

**Ideal for monitoring particulate levels in exhaust gas of industrial combustion or air filtration processes**



- **Measurement reading as mg/m<sup>3</sup> (when calibrated against standard reference measurements)**
- **Modulated green LED source for long lifetime stability and immunity to ambient light**
- **Rugged 316L stainless steel construction**
- **Free utility software for PC based setup, control, and data logging**
- **Optional Operator Interface with different mounting configurations**

The DSL-230 is an optical instrument designed to measure the concentration of dust or particulate matter in an exhaust gas passing through a duct, stack, or flue; typically the exhaust gas from an industrial combustion process or air filtration system.

The DSL-230 uses the standard single pass transmission measurement technique, with Transmitter/Receiver arrangement. A light beam emitted from the Transmitter passes across the stack to a Receiver, which measures the intensity of the received light. Increased particulate or smoke density in the stack gas attenuates the transmitted light and causes the intensity of the received light to fall. When calibrated against standard reference measurements, this reduction in intensity can be used to calculate the particulate concentration and present a reading in mg/m<sup>3</sup>.

The light source in the transmitter is a high intensity, high reliability green LED which provides long life and stable intensity. The transmitted light beam is pulsed to give complete immunity to ambient light levels. The intensity of the transmitted light is monitored at source so that any variations in the emitted light level are compensated for at the Receiver. The Receiver has on board temperature measurement to provide stability over temperature range.

The DSL-230 is available with or without an Operator Interface (control unit) so for the most cost effective monitoring solution the DSL-230 can operate as a “stand-alone” instrument consisting of the Transmitter head (TX) and Receiver head (RX), with all electrical connections (including outputs such as the alarm relays, 4-20mA and ModBus) being made inside the RX head. As a stand-alone instrument the DSL-230 is set-up and controlled using the supplied utility software, installed on a PC or laptop, and connected via the USB connector on the RX.

When supplied with an Operator Interface (OI) all power supply and output connections are made in the OI rather than the RX. The OI is available in a range of enclosure styles, it has a bright 4 digit LED display and a simple 4 button keypad, which allows full command and control of the instrument. Alternatively, the free utility software can be connected to the OI and used to command and control the DSