to lower a single-acting cylinder. The retract position is for double-acting cylinders only.***



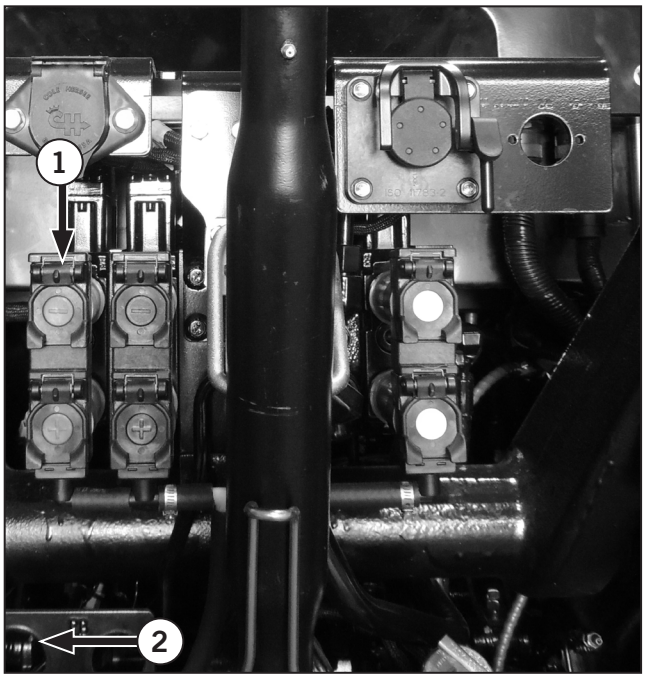

### Connecting Double-acting Cylinders

Connect the feed hose from a double-acting cylinder to the extend coupler (1) on the lower side of the desired remote control valve and the return hose to the retract coupler on the top side of the valve (2). Pull the control lever back to the extend position to extend a double-acting cylinder.

Push the control lever forward past neutral to the retract position to retract a double-acting cylinder. Further forward movement of the lever will select float which will allow the cylinder to extend or retract freely. This feature is very helpful when carrying out work with equipment such as scraper blades and loaders.

## Connecting and Operating Continuous Flow Hydraulic Equipment Operation

Connect continuous flow hydraulic equipment (e.g., hydraulic motors) with the pressure hose connected to the retract coupler (1) and the return hose connected to the low pressure return circuit (2).




Use the flow control to regulate the motor speed. Adjust the flow of the connected remote control valve to regulate the orbit motor speed.

The motor will be stationary when in the remote control valve lever fully forward in the float position. The hydraulic motor will operate if the lever is pulled back to the retract position. Move the lever from the retract position to the float position to stop the motor. In the float position, the motor will be able to stop slowly preventing damage from occuring.

***NOTE: The remote control valve lever must not be moved rearward to the neutral or extend positions as damage to the equipment may result when operating continuous flow equipment.***

Observe the following to further protect the tractor and equipment.

- Do not open any by-pass valve in the equipment or motor. Use the flow control to regulate the rate of flow or speed of the motor.
- Do not hold the remote control valve lever to operate the equipment.
- Operate continuous flow equipment at the highest flow setting (by use of the flow control) and lowest engine speed that will give the required machine performance and speed to ensure optimum hydraulic oil cooling.

## Hydraulic Motor Application

***NOTE: The hydraulic remote valves on the tractor provide an open center supply and return.***

1. Use hydraulic motors designed for open center or pressure/flow load compensating hydraulic systems only. Do not use a hydraulic motor designed for closed center hydraulic systems unless it is adapted for use by removing the inlet restrictor.
2. Rating: Hydraulic motors up to 76 L/min (20 gpm) at 15513 kPa (2250 psi) can be used.
3. Make sure the hydraulic motor does not have restrictors in the ports or fittings.
4. Hydraulic motors less than 38 L/min (10 gpm) may be equipped with 12.7 mm (0.5 in) ID hoses and standard (ASAE/SAE/ISO) couplers.
5. Connect hydraulic motors greater than 38 Lpm (10 gpm) with 19 mm (0.75 in) hoses and standard (ASAE/SAE/ISO) couplers to prevent excessive restriction and heat generation.
6. It is recommended that the low pressure return line kit be installed. The use of the low-pressure return circuit will reduce back pressure in the remote hydraulic return line which will result in more efficient hydraulic motor operation. The low pressure return circuit can also be used in applications where low return oil pressure is desired to improve implement operation such as with orbit motor case drain lines or implement mounted hydraulic control valves.

## Operating the Hydraulic System

**WARNING**

Make sure all bystanders are clear of the tractor before operating electro-hydraulic remote (EHR) valves.

Before traveling on public roads, be sure to set the remote control valve lock button (1) to avoid accidentally dropping the implement. The indicator stays on while in the lock status.


Use the display monitor (1) to set the hydraulic flow rate (hydraulic pressure) to and operation mode of, the implement valve.

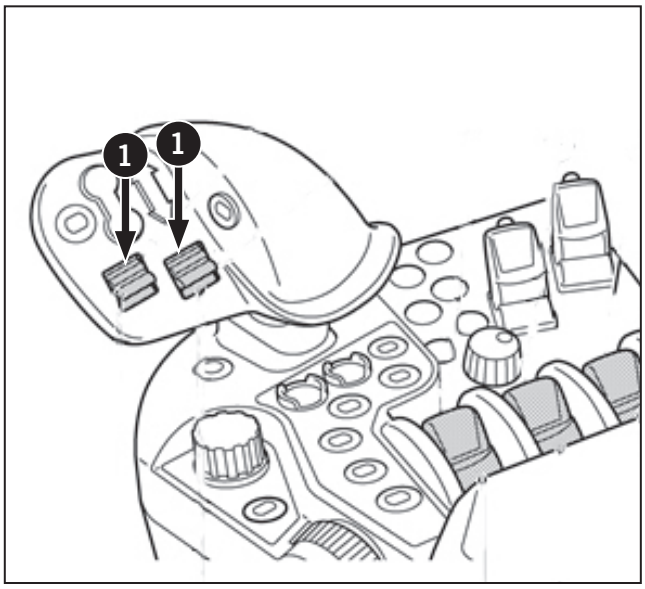
Use the hydraulic levers to control the movement of the implement.

This section begins by detailing the operational relationship between the hydraulic levers, display monitor, remote couplers. Instructions are then provided as follows:

- Step 1 of 3: Activate the hydraulic levers.
- Step 2 of 3: Adjust the hydraulic flow rate limit and operation mode of each valve section using the display monitor.
- Step 3 of 3: Operate the hydraulic levers.

### Remote Control Valve Switch

The remote control valve switches (1) direct pressurized oil flow to the implement hydraulic system.



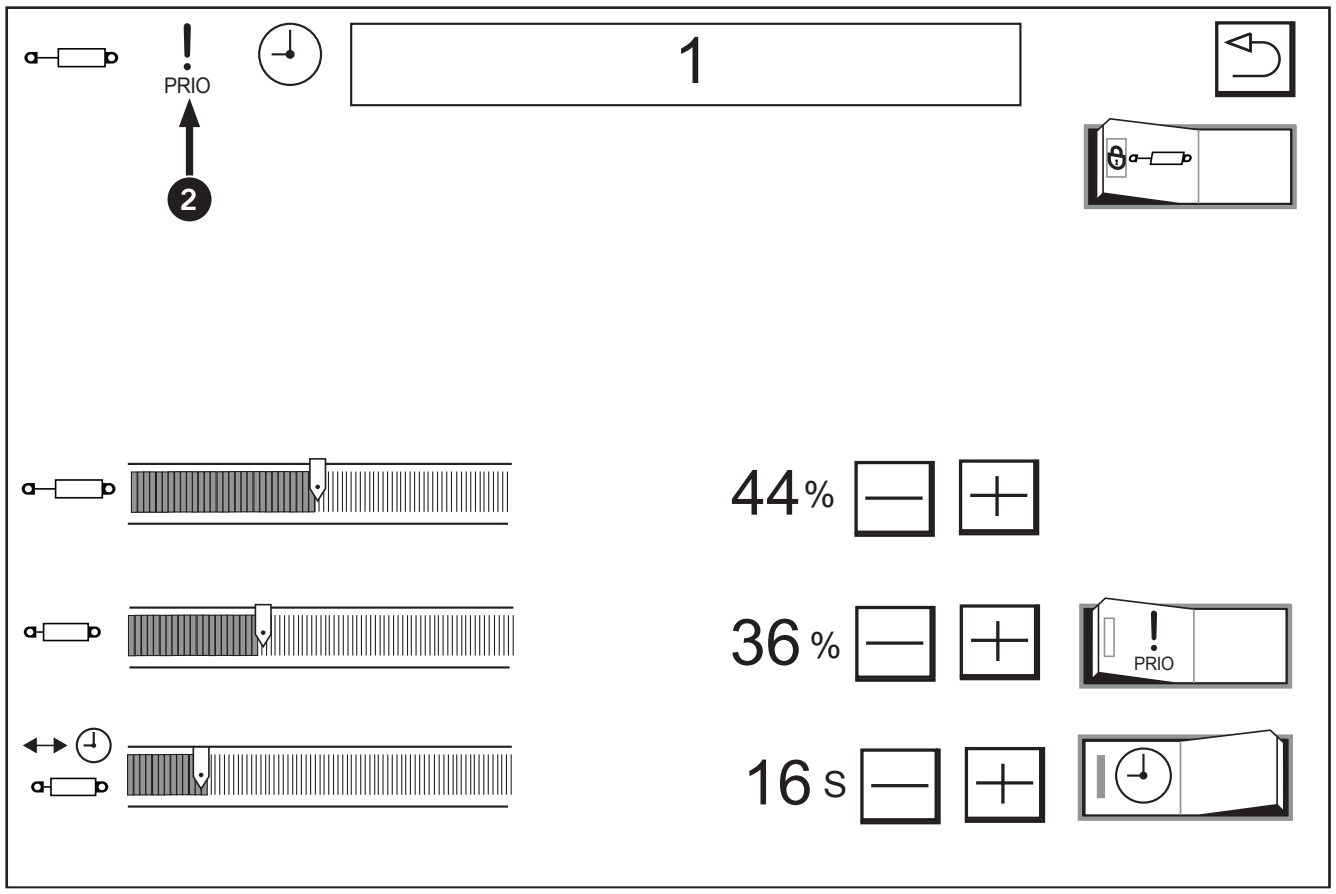

### Operation of remote valves 1 and 2

Each switch can be set at 4 positions. If the switch is held at the FLOAT or DETENT position, the switch is held at that position.

### Securing the priority flow

Oil is preferentially fed from the hydraulic pump to a specified remote control valve.

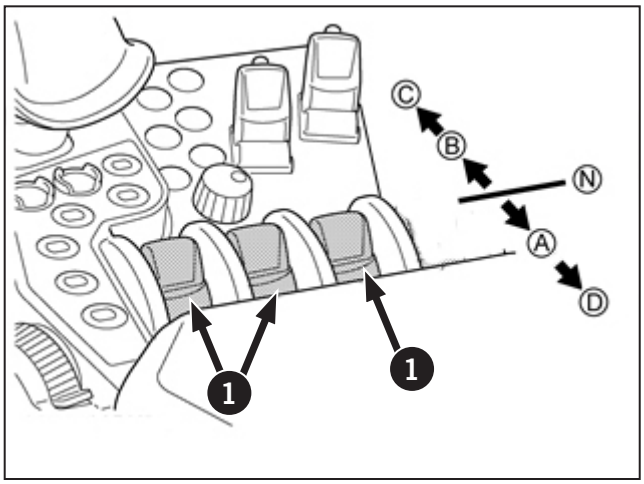
Once the priority flow is ensured, the indicator (2) lights up.



### Operation of remote valves 3 to 5

Each remote valves switch (1) can be set to 4 positions.

- (A) Extend
- (B) Retract
- (C) Float
- (N) Neutral
- (D) Detent




### Joystick for Remote Control Valve and Loader

Using the joystick, the loader and the hydraulic remote control valves (5th) can be operated.

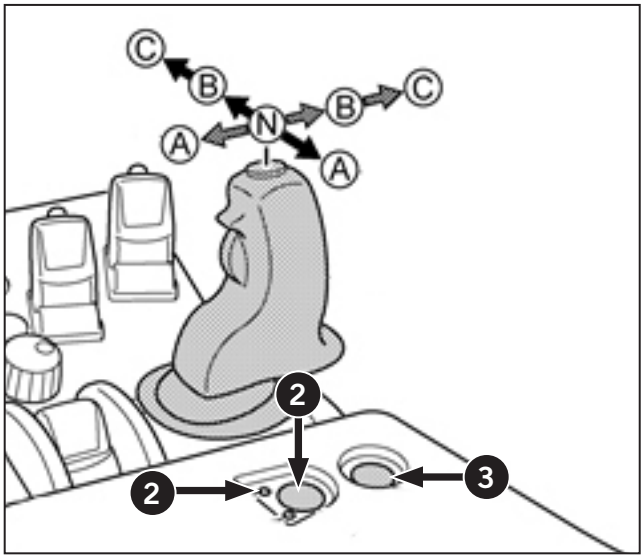
Each time you press the selection button (2), the remote control and the loader mode switch and the respective indicator lights up.

If no such operation is needed, lock the joystick with its lock button (3).

- (A) Extend
- (B) Retract
- (C) Float
- (N) Neutral

***NOTE: Moving the joystick diagonally provides flow for two valves simultaneously in the different combinations illustrated.***

***NOTE: If the front loader valve is not installed, the loader mode indicator (4) and remote control valve mode indicator (5) are blinking. When the valve is installed, the indicator blinking is stopped.***



### Setting of Remote Control Valves

All the remote control valves can be preset in detail and their settings can be confirmed.

For the setting procedure, refer to “Remote Valve Settings” on page 4-17.

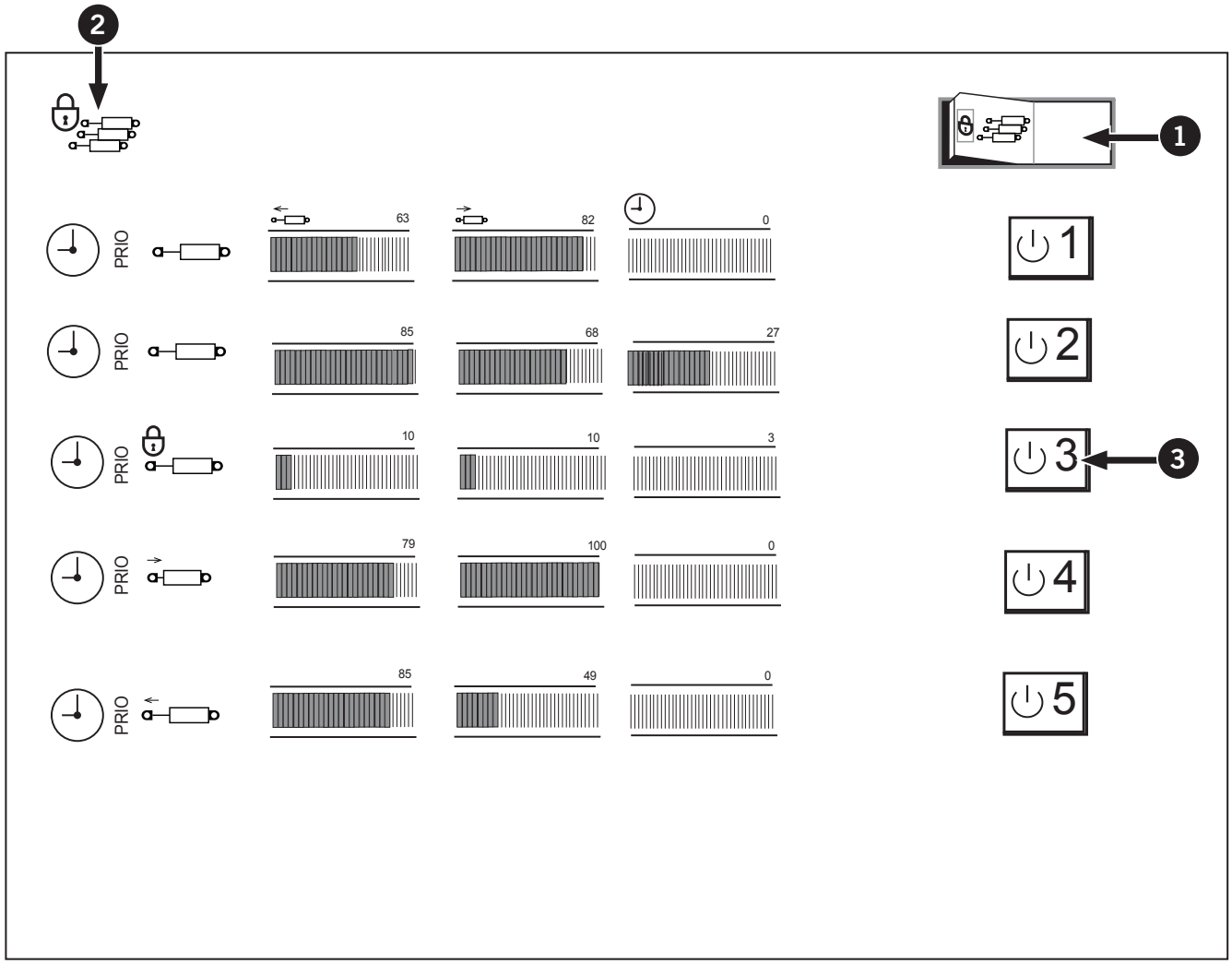
### Locking and unlocking all the remote control valves

Touch the left half of the switch (1) and all the remote control valves are locked and cannot be used for raising and lowering. Touch the right half of the switch and the valves are unlocked.

While the remote control valves are locked, the indicator (2) lights up.

### Locking and unlocking each of the remote control valves

Touch any of the remote control valves lock/unlock switches (3) and the relevant remote control valve can be locked and unlocked. (The figure below shows that the 3rd segment is being locked.)



## Remote Valve Settings

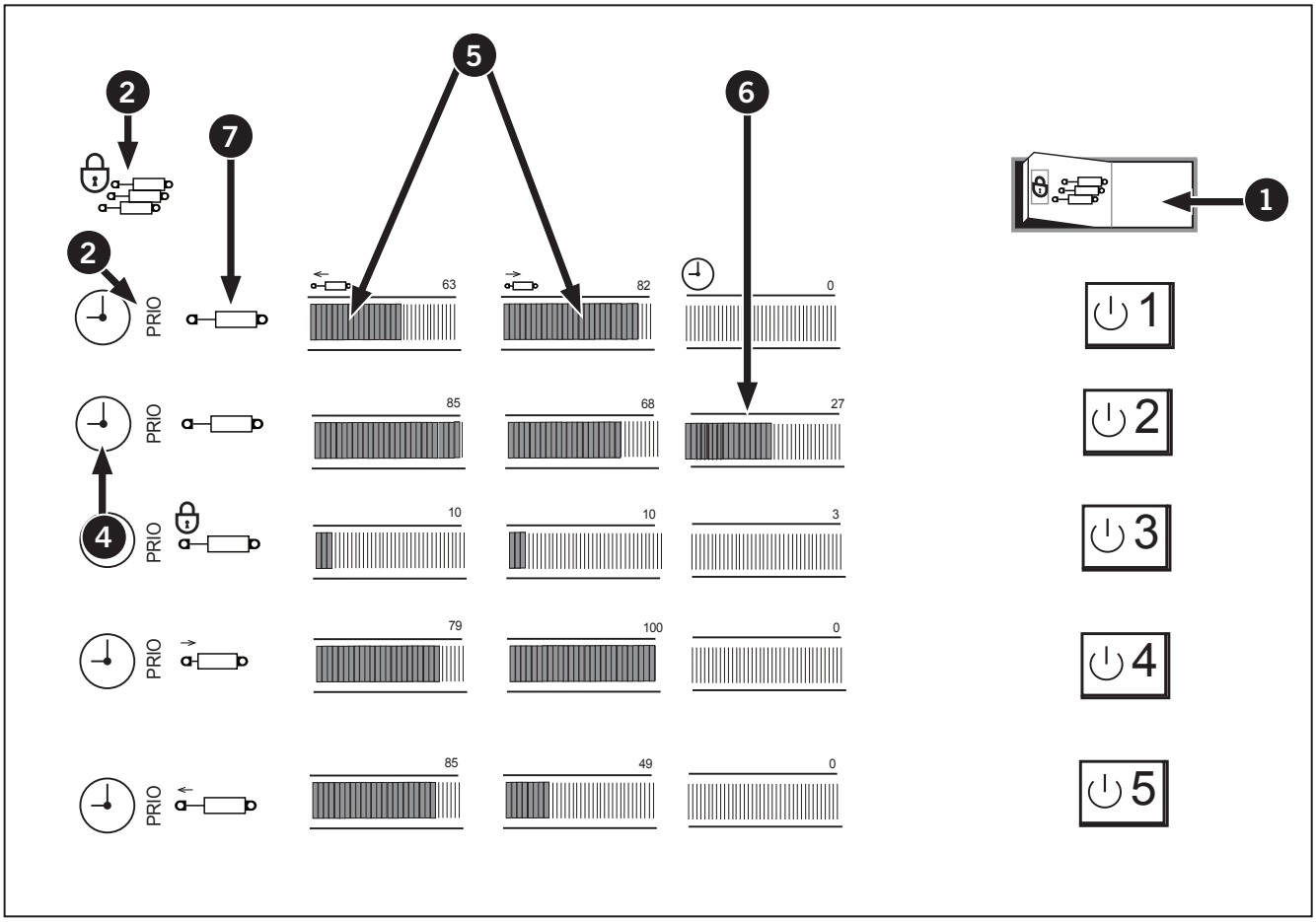
The hydraulic valves can be locked out using the lock out button (1). This will prevent any accidental hitting of the switch causing the hydraulic valve to move

In the figure below, the settings of all the remote control valves can be checked.

1. To modify any of the settings, touch the relevant valve. The “detailed settings of the selected remote control valve” screen appears.
2. Touch the left half of the lock out button (1) and all the remote control valves are collectively locked and the implement cannot be raised and lowered. In locked status, the indicator (2) also lights up.
3. Press the right half of the lock out button (1) and it unlocks all the valves.

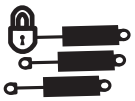
**Table 4-1: Display Monitor Menu Buttons**

| Icon | Description |
|---|---|
| 3 | The priority flow from the hydraulic pump is set for the first remote control valve. |
| 4 | The automatic shut off timer of the second remote control valve is set at ON. |
| 5 | The preset oil flow rate to each implement (remote control cylinder) is displayed. (The third remote control cylinder remains locked, which means that no oil is flowing.) |
| 6 | The automatic shut off timer (time) of remote control is displayed. |
| 7 | Valve action status indicator: The oil flow to the implement (remote control cylinder) is indicated with the icon shown below. |



| Table 4-2: Valve Action Status Indicator | |
|---|---|
| **Icon** | **Description** |
|  | Remote Cylinder - Retract |
|  | Remote Cylinder - Extend |

- Individual remote control valve lock/ unlock switch (8)
- Valve operating time (9)
- Discharge rate from cylinder (retract) port (10)
- Discharge rate from cylinder (extend) port (11)
- Priority valve indicator (12)
- Timer mode indicator (13)

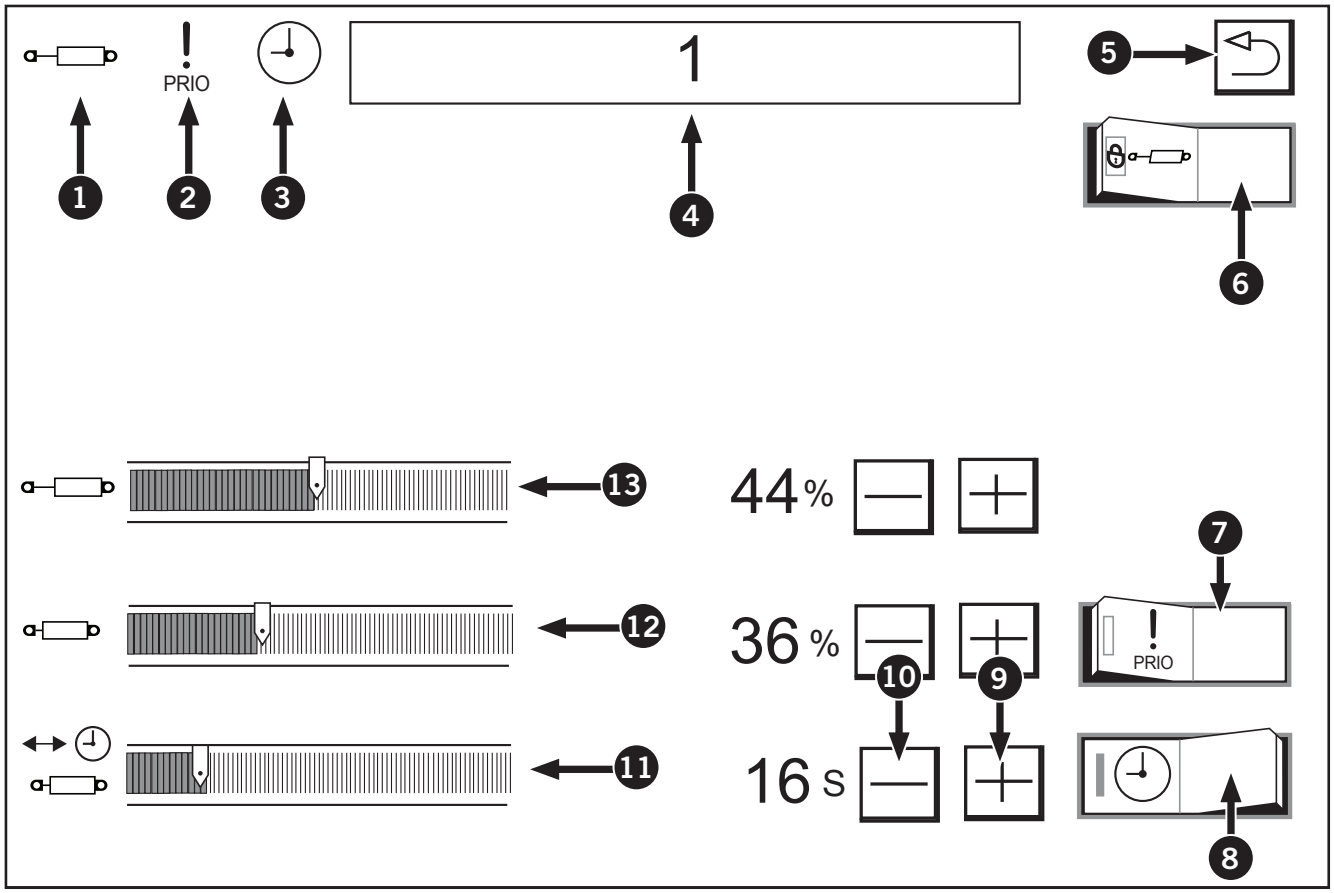
| Table 4-2: Valve Action Status Indicator | |
|---|---|
| **Icon** | **Description** |
|  | Remote Cylinder - Float |
|  | Remote Cylinder - Lock |
|  | Remote Cylinder - Lock |

## Hydraulic Remote Control Valves Icons

The following icons represents the individually preset of the selected remote control valve.

| Table 4-3: Remove Valve 1 Preset Icon Settings | |
|---|---|
| **Icon** | **Description** |
| 1 | Remote control valve operating status indicator |
| 2 | Priority flow status indicator |
| 3 | Automatic shut off timer indicator |
| 4 | Remote Control Valve Number |
| 5 | Previous screen resume switch |
| 6 | Remote control valve lock/unlock switch |

| Table 4-3: Remove Valve 1 Preset Icon Settings | |
|---|---|
| **Icon** | **Description** |
| 7 | Priority flow status on/off switch |
| 8 | Automatic shut off timer on/off switch |
| 9 | (+) switch |
| 10 | (-) switch |
| 11 | Automatic shut off timer control |
| 12 | Discharge rate from cylinder (retract) port control |
| 13 | Discharge rate from cylinder (extend) port control |



## Detailed Settings of Remote Control Valves

Each of the valves can be individually preset in detail, but only one can be set for priority flow.

1. Display the valve number (1) to be set in detail.
2. To ensure the priority flow for the valve 1, touch the left half of the priority flow status on/off switch (2). A touch on the right half clears this setting. Once the priority flow is ensured, the indicator (2) lights up and stays on.
3. To set the automatic shut off timer, touch the left half of the automatic shut off timer on/off switch (3). A touch on the right half clears this setting. Once the timer is ensured, the indicator (4) lights up and stays on.
4. To lock the remote control valve, touch the left half of the remote control valve lock/unlock switch (5). A touch on the right half clears this setting.
5. Touch the switch (6) and the previous screen reappears.

## Setting the oil flow rate and timer

To adjust the oil flow rate for the implement (remote control cylinder), use the (+) switch (7) and the (-) switch (8).

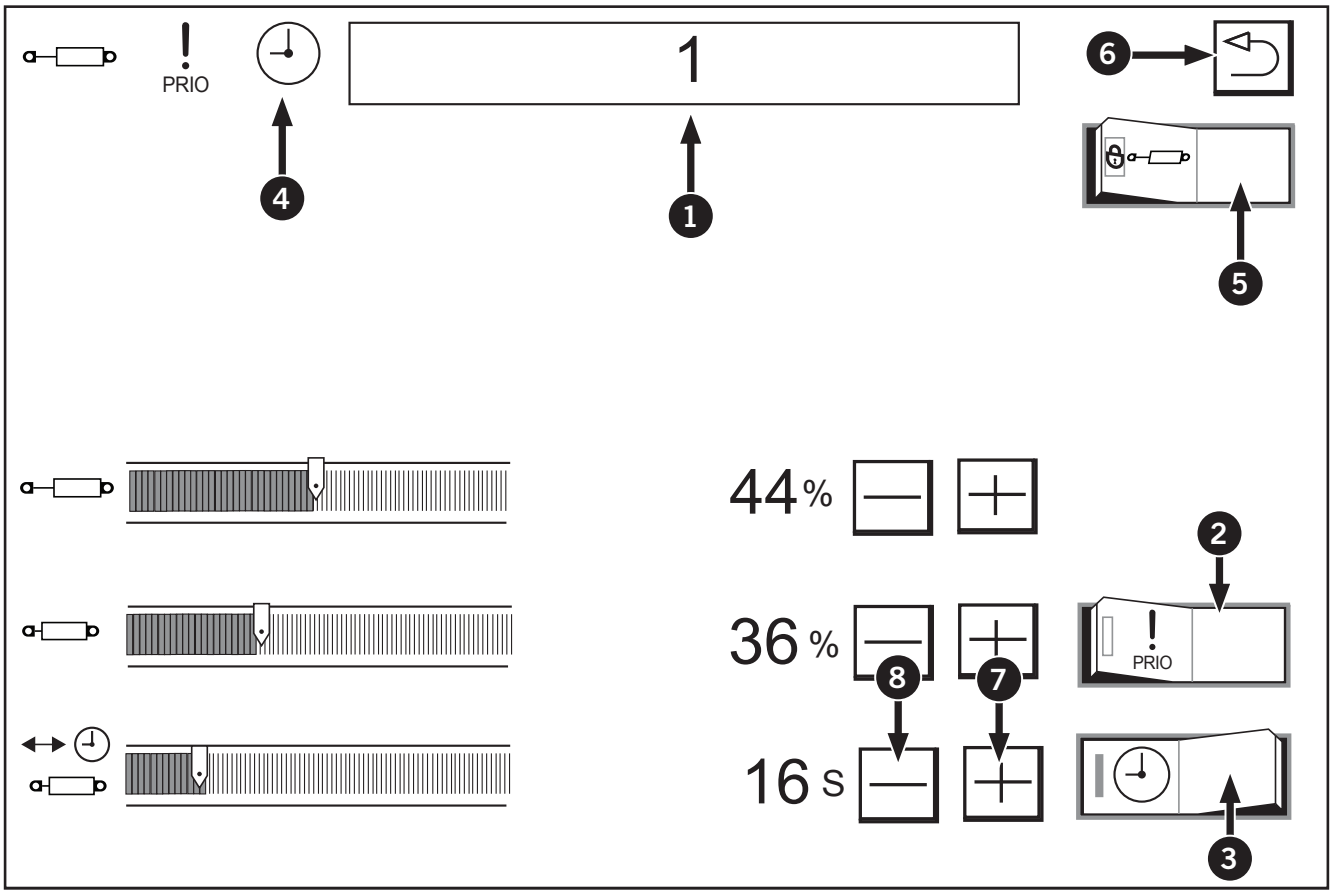
Raise the percentage to increase the oil flow rate.

The timer may be preset up to 60 seconds.

If the timer is set to (∞), the remote control valve will go into continuous operation.

***NOTE: When you have moved the remote control valve switch or lever to the "raise" or "lower" position and then released your hand from the switch or lever, the timer gets activated. When the set time is over, the oil flow to the implement is interrupted. After this stage, the timer can be set only with the switch or lever.***

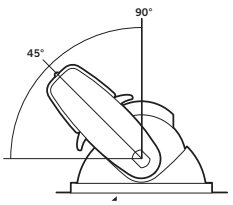
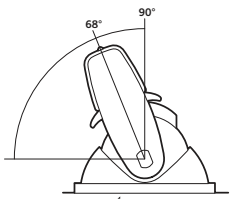
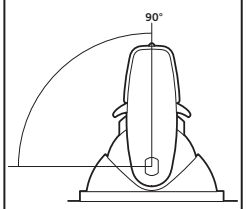
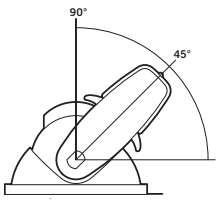
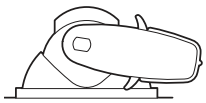
If during an action the switch or lever is moved in the reverse direction, the timer setting is cancelled.



## Operate the Hydraulic System Step 3 of 3: Operate the Hydraulic Levers

Each operation mode (continuous, manual and timed) changes the behavior of the hydraulic levers. See Table 4-4 for an overview of the lever positions and operation modes. See the following pages for details.

**Table 4-4: Hydraulic Lever Operation Quick Reference**

| Float Position | Retract Position | Neutral Position | Extend Position | |
|---|---|---|---|---|
|  |  |  |  |  |
| Symbol:  | Symbol:  | Symbol: **N** | Symbol:  | Symbol:  |
| **Float**: De-pressurizes the hydraulic system connected to the valve section.<br><br>Float will permit the cylinder to extend or retract allowing equipment such as scraper blades to "float" or follow the ground contour.<br><br>The "float" position is also used for retracting a single-acting cylinder and for the OFF position for hydraulic motors.<br><br>To place the valve section in float mode, push the lever all the way forward until it locks into place. | **Retract**: Places the valve section in retract mode. Use this mode to retract double-acting cylinders or to supply continuous flow to a hydraulic motor. Do not use to retract single-acting cylinders.<br><br>**Manual Mode:** Use this mode to manually adjust the flow. Push the lever forward (but not all the way into detent) to supply flow. Release the lever to stop the flow.<br><br>**Timed Detent Mode:** Allows the operator to engage a timed detent, which is a set time between when the control levers are activated and when they will automatically return to neutral. Program the detent before use. To start timed retract mode, push the lever forward until it clicks into the detent and release to neutral.<br><br>**Continuous Mode:** Use this mode to supply continuous flow to a hydraulic motor. Set the time mode to infinity. There is no lock to get retract into continuous flow. | **Neutral:** There is no hydraulic flow in or out of the valve section. | **Extend:** Places the valve section in extend mode. Use this mode to extend single or double-acting cylinders. Do not use the extend position to start a hydraulic motor.<br><br>**Manual Mode:** Use this mode to manually adjust hydraulic flow. Pull the lever back to supply hydraulic flow. Release the lever to stop the flow.<br><br>**Timed Detent Mode:** Allows the operator to engage a timed detent, which is a set time between when the control levers are activated and when they will automatically return to neutral. Program the detent before use. To start timed extend mode, pull the lever back until it clicks into the detent and release to neutral. | **Detent Mode:** Set the switch to the "DETENT" position, and it is held at this position unless it is returned to the "NEUTRAL" position. This function is useful for implements that need constant oil feed.<br><br>**Continuous Mode:** Do not use the extend position to start a hydraulic motor. |

## Float Mode

Float mode de-pressurizes the hydraulic system connected to the valve section.

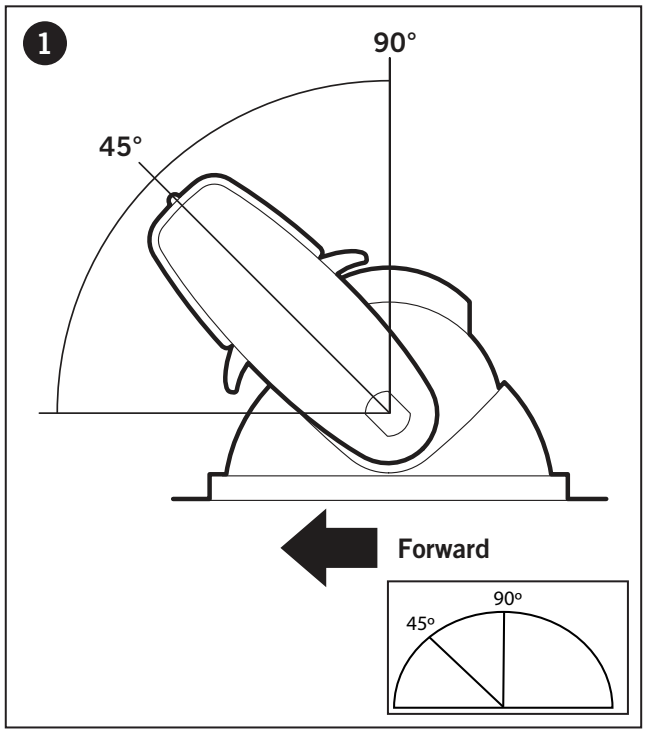
Float will permit the cylinder to extend or retract allowing equipment such as scraper blades to “float” or follow the ground contour.

The “float” position is also used for retracting a single-acting cylinder and is the OFF position for hydraulic motors.

***IMPORTANT:*** *Do not hold the lever in the fully extend or retracted position after a remote cylinder has reached the end of its stroke. Doing so will overheat the oil and may lead to failure of hydraulic pump driveline components.*

To engage float mode, push the hydraulic lever forward until it locks into position (1).

To disengage float mode, pull the lever back to the neutral position (2).

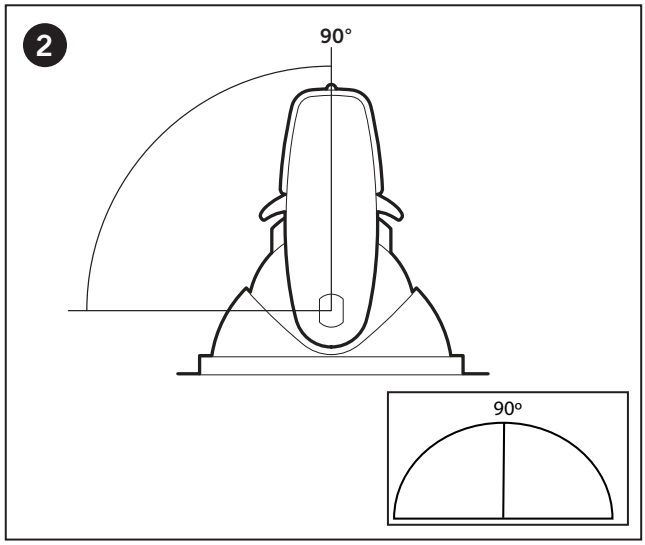



Lever locked into the float position.

## Neutral Mode

If the valve section is in neutral mode then there is no hydraulic flow in or out of the valve section.

- In manual mode, releasing the lever to the neutral position (2) will cause the valve section to enter neutral mode.
- In timed detent mode, the valve section will enter neutral mode if the lever is in the neutral position (2) once the timed detent is complete.
- To correctly place the valve section in neutral mode during continuous flow mode, the operator must first push the lever to the float position (1) and allow the motor to stop before pulling the lever to the neutral position (2).




Lever at the neutral position.

## Continuous Flow Mode

**NOTICE**

Only use continuous flow mode to operate hydraulic motors. Always use the retract position to operate hydraulic motors. Never use the extend position to operate hydraulic motors.

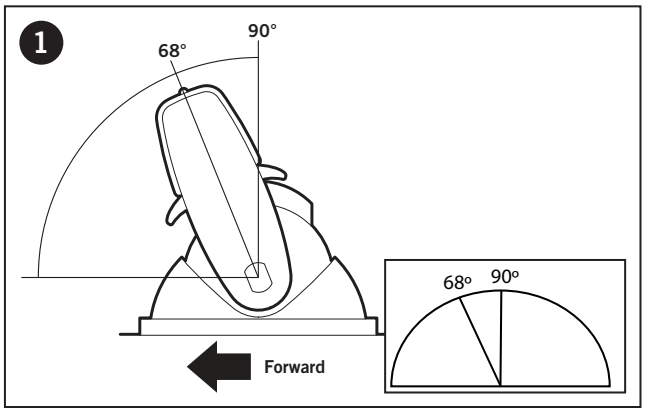
Do not operate the motor by manually holding the hydraulic levers in place or using timed detent mode. If the detent is not working in continuous mode, check the equipment for proper adjustment or contact a dealer for assistance in adapting the equipment to suit the tractor.

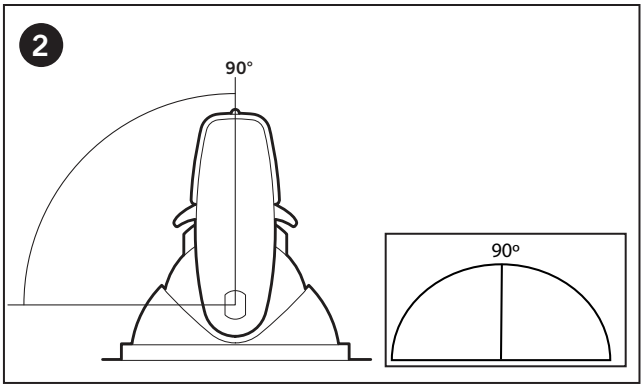
Do not use continuous flow mode to operate remote cylinders. When the cylinder has reached the end of its stroke the control lever will not return to neutral and the hydraulic system relief valve will be activated. This will overheat the oil and may lead to failure of the hydraulic and driveline components.

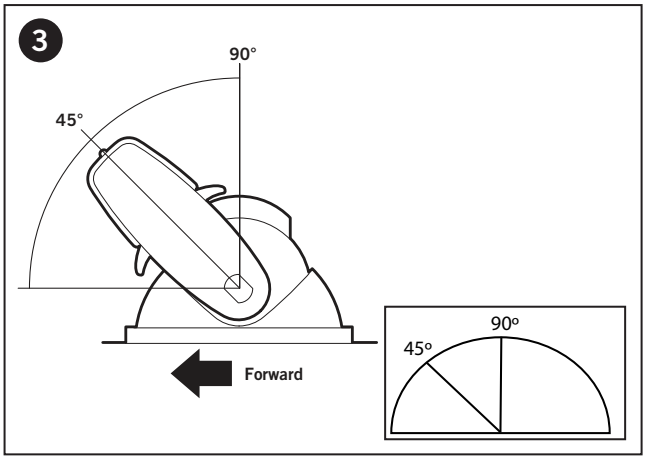
- Use the tractor implement valve flow control (K-monitor) to regulate the motor speed. Do not adjust the flow rate by opening any by-pass valve attached to the equipment or motor.
- If the hydraulic motor is going to be under heavy load, set a low flow rate before startup. Gradually increase the flow once the motor is working. For optimum hydraulic oil cooling, operate continuous flow equipment at the highest flow setting.
- If the flow control is open too far, the 3-pt hitch and other remote valves may slow down or stop. This will ensure that the hydraulic system will only supply the oil demanded by the motor and the pump will not be providing excessive oil flow.

***NOTE: Connect the hoses to the remote couplers properly before proceeding.***

To supply continuous flow, set time detent to infinity on the remote valve, activate timed detent mode (1) and release to neutral (2). Gradually pushing the lever forward before clicking into the retract will steadily increase the load on the hydraulic motor before continous flow mode is engaged.




To stop continuous flow mode:

Gradually push the lever forward until it is in the retract position.

1. Push the lever forward into the float position (3).
2. Allow the motor to slow down.
3. To stops the motor, pull the lever back to the neutral position (2).

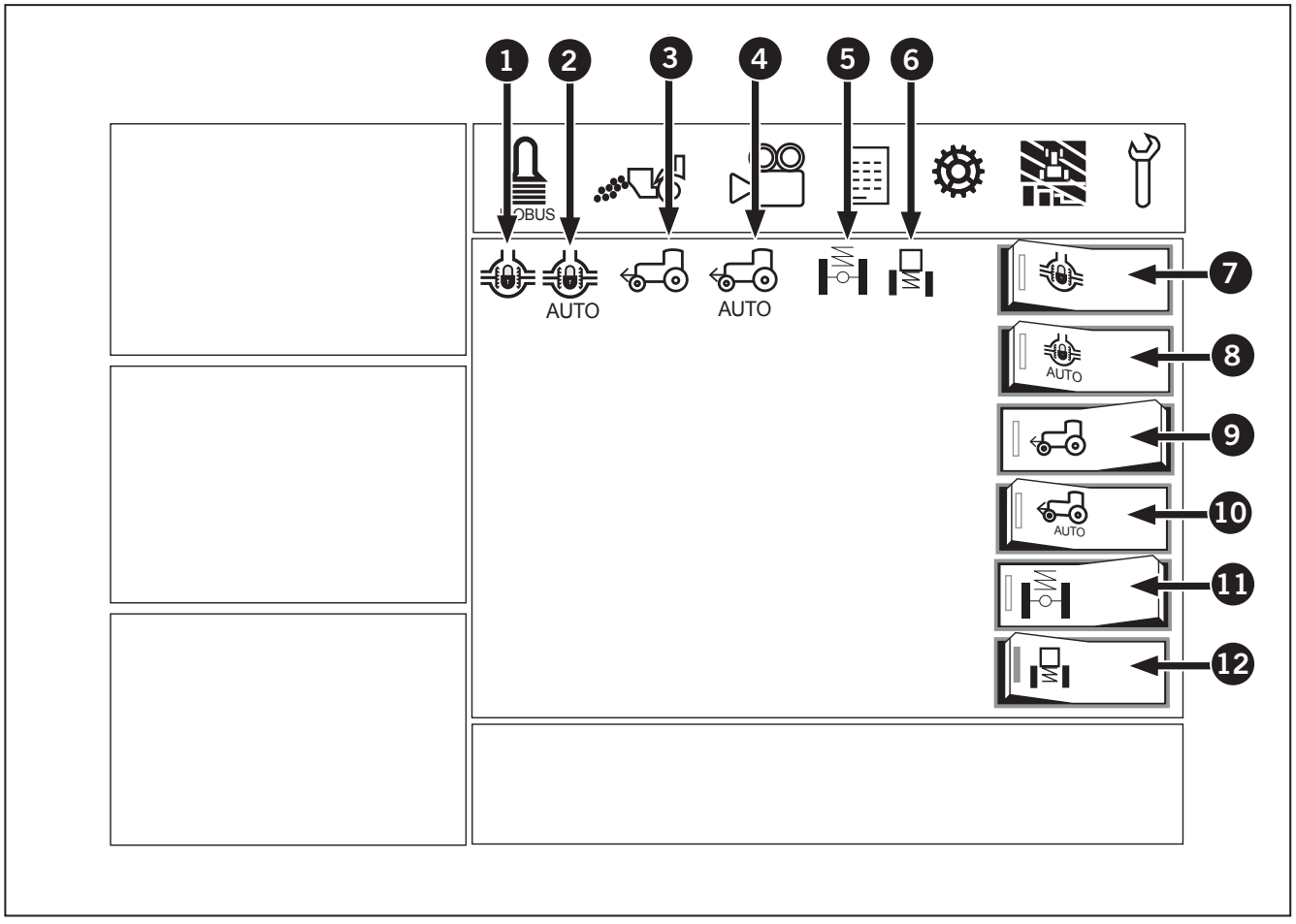
***NOTE: Do not stop continuous flow by nudging the lever past neutral (in either direction) as this will stop the flow abruptly and damage the motor.***

## Drivability Icon Settings

The following icons are settings for differential lock, front wheel drive and front suspension settings.

| Table 4-5: Drivability Setting Icons | |
|---|---|
| **Icon** | **Description** |
| 1 | Differential lock indicator |
| 2 | Auto differential lock indicator |
| 3 | 4WD indicator |
| 4 | Auto 4WD indicator |
| 5 | Front suspension (active) indicator |
| 6 | Cab suspension indicator |

| Table 4-5: Drivability Setting Icons | |
|---|---|
| **Icon** | **Description** |
| 7 | Differential lock switch |
| 8 | Auto differential lock switch |
| 9 | 4WD switch |
| 10 | Auto 4WD switch |
| 11 | Front suspension (block) switch |
| 12 | Cab suspension (block) switch |

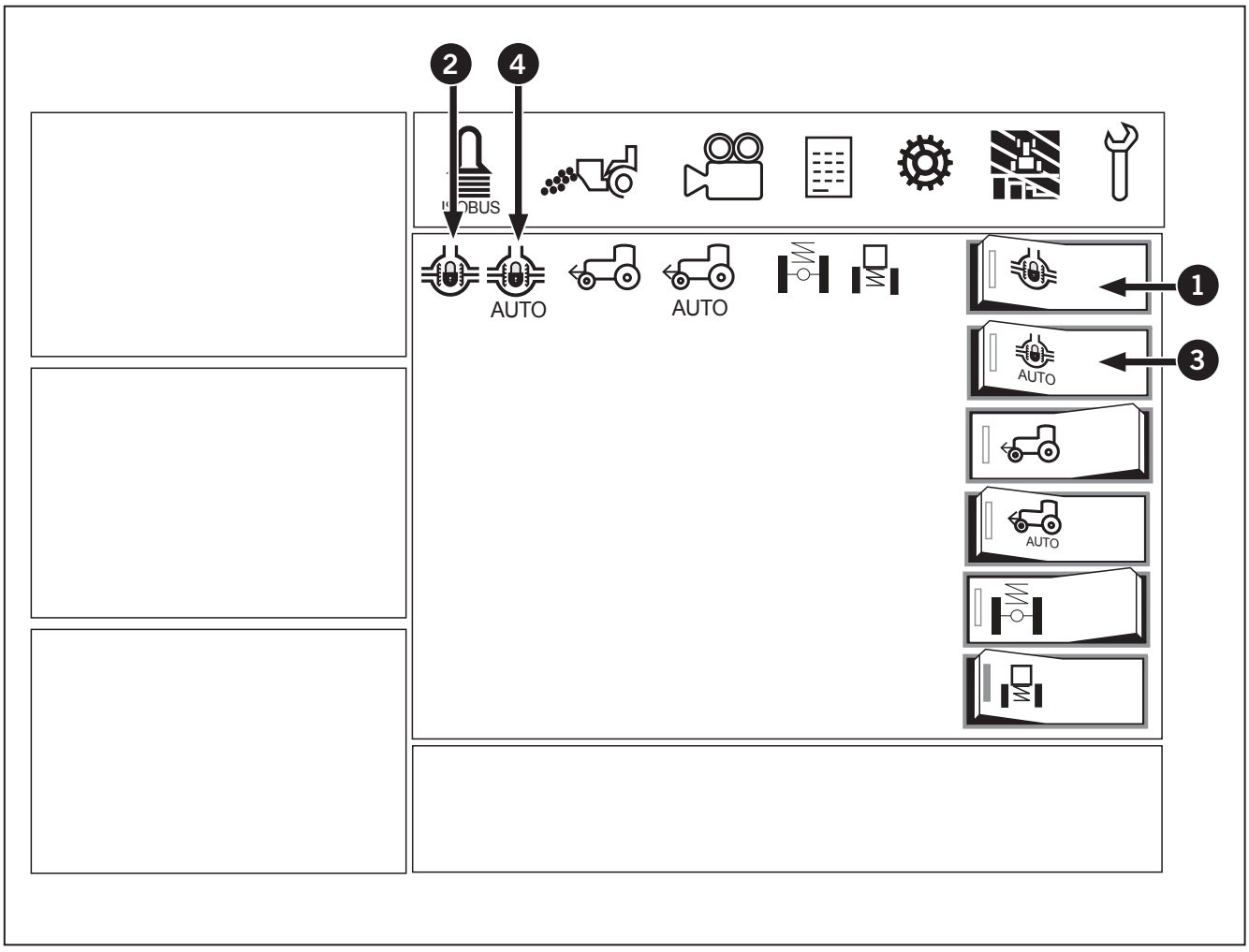


## Differential Lock Setting

1. Touch the left half of the differential lock switch (1) and the differential of the full-time front and rear wheels gets locked. The indicator (2) lights up and stays on.
2. Turn off the differential lock switch (1) and the differential gets unlocked and the indicator (2) goes off.
3. Touch the left half of the auto differential lock switch (3) and both indicator lights (2) and (4) lights up. Same procedure for disengaging.

**Table 4-6: Automatic Differential Lock Operating conditions**

| Traveling Speed | 4-wheel differential lock |
|---|---|
| 0 to 10 km/h (6 mph) | OFF at 15 °<br>(Auto only) |
| 10 (6 mph) to 15 kph (9 mph) | OFF at 10 °<br>(Auto only) |
| 15 km/h (9 mph) and above | OFF (Manual and Auto) |

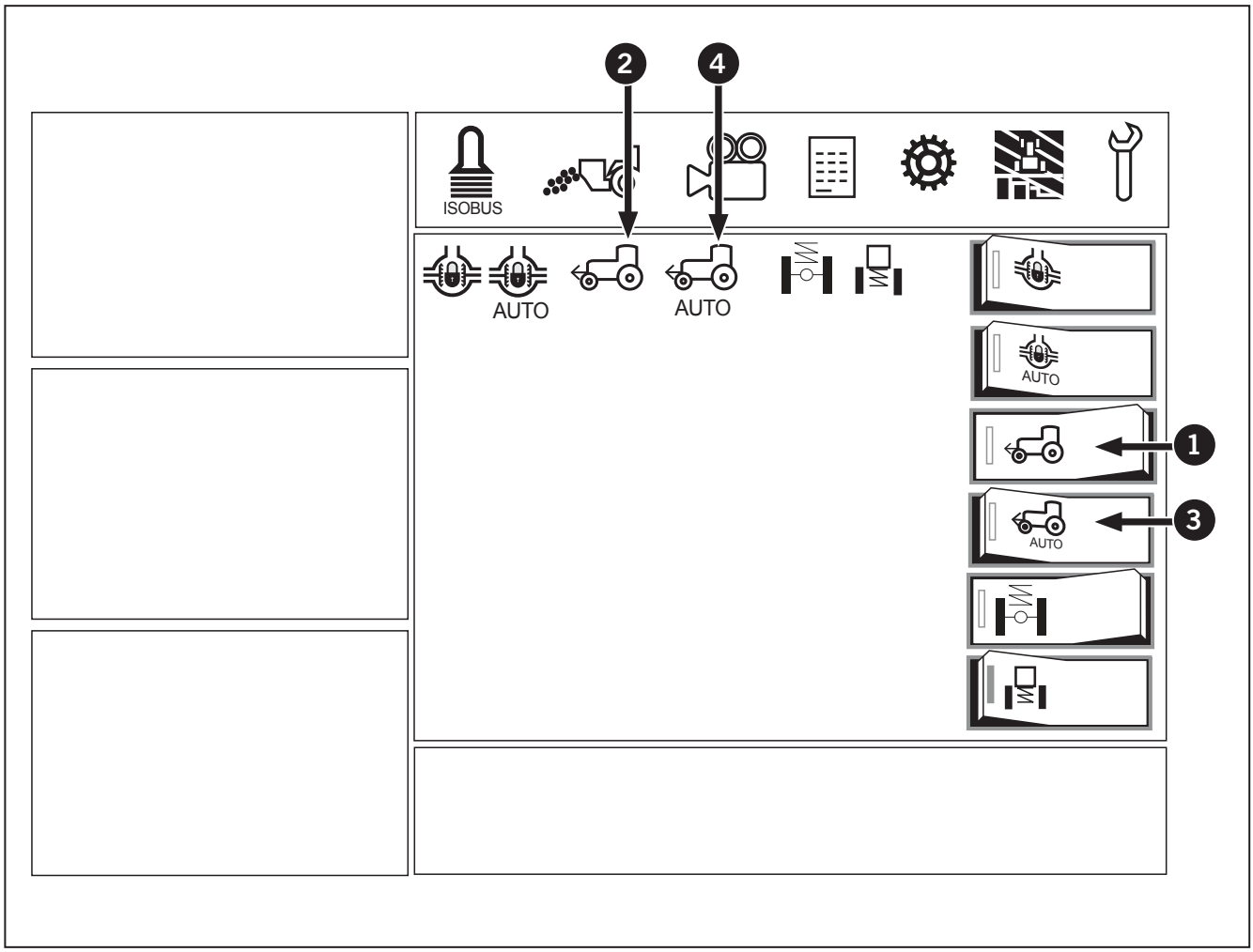


## Front Wheel Drive Setting

1. Touch the left half of the 4WD switch (1) and the front and rear wheels are driven. The indicator (2) lights up and stays on.
2. Turn off the 4WD switch (1) and the front-wheel drive is disabled and the indicator (2) goes off.
3. Touch the left half of the Auto 4WD switch (3) and the automatic 4WD and both indicator lights (2) and (4) lights up. Same procedure for disengaging.

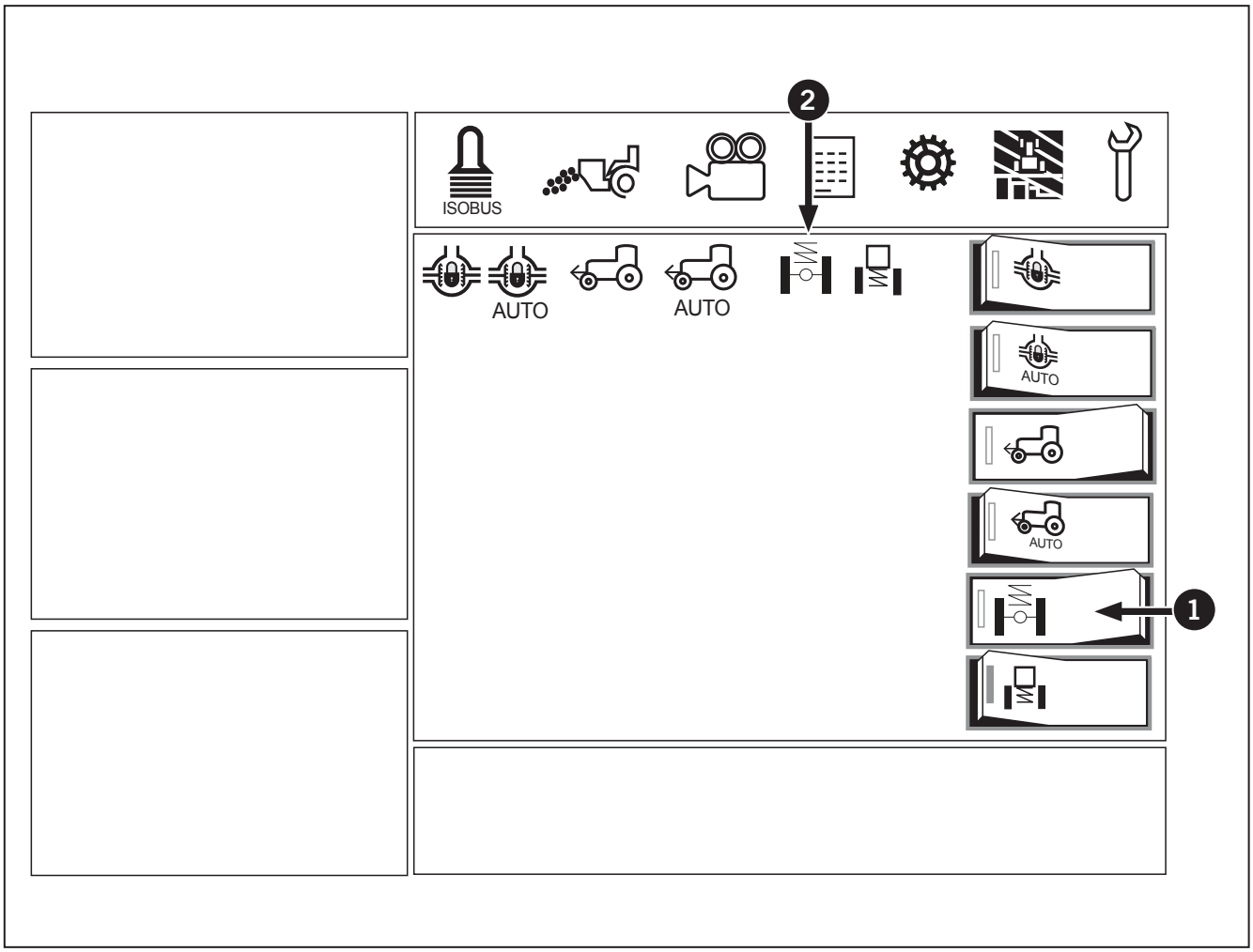
**Table 4-7: Automatic Front Wheel Drive Operating Condition**

| Traveling Speed | 4-wheel differential lock |
|---|---|
| 0 to 10 km/h (6 mph) | OFF at 18 °<br>(Auto only) |
| 10 (6 mph) to 20 kph (12 mph) | OFF at 13 °<br>(Auto only) |
| 20 km/h (12 mph) and above | OFF (Manual and Auto) |



## Front Suspension Setting

1. The front suspension has the “Block” or “Active” modes.
2. Active mode is like auto mode, when the block switch (1) is pressed to the right and is turned off, the suspension is now in active mode and the indicator light (2) will turn on.
3. Press the block switch (1) to the left and the suspension is now blocked and the indicator light (2) will turn off. The axle will now act like a rigid axle.



**This Page Is Intentionally Left Blank.**

# Section 5: Lubrication and Maintenance – Contents

## Introduction

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.

- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.
- Read and practice all safety precautions listed in “Precautionary Safety Statements” on page 1-13.

**NOTICE**

- Park the tractor on level ground and, where applicable, extend all cylinders before checking oil levels.
- It is strongly recommended to perform all inspections and changes listed in the First 50-hour Service checklist. Owners are urged to consider the operating environment, expected ambient temperature and tractor loads when selecting the types and grades of fluids used in the changes. Contact a KUBOTA dealer for advice on fluid selection.

## Daily Service

Regular lubrication and maintenance of the tractor is important for optimum performance and a long service life. The following daily procedures will help maintain the tractor at peak performance:

- Check wheel hardware for tightness;
- Check the planetary hub and differential oil level; and
- Check for leaks and loose or damaged parts.

See "Every 10 Hours (daily)" on page 5-27 and "Break-in Precautions" on page 5-7.

## First 50-hour Service

The first 50 hours of tractor operation are the most critical for ensuring long and dependable tractor life. The tractor will provide long and dependable service given proper care during the initial 50 hour break-in period and if the recommended service operations are performed and the schedules followed.

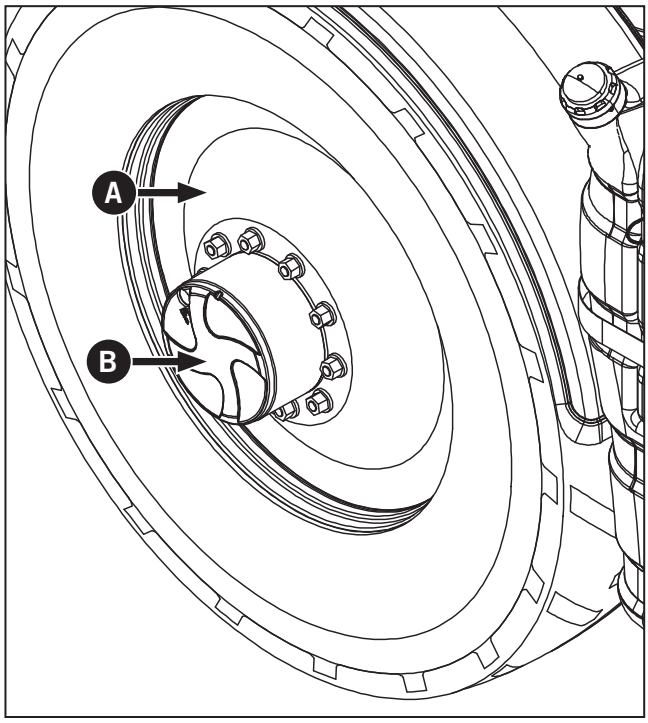
Make sure the following steps are carried out during the first 50 hours of operation.

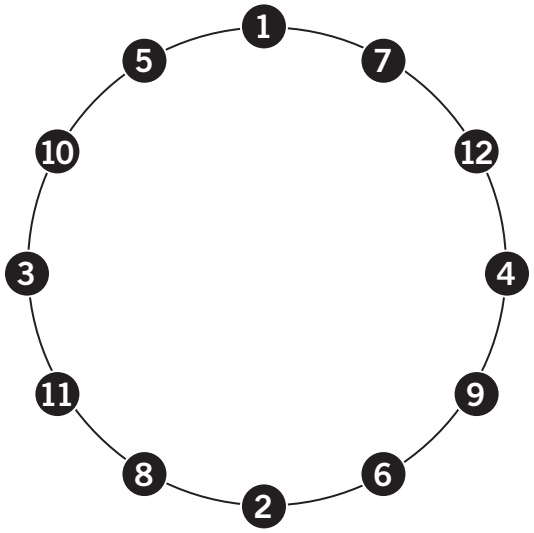
- Review the tractor Pre-delivery Checklist with the KUBOTA dealer and make sure all the items on the list have been inspected and checked off.
- Become familiar with the instructions for operation of the controls.
- Read and understand all safety warnings.
- Check all fluid levels and make sure the systems are filled with the correct fluids suitable for the tractor operating conditions.
- Check the engine, transmission and hydraulic oil levels hourly during the first 10 hours of operation.
- Inspect the tractor for leaks hourly during the first 10 hours of operation.
- Tighten the wheel hardware to the torque values provided in Section 5: Lubrication and Maintenance after the first hour of operation and at the end of each day for the first 50 hours of operation. Also see next page for the following torque sequence.
- Operate the engine at 3/4 load as much as possible during the first 50 hours (3/4 load is approximately one gear lower than would be normally used to pull a matched load).
- Do not operate the engine at idle speed or full throttle for more than five minutes at a time for the first 50 hours.
- Check the instruments frequently during operation.

## Check and Tighten Wheel Torques

### Reinstall wheels

- Tighten the wheel nuts in sequence according to Table 5-1.
- Rotate the criss-cross sequence clockwise until all the wheel hub nuts are tightened.
- For wheels mounted to a large hub (A), tighten mounting nuts to 597 N·m (440 ft·lb).
- For wheels mounted to a small hub (B) , tighten mounting bolts to 800 N·m (590 ft·lb).




| Table 5-1: Torque Sequence for Wheels | |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |
| 11 | 11 |
| 12 | 12 |
| 13 | Again 1 |

## Break-in Precautions

- Do not operate the engine at more than 3/4 load for the first 24 hours of operation. Hold a full load only for short intervals during the next 24 hours of operation.
- Check the oil level every 8 to 10 hours for the first 100 hours of operation.
- Follow the recommendations outlined in the Cummins owner's manual supplied with the tractor.

## Preventing System Contamination

To prevent contamination when changing oils and filters:

- Clean the area around the filler caps, level plugs, drain plugs, dipsticks and filters prior to removal.
- Check that the oil is clean and has not degenerated in storage before connecting remote cylinders.
- Wipe the grease fittings before greasing to prevent the entry of dirt.

## Flexible Maintenance Intervals

The intervals listed in the Lubrication and Maintenance Chart in this section are guidelines to be used when operating in normal working conditions. Adjust the intervals for environmental and working conditions. Shorten intervals under adverse (wet, muddy, sandy or extremely dusty) working conditions.

## Lubrication and Maintenance Chart

The chart lists the intervals for routine checks, lubrication, service and/or adjustments. Use the chart as a quick reference guide when servicing the tractor.

## Engine Oil

KUBOTA and Cummins Inc. recommend the use of a high quality CJ-4 low-ash oil. Additional information on engine oil under extreme conditions (hot or cold weather) can be found in the Cummins Engine Manual provided with the tractor. Contact a KUBOTA dealer for more information.

## Fuel Requirements

Select the correct fuel for dependable performance and satisfactory engine life. The tractor is designed to run efficiently on Ultra Low Sulfur Diesel (ULSD) fuel. ULSD fuels must contain 15 ppm or less sulfur content at point of use in North America and Europe.

Contact a KUBOTA dealer for more information and suppliers of ULSD fuels and about cold weather operations.

- Use of fuel with a high sulfur content will damage the engine and after treatment system.
- Never use blended fuels. Under no circumstances add gasoline, alcohol or blended fuels, such as gasohol or dieselhol, to diesel fuel. These fuel blends are more explosive than pure diesel in an enclosed fuel tank. Do not use these blends.
- Keep the filler cap area clean and free of debris.
- Fill the tanks at the end of each day to reduce overnight condensation.
- Never take the fuel caps off or refuel the tractor with the engine running.
- Keep control of the fuel nozzle while filling the fuel tanks.
- Do not fill the tanks to capacity. Allow room for expansion.
- Wipe up all spilled fuel immediately.
- Use only internally grounded fuel hoses from storage tanks and pumps to the tractor fuel tank. Check with a fuel hose supplier if in doubt.
- Make sure the nozzle is in contact with the tractor filler neck before fuel starts flowing and during the entire time fuel is flowing.

## Fueling the Tractor

**DANGER**

Always observe safe fuel handling practices when fueling the tractor.

**NOTICE**

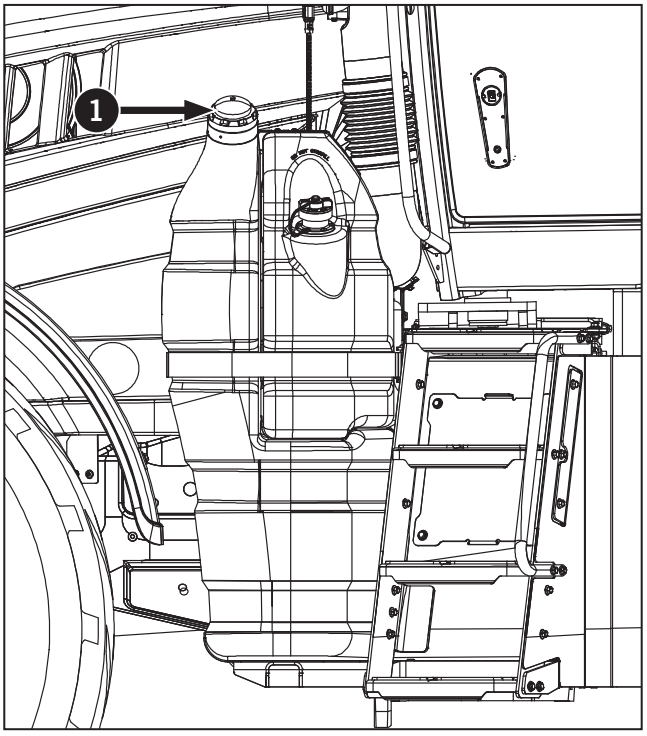
Do not overfill the tanks. Allow room for fuel expansion in changing temperatures. Expanding fuel in overfilled tanks can result in fuel entering engine cylinders and the accompanying hydraulic locks causing damage to the engine.

Model M8-181 and M8-201tractors are equipped with a fuel tank (1) with a capacity of 330 L (87 gal).

***IMPORTANT:****Always replace fuel tank caps with genuine KUBOTA caps. Always tighten fuel tank caps securely.*

To fuel the tractor:

1. Turn off the engine and allow the tractor to cool before starting refueling procedures.
2. Clean the area around the fuel cap (1) to prevent debris from entering the tank and contaminating the fuel.



3. Turn the fuel cap (1) counterclockwise until loose, then pull upward to remove from the tank. Place the cap in a clean area during refueling to prevent fuel contamination.
4. Check the fuel pump nozzle for damage and make sure the fuel hose is properly grounded. Fully insert the fuel pump nozzle in the fuel tank neck and then start fueling.
5. Wipe up all spilled fuel immediately.
6. Turn the fuel cap clockwise until tightened securely. Lock the fuel cap if required.
7. Store fuel properly. See “Fuel Storage” on page 7-22.

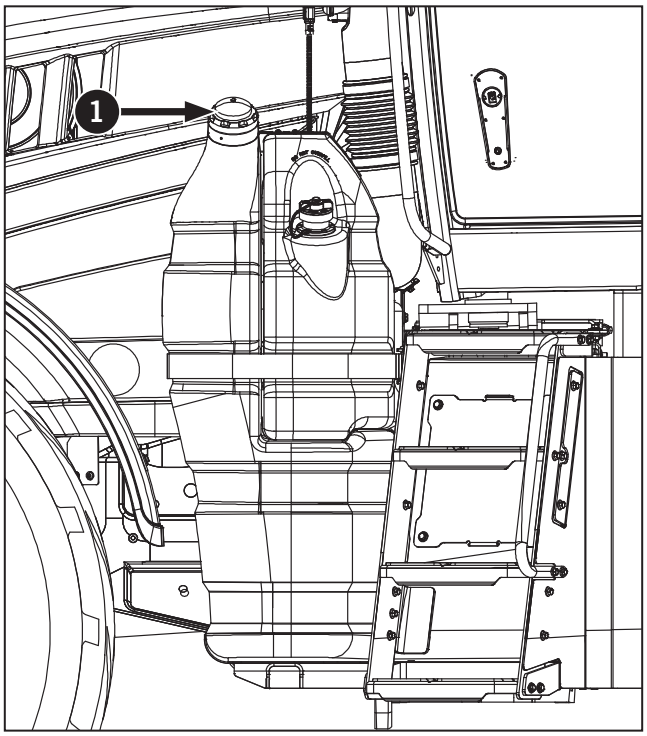



**Table 5-2: Fuel Information**

| General Fuel Type | ULSD | ULSK |
|---|---|---|
| Final Boiling Point | 357 °C (675 °F) | 288 °C (550 °F) |
| Temp Range | -7 °C (20 °F) and above | -7 °C (20 °F) and above |
| Cetane | 40 | 40 |
| Sulfur Content | 15 ppm | 15 ppm |

## Overfuel protection

- 80% fuel level = 1 beep
- 85% fuel level = 2 beep
- 90% fuel level = 3 beep
- 95 % fuel level = 3 seconds beep

## Adding Diesel Exhaust Fluid (DEF)

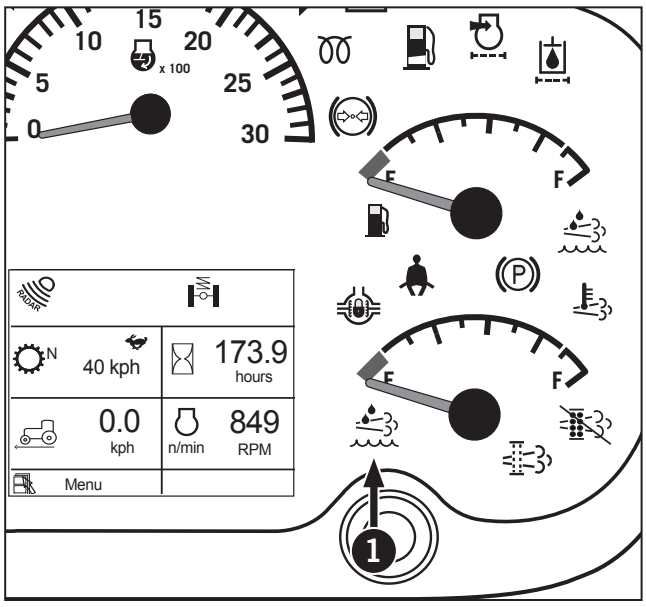
**CAUTION**

Wear gloves and eye protection when adding diesel exhaust fluid (DEF). DEF is not harmful to handle but will corrode certain metals.

- In case of eye contact: Remove contact lenses. Immediately wash your eyes with a lot of water for least 15 minutes.
- In case of skin contact: First aid is normally not required. Immediately wash your skin with soap and water. Avoid prolonged contact with DEF.
- If swallowed: Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, contact a physician immediately.

Guidelines and Requirements:

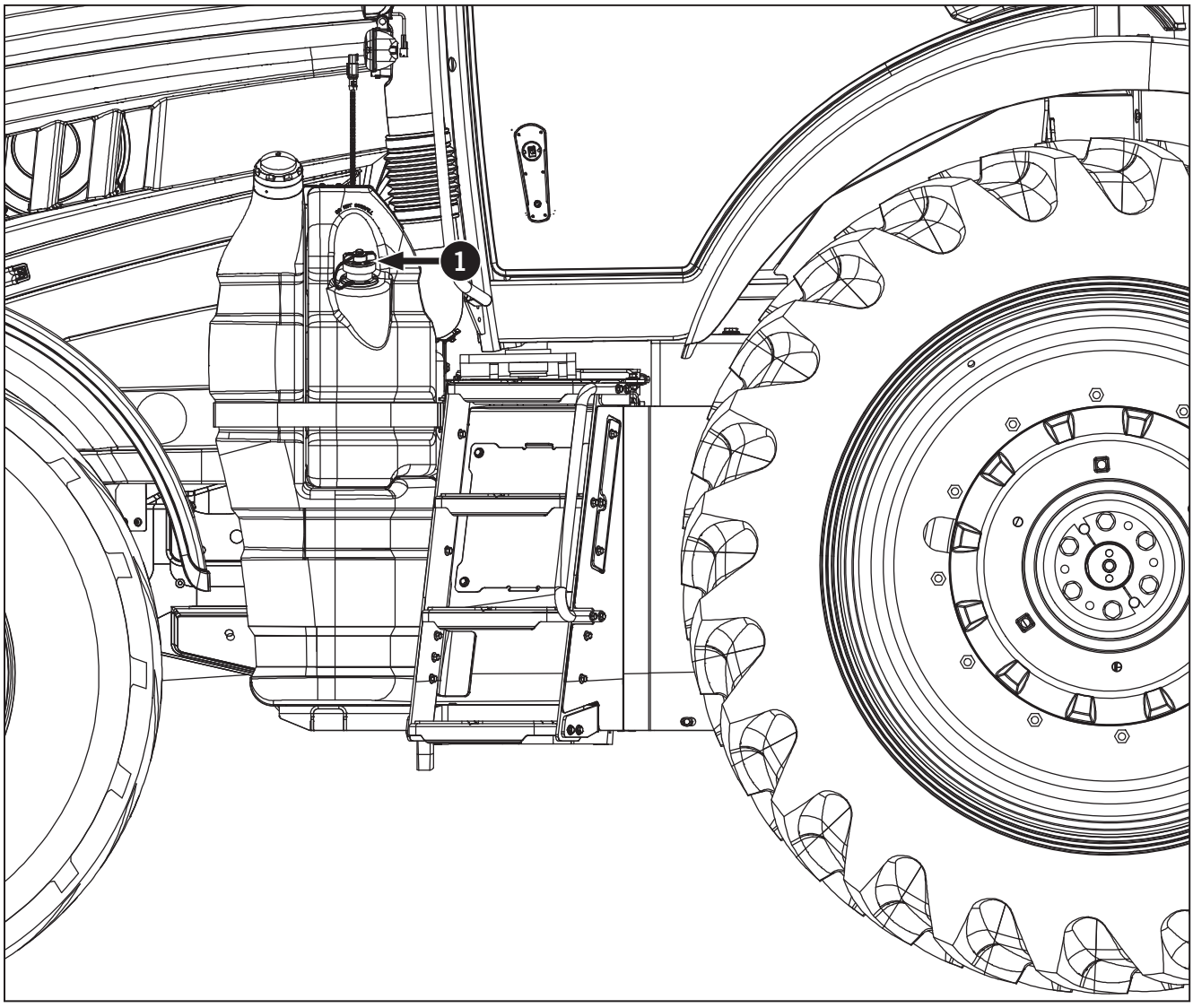
- The quality of the diesel exhaust fluid (DEF) must meet ISO 22241-1. Only use commercially grade DEF. Agricultural grade DEF is not acceptable.
- Never add DEF to diesel.
- Top up the (DEF) tank every time you fill up the fuel tank. This is the easiest way to make sure the aftertreatment system always has enough DEF.
- Warning lamps will appear in the tractor when the DEF is low and empty. If you see the low level DEF icon (1) on the EIC fill up the DEF tank immediately. If the DEF level is critically low the engine will lose power. Once the DEF tank is completely empty the engine power will be reduced to idling.



To add diesel exhaust fluid (DEF):

Before using anything to store or dispense DEF, such as containers or funnels, wash these items with disilled water, not tap water. Tap water will contaminate the DEF. If distilled water is not available, rinse the items with tap water first, and then with DEF.

1. The DEF tank is on the left side of the tractor.
2. Clean the area around the DEF cap (1), the cap itself, and any funnels before filling the tank. DEF must not be contaminated.
3. Fill up the tank. Tighten the DEF cap.
4. Clean up any spills immediately. DEF will wreck the paint on the tractor.
5. Store DEF supplies properly. See “DEF Storage” on page 7-19.



## Coolant Mixture and Additives

Make sure the coolant and additive level is appropriate for tractor:

- Use a coolant that meets Cummins' Engineering Standards as listed in Table 5-3.
- Use a fully-formulated coolant or a mixture of concentrate and water. Any water used must meet the quality standards as listed in Table 5-4 if mixing concentrate with water.
- Maintain a supplemental additive (SCA) level of 0.6 to 0.8 units per L (2.5 to 3 units per gal). Contact a KUBOTA Dealer for help in obtaining this additive (Type: DCA4).
- Make sure the glycol concentration is appropriate for the climate. See Table 5-5.
- Make sure the coolant is not contaminated. See Table 5-6.

**Table 5-5: Coolant Freezing Point**

| Glycol Concentration (% by volume) | Ethylene Glycol | Propylene Glycol |
|---|---|---|
| **40 %** | -24 °C (-12 °F) | -21 °C (-6 °F) |
| **50 %** | -37 °C (-34 °F) | -33 °C (-27 °F) |
| **60 %** | -52 °C (-65 °F) | -49 °C (-56 °F) |
| **Arctic climate only: 68 %** | -71 °C (-96 °F) | Do not use. |

**NOTICE**

- Failure to maintain DCA4 in the cooling system will cause cooling system corrosion and engine failure.
- It is easier and more economical to test the glycol level using test strips. If the test strips show an improper freezing point, test the glycol level with a refractometer (1) for a more precise reading. Propylene glycol protection levels cannot be checked with the same hydrometer used to check ethylene glycol antifreeze.

**Table 5-3: Product Specifications**

| Product | Must Meet Engineering Standard |
|---|---|
| **Coolant** | Cummins 14603<br>(use Fleetguard ES Compleat™ or equivalent) |
| **Coolant Filter** | Cummins 14315 |

**Table 5-4: Water Quality**

| Contaminant | Allowable Level |
|---|---|
| Calcium Magnesium (Hardness) | Max 170 ppm as ($CaCO_3$ + $MgCo_3$) |
| Chloride | Max 40 ppm as (Cl) |
| Sulfate | Max 100 ppm as ($SO_4$) |


**Table 5-6: Coolant Contaminate Limits**

| Contaminant | Allowable Level | If allowable level is not met |
|---|---|---|
| Sulfate (SO4) | 1500 ppm max | 1. Drain coolant.<br>2. Refill system with fully formulated coolant that meets Cummins Engineering Standard 14603. If mixing water with concentrate, first test the water quality according to Table 5-4.<br>3. Re-test SCA and glycol levels and adjust if necessary. |
| Chloride (Cl) | 200 ppm max | |
| PH | 7.5 minimum | |
| Oil or Fuel | No Oil or Fuel | 1. Drain, clean and flush coolant system.<br>2. Replace with fully formulated coolant that meets Cummins Engineering Standard 14603. If mixing water with concentrate, first test the water quality according to Table 5-4.<br>3. Re-test SCA and glycol levels and adjust if necessary. |
| Grease, solder bloom, silica gel, rust or scale | Must be free of these contaminants | |

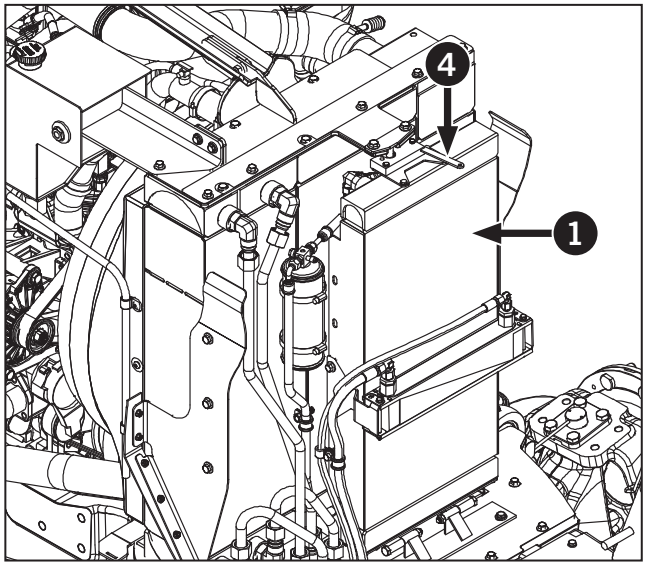
## Inspection Access

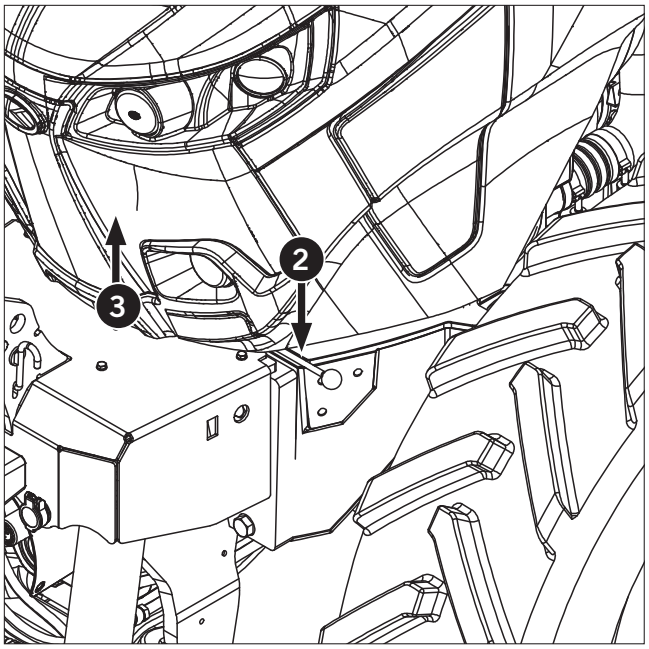
**DANGER**

Always make sure that safety shields and other protective devices are in place and operational after service and maintenance. Never operate the tractor with missing or damaged safety shields.

**WARNING**

- Never operate the tractor with the safety shields removed.
- Safety shields, guards and cowlings must not be removed except when access to the guarded areas is required for maintenance. Always replace the safety shields immediately when the service work is complete.




It may be necessary to open or remove various panels and shields in order to complete some maintenance requirements.

### Cooler Package Access

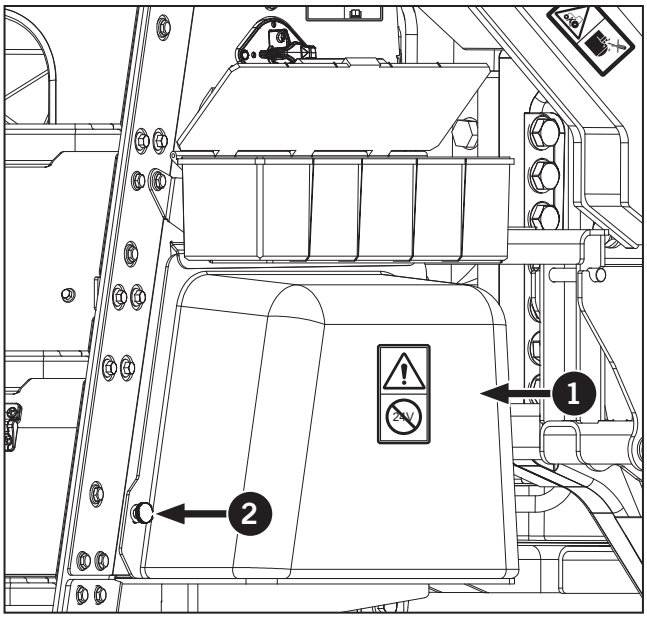
The cooler package (1) consists of the engine cooler, the hydraulic oil cooler, the charge air intercooler and the air conditioning (A/C) condenser. To access the the cooler package:

1. Pull the release latch (2) located by the hood (3). The hood will lift open.
2. With the hood open, push the latch (4) on the cooler pack to release the A/C condenser. Pull forward to swing the condenser out providing access to the front of the cooler pack.
3. Make sure the coolers are secure and that the hood is closed and latched before operating the tractor.

## Battery Box

The battery box (1) is mounted beside the hydraulic reservoir on the right side of the tractor. The cover for the box is held in place with 2 knobs (one on each side) (2).

The battery box protects the two tractor batteries and the electrical connections.



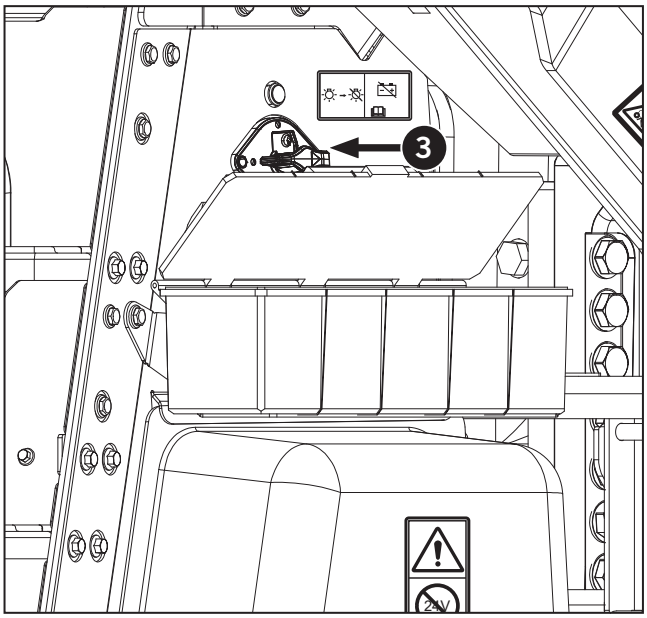

## Battery Shut-off Switch

**NOTICE**

The battery shut-off switch shall not be used as an emergency engine shut-off switch. Turning the battery shut-off switch to OFF while the engine is running may result in damage to vehicle electronics.

Located above the tool box (not shown), the battery shut off switch (3) provides the control needed to terminate electrical power. This switch can be disengaged and padlocked when the tractor is parked or when there is a need to disconnect the main batteries.

- Turn the battery shut off switch to the OFF position to disconnect battery power.
- Turn the battery shut off switch to the ON position to connect battery power.



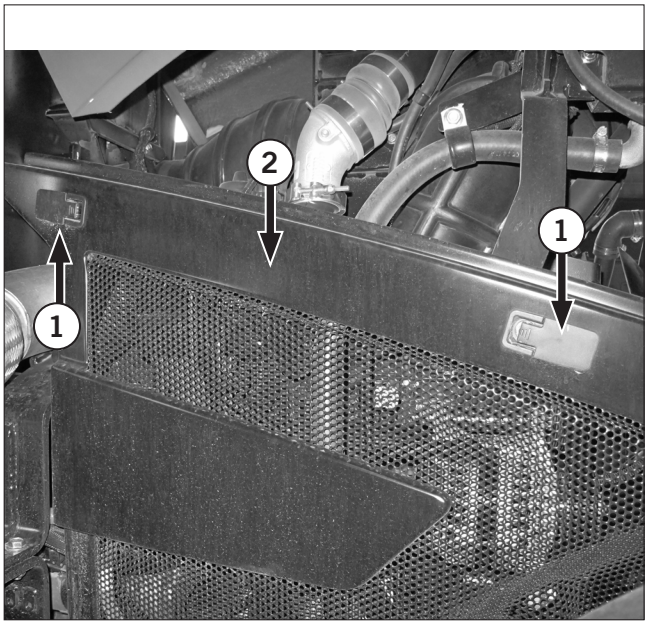
## Engine area Cowlings

1. Open the hood and locate the 2 latches (1) on the engine guard (2) on both sides of the tractor.
2. Lift and turn the latches to loosen the engine guards.
3. Life lift the engine guards to remove it from the engine compartment.
4. Inspect the engine guards for damage. Repair and replace if necessary.

***NOTE: Contact a KUBOTA dealer for service and parts advice.***

5. Replace the engine guards when the maintenance work is completed.
6. Check the fit and alignment of the engine guards and adjust if necessary. Tighten the mounting screws securely.

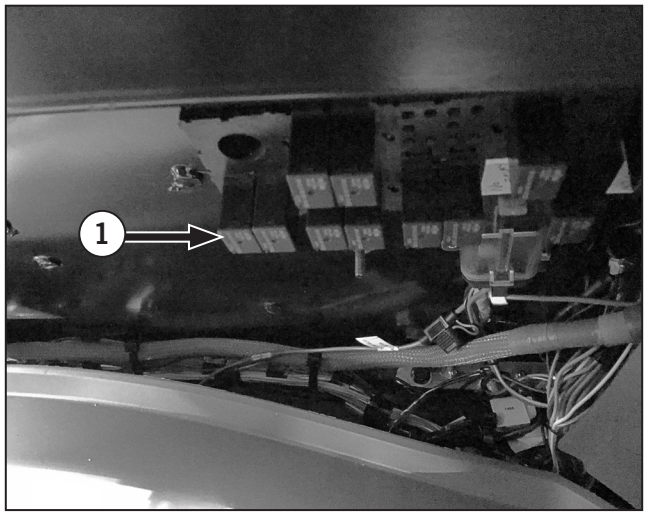
***IMPORTANT:****Make sure the engine guards fits properly and that there is no interference with moving parts.*

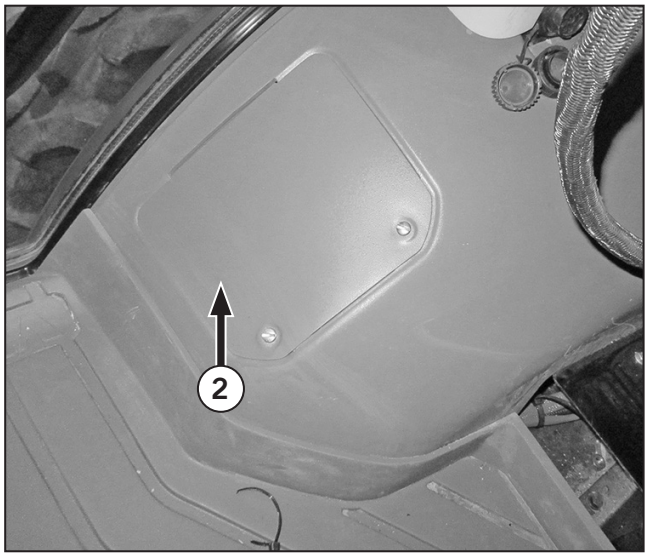


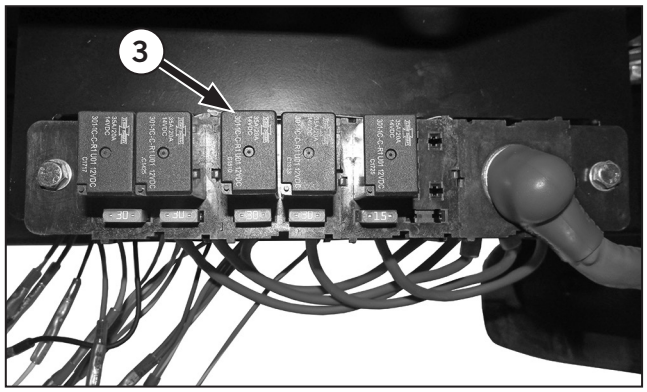
## Fuse Panel

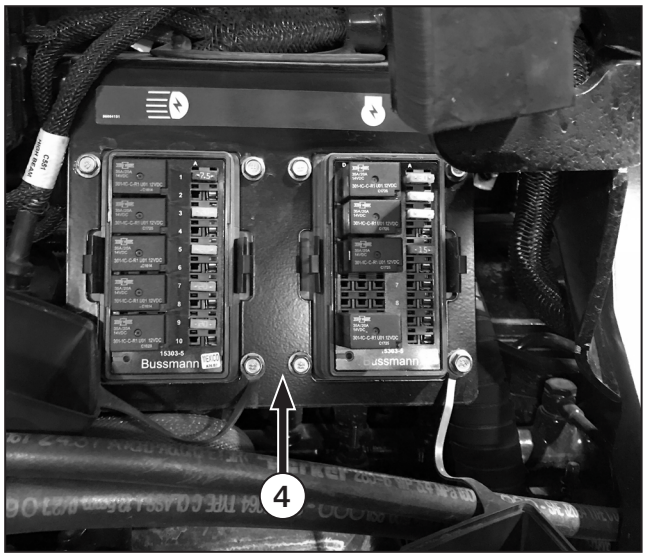
1. Side cover contrains fuses and relays, engine and transmission diagnostic connections and is located on the right side of the cab.
2. There are 4 fuse panels:

- Behind operator's seat (1).
- Right side bottom of the cab (2).
- Behind the upper radio and climate control bezel (3).
- Fuse panels in the engine compartment (4).



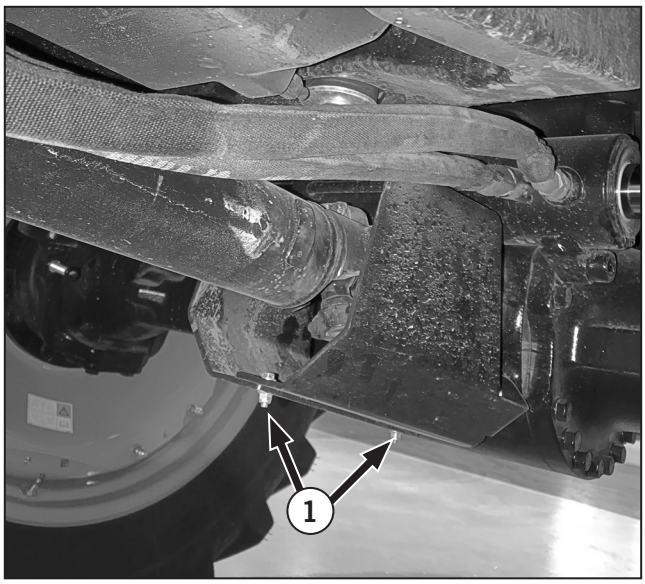



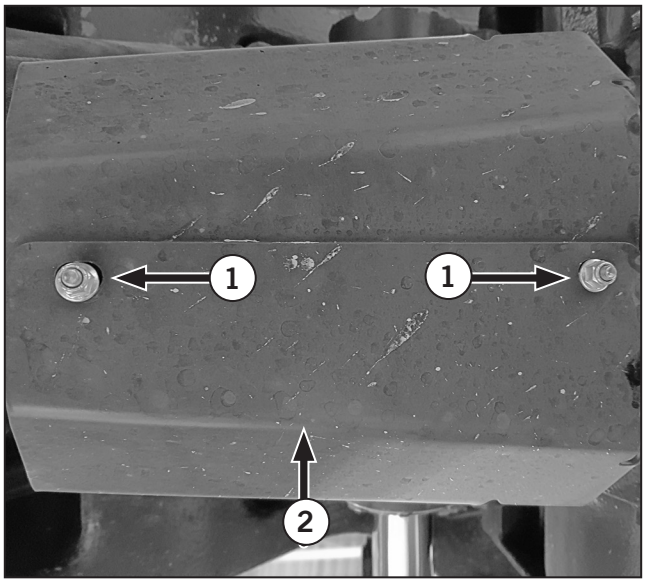



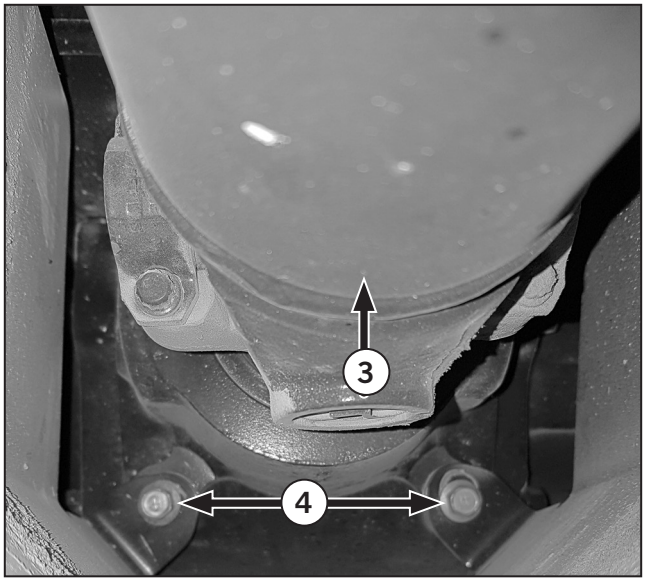
## Removing the Drive Shaft Shield

The protective shield for the drive shaft is in two pieces. The left and right are attached to the front differential and to each other.

Remove bolts (1) from the shield (2) to service the driveshaft components (3). Remove bolts (4) to remove driveshaft shield.

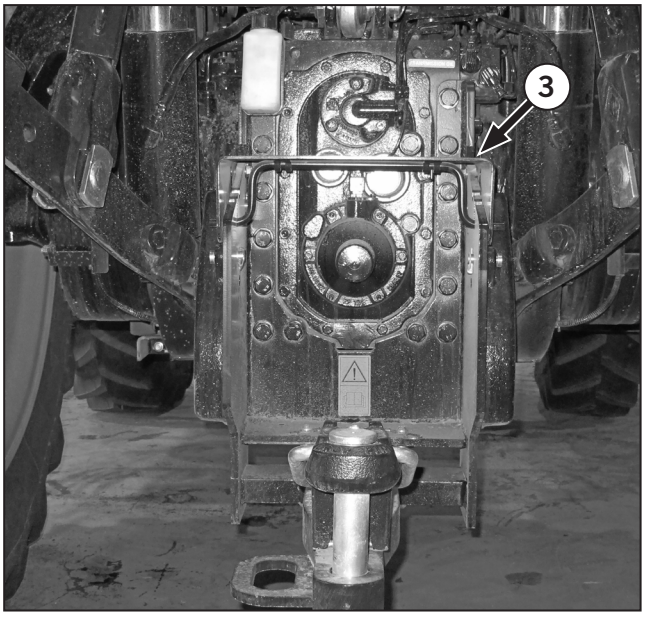


## PTO Shield

The PTO is protected by the shields at the rear of the differential assembly. The adjustable cover (3) for the PTO output shaft must be left in place whenever the PTO is not connected to equipment.



## Lubrication and Maintenance Schedule

Routine lubrication and maintenance is vital to ensure the optimum performance and long service life of the tractor. Regular scheduled lubrication and maintenance is recommended every 10 hours and at every 50, 250, 500, 1 000 and 2 000 hours of operation. The Lubrication and Maintenance Chart lists recommended service procedures at hourly intervals in sequential order. Use the chart as a quick reference guide for servicing the tractor. Descriptions of the operations in this section also follow in sequential order.

**Table 5-7: Lubrication and Maintenance Chart**

| | Description | Service Procedures | | | | | |
|---|---|---|---|---|---|---|---|
| | | Check | Clean | Lube | Change | Adjust | Drain |
| **Daily Maintenance (every 10 hours)** | | | | | | | |
| 1 | **Inspect/Engage Parking Brake** | • | | | | | |
| 2 | **Walk Around Inspection** | • | | | | | |
| 3 | **Check and Clean Air Intake Restriction** | • | • | | | | |
| 4 | **Clean Cooler Package**<br>• A/C Condenser<br>• Radiator<br>• Charge Air Cooler<br>• Hydraulic Oil Cooler<br>• PTO Oil Cooler | | • | | | | |
| 5 | **Check Engine Hoses and Connections**<br>• Cooling System Hoses<br>• Air Cooler Pipes<br>• Turbocharger area<br>• Exhaust System Connections | • | | | | | |
| 6 | **Check and Clean Accessory Drive Belt** | • | • | | | | |
| 7 | **Check and Clean Air Conditioner Belt** | • | • | | | | |
| 8 | **Check Fuel Filter and Connections** | • | | | | | |
| 9 | **Check Engine Oil Level** | • | | | | | |
| 10 | **Check Engine Coolant Level** | • | | | | | |
| 11 | **Check Hydraulic Oil Level**<br>• Transmission<br>• Rear differential | • | | | | • | |
| 12 | **Check and Drain the Fuel/Water Separator** | • | | | | | • |
| 13 | **Check Diesel Exhaust Fluid Level** | • | | | | | |
| 14 | **Check Engine Air Filters** | • | | | | | |
| 15 | **Check Differential Oil and Final Drive Oil Level (Front and Rear)** | • | | | | | |
| 16 | **Lubricate 3-Point Hitch** | • | | • | | | |
| 17 | **Lubricate Front Axle Grease fittings** | • | | • | | | |
| 18 | **Check Stop Adjustment** | • | | | | | |
| 19 | **Check Hydraulic Oil** | • | | | | • | |

***Continued on next page....***

**Table 5-7: Lubrication and Maintenance Chart**

| | Description | Service Procedures | | | | | |
|---|---|---|---|---|---|---|---|
| | | Check | Clean | Lube | Change | Adjust | Drain |
| **Initial 50 hours** | | | | | | | |
| - | Perform First 50-hour Service. See Checklist. | • | • | • | • | • | • |
| **Every 50 Hours** | | | | | | | |
| 20 | Clean Alternator | | • | | | | |
| 22 | Check and Clean the Cab Air Filter | • | • | | | | |
| 23 | Check Weight Hardware; Front and Rear Wheel Weights | • | • | | | • | |
| 24 | Check Front Weight Bolts | • | | | | • | |
| 25 | Check Tire Pressure and Condition | • | | | | • | |
| 26 | Lubricate Front Axle Grease Points | • | • | • | | | |
| 27 | Lubricate 3-pt Hitch (Front) | | | • | | | |
| 28 | Lubricate Drive Shaft Splines | | | • | | | |
| 29 | Inspect and Tighten Drawbar Components | • | | | | | |
| **Every 100 Hours** | | | | | | | |
| 30 | Check the Front PTO Gear Box | • | | | | | |
| **Every 250 Hours** | | | | | | | |
| 31 | Check the Air Conditioner Dryer and Connections | • | | | | | |
| 32 | Check Condition of Battery | • | • | | | | |
| 33 | Check and Drain the Fuel Tanks | • | | | | | • |
| **Initial 500 Hours** | | | | | | | |
| 34 | Clean Suction Filter | | | | | | |
| 36 | Change Oil for Transmission and Rear Final Drives | | | | • | | • |
| 37 | Change Transmission Oil Filter | | | | • | | |
| 38 | Change Rear Planetary Oil | | | | • | | • |
| 39 | Change Hydraulic Filters (Steering, Charge and Return) | | | | • | | • |
| 40 | Change Hydraulic Oil | | | | • | | • |
| **Every 500 Hours** | | | | | | | |
| 41 | Check Batteries | • | | | | | |
| 42 | Check Battery Connections | • | | | | | |
| 43 | Change the Engine Oil and Filter | • | | | | | • |
| 44 | Replace the Fuel Filters | | | | • | | |
| 45 | Change the Front Axle Differential Oil | • | | | • | | • |
| 46 | Check the PTO Gearbox Mounting Bolts | • | | | | | |
| 47 | Lubricate the PTO Drive Shaft | | | • | | | |
| **Every 1 000 Hours or One Year *** | | | | | | | |
| 48 | Check the Accessory Drive Belt and Tensioner | • | | | • | | |
| 49 | Replace the Cab Air Filter | | | | • | | |
| 50 | Replace the Engine Air Filter | • | | | • | | |
| 51 | Inspect the Turbocharger Connections | • | | | | • | |
| 52 | Check the Radiator and Heating System Hoses and Connections | • | | | | • | |

***Continued on next page....***

**Table 5-8: Lubrication and Maintenance Chart**

| | Description | Service Procedures | | | | | |
|---|---|---|---|---|---|---|---|
| | | Check | Clean | Lube | Change | Adjust | Drain |
| **Every 1 000 Hours **** | | | | | | | |
| 53 | Change Hydraulic Filters (Steering, Charge and Return) | | | | • | | • |
| 54 | Change the Hydraulic Oil | | | | • | | • |
| 55 | Clean Suction Filter | | • | | | | |
| 56 | Change Oil for Transmission and Rear Final Drives | | | | • | | • |
| 57 | Change Transmission Oil Filter | | | | • | | |
| 58 | Change Diesel Exhaust Fluid (DEF) In-Tank Filter | | | | • | | |
| 59 | Replace Engine Coolant and Service the Cooling System | | | | • | | |
| 60 | Change the Front Planetary Hub Oil | | | | • | | |
| 61 | Clean and Change Front PTO Filter and Oil | | • | | • | | |
| **Every 4500 Hours** | | | | | | | |
| 62 | Change Diesel Exhaust Fluid (DEF) Dosing Unit Filter | • | | | | | • |
| **Every 5 000 Hours or 5 Years ***** | | | | | | | |
| 63 | Adjust the Engine Valve Lash | • | | | | • | |
| **Every 5 000 Hours ***** | | | | | | | |
| 64 | Clean the Diesel Particulate Filter (DPF) | | • | | | | |
| **As Required** | | | | | | | |
| 65 | Check Windshield Washer Fluid and Wiper Blades | • | | | | • | |
| 66 | Check and Adjust the Parking Brake | • | | | | • | |
| 67 | Change Fuse and Relay Replacement | • | | | • | | |
| 68 | Replace Batteries | • | | | • | | |
| 69 | Prepare the Tractor for Storage | • | • | • | | | • |
| 70 | Prepare the Tractor for Use After Storage | • | • | • | • | | |
| 71 | Clean Tractor | | • | | | | |

* Operations performed at 1 000 hours or at year end, whichever comes first.
** Operations performed at 1 000 hours of use, regardless of other scheduled work.
*** Affects engine warranty. Contact a KUBOTA dealer for instructions on 5 000 hour service.

## Every 10 Hours (daily)

Carry out daily maintenance every 10 hours of operation under normal operating conditions. Perform this maintenance more frequently when the tractor is operated in severe duty service or during conditions of extreme heat or cold.

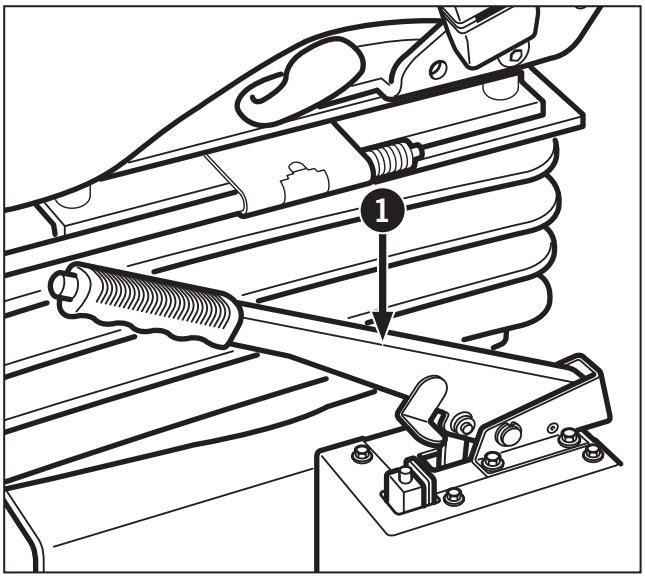
A daily maintenance routine reduces equipment issues and helps identify potential problems at an early stage, allowing corrective action to prevent major breakdowns. Daily maintenance protects the owner's investment and helps avoid costly repairs.

**DANGER**

- Before performing any maintenance operations, always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels.
- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

### Check Parking Brake

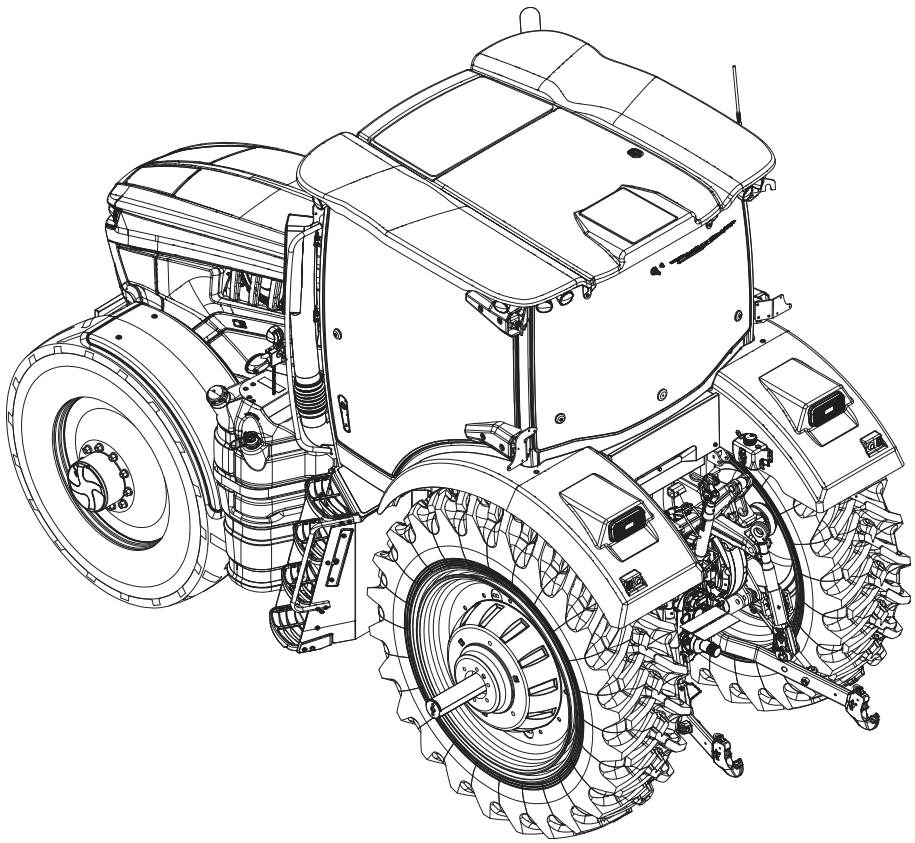
Make sure that the brakes are in good working order before operating the tractor. Adjust if necessary.



## Walk Around Inspection

After applying the parking brake, walk around the tractor carrying out a detailed visual inspection. See “Inspection Access” on page 5-14 for instructions on opening tractor access panels.

- Check the door handle and latch operation.
- Inspect the glass and frame for damage.
- Make sure the hand rails and steps are not loose or damaged.
- Inspect the tires and wheels for proper inflation and signs of damage.
- Inspect the ground or surface under the tractor for signs of fluid leakage.
- Inspect the underside of the tractor for signs of damage or build up of debris.
- Inspect the wheel planetary hubs for signs of oil leakage.
- Inspect the fenders and body panels for damage and make sure they are attached securely.
- Inspect the grille area for damage or build up of debris.
- Make sure the hood latch is secure and will release and latch properly.
- Make sure the exhaust stack is secure and not damaged.
- Inspect the hitch parts for damage or build up of debris.
- Check the area around the tractor for obstacles or potential hazards.
- Make sure that restraints or wheel chocks are removed before moving the tractor.
- Check to see if the tractor and moved and ensure it is safe to proceed with operation if the tractor was parked on an incline or slope.



## Check Air Intake Restriction

**DANGER**

Do not remove safety shields or attempt to work on the tractor when the engine is running.

Pressurized or hot fluids in the lubricating, hydraulic or cooling systems can cause severe injury.

Allow the engine to cool before approaching the exhaust or other hot parts.

Seek medical assistance immediately.

---

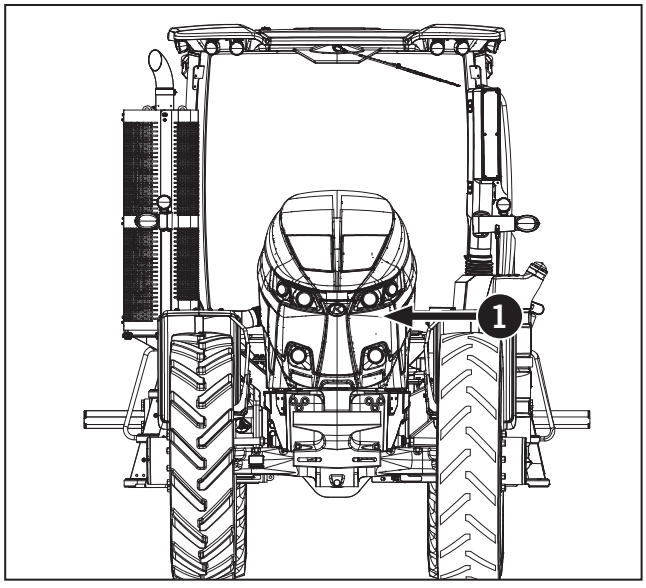
A restriction in the engine air intake may occur .

An intake restriction in the filter will cause the warning and audible alarm on the instrument panel.

***NOTE: Normal air filter maintenance is scheduled at 1 000 hours See Operation 36: Replace the Engine Air Filter.***

1. Park the tractor in a safe and level location and apply the parking brake:
2. Check for and remove debris and inspect for damage.
3. Open the hood (1). Check for and remove debris from the air intake and inspect for damage
4. Inspect the air intake plenum for damage.

***IMPORTANT:*** *Do not operate the tractor if the air intake or filter system is damaged. Contact a KUBOTA dealer for service.*



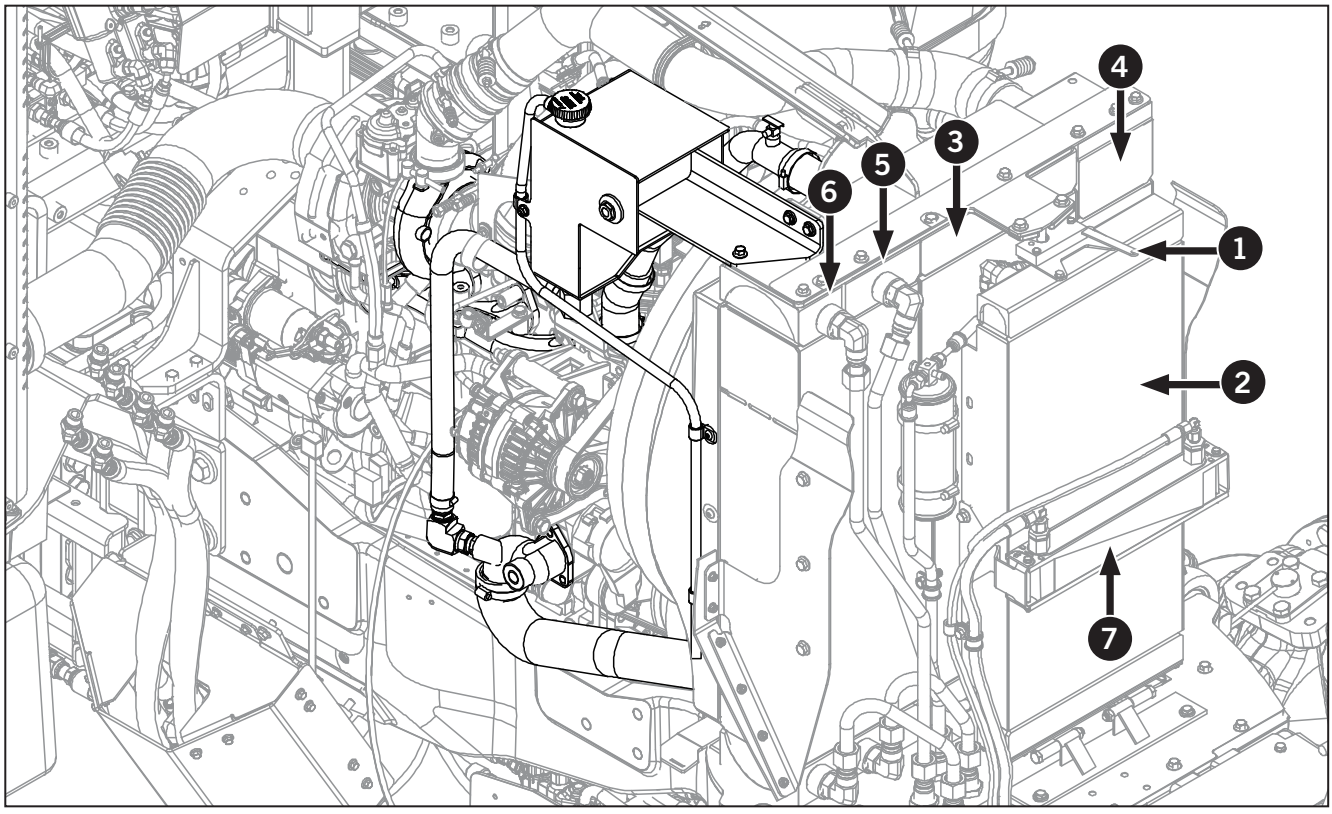
## Clean Cooling Package

Never use a pressure washer to clean the cooling package fins. Use compressed air at less than 6.9 bar (100 psi).

1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition, wait for the power on indicator light to turn off and turn the battery disconnect switch to the OFF position.
2. Open the hood.
3. Push the latch (1) located at the front of the cooling package.
4. Visually inspect the cooler surfaces for signs of leakage or damage. Remove all debris and blow compressed air in both directions through the cooler to clean the cooler fins.

- A/C Condenser (2)
- Radiator (3)
- Charge Air Cooler (4)
- Transmission Oil Cooler (5)
- Hydraulic Oil Cooler (6)
- PTO Oil Cooler (7)

5. Close the hood.



## Check Engine Hoses and Connections

**NOTICE**

Check all engine system hoses and clamps thoroughly after winter. Leaks at engine system connections are more likely to occur after cold weather.

To check the engine hoses and connections:

1. Open the hood.
2. Visually inspect all engine hoses and connections for corrosion, cracks, loose clamps or punctures that can damage the engine.
3. Pay particular attention to the air intake system especially the turbocharger area.

The air intake/exhaust system, aftertreatment, cooling system and turbocharger are detailed on separate pages for clarity.

For detailed overview of these areas, see the next 3 pages.

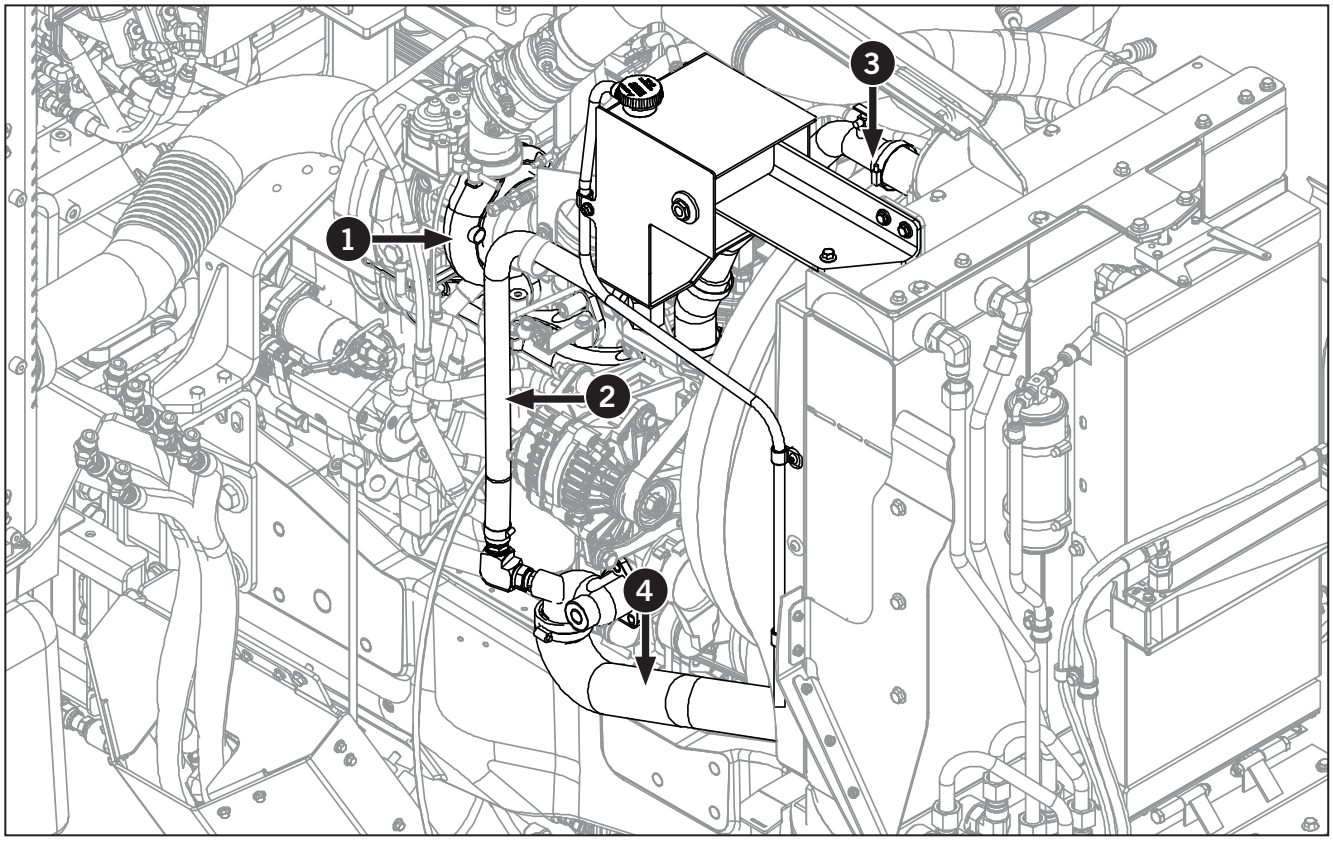
## Engine System Detail 1 of 4: Check Cooling System Hoses

Visually check cooling system hoses and Diesel Exhaust Fluid (DEF) coolant hoses

1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition and turn the battery disconnect switch to the OFF position. Open the hood.
2. Pay extra attention to the turbocharger area (1).
3. If required, tighten clamps. If the clamp is painted black like the rest of the engine/turbocharger, it is a connection only Cummins can service while the tractor is under warranty. Check these connections for leaks/damage but contact Cummins for service.
4. If required, re-secure parts using the same kind of plastic ties.
5. Check cooling system hose (2).
6. Check upper radiator tube (3) and lower radiator tubes (4).

**Table 5-9: Inspections of the Cooling System Hoses**

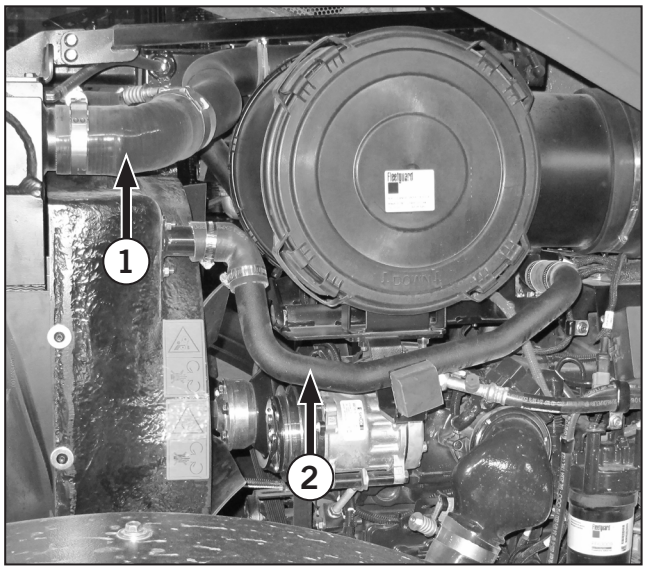
| Ref | Description | Torque or Action Required |
|---|---|---|
| | **Left side and Right side of the engine** | |
| 3 | Upper radiator hose (4 clamps located on the left side) | 5 N·m (65 in·lb) |



## Engine System Detail 2 of 4: Charge Air Cooler Pipes Inspection

Visually check the air intake and after cooler pipping system.

1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition and turn the battery disconnect switch to the OFF position. Open the hood.
2. Pay extra attention to the turbocharger area.
3. If required, tighten clamps. See Table 5-10. If the clamp is painted black like the rest of the engine/ turbocharger, it is a connection only Cummins can service while the tractor is under warranty. Check these connections for leaks/damage but contact Cummins for service.
4. If required, re-secure parts using the same kind of plastic ties.



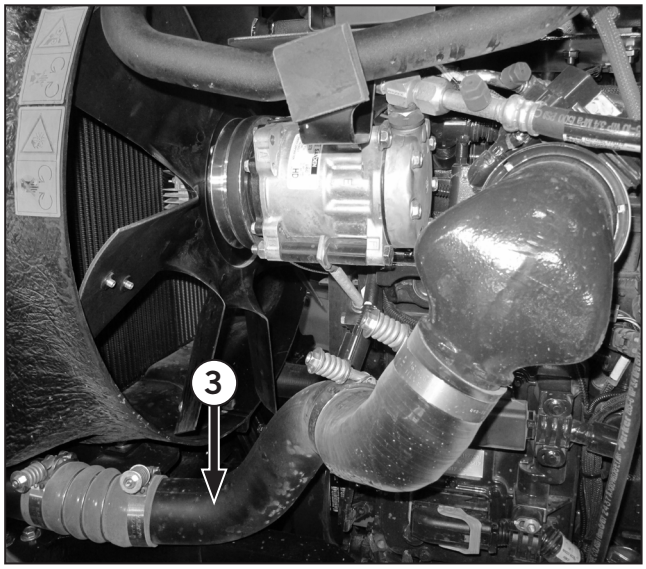




**Table 5-10: Inspections of the Cooling System Hoses**

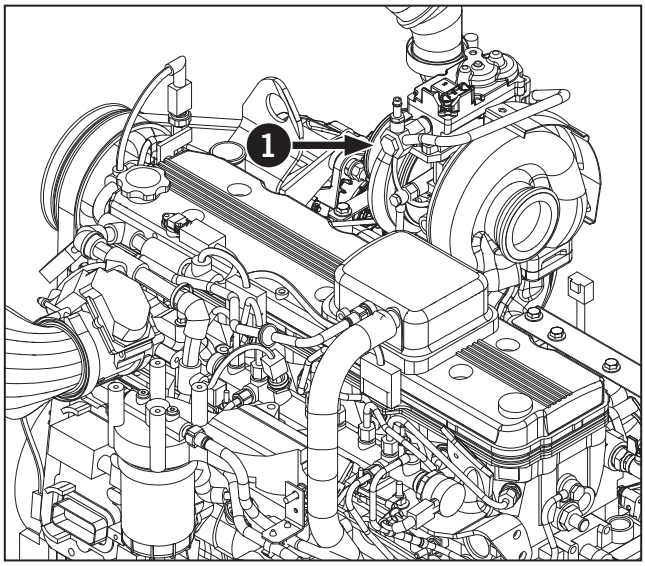
| Ref | Description | Torque or Action Required |
|---|---|---|
| | **Left side and Right side of the engine** | |
| 1 | Upper Charge Air Cooler Tube | 5 N·m (65 in·lb) |
| 2 | Ejector/Aspirator Tube (4 clamps) | Tighten clamps |
| 3 | Lower Charge Air Cooler Tube (3 clamps) | 5 N·m (65 in·lb) |

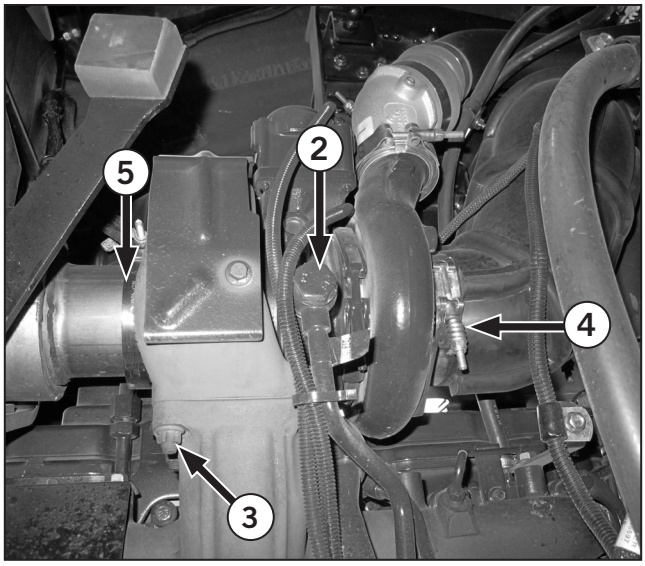
## Engine System Detail 3 of 4: Engine Turbocharger Connections

Check the turbocharger for leaks. Soot at the connections and/or audible whistles indicate a leak. If any of the following parts are loose or are leaking, contact a Cummins Authorized Repair Location for service:

See View A:

- Check the turbocharger oil supply line fitting (1) for leaks and damage. Torque value: 20 N·m (15 ft·lb).
- Check the turbocharger oil return line flange bolt (2) for leaks and damage. Torque value: 27 N·m (20 ft·lb).
- Check the 4 turbocharger mounting nuts (3) for looseness and for soot around the gasket. Torque value: 61 N·m (45 ft·lb).
- Check the clamp securing the flex pipe to turbocharger reducer (4) for leaks.
- Check the turbocharger air intake tube clamp (5). Look and listen for leaks. Soot streaks at the joint or an audible whistle from the engine indicate a leak. Torque value 8.5 N·m (75 in·lb).

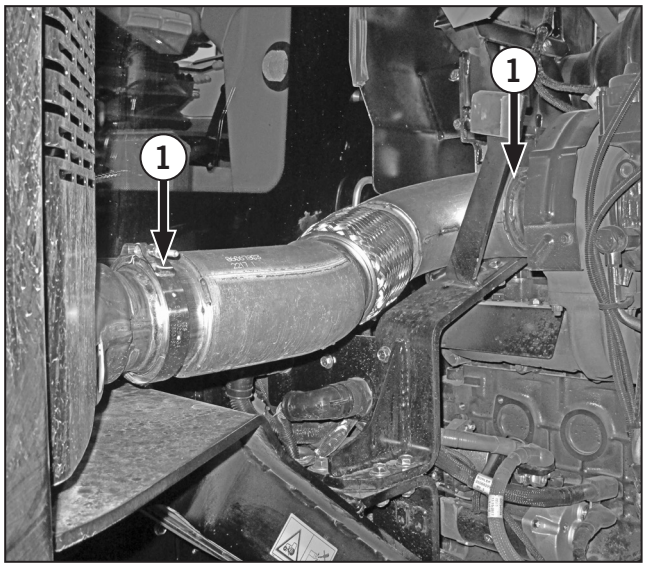


## Engine System Detail 4 of 4: Exhaust System Connections

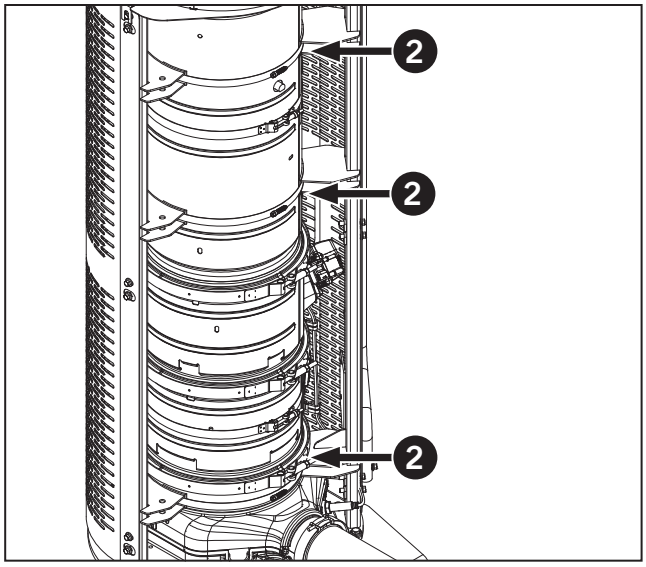
**WARNING**

The exhaust system components become extremely hot during tractor operation. Do not attempt any repairs on the exhaust system until the exhaust system has had time to cool.




Visually check exhaust pipes.

1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition and turn the battery disconnect switch to the OFF position. Open the hood.
2. Pay extra attention to flex pipes (1).
3. If required, tighten clamps. If the clamp is painted black like the rest of the engine/turbocharger, it is a connection only Cummins can service while the tractor is under warranty. Check these connections for leaks/damage but contact Cummins for service.
4. If required, re-secure parts using the same kind of plastic ties.
5. Check exhaust tube (2).
6. Check muffler tip and clamps (4).



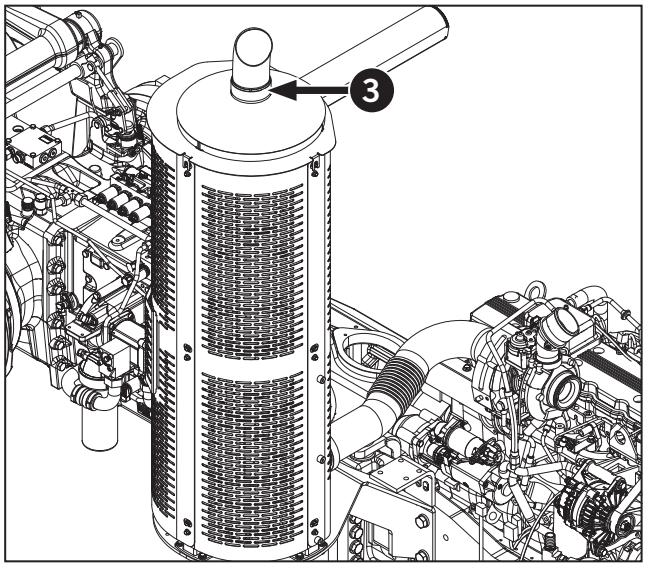




**Table 5-11: Inspections of Exhaust System Connections**

| Ref | Description | Torque or Action Required |
|---|---|---|
| 1 | Flex pipe and clamps (2 clamps | 8 N·m (71 in·lb) |
| 2 | Exhaust Tube (3 clamps) | 8 N·m (71 in·lb) |
| 3 | Muffler tip and clamps (1 clamps) | 55 N·m (41 ft·lb) |

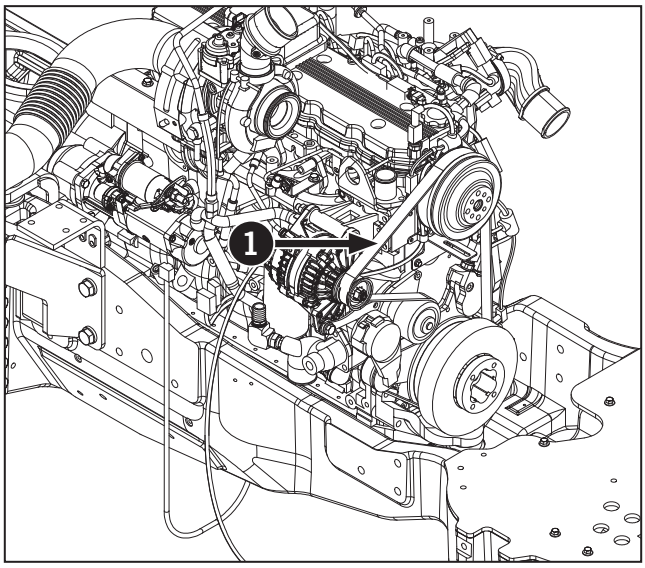
## Check Accessory Drive Belt

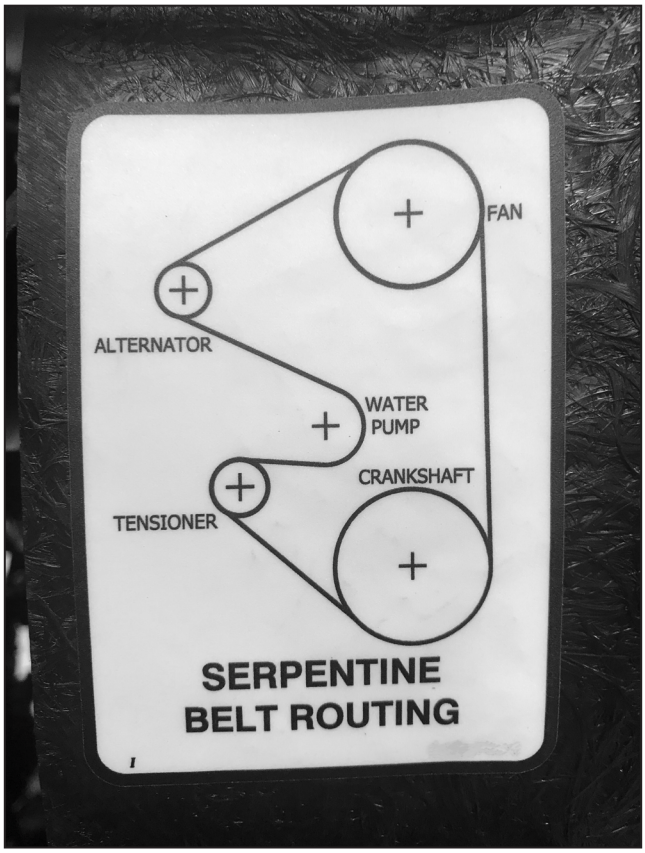
Keep the serpentine belt (1) that powers the engine alternator and the water pump clean at all times. Inspect the belt daily. These accessories are protected by the engine compartment safety shields but the area can be viewed through the gaps between the shields and engine.

With the engine off and the parking brake applied:

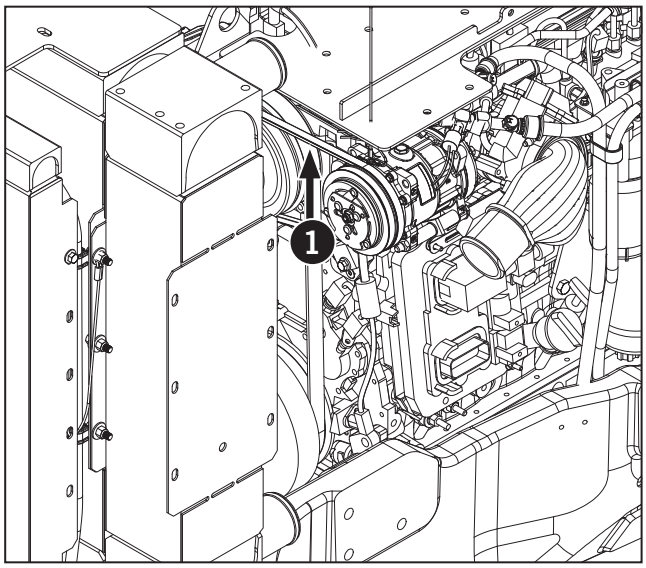
1. Open the hood and inspect the engine accessory drive belt area for build up of debris.
2. Remove debris; use compressed air if necessary. Keep the air pressure under 690 kPa (100 psi) to prevent equipment damage.

Remove the protective shields and proceed to “Check Air Conditioner Drive Belt” on page 5-33 if the debris cannot be removed or if there is concern about the engine accessory drive belt.



## Check Air Conditioner Drive Belt

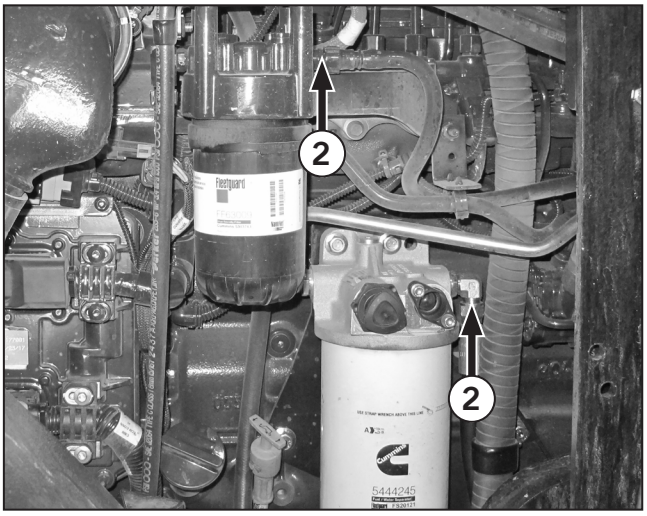



The air conditioner (1) belt needs to be adjusted and checked. Check the belt tension in the following procedure. If the deflection is out of spec or the belt itself is found to be damaged, replace it with a new one. It is protected by the engine compartment safety shields but the area can be viewed through the gaps between the shields and engine.

With the engine off and the parking brake applied:

1. Stop the engine and remove the key.
2. Open the hood and inspect the engine accessory drive belt area for build up of debris.
3. Press on the spot indicated in the image to measure the deflection.
4. Remove debris; use compressed air if necessary. Keep the air pressure under 690 kPa (100 psi) to prevent equipment damage.

## Check Fuel Filter and Connections




Park the tractor on a level surface, stop the engine and apply the parking brake.

1. Inspect the fuel line and fuel filter connections (2). Check for leaks around fittings and seals.

## Engine Oil Level

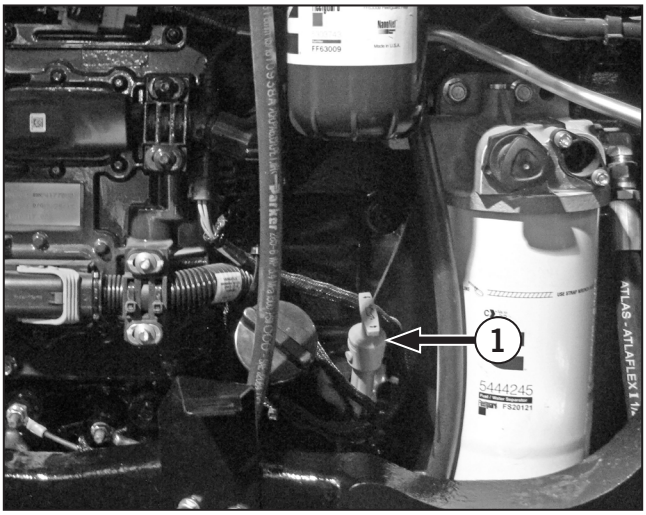
Park the tractor on a level surface, stop the engine and apply the parking brake, then wait at least five minutes:

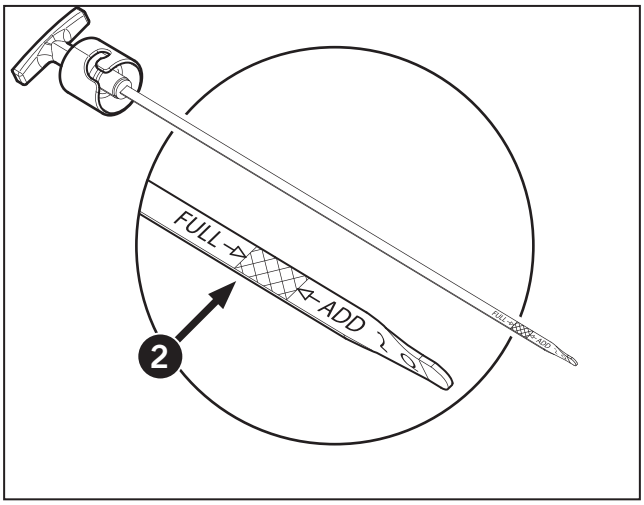
1. Pull out the engine oil dipstick (1), wipe it clean and re-insert fully.
2. Pull the dipstick out again and check the oil level. Make sure the oil level is in the crosshatched area (2) of the dipstick.

***IMPORTANT:****Do not operate the engine when the oil level is below the ADD mark on the dipstick. Do not fill the oil above the FULL mark. Do not operate the engine with the dipstick or the oil filler cap removed.*

***IMPORTANT:****Use oil of the recommended type only. The oil grade and viscosity specifications are in Section 7 of this manual and in the Cummins engine manual.*

***IMPORTANT:****The diesel particulate filter (DPF) will be damaged by continued use of incorrect lubricating oil. Failure to use CK-4 low ash oil will result in damage to the DPF over time. The use of low ash oils is essential because other types of oil will fill the DPF over time and inhibit the DPF's ability to regenerate because ash will not oxidize.*

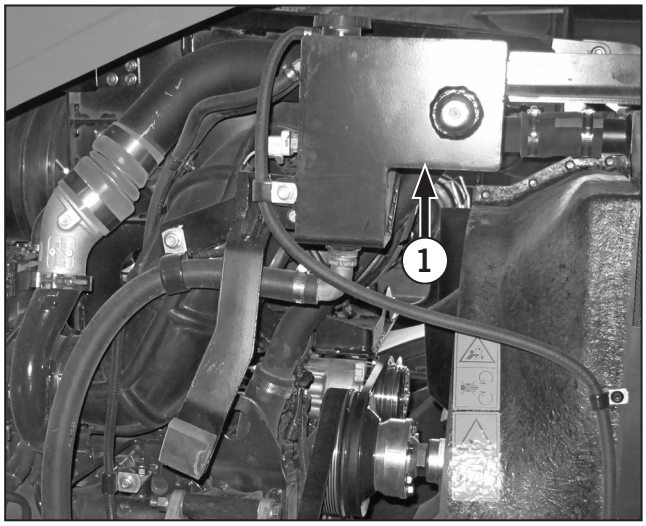


## Engine Coolant Level

Park the tractor on a level surface, shut the engine off and apply the parking brake. Wait until engine is cool and then check coolant level.

1. Check the engine coolant level at the surge tank/ reservoir (1). With the engine cold, the coolant should be visible on the sight glass and fully covered. There is no overflow reservoir on the tractor.
2. If coolant level is low, add coolant to the surge tank/reservoir till the coolant is fully covering the sight glass.




***NOTE: Use the surge tank fill tube to refill the system after servicing the radiator or other cooling system components.***

Use the 50/50 coolant/water mixture with ASTM D6210, D6211 rating in accordance with manufacturer's recommendations.

For more information on coolant specifications, refer to Section 7 of this manual or the Cummins engine owner's manual or contact a KUBOTA dealer.

***IMPORTANT:****Do not add coolant to a hot engine. Allow the engine to cool to below 50°C (120°F) to prevent damage to the engine castings.*

***IMPORTANT:****Do not continue to operate the engine if the coolant level is below the sight glass or if the coolant level will not remain in the normal range. Continued loss of coolant indicates a problem in the engine cooling system that requires attention and repair. Contact a KUBOTA dealer for service.*

## Check Oil Level for Transmission, and Rear Axle

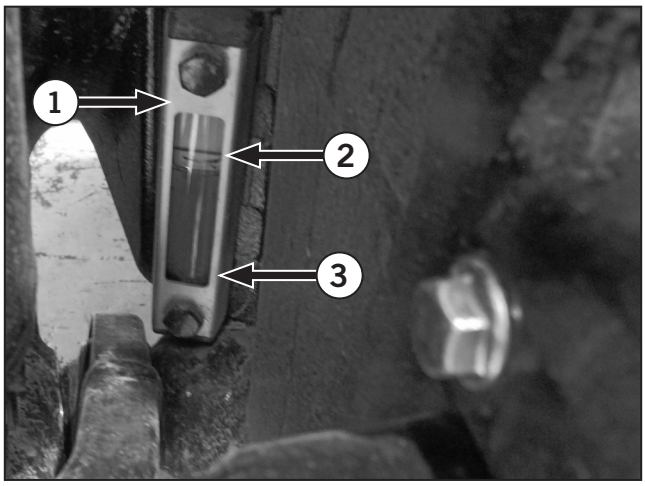
Transmission Oil/Rear differential oil are combined in the transaxle housing. They are checked with the sight glass located to the left of the PTO.

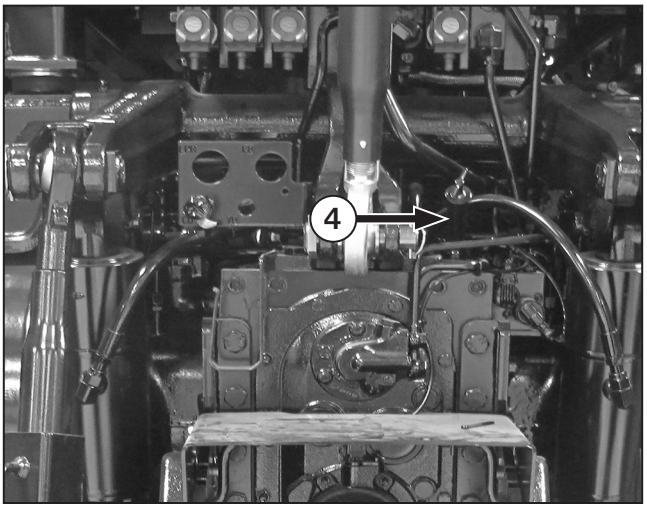
To check the transmission/rear differential oil.

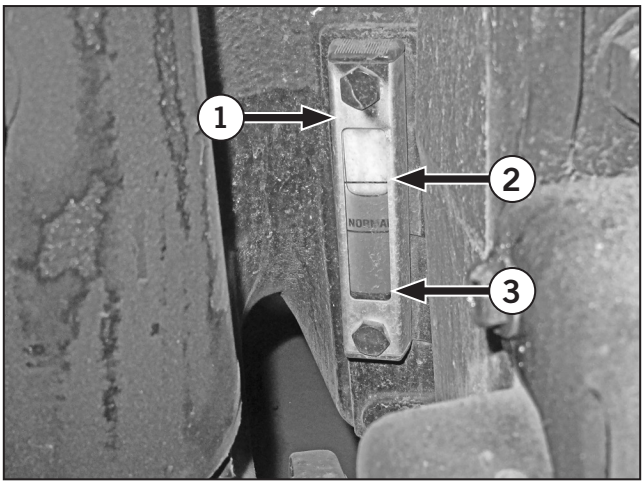
1. Look at the sight glass (1) located beside the PTO stub shaft cover.
2. The transmission/rear differential oil level must be kept between the full mark (2) and the low mark (3) in the sight glass.
3. Add or remove transmission/rear differential oil as necessary to maintain the transmission/rear differential oil level. Add oil at the transmission/rear differential oil filler tube (4) when required to maintain the level between the marks on the sight glass.

***IMPORTANT:*** *Do not overfill the* transmission/rear differential oil *system reservoir.*

***NOTE: For more information on hydraulic oil, refer to Fluid Capacities and Lubricants and Fluids in Section 7 of this manual.***



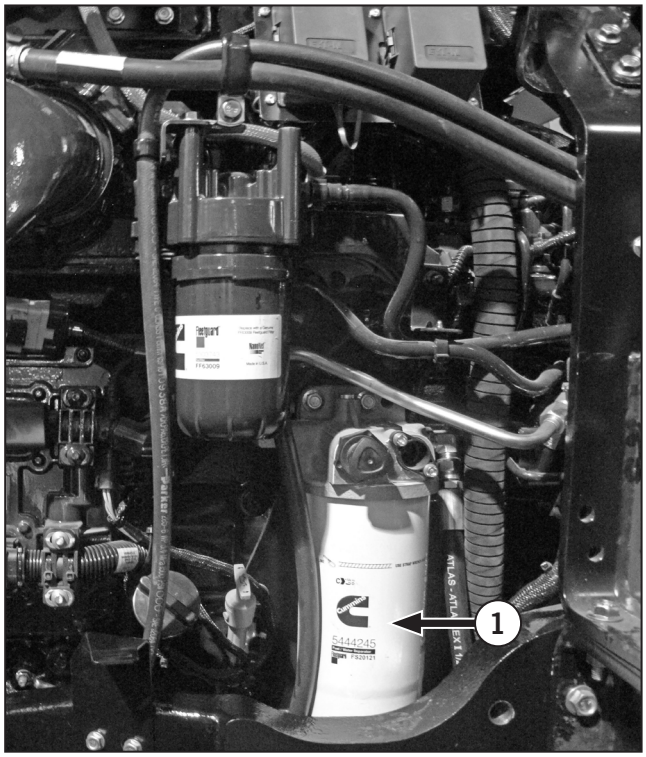



## Check and Drain the Fuel/Water Separator

**WARNING**

Never open the fuel system with the engine running. High pressure fuel spray can cause serious injury or death.

Diesel fuel is a flammable and hazardous material. Use appropriate safe handling precautions.




Check the fuel/water separator (1) daily.

Rotate the drain valve (2) counterclockwise about two and one half turns. The drain will drop about 20 mm (0.75 in) and the contents of the separator will flow out.

***NOTE: Attach a 9.50 mm (0.375 in) flexible tube to the drain. Use a pan to collect the liquid.***

The separator is free of water when the flow is clear with no cloudiness or bubbles. It should not require draining more than 1 L (0.26 gal) of liquid to remove the water from this filter.

Push the drain up and rotate the drain valve clockwise. Tighten by hand.

***IMPORTANT:****Do not overtighten the drain valve.*

***NOTE: Disconnect the sensor harness if the separator must be removed.***

## Check Diesel Exhaust Fluid Level

**CAUTION**

Wear gloves and eye protection when adding diesel exhaust fluid (DEF). DEF is not harmful to handle but will corrode certain metals.

- In case of eye contact: Remove contact lenses. Immediately wash your eyes with a lot of water for least 15 minutes.
- In case of skin contact: First aid is normally not required. Immediately wash your skin with soap and water. Avoid prolonged contact with DEF.
- If swallowed: Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, contact a physician immediately.

Check the DEF level indicator on the EIC or on the display monitor home screen (not shown).

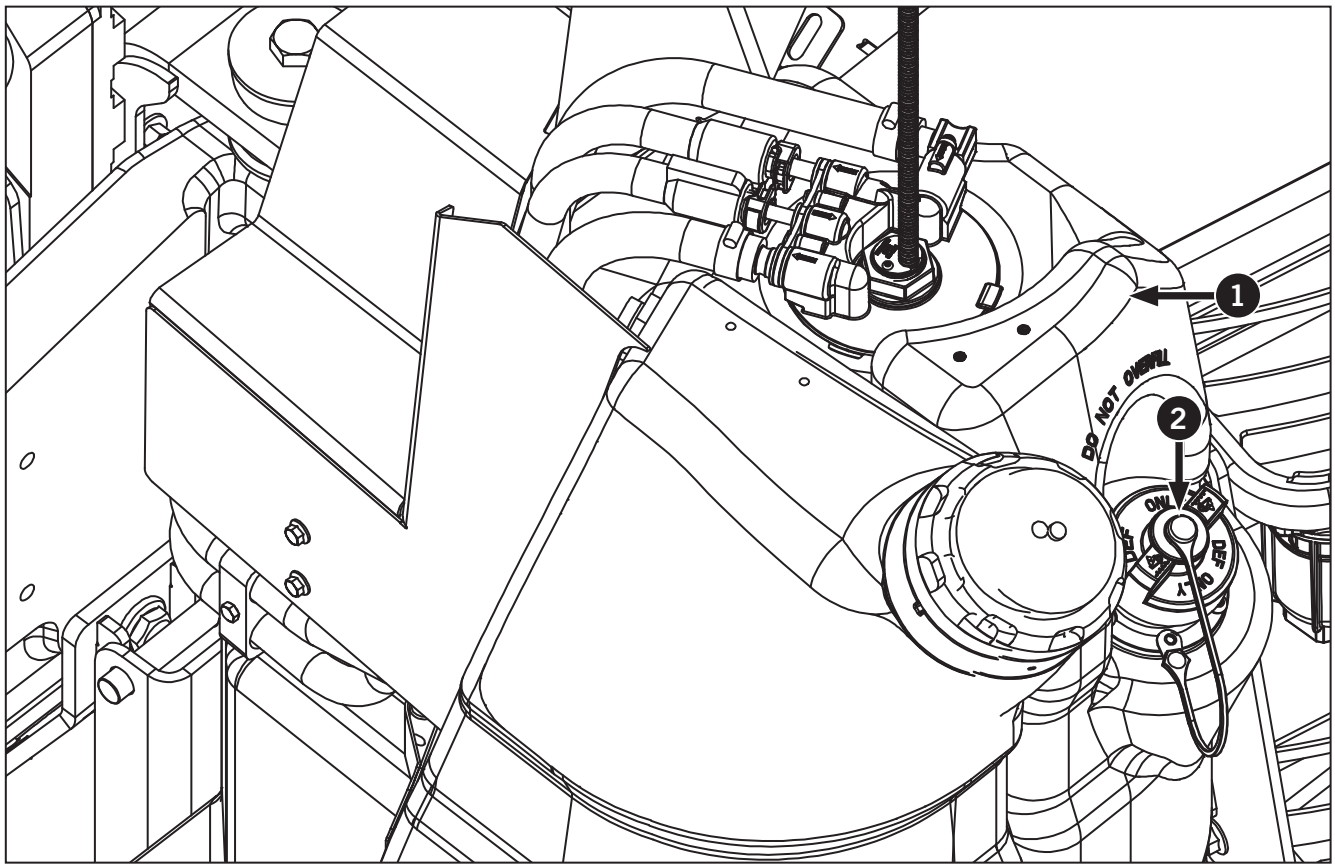
If the DEF Level Low indicator lamp appears on the EIC, add diesel exhaust fluid to the DEF tank immediately.

Before using anything to store or dispense DEF, such as containers or funnels, wash these items with distilled water, not tap water. Tap water will contaminate the DEF. If distilled water is not available, rinse the items with tap water first and then with DEF.

To add diesel exhaust fluid (DEF):

Before using anything to store or dispense DEF, such as containers or funnels, wash these items with disilled water, not tap water. Tap water will contaminate the DEF. If distilled water is not available, rinse the items with tap water first and then with DEF.

1. The DEF tank (1) is on the left side of the tractor.
2. Clean the area around the DEF cap (2), the cap itself and any funnels before filling the tank. DEF must not be contaminated.
3. Fill up the tank. Tighten the DEF cap.
4. Clean up any spills immediately. DEF will wreck the paint on the tractor. DEF is not harmful to handle but is corrosive to certain metals.
5. Store DEF supplies properly. See “DEF Storage” on page 7-19.



## Check Engine Air Filters

**NOTICE**

It is recommended that the engine air filters be changed every 1000 hours of engine operation. However, change the engine air filters more frequently depending on operating conditions.

## Engine Air Filter Inspection Procedure

**DANGER**

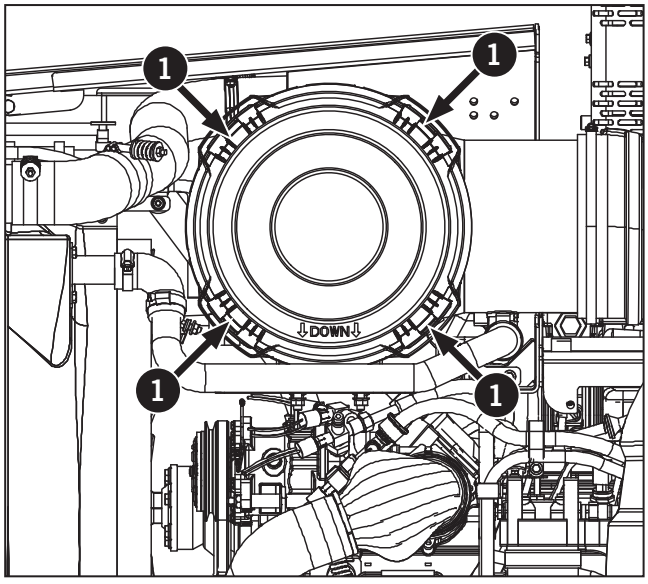
Always wear a mask when servicing the air filters. Do not breathe in the dust.

**NOTICE**

- Do not service the engine air filters or open the filter compartment unless there is an air filter restriction warning.
- To obtain replacement elements, contact a KUBOTA dealer. Inspect the seals on new filter elements before installing. Do not use an element with cracks or chips in the element sealing rubber.
- Make sure to clean the inside filter housing with a damp cloth before removing the secondary filters and again before installing the primary filters to prevent dust entering the intake pipe.

The engine air cleaner consists 1 primary filter and 1 safety filter. The engine air filter is located at the top of the engine. The engine air filter housing is mounted on the upper frame in the engine compartment and the filter elements are inside the air filter housing.

1. Park the tractor on a level surface, shut off the engine and apply the parking brake.
2. Open the hood and find the engine air filter. Use a suitable step ladder to access the filter.
3. Release the four snap latches (1) and pull the air filter cover away from the housing.



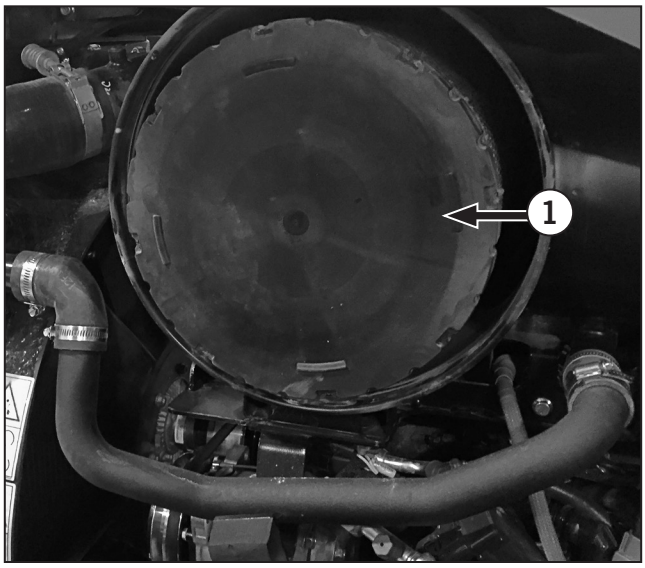
4. Clean the inside of the filter housing before the safety filter element is removed.
5. Pull the primary filter (1) from the housing. The safety filter (2) is now accesible.
6. Check the primary filter for damage. Inspect the safety filter in place.

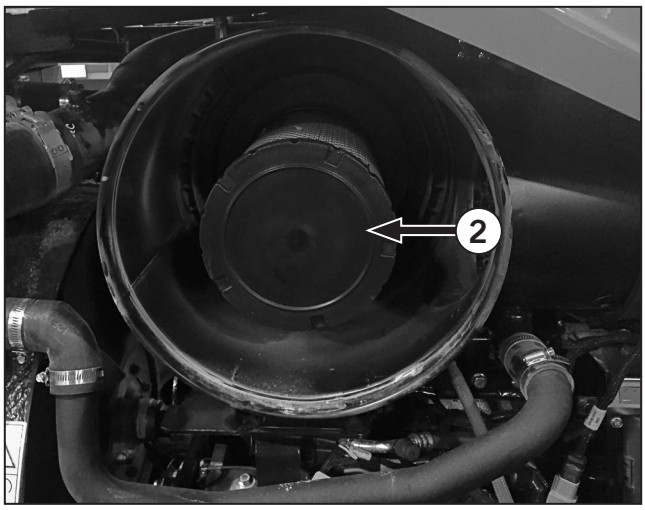
***IMPORTANT:****Do not allow dirt or dust from the filters to contaminate the intake plenum. Use a clean cloth and soap solution to clean the inside of the filter housing before removing the safety filter element.*

7. Install the new safety filter. Carefully press the filter into place by pushing on the plastic edge of filter.

***IMPORTANT:****Do not press on the paper filter element.*

8. Install the new primary filter elements.
9. When the filter elements are in place, reinstall the cover on the filter housing and fasten the snaps.



## Check Front Differential Oil and Final Drive Oil Level (Front and Rear)

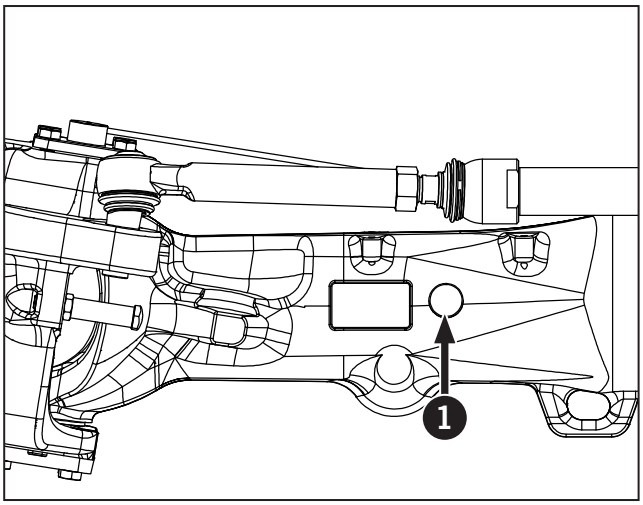
**CAUTION**

Check the level when the oil is cool. Hot oil may spray out and cause injury when the plug is removed from the drain/fill opening.

***IMPORTANT:****Check the oil level when the oil is cool. Hot oil may spray out and cause injury when the plug is removed from the drain/fill opening.*

1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition, wait for the power on indicator light to turn offand turn the battery disconnect switch to the OFF position.
2. Clean the area around the front axle fill plug (1) located on the front left side axle housing.
3. Slowly remove the fill plug. The oil should be level with the bottom of the fill plug opening.

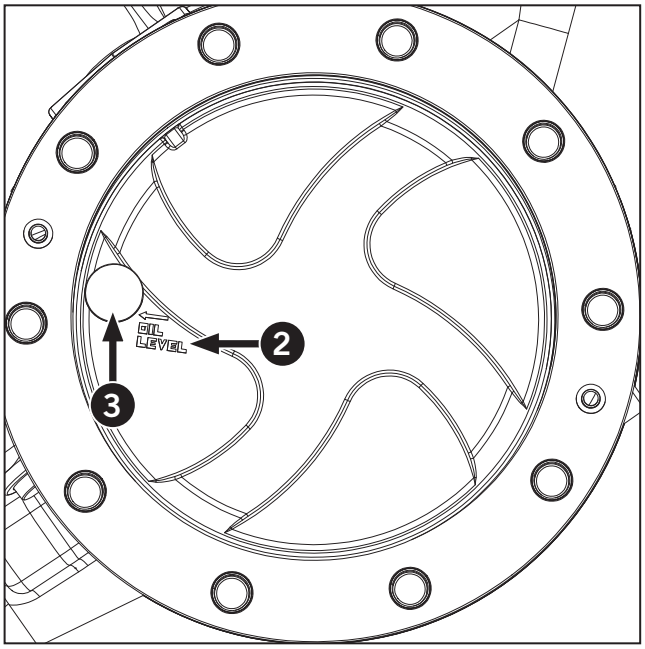
   ***NOTE: If oil is required, see Lubricants in this section for oil specifications.***
4. If the oil is low, add oil until it is level with the bottom of the opening.
5. Install the fill plug and tighten securely.




### Final Drive Oil Level

1. Move the tractor until the oil level line (2) and the planetary oil drain/fill plug (3) is horizontal.
2. Slowly remove the drain/fill plug. The oil should be level with the bottom of the drain/fill plug opening.

   ***NOTE: If oil is required, see "Fuel Storage" on page 7-19.***
3. If the oil is low, add oil until it is level with the bottom of the opening.
4. Install the fill/drain plug and tighten securely.



## Lubricate 3-pt Hitch

Park the tractor on a level area, shut the engine off and apply the parking brake.

Remove debris. Use a pressure washer and suitable cleaner to clean the 3-pt hitch linkage.

Lubricate the 3-pt hitch linkage to maximize performance.

Grease: STD Grease Lithium base High Temperature EP 2 (NLGI 2), available from a KUBOTA dealer.

1. Lubricate the 14 grease fittings (1). These are the only points that require lubrication on the 3-pt hitch.
2. Check that the 4 ball ends (2) are free and not seized.

***NOTE: Lubricate at 10-hour intervals when operating in extremely wet, muddy or very dusty conditions.***

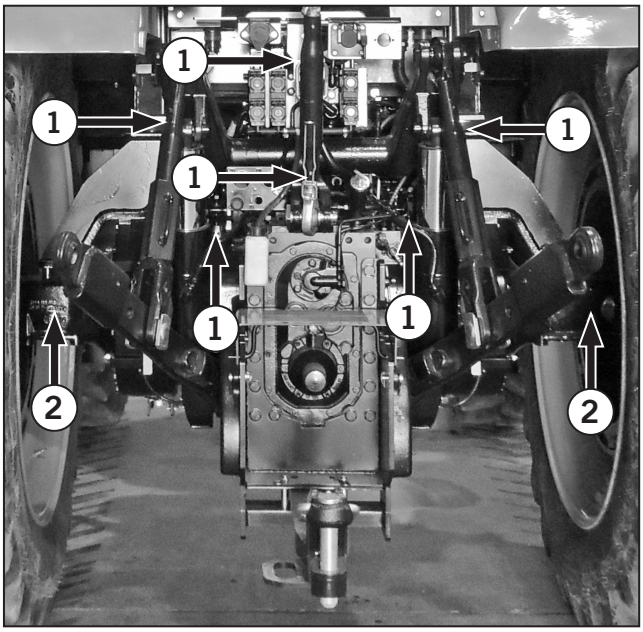
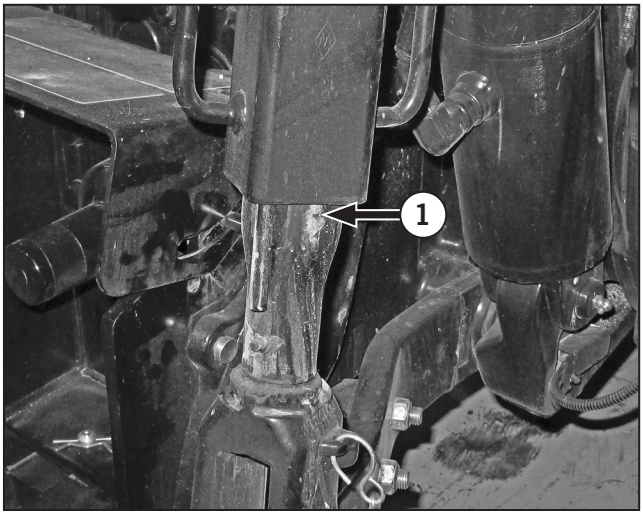
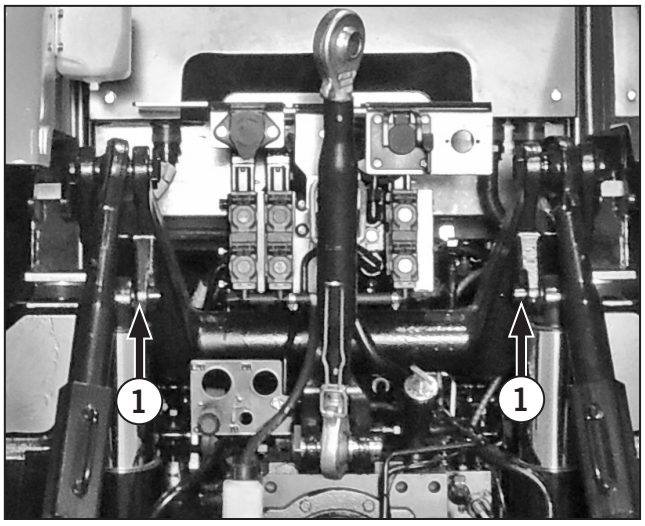
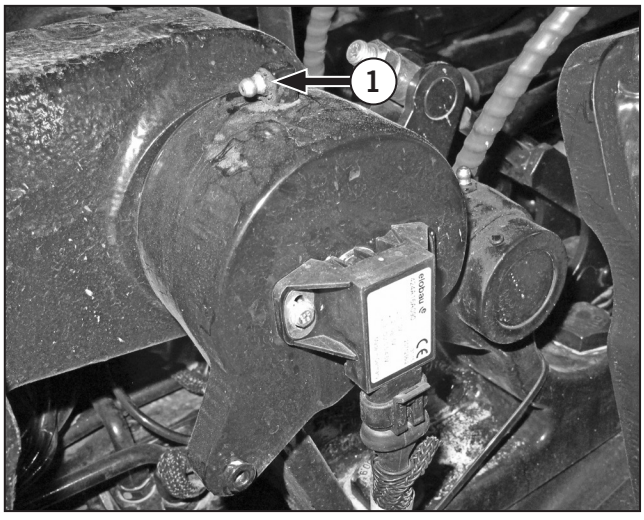



**Table 5-12: 3-pt Hitch Grease fittings**

| Ref | Description |
|---|---|
| 1 | Lift links (2 fittings per link)<br>Center link (2 fittings)<br>Roc shaft ends (1 per side)<br>Back of Roc shaft (1 per side)<br>Top of lift cylinders (1 per side)<br>Bottom of lift cylinders (1 per side) |



## Lubricate Front Axle Grease fittings

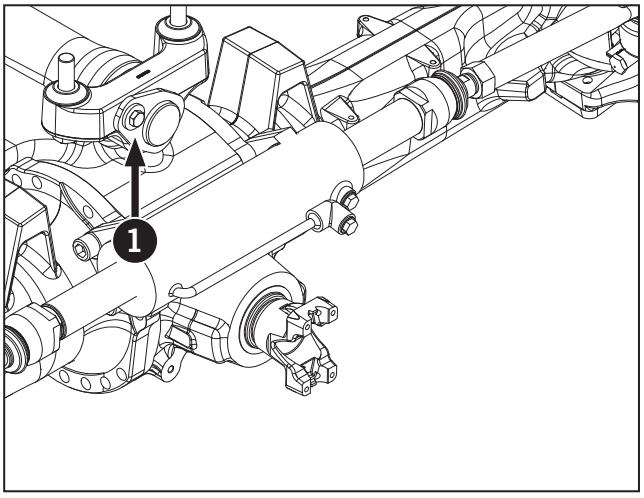
Grease the front axle at 10-hour intervals (daily) when operating in wet, muddy or dusty conditions.

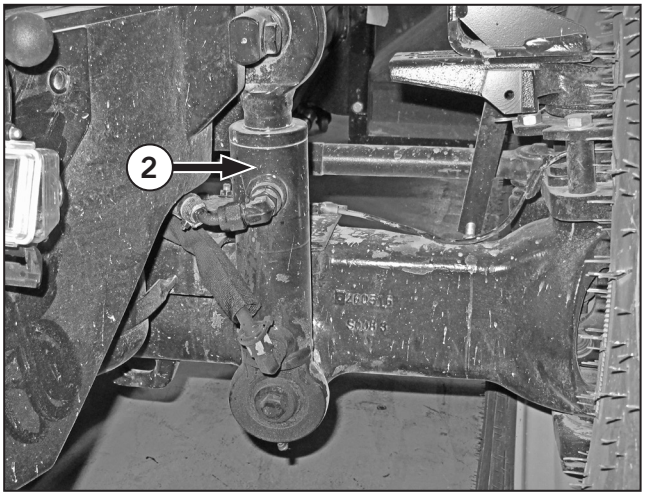
***NOTE: Clean grease fittings before applying grease.***

***IMPORTANT:****Use lithium-based EP high-temperature EP 2 (NLGI 2) grease with Moly available from KUBOTA Parts.*

**Table 5-13: Front Axle Grease fittings**

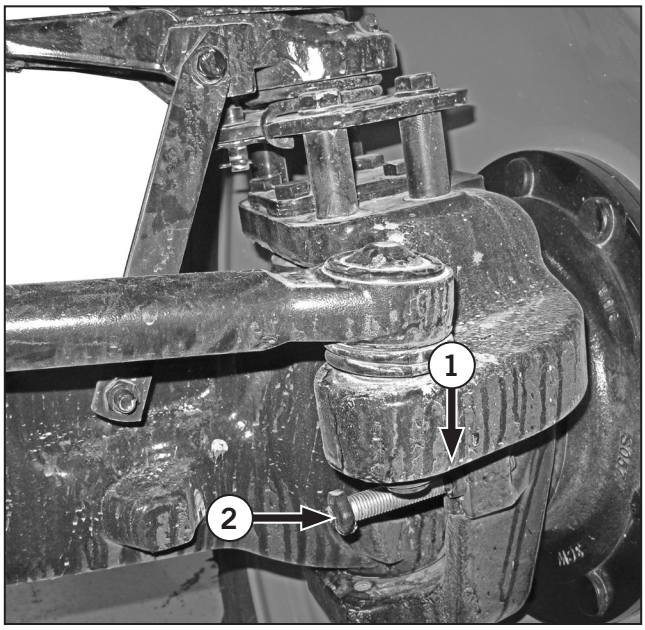
| Ref | Description |
|---|---|
| 1 | Main Pivot Pin |
| 2 | Suspension Cylinders (Suspended Axle only) |



## Check Stop Adjustment

1. Loosen the jam nut (1) on the steering stop.
2. Check the steering stop (2) in or out to provide a minimum clearance of 38 mm (1.5 in) between the tires or fenders if installed and any part of the tractor with the wheels turned full left and right with the axle fully oscillated.
3. Tighten jam nut securely.
4. Repeat this procedure to adjust the other steering stop.
5. Adjust if necesarry.

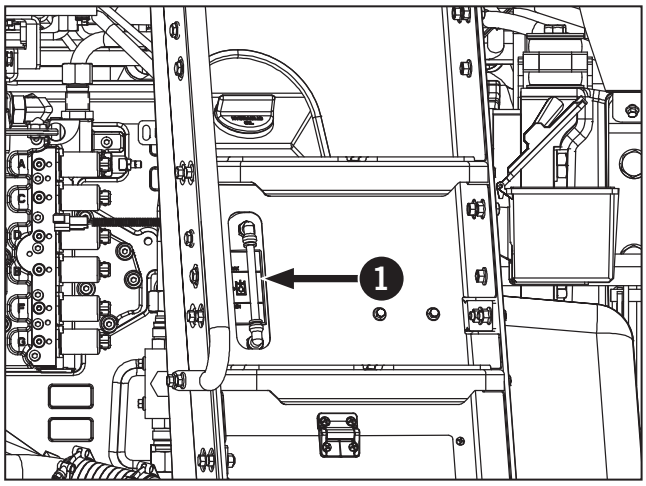


## Check the Hydraulic Oil

***NOTE: Dispose of used oil in accordance with local environmental regulations.***

1. Park the tractor on a level surface, shut the engine off and apply the parking brake.
2. Check the oil level on the sight glass (1) and top up as necessary.
3. Clean up any spills.

***NOTE: Dispose of oil or contaminated materials in accordance with local environmental regulations.***



## Initial 50 Hours

Complete the following maintenance procedures after the initial 50 hours of operation, in addition to the daily maintenance schedule.

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.
- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed.

### First 50-hour Service Checklist

Perform First 50-hour Service Checklist on page 7-41 in the manual.

## Every 50 Hours

Complete the following maintenance procedures after every 50 hours of operation, in addition to the daily maintenance schedule.

**DANGER**

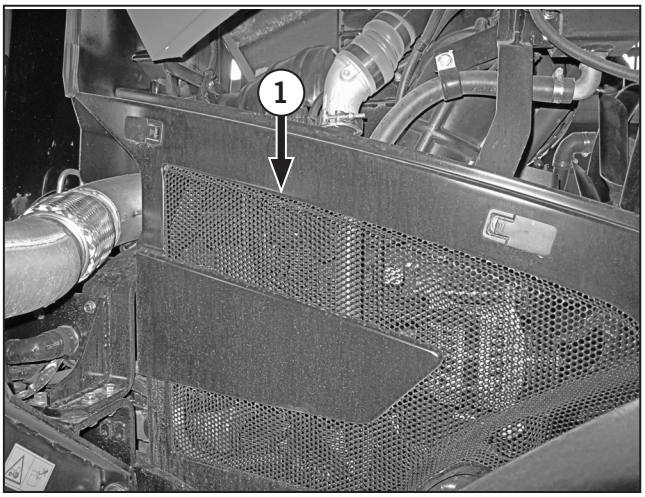
- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.
- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed.

## Clean Alternator

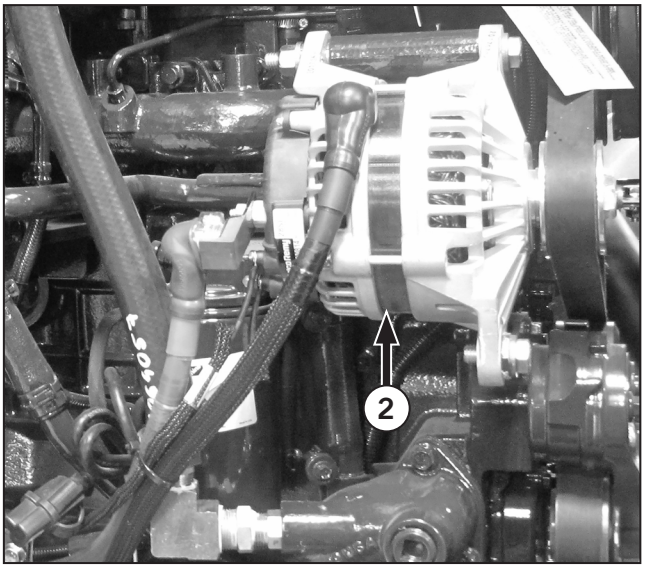
**WARNING**

Always wear appropriate eye and face protection when using compressed air. Flying dirt and debris can cause serious personal injury.

1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition, wait for the power on indicator light to turn off and turn the battery disconnect switch to the OFF position.
2. Open the hood.
3. Remove the engine guard (1) from the tractor.




4. Blow away the fine dust accumulated in and around the alternator (2) with compressed air.
5. Re-Install the engine guard to the tractor.
6. Close the hood.



## Check and Clean the Cab Air Filter

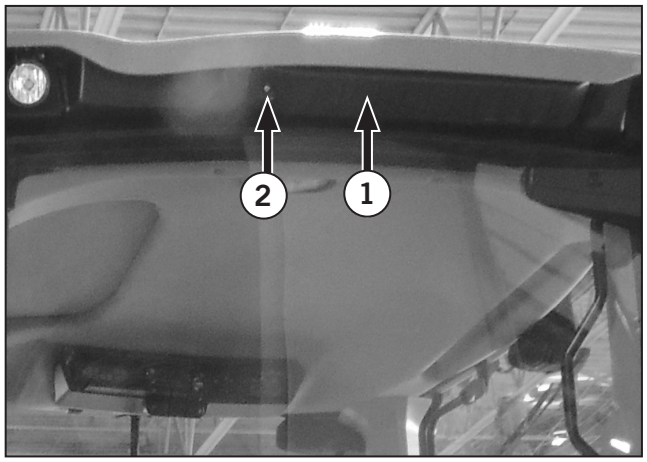
**WARNING**

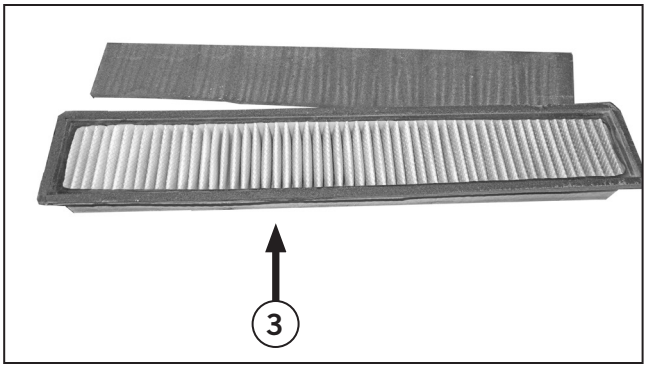
Wear a suitable mask to service or replace the air filters. Do not breath in the dust.

Always wear appropriate eye and face protection when using compressed air. Flying dirt and debris can cause serious personal injury.

The tractor cab is equipped with a single air filter cartridge installed in the cab frame above the left side door.

1. With the cab door closed, hold the cover panel (1) closed and remove the screw (2).
2. Lower the cover panel and swing back.
3. Carefully pull the filter forward to release the filter from the filter housing.
4. Clean the filter housing and ducting with a cloth to remove dust that may have collected. Do not use shop air to clean these components.
5. Gently tap the air filter (3) to remove any dust and debris. Wash the foam pre filter in soap and water.
6. Install the foam pre filter and air filter into housing.



## Check Weight Hardware; Front and Rear Wheel Weights

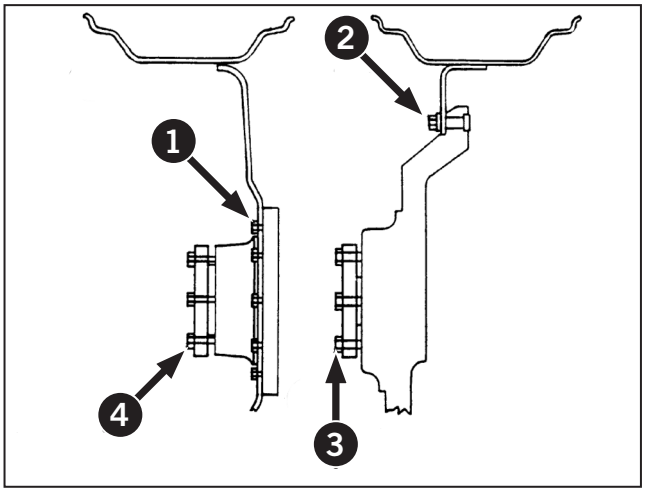
Clean the parts to be inspected.

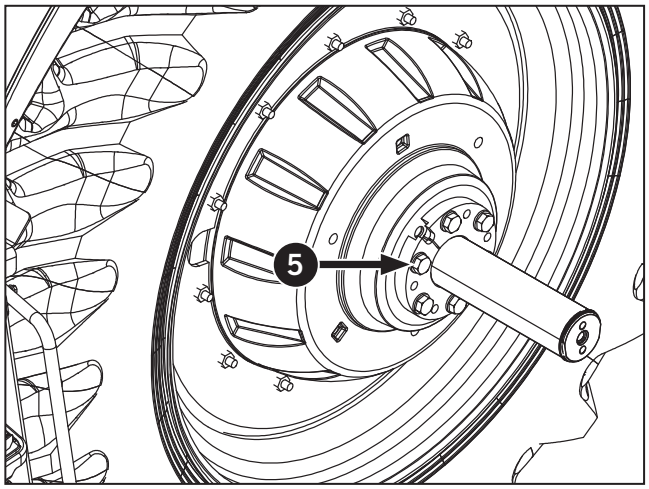
Check the front and rear wheel hardware. Use a torque wrench to tighten the rear wheel weight hardware.

The specified torque values are in the table below.

**Table 5-14: Wheel and Wheel Weight Bolt Torque**

| Item | Torque Specification |
|---|---|
| Front disc-to-hub nuts (1) | 700 N·m (515 ft·lb) |
| Front disc-to-rim nuts (2) | 345 N·m (255 ft·lb) |
| Rear wedge-to-disc bolts (cast disc wheels) (3) | 391 N·m (290 ft·lb) |
| Rear disc-to-rim nuts (cast disc wheels) (Grade 8) (2) | 596 N·m (440 ft·lb) |
| Rear wedge-to-hub bolts (steel disc wheels) (4) | 391 N·m (290 ft·lb) |
| Rear disc-to-hub bolts (steel disc wheels) (1) | 800 N·m (590 ft·lb) |
| Rear wedge-to-hub bolts (dual wheel – four wedge bolts) (4) | 391 N·m (290 ft·lb) |
| Rear wedge-to-hub bolts (dual wheel – four wedge bolts) (4) | 391 N·m (290 ft·lb) |
| Rear wheel weight mounting bolts (5) | 258 N·m (190 ft·lb) |



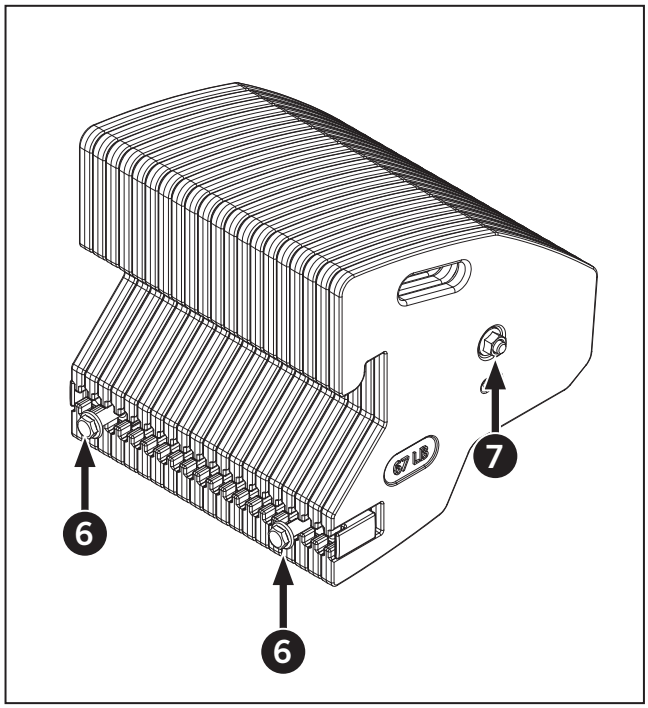




## Front Weight Bolt Torque

Tighten the front weight retaining bolts (6) to the correct torque.

Tighten the mounting bolts at the bracket clamps to 417 N·m (308 ft·lb).

Check and tighten the tie-rod flange nuts (7) to 550 N·m (406 ft·lb).



## Reinstall wheels

- Tighten the wheel nuts in sequence according to Table 5-15.
- Rotate the criss-cross sequence clockwise until all the wheel hub nuts are tightened.
- For wheels mounted to a large hub (A), tighten mounting nuts to 597 N·m (440 ft·lb).
- For wheels mounted to a small hub (B) , tighten mounting bolts to 800 N·m (590 ft·lb).

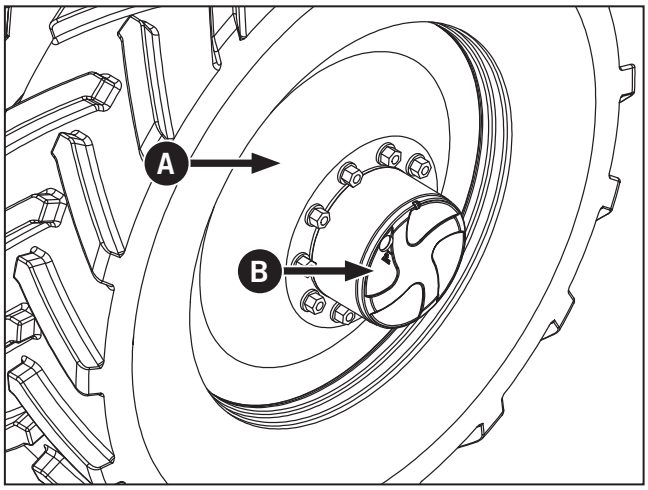
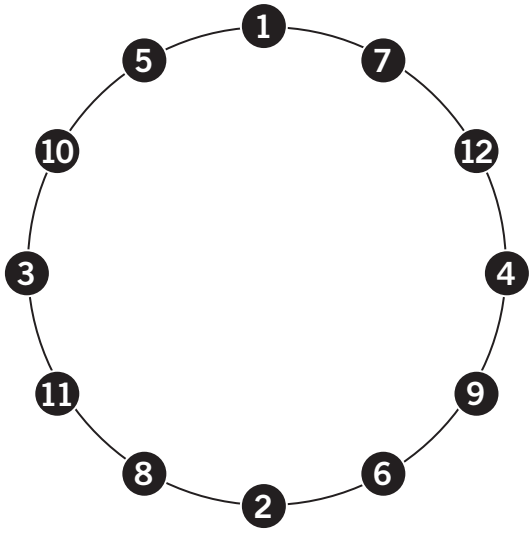



**Table 5-15: Torque Sequence for Wheels**

| Sequence | Nut |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |
| 11 | 11 |
| 12 | 12 |
| 13 | Again 1 |



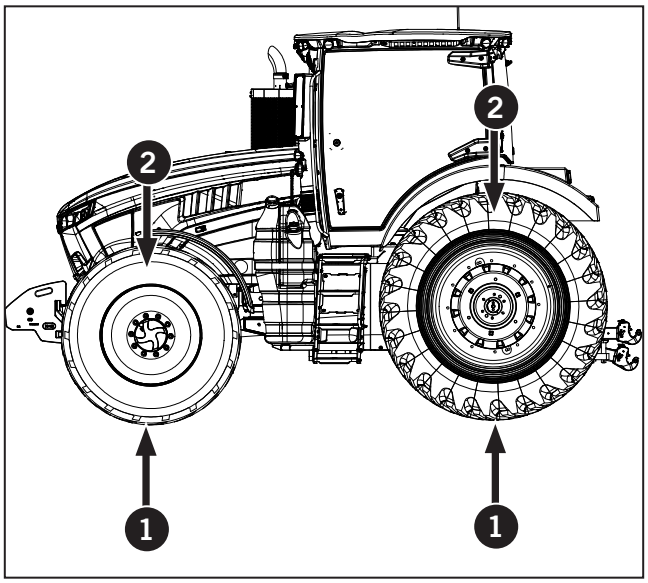
## Check Tire Pressure and Condition

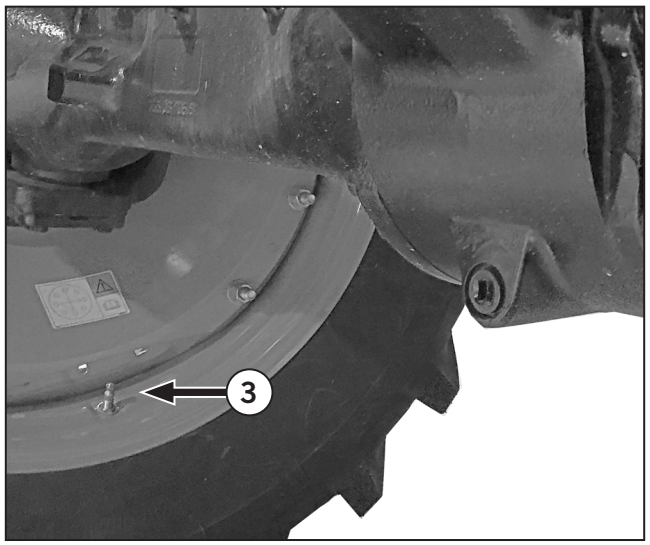
Check and adjust the front and rear tire pressures. Inspect tire treads (1) and sidewalls (2) for damage.

1. Clean the tire valve stems and inspect for damage.
2. Position each wheel so you can easily insert the tire pressure gauge over the tire valve (3).

See Tire Pressures and Permissible Loads in Section 7 of this manual.

***NOTE: Have damaged tires or wheels replaced by trained, qualified tire service technicians.***



## Front Tire Pressures and Permissible Loads

| Table 5-16: Front Tire Pressures and Permissible Loads (four-wheel drive) Metric Units | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Inflation Pressure (bar) | | | | | | | | | | | | | | | | |
| Radial Tire Size | Ply | ☆Rating | 0.40 | 0.50 | 0.55 | 0.60 | 0.70 | 0.80 | 1.00 | 1.10 | 1.20 | 1.40 | 1.50 | 1.60 | 1.80 | 1.90 | 2.00 | 2.20 | 2.30 |
| | | | Load Capacity (kg) | | | | | | | | | | | | | | | | |
| 14.9-28 | 10 | 3 | 800 | 870 | 945 | 1010 | 1075 | 1195 | 1305 | 1415 | 1500 | 1615 | 1705 | 1800 | 1880 | 1960 | 2060 | | |
| 16.9-28 | 8 | 2 | 965 | 1055 | 1145 | 1225 | 1300 | 1450 | 1590 | 1715 | 1850 | 1960 | 2070 | 2240 | | | | | |
| 14.9-30 | 10 | 3 | 820 | 900 | 970 | 1045 | 1105 | 1235 | 1345 | 1460 | 1550 | 1660 | 1760 | 1850 | 1940 | 2025 | 2120 | | |
| 480/70-30 | | - | 1180 | 1285 | 1400 | 1550 | 1650 | 1800 | 1900 | | 2120 | 2360 | | 2575 | 2800 | | 3075 | 3350 | 3550 |
| 16.9-30 | 8 | 2 | 1000 | 1095 | 1180 | 1265 | 1345 | 1495 | 1640 | 1770 | 1900 | 2015 | 2130 | 2300 | | | | | |

| Table 5-17: Front Tire Pressures and Permissible Loads (four-wheel drive) Imperial Units | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Inflation Pressure (psi) | | | | | | | | | | | | | | | | |
| Radial Tire Size | Ply | ☆Rating | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 |
| | | | Load Capacity (lb) | | | | | | | | | | | | | | | | |
| 14.9-28 | 10 | 3 | 1760 | 1920 | 2080 | 2230 | 2370 | 2630 | 2880 | 3120 | 3300 | 3560 | 3760 | 3960 | 4140 | 4320 | 4540 | | |
| 16.9-28 | 8 | 2 | 2130 | 2330 | 2520 | 2700 | 2870 | 3200 | 3500 | 3780 | 4080 | 4320 | 4560 | 4940 | | | | | |
| 14.9-30 | 10 | 3 | 1810 | 1980 | 2140 | 2300 | 2440 | 2720 | 2970 | 3220 | 3420 | 3660 | 3880 | 4080 | 4280 | 4460 | 4680 | | |
| 480/70-30 | | - | 2600 | 2830 | 3080 | 2420 | 3640 | 3960 | 4180 | | 4680 | 5200 | | 5680 | 6150 | | 6800 | 7400 | 7850 |
| 16.9-30 | 8 | 2 | 2200 | 2410 | 2600 | 2790 | 3300 | 3620 | 3900 | 4180 | 4440 | 4700 | 5080 | | | | | | |

## Rear Tire Pressures and Permissible Loads

**Table 5-18: Rear Tire Pressure and Permissible Loads (Metric Units)**

| Bias Tire Size | Ply | ☆Rating | Inflation Pressure (bar) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0.80 | 1.00 | 1.10 | 1.20 | 1.40 | 1.50 |
| | | | Load Capacity (kg) | | | | | |
| 480/80R46 | 8 | - | | | 2 387 | 2 559 | 2 718 | |
| R1 20.8-38 | 10 | - | | | 1 663 | 3 100 | 3 295 | 3 486 |
| R2 30.5L-32 | 12 | - | | | 4 145 | 4 440 | 4 722 | |
| R2 20.8-38 | 10 | - | | | 2 980 | 3 100 | 3 295 | 3 486 |

**Table 5-19: Rear Tire Pressure and Permissible Loads (Imperial Units)**

| Bias Tire Size | Ply | ☆Rating | Inflation Pressure (psi) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 12 | 14 | 16 | 18 | 20 | 22 |
| | | | Load Capacity (lb) | | | | | |
| 480/80R46 | 8 | - | | | 5 250 | 5 630 | 5 980 | |
| R1 20.8-38 | 10 | - | | | 6 360 | 6 820 | 7 250 | 7 670 |
| R2 30.5L-32 | 12 | - | | | 9 120 | 9 770 | 10 390 | |
| R2 20.8-38 | | - | | | 6 360 | 6 820 | 7 250 | 7 670 |

## Lubricate the Front Axle Grease Points

The front axle has a number of grease fittings for proper lubrication of the moving parts.

Locate the service points described below. Clean the fittings and apply fresh grease. Check for damage and repair or replace damaged components.

***NOTE: Contact a KUBOTA dealer for repair service.***

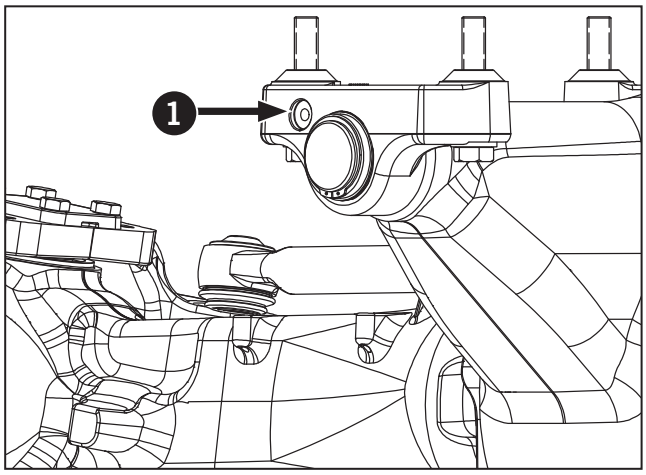
Grease Specification: Use lithium base EP high temperature grease available from a KUBOTA dealer.

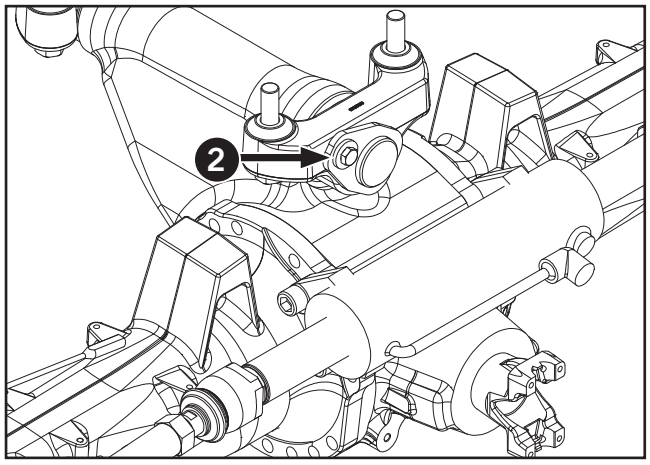
## Front Axle Grease Fitting Locations:

Front axle pivot pin

- The front grease fitting (1) is located on the end of the pivot shaft.
- The rear grease fitting (2) is located on the rear end of the pivot shaft.

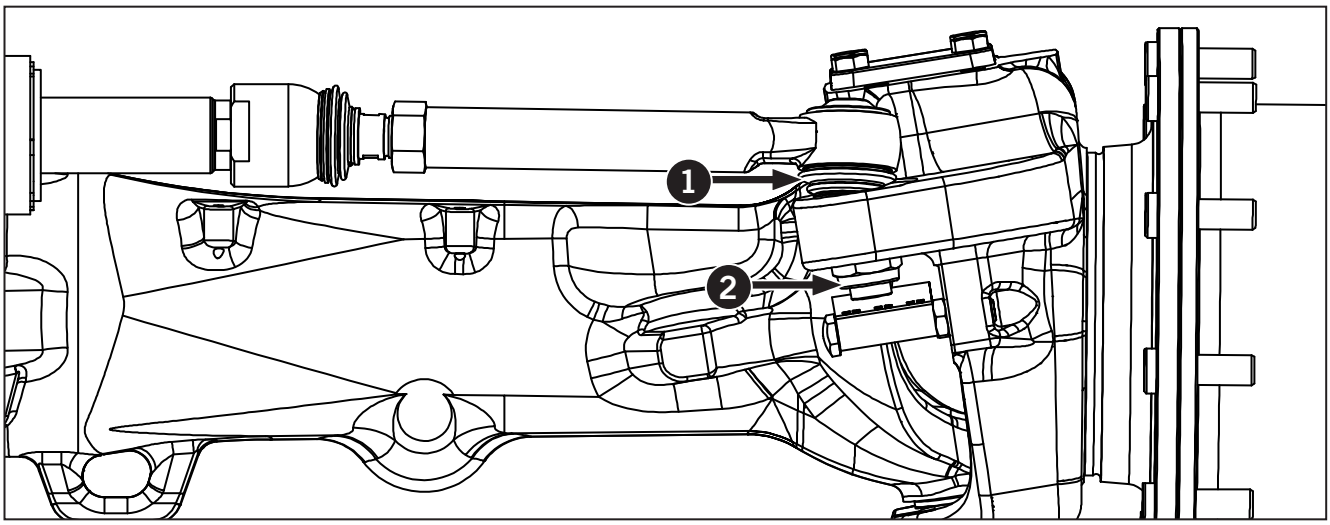
***NOTE: Lubricate at 10-hour intervals when operating in extremely wet, muddy or very dusty conditions.***



### Axle King Pin Bearings

1. Locate the upper (1) and lower (2) grease fittings on the left end of the front axle and apply grease until new grease appears at the joint.
2. Grease the upper and lower fittings on the right end of the front axle.



## Lubricate 3-pt Hitch (Front)

Park the tractor on a level area, shut the engine off and apply the parking brake.

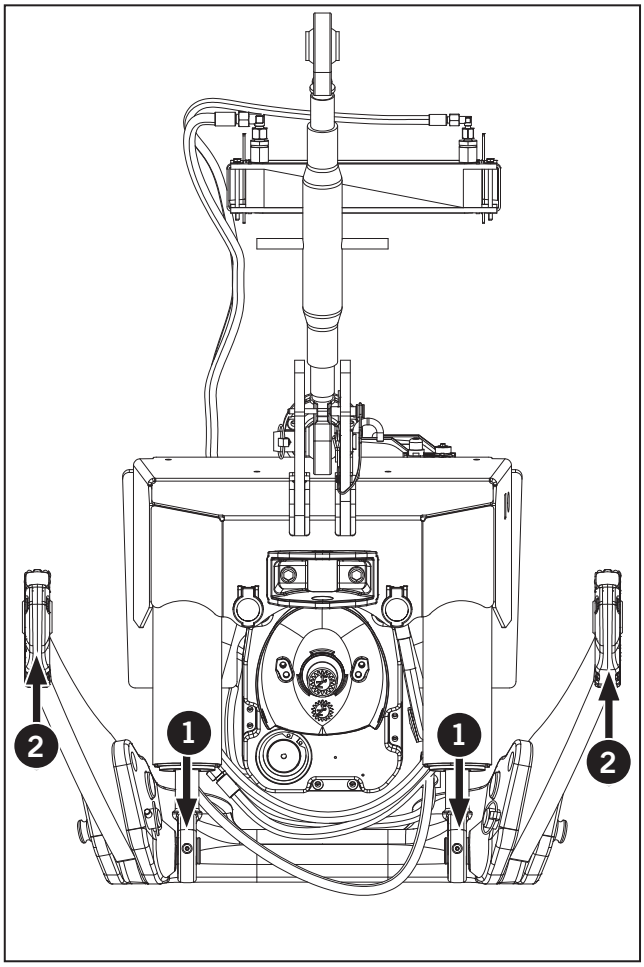
Remove debris. Use a pressure washer and suitable cleaner to clean the 3-pt hitch linkage.

Lubricate the 3-pt hitch linkage to maximize performance.

Grease: STD Grease Lithium base High Temperature EP 2 (NLGI 2), available from a KUBOTA dealer.

1. Lubricate the grease fittings (1). These are the only points that require lubrication on the front 3-pt hitch.
2. Lubricate the grease fittings on the lower links (2). Also check they are free and not seized.

***NOTE: Lubricate at 10-hour intervals when operating in extremely wet, muddy or very dusty conditions.***

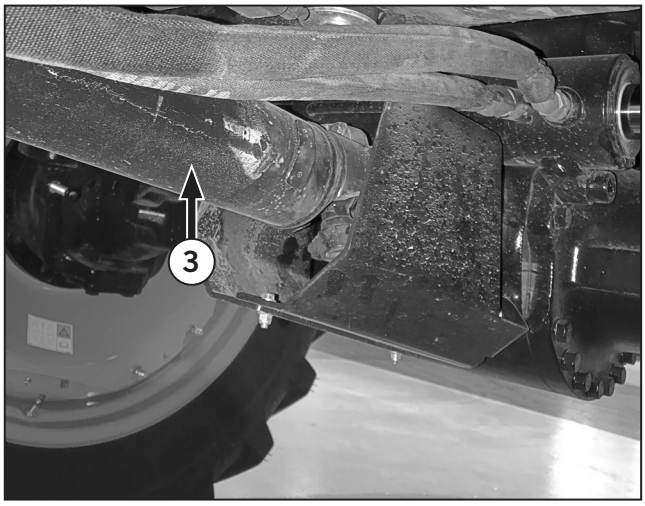



## Lubricate Drive Shaft Splines

Rotate the drive-shaft (3) till grease fitting is accessible, grease fitting is located at the back of the drive shaft. Clean dirt and debris from the area.

Apply a liberal amount of grease to the fitting for thorough lubrication of the driveshaft splines. Grease forced out of the spline coupling may be visible through the access port.

Make sure the drive shaft shield is fastened securely.

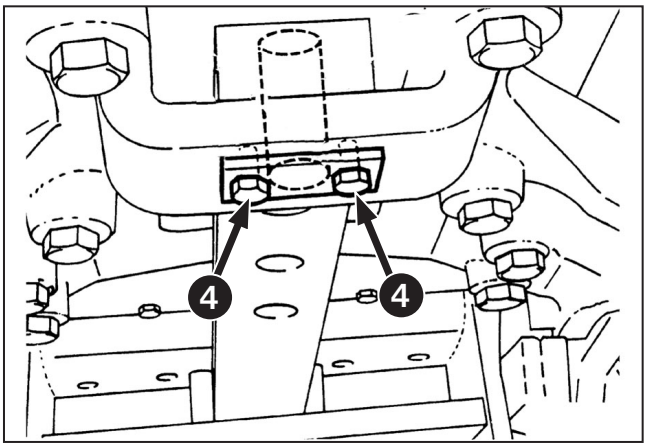


### Inspect and Tighten Drawbar Components

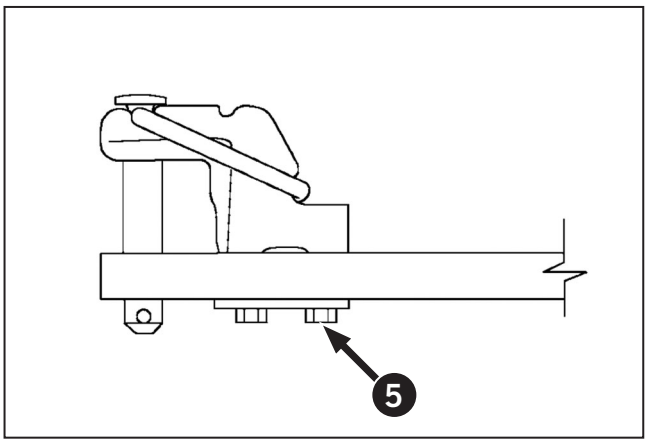
Park the tractor on a level area, shut the engine off and apply the parking brake.

Clean the area around the drawbar mounting bolts.

Check the bolts holding the drawbar locator pin (4) and tighten to 60 N·m (44 ft·lb).




Check the clevis mounting bolts (5) and tighten to 590 N·m (435 ft·lb).



## Every 100 Hours

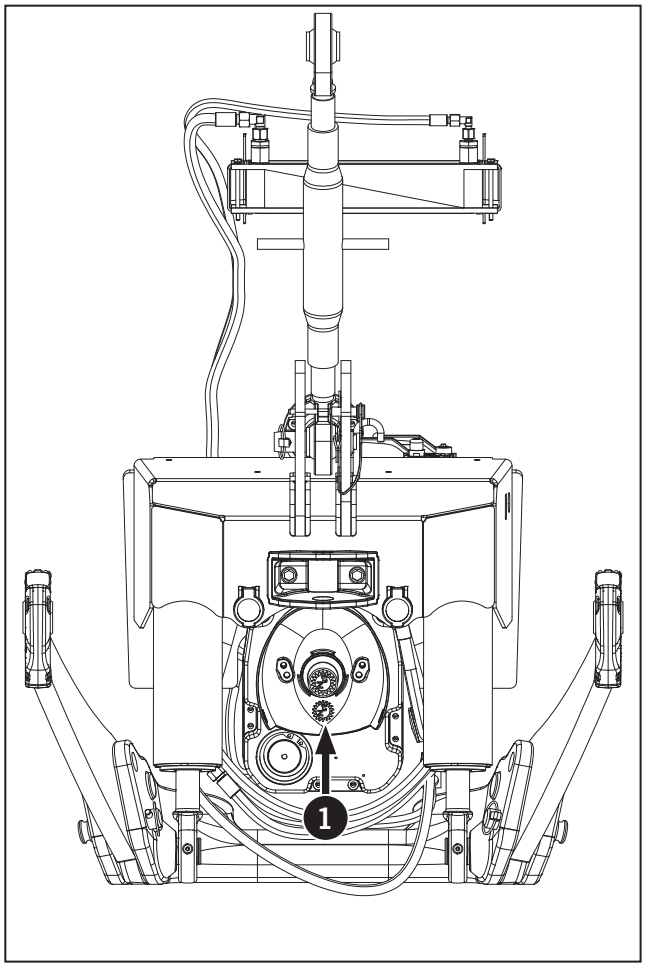
After every 100 hours of operation, complete the following maintenance procedures.

### Check Front PTO Gear Box

Park the tractor on a level area, shut the engine off and apply the parking brake.

Remove debris. Use a pressure washer and suitable cleaner to clean the front 3-pt hitch linkage.

1. Check the front PTO gear box (1) for leaks.



## Every 250 Hours

After every 250 hours of operation, complete the following maintenance procedures. This is in addition to the maintenance performed every 10 (daily), 50 hours and 100 hours.

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.

- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

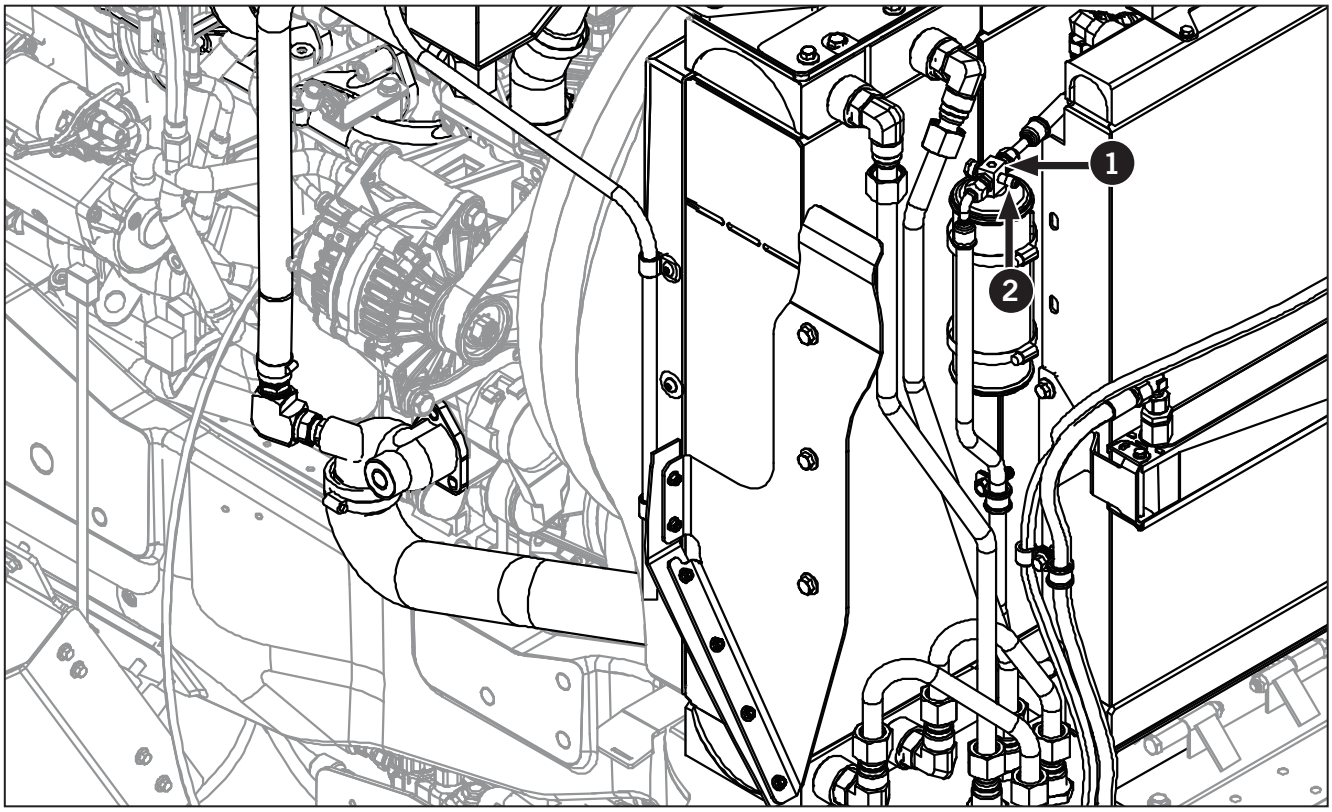
## Check the Air Conditioner Dryer and Connections

**DANGER**

Do not attempt to service the air-conditioning system. Severe skin and eye injury may result from escaping refrigerant. Special equipment and procedures are required to service the system. Contact a KUBOTA dealer.

Park the tractor on a level surface, place the transmission in neutral and apply the parking brake. Exit the tractor and open the hood.

Check the sight glass (1) on the air conditioner (A/C) dryer for bubbles and the color of the moisture indicator (2) when the outside temperature is 21 °C (70 °F) or higher.



### Check the A/C Dryer

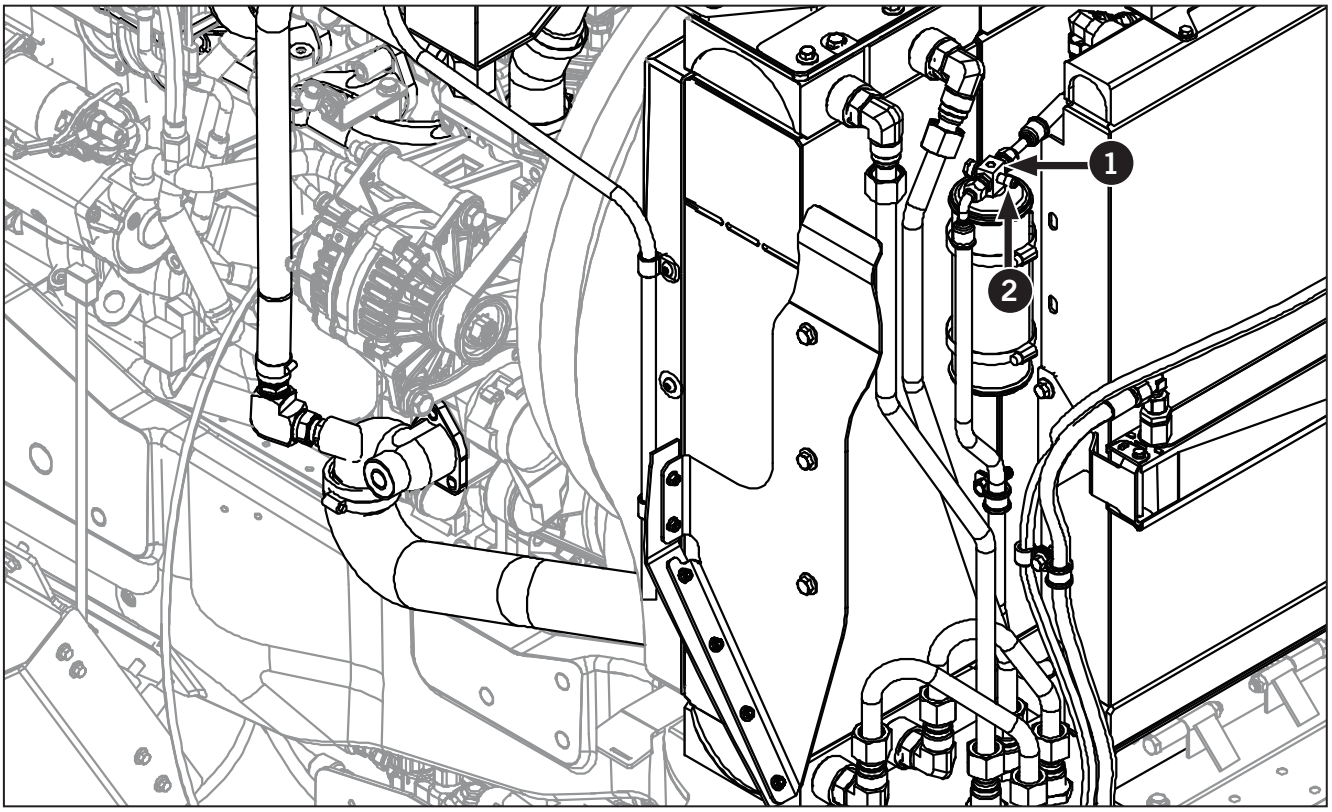
1. Start engine and run at 2000 rpm
2. Press the A/C switch
3. Adjust the cab temperature control to the minimum setting and set the cab blower fan to maximum
4. Operate the system for 10 minutes, then check the sight glass (1) with the A/C compressor running
5. Shut the engine off after the inspection.

If bubbles are visible in the sight glass or the moisture indicator (2) is a pink color, the air conditioning system requires service. Contact a KUBOTA dealer.

### Check the A/C Connections

Check the connections at the A/C dryer and at the compressor for damage or signs of leakage. A build-up of dirt around the A/C connections may indicate a leak.

***IMPORTANT:*** *Do not allow R-134A refrigerant to escape into the atmosphere. A KUBOTA dealer has the proper handling and recycling equipment to service the system.*



## Check Condition of Battery

**CAUTION**

Wear gloves and protective eyewear when handling batteries. Keep open flames or sparks away from the batteries.

**DANGER**

Batteries contain sulfuric acid. Flush the affected area with water for five minutes In case of contact with skin. Seek medical attention immediately.

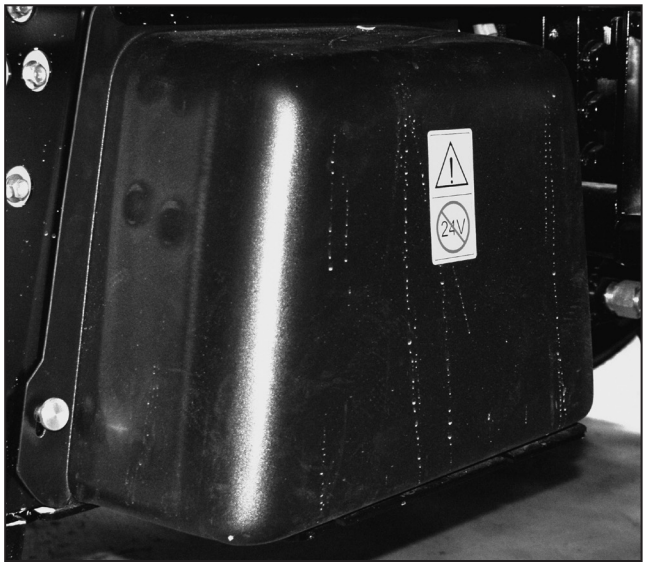
Do not try to open sealed no-maintenance batteries.

Park the tractor on a flat surface, shut off the engine and apply the parking brake.

1. Remove the cover from the battery box.
2. Remove any debris and then wash and dry the battery tops.
3. Inspect components for damage and replace or repair as required.

For serviceable type batteries only:

4. Use a flat-bladed screwdriver to remove the fill caps and check that the electrolyte level is 6 mm (0.75 in) below the filler neck of each cell.
5. Add distilled or demineralized water to the cells if the level is low. Do not overfill.
6. Replace the fill plugs. Check for loose cable connections and tighten if required.
7. Re-install the battery box cover.



## Drain the Fuel Tanks

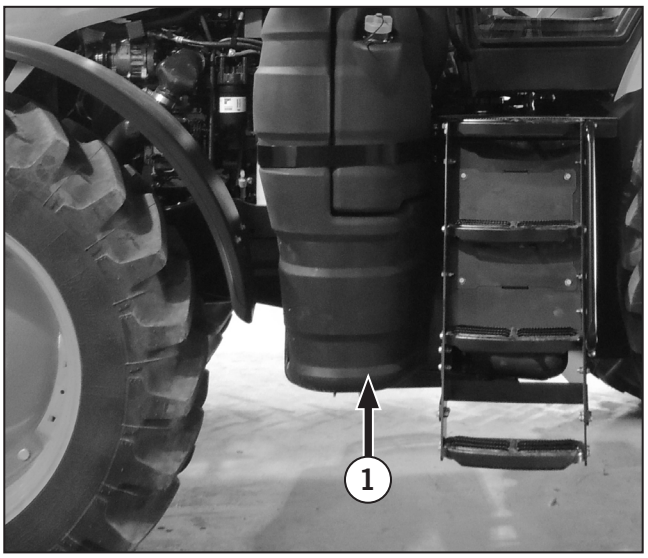
**WARNING**

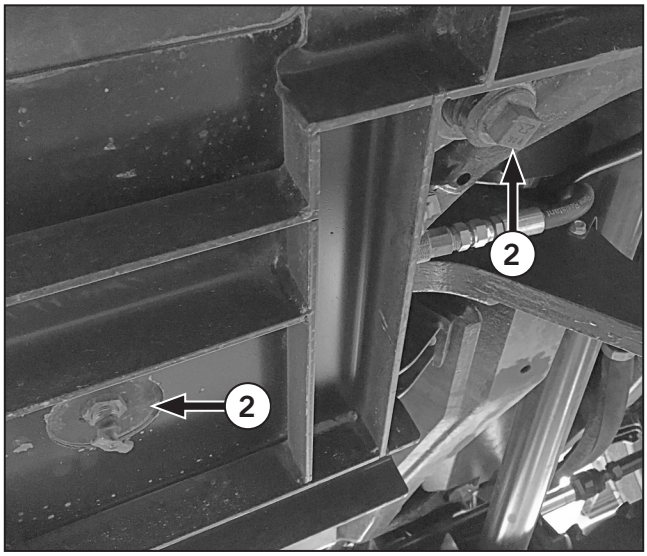
Diesel fuel is a flammable and hazardous material. Use appropriate safe handling precautions.

Perform this operation when the tanks are near empty.

Park the tractor on a flat surface, shut off the engine and apply the parking brake. Block the front and rear wheels. The fuel tank (1) on the left side of the tractor has a 2 drain valve (2) located near the bottom outside corner of the tank.

1. Close the fuel shut-off valves near the bottom of the left side fuel tank.
2. Remove any debris and clean the area around the drain valve on the fuel tank.
3. Place a container under the drain valve.
4. Open the drain valve and allow all the remaining fuel in the tank to flow into the container.
5. Close the drain valve.
6. Inspect the fuel connections, hoses and clamps for signs of leakage, damage or deterioration and make repairs if required. Tighten the hose clamps to 5 N·m (44 in-lb).
7. Open the fuel shut-off valves when the procedure is completed.
8. Fill the tanks with fresh diesel fuel.
9. Dispose of the old fuel properly and in compliance with regulatory requirements in your area.



## Initial 500 Hours

**DANGER**

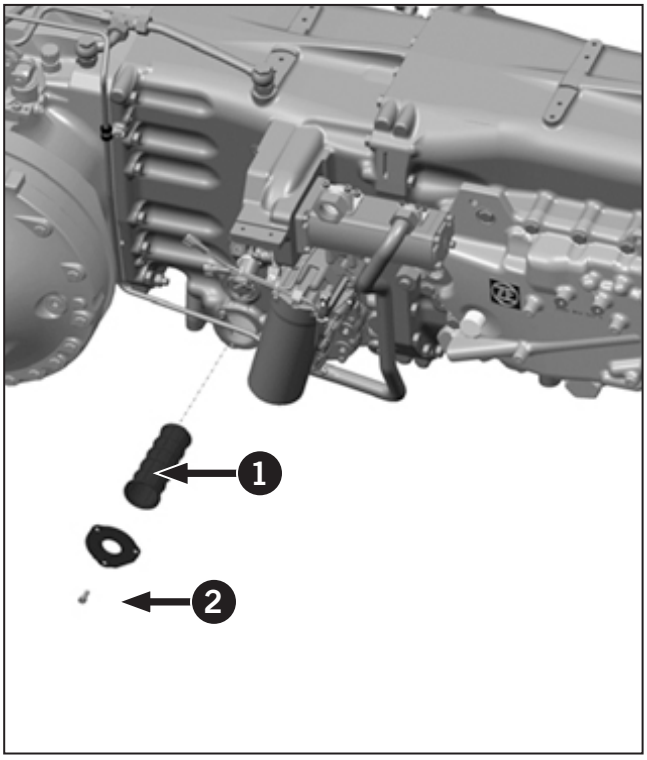
- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.
- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed.

After the initial 500 hours of operation, complete the following maintenance procedures. This is in addition to the maintenance performed every 10 (daily), 50, 100 and 250 hours.

### Clean Suction Filter

1. Place vessel under the filter (1).
2. Loosen the hexagon screws (2).
3. Clean the filter.
4. Re-assemble in reverse order.

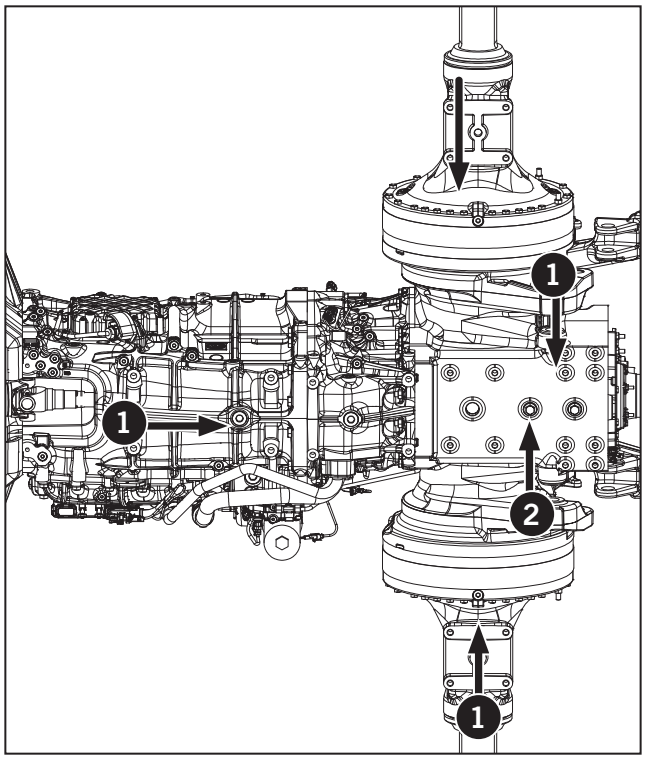
***NOTE: The suction filter (screen insert) must be cleaned at every oil change and checked whether it is in a perfect condition.***



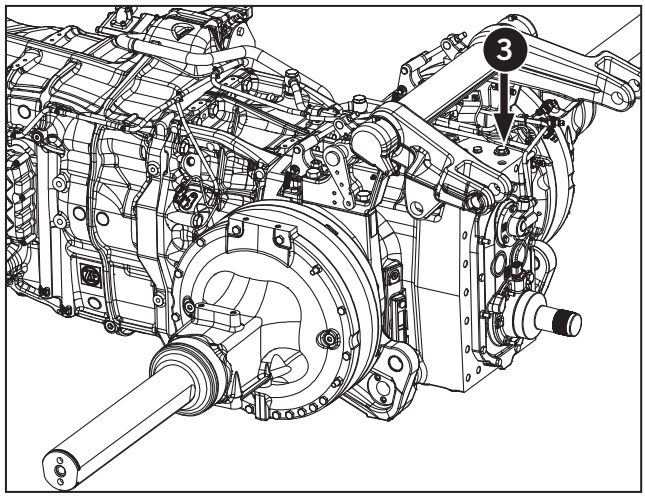
## Change and Fill Oil for Transmission and Rear Axle Final Drives

***NOTE: Drain oil only at operating temperature***

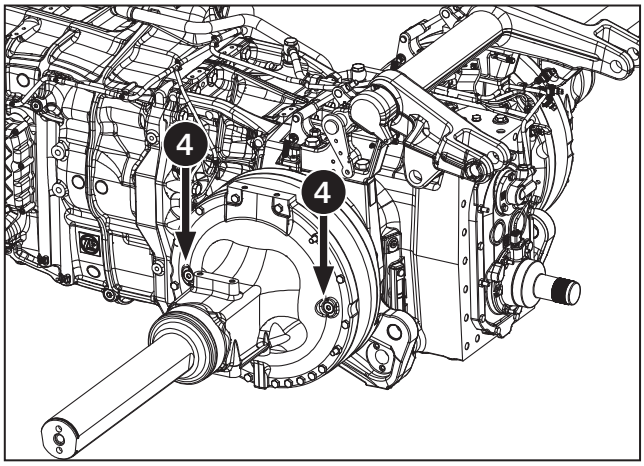
1. Oil drain plugs are located at the bottom side of the transmission.
2. Loosen the oil plugs (1) to drain oil from the transmission and rear axle.
3. Loosen the oil drain plugs (2) located at the bottom of rear final drives, right and left sides to drain oil from the rear final drives.
4. Once all oil has been drained, reinstall all oil drain plugs with new seal rings and tighten.




5. Remove transmission/rear differential fill cap (3).
6. Fill with 72 L (19 gal) of oil. Oil level is near the upper marking at the oil sight glass.



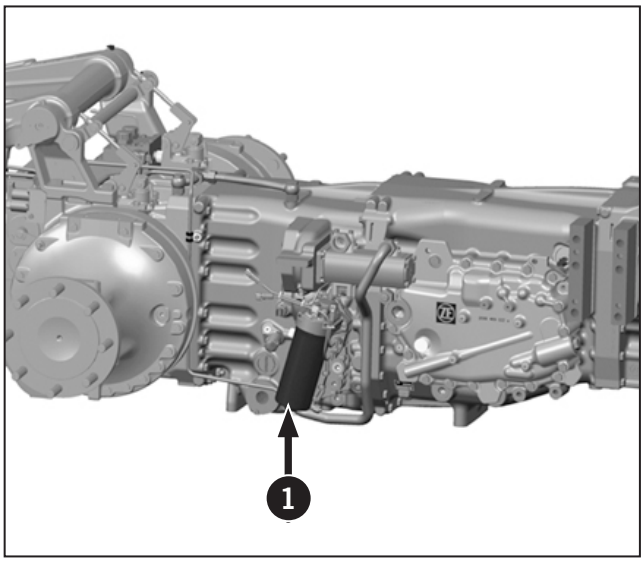

7. Remove rear final drive plugs (4) from the right and left sides.
8. Fill final drive till oil is at the bottom of the tank fill plug holes. Approximately 11 L (2.9 gal).
9. Re-install rear final drives with new seal rings and tighten.

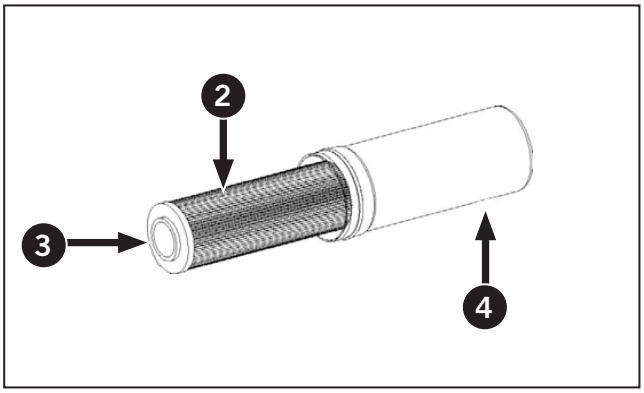


## Change Transmission Oil Filter

***NOTE: Drain oil only at operating temperature.***

1. Unscrew housing on the filter housing (1).
2. Change filter element (2).
3. Replace O-ring (3) and place into the groove of the filter housing and insert in the filter.
4. Refit pressure filter (4) with filter element into the housing until contact. Torque to 50 N·m (37 ft·lb).

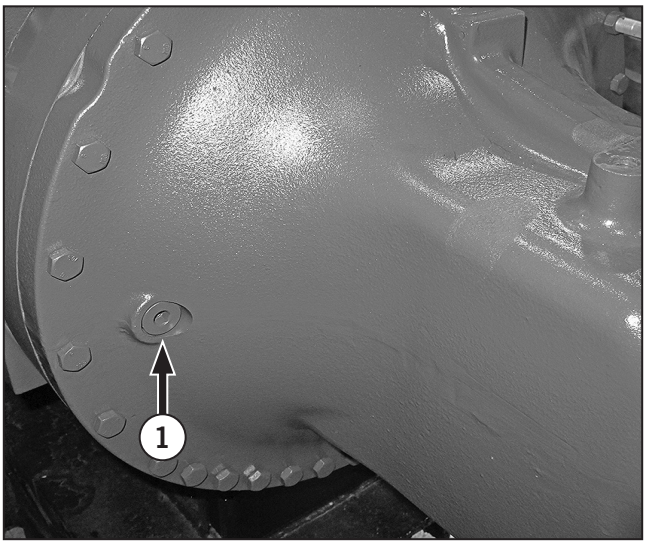


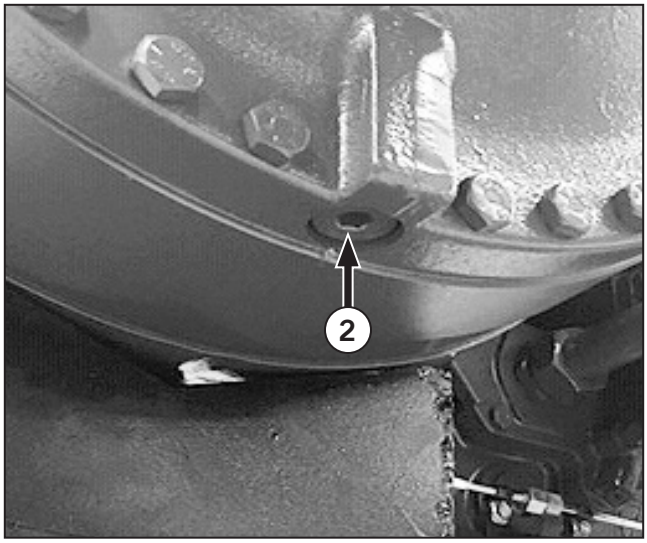



## Change Rear Planetary Oil

***NOTE: Drain oil only at operating temperature.***

1. Loosen the oil plugs to drain oil from the rear planetary (1).
2. Once all oil has been drained, reinstall all oil drain plugs with new seal rings and tighten.



## Change Hydraulic Filters (Steering, Charge and Return)

**WARNING**

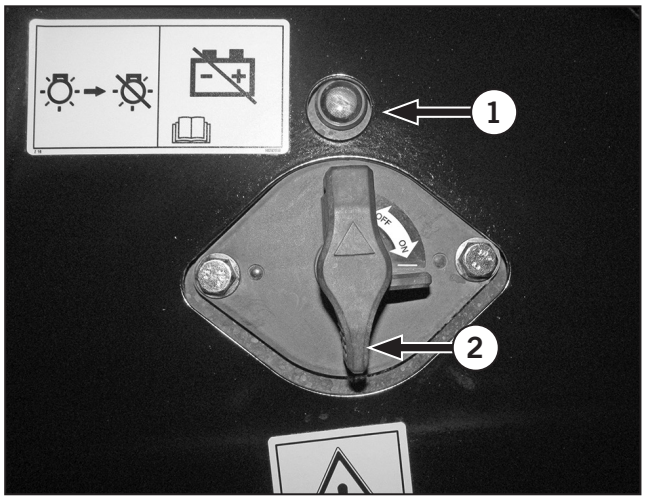
Never under any circumstances try to disconnect a fitting or open the hydraulic system with the engine running. High pressure oil spray can cause serious injury or death.

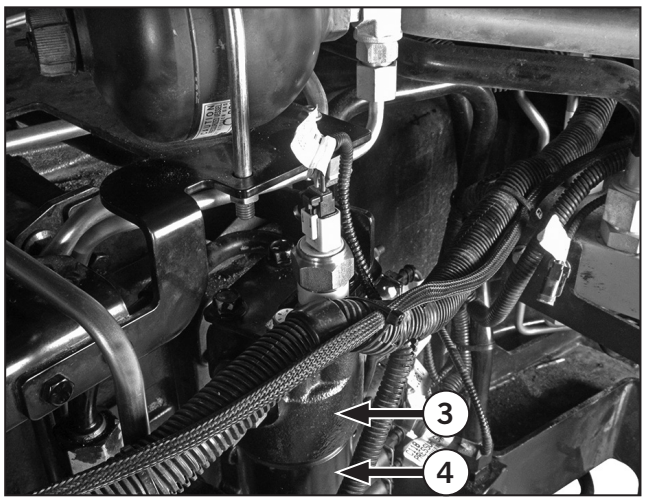
Never start the engine when a hydraulic component is disconnected.

## Change Steering Hydraulic Filter

### Removal

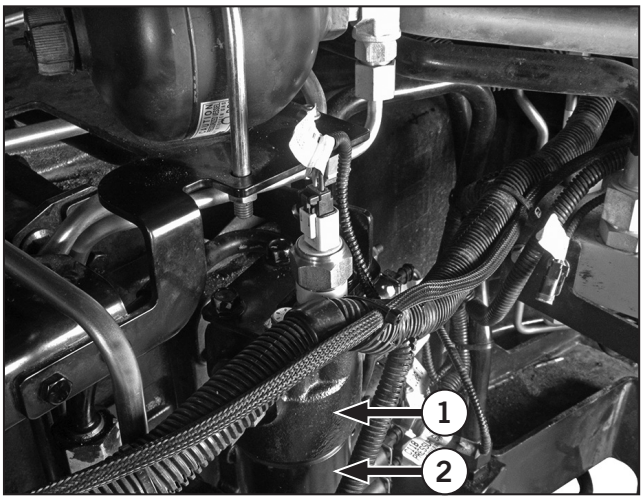
1. Always engage the parking brake fully, place the transmission in neutral, shut the engine off, wait for the power on indicator light (1) to turn off.
2. Turn the battery shut-off switch (2) to OFF and block the wheels before performing any maintenance operations.
3. Switch off the hydraulic system and release filter pressure.
4. Unscrew the filter head (3), drain the fluid into a suitable contrainer and clean or dispose in accordance with environment regulations.
5. Remove the filter (4). Check the surface of element for contamination residue and larger particles. These can indicate damage to components.
6. Replace the filter.
7. Clean the filter bowl and filter head. Pay attention to the threads.
8. Examine the filter especially the sealing surfaces for mechanical damage.
9. Check o-rings and replace if necessary.



### Installing

1. Wet the sealing surfaces and thread on the filter head (1) and the o-ring with clean operating fluid.
2. Place the filter element (2) on the filter head.
3. Apply silver grade anti-seize (per Mil-PRF 907E) to the threads.
4. Tighten the filter head and then unscrew by one-quarter turn.
5. Switch the hydraulic system on and vent filter at a suitable point in the system.
6. Check for leakage.



## Change Hydraulic Oil Return Filter

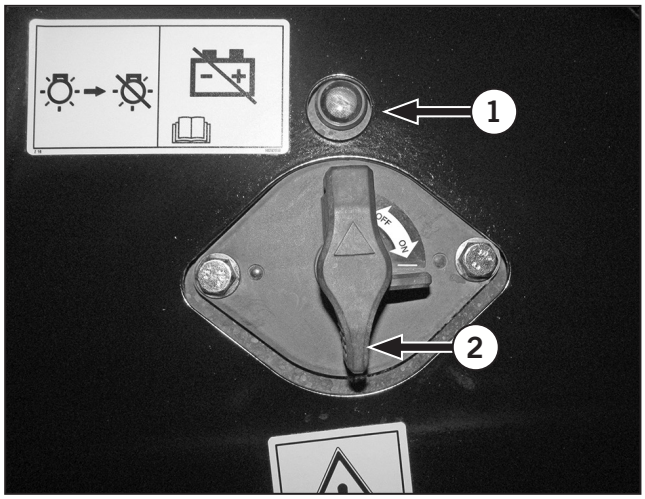
**WARNING**

Escaping fluids under high pressure can penetrate skin and cause serious and life-threatening injury.

Relieve hydraulic pressure before opening any component. Wear gloves and eye protection when carrying out hydraulic tests.

Never use your hands to check for fluid leaks. Use a piece of cardboard or paper to search for a suspected leak.

1. Always engage the parking brake fully, place the transmission in neutral, shut the engine off, wait for the power on indicator light (1) to turn off.
2. Turn the battery shut-off switch (2) to OFF and block the wheels before performing any maintenance operations.
3. Place an oil pan under the tractor to catch any hydraulic fluid that may drain.




4. Spin off the canister (3).
5. Lube the o-ring on the filter. Fill the filter with oil and install the filter.
6. Start the tractor and check for hydraulic oil leaks.
7. Check the hydraulic oil level on the sight glass and add hydraulic oil if needed.

## Change Hydraulic Charge Filter

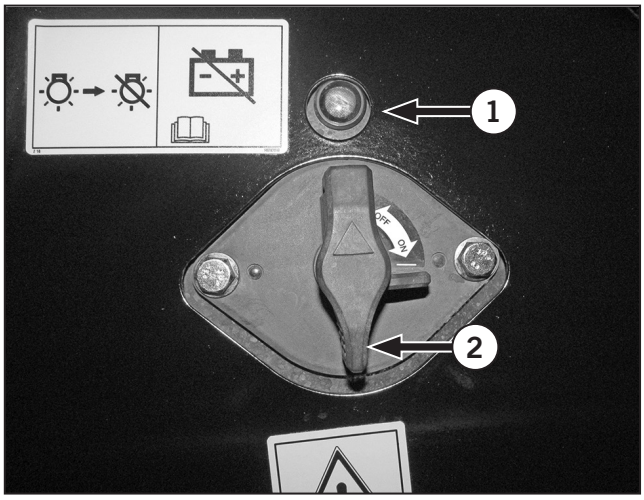
**WARNING**

Escaping fluids under high pressure can penetrate skin and cause serious and life-threatening injury.

Relieve hydraulic pressure before opening any component. Wear gloves and eye protection when carrying out hydraulic tests.

Never use your hands to check for fluid leaks. Use a piece of cardboard or paper to search for a suspected leak.

1. Always engage the parking brake fully, place the transmission in neutral, shut the engine off, wait for the power on indicator light (1) to turn off.
2. Turn the battery shut-off switch (2) to OFF and block the wheels before performing any maintenance operations.
3. Place an oil pan under the tractor to catch any hydraulic fluid that may drain.




4. Spin off the canister (3).
5. Lube the o-ring on the filter. Fill the filter with oil and install the filter.
6. Start the tractor and check for hydraulic oil leaks.
7. Check the hydraulic oil level on the sight glass and add hydraulic oil if needed.

## Change the Hydraulic Oil

***NOTE: Dispose of used oil in accordance with local environmental regulations.***

1. Disconnect any attached equipment.
2. Operate the tractor to warm up the hydraulic system.
   - Lift the 3-pt hitch to the fully raised position, then lower it fully.
   - Cycle the remote hydraulic valves.
   - Center the steering.
   - Apply the service brake pedals.
3. Park the tractor on a level surface, shut the engine off and apply the parking brake.
4. Clean the area around the drain plug (1) and the fill cap (3).
5. Place a container that will hold 140 L (37 gal) below the drain remove the drain plug.

***NOTE: Expect oil retention in the system. Up to 20 L (5.25 gal) may remain in passages and filters.***

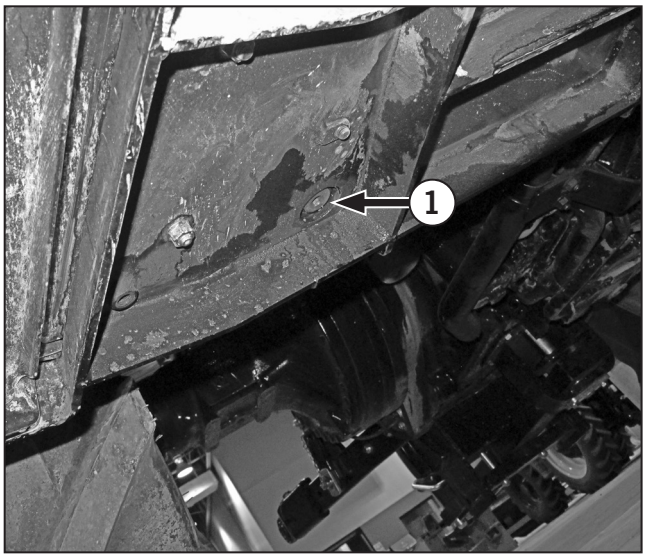
6. Replace the drain plug when the hydraulic fluid stops draining. Tighten plug.

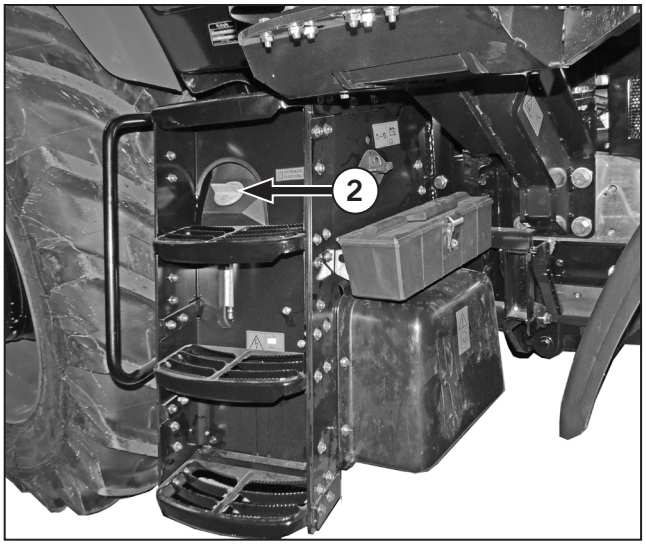
***NOTE: Before refilling the system, perform "Change Hydraulic Filters (Steering, Charge and Return)" on page 5-71. Specified oil is Shell Spirax S4 TXM™ or equivalent.***

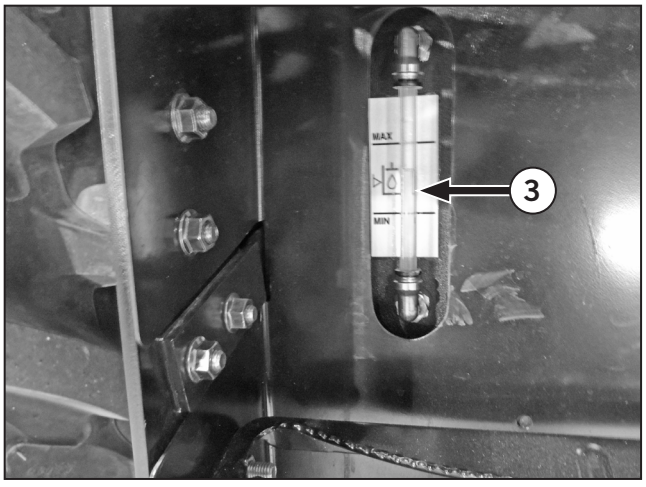
***NOTE: Refer to specifications in Section 7 of this manual.***

7. Remove the hydraulic oil filler cap (2) and add fresh transmision oil until the oil level is between the marks in the sight glass (3).
8. Wait 5 minutes before starting the engine to allow air to escape from the oil and the fluid level to stabilize.
9. Start the engine and run at 1 200 rpm for 2 minutes.
10. Raise the 3-pt hitch to fully extend the cylinders.
11. Check the oil level and top up as necessary.
12. Clean up any spills.

***NOTE: Dispose of oil or contaminated materials in accordance with local environmental regulations.***



## Every 500 Hours

After every 500 hours of operation, complete the following maintenance procedures. This is in addition to the maintenance performed every 10 (daily), 50, 100 and 250 hours.

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.

- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

### Check Batteries

Follow the Battery Safety Guide and Battery Disconnect Procedure below before performing the following:

- Checking battery connections.
- Checking battery electrolyte level.
- Checking alternator power cables.

***NOTE: Before disconnecting batteries, record the tire size from the Tire Size Adjustment calibration screen on the EIC. After disconnecting batteries, check the tractor configuration as it appears on the EIC (wheel speed, lighting, etc.).***

### Battery Safety Guide

**DANGER**

- Wear personal protective equipment. Batteries are full of corrosive acid.
- Always wear safety glasses to protect eyes and protective clothing when working with batteries.

- Flush the affected area with water for 5 minutes and seek immediate medical attention in case of contact with skin.

Batteries generate corrosive gas.

- Do not smoke or expose the battery to open flame. Batteries generate hydrogen gas, which is highly flammable. The gas may explode, causing a spray of battery acid and fragments which can cause severe personal injury if ignited by a spark or flame.

- Do not open sealed valve regulated batteries (AGM or Gel types).
- Always cover vents with a damp cloth to minimize gas seepage.
- Never lean over battery while testing, boosting or charging.
- Do not remove or damage vent caps.

**NOTICE**

Battery connections must be clean and tight for the electrical system to work properly.

## Battery Disconnect Procedure

**DANGER**

Follow this battery disconnect procedure before servicing batteries or electrical parts to avoid sparks or explosions:

1. Turn the battery shut-off switch to OFF and lockout the switch.
2. Always disconnect the negative (-) black cables before the positive (+) red cables.
3. Always connect the positive (+) red cables before the negative (-) black cables.

---

**CAUTION**

Do not contact the positive and negative terminals at the same time with a metal tool. This will cause an arc.

---

## Check Battery Connections

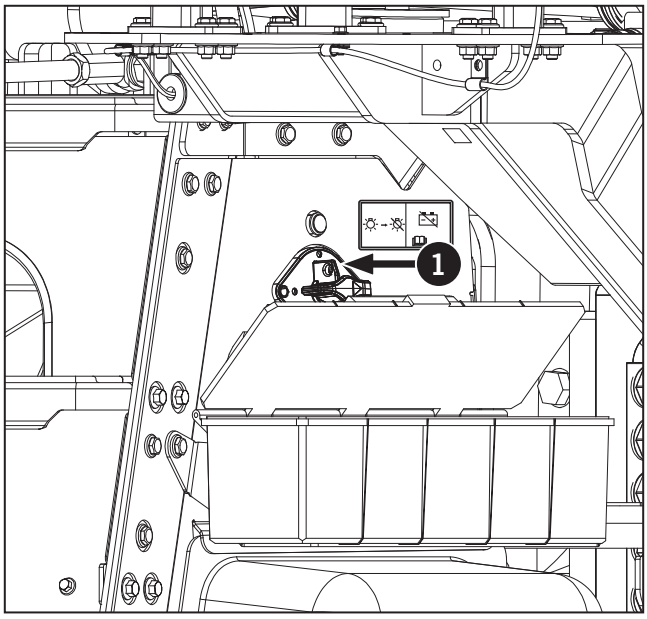
**DANGER**

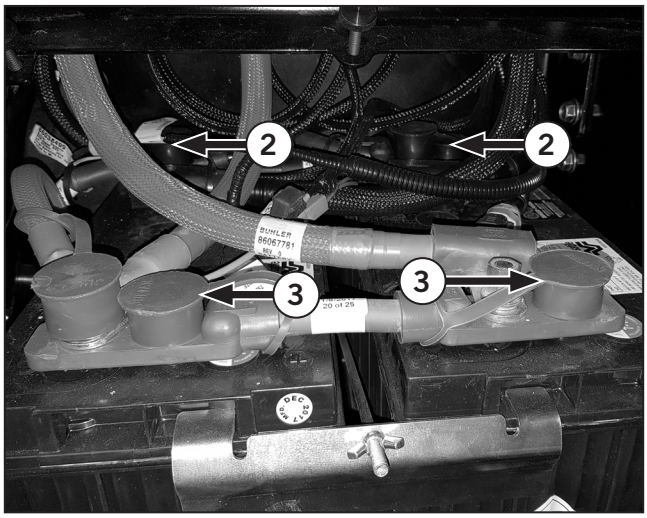
- Wear safety glasses and protective clothing for this task. Keep battery away from sparks or flames.
- Do not try to open sealed no-maintenance batteries.
- Cover vents with a damp cloth to minimize gas seepage (flooded types).
- Never lean over battery while testing, boosting or charging.

Keep battery connections clean and tight for proper operation of the electrical system. Remove debris and clean the area, then inspect as follows:

1. Shut off the main power disconnect switch (1) and remove the battery cover.
2. Remove the black rubber boot protecting the negative (-) battery terminals. Disconnect the negative (-) battery ground cable connections (2).
3. Remove the red rubber boot protecting the positive (+) battery terminals. Disconnect the positive (+) cable connections (3).
4. Use a wire brush to thoroughly clean the battery studs, battery cables and mounting nuts.
5. Reconnect the cables. Make sure to connect the positive cables first and then the negative cables.
6. Replace worn or damaged parts.

***NOTE: Tighten the battery connections to 20 N·m (15 ft·lb) maximum. Do not overtighten. Contact a KUBOTA dealer for parts and service information.***



## Inspect the Electrical Cables at the Starter

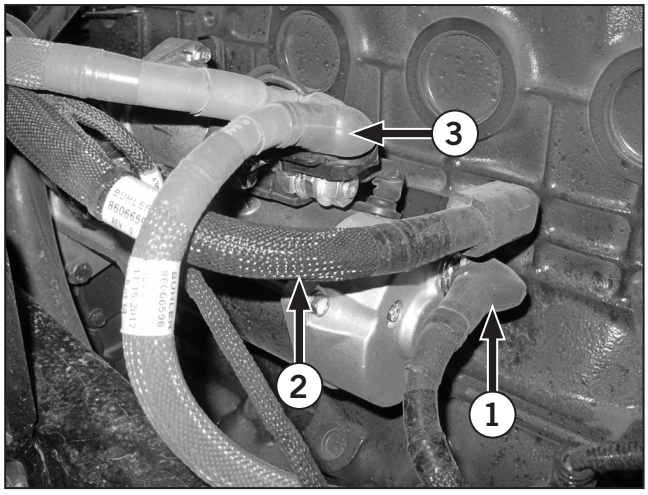
**DANGER**

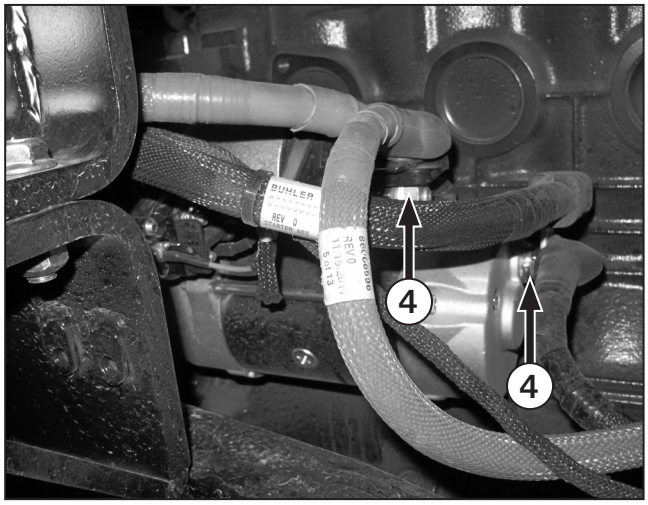
Disconnect the cables at the battery before inspecting or working on the cables at the starter.

***IMPORTANT:****To reduce the risk of sparks and battery explosion:*

***IMPORTANT:****Always connect the positive cables first and then the negative cables.*

1. Disconnect the cables at the battery.
2. Open the hood. The starter is located on the right hand side of the engine.
3. Use compressed air at less than 690 kPa (100 psi) to clean the starter and adjacent areas.
4. Check the starter ground cable (1) to make sure the cable and connection are clean and tight.
5. Check the starter power cable (2) to ensure the cable and connection are clean and tight.
6. Check the connections to the starter solenoid (3).
7. Remove the cables and clean the terminal posts (4) with a wire brush if the connections are dirty or corroded. Replace any damaged connector terminations and rubber covers.
8. Reconnect the components and tighten carefully to 17.5 to 24.5 N·m (13 to 18 ft lb).



## Change the Engine Oil and Filter

**NOTICE**

Use CJ4 low ash oil to prevent damage to the DPF over time. The DPF's cannot regenerate ash because it does not oxidize.

**NOTICE**

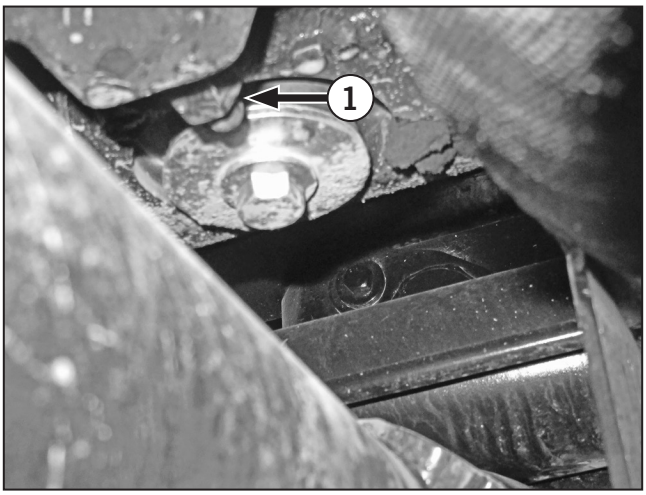
Do not over-tighten the filter. Install the new filter and tighten the filter by hand until the gasket just contacts the filter head surface. Use a strap wrench to tighten the filter an additional one-half turn.

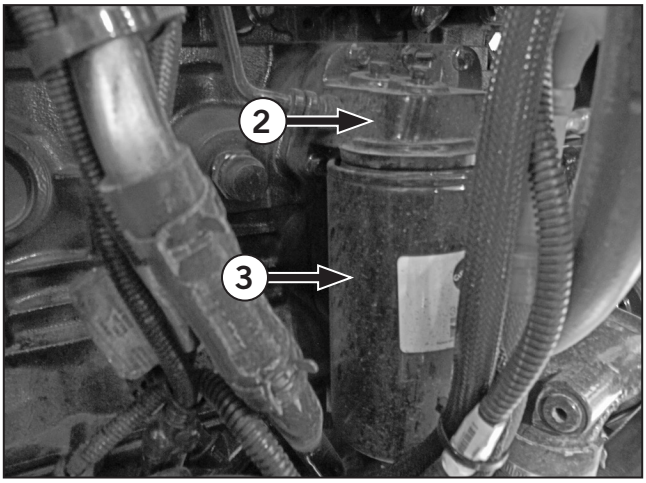
**NOTICE**

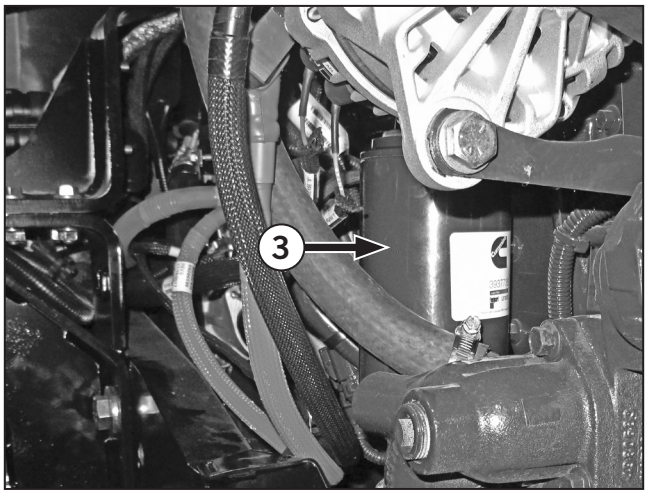
Do not overfill. If necessary, drain oil to adjust to the proper level.

***NOTE: Discard used engine oil and filter according to local laws and regulations.***

1. Park the tractor on a level surface and apply the parking brake.
2. Operate the engine until the coolant temperature reaches at least 82°C (180°F) then shut the engine off.
3. Remove the drain plug (1) from the engine oil pan and allow the oil to drain completely into an appropriate container with a capacity of at least 25 L (6.60 gal).
4. Clean the area around the oil filter head (2). Rotate the oil filter (3) counterclockwise to remove and discard the used filter in accordance with local regulations.
5. Clean the sealing surface of the filter head. Make sure the O-ring from the old filter did not stick to the filter head.
6. Lubricate the inner O-ring on the new filter with clean engine oil prior to installation.

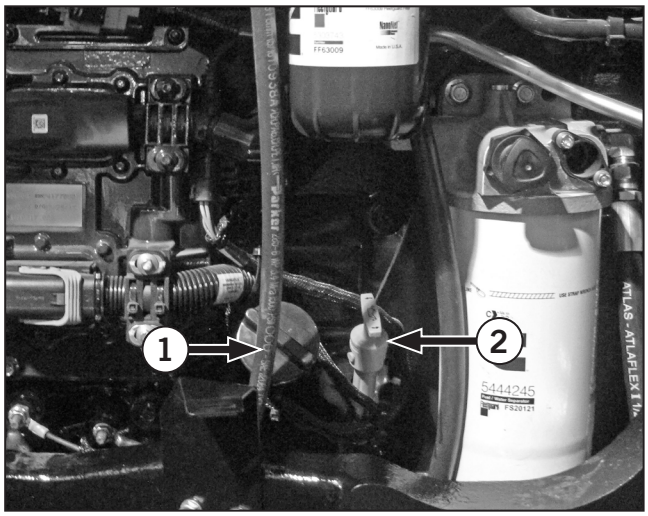


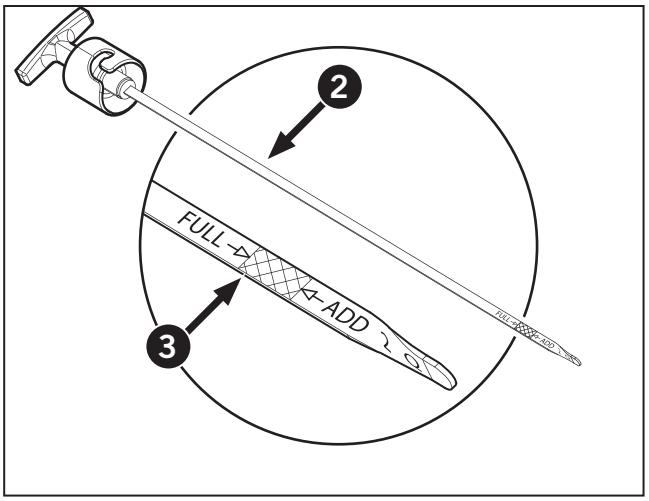



7. Clean and check the oil drain plug threads and the sealing surfaces. Reinstall and tighten the oil drain plug to 80 N·m (59 ft·lb). Do not over tighten.
8. Clean the area around the fill port (1) and the dipstick (2). Add oil until it reaches the FULL mark (3) on the dipstick. Use the dipstick to check for the proper level of oil before the engine is started. Oil change capacity of the oil pan and filter is approximately 23 L (6.1 gal).
9. Start the engine and run at idle speed. Inspect for leaks at the filter and drain plug.
10. Shut off the engine. Wait at least 15 minutes to allow the oil to drain down from the upper engine. Check the oil level and adjust to the FULL mark on the dipstick.

***NOTE: The maximum engine oil capacity is 25.6 L (6.76 gal).***



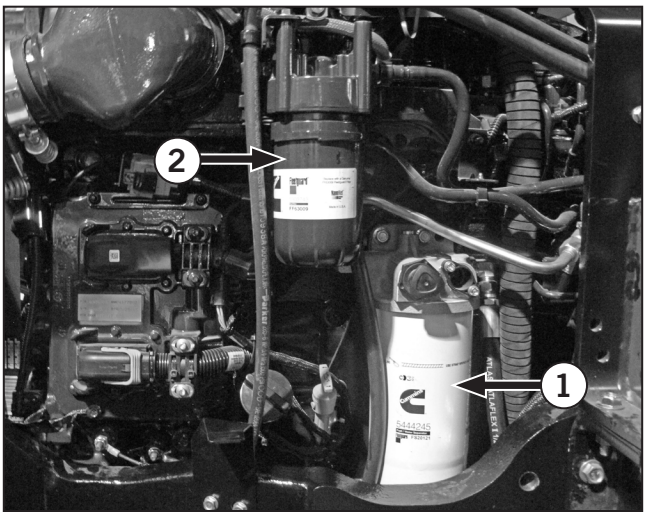
## Replace the Fuel Filters

**WARNING**

Never try to open fuel system components or connections with the engine running. High pressure fuel spray can cause serious injury or death.

Diesel fuel is a flammable and hazardous material. Use appropriate safe handling precautions.

The Cummins fuel system uses 2 filters. The first or primary filter is a combined filter and fuel/water separator (1) located at the rear of the left hand side of the engine. The secondary filter (2) is the particulate filter.



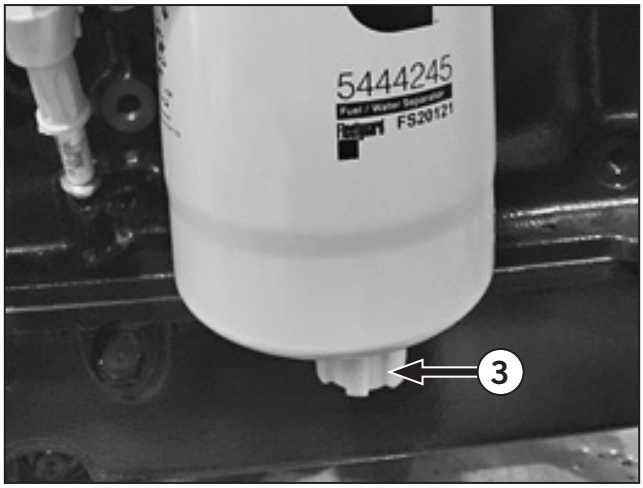

**CAUTION**

Wear eye protection and gloves when handling fuel. Observe the safety precautions for flammable liquids.

***NOTE: Use only the manufacturer's recommended replacement filters.***

Park the tractor on level ground, shut the engine off and apply the parking brake. Use a suitable container and cloths to control and absorb spills.

1. Clean the area around the fuel filters and connections.
2. Disconnect the sensor connector (3) from the fuel/water separator.
3. Rotate the filter counterclockwise with a filter wrench to loosen, then remove the filter by hand. Use a container to collect fuel that may spill.
4. Replace the primary filter first. Make sure the seal is in place and lubricated and add approximately 1 IL (0.26 qt) of clean fuel to the filter before installation.
5. Tighten the new fuel filter by hand, then use a filter wrench to tighten an additional 1/4 turn.




6. Reconnect the sensor connection.
7. Use a similar procedure to replace the secondary filter.

***IMPORTANT:****Do not add fuel to the secondary fuel filter (2) before installing.*

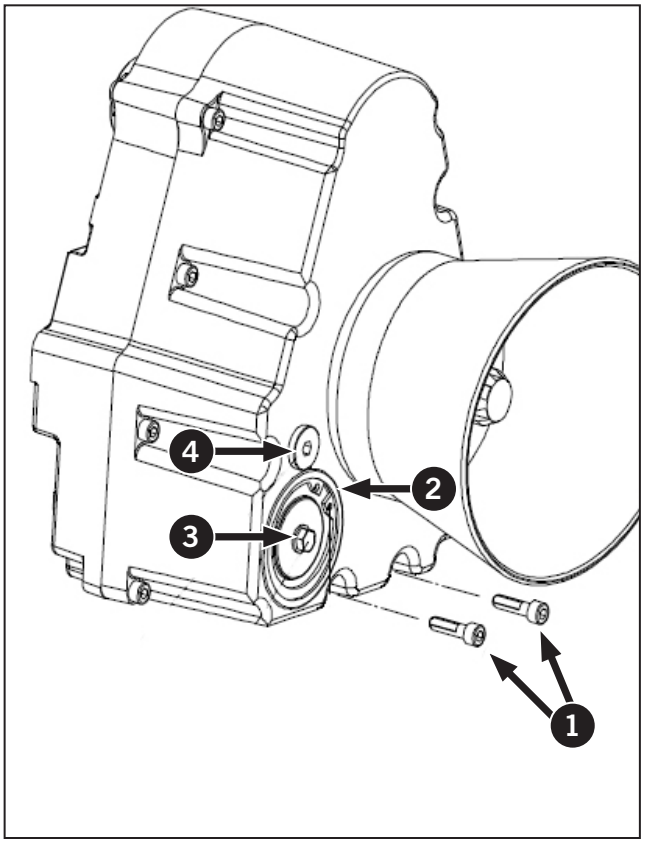
***NOTE: Always lubricate the rubber seals on filters unless otherwise noted. Rotate filters by hand counterclockwise to install until the O-ring contacts the filter head sealing face, then use a filter wrench to tighten another 1/4 turn.***

## Front PTO Oil Change and Filter Clean

***NOTE: Clean the filter area before proceeding. Keep hydraulic components and systems free of contamination.***

1. Drain the oil from the gear box. The draining plugs (1) are on the underside of the gear box.
2. Remove the snap ring (2) from the pump unit and loosen the M8 bolt (3) to remove the cover.
3. Take the oil filter from the pump unit and clean it with an air compressor.
4. Replace the oil filter, the lid and snap ring and fill the gear box to the filling plug (4) with oil.

***NOTE: Contact a KUBOTA dealer for service advice or materials.***

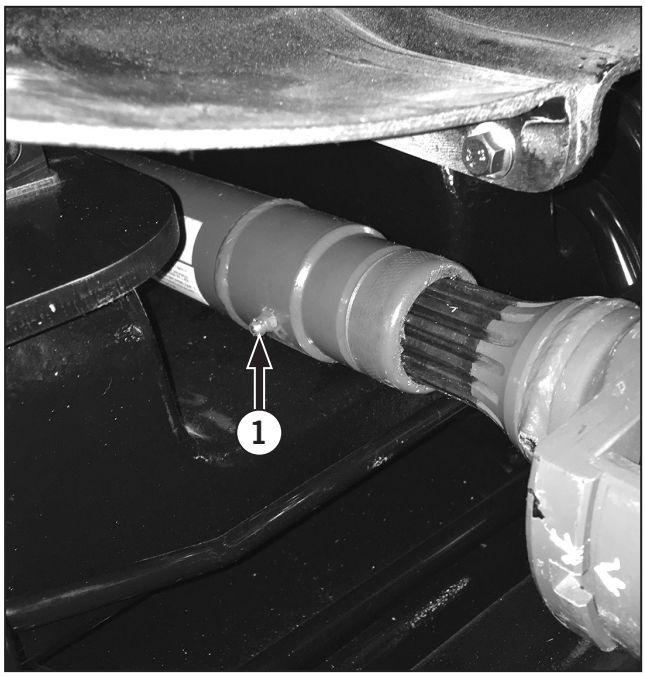


### Check the PTO Gearbox Mounting Bolts

Check the security of all PTO and 3PT hitch mounting all bolts.

### Lubricate the PTO Drive Shaft

Lubricate the the PTO drive shaft lubrication fitting (1) with high temperature EP grease.



## Every 1 000 Hours or 1 Year

After every 1 000 hours or 1 year of operation, complete the following maintenance procedures. This is in addition to the maintenance performed every 10 (daily), 50, 250 and 500 hours.

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.

- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

***IMPORTANT:****The maintenance procedures in this category must be performed once a year even if the tractor was used less than 1 000 hours during the year. These maintenance procedures must be performed at the 1 000-hour service interval if the tractor is used more than 1 000 hours a year.*

### Check the Accessory Drive Belt and Tensioner

Remove the engine compartment safety shields to access the engine accessory drive belt.

Inspect the drive belt for cracks or wear. Replace the belt if there is any indication of damage or wear.

Check the automatic tensioner for wear or looseness. Consult with a KUBOTA dealer if there are concerns about the belt tensioner.

Refer to the Cummins engine manual or a KUBOTA dealer for details.

## Replace the Cab Air Filter

**WARNING**

Wear a suitable mask to service or replace the air filters. Do not breath in the dust.

Always wear appropriate eye and face protection when using compressed air. Flying dirt and debris can cause serious personal injury.

**WARNING**

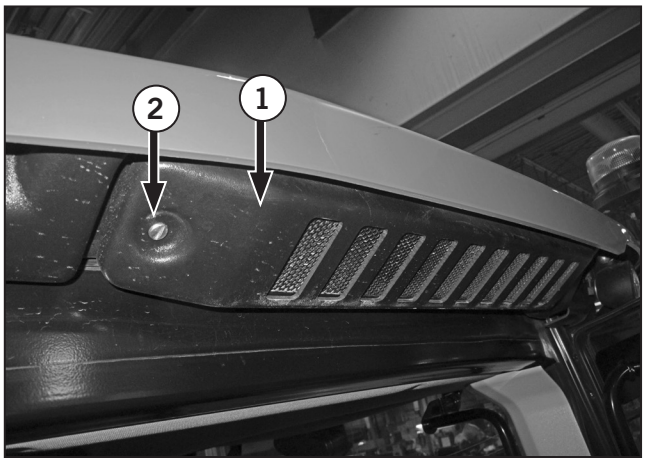
The cab air filter is designed to remove dust and particulate from the air that is used for ventilation.

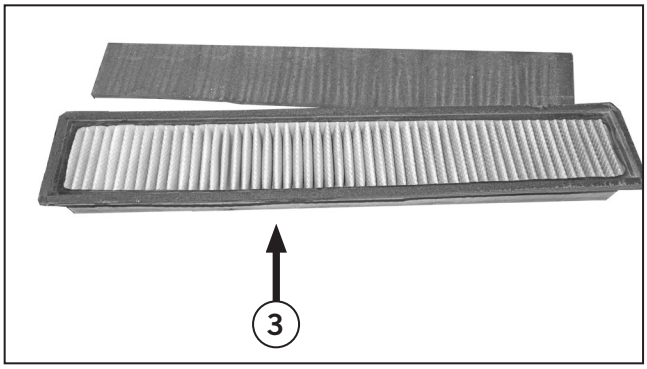
The filter does not provide protection from chemical vapor and is not a safe barrier from pesticides.

Always follow the chemical manufacturers safety instructions for use of their products.

The tractor cab is equipped with a single air filter cartridge installed in the cab frame above the left side door.

1. With the cab door closed, hold the cover panel (1) closed and remove the screw (2).
2. Lower the cover panel and swing the panel back.
3. Carefully pull the filter (3) forward to release the filter from the filter housing.
4. Clean the filter housing and ducting with a cloth to remove dust that may have collected. Do not use shop air to clean these components.
5. Use soap and water solution to clean and lubricate the seal.
6. Push the new filter and foam pre-filter onto the filter housing and reinstall the cover.
7. Dispose of the used cab air filter.

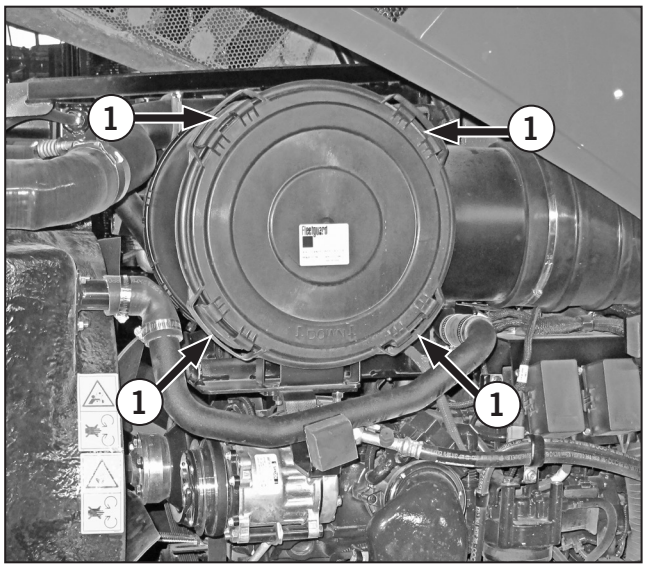


## Replace the Engine Air Filter

The engine air cleaner consists of 1 primary and 1 secondary filters located at the top of the engine. To change the engine air filters:

1. Park the tractor on a level surface, shut off the engine and apply the parking brake.
2. Open the hood and find the engine air filter. Use a suitable step ladder to access the filter.
3. Release the four snap latches (1) and pull the air filter cover away from the housing.



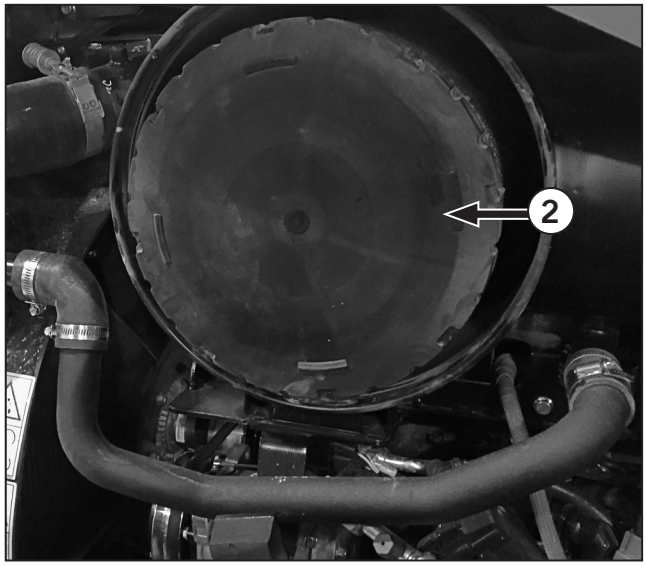

4. Clean the inside of the filter housing before the safety filter element is removed.
5. Pull the primary filter (2) from the housing.
6. Pull the safety filter (3) from the housing.

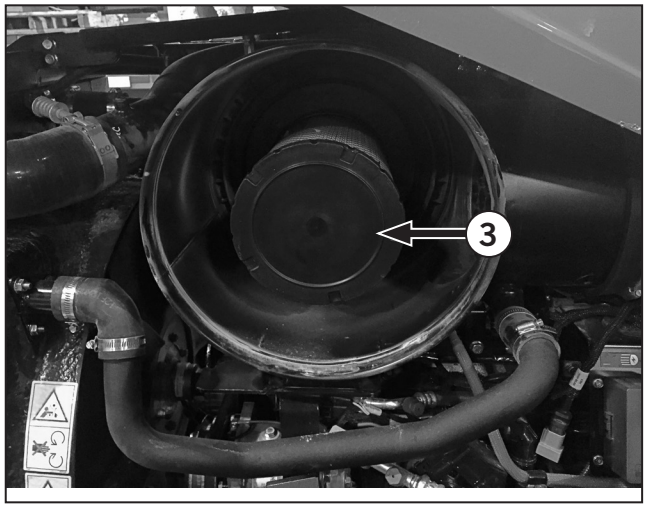
***IMPORTANT:****Do not allow dirt or dust from the filters to contaminate the intake plenum. Use a clean cloth and soap solution to clean the inside of the filter housing before removing the safety filter element.*

7. Install the new safety filter. Carefully press the filter into place by pushing on the plastic edge of filter.

***IMPORTANT:****Do not press on the paper filter element.*

8. Install the new primary filter elements.
9. When the filter elements are in place, reinstall the cover on the filter housing and fasten the snaps.



## Inspect the Turbocharger Connections

**DANGER**

- Keep hands and clothing away from moving parts.
- Do not wear loose clothing.
- Do not touch hot parts.
- Wear appropriate eye and face protection.

1. Turbocharger maintenance affects the engine warranty. Refer to the Cummins Engine Manual or contact a KUBOTA dealer for details.
2. Inspect the air inlet and outlet connections for the turbocharger for cracks. Check flexible hoses for damage, cracking, abrasion or soft spots.
3. Check clamps (1) for damage and make sure the clamps are properly tightened.

| Table 5-20: Clamp Torque Specifications | |
|---|---|
| Hose clamp | 5 N·m (44 in-lb) |
| Tee bolt (T-bar) clamp (Charge Air System) | 8 N·m (71 in-lb) |
| Exhaust outlet pipe, V-band clamp | 8 N·m (71 in-lb) |

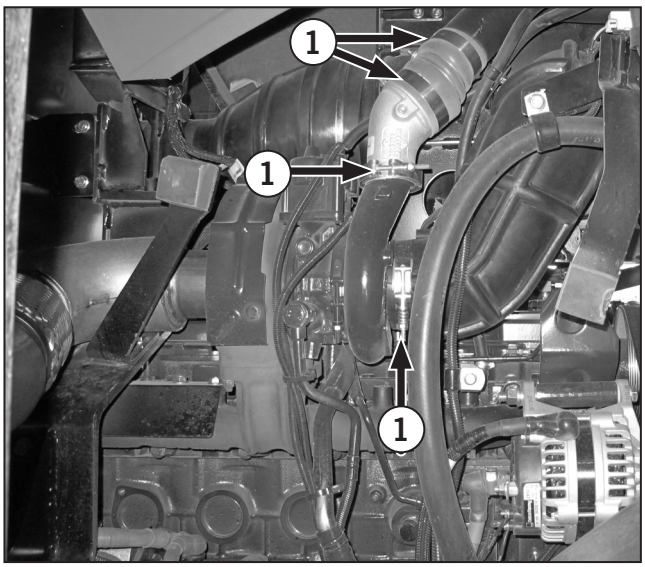
4. Check the charge air components from the charge air cooler (2) to the intake charger and from the charge air cooler to the engine intake manifold (3).
5. Leaks in the turbocharger system can sometimes be detected by visual inspection or by a whistling sound in the area of a connection.

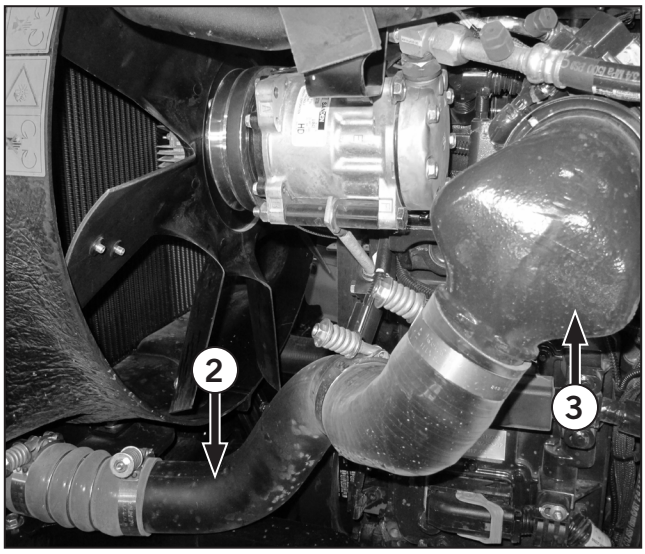
Visual Leak Test

With the aid of a second person to operate the engine:

6. Start and run the tractor engine with the parking brake applied and the tractor in neutral.
7. Have the operator adjust the engine speed from idle to 1 700 rpm and listen for air leaks. Use a spray bottle with soap-and-water solution to wet the area around hoses and pipe fittings and watch for bubbles which indicate air leaks. Note the location of air leaks and shut the engine off.

Contact a KUBOTA dealer for service and parts advice.



## Check the Radiator and Heating System Hoses and Connections

**WARNING**

- Never open the radiator or cooling system when the engine is hot.
- Observe all safety and environmental precautions with regard to engine antifreeze handling and spills. Engine antifreeze is an environmental hazard and there is no acceptable level of leakage or loss.

1. Inspect radiators and all fittings and attachment points for cracks, leakage or other signs of damage.
2. Inspect hoses for cracks and wear. Check for soft spots which indicate internal failure. Inspect the clamps and fittings for corrosion and damage; make sure the clamps are properly tightened.
3. Replace components that show any indication of damage or deterioration.

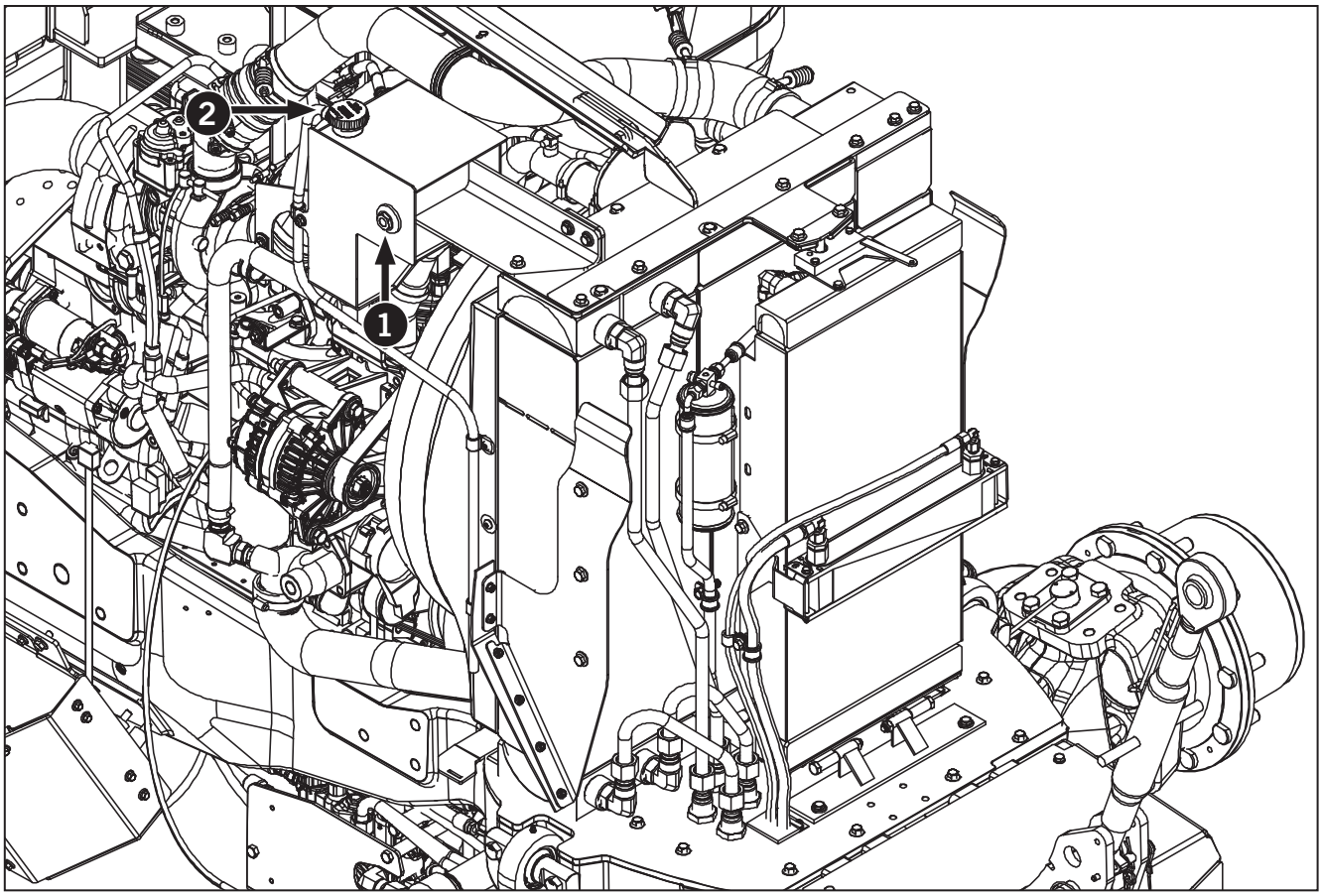
Contact a KUBOTA dealer if there is any doubt about the condition of hoses, clamps or radiators.

4. Tighten cooling system hose clamps to 5 N·m (44 in-lb).
5. Check the level at the cooling system surge tank (1). Use the filler neck (2) when replacing coolant.
6. Run the engine until operating temperature is reached and then recheck the coolant levels at the surge tank (1).

Recommended coolant is ASTM4985 specification such as Fleetguard™.

Fully formulated coolant must meet ASTM D-6210/D-6211 specification.

Contact a KUBOTA dealer for service advice.



## Every 1 000 Hours

Perform these maintenance procedures after every 1 000 hours of operation, in addition to the regular service at 10, 50, 250 and 500 hours.

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.

- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

**WARNING**

Avoid contact with hot oil. Allow the oil to cool to a safe temperature before proceeding.

## Change Hydraulic Filters (Steering, Charge and Return)

**WARNING**

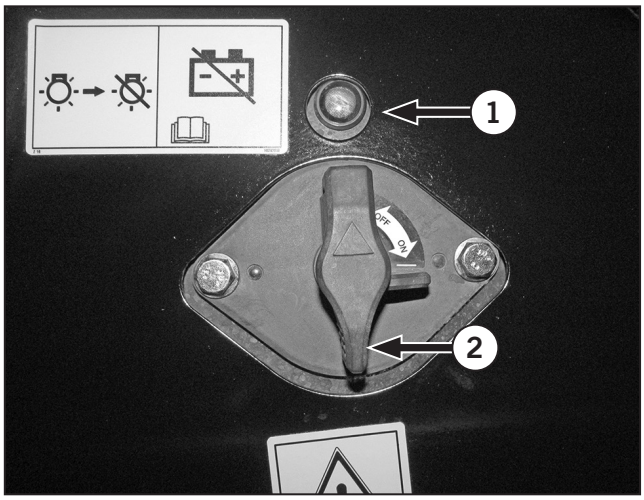
Never under any circumstances try to disconnect a fitting or open the hydraulic system with the engine running. High pressure oil spray can cause serious injury or death.

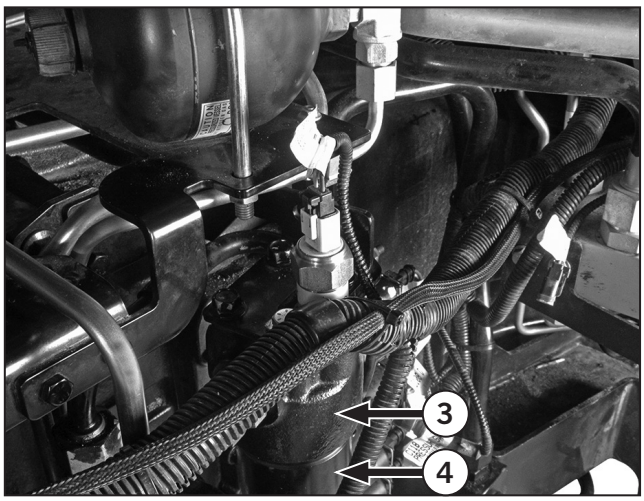
Never start the engine when a hydraulic component is disconnected.

## Change Steering Hydraulic Filter

### Removal

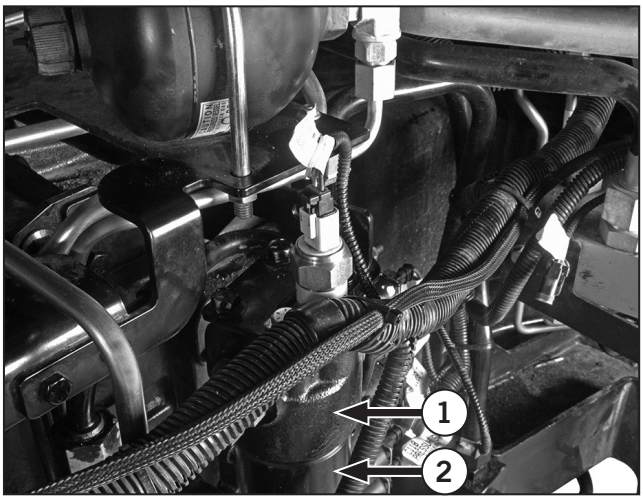
1. Always engage the parking brake fully, place the transmission in neutral, shut the engine off, wait for the power on indicator light (1) to turn off.
2. Turn the battery shut-off switch (2) to OFF and block the wheels before performing any maintenance operations.
3. Switch off the hydraulic system and release filter pressure.
4. Unscrew the filter head (3), drain the fluid into a suitable contrainer and clean or dispose in accordance with environment regulations.
5. Remove the filter (4). Check the surface of element for contamination residue and larger particles. These can indicate damage to components.
6. Replace the filter.
7. Clean the filter bowl and filter head. Pay attention to the threads.
8. Examine the filter especially the sealing surfaces for mechanical damage.
9. Check o-rings and replace if necessary.



### Installing

1. Wet the sealing surfaces and thread on the filter head (1) and the o-ring with clean operating fluid.
2. Place the filter element (2) on the filter head.
3. Apply silver grade anti-seize (per Mil-PRF 907E) to the threads.
4. Tighten the filter head and then unscrew by one-quarter turn.
5. Switch the hydraulic system on and vent filter at a suitable point in the system.
6. Check for leakage.



## Change Hydraulic Oil Return Filter

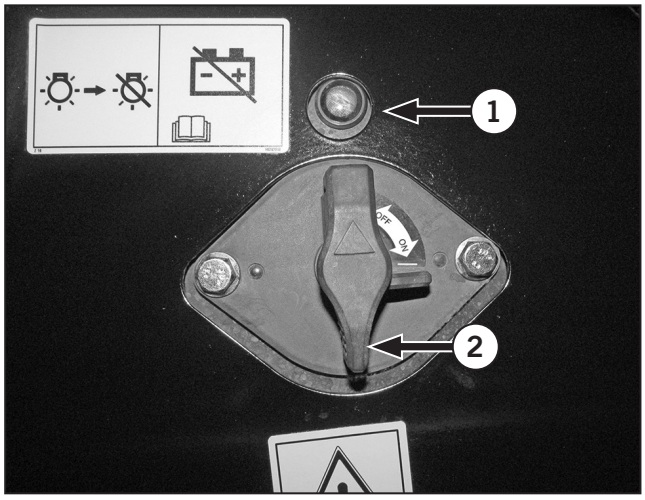
**WARNING**

Escaping fluids under high pressure can penetrate skin and cause serious and life-threatening injury.

Relieve hydraulic pressure before opening any component. Wear gloves and eye protection when carrying out hydraulic tests.

Never use your hands to check for fluid leaks. Use a piece of cardboard or paper to search for a suspected leak.

1. Always engage the parking brake fully, place the transmission in neutral, shut the engine off, wait for the power on indicator light (1) to turn off.
2. Turn the battery shut-off switch (2) to OFF and block the wheels before performing any maintenance operations.
3. Place an oil pan under the tractor to catch any hydraulic fluid that may drain.




4. Spin off the canister (3).
5. Lube the o-ring on the filter. Fill the filter with oil and install the filter.
6. Start the tractor and check for hydraulic oil leaks.
7. Check the hydraulic oil level on the sight glass and add hydraulic oil if needed.

## Change Hydraulic Charge Filter

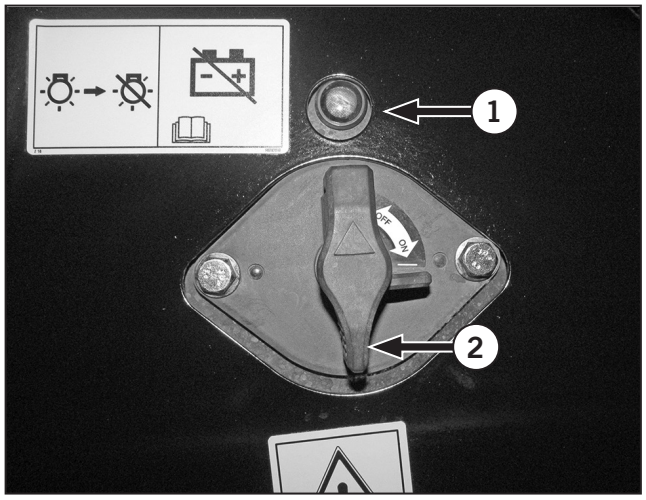
**WARNING**

Escaping fluids under high pressure can penetrate skin and cause serious and life-threatening injury.

Relieve hydraulic pressure before opening any component. Wear gloves and eye protection when carrying out hydraulic tests.

Never use your hands to check for fluid leaks. Use a piece of cardboard or paper to search for a suspected leak.

1. Always engage the parking brake fully, place the transmission in neutral, shut the engine off, wait for the power on indicator light (1) to turn off.
2. Turn the battery shut-off switch (2) to OFF and block the wheels before performing any maintenance operations.
3. Place an oil pan under the tractor to catch any hydraulic fluid that may drain.

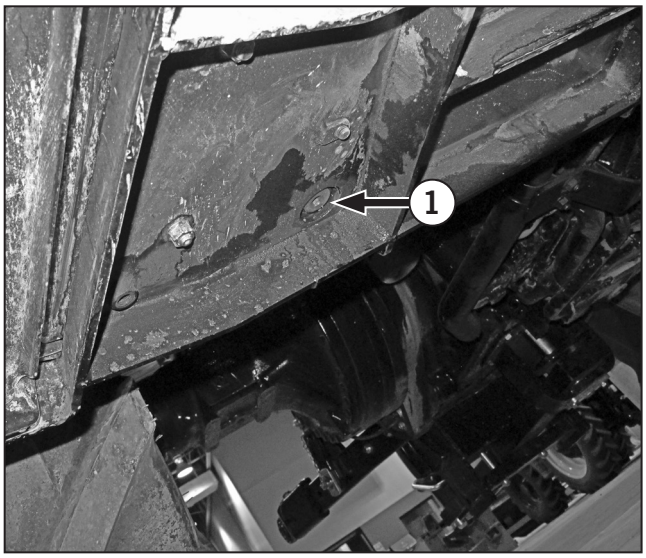



4. Spin off the canister (3).
5. Lube the o-ring on the filter. Fill the filter with oil and install the filter.
6. Start the tractor and check for hydraulic oil leaks.
7. Check the hydraulic oil level on the sight glass and add hydraulic oil if needed.

## Change the Hydraulic Oil

***NOTE: Dispose of used oil in accordance with local environmental regulations.***

1. Disconnect any attached equipment.
2. Operate the tractor to warm up the hydraulic system.
   - Lift the 3-pt hitch to the fully raised position, then lower it fully.
   - Cycle the remote hydraulic valves.
3. Park the tractor on a level surface, shut the engine off and apply the parking brake.
4. Clean the area around the drain plug (1) and the fill cap (2).
5. Place a container that will hold 140 L (37 gal) below the drain remove the drain plug.




***NOTE: Expect oil retention in the system. Up to 20 L (5.25 gal) may remain in passages and filters.***

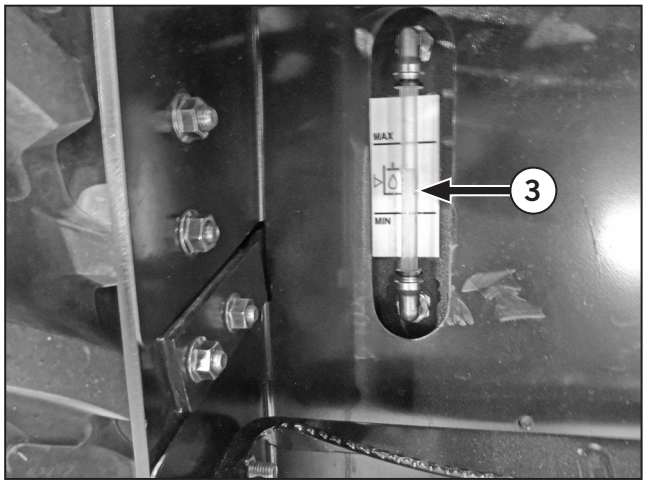
6. Replace the drain plug when the hydraulic fluid stops draining. Tighten plug.

***NOTE: Before refilling the system, perform "Change the Hydraulic Oil Filters" on page 5-91. Specified oil is Shell Spirax S4 TXM™ or equivalent.***

***NOTE: Refer to specifications in Section 7 of this manual.***

7. Remove the hydraulic oil filler cap (2) and add fresh transmision oil until the oil level is between the marks in the sight glass (3).
8. Wait 5 minutes before starting the engine to allow air to escape from the oil and the fluid level to stabilize.
9. Start the engine and run at 1 200 rpm for 2 minutes
10. Raise the 3-pt hitch to fully extend the cylinders.
11. Check the oil level and top up as necessary.
12. Clean up any spills.

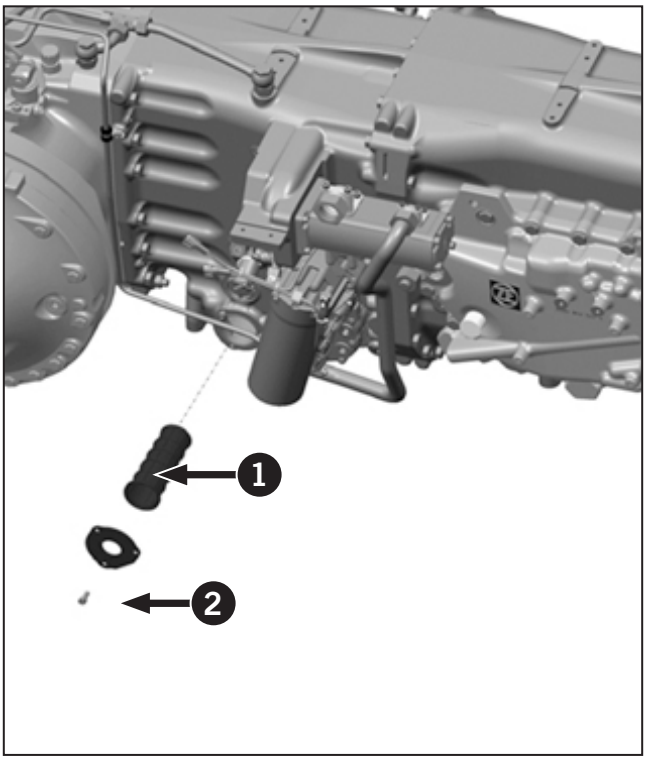

***NOTE: Dispose of oil or contaminated materials in accordance with local environmental regulations.***



## Clean Suction Filter

1. Place vessel under the filter (1).
2. Loosen the hexagon screws (2).
3. Clean the filter.
4. Re-assemble in reverse order.

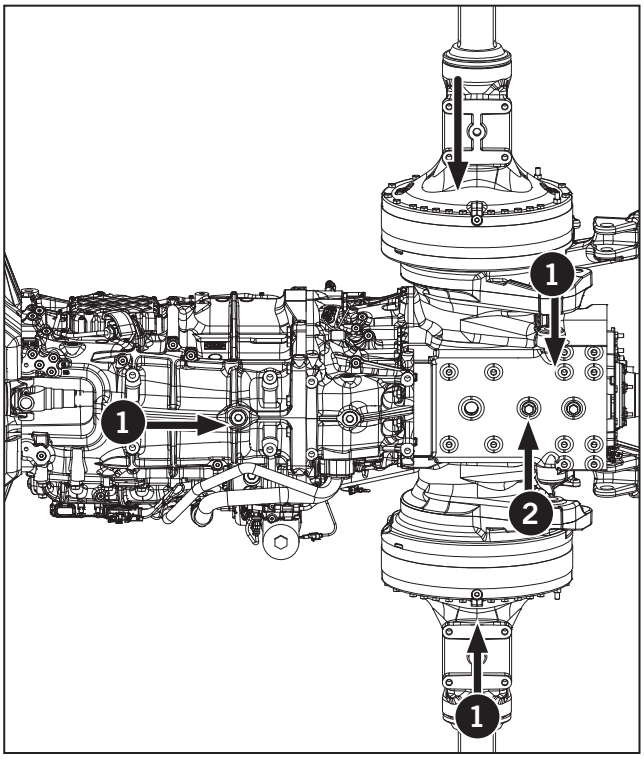
***NOTE: The suction filter (screen insert) must be cleaned at every oil change and checked whether it is in a perfect condition.***

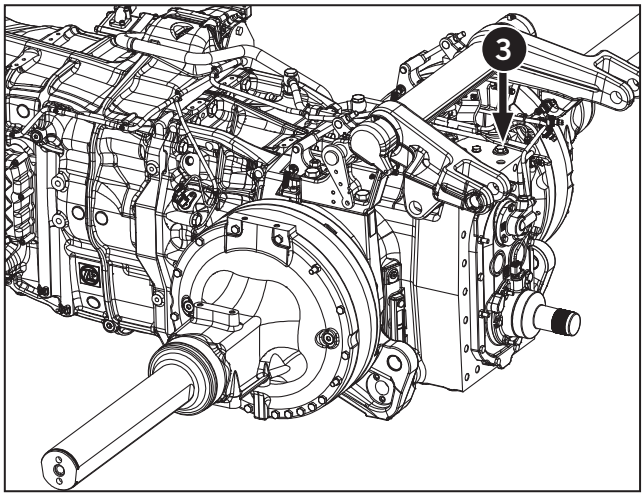


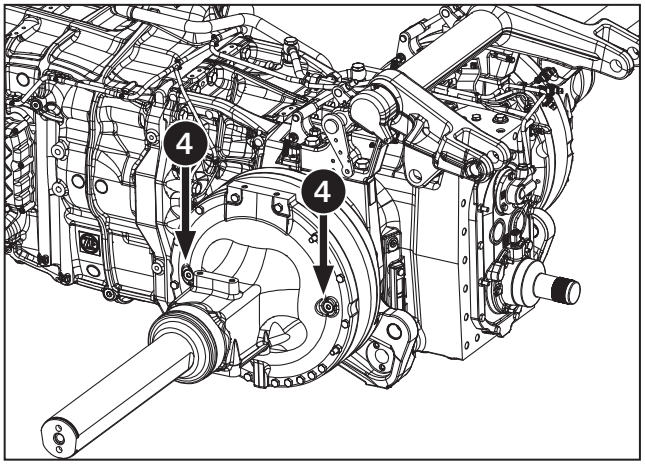
## Change and Fill Oil for Transmission and Rear Axle Final Drives

***NOTE: Drain oil only at operating temperature***

1. Oil drain plugs are located at the bottom side of the transmission.
2. Loosen the oil plugs (1) to drain oil from the transmission and rear axle.
3. Loosen the oil drain plugs (2) located at the bottom of rear final drives, right and left sides to drain oil from the rear final drives.
4. Once all oil has been drained, reinstall all oil drain plugs with new seal rings and tighten.
5. Remove transmission/rear differential fill cap (3).
6. Fill with 72 L (19 gal) of oil. Oil level is near the upper marking at the oil sight glass.
7. Remove rear final drive plugs (4) from the right and left sides.
8. Fill final drive till oil is at the bottom of the tank fill plug holes. Approximately 11 L (2.9 gal).
9. Re-install rear final drives with new seal rings and tighten.



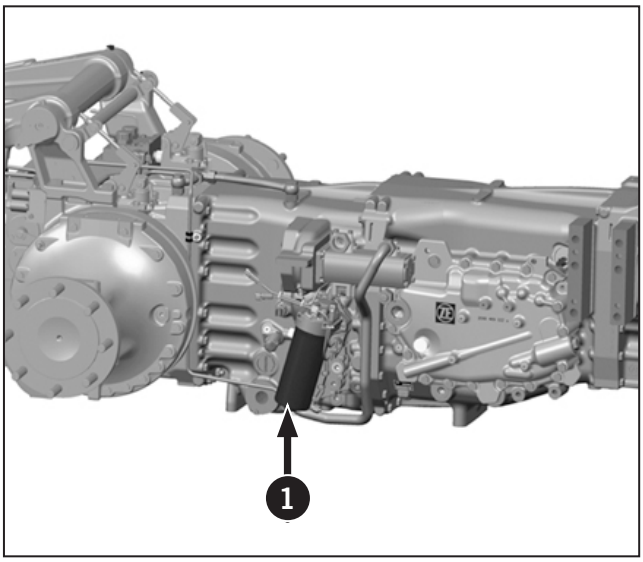



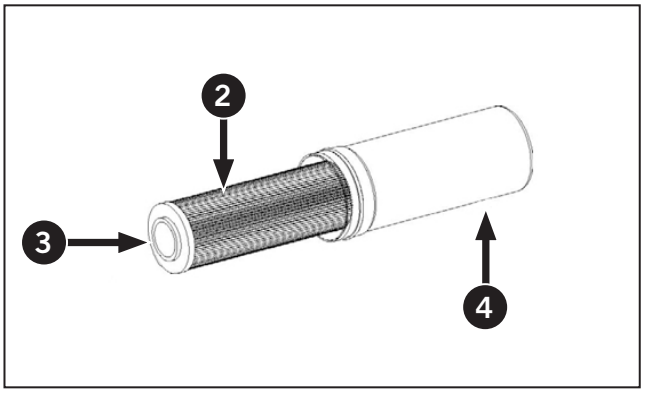



## Change Transmission Oil Filter

***NOTE: Drain oil only at operating temperature.***

1. Unscrew housing on the filter housing (1).
2. Change filter element (2).
3. Replace O-ring (3) and place into the groove of the filter housing and insert in the filter.
4. Refit pressure filter (4) with filter element into the housing until contact. Torque to 50 N·m (37 ft·lb).



## Change Diesel Exhaust Fluid (DEF) In-Tank Filter

**WARNING**

To avoid structural damage and personal injury, do not remove the ladder or any feature supporting the ladder without first emptying the fuel tanks.

**CAUTION**

Wear gloves and eye protection when adding diesel exhaust fluid (DEF). DEF is not harmful to handle but will corrode certain metals.

- In case of eye contact: Remove contact lenses. Immediately wash your eyes with a lot of water for least 15 minutes.
- In case of skin contact: First aid is normally not required. Immediately wash your skin with soap and water. Avoid prolonged contact with DEF.
- If swallowed: Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, contact a physician immediately.

The DEF tank filter (1) is located on the DEF tank sensor (2).

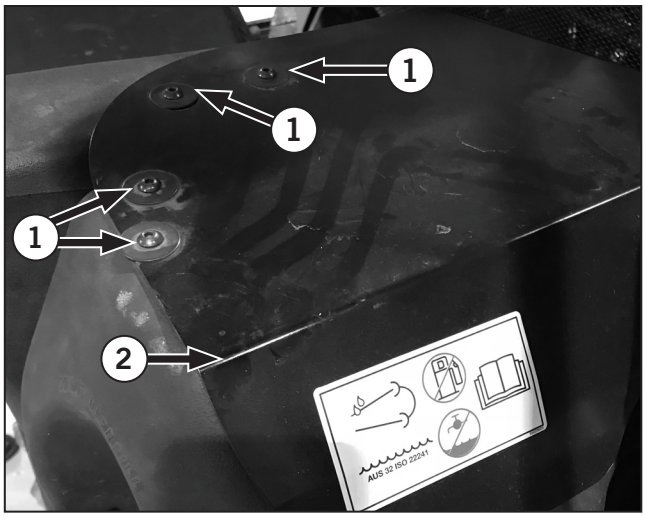
To change the DEF Doser Unit Filter or if you need to access the DEF Doser Unit for any other purpose, remove the cover on top of the Diesel Exhaust Fluid (DEF) tank.

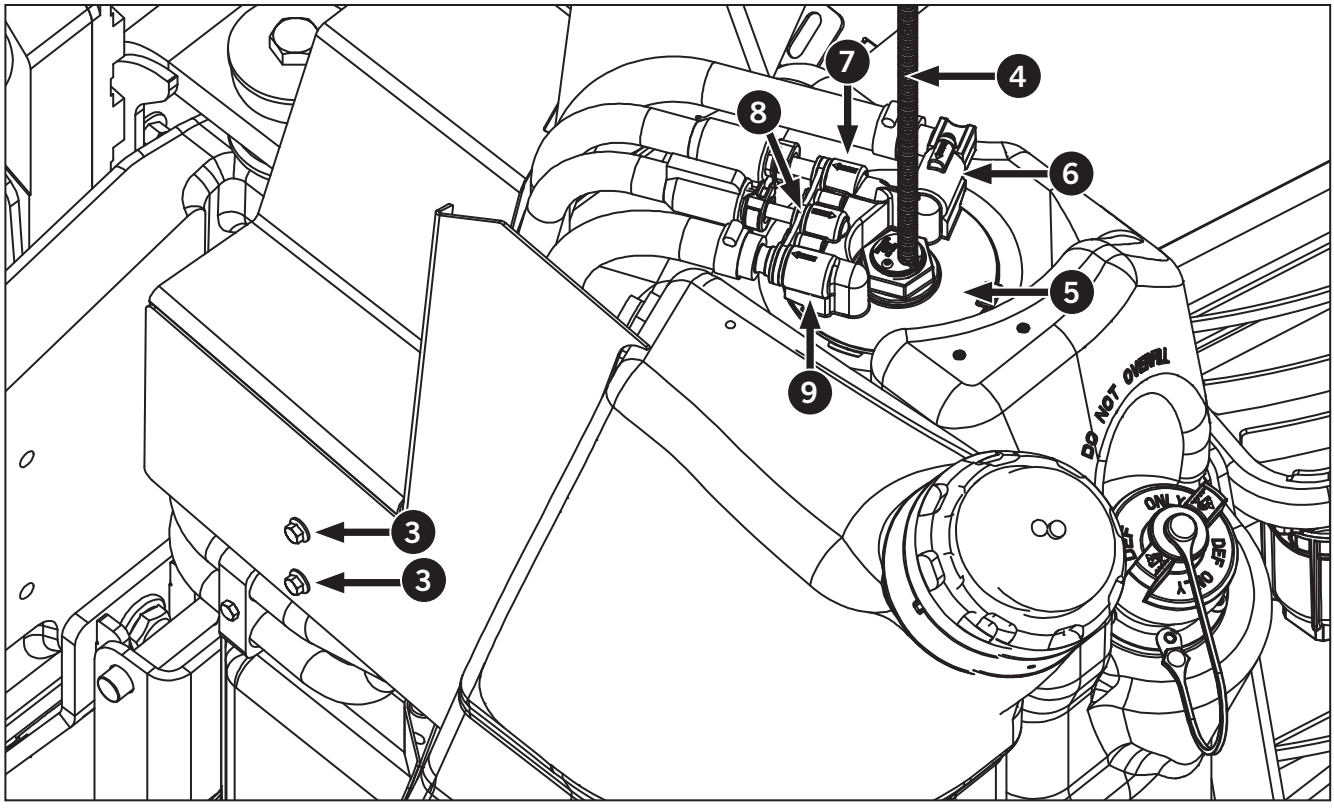
See “Step 2: Remove DEF Sensor and Change Filter” on page 5-101.

### Step 1: Remove the DEF Tank Cover and Hoses

***NOTE: Label all hoses and wires and mark there location before disconnecting them from the DEF tank.***

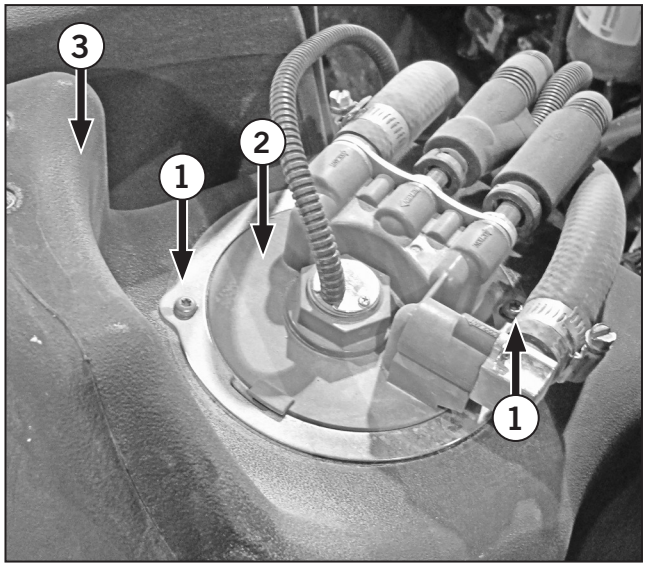
1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition, wait for the power on indicator to turn off and turn the battery disconnect switch to the OFF position.
2. Remove the 4 capscrews (1) on top of the diesel exhaust fluid (DEF) tank cover (2).
3. Remove the 2 bolts (3) on the side of the DEF tank cover
4. Remove the DEF tank cover from the tractor.
5. Disconnect the DEF harness electrical connector (4) from the DEF Sensor unit (5). Remove plastic ties if needed.
6. Tag and disconnect the coolant supply line (6) from heater valve, DEF supply line (7), DEF return line (8) from the DEF injector and coolant line (9) to DEF module/pump. Cap and plug all openings to prevent contamination and fluid loss.



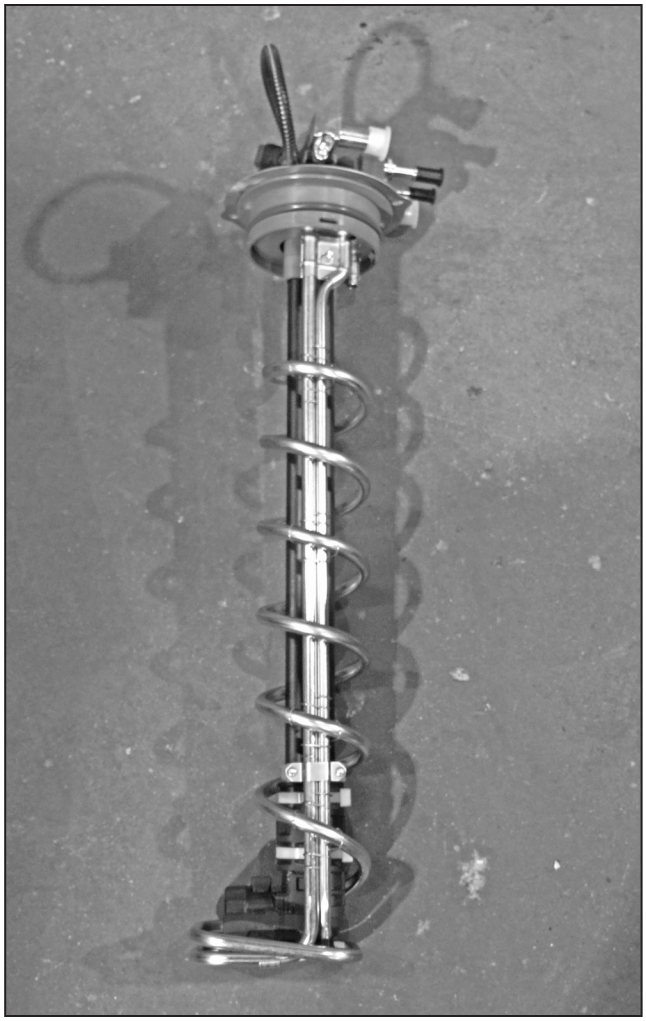



### Step 2: Remove DEF Sensor and Change Filter

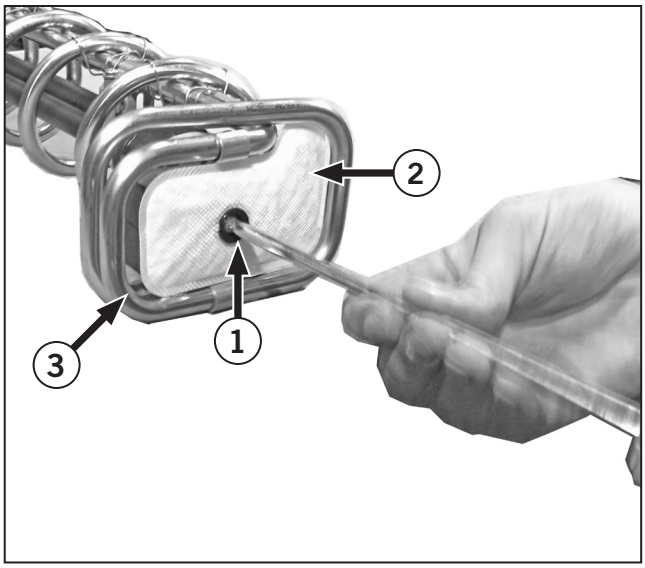
1. Remove the 2 capscrews (1) from the DEF sensor (2) to the DEF tank (3).




2. Pull the DEF sensor completely out of the tank.



3. Remove the bolt (1) and old filter (2) from the DEF Sensor Tube (3).
4. Install the new filter.
5. Reinsert the DEF sensor into the tank.
6. Follow the reverse of this procedure to reinstall the DEF tank sensor.
7. Reinstall DEF Tank cover and reconnect all hoses and wiring harnesses.
8. Fill the DEF tank.
9. Start the engine and allow the DEF to circulate through the system. Check for any warning indicator lamps on the EIC.



### Before Changing the Coolant

- Check the coolant level. Low coolant may indicate leaks in the system.
- Check for leaks. Look for signs of coolant leaks around connections or below coolers.
- Inspect coolant hoses and connections.
- Check for damaged or cracked hoses. Replace any hose that has soft spots or bulges.
- Replace corroded or damaged hose clamps before refilling the system.

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.
- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

**WARNING**

Coolant is toxic. Observe all safety precautions when handling coolant. Wear eye protection and gloves. Dispose of coolant safely and in compliance with environmental regulations.

**WARNING**

Do not remove the pressure cap on a hot engine. Hot coolant spray or steam can cause personal injury. Allow the engine temperature to drop to 50°C (120°F) before removing the pressure cap. Wear eye protection and protective clothing when working on the cooling system.

## Replace Engine Coolant and Service the Cooling System

***IMPORTANT:****Do not allow the cooling system to dry out.*

The rust and corrosion inhibitors in the antifreeze and the filter/conditioner deteriorate with use and require replacement.

The tractor is equipped with a filter system that maximizes the service life of the coolant. The continued life and performance of the engine requires proper maintenance of the cooling system

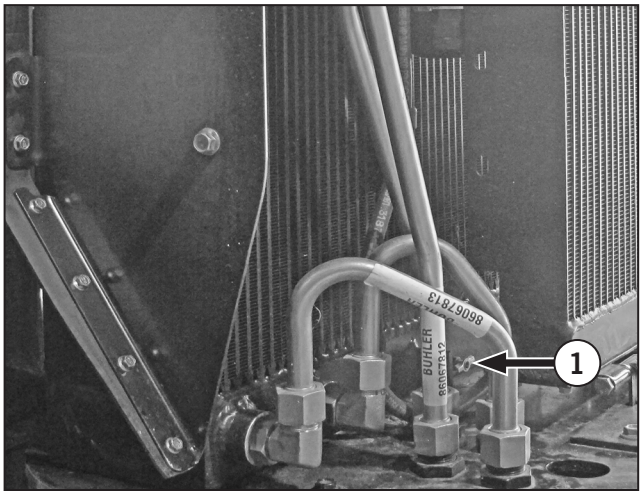
### Change the Coolant

**WARNING**

Do not allow coolant to spill onto ground. The toxic components of the chemicals are proven health hazards and will find their way into the water supply. Always observe the environmental regulations in disposing of containers and fluids.

Park the tractor on a level service pad, shut the engine off and apply the parking brake. Use a 20 L (5 gal) catch basin and a splash tray to drain the coolant. Prepare a drain hose and hose adapters and have a supply of clean absorbent cloths for wiping and emergency clean up.

1. Allow the engine temperature to cool below 50°C (120°F).
2. Use a thick cloth to carefully open and remove the pressure cap from the overflow tank.
3. Turn the heater control to the full hot position.
4. Open the lower drain valve (1) on bottom of the radiator and drain the coolant into the basin.
5. Loosen the lower hose clamp and pull the hose off the radiator to drain the remaining coolant from the radiator and the engine.



## Flushing the Cooling System

***NOTE: Contact a Kubota dealer for questions about cooling system maintenance.***

***NOTE: Follow the directions provided in your Cummins operation and maintenance manual.***

Flush the cooling system using Fleetguard Restore™ and refill with the specified coolant mixture.

***NOTE: Extreme environment and heavy duty use may shorten the service life of the coolant system. Contact a KUBOTA dealer for more information and service.***

## Engine Coolant Mixture

The use of premixed coolant is recommended. Use fully formulated antifreeze/coolant that meets Cummins Engineering Standard 14603 and use distilled water if mixing is necessary.

***IMPORTANT:****Do not use additives of any kind.*

Water must not exceed 170 ppm hardness or contain more than 40 ppm chloride or 100 ppm sulfate. Do not use water if you are unsure of the water quality.

***IMPORTANT:****Do not add cold coolant to a hot or overheating engine. Serious engine damage can occur. Allow the engine temperature to cool below 50 °C (120 °F) before adding coolant.*

## Refilling the Cooling System

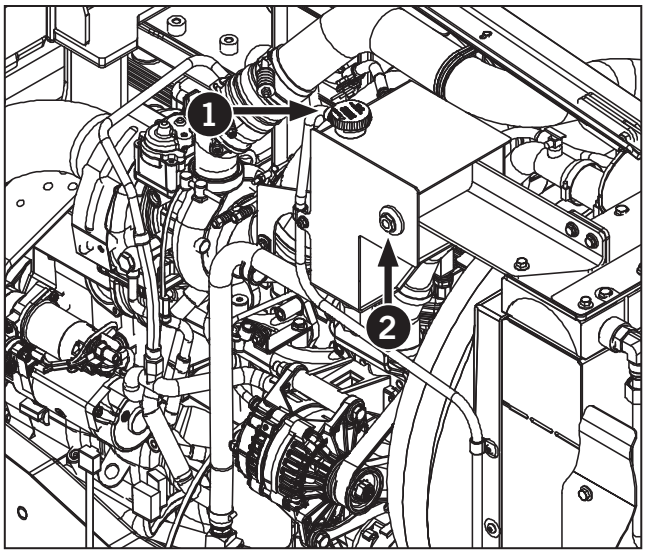
***IMPORTANT:****Make sure the air is purged from the cooling system before returning the vehicle to service.*

***NOTE: The cooling system capacity is approximately 72 L (19 gal).***

1. Make sure all coolant connections are tight and the drains are closed.
2. Remove the pressure cap (1) from the vent fitting on the top of the coolant surge tank and check that the coolant filter bypass is open.
3. Slowly pour the fresh coolant mixture into the upper reservoir fill opening. Avoid spills.
4. Add coolant until the level on the sight glass.
5. Wait two to three minutes and check the coolant level in the sight glass (2) on the surge tank. Add coolant until the level shows in the middle of the reservoir sight glass.
6. Start the engine and idle at 1 000 rpm for two minutes with the fill cap off. Shut the engine off and top up the upper reservoir if required.
7. Install the pressure cap.
8. Start the engine and run at 1 700 rpm until the thermostat opens. Make sure the temperature is at least 82°C (180 °F).
9. Reduce engine speed to 1 000 rpm for two minutes to cool the engine and turbocharger components.
10. Shut the engine off and allow the system to cool until the coolant temperature is below 50°C (120°F).
11. Check the coolant level at the surge tank (1).

***NOTE: Check for leaks and check the level at the surge tank sight glass If the overflow tank level is low (4).***

12. Top up the coolant if necessary and repeat steps 5 through 11 as required. Do not overfill the system.
13. Add coolant to the surge tank when required to maintain the level in the cooling system.



## Change the Front Axle Differential Oil

***NOTE: For severe or high ambient temperature applications, reduce the oil change interval to 500 hours or 6 months, whichever comes first.***

Operate the tractor for at least ten minutes to warm the oil in the differential. Park the tractor on a level surface and center the front wheels. Shut the engine off and apply the parking brake.

**WARNING**

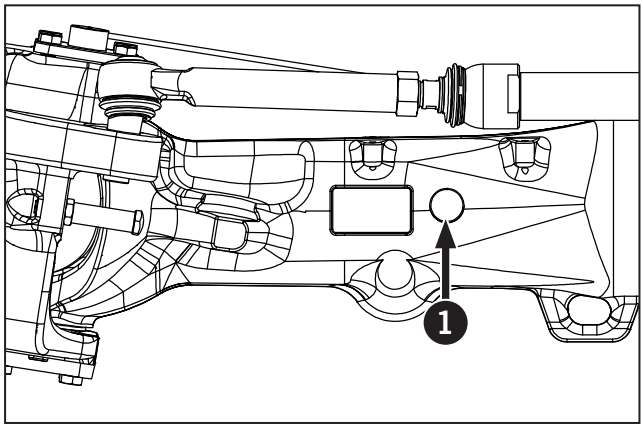
Hot oil may spray out when the plug is removed. Wear protective clothing and safety glasses to help prevent injury.

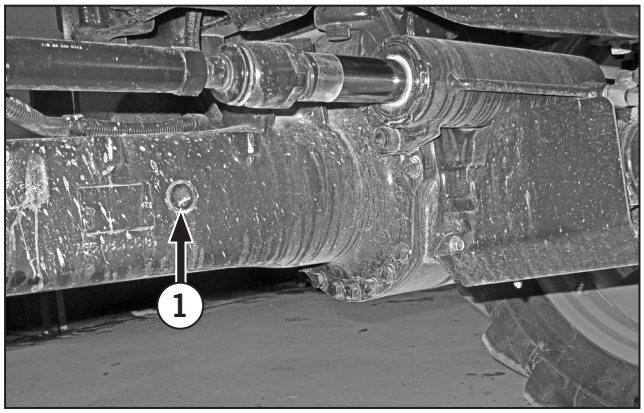
1. Place a suitable container approximately 16 L (4 gal) in capacity under the axle drain plug.
2. Loosen the fill/check plug (1) to allow air to enter.
3. Carefully remove the axle drain plug (2) and allow the oil to drain completely into the container. Dispose of the used oil properly.
4. Re-install the axle drain plug.
5. Remove the fill/check plug (1) and fill the axle with fresh oil until it reaches the bottom of the fill/check plug hole.

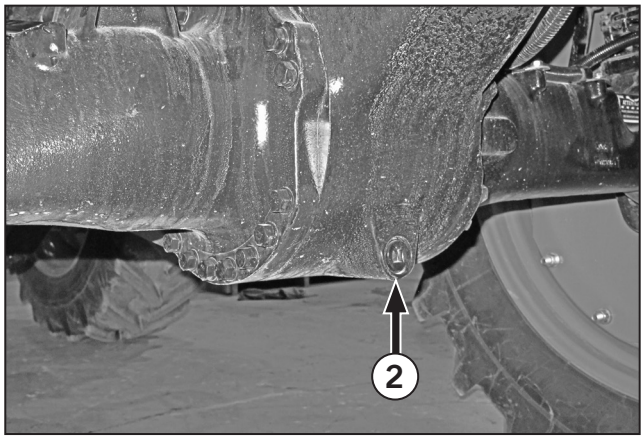
***NOTE: Oil Specification: Shell Spirax S4 TXM™ or equivalent. See Lubricants and Fluids in Section 7 of this manual. Rated oil capacity: 14.5 L (3.83). Contact a KUBOTA dealer for service advice or materials.***

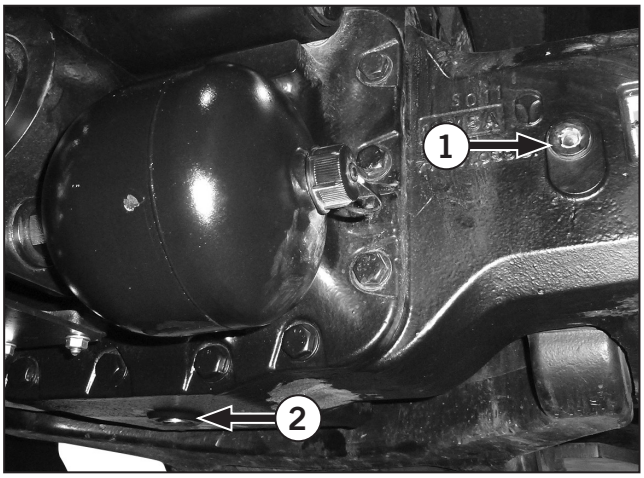
6. Re-install the fill/check plug (1) and operate the tractor; stop the tractor and check for leaks.

***NOTE: Dispose of oil and contaminated materials in accordance with local environmental regulations.***



## Change the Front Planetary Hub Oil

***NOTE: Operate the tractor to warm the oil and help remove contaminants when the oil is drained. Contaminants may settle out and not be removed if the oil is not warm.***

1. Park the tractor on a level surface and center the front wheels. Shut the engine off and apply the parking brake.
2. Rotate the hub to position the fill/drain plug near the top (1). Loosen the plug to allow air to escape; the hub is not vented.
3. Hand tighten the plug and rotate the hub until the plug is at the bottom (2).
4. Place a suitable container of at least 6 L (1.59 gal) capacity under the plug. Remove the plug and allow the oil to drain completely.
5. Rotate the hub to position the plug opening level with the center of the hub.
6. Refill the hub with fresh oil and install the fill/drain plug. The capacity of each hub is 5 L (1.32 gal).

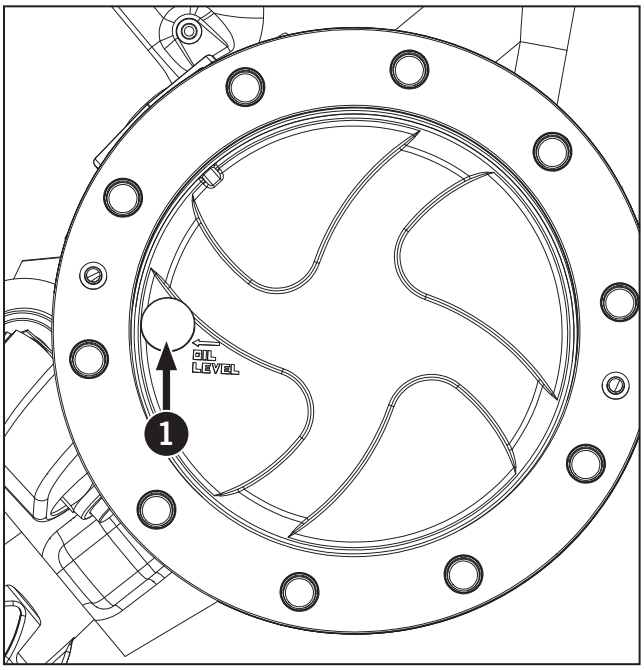
***NOTE: The oil level is correct when the oil is at the bottom of the plug opening when the opening is level with the center of the hub.***

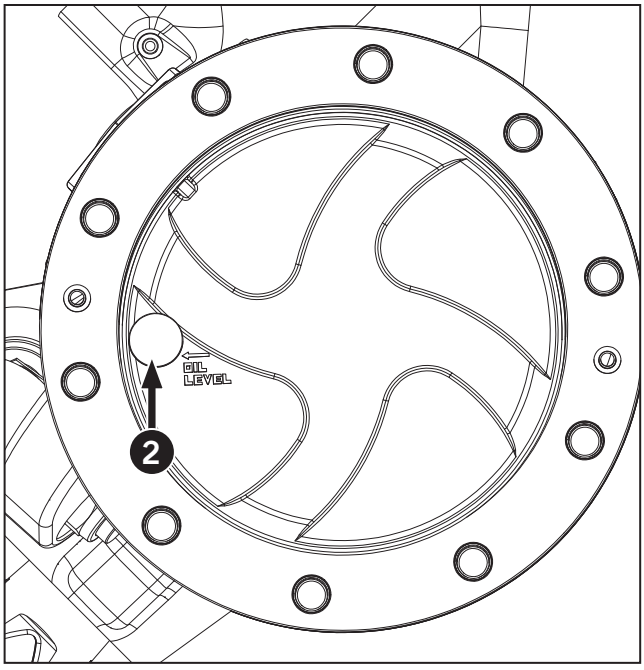
***NOTE: Oil Specification: Shell Spirax S4 TXM™ or equivalent. See Lubricants and Fluids in Section 7 of this manual.***

7. Use the same procedure to change the oil in the other front planetary hub.

***NOTE: Rated oil capacity of each hub is approximately 5 L ( 1.32 gal).***

***NOTE: Dispose of oil and contaminated materials in accordance with local environmental regulations.***



## Every 4 500 Hours or Three Years

### Change Diesel Exhaust Fluid (DEF) Dosing Unit Filter

**CAUTION**

Wear gloves and eye protection when adding diesel exhaust fluid (DEF). DEF is not harmful to handle but will corrode certain metals.

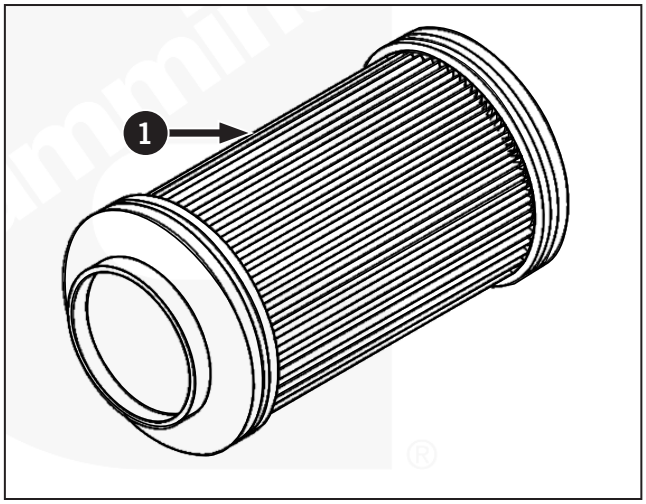
- In case of eye contact: Remove contact lenses. Immediately wash your eyes with a lot of water for least 15 minutes.
- In case of skin contact: First aid is normally not required. Immediately wash your skin with soap and water. Avoid prolonged contact with DEF.
- If swallowed: Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, contact a physician immediately.

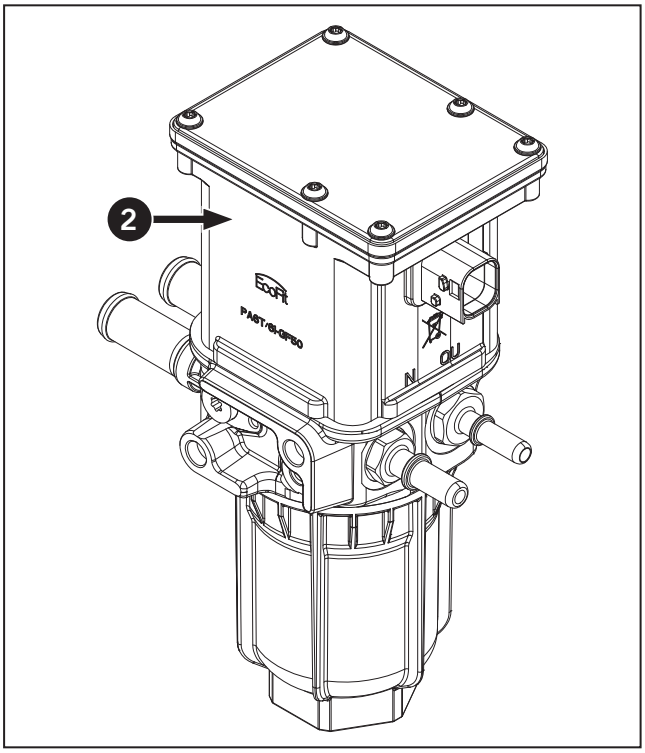
***NOTE: Do not powerwash or steam clean the DEF Doser Unit. Use compressed air to remove any loose debris.***

The DEF Doser Unit filter (1) is located inside the DEF Doser Unit (2).

To change the DEF Doser Unit Filter or if you need to access the DEF Doser Unit for any other purpose, remove the third step of the ladder on the left side of the tractor and the shield of the (Diesel Exhaust Fluid) DEF module access panel.

Change the DEF Doser Unit filter. See Step 2: DEF Dosing Unit Filter Change..

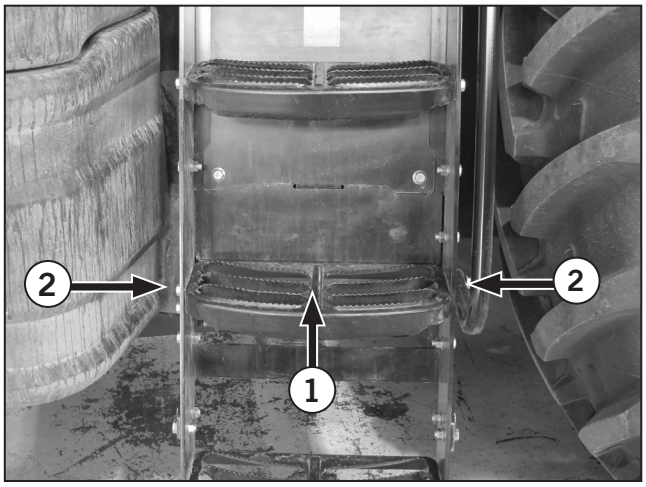


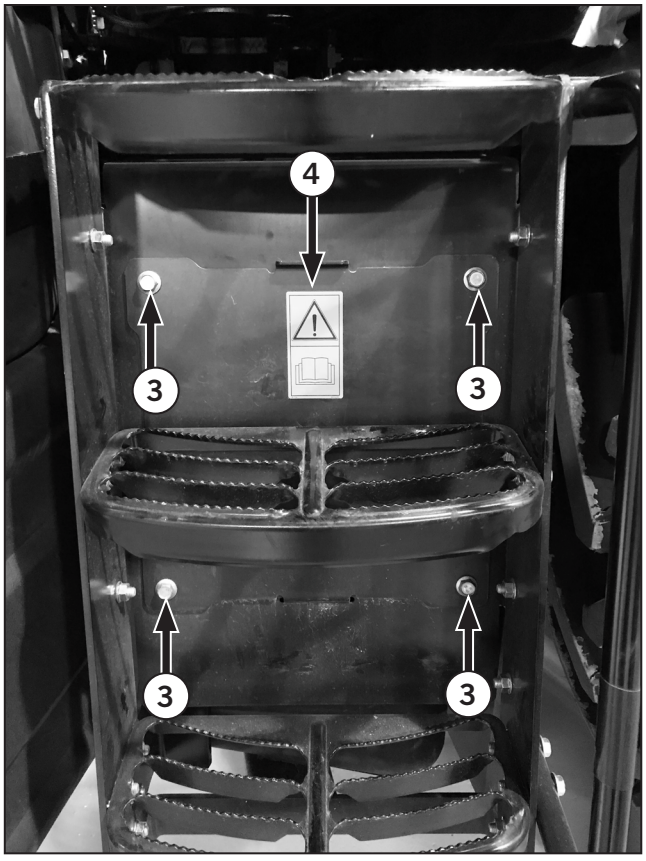
### Step 1: Remove the DEF Doser Pump Cover

***NOTE: Label all hoses and wires and mark there location before disconnecting them from the DEF tank.***

1. Park the tractor on a level surface and set the parking brake. Remove the key from the ignition, wait for the power on indicator to turn off and turn the battery disconnect switch to the "OFF" position.
2. Remove the third step (1) on the ladder on the left side of the tractor by removing 4 bolts (2). Remove the third step.



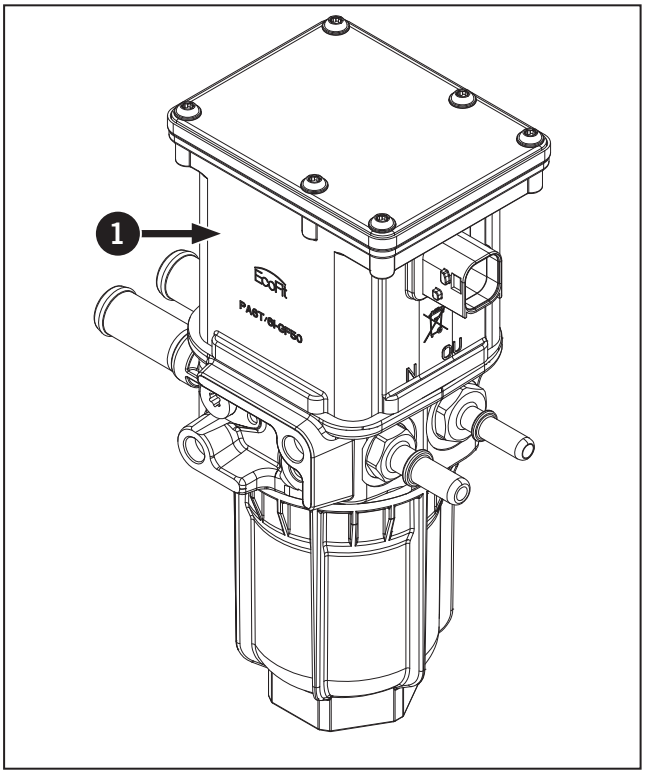

3. Remove the 4 bolts (3) from the DEF (Diesel Exhaust Fluid) module access panel (4).



## Step 2: DEF Dosing Unit Filter Change

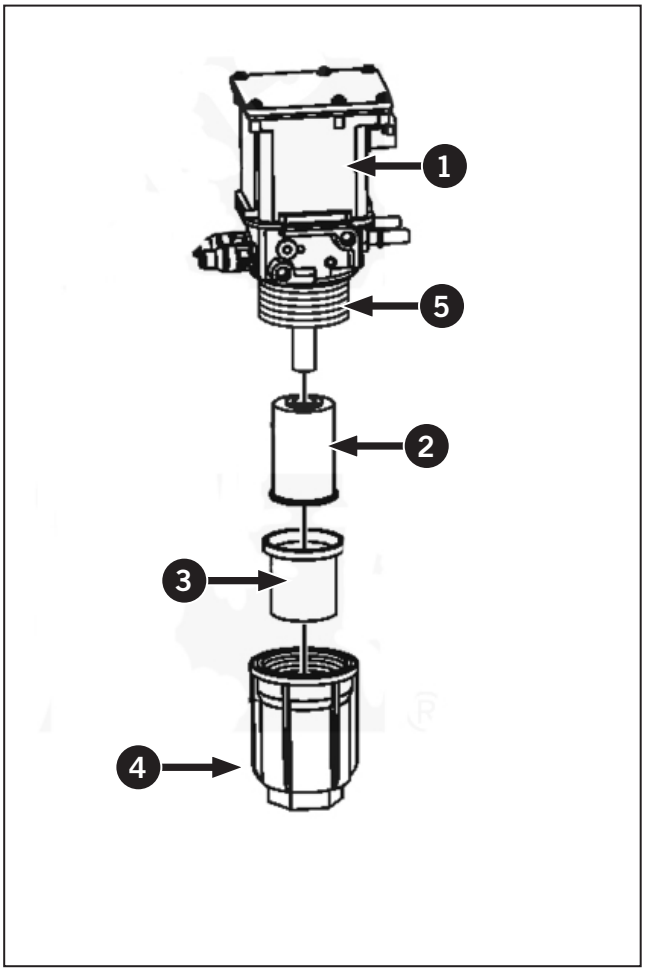
***NOTE: Inspect the area around the seal and vent of the aftertreatment DEF dosing unit filter cap for signs of leakage such as white deposits. Refer to Clean and Inspect for Reuse later in the section.***

***NOTE: There may be residual DEF in the filter housing. It is recommended to place a collection container below the DEF filter cap.***



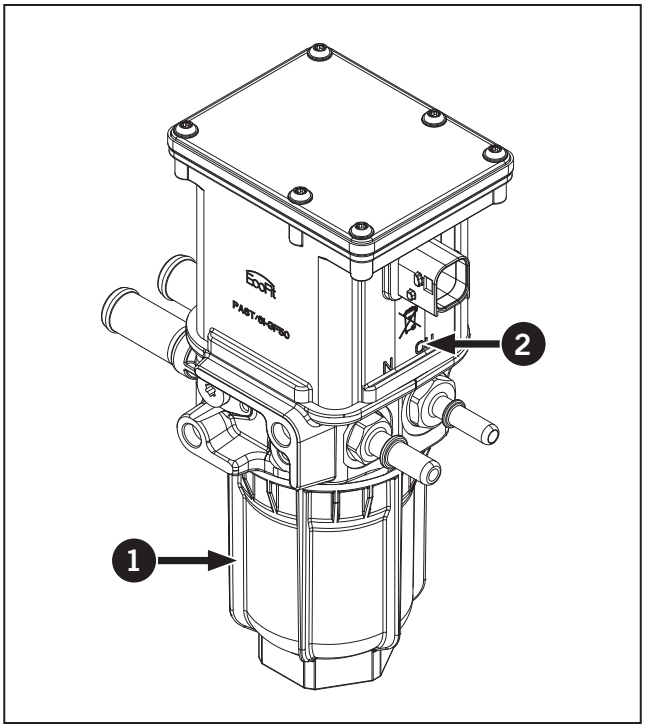

The aftertreatment DEF dosing unit consists of the following components:

1. Aftertreatment DEF dosing unit (1).
2. Aftertreatment DEF dosing unit filter element (2).
3. Aftertreatment DEF dosing unit frost protection membrane (3).
4. Aftertreatment DEF dosing unit filter housing (4).




1. Inspect the aftertreatment DEF dosing unit threads (5). This is important if the aftertreatment DEF dosing unit cap was damaged.
2. Replace the entire aftertreatment DEF dosing unit if the threads are damaged.
3. Make sure the frost protection membrane groove is clean and free of debris. Use a clean damp cloth, warm water and mild detergent.

4. Remove the DEF filter cap (1) from the DEF Dosing Unit (2) with a 46 mm (1.8 in) socket.
5. Remove DEF frost protection membrane (3) from the DEF Dosing Unit (2).

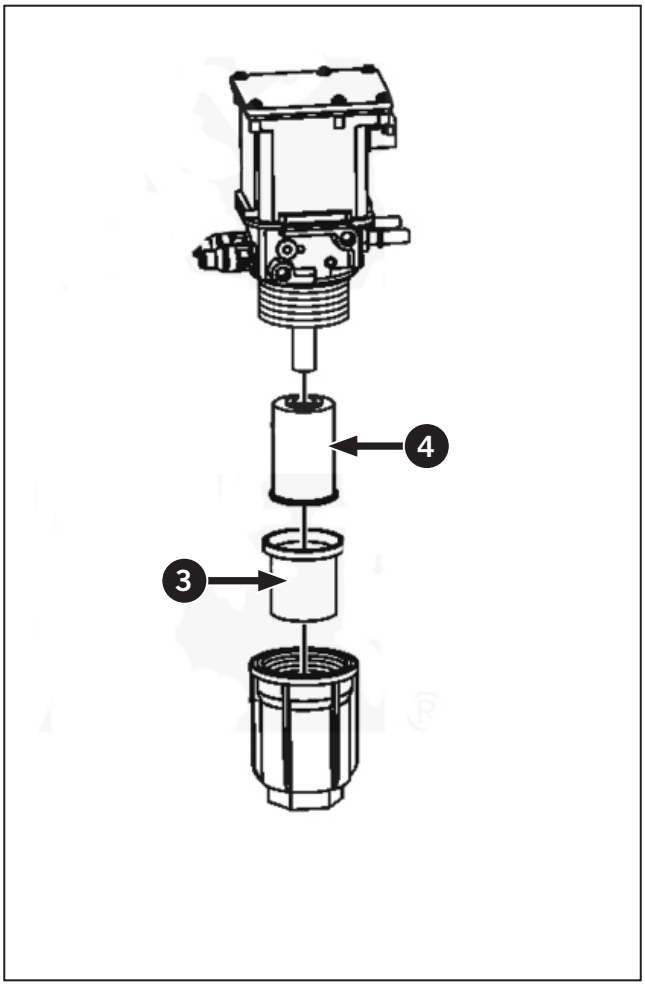



6. Remove the old DEF dosing unit filter (4).
7. Discard the frost protection membrane and filter element.
8. Install new frost protection membrane and filter.

***NOTE: The sealing bead of the frost protection membrane must sit completely in the groove of the pump housing.***

***NOTE: The provided lubricant must be used when installing the filter housing.***

9. Spray the supplied lubricant to the threads on the pump housing and sealing bead of the frost protection membrane.
10. Install and torque the filter housing to 80 N·m (59 ft-lb).
11. Follow the reverse of this procedure to reinstall.



## Every 5 000 Hours or Four Years

**DANGER**

- Always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels before performing any maintenance operations.

- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

After every 5000 hours of operation or every four years (which ever comes first) complete the following maintenance procedures. This is in addition to regular service at 10, 50, 250, 500, 1 000 and 2 000 hour service.

### Adjust the Engine Valve Lash

The valve lash in your Cummins engine requires adjustment every 5 000 hours or four years of operation. Contact a KUBOTA dealer.

## Every 5 000 Hours

### Clean the Diesel Particulate Filter (DPF)

The Diesel Particulate Filter (DPF) must be removed and cleaned every 5 000 hours to remove ash that has collected during engine operation.

The DPF requires a special cleaning procedure and the Engine Control Module (ECM) must be adjusted after a new or cleaned DPF is installed.

Contact a KUBOTA dealer when the DPF needs to be cleaned.

## As Required

Perform the following maintenance operations as required.

**DANGER**

- Before performing any maintenance operations, always engage the parking brake fully, place the transmission in neutral, shut the engine off, turn the battery shut-off switch to OFF and block the wheels.

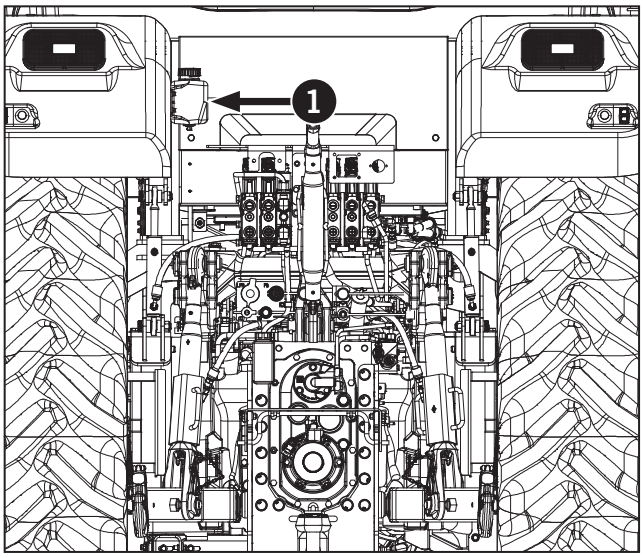
- Allow the engine to cool before performing maintenance.
- Do not check, lubricate, service or adjust the tractor with the engine running unless otherwise instructed in a specific maintenance operation.

## Windshield Washer Fluid and Wiper Blades

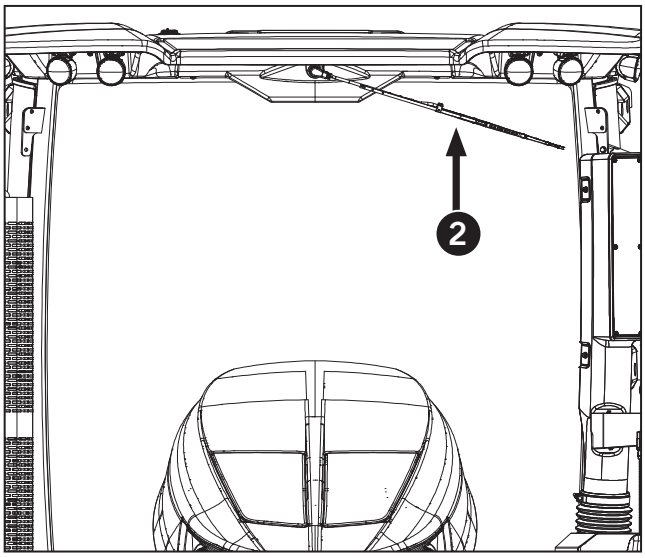
The washer fluid reservoir (1) is located at the rear of the cab.

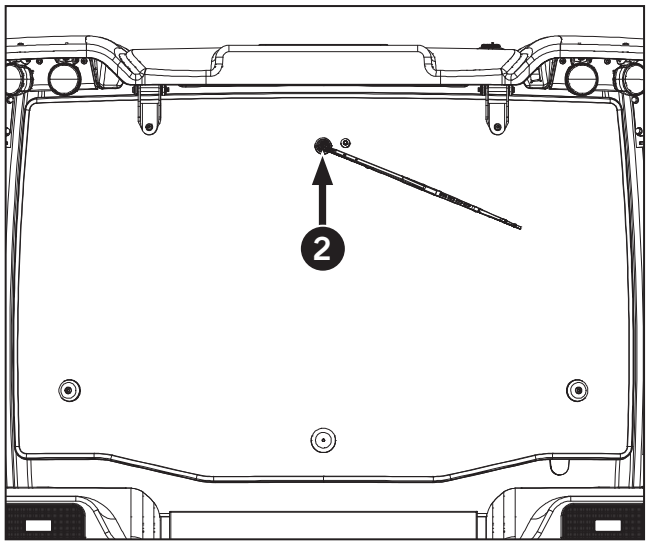
Remove the cap and fill the reservoir with a formulated automotive type washer fluid.

Use the following procedure to replace the front and rear windshield wiper blades:




1. Pivot the wiper arm outward away from the window.
2. Remove the lockwasher (2) and the pivot bolt from the center of the blade.
3. Install the new blade and reinstall the pivot bolt at the center of the blade.
4. Use 713 mm (28 in) wiper blades for the front and rear wipers.



## Check and Adjust the Parking Brake

Set the parking brake each time the operator leaves the driver's seat and release the parking brake before operating the tractor. Checking the parking brake is part of the daily inspection. Adjustment of the parking brake when required for safe operation of the tractor.

***IMPORTANT:*** *The parking brake should be fully applied when the parking brake lever (1) is raised to the third or fourth notch (click) on the quadrant (position 4 in the diagram at right). the cable has stretched and requires adjustment if the parking brake lever must be raised above the fourth notch to fully apply the brake.*

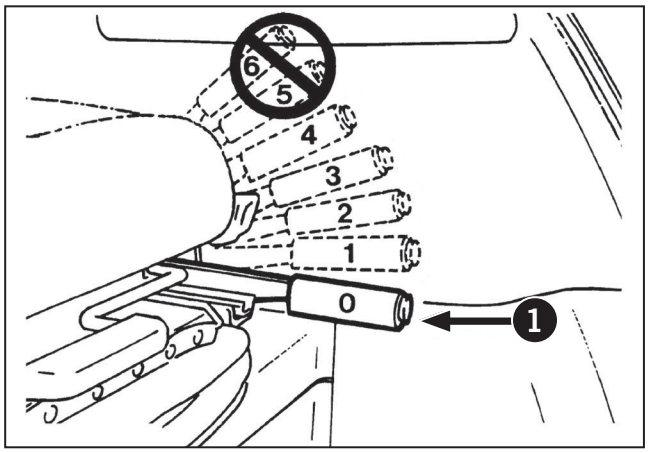
***IMPORTANT:*** *Adjust the parking brake when the parking brake lever must be raised above the fourth notch on the quadrant to fully apply the brake.*

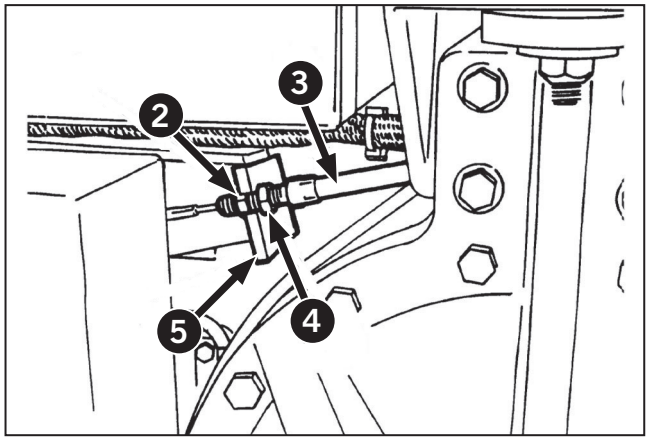
Park the tractor on a level surface, shut the engine off and block the front and rear wheels.

1. Put the parking brake lever in the fully lowered 0 position.
2. Raise the parking brake lever to the second notch on the quadrant.
3. Loosen the forward jam nut (2) as far as possible on the cable housing (3).
4. Pull the cable housing rearward until a 9 kg (20 lb) resistance is felt. Hold the cable in that position.
5. Tighten the rear jam nut (4) until it contacts the bracket (5).
6. Tighten the forward jam nut against the bracket.

***IMPORTANT:*** *Do not overtighten the jam nuts.*

7. Raise the parking brake lever and check for proper adjustment.



## Fuse and Relay Replacement

The tractor has 4 fuse and relay panels. Locate the fuse and relay panel for the circuits and systems that are under inspection and use the layout drawings provided to identify the correct component to be replaced or checked.

**NOTICE**

- Disconnect battery to cut power to the fuse panel before attempting to remove any fuse or relay.
- Use replacement fuses that have exactly the same rating as the original fuse.
- Do not replace any relay with a different component or part number.
- Stop the tractor and investigate to identify and repair the fault if a blown fuse has been replaced and the circuit blows again.

## Locating the Fuse and Relay Panels

### Main Fuse and Relay Panel

The main fuse and relay panel is made up of 2 modular blocks and located on the right side inner fender of the cab (1).

***NOTE: A component layout diagram is provided on the inner surface of the access panel.***

***NOTE: A repeat failure in a relay indicates an electrical system fault. If this happens, stop using the tractor and take steps to find and repair the fault.***

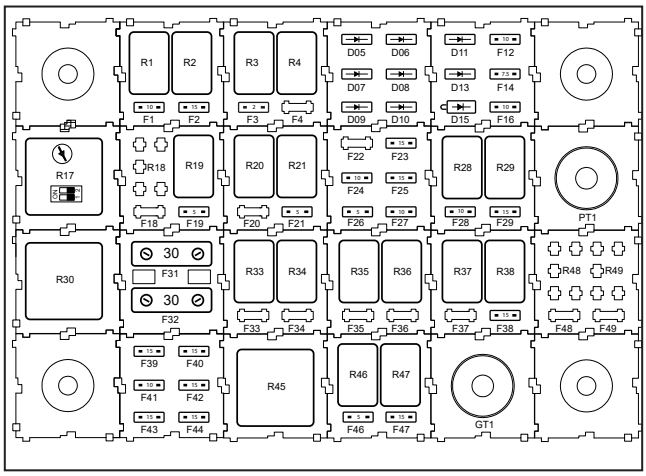
When a fuse blows, investigate to determine the cause and take steps to correct the problem.

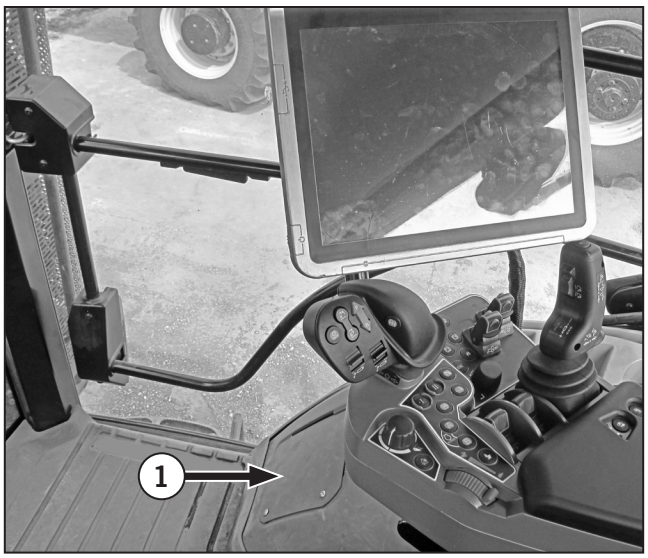
Relays may fail as a result of normal use and once replaced should provide a reliable service period.

Electrical system diagnostics and repairs must be performed by trained service personel.

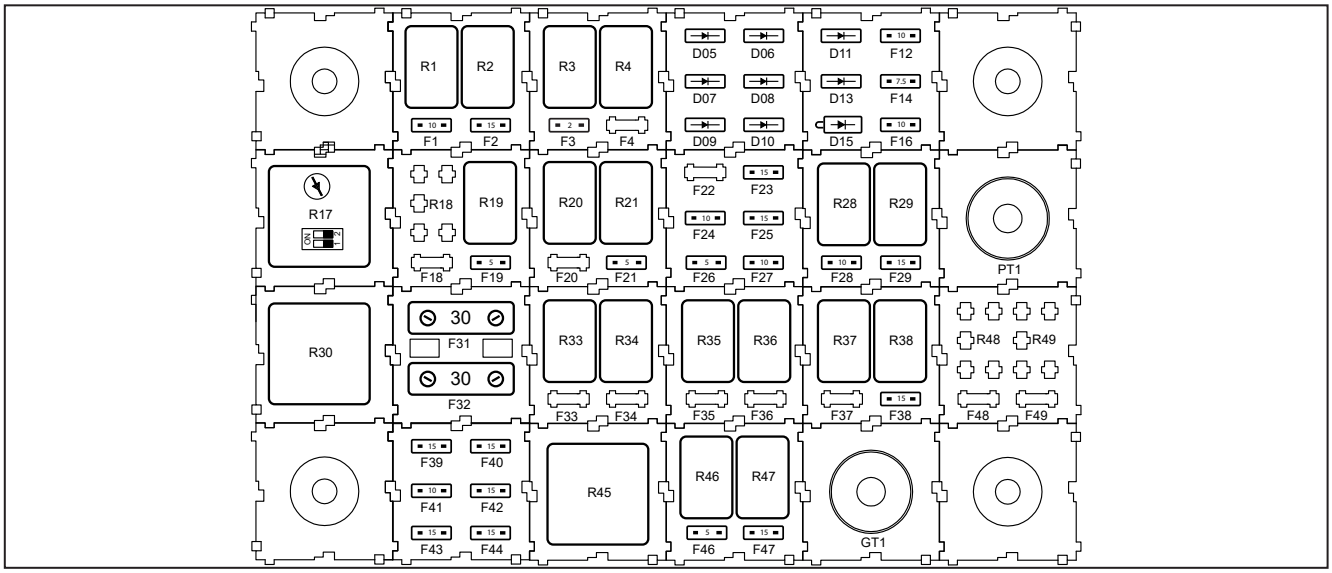
Contact a KUBOTA dealer for service and parts advice.

A decal of this fuse and relay panel is located inside the access panel.



## Main Fuse and Relay Panel Layout



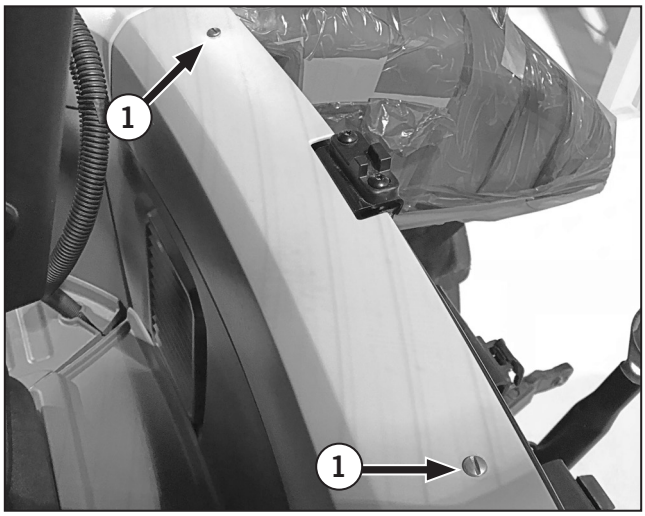

| Table 5-21: Main Panel Relays | |
|---|---|
| **Relay Number** | **Relay Description** |
| F01/R01 | Accessory Switch (Key Switch) |
| F02/R02 | Ignition Key Supply |
| F03/R03 | Column |
| R04 | Dome Light |
| D07 | Vehicle Controller Electronics |
| D08 | VCU Acc Wake-up |
| D09 | Vehicle Controller Electronics |
| D10 | Hazard |
| D11 | Front Wiper High |
| F12 | Dome Light |
| D13 | Front Wiper Low |
| F14 | Front Console |
| D15 | Dome Light |
| F16 | Front Console |
| R17 | Mirror Timer |
| R20 | VCU Electronics |
| F21/R21 | VCU Timed |
| F23 | Diagnostic 1 |
| F24 | Raven Autosteer HC |
| F25 | Diagnostic 2 |
| F26 | Raven Autosteer Cruise |
| F27 | Armrest Live |
| F28/R28 | Armrest |

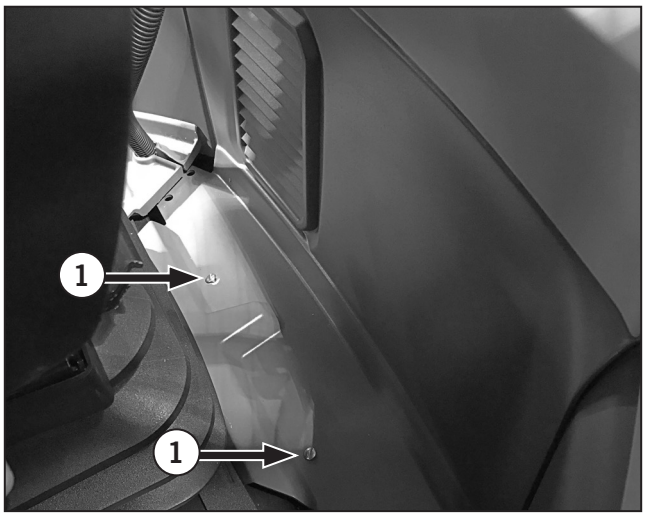
| Table 5-21: Main Panel Relays | |
|---|---|
| **Relay Number** | **Relay Description** |
| F29/R29 | Diagnostic 2 |
| R30 | Wiper Sw |
| F31 | Front Wiper |
| F32 | Rear Wiper |
| R33 | Rear Wiper |
| R34 | Rear Wiper Low Speed |
| R35 | Front Wiper |
| R36 | Front Wiper High |
| R37 | Front Wiper Low |
| F38/R38 | Cab Seat |
| F39 | PP1 |
| F40 | PP2 |
| F41 | Power Plug Accessory |
| F42 | PP4 |
| F43 | PP5 |
| F44 | PP4 Live |
| R45 | Power Point switched |
| F46/R46 | PP3 (USB) |
| F47/R47 | Suspended Cab and Axle |

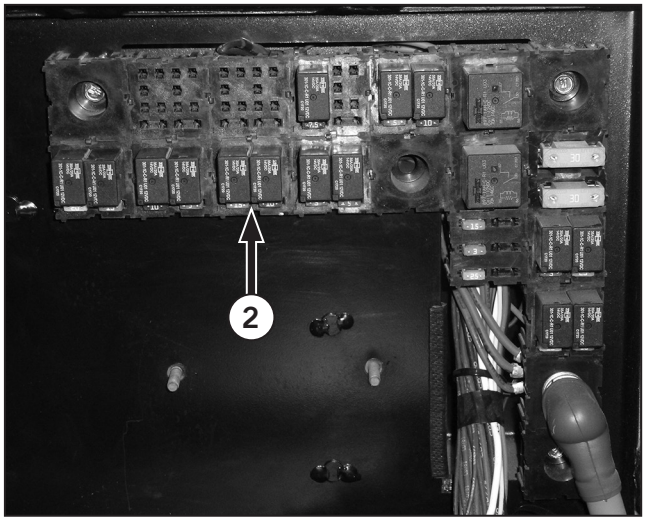
## Locating Rear Cab Fuse and Relay Panel Layout

The accessory relay panel is located at the rear of the cab under the rear interior trim panel.

Loosen the fasteners (1) and remove the trim panel to access the relay panel (2).



## Rear Cab Fuse and Relay Panel Layout

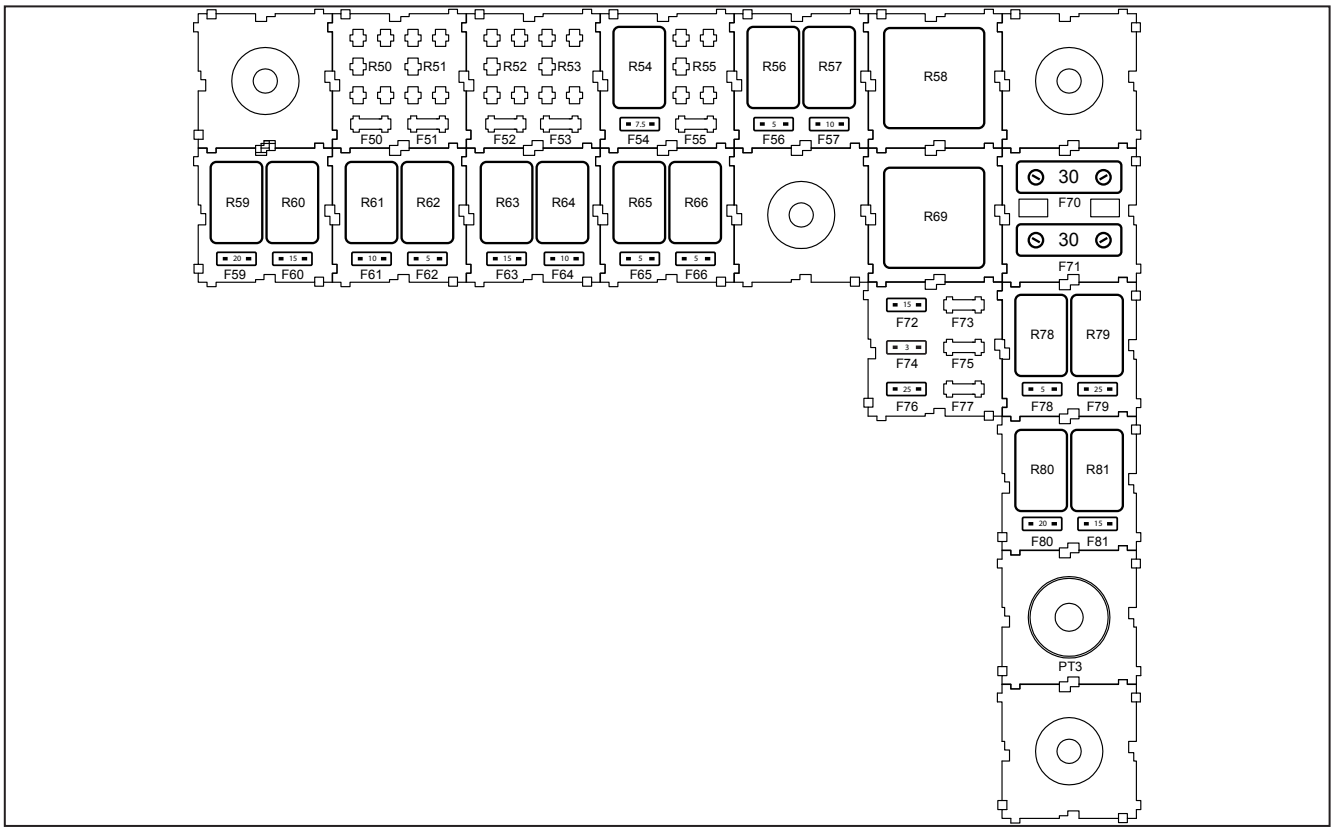



**Table 5-22: Relays**

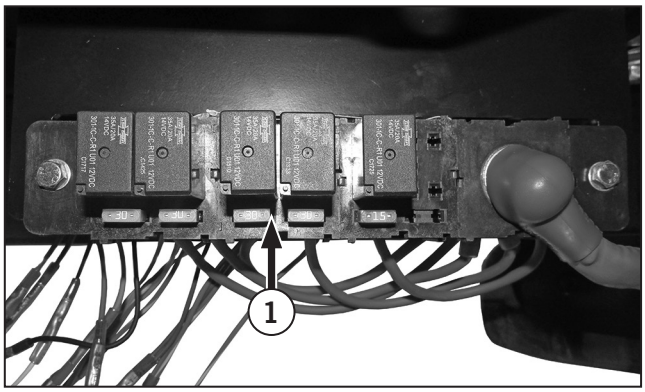
| Relay | Function |
|---|---|
| R54 | TPT20 |
| R56 | Trailer Brake Hydraulic Solenoid |
| R57 | ISOBUS Trailer |
| R58 | Vehical Control Unit (VCU) |
| R59 | Trailer Accessory Power |
| R60 | Trailer Marker Lights |
| R61 | Trailer Stop Lights |
| R62 | Rear Washer Pump |
| R63 | Mid A-post Worklights |
| R64 | EHR Remote |
| R65 | ECM Enable |
| R66 | Worklight Control Panel |
| R69 | Rear Defrost |
| R78 | Back Lighting |
| R79 | HVAC Manual Blower |
| R80 | HVAC Blower |
| R81 | HVAC Main |

**Table 5-23: Fuses**

| Fuse | Rating | Function |
|---|---|---|
| F54 | 7.5 | TPT20-VPI |
| F56 | 5A | Trailer Brake Hydraulic Solenoid |
| F57 | 10A | ISOBUS Trailer |
| F59 | 20A | Trailer Accessory Power |
| F60 | 15A | Trailer Marker Lights |
| F61 | 10A | Trailer Stop Lights |
| F62 | 5A | Rear Washer Pump |
| F63 | 15A | Mid A-post Worklights |
| F64 | 10A | EHR Remote |
| F65 | 5A | ECM Enable |
| F66 | 5A | Worklight Control Panel |
| F70 | 30A | Controller |
| F71 | 30A | Rear Defrost |
| F72 | 15A | TPT20-VPE |
| F74 | 3A | V-PAS Module |
| F76 | 25A | Trailer Power (EU) |
| F78 | 5A | Back Lighting |
| F79 | 25A | HVAC Manual Blower |
| F80 | 20A | HVAC Blower |
| F81 | 15A | HVAC Main |

## Lightning Fuse and Relay Panel

The lighting fuse and relay panel (1) is located inside the cab behind the overhead accessory panel on the right. These fuses and relays provide circuit overload protection and a means to complete electrical circuits for the worklights and beacon.



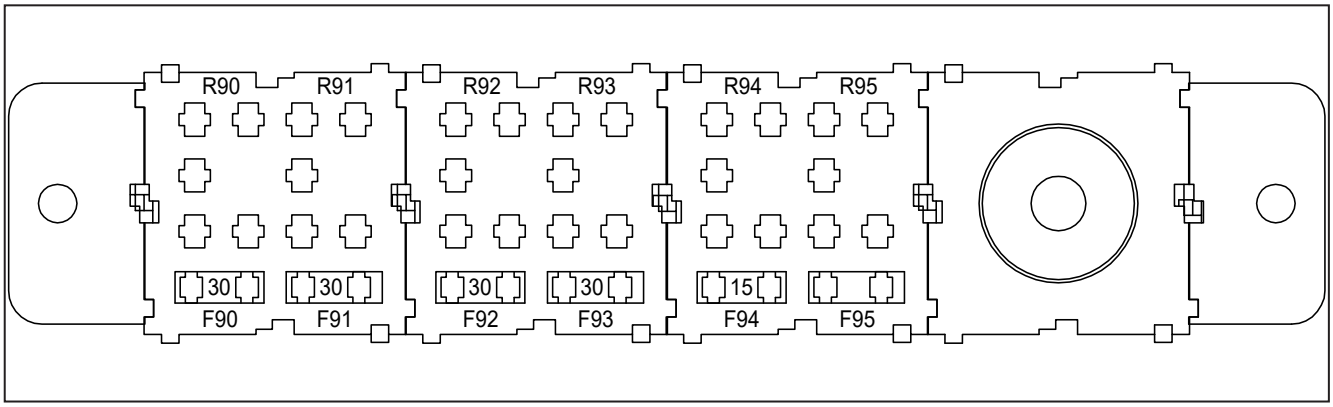




**Table 5-24: Worklight Relays**

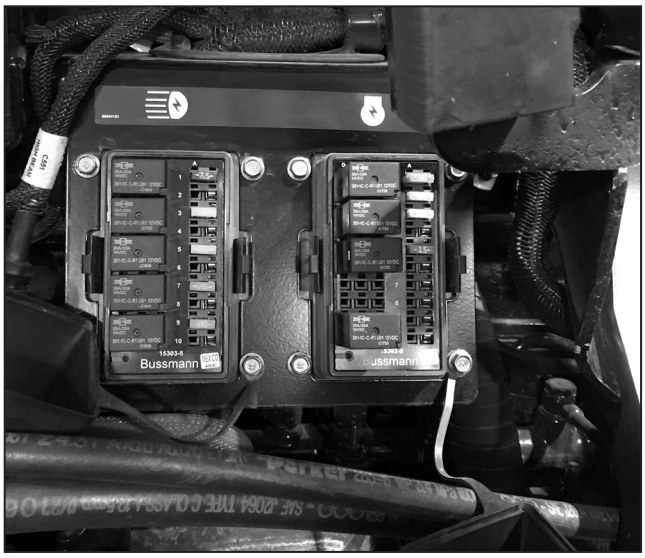
| Relay | Function |
|---|---|
| R90 | Right-Front Worklights 1, 2, and 3 |
| R91 | Right-Rear Worklights 4, 5, and 6 |
| R92 | Left-Rear Worklights 7, 8, and 9 |
| R93 | Left-Front Worklights 10, 11, and 12 |
| R94 | Beacon +12V |
| R95 | Not Used |

**Table 5-25: Worklight Fuses**

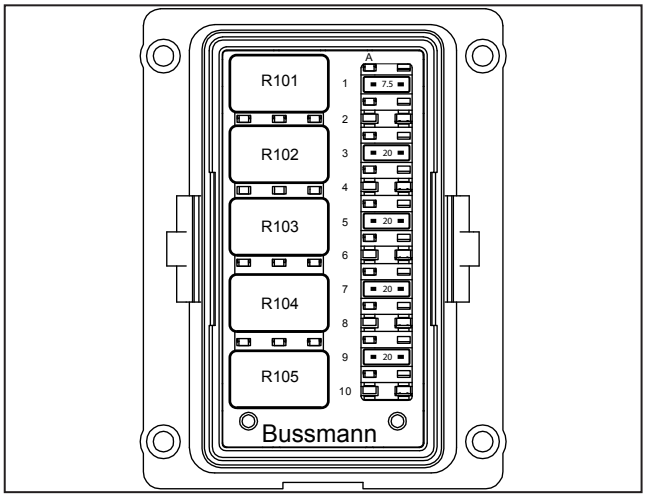
| Fuse | Rating | Function |
|---|---|---|
| F90 | 30A | Right-Front Worklights 1, 2, and 3 |
| F91 | 30A | Right-Rear Worklights 4, 5, and 6 |
| F92 | 30A | Left-Rear Worklights 7, 8, and 9 |
| F93 | 30A | Left-Front Worklights 10, 11, and 12 |
| F94 | 15A | Beacon +12V |
| F95 | | Not Used |

## Engine Fuse and Relay Panel

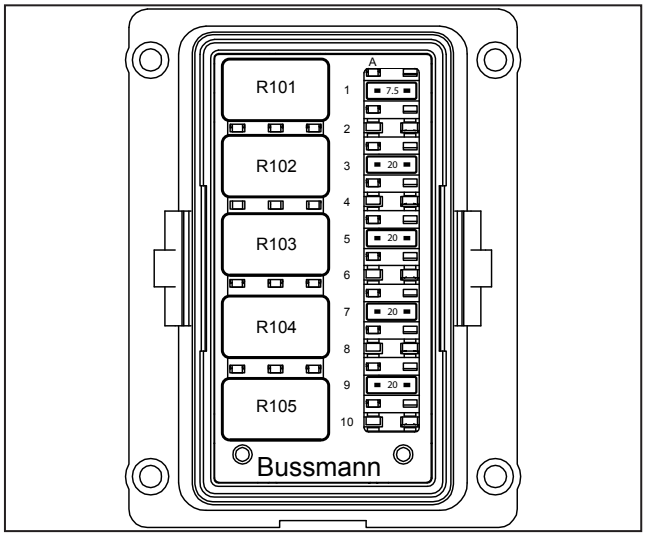
The engine fuse and relay panel is located on the left side hood support frame at the rear of the engine compartment.



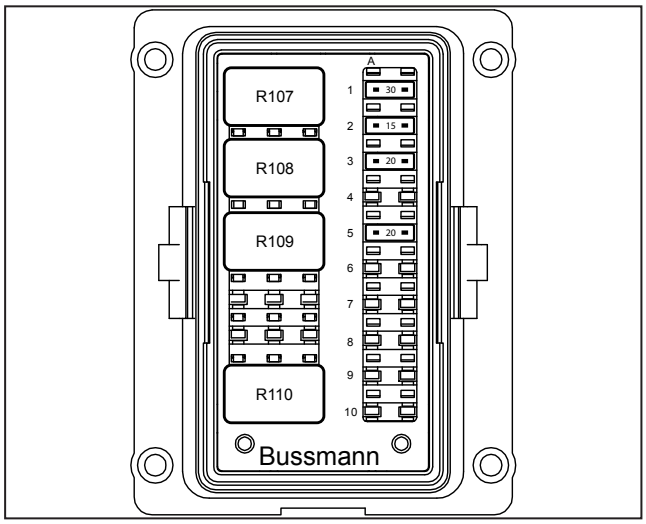

| Table 5-26: Front Frame Relays (PDM-1) | |
|---|---|
| **Relay** | **Function** |
| R101 | Horn |
| R102 | High Beam |
| R103 | Low Beam |
| R104 | WL 90mm |
| R105 | WL 70mm |



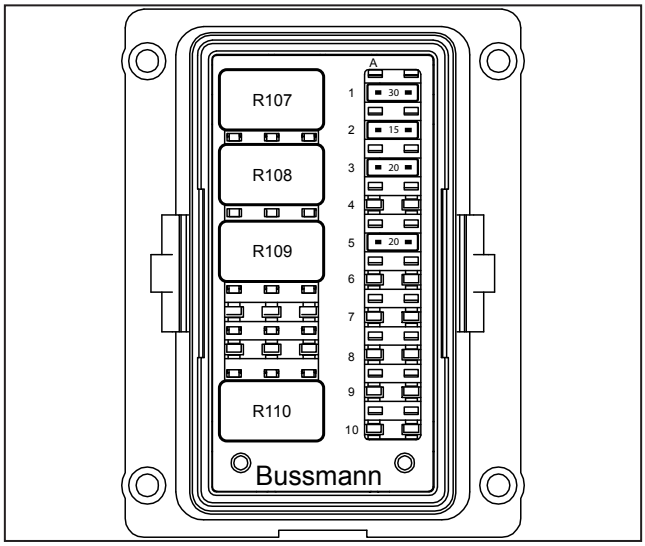

| Table 5-27: Front Frame Fuses (PDM-1) | | |
|---|---|---|
| **Fuse** | **Rating** | **Function** |
| 1 | 7.5A | Horn |
| 2 | | Not Used |
| 3 | 20A | High Beam |
| 4 | | Not Used |
| 5 | 20A | Low Beam |
| 6 | | Not Used |
| 7 | 20A | WL 90mm |
| 8 | | Not Used |
| 9 | 20A | WL 70mm |
| 10 | | Not Used |



| Table 5-29: Front Frame Relays (PDM-2) | |
|---|---|
| **Relay** | **Function** |
| R107 | Aftertreatment System |
| R108 | Diesel Exhaust Fluid (DEF) Supply |
| R109 | Diesel Exhaust Fluid (DEF) Heater |
| | Not Used |
| R110 | Starter Interlock |



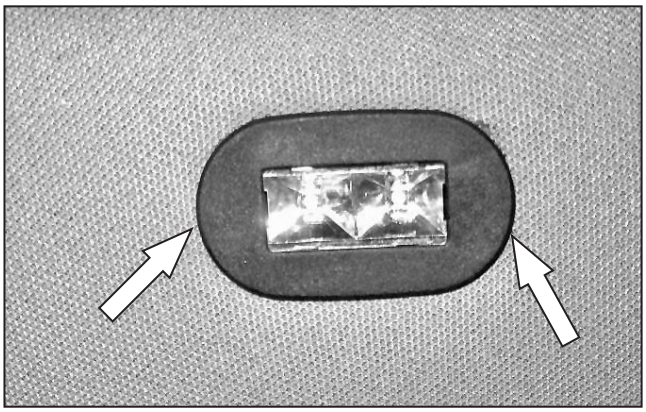

| Table 5-30: Front Frame Fuses (PDM-2) | | |
|---|---|---|
| **Fuse** | **Rating** | **Function** |
| 1 | 30A | Engine Control Module |
| 2 | 15A | Aftertreatment System |
| 3 | 20A | DEF Supply Module |
| 4 | | Not Used |
| 5 | 20A | DEF Heater Power |
| 6 | | Not Used |
| 7 | | Not Used |
| 8 | | Not Used |
| 9 | | Not Used |
| 10 | | Not Used |

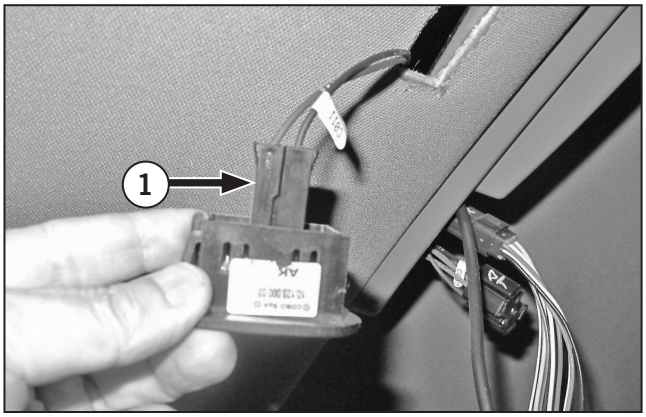


## Change the Console Light

The console light is mounted in the roof liner above the right side control console. The light is powered whenever the key switch is turned on. When the key switch is turned off, the light can remain on and will be turned off by a timer.

1. With the main power off, insert a small screwdriver and gently push against the clips to pry the light from the headliner.
2. Disconnect the electrical connector (1). The console light is sealed in the case and must be replaced as a unit.
3. Connect the electrical connector to the new light and install the light fixture into the headliner.





## Replace Batteries

**WARNING**

Batteries generate hydrogen gas, which is highly flammable. If ignited by a spark or flame the gas may explode causing a spray of battery acid and fragments causing severe personal injury. Do not smoke or expose the battery to open flame.

**CAUTION**

Always follow the proper connect and disconnect procedures. Always disconnect the negative (-) black cables before the positive (+) red cables. Always connect the positive (+) red cables before the negative (-) black cables to reduce the possibility of sparking and an explosion.

If the batteries are no longer functioning or seem to be functioning incorrectly, they may need to be replaced.

Contact a KUBOTA dealer for any questions regarding battery replacement.

Before beginning, park the tractor, set the parking brake and shut off the engine.

**CAUTION**



Always wear goggles to protect eyes and protective clothing when working with batteries. In case of contact with skin, flush the affected area for 5 minutes and seek immediate medical attention.

## Remove Batteries

1. Turn the main power disconnect switch (1) to the OFF position.
2. Remove the rubber boots covering the black negative (-) battery ground cable connections.
3. Disconnect the black negative (-) battery ground cable connections by turning the nut counterclockwise and pulling the connection from the battery mounting stud.
4. Remove the rubber boots covering the red positive (+) battery ground cable connections.
5. Disconnect the red positive (+) battery ground cable connections by turning the nut counterclockwise and pulling the connection from the battery mounting stud.
6. Loosen the wing nuts until the clamp can be lowered away from the batteries.
7. Lift the battery from the battery tray.
8. Examine the battery for cracks and/or leakage. If required, replacing using the "Install Batteries" instructions provided.
9. Clean the battery and neutralize any corrosion with a solution of baking soda and water.
10. Clean the battery cables and terminals using a wire brush.


## Install Batteries

11. Set the batteries in place with the negative terminals toward the tractor.
12. Return the clamps into position and tighten the wing nuts.
13. Connect the red positive (+) battery ground cable connections and the protective rubber boots.
14. Connect the black negative (-) battery ground cable connections and the protective rubber boots.

## Prepare the Tractor For Storage

***NOTE: Storage refers to periods of approximately three months or greater.***

1. Change the hydraulic and transmission oil.
2. Change the engine coolant.
3. Drain and flush the oil from the differentials and planetary housings. Fill with new oil.
4. Change the engine oil and filter.
5. Start the engine. While the engine is warming up, operate the transmission, hydraulic system, steering and differentials to distribute new lubricant to components. Warm the engine to at least 70 °C (160 °F). Stop the engine.
6. Clean the tractor of all debris, dirt and accumulated grease.
7. Drive the tractor to the storage location.
8. Release the tension on the engine accessory drive belt(s).
9. Coat all exposed hydraulic cylinder shaft areas with grease or a rust preventive.
10. Fill the fuel tanks with fresh fuel.
11. Refer to the Cummins Owner's Manual for more engine related preparations.

## Store the Tractor

Use plastic bags or tape to seal the muffler, fuel tank breather, air intake filter and engine crankcase breather openings.

1. Touch up all scratches or chips in the paint.
2. Support the tractor on blocks to remove weight from the tires.
3. Cover the tires if they will be exposed to heat or direct sunlight.
4. If the tractor is to be stored outside, cover it with a waterproof canvas or other protective material.
5. Remove the batteries from the tractor and store them in a cool, dry, weatherproof area. Do not store the batteries on a concrete floor.

## Prepare the Tractor for Use After Storage

Perform the following checks and make any necessary adjustments or repairs before starting the tractor after storage.

**NOTICE**

Fuel poured directly into the filter will go into the fuel pump without being filtered. Ensure the fuel used for priming is clean. Remove the fuel filter and fill it with clean filtered fuel.

Refer to the Cummins Owner's Manual for the manufacturer's notes on engine related preparations after storage.

1. Remove the protective covering from the tractor tires and remove the sealing materials from the muffler, fuel tank breather, air intake filter and engine crankcase breather openings.
2. Remove the blocks. Lower the tractor onto the tires.
3. Repair any leaks.
4. Inflate the tires to the recommended pressure.
5. Install fully charged batteries. Tighten the battery connections to 20 N·m (15 ft·lb) torque.
6. Check the condition and tension of the engine accessory drive belt(s).
7. Check the fluid level of the engine crankcase, differentials, planetaries, transmission, hydraulic reservoir, brake cylinder reservoir and engine cooling system.
8. Drain sediment from the fuel tanks.
9. If the fuel filter is changed during or after storage, prime the new fuel filter, the fuel pump and the fuel lines.

## Initial Engine Startup (after storage)

**DANGER**

Do not use chemical starting aids.

An explosion can occur in the engine turbocharger or inlet heater if chemicals are injected into the intake or added to the fuel.

**NOTICE**

Do not use the throttle to increase speed when the engine is first started after storage. The engine will idle at low speed until the engine oil pressure is normal. Contact a KUBOTA dealer if the engine does not start.

Follow the normal starting procedure with the throttle in the slow idle position when all of the steps in Operation 53 have been completed.

Initial engine startup after long periods of storage can place abnormal loads on the starting system.

Do not crank the engine for longer than 30 seconds.

Allow at least two minutes between cranking cycles to permit the starting motor to cool and the batteries to recover.

## Clean Tractor

### Pressure Wash Tractor

**NOTICE**

Avoid cleaning the greasing system pump to prevent possible entry of water through the vent openings if a high pressure steam cleaner is used to clean the tractor. Water will not enter the greasing system pump during normal operating conditions.

Never spray cold water on a hot tractor engine. Do not use caustic soaps that can cause damage to the paint finish on the tractor. Read the manufacturer's instructions carefully on the soap package.

Do not spray high pressure water into the cooler/radiator area of the front grille. Damage to the cooling fins will result.

A clean tractor experiences fewer breakdowns and improves overall safety. Keeping the tractor clean will also improve its value in later years.

Use a steam cleaner or high pressure washer to clean the tractor from end to end. Pay particular attention to the underside of the tractor and the wheel area.

### Clean Cab Seat and Upholstery

The interior molding and seat inside the cab can be cleaned with a mild water/detergent solution.

1. Dip a soft cloth in a warm water/detergent solution.
2. Wring out as much water as possible.
3. Wipe the interior of the cab and seat with damp cloth as required.

### Clean Cab Floor

Keep the cab floor free of dirt and debris that may cause obstructions and contribute to safety hazards. This is especially important around the brake and inching pedal area.

Keep the cab floor clean by periodically vacuuming or sweeping and washing.

The floor mat can be removed from the cab floor by rolling it away from the walls of the cab and pulling it upward and away from the floor. The floor mat is a 2 piece rubber mat that can be washed using a mild detergent.

**This Page Is Intentionally Left Blank.**

# Section 6: Troubleshooting – Contents

**This Page Is Intentionally Left Blank.**

## Troubleshooting

This section provides information about common operating problems you may experience during the service life of your tractor.

Mechanical problems are often caused by improper operation and maintenance. Regularly scheduled maintenance and service is the best way to avoid problems.

Refer to the maintenance instructions provided in Section 5: Lubrication and Maintenance.

The following tables provide a short description of problems, possible causes and suggestions for corrective procedures.

**Table 6-1: Engine Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Engine Does Not Turn Over** | Main power disconnect switch is Off | Check disconnect switch position and turn On |
| | Battery has no charge | Check and charge battery; boost to start |
| | Starter connections loose or broken | Check and repair starter connections |
| | Starter failed or damaged | Check and replace or repair starter |
| | Other electrical problems | Check fuses. Contact a KUBOTA dealer |
| | Mechanical problem in engine | Contact a KUBOTA dealer |
| **Engine Cranks But Will Not Start, or Starts Hard** | Incorrect starting procedure | Review starting procedures |
| | Low or no fuel | Check fuel level |
| | Air leaks in fuel lines | Test and repair fuel system |
| | Insufficient (slow) cranking rpm | Refer to Table 6-3: Electrical Troubleshooting |
| | Low engine oil or incorrect viscosity | Check and top up. Use the correct oil |
| | Incorrect fuel for temperature | Use correct fuel |
| | Restricted fuel filter | Replace fuel filter(s) |
| | Water in fuel | Drain the fuel/water separator. Review correct maintenance procedures |
| | Malfunctioning fuel injector(s) | Contact a KUBOTA dealer |
| | Malfunctioning fuel solenoid | Contact a KUBOTA dealer |
| | Restricted air filter | Replace air filter(s) |
| **Engine Runs Poorly and/or Stalls** | Combustion temperature too low | Wait for the engine to reach operating temperature. |
| | Restricted fuel filter | Replace fuel filter(s) |
| | Restricted air filter | Replace air filter(s) |
| | Contaminated fuel system | Replace fuel and fuel filters |
| | Malfunctioning fuel injector(s) | Contact a KUBOTA dealer |
| | Turbo-charger malfunction | Contact a KUBOTA dealer |

**Table 6-1: Engine Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **High Engine Operating Temperature** | Over loading | Stop tractor operation and adjust loading factors. Review correct operating procedures |
| | High environmental temperatures | Stop tractor and allow engine to cool at idle speed |
| | Blocked coolers or fan failure | Check coolers and remove debris. Check fan drive operation and repair if necessary. |
| | Cooling system blocked or coolant level low | Check coolant level, service cooling system |
| **High Engine Operating Temperature** | Turbo-charger malfunction | Stop operation and contact a KUBOTA dealer |
| **Low Engine Operating Temperature** | Engine temperature gauge faulty | Contact a KUBOTA dealer |
| | Malfunctioning thermostat(s) | Contact a KUBOTA dealer |
| **Low Power/ Poor Tractor Performance** | Engine overloaded | Shift to lower gear or reduce load |
| | Air cleaner restricted | Replace air filter(s) |
| | Restricted fuel filter | Replace fuel filter(s) |
| | Incorrect type of fuel | Use correct fuel |
| | Engine overheating | Refer to High Engine Operating Temperature |
| | Implement malfunction | Refer to the implement operator's manual |
| | Low engine operating temperature | Contact a KUBOTA dealer |
| | Malfunctioning fuel injector(s) | Contact a KUBOTA dealer |
| | High idle speed is low | Contact a KUBOTA dealer |
| | Engine power derate | Refer to EIC operation in Section 3 |
| **Abnormal Engine Noise** | Low oil level | Add oil to required level |
| | Low oil pressure | Contact a KUBOTA dealer |
| | Engine overheated | Refer to Engine Overheating |
| | Internal mechanical failure | Contact a KUBOTA dealer |
| **Low Oil Pressure** | Low oil level | Add oil as to required level |
| | Oil pressure gauge faulty | Contact a KUBOTA dealer |
| | Incorrect grade or viscosity oil | Drain and refill with correct oil |
| | Internal engine component failure | Contact a KUBOTA dealer |

**Table 6-1: Engine Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Excessive Oil Consumption** | Engine oil level too high | Reduce oil to required level. Review correct maintenance procedures |
| | Incorrect viscosity oil | Use the correct viscosity oil |
| | External oil leaks | Contact a KUBOTA dealer |
| | Restricted crankcase vent | Contact a KUBOTA dealer |
| | Internal engine component failure | Contact a KUBOTA dealer |

**Table 6-2: Transmission Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Tractor Will Not Move** | Tractor is mired or obstructed | Check for and remove obstructions. Review and follow correct operating procedures |
| | Attached equipment is grounded or obstructed | Check operation of attached equipment and disconnect if necessary to move tractor |
| | Parking brake applied | Release parking brake. Review operating procedures. |
| | Transmission oil low | Check for leaks. Add hydraulic oil to the required level. Review maintenance procedures. |
| | Hydraulic system pressure low | Check for leaks; perform maintenance |
| | Transmission mechanical failure | Contact a KUBOTA dealer |
| | Control failure | Review electrical troubleshooting procedures. Contact a KUBOTA dealer |
| **Low Transmission Oil Temp** | Insufficient warm up time | Allow tractor to run at idle until all fluid pressures reach operating range. Review and follow correct operating procedures. |
| | Low transmission oil level | Check for leaks. Add hydraulic oil to the required level. Review maintenance procedures. |
| | Defective sensor circuit | Contact a KUBOTA dealer |
| | Pressure sender failure | Contact a KUBOTA dealer |
| **High Transmission Oil Temp** | Hot operating environment | Stop operating tractor and allow to cool with the engine idling |
| | Obstructed cooling system | Remove debris from coolers |
| | Overloaded tractor | Stop operation and reduce loading. Review correct operating procedures. |
| **Transmission Oil Filter Bypass** | Filter is restricted | Replace Filter |
| | Extremely cold temperature | Run tractor at low idle for 30 minutes to warm up the system. Contact a KUBOTA dealer if problem persists. |
| | Sensor circuit failure | Contact a KUBOTA dealer |
| | Sensor failure | Contact a KUBOTA dealer |

**Table 6-3: Electrical System Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **No Electrical Power** | Battery disconnect switch turned Off | Turn disconnect switch to On |
| | Loose or corroded battery connections | Clean and tighten connections |
| | Defective starting batteries | Test and replace defective batteries |
| | Fuse or relay failure | Inspect fuses and relays* |
| | Ignition switch failure | Contact a KUBOTA dealer |
| **Engine Cranks Slowly** | Loose or corroded battery connections | Clean and tighten connections |
| | Low battery output | Test and replace defective batteries |
| | Incorrect engine oil viscosity | Use the correct oil |
| | Defective starter | Contact a KUBOTA dealer |
| **Engine Will Not Crank** | Parking brake lever not applied | Apply parking brake |
| | Inching pedal not pushed down | Push down inching pedal when starting |
| | Loose or corroded battery connection | Clean and tighten loose connections |
| | Defective starting batteries | Test and replace defective batteries |
| | PTO switch on | Turn off PTO switch |
| | Incorrect ignition switch operation | Turn ignition switch to Off, then to Start. |
| | Neutral safety or PTO switch malfunction | Contact a KUBOTA dealer. |
| | Fuse or relay failure | Inspect fuses and relays at fuse box* |
| | Ignition switch failure | Contact a KUBOTA dealer |
| **Charge Indicator Light Stays On With Engine Running (Over/ Under Voltage)** | Low engine idle speed | Contact a KUBOTA dealer |
| | Loose or corroded battery connections | Clean and tighten connections |
| | Loose, damaged or missing engine accessory drive belt | Inspect belt and adjust tension. Replace if necessary. |
| | Malfunctioning batteries | Test and replace defective batteries |
| | Malfunctioning alternator | Contact a KUBOTA dealer |
| | Short circuit in electrical system | Contact a KUBOTA dealer |
| **Batteries Will Not Charge** | Batteries defective or sulfated | Test and replace batteries |
| | Malfunctioning alternator | Contact a KUBOTA dealer |
| | Loose or corroded battery connections | Clean and tighten connections |
| | Loose, damaged or missing engine accessory drive belt | Inspect belt and adjust tension. Replace if necessary. |

**Table 6-3: Electrical System Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Tractor Runs a Short Time and Shuts Off** | Automatic shutdown mode activated | Check alarm indicators for cause of shutdown. Contact a KUBOTA dealer. |
| | Air filter restriction | Replace air filter elements. Review correct maintenance procedures. |
| | Turbo-charger or air induction system failure | Contact a KUBOTA dealer. |
| | Fuel restriction | Inspect/replace fuel filter(s), contact a KUBOTA dealer. |
| **Filter Warning Lights On** | Filter restriction | Service filter, review maintenance procedures. |
| | Wiring problem | Contact a KUBOTA dealer. |
| | Sensor failure | Contact a KUBOTA dealer. |
| **Lights Not Working** | Fuses | Check fuses. Replace blown fuses*. |
| | Failed lights or ballasts | Check lights and ballasts. |
| | Loose connectors | Check lighting connectors. |

***NOTE: * Replace as required.*** **Use only fuses and relays of the correct current rating to prevent damage to the electrical system.**

**Table 6-4: Hydraulic System Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **No Hydraulic System Operation** | Low oil level | Add oil to proper level. |
| | Restricted hydraulic filter | Replace hydraulic filter. |
| | Restricted reservoir suction screen | Replace hydraulic filter. |
| | Malfunctioning hydraulic system | Replace hydraulic filter. |
| | Blown fuse or faulty relay | Replace fuses and or relays*. |
| **Hydraulic Oil Overheats** | Oil level too low or too high | Adjust oil level. |
| | Oil cooler or radiator plugged | Clean oil cooler and radiator. |
| | Blocked oil filter element | Replace filter. |
| | Flow control improperly adjusted | Adjust flow control to lower rate. |
| | Hydraulic load or orbit motor system is not matched to tractor | Contact a KUBOTA dealer. |
| **Hoses Will Not Uncouple** | Hoses being pulled at 15° angle or greater | Pull straight back on hoses. |
| | Dirty or damaged coupler | Clean or replace coupler. |
| **Hoses Will Not Couple** | Pressure in hydraulic lines | Place hydraulic system into float. |
| | Incompatible male connectors | Replace connectors with ISO standard connectors 12.7 mm (0.5 in) available from a KUBOTA dealer. |
| **Detent Disengages Prematurely** | Equipment exceeds pressure settings | Contact a KUBOTA dealer. |
| | High pressure standby set too low | Contact a KUBOTA dealer. |
| | Detent release pressure set too low | Contact a KUBOTA dealer. |
| | Incorrect time set on electric valve | Contact a KUBOTA dealer. |

**Table 6-4: Hydraulic System Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Implement Speed is Incorrect** | Flow control not properly adjusted | Adjust flow control. |
| | Incorrect oil viscosity | Replace oil with correct viscosity. |
| **Hydraulic Filter Bypass Warning Light On** | Clogged filter | Replace filter. |
| | Kinked or damaged hose | Repair or replace hose. |
| **Implements and Accessories Will Not Operate** | Hoses are not completely connected | Attach hoses correctly (see implement or accessory operation manual). |
| | Load exceeds system capacity | Reduce load or increase size of hydraulic cylinder. |
| | Lever lock restricts control lever movement | Reposition the lever lock. |
| | Low oil level | Add oil to proper level. |

***NOTE: * Replace as required.*** **Use only fuses and relays of the correct current rating to prevent damage to the electrical system.**

**Table 6-5: HVAC Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Dust Enters the Cab** | Poor seal around cabin filter element | Check seal condition. Adjust or replace as necessary. |
| | Plugged cabin filter | Clean or replace filter. |
| | Torn or defective cabin filter | Replace filter. |
| | Poor cabin sealing | Repair or adjust doors/windows for proper alignment and sealing. |
| **Poor Airflow from Vents** | Plugged cabin air filter | Clean or replace filter. |
| | Heater core or air-conditioning evaporator core is plugged or frozen | Contact a KUBOTA dealer. |
| **Cab Windows Fog Up** | Excessive moisture in the cab air system | Use the A/C system and recirculation control along with the heating system to dehumidify cab air. Position air vents toward windows. Check the A/C drain hoses for restriction. |
| **Poor Heater Output** | Heater valve shut off at engine | Turn heater valve to the fully open position. |
| | Defective engine thermostats | Contact a KUBOTA dealer. |
| | Heater core plugged | Contact a KUBOTA dealer. |
| | Cab heater controls not functioning | Contact a KUBOTA dealer. |

**Table 6-6: Brakes Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Parking Brake Does Not Work** | Lever or cable damaged | Repair or replace damaged parts. Contact a KUBOTA dealer. |
| | Broken parking brake cable or actuator lever at the rear axle | Stop operating the tractor immediately. Contact a KUBOTA dealer. |
| | Brake out of adjustment | Contact a KUBOTA dealer. |
| **Brake Pedal Bottoms Out or Feels Spongy** | Air in the hydraulic brake system | Review maintenance procedures and bleed the brake system. Contact a KUBOTA dealer. |
| | Brake bleed screw will not seal | Review maintenance procedures and tighten bleeder. Contact a KUBOTA dealer. |
| | Worn brake discs | Contact a KUBOTA dealer. |
| | Hydraulic malfunction | Contact a KUBOTA dealer. |
| **Brake Pedal Does Not Work** | Mechanical failure | Stop operating the tractor. Contact a KUBOTA dealer. |

**NOTICE**

The internal components of the parking brake may become damaged if the tractor is driven with a broken actuator arm. The actuator arm must be supported. To avoid costly and major repairs to the rear axle assembly, inspect the brake cable and actuator components on a daily basis before operating.

**WARNING**

Do not operate the tractor if the service brakes or the parking brake do not work properly. Inspect the brake mechanisms and make repairs before operating the tractor.

**Table 6-7: PTO Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Rough PTO Engagement** | Equipment loading is too high | Check operation and condition of attached equipment; review correct operating procedures for the attached equipment; review correct operating procedures for tractor PTO. |
| | Engine speed set too high for engagement | Adjust engine speed (reduce to 1 200 rpm) to lessen shock of engagement. Review correct operating procedures. |
| **PTO Will Not Engage** | Incorrect speed selection for stub shaft | Make sure the PTO speed is selected correctly for the installed stub shaft. Review correct operating procedures and use the correct stub shaft and speed settings. |
| | PTO control failure | Contact a KUBOTA dealer. |
| | PTO system mechanical failure | Contact a KUBOTA dealer. |
| **PTO Overspeed Alarm** | Engine speed too high | Set the correct engine speed for PTO operation. |
| | Improper equipment use | Review equipment operating procedures provided by the manufacturer. Review correct operating procedures for tractor PTO. |
| **PTO Slips Under Load** | Malfunction in the PTO system | Contact a KUBOTA dealer. |
| **PTO Turns When in the Off Position** | Malfunction in the PTO system | Contact a KUBOTA dealer. |

**Table 6-8: 3-pt Hitch Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Hitch Will Not Operate** | Low oil level | Check and fill the hydraulic reservoir. |
| | Loose electrical connections | Check and repair the connections at the electro-hydraulic valve and controls. |
| | Blown fuse | Replace fuse*. |
| | Hydraulic pump failure | Contact a KUBOTA dealer. |
| **Hitch Raises Too Slowly or Too Quickly** | Rate of raise adjustment incorrectly set | Adjust the flow control on the 3-pt point hitch valve section. |
| **Hitch Drops Too Slowly or Too Quickly** | Lowering rate adjustment incorrectly set | Adjust rate of lowering flow control knob. |
| **Hitch Over Raises or Lowers Causing Pump Pressure Relief** | Feedback potentiometer incorrectly adjusted | Adjust the potentiometer. |

***NOTE:*** *** Use only fuses of the correct current rating to prevent damage to the electrical system.**

**Table 6-9: Traction and Ride Troubleshooting**

| Concern | Possible Cause | Correction |
|---|---|---|
| **Tractor Rides Roughly** | Incorrect seat dampener adjustments | Adjust the seat |
| | Faulty seat suspension | Contact a KUBOTA dealer |
| | Too much ballast | Ballast the tractor correctly |
| | Tire inflation pressure too high | Adjust tire inflation correctly |
| | Implement mismatched with tractor | Use a suitable implement |
| | Implement adjusted incorrectly | Review the implement operator's manual for proper adjustments |
| **Tractor Hops or Bounces During Operation** | Incorrect ballast | Ballast the tractor correctly |
| | Incorrect tire pressure | Adjust tire inflation correctly |
| | Incorrect tire size, type or configuration | Select the proper tire combination |
| **Incorrect Wheel Slippage or Poor Traction** | Incorrect ballast | Ballast the tractor correctly |
| | Incorrect tire size, type or configuration | Select proper tire combination |
| | Incorrect tire pressure | Adjust tire inflation correctly |
| | Implement mismatched with tractor | Use a suitable implement |
| | Implement adjusted incorrectly | Review the implement operator's manual for proper adjustments |

## Tractor Fault Indicators

An indicator will flash on the EIC panel when a fault is detected by the tractor monitor systems. Read the tractor fault information and codes from the fault display screen and record the information for troubleshooting and repair.

The SPN and FMI information can be used by a KUBOTA dealer to obtain detailed fault descriptions from the OEM service data.

See also: Active Fault in Section 2: Controls and Instruments of this manual.

Use the general troubleshooting notes that follow in this section as a guide to identifying the correct actions when faults occur.

**NOTICE**

Contact a KUBOTA dealer for assistance and quote the fault code (SPN and FMI) number.

Always contact a KUBOTA dealer when directed to in the manual notes.

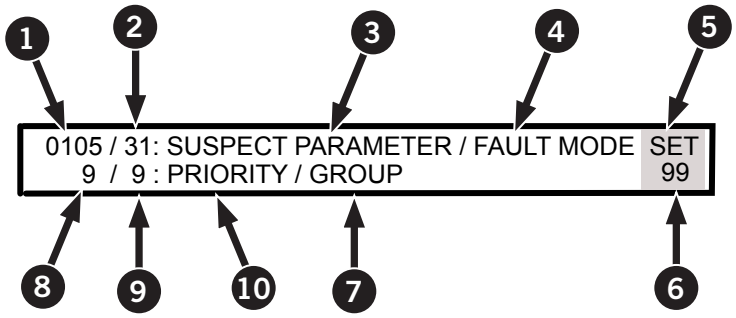



**Table 6-10: Active Fault Display**

| | | | | | |
|---|---|---|---|---|---|
| 1 | Numeric Value of SPN | 2 | Numeric Value of FMI | 3 | SPN Description |
| 4 | Description of FMI | 5 | String Identifier | 6 | Total Number of Alarms |
| 7 | Group Description | 8 | Numeric Value of Priority | 9 | Numeric Value of Group |
| 10 | Description of Priority | | | | |

# Tractor Fault Codes

## Introduction

The electronic instrument cluster (EIC) and the display monitor will warn you if there are faults with the following systems:

- Armrest: Fault code list starts on Table 6-11.
- Display: Fault code list starts on Table 6-12.
- Engine: Fault code list starts on Table 6-13.
- Transmission: Fault code list starts on Table 6-14.
- DPS-C: Fault code list starts on Table 6-15.
- FAS/FCS: Front Suspension and Cab suspension fault code list starts on Table 6-16.
- EHR: Fault code list starts on Table 6-17
- Raw: Fault code list starts on Table 6-18
- TPH/PTO: 3-pt hitch and Power Take-off (PTO) fualt code list starts on Table 6-19.

To check for faults, start the engine (a vehicle with the ignition key only turned to RUN will only detect some of the faults).

If a fault occurs with any of the systems listed above the following will occur:

- A fault icon will appear on the EIC LCD screen.
- A malfunction indicator (such as the yellow engine warning light) may flash on the electronic instrument cluster (EIC).

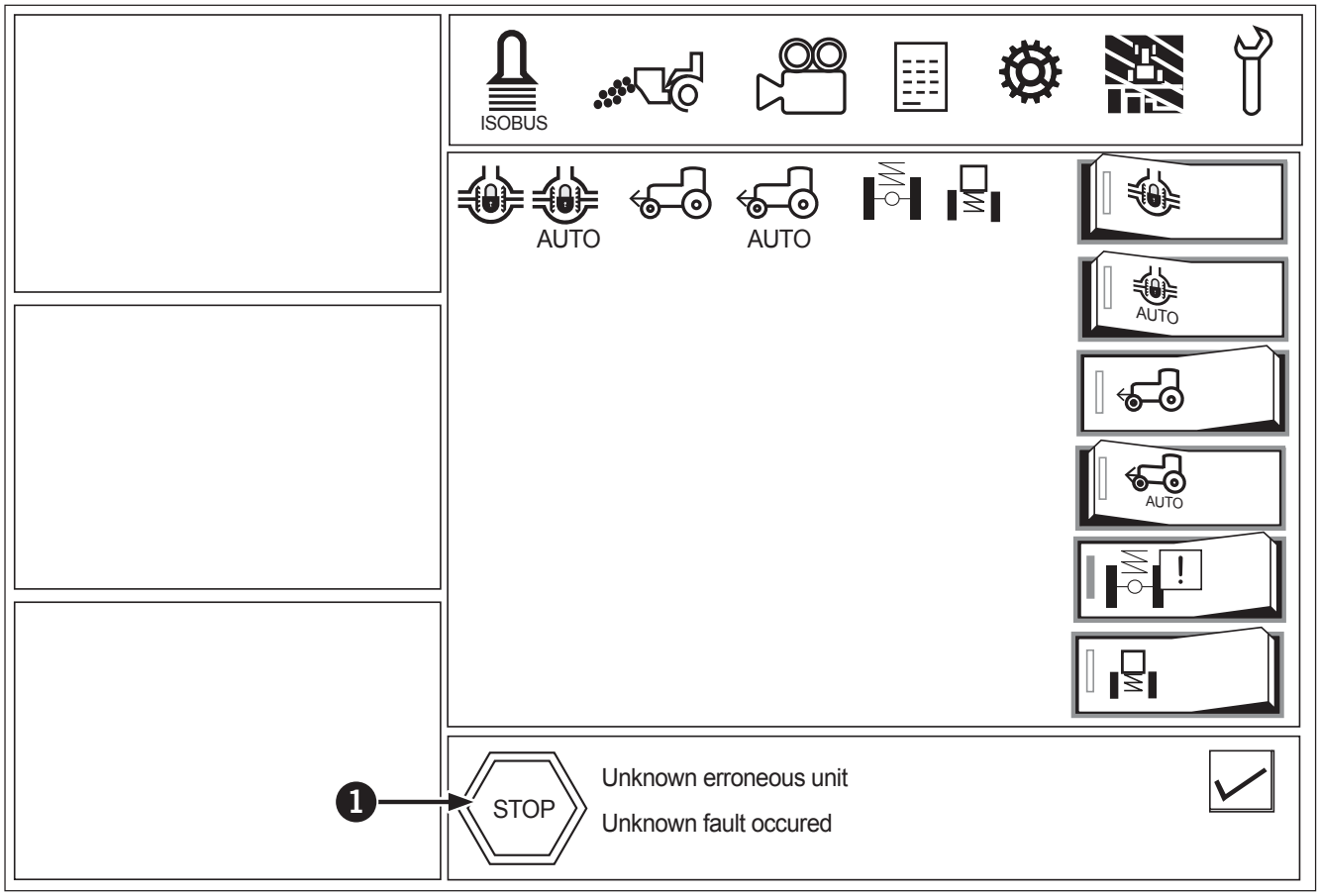
For more information on specific codes contact a KUBOTA dealer and quote the fault code number.

### Implement Valve Faults

Models M8-181 and M8-201are equipped with electro-hydraulic remote (EHR) implement valves.

***NOTE: The vehicle controller detects faults in the electro-hydraulic system. These faults are listed in***

## Checking Fault Codes Using the Display Monitor




***NOTE: The fault code menu will only be accessible if there is an active fault code. A notification (1) on the display monitor will appear.***

To check active fault codes:

1. Press on the notification (1).
2. Any active faults will appear in the fault menu/ screen. Swipe up and down to scroll through the fault code list. Fault code information is described as follows:
   - Source: Source of the active fault code (Engine, Transmission, Vehicle, Aftertreatment)
   - SPN: Suspect Parameter Number
   - FMI: Fault Mode Indicator
   - Count: The number of times the fault has occurred

## Armrest Fault Codes

The fault codes listed in Table 6-11 may appear in the "Armrest" category of active faults.

***NOTE: The fault codes are listed by SPN-FMI pairs in ascending order.***

**Table 6-11: Armrest Fault Codes**

**LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **ForwardDirection Switch** | 454656 | 2 | Receive | Forward gear direction switch on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **ForwardDirectionSwitch** | 454657 | 9 | Receive | Forward gear direction switch on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **NeutralDirectionSwitch** | 454658 | 2 | Receive | Neutral gear direction switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **NeutralDirectionSwitch** | 454659 | 9 | Receive | Neutral gear direction switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **ReverseDirectionSwitch** | 454660 | 2 | Receive | Reverse gear direction switch on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **ReverseDirectionSwitch** | 454661 | 9 | Receive | Reverse gear direction switch on multi-function lever - CAN data on VCU from armrest was not during the transmission period |
| **TransmissionNeutralLockSwitch** | 454662 | 2 | Receive | Transmission neutral lock switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **TransmissionNeutralLockSwitch** | 454663 | 9 | Receive | Front PTO normally closed switch on armrest - CAN data on VCU from armrest was not during the transmission period |
| **GearShiftUpSwitch** | 454664 | 2 | Receive | Shift up on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **GearShiftUpSwitch** | 454665 | 9 | Receive | Shift up on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **GearShiftDownSwitch** | 454666 | 2 | Receive | Shift down on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **GearShiftDownSwitch** | 454667 | 9 | Receive | Shift down on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **ArmrestStatus** | 454668 | 2 | Receive | Armrest status - CAN data received on VCU from armrest is invalid or incorrect |
| **ArmrestStatus** | 454669 | 9 | Receive | Armrest status - CAN data on VCU from armrest was not receieved during the transmission period |
| **ArmrestVersion** | 454670 | 2 | Receive | Armrest version - CAN data received on VCU from armrest is invalid or incorrect |
| **ArmrestVersion** | 454671 | 9 | Receive | Armrest version - CAN data on VCU from armrest was not receieved during the transmission period |
| **HMSPlayback1Switch** | 454672 | 2 | Receive | HMS playback 1 switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **HMSPlayback1Switch** | 454673 | 9 | Receive | HMS playback 1 switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |

**Table 6-11: Armrest Fault Codes**

**LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **HMSPlayback2Switch** | 454674 | 2 | Receive | HMS playback 2 switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **HMSPlayback2Switch** | 454675 | 9 | Receive | HMS playback 2 switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **TPHRaiseUpSwitch** | 454676 | 2 | Receive | TPH raise switch on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **TPHRaiseUpSwitch** | 454677 | 9 | Receive | TPH raise switch on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **TPHLowerDownSwitch** | 454678 | 2 | Receive | TPH lower switch on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **TPHLowerDownSwitch** | 454679 | 9 | Receive | TPH lower switch on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **AutoPowerShiftSwitch** | 454680 | 2 | Receive | Auto power shift switch on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **AutoPowerShiftSwitch** | 454681 | 9 | Receive | Auto power shift switch on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **DeadmanEnableSwitch** | 454682 | 2 | Receive | Deadman enable switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **DeadmanEnableSwitch** | 454683 | 9 | Receive | Deadman enable switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **RangeShiftEnableSwitch** | 454684 | 2 | Receive | Range shift enable switch on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **RangeShiftEnableSwitch** | 454685 | 9 | Receive | Range shift enable switch on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **EHRValvesLockSwitch** | 454686 | 2 | Receive | Hydraulics valve lock switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **EHRValvesLockSwitch** | 454687 | 9 | Receive | Hydraulics valve lock switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **TPHLockSwitch** | 454688 | 2 | Receive | TPH lock switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **TPHLockSwitch** | 454689 | 9 | Receive | TPH lock switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **EngineSpeedMemoASwitch** | 454690 | 2 | Receive | Engine speed memo A switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **EngineSpeedMemoASwitch** | 454691 | 9 | Receive | Engine speed memo A switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **EngineSpeedMemoBSwitch** | 454692 | 2 | Receive | Engine speed memo B switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |

**Table 6-11: Armrest Fault Codes**

**LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **EngineSpeedMemoBSwitch** | 454693 | 9 | Receive | Engine speed memo B switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **FrontPTONCSwitch** | 454694 | 2 | Receive | Front PTO normally closed switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **FrontPTONCSwitch** | 454695 | 9 | Receive | Front PTO normally closed switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **FrontPTONOSwitch** | 454696 | 2 | Receive | Front PTO normally open switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **FrontPTONOSwitch** | 454697 | 9 | Receive | Front PTO normally open switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **RearPTONCSwitch** | 454698 | 2 | Receive | Rear PTO normally closed switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **RearPTONCSwitch** | 454699 | 9 | Receive | Rear PTO normally closed switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **RearPTONOSwitch** | 454700 | 2 | Receive | Rear PTO normally open switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **RearPTONOSwitch** | 454701 | 9 | Receive | Rear PTO normally open switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **DeflectionFingertipTV1** | 454702 | 2 | Receive | Hydraulics fingertip 1 on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **DeflectionFingertipTV1** | 454702 | 9 | Receive | Hydraulics fingertip 1 on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **DeflectionFingertipTV2** | 454703 | 2 | Receive | Hydraulics fingertip 2 on multi-function lever - CAN data received on VCU from armrest is invalid or incorrect |
| **DeflectionFingertipTV2** | 454703 | 9 | Receive | Hydraulics fingertip 2 on multi-function lever - CAN data on VCU from armrest was not receieved during the transmission period |
| **DeflectionFingertipTV3** | 454704 | 2 | Receive | Hydraulics fingertip 3 on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **DeflectionFingertipTV3** | 454704 | 9 | Receive | Hydraulics fingertip 3 on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **DeflectionFingertipTV4** | 454705 | 2 | Receive | Hydraulics fingertip 4 on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **DeflectionFingertipTV4** | 454705 | 9 | Receive | Hydraulics fingertip 4 on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **DeflectionFingertipTV5** | 454706 | 2 | Receive | Hydraulics fingertip 5 on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **DeflectionFingertipTV5** | 454706 | 9 | Receive | Hydraulics fingertip 5 on armrest - CAN data on VCU from armrest was not receieved during the transmission period |

**Table 6-11: Armrest Fault Codes**

**LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **DeflectionFingertipTV6** | 454707 | 2 | Receive | Hydraulics fingertip 6 on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **DeflectionFingertipTV6** | 454707 | 9 | Receive | Hydraulics fingertip 6 on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **HandThrottlePosition** | 454708 | 2 | Receive | Hand throttle lever on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **HandThrottlePosition** | 454708 | 9 | Receive | Hand throttle lever on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **AWDSwitch** | 454709 | 2 | Receive | Front wheel assist switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **AWDSwitch** | 454709 | 9 | Receive | Front wheel assist switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **DifflockSwitch** | 454710 | 2 | Receive | Differential lock switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **DifflockSwitch** | 454710 | 9 | Receive | Differential lock switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **JoystickThumbWheel** | 454711 | 2 | Receive | Joystick thumb wheel on loader joystick - CAN data received on VCU from armrest is invalid or incorrect |
| **JoystickThumbWheel** | 454711 | 9 | Receive | Joystick thumb wheel on loader joystick - CAN data on VCU from armrest was not receieved during the transmission period |
| **Joystick4thFunctionSwitch** | 454712 | 2 | Receive | Joystick 4th function switch on loader joystick - CAN data received on VCU from armrest is invalid or incorrect |
| **Joystick4thFunctionSwitch** | 454712 | 9 | Receive | Joystick 4th function switch on loader joystick - CAN data on VCU from armrest was not receieved during the transmission period |
| **JoystickLockSwitch** | 454713 | 2 | Receive | Joystick lock switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **JoystickLockSwitch** | 454713 | 9 | Receive | Joystick lock switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **EHROrFrontLoaderModeSwitch** | 454714 | 2 | Receive | Hydraulic and front loader mode change switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **EHROrFrontLoaderModeSwitch** | 454714 | 9 | Receive | Hydraulic and front loader mode change switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **TPHPosition** | 454715 | 2 | Receive | Three point hitch position potentiometer on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **TPHPosition** | 454715 | 9 | Receive | Three point hitch position potentiometer on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **CreeperSwitch** | 454716 | 2 | Receive | Creeper switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **CreeperSwitch** | 454716 | 9 | Receive | Creeper switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |

**Table 6-11: Armrest Fault Codes**

**LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **FreezeRatioSwitch** | 454717 | 2 | Receive | Freeze ratio switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **FreezeRatioSwitch** | 454717 | 9 | Receive | Freeze ratio switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |
| **CruiseControlOnOffSwitch** | 454718 | 2 | Receive | Cruise control enable switch on armrest - CAN data received on VCU from armrest is invalid or incorrect |
| **CruiseControlOnOffSwitch** | 454718 | 9 | Receive | Cruise control enable switch on armrest - CAN data on VCU from armrest was not receieved during the transmission period |

## Display Fault Codes

The fault codes listed in Table 6-12 on page 6-24 may appear category of active faults.

**Table 6-12: Display Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **Display** | 454784 | | Receive | EngineSpeedMemoASoftSwitch - No Fault codes available |
| **Display** | 454785 | | Receive | EngineSpeedMemoBSoftSwitch - No Fault codes available |
| **Display** | 454786 | | Receive | EngineSpeedMemoASetpoint - No Fault codes available |
| **Display** | 454787 | | Receive | EngineSpeedMemoBSetpoint - No Fault codes available |
| **Display** | 454788 | | Receive | EngineSpeedUpperLimitSetpoint - No Fault codes available |
| **Display** | 454789 | | Receive | TransmissionSensitivitySetpoint - No Fault codes available |
| **Display** | 454790 | | Receive | AutoshiftSynchronicGearBegin - No Fault codes available |
| **Display** | 454791 | | Receive | AutoshiftSynchronicGearEnd - No Fault codes available |
| **Display** | 454792 | | Receive | AutoshiftPowershiftGearBegin - No Fault codes available |
| **Display** | 454793 | | Receive | AutoshiftPowershiftGearEnd - No Fault codes available |
| **Display** | 454794 | | Receive | AutoshiftConfigurationSelect - No Fault codes available |
| **Display** | 454795 | | Receive | EHRExtendFlowSetpoint - No Fault codes available |
| **Display** | 454796 | | Receive | EHRRetractFlowSetpoint - No Fault codes available |
| **Display** | 454797 | | Receive | EHRExtendTimerSetpoint - No Fault codes available |
| **Display** | 454798 | | Receive | EHRRetractTimerSetpoint - No Fault codes available |
| **Display** | 454799 | | Receive | EHRValve1LockSoftSwitch - No Fault codes available |
| **Display** | 454800 | | Receive | EHRValve2LockSoftSwitch - No Fault codes available |
| **Display** | 454801 | | Receive | EHRValve3LockSoftSwitch - No Fault codes available |
| **Display** | 454802 | | Receive | EHRValve4LockSoftSwitch - No Fault codes available |
| **Display** | 454803 | | Receive | EHRValve5LockSoftSwitch - No Fault codes available |
| **Display** | 454804 | | Receive | EHRValve6LockSoftSwitch - No Fault codes available |
| **Display** | 454805 | | Receive | EHRValve1TimerSoftSwitch - No Fault codes available |
| **Display** | 454806 | | Receive | EHRValve2TimerSoftSwitch - No Fault codes available |
| **Display** | 454807 | | Receive | EHRValve3TimerSoftSwitch - No Fault codes available |
| **Display** | 454808 | | Receive | EHRValve4TimerSoftSwitch - No Fault codes available |
| **Display** | 454809 | | Receive | EHRValve5TimerSoftSwitch - No Fault codes available |
| **Display** | 454810 | | Receive | EHRValve6TimerSoftSwitch - No Fault codes available |
| **Display** | 454811 | | Receive | EHRMasterLockSoftSwitch - No Fault codes available |
| **Display** | 454812 | | Receive | FrontLoaderExtendFlowSetpoint - No Fault codes available |
| **Display** | 454813 | | Receive | FrontLoaderRetractFlowSetpoint - No Fault codes available |
| **Display** | 454814 | | Receive | FrontLoaderSoftDriveSoftSwitch - No Fault codes available |
| **Display** | 454815 | | Receive | DifflockSoftSwitch - No Fault codes available |
| **Display** | 454816 | | Receive | DifflockAutoSoftSwitch - No Fault codes available |
| **Display** | 454817 | | Receive | AWDSoftSwitch - No Fault codes available |
| **Display** | 454818 | | Receive | AWDAutoSoftSwitch - No Fault codes available |
| **Display** | 454819 | | Receive | SuspendedAxleSoftSwitch - No Fault codes available |
| **Display** | 454820 | | Receive | SuspendedCabSoftSwitch - No Fault codes available |
| **Display** | 454821 | | Receive | HMSRecordSoftSwitch - No Fault codes available |
| **Display** | 454822 | | Receive | HMSDeleteSoftSwitch - No Fault codes available |
| **Display** | 454823 | | Receive | HMSToggleSoftSwitch - No Fault codes available |

**Table 6-12: Display Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **Display** | 454824 | | Receive | HMSLockSoftSwitch - No Fault codes available |
| **Display** | 454825 | | Receive | AutoPTOSoftSwitch - No Fault codes available |
| **Display** | 454826 | | Receive | Auto PTO Off Height Set point - No Fault codes available |
| **Display** | 454827 | | Receive | AutoPTOOnHeightSetpoint - No Fault codes available |
| **Display** | 454828 | | Receive | TPHLockSoftSwitch - No Fault codes available |
| **Display** | 454829 | | Receive | TPHRideControlSoftSwitch - No Fault codes available |
| **Display** | 454830 | | Receive | TPHDraftControlSoftSwitch - No Fault codes available |
| **Display** | 454831 | | Receive | TPHWheelSlipSoftSwitch - No Fault codes available |
| **Display** | 454832 | | Receive | TPHUpperLimitSetpoint - No Fault codes available |
| **Display** | 454833 | | Receive | TPHLoweringSpeedSetpoint - No Fault codes available |
| **Display** | 454834 | | Receive | TPHDraftControlSetpoint - No Fault codes available |
| **Display** | 454835 | | Receive | TPHWheelSlipSetpoint - No Fault codes available |
| **Display** | 454836 | | Receive | CreeperMaxSpeedSetpoint - No Fault codes available |
| **Display** | 454837 | | Receive | AccelerationSpeedSetpoint - No Fault codes available |
| **Display** | 456704 | | Transmit | AutoshiftModeDisplay - No Fault codes available |
| **Display** | 456705 | | Transmit | EngineSpeedMemoA - No Fault codes available |
| **Display** | 456706 | | Transmit | EngineSpeedMemoB - No Fault codes available |
| **Display** | 456707 | | Transmit | EngineSpeedMemoASetpoint - No Fault codes available |
| **Display** | 456708 | | Transmit | EngineSpeedMemoBSetpoint - No Fault codes available |
| **Display** | 456709 | | Transmit | EngineSpeedLimit - No Fault codes available |
| **Display** | 456710 | | Transmit | RadarDistance - No Fault codes available |
| **Display** | 456711 | | Transmit | HMSEdit - No Fault codes available |
| **Display** | 456712 | | Transmit | HMSRecord - No Fault codes available |
| **Display** | 456713 | | Transmit | HMSRecordState - No Fault codes available |
| **Display** | 456714 | | Transmit | HMSPlayState - No Fault codes available |
| **Display** | 456715 | | Transmit | HMSLock - No Fault codes available |
| **Display** | 456716 | | Transmit | HMSLockState - No Fault codes available |
| **Display** | 456717 | | Transmit | HMSSequenceToggle - No Fault codes available |
| **Display** | 456718 | | Transmit | HMSActiveSequence - No Fault codes available |
| **Display** | 456719 | | Transmit | HMSActiveSet - No Fault codes available |
| **Display** | 456720 | | Transmit | HMSCurrentActionNumber - No Fault codes available |
| **Display** | 456721 | | Transmit | HMSCurrentSequence - No Fault codes available |
| **Display** | 456722 | | Transmit | HMSCurrentAction - No Fault codes available |

## Engine Fault Codes

The fault codes listed in  may appear in the “Engine” or “Aftertreatment” category of active faults.

**Table 6-13: Engine Fault Codes**

**LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **EngineTotalFuelUsed** | 250 | 2 | Receive | Engine total fuel used - CAN data received on VCU is invalid or incorrect |
| **EngineTotalFuelUsed** | 250 | 9 | Receive | Engine total fuel used - CAN data on VCU was not receieved during the transmission period |
| **EngineSpeed** | 190 | 2 | Receive | Engine speed - CAN data received on VCU is invalid or incorrect |
| **EngineSpeed** | 190 | 9 | Receive | Engine speed - CAN data on VCU was not receieved during the transmission period |
| **EngineSpeedAverage** | 454912 | 2 | Receive | Engine speed average - CAN data received on VCU is invalid or incorrect |
| **EngineSpeedAverage** | 454912 | 9 | Receive | Engine speed average - CAN data on VCU was not receieved during the transmission period |
| **EngineCoolantTemperature** | 110 | 2 | Receive | Engine coolant temperature - CAN data received on VCU is invalid or incorrect |
| **EngineCoolantTemperature** | 110 | 9 | Receive | Engine coolant temperature - CAN data on VCU was not receieved during the transmission period |
| **EngineOilPressure** | 100 | 2 | Receive | Engine oil pressure - CAN data received on VCU is invalid or incorrect |
| **EngineOilPressure** | 100 | 9 | Receive | Engine oil pressure - CAN data on VCU was not receieved during the transmission period |
| **EngineTotalHoursOfOperation** | 247 | 2 | Receive | Engine total hours of operation - CAN data received on VCU is invalid or incorrect |
| **EngineTotalHoursOfOperation** | 247 | 9 | Receive | Engine total hours of operation - CAN data on VCU was not receieved during the transmission period |
| **EngineFuelRate** | 183 | 2 | Receive | Engine fuel rate - CAN data received on VCU is invalid or incorrect |
| **EngineFuelRate** | 183 | 9 | Receive | Engine fuel rate - CAN data on VCU was not receieved during the transmission period |
| **DefTankLevel** | 1761 | 2 | Receive | Aftertreatment 1 diesel exhaust fluid tank level - CAN data received on VCU is invalid or incorrect |
| **DefTankLevel** | 1761 | 9 | Receive | Aftertreatment 1 diesel exhaust fluid tank level - CAN data on VCU was not receieved during the transmission period |
| **ExhaustSystemHighTemperatureLampCommand** | 3698 | 2 | Receive | Exhaust system high temperature lamp command - CAN data received on VCU is invalid or incorrect |
| **ExhaustSystemHighTemperatureLampCommand** | 3698 | 9 | Receive | Exhaust system high temperature lamp command - CAN data on VCU was not receieved during the transmission period |

**Table 6-13: Engine Fault Codes**

**LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **DpfActiveRegenerationInhibitedStatus** | 3702 | 2 | Receive | Diesel particulate filter active regeneration inhibited status - CAN data received on VCU is invalid or incorrect |
| **DpfActiveRegenerationInhibitedStatus** | 3702 | 9 | Receive | Diesel particulate filter active regeneration inhibited status - CAN data on VCU was not receieved during the transmission period |
| **DieselParticulateFilterLampCommand** | 3697 | 2 | Receive | Diesel particulate filter lamp command - CAN data received on VCU is invalid or incorrect |
| **DieselParticulateFilterLampCommand** | 3697 | 9 | Receive | Diesel particulate filter lamp command - CAN data on VCU was not receieved during the transmission period |
| **DpfActiveRegenerationInhibitedDueToInhibitSwitch** | 3703 | 2 | Receive | Diesel particulate filter active regeneration inhibited due to inhibit switch - CAN data received on VCU is invalid or incorrect |
| **DpfActiveRegenerationInhibitedDueToInhibitSwitch** | 3703 | 9 | Receive | Diesel particulate filter active regeneration inhibited due to inhibit switch - CAN data on VCU was not receieved during the transmission period |
| **EngineProtectionSystemApproachingShutdown** | 1109 | 2 | Receive | Engine protection system approaching shutdown - CAN data received on VCU is invalid or incorrect |
| **EngineProtectionSystemApproachingShutdown** | 1109 | 9 | Receive | Engine protection system approaching shutdown - CAN data on VCU was not receieved during the transmission period |
| **EngineWaitToStartLamp** | 1081 | 2 | Receive | Engine wait to start lamp data - CAN data received on VCU is invalid or incorrect |
| **EngineWaitToStartLamp** | 1081 | 9 | Receive | Engine wait to start lamp data - CAN data on VCU was not receieved during the transmission period |
| **EngineProtectLampCommand** | 5077 | 2 | Receive | Engine protect lamp - CAN data received on VCU is invalid or incorrect |
| **EngineProtectLampCommand** | 5077 | 9 | Receive | Engine protect lamp - CAN data on VCU was not receieved during the transmission period |
| **EngineAmberWarningLampCommand** | 5078 | 2 | Receive | Engine amber warning lamp command - CAN data received on VCU is invalid or incorrect |
| **EngineAmberWarningLampCommand** | 5078 | 9 | Receive | Engine amber warning lamp command - CAN data on VCU was not receieved during the transmission period |
| **EngineRedStopLampCommand** | 5079 | 2 | Receive | Engine red stop lamp command - CAN data received on VCU is invalid or incorrect |
| **EngineRedStopLampCommand** | 5079 | 9 | Receive | Engine red stop lamp command - CAN data on VCU was not receieved during the transmission period |
| **EngineBrakeActiveLampCommand** | 5081 | 2 | Receive | Engine brake active lamp command - CAN data received on VCU is invalid or incorrect |
| **EngineBrakeActiveLampCommand** | 5081 | 9 | Receive | Engine brake active lamp command - CAN data on VCU was not receieved during the transmission period |

| Table 6-13: Engine Fault Codes | | | | |
|---|---|---|---|---|
| **LIGHT CODES: R = Red, A = Amber, N = None, P = Protect, Blink = Light is blinking** | | | | |
| **Source** | **SPN** | **FMI** | **RX/TX** | **Description (SPN–FMI)** |
| **EngineOilPressureLowLampCommand** | 5082 | 2 | Receive | Engine oil pressure low lamp command - CAN data received on VCU is invalid or incorrect |
| **EngineOilPressureLowLampCommand** | 5082 | 9 | Receive | Engine oil pressure low lamp command - CAN data on VCU was not receieved during the transmission period |
| **EngineCoolantTempHighLampCommand** | 5083 | 2 | Receive | Engine coolant temperature high lamp command - CAN data received on VCU is invalid or incorrect |
| **EngineCoolantTempHighLampCommand** | 5083 | 9 | Receive | Engine coolant temperature high lamp command - CAN data on VCU was not receieved during the transmission period |
| **EngineCoolantLevelLowLampCommand** | 5084 | 2 | Receive | Engine coolant level low lamp command - CAN data received on VCU is invalid or incorrect |
| **EngineCoolantLevelLowLampCommand** | 5084 | 9 | Receive | Engine coolant level low lamp command - CAN data on VCU was not receieved during the transmission period |
| **ParticulateTrapRegenerationInhibitSwitch** | 3695 | | Transmit | Not available |
| **ParticulateTrapRegenerationForceSwitch** | 3696 | | Transmit | Not available |
| **DpfMode** | 3699 | | Transmit | Not available |
| **EngineShutdownOverrideSwitch** | 1237 | | Transmit | Not available |

## Transmission Fault Codes

The fault codes listed in Table 6-14 will appear in the "Transmission" category of active faults.

***NOTE: The fault codes are listed by SPN-FMI pairs in ascending order.***

**Table 6-14: ZF Transmission Fault Codes**

| Source | SPN | FMI | Description (SPN–FMI) |
|---|---|---|---|
| Transmission | 0 | 0 | --- no error present --- |
| Transmission | 520222 | 31 | CPU - Processor arithmetic, push, pop, system stack |
| Transmission | 520223 | 31 | CPU - Processor register |
| Transmission | 520224 | 31 | CPU - Processor watchdog |
| Transmission | 520225 | 31 | CPU - Processor peripherals, external watchdog |
| Transmission | 520226 | 31 | CPU - Timeout at interrupt für digital inputs |
| Transmission | 520251 | 13 | EEPROM - ECU in shipment condition, parameters invalid |
| Transmission | 520227 | 31 | Flash EPROM - checksum at Init inconsistent |
| Transmission | 520227 | 31 | Flash EPROM - checksum at Run inconsistent |
| Transmission | 520229 | 31 | ECU - Application Error - application data's don't correspond to software |
| Transmission | 520250 | 13 | ECU - wrong configured - no or a not existing data set is selected |
| Transmission | 520208 | 31 | CPU - RAM addressing error - internal at Init |
| Transmission | 520209 | 31 | CPU - RAM addressing error - internal at Run |
| Transmission | 520210 | 31 | CPU - RAM addressing error - external at Init |
| Transmission | 520211 | 31 | CPU - RAM addressing error - external at Run |
| Transmission | 520240 | 2 | EEPROM - Checksum 0 (Manufacturer and ISO data) inconsistent |
| Transmission | 520241 | 2 | EEPROM - Checksum 1 (Vehicle data) inconsistent |
| Transmission | 520242 | 2 | EEPROM - Checksum 2 (History track) inconsistent |
| Transmission | 520243 | 2 | EEPROM - Checksum 3 (Calibration data) inconsistent |
| Transmission | 520252 | 13 | EEPROM - Checksum 4 (Configuration data) inconsistent |
| Transmission | 520244 | 2 | EEPROM - Checksum 5 (Error memory FMGR) inconsistent |
| Transmission | 520245 | 2 | EEPROM - Checksum 7 (acquired data) inconsistent |
| Transmission | 520212 | 31 | CPU - ILLBUS illegal external bus access |
| Transmission | 520213 | 31 | CPU - ILLINA illegal instruction access |
| Transmission | 520214 | 31 | CPU - ILLOPA illegal word operand access |
| Transmission | 520215 | 31 | CPU - PRTFLT Protection fault flag |
| Transmission | 520216 | 31 | CPU - UNDOPC no valid C167 instruction |
| Transmission | 520217 | 31 | CPU - STKUF Stack underflow |
| Transmission | 520218 | 31 | CPU - STKOF Stack overflow |
| Transmission | 520219 | 31 | CPU - NMI Non maskable interrupt |
| Transmission | 520720 | 9 | Timeout Message PTCDN1 |
| Transmission | 520721 | 9 | Timeout Message PTCDN2 |
| Transmission | 520722 | 9 | Timeout Message PTCDN3 |
| Transmission | 520723 | 9 | Timeout Message AXCDN1 |
| Transmission | 520724 | 9 | Timeout Message EEC1 |
| Transmission | 520725 | 9 | Timeout Message EEC2 |
| Transmission | 520726 | 9 | Timeout Message TFLUID |

**Table 6-14: ZF Transmission Fault Codes**

| Source | SPN | FMI | Description (SPN–FMI) |
|---|---|---|---|
| **Transmission** | 520727 | 9 | Timeout Message EEC3 |
| **Transmission** | 520728 | 9 | Timeout Message ET |
| **Transmission** | 520729 | 9 | Timeout Message FE |
| **Transmission** | 520730 | 9 | Timeout Message TSC1_VE |
| **Transmission** | 520731 | 9 | Timeout Message TSC1_VER |
| **Transmission** | 520704 | 31 | Powertrain CAN Tx/Rx Broadcast inhibited because of DM13 reception |
| **Transmission** | 520705 | 11 | Powertrain - Bus off |
| **Transmission** | 520256 | 4 | Vehicle Power Supply - Low voltage terminal 30 (9V for 1.5s) |
| **Transmission** | 520256 | 3 | Vehicle Power Supply - High voltage terminal 30 (36V immediately or 15V for 0.8s) |
| **Transmission** | 520220 | 31 | ECU Internal Main Switch - not switchable (at Init) |
| **Transmission** | 520221 | 31 | ECU Internal Main Switch - permanantly on (at Init) |
| **Transmission** | 520248 | 13 | Handthrottle - Calibration values out off limits |
| **Transmission** | 520340 | 12 | PTO NAO - Duty Cycle not detectable |
| **Transmission** | 520288 | 3 | Driving Lever - Channel 2 Signal voltage out of range high |
| **Transmission** | 520288 | 4 | Driving Lever - Channel 2 Signal voltage out of range low (SG,OC) |
| **Transmission** | 520289 | 3 | Handthrottle - Signal voltage out ouf range high |
| **Transmission** | 520289 | 4 | Handthrottle - Signal voltage out ouf range low (SG,OC) |
| **Transmission** | 520290 | 3 | Drivingpedal - Signal voltage out ouf range high |
| **Transmission** | 521286 | 31 | Drivingpedal - Check with APP |
| **Transmission** | 520290 | 4 | Drivingpedal - Signal voltage out ouf range low(SG,OC) |
| **Transmission** | 520291 | 3 | Driving Lever - Channel 1 Signal voltage out of range high |
| **Transmission** | 521287 | 31 | Driving Lever - Wrong synchronity between channel 1 and 2 |
| **Transmission** | 520291 | 4 | Driving Lever - Channel 1 Signal voltage out of range low (SG,OC) |
| **Transmission** | 520292 | 3 | Lube-Oil Pressure Sensor - Signal voltage out of range high |
| **Transmission** | 520292 | 4 | Lube-Oil Pressure Sensor - Signal voltage out of range low (SG,OC) |
| **Transmission** | 520293 | 3 | Clutch Pedal - Signal voltage out of range high |
| **Transmission** | 521288 | 31 | Clutch Pedal - Plausibility check with CCO-Switch |
| **Transmission** | 520293 | 4 | Clutch Pedal - Signal voltage out of range low (SG,OC) |
| **Transmission** | 520320 | 3 | PTO Tip Switch Fender NO Position -Short to plus |
| **Transmission** | 520320 | 8 | PTO Tip Switch Fender NO Position - Wrong PSS |
| **Transmission** | 520321 | 3 | PTO Tip Switch Cabine NO Position -Short to plus |
| **Transmission** | 520321 | 8 | PTO Tip Switch Cabine NO Position - Wrong PSS |
| **Transmission** | 520322 | 3 | Seat Switch - Short to plus |
| **Transmission** | 520322 | 8 | Seat Switch - Wrong PPS |
| **Transmission** | 520323 | 10 | Brake Pedal Switch Left - Activated too long (OC) |
| **Transmission** | 520323 | 3 | Brake Pedal Switch Left - Short to plus |
| **Transmission** | 520323 | 8 | Brake Pedal Switch Left - Wrong PPS |
| **Transmission** | 520324 | 10 | Brake Pedal Switch Right - activated too long(OC) |
| **Transmission** | 520324 | 3 | Brake Pedal Switch Right - Short to plus |
| **Transmission** | 520324 | 8 | Brake Pedal Switch Right - Wrong PPS |
| **Transmission** | 520325 | 10 | Neutral Switch - Activated too long (OC) |
| **Transmission** | 520325 | 3 | Neutral Switch - Short to plus |
| **Transmission** | 520325 | 8 | Neutral Switch - Wrong PPS |
| **Transmission** | 520326 | 3 | Control Head Forward switch - Short to plus |

**Table 6-14: ZF Transmission Fault Codes**

| Source | SPN | FMI | Description (SPN–FMI) |
|---|---|---|---|
| **Transmission** | 520326 | 8 | Control Head Forward switch - Wrong PPS |
| **Transmission** | 520327 | 3 | Control Head Reverse switch - Short to plus |
| **Transmission** | 520327 | 8 | Control Head Reverse switch - Wrong PPS |
| **Transmission** | 520328 | 3 | PTO Tip Switch Cabine NC Position -Short to plus |
| **Transmission** | 520328 | 8 | PTO Tip Switch Cabine NC Position - Wrong PSS |
| **Transmission** | 520329 | 3 | Control Head TemporaryCC switch - Short to plus |
| **Transmission** | 520329 | 8 | Control Head TemporaryCC switch - Wrong PPS |
| **Transmission** | 520330 | 10 | Control Head Cruise Control Minus - Activated too long |
| **Transmission** | 520330 | 3 | Control Head Cruise Control Minus - Short to plus |
| **Transmission** | 520330 | 8 | Control Head Cruise Control Minus - Wrong PPS |
| **Transmission** | 520331 | 10 | Control Head Cruise Control Plus - Activated too long |
| **Transmission** | 520331 | 3 | Control Head Cruise Control Plus - Short to plus |
| **Transmission** | 520331 | 8 | Control Head Cruise Control Plus - Wrong PPS |
| **Transmission** | 520332 | 10 | Control Head Cruise Control On/Off - activated too long |
| **Transmission** | 520332 | 3 | Control Head Cruise Control On/Off - Short to plus |
| **Transmission** | 520332 | 8 | Control Head Cruise Control On/Off - Wrong PPS |
| **Transmission** | 521223 | 31 | Overspeed TransOutSpeed |
| **Transmission** | 520333 | 3 | PTO Tip Switch Fender NC Position -Short to plus |
| **Transmission** | 520333 | 8 | PTO Tip Switch Fender NC Position - Wrong PSS |
| **Transmission** | 520334 | 3 | Shuttle Shift Lever F-Position - Short to plus |
| **Transmission** | 520334 | 8 | Shuttle Shift Lever F-Position - Wrong PPS |
| **Transmission** | 520335 | 3 | Shuttle Shift Lever R-Position - Short to plus |
| **Transmission** | 520335 | 8 | Shuttle Shift Lever R-Position - Wrong PPS |
| **Transmission** | 520336 | 3 | Shuttle Shift Lever O-Position - Short to plus |
| **Transmission** | 520336 | 8 | Shuttle Shift Lever O-Position - Wrong PPS |
| **Transmission** | 520337 | 10 | Control Head Dead Man - Activated too long |
| **Transmission** | 520337 | 3 | Control Head Dead Man - Short to plus |
| **Transmission** | 520337 | 8 | Control Head Dead Man - Wrong PPS |
| **Transmission** | 520338 | 3 | DIFFLOCK Tip Switch - Short to plus |
| **Transmission** | 520338 | 8 | DIFFLOCK Tip Switch - Wrong PPS |
| **Transmission** | 520339 | 3 | FWD Tip Switch - Short to plus |
| **Transmission** | 520339 | 8 | FWD Tip Switch - Wrong PPS |
| **Transmission** | 520257 | 17 | Driving Lever - Supply voltage out of range low |
| **Transmission** | 520257 | 16 | Driving Lever - Supply voltage out of range high |
| **Transmission** | 520257 | 3 | Driving Lever - Supply voltage short to plus |
| **Transmission** | 520257 | 4 | Driving Lever - Supply voltage short to ground |
| **Transmission** | 520258 | 17 | Lubricating Oil Sensor - Supply voltage out of range low |
| **Transmission** | 520258 | 16 | Lubricating Oil Sensor - Supply voltage out of range high |
| **Transmission** | 520258 | 3 | Lubricating Oil Sensor - Supply voltage short to plus |
| **Transmission** | 520258 | 4 | Lubricating Oil Sensor - Supply voltage short to ground |
| **Transmission** | 520259 | 17 | Driving Pedal - Supply voltage out of range low |
| **Transmission** | 520259 | 16 | Driving Pedal - Supply voltage out of range high |
| **Transmission** | 520259 | 3 | Driving Pedal - Supply voltage short to plus |
| **Transmission** | 520259 | 4 | Driving Pedal - Supply voltage short to ground |

**Table 6-14: ZF Transmission Fault Codes**

| Source | SPN | FMI | Description (SPN–FMI) |
|---|---|---|---|
| **Transmission** | 520260 | 17 | Hand Throttle - Supply voltage out of range low |
| **Transmission** | 520260 | 16 | Hand Throttle - Supply voltage out of range high |
| **Transmission** | 520260 | 3 | Hand Throttle - Supply voltage short to plus |
| **Transmission** | 520260 | 4 | Hand Throttle - Supply voltage short to ground |
| **Transmission** | 520261 | 17 | Clutch Pedal - Supply voltage out of range low |
| **Transmission** | 520261 | 16 | Clutch Pedal - Supply voltage out of range high |
| **Transmission** | 520261 | 3 | Clutch Pedal - Supply voltage short to plus |
| **Transmission** | 520261 | 4 | Clutch Pedal - Supply voltage short to ground |
| **Transmission** | 520262 | 31 | PPS1 for switch modules - Short to other PPS |
| **Transmission** | 520262 | 3 | PPS1 for switch modules - Short to plus |
| **Transmission** | 520262 | 4 | PPS1 for switch modules - Short to ground |
| **Transmission** | 520263 | 31 | PPS2 for switch modules - Short to other PPS |
| **Transmission** | 520263 | 3 | PPS2 for switch modules - Short to plus |
| **Transmission** | 520263 | 4 | PPS2 for switch modules - Short to ground |
| **Transmission** | 520264 | 31 | PPS3 for switch modules - Short to other PPS |
| **Transmission** | 520264 | 3 | PPS3 for switch modules - Short to plus |
| **Transmission** | 520264 | 4 | PPS3 for switch modules - Short to ground |
| **Transmission** | 520352 | 5 | PTO Solenoid - Open circuit or not operating security relais |
| **Transmission** | 521289 | 31 | PTO Clutch - Slip or wrong speed |
| **Transmission** | 520352 | 3 | PTO Solenoid - Short to plus |
| **Transmission** | 520352 | 4 | PTO Solenoid - Short to ground |
| **Transmission** | 520353 | 5 | LCO Solenoid - Open circuit |
| **Transmission** | 520353 | 3 | LCO Solenoid - Short to plus |
| **Transmission** | 520353 | 4 | LCO Solenoid - Short to ground |
| **Transmission** | 520354 | 5 | FWD Solenoid - Open circuit |
| **Transmission** | 520354 | 3 | FWD Solenoid - Short to plus |
| **Transmission** | 520354 | 4 | FWD Solenoid - Short to ground |
| **Transmission** | 520355 | 5 | DIFFLOCK Solenoid -Open circuit |
| **Transmission** | 520355 | 3 | DIFFLOCK Solenoid -Short to plus |
| **Transmission** | 520355 | 4 | DIFFLOCK Solenoid -Short to ground |
| **Transmission** | 520976 | 9 | Timeout Message DispVehicleConfig2 |
| **Transmission** | 520977 | 9 | Timeout Message DispDrivetrainStateDes |
| **Transmission** | 520978 | 9 | Timeout Message ExtDrivetrainStateDes |
| **Transmission** | 520979 | 9 | Timeout Message ExtPoti00 |
| **Transmission** | 520980 | 9 | Timeout Message ExtSwitch00 |
| **Transmission** | 520960 | 31 | Drivetrain CAN Tx/Rx Broadcast inhibited because of DM13 reception |
| **Transmission** | 520961 | 11 | Drivetrain Bus Off |
| **Transmission** | 521312 | 31 | Transmission - Gear forward does not engage (after 5s) |
| **Transmission** | 521313 | 31 | Transmission - Gear reverse does not engage (after 5s) |
| **Transmission** | 521316 | 31 | Transmission - CCO not acknowledged(after 200ms) |
| **Transmission** | 521314 | 31 | Transmission - Neutral status unplausible (not neutral, 200ms after demand) |
| **Transmission** | 521315 | 31 | Engine - Speed variation impossible |
| **Transmission** | 521248 | 31 | Vehicle - Overspeed with engaged gear (> 65km/h for 100ms) |
| **Transmission** | 521249 | 31 | Vehicle - Overspeed while neutral (> 55km/h for 100ms) |

**Table 6-14: ZF Transmission Fault Codes**

| Source | SPN | FMI | Description (SPN–FMI) |
|---|---|---|---|
| **Transmission** | 521250 | 31 | Vehicle - Engine overspeed (> 2500rpm for 100ms) |
| **Transmission** | 520784 | 19 | Powertrain CAN - TCU - Transmission input shaft speed faulty or not available |
| **Transmission** | 520785 | 19 | Powertrain CAN - EEC - Engine speed faulty or not available |
| **Transmission** | 520787 | 19 | Powertrain CAN - TCU - Transmission output shaft speed faulty or not available |
| **Transmission** | 520246 | 13 | Driving Pedal - Calibration value out of range |
| **Transmission** | 520249 | 13 | Clutch Pedal - Calibration value out of range |
| **Transmission** | 520247 | 13 | Driving Lever - Calibration value out of range |
| **Transmission** | 520356 | 10 | Brake Light - Fault OC, SG, SS |
| **Transmission** | 521251 | 31 | Hand Brake - Vehicle speed is limited to 2kph because of engaged hand brake |
| **Transmission** | 521280 | 31 | Shuttle Shift Lever3(CanReverser) - Signals implausible |
| **Transmission** | 521281 | 31 | Shuttle Shift Lever1(LeftHandReverser) - Signals implausible |
| **Transmission** | 521282 | 31 | Shuttle Shift Lever2(RightHandReversr) - Signals implausible |
| **Transmission** | 521283 | 31 | PTO Tip Switch Cabine - Signals implausible |
| **Transmission** | 521284 | 31 | PTO Tip Switch Fender - Signals implausible |
| **Transmission** | 521290 | 31 | PTO NAO - Speed range exceeded |
| **Transmission** | 521040 | 11 | AXCDN1 MsgCounter incorrect |
| **Transmission** | 521041 | 11 | AXCDN1 MsgChecksum incorrect |

## DPS-C Fault Codes

The fault codes listed in may appear category of active faults.

***NOTE: The fault codes are listed by SPN-FMI pairs in ascending order.***

**Table 6-15: DPS-C Fault Codes**

| Source | SPN | FMI | Description (SPN–FMI) |
|---|---|---|---|
| **DPS-C** | 455168 | 2 | Hazard switch - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455168 | 9 | Hazard switch - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455169 | 2 | Engine shutdown override - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455169 | 9 | Engine shutdown override - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455170 | 2 | Rear defog switch - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455170 | 9 | Rear defog switch - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455171 | 2 | Shifter neutral lock lever switch - Voltage above normal or shorted to high source |
| **DPS-C** | 455171 | 3 | Shifter neutral lock lever switch - Voltage below normal or shorted to ground |
| **DPS-C** | 455171 | 4 | Shifter neutral lock lever switch - Voltage is out of range |
| **DPS-C** | 455172 | 2 | Shifter forward lever switch - Voltage above normal or shorted to high source |
| **DPS-C** | 455172 | 3 | Shifter forward lock lever switch - Voltage below normal or shorted to ground |
| **DPS-C** | 455172 | 4 | Shifter forward lock lever switch - Voltage is out of range |
| **DPS-C** | 455173 | 2 | Shifter reverse lever switch - Voltage above normal or shorted to high source |
| **DPS-C** | 455173 | 3 | Shifter reverse lever switch - Voltage below normal or shorted to ground |
| **DPS-C** | 455173 | 4 | Shifter reverse lever switch - Voltage is out of range |
| **DPS-C** | 455174 | 2 | Shifter neutral lever switch - Voltage above normal or shorted to high source |
| **DPS-C** | 455174 | 3 | Shifter neutral lever switch - Voltage below normal or shorted to ground |
| **DPS-C** | 455174 | 4 | Shifter neutral lever switch - Voltage is out of range |
| **DPS-C** | 455175 | 2 | DPS-C left button - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455175 | 9 | DPS-C left button - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455176 | 2 | DPS-C right button - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455176 | 9 | DPS-C right button - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455177 | 2 | Brake lock switch - CAN data received on VCU is invalid or incorrect, switches are either shorted to high or shorted to ground |
| **DPS-C** | 455680 | 2 | Raven source address request - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455680 | 9 | Raven source address request - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455681 | 2 | Suspended axle calibration request - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455681 | 9 | Suspended axle calibration request - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455682 | 2 | Steering angle calibration request - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455682 | 9 | Steering angle calibration request - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455683 | 2 | Suspended cab calibration request - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455683 | 9 | Suspended cab calibration request - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455684 | 2 | Requested reverse characteristic - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455684 | 9 | Requested reverse characteristic - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455685 | 2 | Tire size configuration - CAN data received on VCU is invalid or incorrect |

**Table 6-15: DPS-C Fault Codes**

| Source | SPN | FMI | Description (SPN–FMI) |
|---|---|---|---|
| **DPS-C** | 455685 | 9 | Tire size configuration - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455686 | 2 | Rear PTO curve shape - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455686 | 9 | Rear PTO curve shape - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455687 | 2 | DPF inhibit/forced regeneration request - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455687 | 9 | DPF inhibit/forced regeneration request - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455688 | 2 | Imperial enabled - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455688 | 9 | Imperial enabled - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455689 | 2 | Tire size calibration request - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455689 | 9 | Tire size calibration request - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455690 | 2 | Steering angle installed - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455690 | 9 | Steering angle installed - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455691 | 2 | Suspended axle installed - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455691 | 9 | Suspended axle installed - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455692 | 2 | Suspended cab installed - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455692 | 9 | Suspended cab installed - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455693 | 2 | Zero sliip calibration request - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455693 | 9 | Zero sliip calibration request - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2872 | 2 | Main light command - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2872 | 9 | Main light command - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2347 | 2 | High beam headlight command - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2347 | 9 | High beam headlight command - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2349 | 2 | Low beam headlight command - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2349 | 9 | Low beam headlight command - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2351 | 2 | Alternate beam headlight command - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2351 | 9 | Alternate beam headlight command - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2369 | 2 | Right turn signal command - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2369 | 9 | Right turn signal command - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2367 | 2 | Left turn signal command - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2367 | 9 | Left turn signal command - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2863 | 2 | Front wiper switch - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2863 | 9 | Front wiper switch - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 2866 | 2 | Front washer switch - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 2866 | 9 | Front washer switch - CAN data on VCU was not receieved during the transmission period |
| **DPS-C** | 455695 | 2 | DPS-C language configuration - CAN data received on VCU is invalid or incorrect |
| **DPS-C** | 455695 | 9 | DPS-C language configuration - CAN data on VCU was not receieved during the transmission period |

## Front Suspension and Suspended Cab Fault Codes

This tractor is equipped with a front suspension. The fault code is listed in

***NOTE: The vehicle controller detects faults in the suspended axle system .***

***NOTE: The fault codes are listed by SPN-FMI pairs in ascending order.***

**Table 6-16: Front Suspension and Suspended Cab Fault Codes**

| System Effected | SPN | FMI | Failure Mode | Error Saved (Requires Recalibration to clear) | Description (SPN–FMI) |
|---|---|---|---|---|---|
| **Both** | 0 | 0 | None | FALSE | No Error |
| **Cab** | 709 | 3 | Failed Position Sensor | TRUE | Position Sensor Voltage is below 0 mm (approximately 0.040 Volts). |
| **Cab** | 709 | 4 | Failed Position Sensor | TRUE | Position Sensor Voltage is above 175 mm (approximately 4.70 Volts). |
| **Cab** | 709 | 0 | Failed Linkage / Vehicle Mechanics | TRUE | During calibration, Lower Stop is below 10 mm |
| **Cab** | 709 | 1 | Failed Linkage / Vehicle Mechanics | TRUE | During calibration, Upper Stop is above 160 mm |
| **Axle** | 710 | 3 | Failed Position Sensor | TRUE | Position Sensor Voltage is below 0 mm (approximately 0.040 Volts). |
| **Axle** | 710 | 4 | Failed Position Sensor | TRUE | Position Sensor Voltage is above 175 mm (approximately 4.70 Volts). |
| **Axle** | 710 | 0 | Failed Linkage / Vehicle Mechanics | TRUE | During calibration, Lower Stop is below 10 mm |
| **Axle** | 710 | 1 | Failed Linkage / Vehicle Mechanics | TRUE | During calibration, Upper Stop is above 160 mm |
| **Cab** | 701 | 5 | Wire Broken Cab Raise or Lower Coil | FALSE | Desired current differs from feedback by more the 500 milliamps for more the 300 milliseconds |
| **Axle** | 702 | 5 | Wire Broken/Shorted Axle Raise Coil | FALSE | Desired current differs from feedback by more the 500 milliamps for more the 300 milliseconds |
| **Axle** | 703 | 5 | Wire Broken/Shorted Axle Lower Coil | FALSE | Desired current differs from feedback by more the 500 milliamps for more the 300 milliseconds |
| **Axle** | 704 | 5 | Wire Broken Axle/Shorted Compression Coil | FALSE | Desired current differs from feedback by more the 500 milliamps for more the 300 milliseconds |
| **Cab** | 701 | 7 | Failed Valve #1 / Pump Issues | TRUE | During calibration, Suspension did not raise above 85 mm within 60 seconds of command. |
| **Cab** | 702 | 7 | Failed Valve #2 | TRUE | During calibration, Suspension did not lower below 85 mm within 60 seconds of command. |
| **Axle** | 711 | 7 | Failed Valve #1 / Pump Issues | TRUE | During calibration, Suspension did not raise above 85 mm within 60 seconds of command. |
| **Axle** | 712 | 7 | Failed Valve #2 | TRUE | During calibration, Suspension did not lower below 85 mm within 60 seconds of command. |
| **Cab** | 701 | 13 | Failed Valve #1 / Pump Issues | TRUE | During Suspension operation, did not return to upper target band within 60 seconds of raise command. |
| **Cab** | 702 | 13 | Failed Valve #2 | TRUE | During Suspension operation, did not return to lower target band within 60 seconds of lower command. |
| **Axle** | 711 | 13 | Failed Valve #1 / Pump Issues | TRUE | During Suspension operation, did not return to upper target band within 60 seconds of raise command. |

**Table 6-16: Front Suspension and Suspended Cab Fault Codes**

| System Effected | SPN | FMI | Failure Mode | Error Saved (Requires Recalibration to clear) | Description (SPN–FMI) |
|---|---|---|---|---|---|
| **Axle** | 712 | 13 | Failed Valve #2 | TRUE | During Suspension operation, did not return to lower target band within 60 seconds of lower command. |
| **Axle** | 712 | 13 | Failed Valve #2 | TRUE | During Lock Down mode, the suspension did not lower past the Calibration Lower Stop (XXX mm) within 20 seconds. |
| **Cab** | 709 | 16 | Damaged Linkage / Vehicle Mechanics | TRUE | Position sensor exceed calibrated upper stop by 20 mm. |
| **Cab** | 709 | 18 | Damaged Linkage / Vehicle Mechanics | TRUE | Position sensor below calibrated lower stopby 20 mm. |
| **Axle** | 710 | 16 | Damaged Linkage / Vehicle Mechanics | TRUE | Position sensor exceed calibrated upper stop by 20 mm. |
| **Axle** | 710 | 18 | Damaged Linkage / Vehicle Mechanics | TRUE | Position sensor below calibrated lower stopby 20 mm |
| **Cab** | 701 | 14 | Calibration Aborted | FALSE | One of the following conditions has occurred during the Calibration process:<br>1. SUSPENSION_MODE_REQUEST = Calibration Abort<br>2. PARK_BRAKE_SIGNAL <> Park Brake Active<br>3. OPERATOR_PRESENCE <> Operator Present<br>4. VEHICLE_SPEED <> 0 |
| **Axle** | 711 | 14 | Calibration Aborted | FALSE | One of the following conditions has occurred during the Calibration process:<br>1. SUSPENSION_MODE_REQUEST = Calibration Abort<br>2. PARK_BRAKE_SIGNAL <> Park Brake Active<br>3. OPERATOR_PRESENCE <> Operator Present<br>4. VEHICLE_SPEED <> 0 |
| **Both** | 597 | 9 | CCVS Message not received on CAN | FALSE | CAN message containing the Park Brake signal has not been received for 2.000 seconds; this error will clear when the message is received and if no other errors are present, then the Cab and/ or Axle will enter its respective Start-Up state. |
| **Both** | 628 | 12 | ECU Failure | TRUE | Controller memory failure |
| **Axle** | 455296 | 2 | VCU Failure | TRUE | FAS mode status - CAN data received on VCU is invalid or incorrect |
| **Axle** | 455296 | 9 | VCU Failure | TRUE | FAS mode status - CAN data on VCU was not receieved during the transmission period |
| **Axle** | 455297 | 2 | VCU Failure | TRUE | FAS calibration status - CAN data received on VCU is invalid or incorrect |
| **Axle** | 455297 | 9 | VCU Failure | TRUE | FAS calibration status - CAN data on VCU was not receieved during the transmission period |
| **Cab** | 455298 | 2 | VCU Failure | TRUE | FCS mode status - CAN data received on VCU is invalid or incorrect |
| **Cab** | 455298 | 9 | VCU Failure | TRUE | FCS mode status - CAN data on VCU was not receieved during the transmission period |
| **Cab** | 455299 | 2 | VCU Failure | TRUE | FCS calibration status - CAN data received on VCU is invalid or incorrect |
| **Cab** | 455299 | 9 | VCU Failure | TRUE | FCS calibration status - CAN data on VCU was not receieved during the transmission period |

## Electronic Hydraulic Remote (EHR) Fault Codes

The EHR fault code is listed in

***NOTE: The fault codes are listed by SPN-FMI pairs in ascending order.***

**Table 6-17: Electronic Hydraulic Remote (EHR) Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **EHR** | 455552 | 2 | Receive | Valve 1 CAN error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455552 | 9 | Receive | Valve 1 CAN error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455553 | 2 | Receive | Valve 2 CAN error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455553 | 9 | Receive | Valve 2 CAN error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455554 | 2 | Receive | Valve 3 CAN error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455554 | 9 | Receive | Valve 3 CAN error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455555 | 2 | Receive | Valve 4 CAN error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455555 | 9 | Receive | Valve 4 CAN error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455556 | 2 | Receive | Valve 5 CAN error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455556 | 9 | Receive | Valve 5 CAN error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455557 | 2 | Receive | Valve 6 CAN error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455557 | 9 | Receive | Valve 6 CAN error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455558 | 2 | Receive | Valve 1 CAN minor error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455558 | 9 | Receive | Valve 1 CAN minor error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455559 | 2 | Receive | Valve 2 CAN minor error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455559 | 9 | Receive | Valve 2 CAN minor error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455560 | 2 | Receive | Valve 3 CAN minor error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455560 | 9 | Receive | Valve 3 CAN minor error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455561 | 2 | Receive | Valve 4 CAN minor error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455561 | 9 | Receive | Valve 4 CAN minor error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455562 | 2 | Receive | Valve 5 CAN minor error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455562 | 9 | Receive | Valve 5 CAN minor error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455563 | 2 | Receive | Valve 6 CAN minor error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455563 | 9 | Receive | Valve 6 CAN minor error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455564 | 2 | Receive | Valve 1 CAN miscellaneous error information - CAN data received on VCU is invalid or incorrect |

**Table 6-17: Electronic Hydraulic Remote (EHR) Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **EHR** | 455564 | 9 | Receive | Valve 1 CAN miscellaneous error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455565 | 2 | Receive | Valve 2 CAN miscellaneous error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455565 | 9 | Receive | Valve 2 CAN miscellaneous error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455566 | 2 | Receive | Valve 3 CAN miscellaneous error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455566 | 9 | Receive | Valve 3 CAN miscellaneous error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455567 | 2 | Receive | Valve 4 CAN miscellaneous error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455567 | 9 | Receive | Valve 4 CAN miscellaneous error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455568 | 2 | Receive | Valve 5 CAN miscellaneous error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455568 | 9 | Receive | Valve 5 CAN miscellaneous error information - CAN data on VCU was not receieved during the transmission period |
| **EHR** | 455569 | 2 | Receive | Valve 6 CAN miscellaneous error information - CAN data received on VCU is invalid or incorrect |
| **EHR** | 455569 | 9 | Receive | Valve 6 CAN miscellaneous error information - CAN data on VCU was not receieved during the transmission period |

## Raw Fault Codes

The fault codes listed in may appear category of active faults.

***NOTE: The fault codes are listed by SPN-FMI pairs in ascending order.***

**Table 6-18: Raw Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **Raw** | 456192 | 0 | Receive | Left brake switch - voltages of both switches are above normal operational range |
| **Raw** | 456192 | 3 | Receive | Left brake switch - voltage of one or more switches is/ are above normal or shorted to high source |
| **Raw** | 456192 | 4 | Receive | Left brake switch - voltage of one or more switches is/ are below normal or shorted to low source |
| **Raw** | 456192 | 7 | Receive | Left brake switch - both switches are either open or both switches are closed |
| **Raw** | 456193 | 0 | Receive | Right brake switch - voltages of both switches are above normal operational range |
| **Raw** | 456193 | 3 | Receive | Right brake switch - voltage of one or more switches is/ are above normal or shorted to high source |
| **Raw** | 456193 | 4 | Receive | Right brake switch - voltage of one or more switches is/ are below normal or shorted to low source |
| **Raw** | 456193 | 7 | Receive | Right brake switch - both switches are either open or both switches are closed |
| **Raw** | 70 | 0 | Receive | Park brake switch - voltages of both switches are above normal operational range |
| **Raw** | 70 | 3 | Receive | Park brake switch - voltage of one or more switches is/ are above normal or shorted to high source |
| **Raw** | 70 | 4 | Receive | Park brake switch - voltage of one or more switches is/ are below normal or shorted to low source |
| **Raw** | 70 | 7 | Receive | Park brake switch - both switches are either open or both switches are closed |
| **Raw** | 456194 | 2 | Receive | Seat switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456194 | 3 | Receive | Seat switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456194 | 4 | Receive | Seat switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456195 | 2 | Receive | Key switch crank - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456195 | 3 | Receive | Key switch crank - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456195 | 4 | Receive | Key switch crank - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 2602 | 2 | Receive | Hydraulic oil level switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 2602 | 3 | Receive | Hydraulic oil level switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 2602 | 4 | Receive | Hydraulic oil level switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456196 | 2 | Receive | Hydraulic charge filter switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456196 | 3 | Receive | Hydraulic charge filter switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456196 | 4 | Receive | Hydraulic charge filter switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456197 | 2 | Receive | Hydraulic steering filter switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |

**Table 6-18: Raw Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **Raw** | 456197 | 3 | Receive | Hydraulic steering filter switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456197 | 4 | Receive | Hydraulic steering filter switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456198 | 2 | Receive | Hydraulic return filter switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456198 | 3 | Receive | Hydraulic return filter switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456198 | 4 | Receive | Hydraulic return filter switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 3353 | 2 | Receive | Alternator status switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 3353 | 3 | Receive | Alternator status switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 3353 | 4 | Receive | Alternator status switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456199 | 2 | Receive | Implement status switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456199 | 3 | Receive | Implement status switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456199 | 4 | Receive | Implement status switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456200 | 2 | Receive | Rear wiper low speed switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456200 | 3 | Receive | Rear wiper low speed switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456200 | 4 | Receive | Rear wiper low speed switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456201 | 2 | Receive | Rear wiper intermittent switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456201 | 3 | Receive | Rear wiper intermittent switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456201 | 4 | Receive | Rear wiper intermittent switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456202 | 2 | Receive | Radar presence status switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456202 | 3 | Receive | Radar presence status switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456202 | 4 | Receive | Radar presence status switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456203 | 2 | Receive | Front fender 3PH raise switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456203 | 3 | Receive | Front fender 3PH raise switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456203 | 4 | Receive | Front fender 3PH raise switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456204 | 2 | Receive | Front fender 3PH lower switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456204 | 3 | Receive | Front fender 3PH lower switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456204 | 4 | Receive | Front fender 3PH lower switch - voltage of the switch is below normal operational range or shorted to low source |

**Table 6-18: Raw Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **Raw** | 456205 | 2 | Receive | Front fender PTO pulse switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456205 | 3 | Receive | Front fender PTO pulse switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456205 | 4 | Receive | Front fender PTO pulse switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456206 | 2 | Receive | Rear fender PTO pulse switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456206 | 3 | Receive | Rear fender PTO pulse switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456206 | 4 | Receive | Rear fender PTO pulse switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456207 | 2 | Receive | Auto steer status switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456207 | 3 | Receive | Auto steer status switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456207 | 4 | Receive | Auto steer status switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456208 | 8 | Receive | Radar speed sensor - frequency of the sensor is higher than high threshold |
| **Raw** | 1638 | 0 | Receive | Hydraulic temperature sensor - temperature is above 104.4 degrees celcius (most severe level) |
| **Raw** | 1638 | 15 | Receive | Hydraulic temperature sensor - temperature is above 93.3 degrees celcius (moderately severe level) |
| **Raw** | 1638 | 16 | Receive | Hydraulic temperature sensor - temperature is above 82.2 degrees celcius (least severe level) |
| **Raw** | 456209 | 0 | Receive | Steering angle sensor - voltage of the sensor is above 4.9 (most severe level) |
| **Raw** | 456209 | 1 | Receive | Steering angle sensor - voltage of the sensor is below 0.2 (most severe level) |
| **Raw** | 456209 | 15 | Receive | Steering angle sensor - voltage of the sensor is above 4.6 (least severe level) |
| **Raw** | 456209 | 16 | Receive | Steering angle sensor - voltage of the sensor is above 4.75 (moderately severe level) |
| **Raw** | 456209 | 17 | Receive | Steering angle sensor - voltage of the sensor is below 0.5 (least severe level) |
| **Raw** | 456209 | 18 | Receive | Steering angle sensor - voltage of the sensor is below 0.35 (moderately severe level) |
| **Raw** | 29 | 0 | Receive | Foot pedal - voltage of the sensor is above 4.9 (most severe level) |
| **Raw** | 29 | 1 | Receive | Foot pedal - voltage of the sensor is below 0.2 (most severe level) |
| **Raw** | 29 | 15 | Receive | Foot pedal - voltage of the sensor is above 4.3 (least severe level) |
| **Raw** | 29 | 16 | Receive | Foot pedal - voltage of the sensor is above 4.6 (moderately severe level) |
| **Raw** | 29 | 17 | Receive | Foot pedal - voltage of the sensor is below 1.0 (least severe level) |
| **Raw** | 29 | 18 | Receive | Foot pedal - voltage of the sensor is below 0.5 (moderately severe level) |
| **Raw** | 96 | 0 | Receive | Fuel level - resistance is below normal operational range (moderately severe level) |
| **Raw** | 96 | 1 | Receive | Fuel level - resistance is above normal operational range (moderately severe level) |
| **Raw** | 456210 | 2 | Receive | Rear fender 3PH raise switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456210 | 3 | Receive | Rear fender 3PH raise switch - voltage of the switch is above normal operational range or shorted to high source |
| **Raw** | 456210 | 4 | Receive | Rear fender 3PH raise switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 456211 | 2 | Receive | Rear fender 3PH lower switch - voltage of the switch is is incorrect or invalid; in between mid and max range or min and mid range |
| **Raw** | 456211 | 3 | Receive | Rear fender 3PH lower switch - voltage of the switch is above normal operational range or shorted to high source |

**Table 6-18: Raw Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **Raw** | 456211 | 4 | Receive | Rear fender 3PH lower switch - voltage of the switch is below normal operational range or shorted to low source |
| **Raw** | 458240 | - | Transmit | StarterInterlock - No fault codes available |
| **Raw** | 458241 | - | Transmit | FrontWheelAssistEngaged - No fault codes available |
| **Raw** | 458242 | - | Transmit | DifflockEngaged - No fault codes available |
| **Raw** | 458243 | - | Transmit | FrontWipersLow - No fault codes available |
| **Raw** | 458244 | - | Transmit | FrontWipersHigh - No fault codes available |
| **Raw** | 458245 | - | Transmit | FrontWipersWasher - No fault codes available |
| **Raw** | 458246 | - | Transmit | RearWipersLow - No fault codes available |
| **Raw** | 458247 | - | Transmit | LowBeam - No fault codes available |
| **Raw** | 458248 | - | Transmit | HighBeam - No fault codes available |
| **Raw** | 458249 | - | Transmit | ParkLights - No fault codes available |
| **Raw** | 458250 | - | Transmit | FrontLeftTurnLight - No fault codes available |
| **Raw** | 458251 | - | Transmit | FrontRightTurnLight - No fault codes available |
| **Raw** | 458252 | - | Transmit | RearLeftFrontTurnLight - No fault codes available |
| **Raw** | 458253 | - | Transmit | RearRightTurnLight - No fault codes available |
| **Raw** | 458254 | - | Transmit | TrailerBrakeLight - No fault codes available |
| **Raw** | 458255 | - | Transmit | RearDefog - No fault codes available |
| **Raw** | 458256 | - | Transmit | RearDefogLed - No fault codes available |
| **Raw** | 458257 | - | Transmit | HVACCommand - No fault codes available |
| **Raw** | 458258 | - | Transmit | DPScWakeupStatus - No fault codes available |
| **Raw** | 458259 | - | Transmit | DelayShutdownStatus - No fault codes available |
| **Raw** | 458260 | - | Transmit | EngineEnable - No fault codes available |
| **Raw** | 458261 | - | Transmit | IsobusEcuPowerEnable - No fault codes available |

## 3-pt Hitch and Power Take-off (PTO) Fault Codes

The fault codes listed may appear in category of active faults.

***NOTE: The fault codes are listed by SPN-FMI pairs in ascending order.***

**Table 6-19: 3-pt Hitch and Power Take-off (PTO) Fault Codes**

| Source | SPN | FMI | RX/TX | Description (SPN–FMI) |
|---|---|---|---|---|
| **TPH/PTO** | 457728 | - | Transmit | FrontTphFlow - No Fault codes available |
| **TPH/PTO** | 457729 | - | Transmit | FrontTphDirection - No Fault codes available |
| **TPH/PTO** | 457730 | - | Transmit | RearPTOEnabledStatus - No Fault codes available |
| **TPH/PTO** | 457731 | - | Transmit | RearPTOSpeedSelected - No Fault codes available |
| **TPH/PTO** | 457732 | - | Transmit | RearPTOSpeed - No Fault codes available |
| **TPH/PTO** | 457733 | - | Transmit | FrontPTOEnabledStatus - No Fault codes available |
| **TPH/PTO** | 457734 | - | Transmit | FrontPTOSpeed - No Fault codes available |
| **TPH/PTO** | 457735 | - | Transmit | AutoPtoEnabledStatus - No Fault codes available |
| **TPH/PTO** | 457736 | - | Transmit | TphLockSwitch - No Fault codes available |
| **TPH/PTO** | 457737 | - | Transmit | TphRideControlSwitch - No Fault codes available |
| **TPH/PTO** | 457738 | - | Transmit | TphDraftControlSwitch - No Fault codes available |
| **TPH/PTO** | 457739 | - | Transmit | TphWheelControlSwitch - No Fault codes available |
| **TPH/PTO** | 457740 | - | Transmit | TphUpperLimitSetpoint - No Fault codes available |
| **TPH/PTO** | 457741 | - | Transmit | TphLoweringSpeedSetpoint - No Fault codes available |
| **TPH/PTO** | 457742 | - | Transmit | TphDraftConrtolSetpoint - No Fault codes available |
| **TPH/PTO** | 457743 | - | Transmit | TphWheelSlipSetpoint - No Fault codes available |
| **TPH/PTO** | 457744 | - | Transmit | TphPositionRequested - No Fault codes available |
| **TPH/PTO** | 457745 | - | Transmit | CalculatedWheelSlip - No Fault codes available |

# Section 7: Specifications – Contents

**This Page Is Intentionally Left Blank.**

## Tractor Dimensions

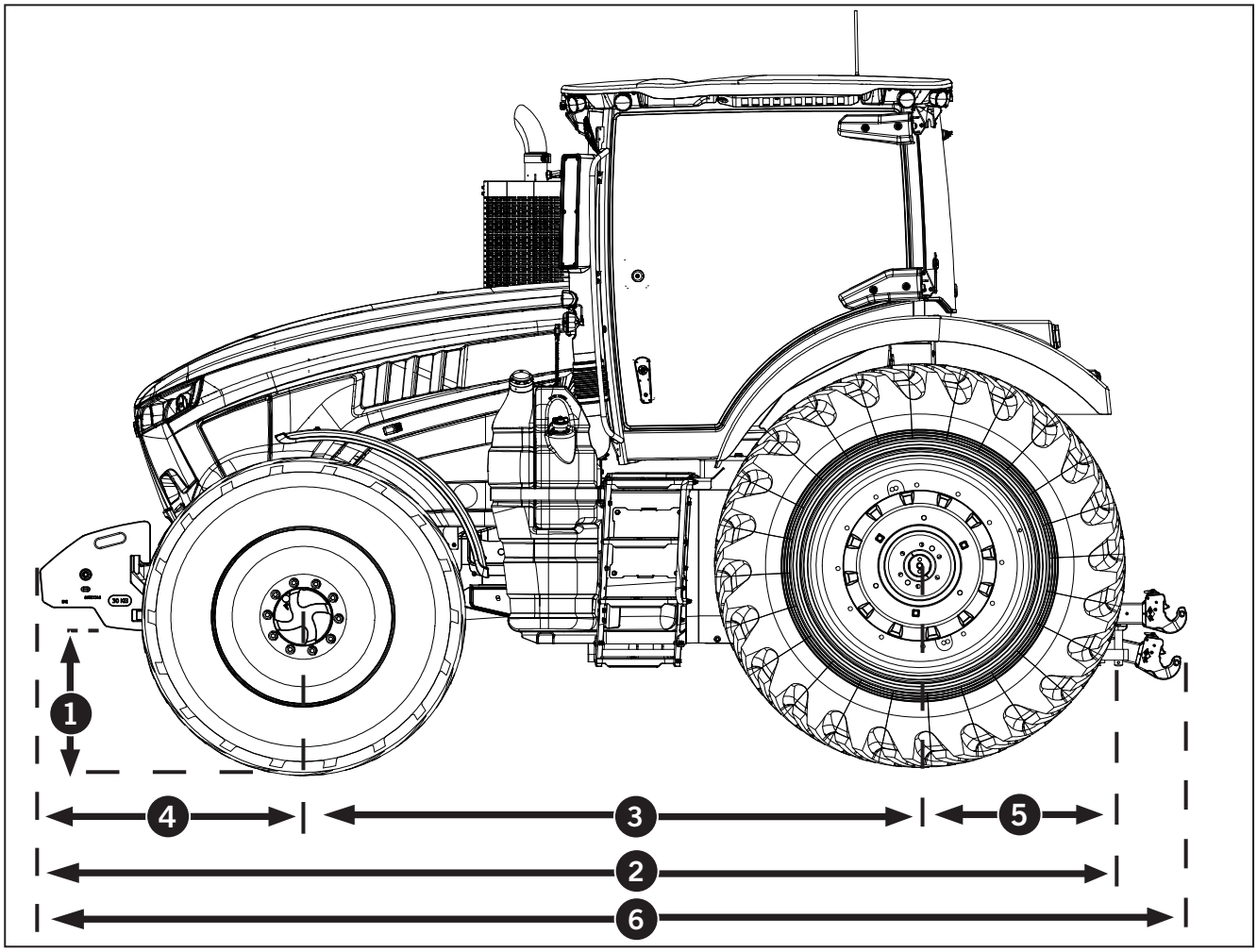
**Table 7-1: Tractor Dimensions**

| Ref | Description | mm (in) |
|---|---|---|
| 1 | Front Ground Clearance | 686 (27) |
| 2 | Overall length from nose to end of drawbar. | 5055 (199) |
| 3 | Wheelbase from center of axle to center of axle. | 2896 (114) |
| 4 | Distance from center of front axle to nose of tractor | 1245 (49) |
| 5 | Distance from center of rear axle to end of drawbar | 940 (37) |
| 6 | Distance from front bracket to end of 3-pt hitch | 5334 (210) |
| 7 | Distance from nose end of 3-pt hitch | 4945 (194) |

**NOTICE**

The specifications on the following pages are given for information and guidance only. Our policy is one of continuous improvement and we reserve the right to change prices, specifications, or equipment at any time without noticed. For further information concerning the tractor, contact a KUBOTA dealer.

All specifications are given metric units then standard imperial units.



## Overall Height

The overall height of the tractor is determined by the tire size chosen. The tire combination used for this example are 380/85R34 (Front) and 480/80R46 (Rear). Single or dual configuration does not affect the height.

## Overall Width

The overall width of the tractor is determined by the tire size chosen and whether the tractor is configured with single or dual tires in the rear.

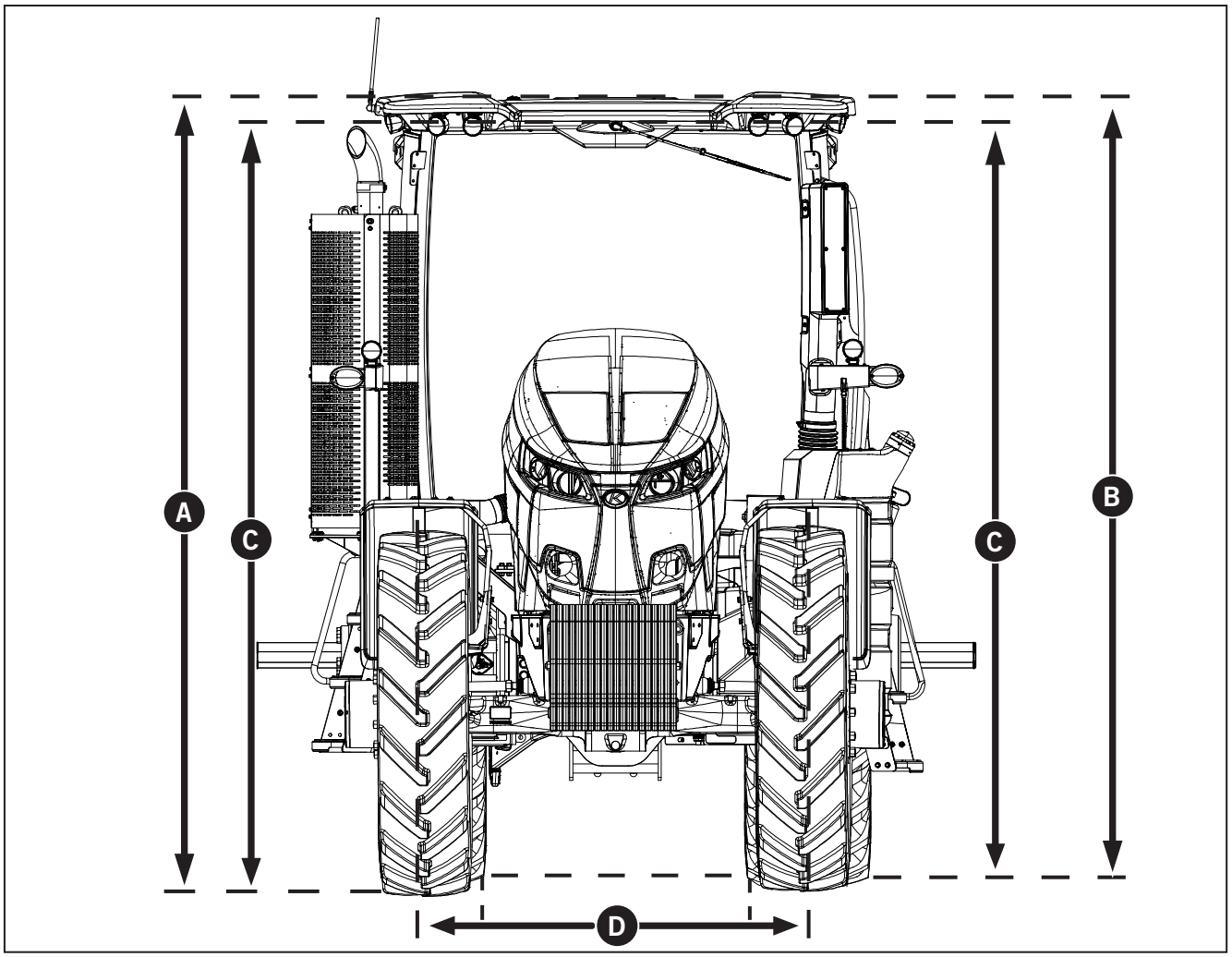
## Wheel Tread Width

The wheel tread width of the tractor will be determined by the tire size chosen. Single or dual tire configuration will also affect wheel tread width. details overall width by tire size and configuration. Tread width is shown from center to center of outer wheels. The specification provided is just an example based on the tire combination.

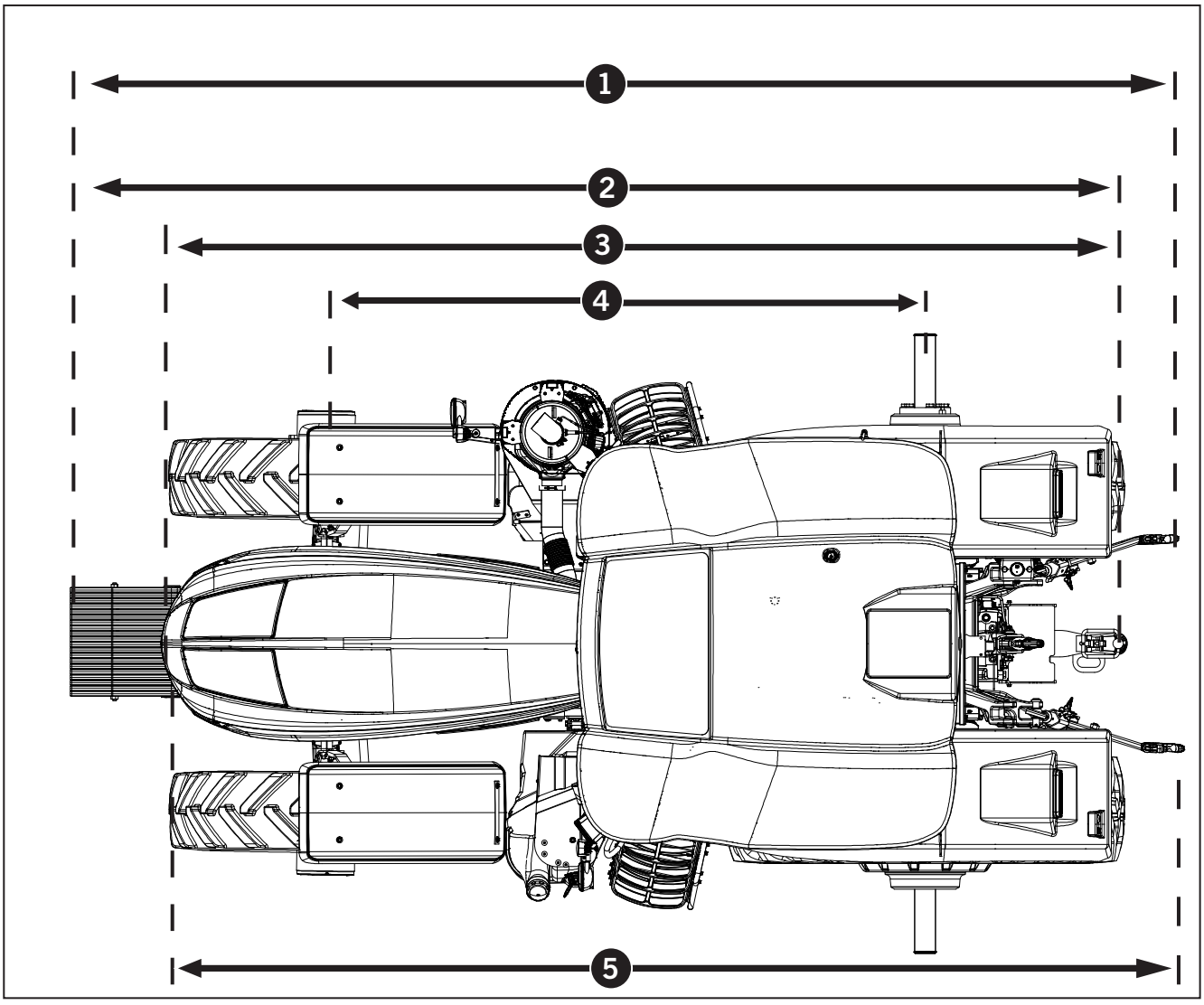
**Table 7-2: Tractor Height and Width Examples mm (in) 380/85R34 (Front) and 480/80R46 (Rear) Tires**

| Dimension | mm (in) |
|---|---|
| Height to Front of Roof (A) | 3200 (126) |
| Height to Rear of Roof (B) | 3226 (127) |
| Height to Exhaust Tip (C) | 3150 (124) |
| Tire Width Front and Rear (singles) (D) | 1850 (72.8) |

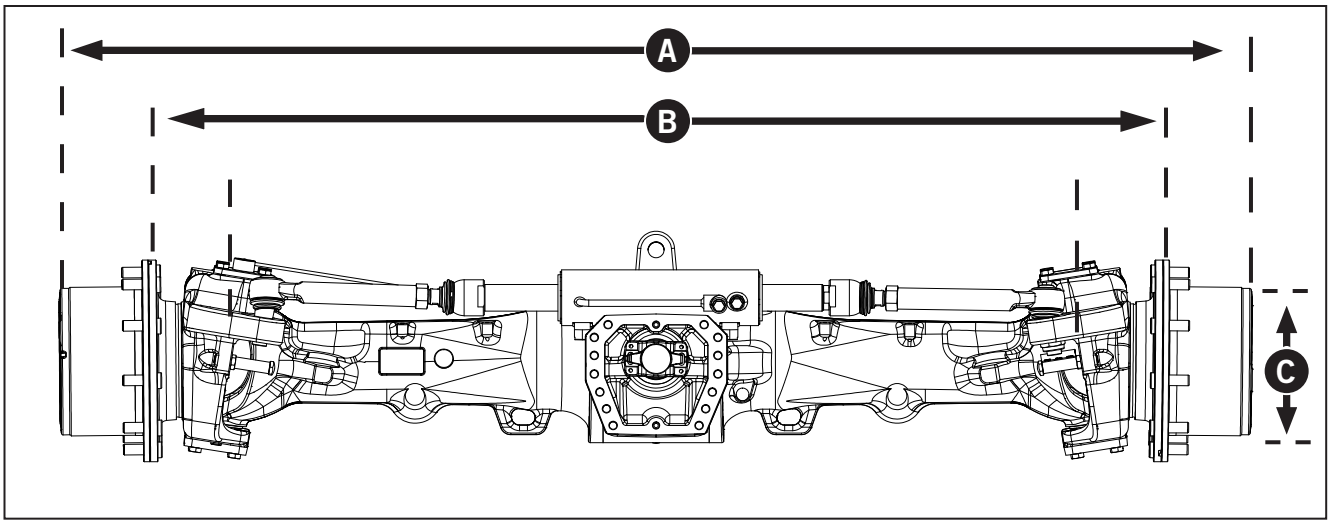
***NOTE: This table provides example heights and widths based on 2 possible tire sizes. Contact a KUBOTA dealer for assistance in measuring a tractor.***

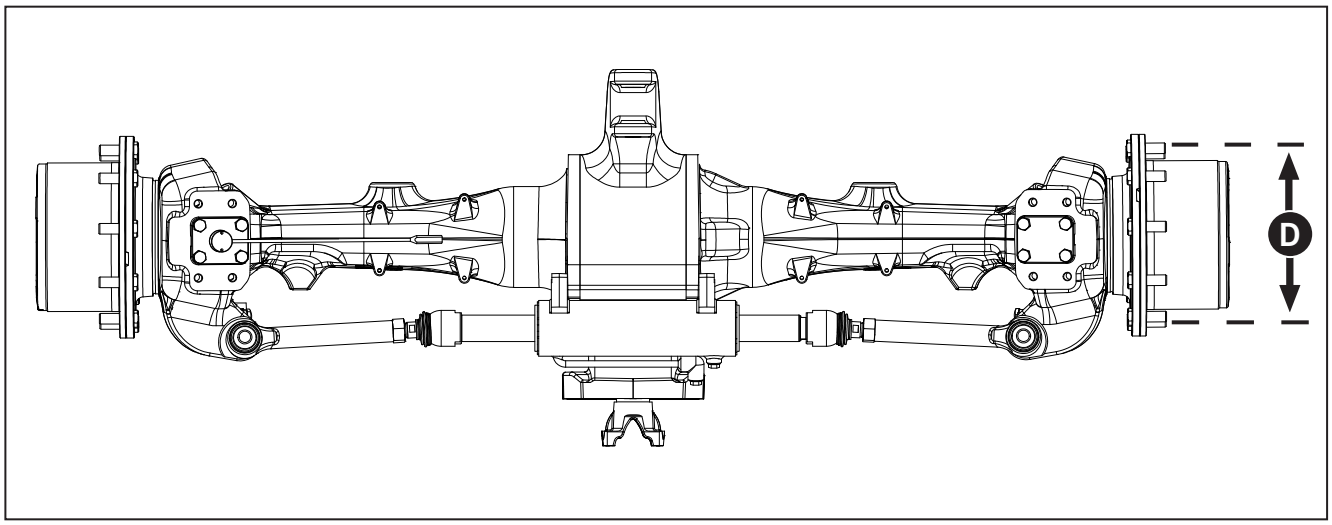


| Table 7-3: Tractor Overall Length | | |
|---|---|---|
| **Ref** | **Description** | **mm (in)** |
| 1 | Overall Length (with weight pack to end of 3-pt hitch) | 5334 (210) |
| 2 | Overall Length (with weight pack to center of drawbar pin) | 5055 (199) |
| 3 | Overall Length (without weight pack to center of drawbar pin) | 4623 (182) |
| 4 | Overall length wheelbase | 2896 (114) |
| 5 | Distance without weight pack to center of 3-pt hitch pin | 4877 (192) |



| Table 7-4: Suspended Axle Dimensions mm (in) | | |
|---|---|---|
| **Ref** | **Description** | **mm (in)** |
| A | Planetary Carrier to Planetary Carrier | 2235 (88) |
| B | Swivel Housing to Swivel Housing | 1930 (76) |
| C | Planetary Cover Diameter | 279 (11) |
| D | Wheel Stud to Wheel Stud Diameter | 305 (12) |



## Tractor Weight

**NOTICE**

It is the owner's responsibility to determine the exact weight of the tractor. Exact weights are only obtainable by weighing the tractor.

Weigh the tractor to obtain the exact weight. Both factory and dealer-installed accessories/options affect the weight of the tractor.

**Table 7-5: Maximum Gross Vehicle Weight (GVW) and Estimated Shipping Weights**

| Description | kg (lb) |
|---|---|
| M8-181 and M8-201TMT20 GVW | 10929 (24094) |
| Front Axle Weight | 5670 (12500) |
| Rear Axle Weight | 4926 (10860) |
| Front Weight Package | 600 (1323) |
| Total Base Tractor Weight | 7257.5 (16000) |

***NOTE: These weights are a manufacturer's estimate and do not include factory installed options.***

***NOTE: Weights are based on normal shipping configuration and are used as a guide for field applications.***

**Table 7-6: Tractor Weight**

| Axle and Drive Components | kg (lb) |
|---|---|
| Axles 3048 mm (120 in) | 34 (75) |
| **Front Weight Packages (FWP)** | **kg (lb)** |
| 20 x 30 Front | 600 (1323) |
| 33 x 30 Front | 990 (2432) |
| **Rear Weight Packages (RWP)** | **kg (lb)** |
| 10 x 39 | 390 (860) |
| **Front Fenders** | **kg (lb)** |
| Dynamic Front Fenders | 39 (86) |

***NOTE: These weights are a manufacturer's estimate and do not include factory installed options.***

***NOTE: Contact a KUBOTA dealer for additional information or accessories and modifications. All measures are approximate and are to be used only as a guide.***

## Tractor Specifications

The specifications on the following pages are given for your information and guidance. Contact a KUBOTA dealer for further information concerning the tractor.

All data given in this book is subject to production variations. Dimensions and weights are approximate only. For exact information about any particular tractor, contact a KUBOTA dealer.

**DANGER**

Extreme angles may result in loss of control. Tipping the tractor will cause severe damage and may result in severe personal injury or death.

### Operation Specifications

| Table 7-7: Operating Limits | | |
|---|---|---|
| | **mm** | **in** |
| Outside Wheel Track Radius | 6400 | 252 |
| Drawbar Center Turn Radius | 4810 | 189 |

***NOTE: Turning radius dimensions are estimated based on geometry of the components and do not allow for brake assisted turning which decreases the turning radius. Wheel spacing used for measurement is 1 524 mm (60 in).***

| Table 7-8: Maximum Tractor Operating Angle | |
|---|---|
| Front End – Rear End | 25 degrees off horizontal |
| Side to Side | 25 degrees off horizontal |

## QSB 6.7 Engine

| Table 7-9: Engine and Fuel System Specifications | |
|---|---|
| Models | M8-181 and M8-201 |
| Engine Type | Cummins Model QSB6.7 |
| Engine Displacement | 6.7 litres (409 C.I.D.) |
| Engine Weight (wet) | 583 kg (1 285 lb) |
| Emissions Control | Tier IV Final |
| Electronic Control | Fully Integrated Electronic Control (ECM) |
| Rated Engine Speed | 2100 rpm |
| Engine Power Rating | 180 HP<br>200 HP |
| Peak Torque | M8-181: 863 N·m (637 ft·lb)<br>M8-201: 906 N·m (668 ft·lb) |
| PTO Power | M8-181: 145 HP @ 2000 rpm<br>M8-201: 159 HP @ 2000 rpm |
| PTO Speed @ PTO Standard rpm (2 000 rpm) | 1000 rpm |
| Rear PTO Type 1 | 35 mm (1.375 in) 540 rpm PTO shaft |
| Rear PTO Type 2 | 35 mm (1.375 in) 1000 rpm PTO shaft |
| Rear PTO Type 3 | 45 mm (1.750 in) 1000 rpm PTO shaft |
| Number of Cylinders | 6 |
| Cylinder Bore and Stroke | 107 mm (4.21 in) x 124 (4.88 in) |
| Firing Order | 153624 |
| Compression Ratio | 17.3:1 |
| Induction | Turbo-Charged with Charge Air Cooling |
| Turbocharger | Variable Geometry (VGT ™) |
| Exhaust | Selective Catalytic Reduction with Diesel Oxidization Catalyst (SCR with DOC) |
| Crankcase Ventilation | High Performance Coalescing Filter |
| Fuel System | Cummins Extra High Pressure Injection (XPI) |
| Injection Pump | Cummins/Bosch |
| Fuel Filtration | Two Stage: Water Separator and Particulate Filter |
| Fuel Inlet Restriction (max) | 33.8 kPa (4.9 psi) |
| Return Pressure | 30 kpa (4.3 psi) |
| Lift Pump | Mechanical |

| Table 7-12: QSB 6.7 Power Ratings | | |
|---|---|---|
| **Model** | **Rated kW (hp) @ 2 100 rpm** | **Max kW (hp) @ 1 900 rpm** |
| M8-181 | 134 (180) | 153 (205) |
| M8-201 | 149 (200) | 164 (220) |

***NOTE:*** **Engine warranty requires full compliance with Cummins service procedures.**

***NOTE:*** **The engine is entirely controlled by the Cummins Engine Control Module (ECM) and there are no user adjustable components.**

***NOTE:*** **The Cummins Owner's Manual provides details of user service recommendations for fluid and filter checks and changes. See the Cummins Owner's Manual for details or contact a KUBOTA or Cummins dealer.**

| Table 7-10: Engine Lubricating Oil System Specifications | |
|---|---|
| Regulated Operating Pressure | 517 kpa (75 psi) |
| Minimum Oil Pressure (low idle) | 69 kpa (10 psi) |
| Minimum Oil Pressure (at rated engine speed) | 380 kpa (55 psi) |
| Lubricating Oil Filter Capacity | 0.950 L (0.25 gal) |
| Engine Oil Pan Capacity | 14.2 L (3.75 gal) |
| Maximum Engine Oil Capacity | 16.7 L (4.41 gal) |
| Oil Pan Drain Plug Torque | 80 N·m (59 ft·lb) |

## Cooling System

| Table 7-11: Cooling System Specifications | |
|---|---|
| Thermostats | 1 |
| Begin to Open | 70 °C (160 °F) |
| Fully Open | 82.8 °C (181°F) |
| Radiator Pressure Cap | 1.0 bar (15 psi) |
| Block Heater | 1 000 Watt |

## Hydraulics

| Table 7-13: Hydraulics Specifications | |
|---|---|
| Hydraulic System | Closed Center Load Sensing |
| Nominal System Pressure | 200 bar (2900 psi) |
| Hydraulic Pump | 118 lpm (31 gpm) standard flow pump<br>166 lpm (44 gpm) high flow pump |
| Rated Flow/Engine Speed Standard Flow | 118 lpm (31 gpm)/2100 rpm<br>126 lpm (33 gpm)/2250 rpm max speed |
| Rated Flow/Engine Speed High Flow | 166 lpm (44 gpm)/2100 rpm<br>178 lpm (47 gpm)/2250 rpm max speed |
| Remote Control SB24 Valve | 120 Lpm (31.7 gpm) |
| Remote Hydraulic Brake (Option) | 145 bar (2150 psi) maximum output pressure |

## Transmission

- Continuously variable, hydrostatic-mechanical powersplit transmission consists of 4 planetary stages and 4 multi-disk clutches.
- The transmission is equipped with a reversing transmission with starting and reversing clutch in countershaft design.
- The shifting elements have synchronous speed in all gear-change points.
- High level of operating comfort.
- Selection of different operating modes optimally matched to the individual applications, e.g. constant speed during cultivation, harvesting and traction work, constant engine speed during PTO shaft operations, automatic, efficiency-oriented driving within economic engine performance characteristics
- Increased field productivity by optimum utilization of engine power.
- Optimized emission levels through appropriate engine control. Equal tractive efforts forward / reverse.

| Table 7-14: Transmission Specifications | |
|---|---|
| | **TMT 16/18/20** |
| Transmission input speed | 2200 min-1 |
| Input torque max. | 703 N·m (519 ft·lb) |
| Transmission input power max. | 121 kW (162 hp) |
| Vehicle speed forward | 50 km/h (31 mph) |
| Vehicle speed reverse | 30 km/h (19 mph) |
| Vehicle weight transport/ PTO at 50 km/h | 10000 kg (22046 lb) |
| Vehicle weight field operations | 8766 kg (19326 lb) |
| Rear axle load transport/PTO | 8400 kg (18519 lb) |
| Rear axle load traction operations | 7000 kg (15432 lb) |
| Tire size max. rear | 855 mm (34 in) |
| Tire size max. front | 675 mm (27 in) |

## Transmission Oil

**CAUTION**

Only use oils listed in the valid ZF List of Lubricants.

For transmission TMT16/18/20 ZF requests the use of high-quality oils. The oils are released by ZF and indicated in the ZF List of Lubricants TE-ML06.

Prescribed/approved transmission oils for rear axle final drives (planetary drive) see ZF-list of lubricants TE-ML 21.

The ZF List of Lubricants is being continuously updated to consider newly added oils and changed trade names. Only the latest version is applicable. It can be obtained or viewed as follows:

- at all ZF plants
- at all ZF service organizations
- Internet http://www.zf.com

## Transmission Oil Temperature

The transmission oil temperature must be >-7°C.

If the transmission oil temperature is < -7°C warm up the transmission in neutral.

**Table 7-16: Transmission Oil Temperature Specifications**

| Oil Temperature | Permanently | Temporarily (<2 h) |
|---|---|---|
| Up to 20 km/h | 80 °C (176 °F) max | 90 °C (194 °F) max |
| Above 20 km/h | 90 °C (194 °F) max | 100 °C (212 °F) max |

## 3-pt Hitch

| Table 7-17: 3-pt Hitch Specifications | |
|---|---|
| Linkage | Category 3N/3 |
| Maximum lift capacity @ 610 mm (24 in) behind hitch point | 5 080 kg (11 200 lb) |
| Cylinder<br>Diameter<br>Stroke | <br>2 x 114.3 mm (4.5 in)<br>305 mm (12 in) |
| Drawbar | Adjustable Swinging Drawbar |
| Maximum Drawbar Offset | 214 mm (8.4 in) |

## Drawbar

| Table 7-18: Drawbar Specification | |
|---|---|
| Drawbar Pin Diameter | 38 mm (1.5 in) |
| Drawbar Clevis Throat | 92 mm (3.6 in) |
| Hitch Point to PTO Shaft Distance | Rear 406 mm (16 in)<br>Center 508 mm (20 in)<br>Forward 609 mm (24 in) |
| Drawbar Maximum Static Downward Load: | |
| Shortest Drawbar Position | 2 700 kg (5 952 lb) |
| Regular Drawbar Position | 1 800 kg (3 968 lb) |
| Extended Drawbar Position | 1 300 kg (2 866 lb) |
| Heavy Duty Drawbar Option at Shortest position | 2 900 kg (6 393 lb) |

## Brake System

| Table 7-19: Brakes Specifications | |
|---|---|
| Brakes | Self Adjusting Inboard (differential/axle housing) Hydraulic Wet Discs |
| Number of Discs | 5 |
| Disc Diameter (O.D.– I.D.) | 368–305 mm (9.5 – 7 in) |

## Steering System

| Table 7-20: Steering Specifications | |
|---|---|
| Type | Hydrostatic with Tilt and Telescopic Steering Wheel |
| Maximum Pressure | 186 bar (2700 psi) |
| Toe-in Adjustment | 0 – 6.3 mm (0 – 0.25 in) |

## Electrical System

| Table 7-21: Electrical Specifications | |
|---|---|
| Batteries | 2 x 950 Cold Cranking Amps (CCA) Rated |
| Alternator | Heavy Duty 12V (200A) |
| Starter Motor | Positive Engagement Solenoid Operated 7.2 kW (9.6 hp) |
| Radar (option) | 58.9 Hz/mph |
| Radio (option) | Consult a KUBOTA dealer |

## Fluid Capacities

| Table 7-22: Fluid Capacities | | |
|---|---|---|
| | **litres (L)** | **gallons (gal)** |
| Total Fuel Capacity | 375 L | (99 gal) |
| DEF Tank | 35 L | (9.2 gal) |
| Cooling System | 11 L | (3.0 gal) |
| Engine Oil with Filter | 25.6 L | (6.76 gal) |
| Front Hubs (individual) | 5 L | (1.32 gal) |
| Rear Planetary Oil | 11 L | (2.9 gal) |
| Transmission/Rear Axle/Hydraulic System | 83 L | (22 gal) |
| Working Hydraulic | 40 L | (10 gal) |

***NOTE: Operating remote cylinders may require adding extra hydraulic oil to the rear axle.***

### Adding Hydraulic Oil for Hydraulic Remote Operation

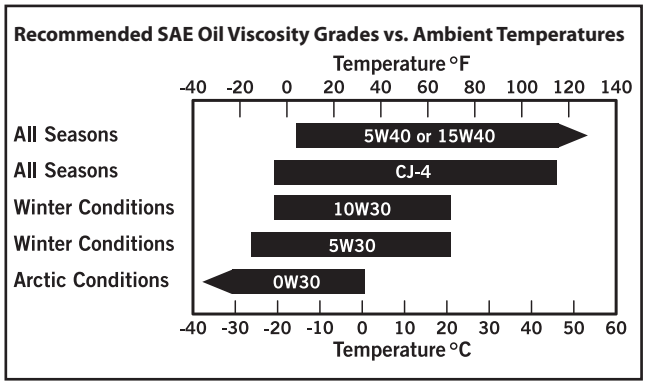
This must be done with all the rams fully extended. Make sure not to add more than the necessary amount needed to bring the level to the full mark on the dipstick. Remote cylinders with a total capacity of up to 23 L (6 gal) may be connected to the tractor without adding oil provided the tractor is operated on level ground.

Normal oil changes require less than the total fill capacity of the axle assembly. The difference may be as much as 23 litres (6 gal) and is the result of oil being retained in passages and control systems.

# Lubricants and Fluids

## Summary of Lubricants and Fluids

**Table 7-23: Summary of Lubricants and Fluids**

| Components | Specification |
|---|---|
| Engine Oil (See note 1 below) | **Recommended:** CES 20086 or oil classification API CK-4<br>**Permitted:** Cummins Engineering Standard (CES) 20081 or oil classification API CJ-4, ACEA E9, JAMA DH-2<br>• 15W-40 (All season – recommended for diesel engines)<br>• 10W-30 (Winter conditions – recommended for diesel engines)<br>• 5W-30 (Arctic conditions – recommended for diesel engines)<br>• Do not use aftermarket oil additives |
| |  |
| Fuel | Use Ultra-low Sulphur Diesel (ULSD) only (less than 15 ppm in North America, less than 10 ppm in the European Union).<br>• For ambient temperatures above 0 °C (32 °F), use Number 2D diesel with a minimum cetane level of 42.<br>• For ambient temperatures below 0 °C (32 °F), use a blend of Number 1D and 2D diesel with a minimum cetane level of 45.<br>• Fuel must be free of dirt and water.<br>• Never use blended fuels.<br>• Biodiesel: A B20 blend of ULSD and biodiesel (up to 20 % biodiesel). In North America, biodiesel must be purchased from a BQ-9000 Certified Marketer (website: http://www.bq-9000.org). If outside of North America, contact a Cummins Inc. representative.<br>• Contact a KUBOTA dealer for more information and suppliers of ULSD fuels and about cold weather operations.<br>• Fuel storage: see . page 7-22.<br>• 2-D – ABOVE -7°C (20°F)<br>1-D (blended with 2D) – BELOW -7°C (20°F) |
| Diesel Exhaust Fluid (DEF) | Must meet ISO 22241-1 or DIN 70070. Commercial grade only. |
| Hydraulic, Transmission and Rear Axle | ZF 21A, 21C, 21G<br>10w-30 Universal Tractor Transmission Oil (U.T.T.O) |

| Table 7-23: Summary of Lubricants and Fluids | | |
|---|---|---|
| **Components** | **Specification** | |
| | Examples of acceptable brand name oils | |
| | Brand | Equivalent Specification |
| | KUBOTA | KUBOTA UDT-HD fluid (Canada makert: K4-Trans Hydraulic Oil) |
| | Imperial Oil (Esso) | Hydraul 56 |
| | Shell | Spirax S4 TXM |
| | Texaco | TDH |
| | Amoco | 2016 (United States)<br>01055 (Canada) |
| | Petro-Canada | Duratran |
| | Exxon Mobil | 424 |
| Grease Fittings | STD Grease Lithium base High Temperature EP 2 (NLGI 2): Use to lubricate the 3-pt hitch. | |
| Front Wheel Bearings | Lithium Base EP High Temperature | |
| Air-conditioning Refrigerant | R134a | |
| A/C Compressor Oil | PAG 46 | |

***NOTE: Use only Ultra Low Sulfur Fuel. Failure to use proper fuel could result in emissions control failure and damage to the exhaust after treatment system.***

* Factory Fill

***NOTE: Cummins Inc. recommends the use of high-quality 15W-40 multi-viscosity heavy duty engine oil that meets the minimum requirements of Cummins Engineering Specification CES 20081. American Petroleum Institute (API) specifications are similar to Cummins but the Cummins specification always takes precedence. Use of lower grade oils will invalidate the manufacturer's warranty and may cause severe damage to the engine.***

Most popular brand Heavy Duty engine oils that meet API specifications will also meet the Cummins specification. Always read the product description and specifications to determine its suitability for use.

(See the Cummins QSL Engine Operation and Maintenance Manual for further details.)

## Front Axle Lubricants

| Table 7-24: Recommended Front Axle Lubricants | |
|---|---|
| **Brand** | **Type** |
| KUBOTA | KUBOTA UDT-HD fluid (Canada makert: K4-Trans Hydraulic Oil) |
| Imperial Oil Esso | GX |
| Shell | Spirax S3 AX |
| Texaco | Multigear |
| Petro Canada | TRAXON |
| Exxon Mobil | Mobilube |

| Component | Fluid Type | Type |
|---|---|---|
| Differential and Planetary | Gear Oil | SAE 80W/90 (API GL4 or GL5) |
| Final Drive | Gear Oil | SAE 80W/90 (API GL4 or GL5) |
| Bearings, Bushings and Seals | Grease | Lithium–EP 2 or NLGI EP 3 with Moly Additive |

## Engine Coolant Specifications

| Table 7-25: Coolant Specfications | |
|---|---|
| Engine Coolant* | • Factory Filled – Includes DCA4 Additive, Fully Formulated (Propylene or Ethylene Glycol) (Pink Color)<br>• Coolant must meet Cummins Engineering Standard (CES) 14603.<br>• See for water quality, contaminate limits, SCA levels and freezing points. |

| Table 7-26: Coolant Properties | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Property** | | **Ethylene Glycol (% by volume)** | | **Propylene Glycol (% by volume)** | | | **Pure $H^2O$** |
| Glycol Concentration | 40 | 50 | 60 | 40 | 50 | 60 | 0 |
| Specific Gravity, 16 °C (50 °F) | 1.062 | 1.076 | 1.088 | 1.038 | 1.043 | 1.047 | 1.000 |
| Freezing Point °C (°F) | -24 (-12) | -37 (-34) | -52 (-62) | -21 (-6) | -33 (-27) | -49 (-56) | 0 (32) |
| Boiling Point °C (°F) at Sea level | 106 (222) | 108 (226) | 111 (232) | 104 (219) | 106 (222) | 109 (228) | 100 (212) |

For operation of Diesel Engines in Cold Climates (Arctic conditions) -32°C to -54°C (-25°F to -65°F), Cummins Inc. recommends use of a 65% ethylene glycol antifreeze mixture. 68% antifreeze (ethylene glycol) is the absolute maximum allowable. Propylene glycol is not recommended for Arctic conditions due to possible gelling.

***IMPORTANT:****The coolant must be replaced if any contaminant level exceeds the following limits:*

*Factory Fill

***IMPORTANT:****The coolant must meet Cummins Engineering Standard CES 14603.*

Antifreeze or coolant must be used in all climates for both freeze and boiling point protection. Cummins Inc. recommends filling the cooling system with premixed fully formulated coolant or with a 50/50 mixture of high-quality water and fully formulated concentrated antifreeze for most conditions.

| Table 7-27: Coolant Contaminate Limits | |
|---|---|
| **Contaminate** | **Allowable Level** |
| Sulfate (SO4) | 1 500 ppm. Maximum |
| Chloride (Cl) | 200 ppm. Maximum |
| Oil or fuel contamination | Must not contain any oil or fuel |
| PH | 6.5 minimum |
| Grease, solder bloom, silica gel, rust or scale | Must be free of these contaminants |

## DEF Storage

Before using anything to store or dispense (diesel exhaust fluid) DEF, such as containers or funnels, wash these items with disilled water, not tap water. Tap water will contaminate the DEF.

- If distilled water is not available, rinse the items with tap water first, and then with DEF.

Ambient temperature and the duration of storage are the 2 major factors that affect the shelf life of DEF. In ideal storage conditions, DEF will have a minimum shelf life of 18 months. Ideal conditions are:

- Storage temperature between -5 °C to 25 °C (-65 °F to 77 °F)
- Store in sealed, approved containers made of polyethylene or polypropylene.
- No direct sunlight

Higher temperatures and extended storage periods will reduce DEF shelf life.

- The shelf life will be reduced by 6 months for every 5 °C (9 °F) above 25 °C (77 °F).
- Avoid storing DEF in the tractor for more than 6 months.
- Test the DEF if it has been stored for extended periods of time.

## Testing Diesel Exhaust Fluid

Test the DEF quality if:

- The DEF has been stored for an extended period of time, or
- You suspect water has been added to the DEF tank. If any other incorrect fluid has been added to the DEF tank, such as coolant or fuel, contact an Authorized Cummins Repair Location for help.

To test the DEF quality:

1. Obtain the Cummins Diesel Exhaust Fluid Refractometer, part number 4919554.
2. Follow the instructions included with the tool.
3. A Urea concentration between 31 % to 34 % is acceptable.
    - If the concentration is outside of this specification, then drain the DEF tank, flush with distilled water, re-fill with DEF and re-test the DEF.

## Fuel Storage

Contaminated fuel is a leading cause of potential malfunctions and breakdowns. Keep the fuel clean and free of dirt, water or other contaminants as an important part of maintaining a KUBOTA tractor in operating condition. Take these precautions to keep stored fuel free of dirt, water and other contaminants.

- Store fuel in black iron tanks. Do not use galvanized tanks as the zinc coating will react with the fuel and form compounds that will contaminate the injection pump and injectors.
- Install bulk storage tanks away from direct sunlight and tilt them slightly so sediment in the tanks will settle away from the outlet pipe. Check the fuel storage tanks regularly for condensation by draining from the tank bottom.
- Provide a drain plug at the lowest point of the storage tank, at the opposite end from the outlet pipe, to facilitate moisture and sediment removal.
- B20 biodiesel can be used with a KUBOTA tractor but use this fuel within 6 months of its date of manufacture. With lower oxidation stability, rubber components may degrade over time. Hot, humid conditions may lead to increased fuel degradation. Avoid storing the tractor for periods of longer than 3 months with biodiesel in the fuel system.
- If the fuel is not filtered from the storage tank, always use a funnel with a fine mesh screen when refueling the tractor.
- Arrange fuel purchases so summer grade fuels are not held over and used in winter.
- Ground fuel storage tanks to prevent static buildup.

## Speed Chart

The speed chart below is based on a Continuously Variable Transmission.

**Table 7-28: Speed Chart for 40 km/h (25 mph) rated engine rpm**

| V (km/h) | | Range | K1 | K2 | K3 | K4 | BG | KV | KR | P1 | P2 | P3 | P4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00-7.72 | **Forward** | I | • | | | | • | • | | • | • | • | • |
| 7.72-15.44 | | II | | • | | | • | • | | • | • | | • |
| 15.44-30.87 | | III | | • | • | | | • | | • | | | |
| 30.87-63.29 | | IV | | • | | • | | • | | • | • | | |
| | | | | | | | | | | | | | |
| 0.00-5.04 | **Reverse** | I | • | | | | • | | • | • | • | • | • |
| 5.04-10.07 | | II | | • | | | • | | • | • | • | | • |
| 10.07-20.14 | | III | | • | • | | | | • | • | | | |
| 20.14-40.28 | | IV | | • | | • | | | • | • | • | | |

# Tire Data, Combinations, Pressures and Loads

## Introduction

The tires fitted to tractors with optional four wheel drive have been carefully selected to match the gearing of the transmission and axles. Always install tires of the same make, model and size as those removed when replacing worn or damaged tires. The installation of other tire combinations may result in excessive tire wear, loss of usable power or severe damage to driveline components. If in doubt, contact a KUBOTA dealer.

## Radial Tire Identification

Radial tires are identified according to a star code on the tire sidewall:

1. Tires with ☆ are inflated to a maximum of 1.2 bar (18 psi).
2. Tires with ☆☆ are inflated to a maximum of 1.6 bar (24 psi).
3. Tires with ☆☆☆ are inflated to a maximum of 2.0 bar (30 psi).

## Tire Pressures and Permissible Loads

***IMPORTANT:****The figures in the following charts are for guidance only. Tire specifications vary by tire manufacturer. For exact tire loading information, refer to the information provided by the manufacturer of the tires on the tractor.*

To avoid the possibility of tire to rim creep, do not use tire pressures below 0.4 bar (6 psi) with radial tires and 0.8 bar (12 psi) with bias ply for operations having a high torque requirement, e.g., subsoiling, plowing, heavy cultivation, etc.

Tire loading figures in the following tables are for a single wheel. To determine the maximum tire loading for single wheel applications, multiply the load figure in the table by two, the total number of wheels on the axle.

Example: Rear Wheels  2 wheels (singles) x table figure = Maximum tire load

To determine the maximum tire loading for units with duals, multiply the load figure in the table by the total number of wheels on the axle, then multiply by 88%.

Example: Rear Wheels  4 wheels (models with duals) x table figure x 88% = Maximum tire load

Axle loading must be within the capacities listed in Section 3 of this manual.

Remember the information in the charts and the examples cited are for guidance only. For exact information regarding inflation pressures and tractor loading, contact a Kubota dealer or the tire manufacturer.

When front mounted implements are fitted, front tire loads may be increased by up to 35% with no increase in inflation pressure when operated at speeds not exceeding 20 km/h (12 mph).

At speed not exceeding 8 km/h (5 mph), the load on the front tires may be increased by 50% provided the inflation pressures are increased by 25%.

| Table 7-30: Tire Technical Data - Front (380/85 R34) Rear (380/90 R50) RCI 42 | | | | |
|---|---|---|---|---|
| **Front (380/85 R34)** | | | | |
| **Overall Diameter** | **Overall Width** | **Max Load** | **RC** | **SLR** |
| 1516 (59.7 in) | 378 mm (14.9 in) | 2835kg (6250 lb) | 4519 mm (177.9 in) | 691 mm (27.2 in) |
| **Rear (380/90 R50)** | | | | |
| 1935 (76.2 in) | (15.5 in) | 3447 kg (7600 lb) | 5814 (229 in) | 912 mm (35.9 in) |

| Table 7-31: Tire Technical Data - Front (380/85 R34) Rear (380/90 R50) RCI 42 | | | | |
|---|---|---|---|---|
| **Front (480/70 R30)** | | | | |
| **Overall Diameter** | **Overall Width** | **Max Load** | **RC** | **SLR** |
| 1516 (58.3 in) | 497 mm (19.6 in) | 2835kg (6220 lb) | 4389 mm (172.8 in) | 691 mm (25.8 in) |
| **Rear (620/70 R42)** | | | | |
| 1953 (76.9 in) | 640 mm (25.2 in) | 3447 kg (10870 lb) | 5781 (227.6 in) | 864 mm (34 in) |

| Table 7-32: Tire Technical Data - Front (600/65 R28) Rear (710/70 R38) RCI 42 | | | | |
|---|---|---|---|---|
| **Front (600/65 R28)** | | | | |
| **Overall Diameter** | **Overall Width** | **Max Load** | **RC** | **SLR** |
| 1491 (58.7 in) | 589 mm (23.2 in) | 2835kg (7440 lb) | 4448 mm (175.1 in) | 660 mm (26 in) |
| **Rear (710/70 R38)** | | | | |
| 1956 (77 in) | 719 mm (28.3 in) | 5307 kg (11700 lb) | 5781 (227.6 in) | 864 mm (34 in) |

## Tire Load and Inflation Tables

### Metric Units

| Table 7-33: Tire Load and Inflation Table - 380/85 R34 | | | | | |
|---|---|---|---|---|---|
| 380/85 R34 | | | | | |
| 30 mph (for reference) | 25 mph | 20 mph | 6 mph | 25 mph Dual | Pressure |
| 50 km/h (for reference) | 40 km/h | 30 km/h | 10 km/h | 40 km/h Dual | |
| Load Capacity | | | | | |
| 3640 lb | 3640 lb | 3895 lb | 4878 lb | N/A | 6 psi |
| 1650 kg | 1650 kg | 1766 kg | 2211 kg | N/A | 0.4 bar |
| 5200 lb | 5200 lb | 5564 lb | 6968 lb | N/A | 12psi |
| 2360 kg | 2360 kg | 2525 kg | 3162 kg | N/A | 0.8 bar |
| 5840 lb | 5840 lb | 6249 lb | 7826 lb | N/A | 15psi |
| 2650 kg | 2650 kg | 2836 kg | 3551 kg | N/A | 1.0 bar |
| 6600 lb | 6600 lb | 7062 lb | 8844 lb | N/A | 17 psi |
| 3000 kg | 3000 kg | 3210 kg | 4020 kg | N/A | 1.2 bar |
| 7850 lb | 7850 lb | 8400 lb | 10519 lb | N/A | 23 psi |
| 3550 kg | 3550 kg | 3799 kg | 4757 kg | N/A | 1.6 bar |
| 8800 lb | 8800 lb | 9416 lb | 11792 lb | N/A | 29 psi |
| 4000 kg | 4000 kg | 4280 kg | 5360 kg | N/A | 2.0 bar |
| 9350 lb | 9350 lb | 10005 lb | 12529 lb | N/A | 35 psi |
| 4250 kg | 4250 kg | 4548 kg | 5695 kg | N/A | 2.4 bar |
| 10500 lb | 10500 lb | 11235 lb | 14070 lb | N/A | 41 psi |
| 4750 kg | 4750 kg | 5083 kg | 6365 kg | N/A | 2.8 bar |

## Tire Load and Inflation Tables

### Metric Units

| Table 7-34: Tire Load and Inflation Table - 600/65 R28 | | | | | | |
|---|---|---|---|---|---|---|
| 600/65 R28 | | | | | | |
| 30 mph | 25 mph | 20 mph | 15 mph | 6 mph | 25 mph Dual | Pressure |
| 50 km/h | 40 km/h | 30 km/h | 25 km/h | 10 km/h | 40 km/h Dual | |
| Load Capacity | | | | | | |
| | | 3550 lb | | | 2910 lb | 6 psi |
| | | 1610 kg | | | 1320 kg | 0.4 bar |
| | | 4880 lb | | | 4190 lb | 12 psi |
| | | 2215 kg | | | 1900 kg | 0.8 bar |
| | 5490 lb | 5560 lb | 5750 lb | 6940 lb | 4830 lb | 15 psi |
| | 2490 kg | 2520 kg | 2610 kg | 3150 kg | 2190 kg | 1.0 bar |
| 5970 lb | 5970 lb | 6230 lb | 6450 lb | 7730 lb | 5260 lb | 17 psi |
| 2710 kg | 2710 kg | 2825 kg | 2925 kg | 3505 kg | 2385 kg | 1.2 bar |
| 6460 lb | 6460 lb | 6890 lb | 7150 lb | 8500 lb | 5680 lb | 20 psi |
| 2930 kg | 2930 kg | 3125 kg | 3245 kg | 3855 kg | 2575 kg | 1.4 bar |
| 6940 lb | 6940 lb | 7560 lb | 7850 lb | 9280 lb | 6110 lb | 23 psi |
| 3150 kg | 3150 kg | 3430 kg | 3560 kg | 4210 kg | 2770 kg | 1.6 bar |
| 7280 lb | 7280 lb | 7880 lb | 8180 lb | 10060 lb | 6390 lb | 26 psi |
| 3300 kg | 3300 kg | 3575 kg | 3710 kg | 4565 kg | 2900 kg | 1.8 bar |
| 7610 lb | 7610 lb | 8200 lb | 8510 lb | 10850 lb | 6690 lb | 29 psi |
| 3450 kg | 3450 kg | 3720 kg | 3860 kg | 4920 kg | 3035 kg | 2.0 bar |
| 7940 lb | 7940 lb | 8520 lb | 8840 lb | 11630 lb | 6990 lb | 32 psi |
| 3600 kg | 3600 kg | 3865 kg | 4010 kg | 5275 kg | 3170 kg | 2.2 bar |
| 8270 lb | 8270 lb | 8840 lb | 9170 lb | 12410 lb | 7280 lb | 35 psi |
| 3750 kg | 3750 kg | 4010 kg | 4160 kg | 5630 kg | 3300 kg | 2.4 bar |

## Tire Load and Inflation Tables

## Metric Units

| Table 7-35: Tire Load and Inflation - RCI 47 | | | | | | |
|---|---|---|---|---|---|---|
| RCI 47 | | | | | | |
| 30 mph<br>50 km/h | 25 mph<br>40 km/h | 20 mph<br>30 km/h | 15 mph<br>25 km/h | 6 mph<br>10 km/h | 25 mph Dual<br>40 km/h Dual | Pressure |
| Load Capacity | | | | | | |
| | | | 6150 lb | 8020 lb | 5160 lb | 6 psi |
| | | | 2790 kg | 3640 kg | 2340 kg | 0.4 bar |
| | 6750 lb | 7030 lb | 7360 lb | 9370 lb | 6170 lb | 9 psi |
| | 3060 kg | 3190 kg | 3340 kg | 4250 kg | 2800 kg | 0.6 bar |
| 7390 lb | 7870 lb | 8200 lb | 8580 lb | 10710 lb | 7190 lb | 12 psi |
| 3350 kg | 3570 kg | 3720 kg | 3890 kg | 4860 kg | 3260 kg | 0.8 bar |
| 9530 lb | 10090 lb | 10520 lb | 11010 lb | 13250 lb | 9230 lb | 17 psi |
| 4325 kg | 4575 kg | 4770 kg | 4995 kg | 6010 kg | 4185 kg | 1.2 bar |
| 11680 lb | 12270 lb | 12800 lb | 13440 lb | 15640 lb | 11250 lb | 23 psi |
| 5300 kg | 5565 kg | 5805 kg | 6095 kg | 7095 kg | 5105 kg | 1.6 bar |
| 12620 lb | 13250 lb | 13820 lb | 14510 lb | 18020 lb | 12160 lb | 29 psi |
| 5725 kg | 6010 kg | 6270 kg | 6580 kg | 8175 kg | 5515 kg | 2.0 bar |
| 13100 lb | 13730 lb | 14330 lb | 15050 lb | 18610 lb | 12610 lb | 32 psi |
| 5940 kg | 6230 kg | 6500 kg | 6825 kg | 8440 kg | 5720 kg | 2.2 bar |
| 13560 lb | 14230 lb | 14850 lb | 15590 lb | 19180 lb | 13060 lb | 35 psi |
| 6150 kg | 6455 kg | 6735 kg | 7070 kg | 8700 kg | 5925 kg | 2.4 bar |
| | | | | 19750 lb | | 38 psi |
| | | | | 8960 kg | | 2.6 bar |
| | | | | 20340 kg | | 41 psi |
| | | | | 9225 kg | | 2.8 bar |

## Service Techniques

### General

Clean the exterior of all components before carrying out any form of repair. Dirt and abrasive dust can reduce the efficient working life of a component and lead to costly replacement.

Time spent on the preparation and cleanliness of working surfaces will pay dividends in making the job easier and safer. This will result in overhauled components being more reliable and efficient in operation.

Use cleaning fluids which are known to be safe. Certain types of fluid can cause damage to O-rings and cause skin irritation. Check solvents for their suitability for the cleaning of components and also that they do not risk the personal safety of the user.

Replace O-rings, seals or gaskets whenever they are disturbed. Never mix new and old seals or O-rings, regardless of condition. Always lubricate new seals and O-rings with hydraulic oil before installation. When replacing component parts, use the correct tool for the job.

### Hoses and Tubes

- Always replace hoses and tubes if the cone end or the end connections on the hose are damaged.
- When installing a new hose, loosely connect each end and make sure the hose takes up the designed position before tightening the connection. Tighten clamps sufficiently to hold the hose without crushing and to prevent chafing.
- After hose replacement to a moving component, check that the hose does not foul by moving the component through the complete range of travel.
- Always check to make sure newly installed hoses are not kinked or twisted.
- Damaged, dented, crushed or leaking hose connections restrict oil flow and the productivity of the components being served. Connectors that show signs of movement from the original swaged position have failed and will ultimately separate completely.
- A hose with a chafed outer cover will allow water entry. Concealed corrosion of the wire reinforcement will subsequently occur along the hose length with resultant hose failure.
- A ballooning hose indicates an internal leakage due to structural failure. This condition rapidly deteriorates and total hose failure soon occurs.
- Kinked, crushed, stretched or deformed hoses generally suffer internal structural damage which can result in oil restriction, a reduction in the speed of operation and hose failure.
- Free-moving, unsupported hoses must never be allowed to touch each other or related working surfaces. This causes chafing, which reduces hose life.

## Standard Hardware Torque Specifications

Check the tightness of hardware periodically.

Use the following charts to determine the correct torque when checking, adjusting or replacing hardware on the tractor.

***IMPORTANT:****Torque values listed are for general use only. Always follow directions where torque values are specified.*

***NOTE: Use a torque wrench to properly tighten hardware. Make sure fastener threads are clean and not damaged.***

### Metric Hardware and Locknuts

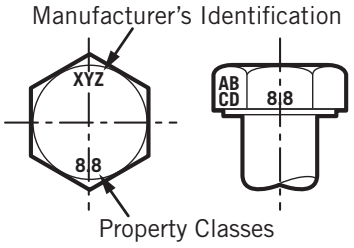
N·m (ft-lb) for normal assembly.

**Table 7-36: Metric Hardware and Locknuts Torque Values**

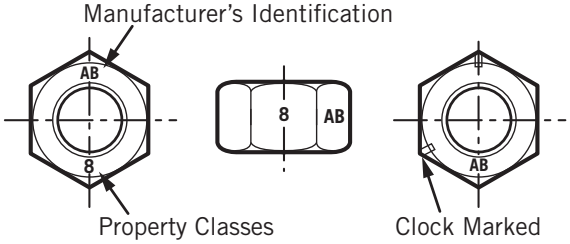
| Nominal Size | Class 5.8 | | Class 8.8 | | Class 10.9 | | Locknut CL.8 w/CL8.8 Bolt |
|---|---|---|---|---|---|---|---|
| | Unplated | Plated w/zncr | Unplated | Plated w/zncr | Unplated | Plated w/zncr | |
| M4 | 1.7 (15*) | 2.2 (19*) | 2.6 (23*) | 3.4 (30*) | 3.7 (33*) | 4.8 (42*) | 1.8 (16*) |
| M6 | 5.8 (51*) | 7.6 (67*) | 8.9 (79*) | 12 (102*) | 13 (115*) | 17 (150*) | 6.3 (56*) |
| M8 | 14 (124*) | 18 (159*) | 22 (195*) | 28 (248*) | 31 (274*) | 40 (354*) | 15 (133*) |
| M10 | 28 (21) | 36 (27) | 43 (32) | 56 (41) | 61 (45) | 79 (58) | 30 (22) |
| M12 | 49 (36) | 63 (46) | 75 (55) | 97 (72) | 107 (79) | 138 (102) | 53 (39) |
| M16 | 121 (89) | 158 (117) | 186 (137) | 240 (177) | 266 (196) | 344 (254) | 131 (97) |
| M20 | 237 (175) | 307 (226) | 375 (277) | 485 (358) | 519 (383) | 671 (495) | 265 (195) |
| M24 | 411 (303) | 531 (392) | 648 (478) | 839 (619) | 897 (662) | 1160 (855) | 458 (338) |

*** Torque values shown with* are inch-pounds.**

### Identification of Hex Cap Screws and Carriage Bolts - Classes 5, 6 and Up




**Hex Nuts and Locknuts**
**Classes 05 and Up**



## Imperial Hardware

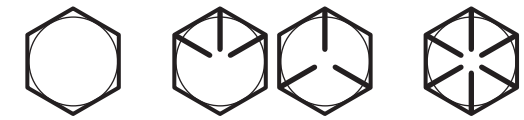
In N·m (ft-lb) for normal assembly applications.

**Table 7-37: Imperial Hardware Torque Values**

| Nominal Size | SAE Grade 2 | | SAE Grade 5 | | SAE Grade 8 | | Locknuts | |
|---|---|---|---|---|---|---|---|---|
| | Unplated or Plated Silver | Plated w/zncr Gold | Unplated or Plated Silver | Plated w/zncr Gold | Unplated or Plated Silver | Plated w/zncr Gold | GR.B w/GR5 Bolts | GR.C w/GR5 Bolts |
| 1/4 | 6.2 (55*) | 8.1 (72*) | 9.7 (86*) | 13 (112*) | 14 (121*) | 18 (157*) | 6.9 (61*) | 9.8 (86*) |
| 5/16 | 13 (115*) | 17 (149*) | 20 (178*) | 26 (229*) | 28 (250*) | 37 (324*) | 14 (125*) | 20 (176*) |
| 3/8 | 23 (17) | 30 (22) | 35 (26) | 46 (34) | 50 (37) | 65 (48) | 26 (19) | 35 (26) |
| 7/16 | 37 (27) | 47 (35) | 57 (42) | 73 (54) | 80 (59) | 104 (77) | 41 (30) | 57 (42) |
| 1/2 | 57 (42) | 73 (54) | 87 (64) | 113 (83) | 123 (91) | 159 (117) | 61 (45) | 88 (64) |
| 9/16 | 81 (60) | 104 (77) | 125 (92) | 163 (120) | 176 (130) | 229 (169) | 88 (65) | 125 (92) |
| 5/8 | 112 (83) | 145 (107) | 174 (128) | 224 (165) | 244 (180) | 316 (233) | 122 (90) | 172 (127) |
| 3/4 | 198 (146) | 256 (189) | 306 (226) | 397 (293) | 432 (319) | 560 (413) | 217 (160) | 306 (226) |
| 7/8 | 193 (142) | 248 (183) | 495 (365) | 641 (473) | 698 (515) | 904 (667) | 350 (258) | 494 (364) |
| 1 | 289 (213) | 373 (275) | 742 (547) | 960 (708) | 1048 (773) | 1356 (1000) | 523 (386) | 739 (545) |

***NOTE: Torque values shown with * are inch-pounds.***

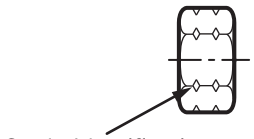
### Identification of Hex Cap Screws and Carriage Bolts



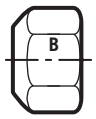
Grade 2 SAE Bolts | Grade 5 SAE Bolts | Grade 8 SAE Bolts

Regular Nuts | SAE Grade 5 Hex Nuts | SAE Grade 6 Hex Nuts

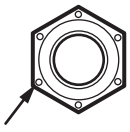
**Locknuts**



Grade Identification
Grade A: No Notches
Grade B: One Circumferential Notch
Grade C: Two Circumferential Notches




Grade Identification
Grade A: No Mark
Grade B: Letter B
Grade C: Letter C



Grade Identification
Grade A: No Marks
Grade B: Three Marks
Grade C: Six Marks
Marks need not be located at corners

## Torque Values for Hydraulic Fittings (Imperial)

Use the following charts to determine the common torque specification for hose and tube fittings. These specifications refer to the minimum hardware tightening torque for normal assembly applications.

***NOTE: Torque values listed here are for general use only.***

***IMPORTANT:****Always follow tightening procedure where specified in the manual for a specific application.*

**Table 7-38: Torque Requirements for all Flare Fittings**

| Thread Size | Torque (N·m) | Torque (ft-lb) |
|---|---|---|
| 7/16 - 20 | 14 | 10 |
| 1/2 - 20 | 19 | 14 |
| 9/16 - 18 | 22 | 16 |
| 3/4 - 16 | 42 | 31 |
| 7/8 - 14 | 64 | 47 |
| 1 1/16 - 12 | 94 | 69 |
| 1 3/16 - 12 | 110 | 82 |
| 1 5/16 - 12 | 150 | 110 |
| 1 5/8 - 12 | 195 | 140 |
| **Torque Requirements SAE O-ring (Boss) Fittings** | | |
| 7/16 - 20 | 9 | 7 |
| 1/2 - 20 | 14 | 10 |
| 9/16 - 18 | 19 | 14 |
| 3/4 - 16 | 29 | 21 |
| 7/8 - 14 | 40 | 29 |
| 1 1/16 - 12 | 80 | 59 |
| 1 3/16 - 12 | 90 | 66 |
| 1 5/16 - 12 | 100 | 74 |
| 1 5/8 - 12 | 150 | 110 |
| **Torque Requirements O-ring Face Seal Fittings** | | |
| 9/16 - 18 | 14 | 10 |
| 11/16 - 16 | 25 | 18 |
| 13/16 - 16 | 46 | 33 |
| 1 - 14 | 65 | 48 |
| 1 3/16 - 12 | 95 | 70 |
| 1 7/16 - 12 | 132 | 97 |
| 1 11/16 - 12 | 175 | 129 |
| 2 - 12 | 224 | 165 |

# Index

**This Page Is Intentionally Left Blank.**

## First 50-hour Service
## (Check and adjust, as required)

| Description | OK |
|---|---|
| **Stationary Checks - Engine Off** | |
| Tire pressures and condition | |
| Check radiator coolant level and specific gravity | |
| Level of DCA4 coolant additive | |
| Engine accessory drive belt(s) | |
| Check engine oil level | |
| Check transmission and rear final drive oil level | |
| Check hydraulic oil level | |
| Change transmission oil filter | |
| Change all hydraulic filters (charge, steering and power steering) | |
| Change front axle and final drive oil | |
| Drain fuel/water separator | |
| Battery, starter and alternator electrical connections | |
| Air cleaner element and hose connections | |
| Coolant lines and clamps | |
| Windshield wiper/operation and washer fluid level | |
| Wheel-to-rim hardware torque | |
| Wheel disc-to-hub hardware torque | |
| Front end weight clamp bolts for tightness | |
| Front wheel toe-in and steering stops | |
| Lubricate all grease fittings | |
| Seat for proper operation | |
| All electrical cables, terminals and wires | |
| Exhaust manifold bolt torque | |
| Clean cab air filter | |
| Inspect and tighten drawbar components | |

| Description | OK |
|---|---|
| **Safety Items Checks** | |
| Seat belt operation | |
| All safety decals and warnings are legible | |
| All safety shields installed | |
| Parking brake operation and adjustment | |
| Start switches operation (operator presence and parking brake) | |
| Cab mounting bolt torques (ROPS) | |
| Stationary Checks – Engine Running at Normal Operating Temperature | |
| Lights, instruments and controls for proper operation | |
| Fluid and oil leaks | |
| Air intake, turbocharger and cooler for air leaks | |
| PTO operation and braking | |
| Shift lever operation and EIC display | |
| Hydraulic System | |
| 3-pt hitch – controls function | |
| Remote hydraulic – controls function | |
| Extend – retract – float modes function | |
| Remote valves – connection and flow correct | |
| Flow control operation | |
| Road Test Service Checks | |
| Engine operation including throttle | |
| Direction control + response (speed/slow down) | |
| Steering control | |
| Differential locks and MFWD engagement/ disengagement | |
| Service brake operation | |
| All optional equipment and accessories | |
| Ballasting – correct weights installed and securely fastened | |

### Service Performed

Tractor Model No. _____ Tractor Serial No. _____

Print Name _____ Actual Engine Hours _____

Signature _____ Date _____

## Notes

U.S.A. : **KUBOTA TRACTOR CORPORATION**
1000 Kubota Drive, Grapevine, TX 76051
Telephone : 888-4KUBOTA

Canada : **KUBOTA CANADA LTD.**
5900 14th Avenue, Markham, Ontario, L3S 4K4, Canada
Telephone : (905)294-7477

France : **KUBOTA EUROPE S.A.S**
19-25, Rue Jules Vercruysse, Z.I. BP88, 95101 Argenteuil Cedex, France
Telephone : (33)1-3426-3434

Italy : **KUBOTA EUROPE S.A.S Italy Branch**
Via Grandi, 29 20068 Peschiera Borrome (MI) Italy
Telephone : (39)02-51650377

Germany : **KUBOTA (DEUTSCHLAND) GmbH**
Senefelder Str. 3-5 63110 Rodgau /Nieder-Roden, Germany
Telephone : (49)6106-873-0

U.K. : **KUBOTA (U.K.) LTD.**
Dormer Road, Thame, Oxfordshire, OX9 3UN, U.K.
Telephone : (44)1844-214500

Spain : **KUBOTA ESPAÑA S.A.**
Avenida Recomba No.5, Poligno Industrial la Laguna, Leganes, 28914 (Madrid) Spain
Telephone : (34)91-508-6442

Australia : **KUBOTA AUSTRALIA PTY LTD.**
25-29 Permas Way, Truganina, VIC 3029, Australia
Telephone : (61)-3-9394-4400

Malaysia : **SIME KUBOTA SDN. BHD.**
No.3 Jalan Sepadu 25/123 Taman Perindustrian Axis,
Seksyen 25, 40400 Shah Alam, Selangor Darul Ehsan Malaysia
Telephone : (60)3-736-1388

Philippines : **KUBOTA PHILIPPINES, INC.**
232 Quirino Highway, Baesa, Quezon City 1106, Philippines
Telephone : (63)2-422-3500

Taiwan : **SHIN TAIWAN AGRICULTURAL MACHINERY CO., LTD.**
16, Fengping 2nd Rd, Taliao Shiang Kaohsiung 83107, Taiwan R.O.C.
Telephone : (886)7-702-2333

Indonesia : **PT KUBOTA MACHINERY INDONESIA**
Tower A at EightyEight@Kasablanka Lantai 16
Jalan Raya Casablanka Kav. 88, Jakarta 12870 Indonesia
Telephone : (62)-21-29568-720

Thailand : **SIAM KUBOTA CORPORATION CO., LTD.**
101/19-24 Moo 20, Navanakorn Industrial Estate, Tambon Khlongnueng, Amphur Khlongluang,
Pathumthani 12120, THAILAND
Telephone : (66)2-909-0300

Korea : **KUBOTA KOREA CO., LTD.**
41-27, Jayumuyeok-gil, Baeksan-myeon, Gimje-si, Jeollabuk-do, Korea
Telephone : (82)-63-544-5822

India : **KUBOTA AGRICULTURAL MACHINERY INDIA PVT. LTD.**
No.15, Medavakkam Road, Sholinganallur, Chennai-600119, T.N., India
Telephone : (91)44-6104-1500

Vietnam : **KUBOTA VIETNAM CO., LTD.**
Lot B-3A2-CN, My Phuoc 3 Industrial Park, Ben Cat District, Binh Duong Province, Vietnam
Telephone : (84)-650-3577-507

KUBOTA Corporation

English (U.S.A.)
Code No.LBT00-13934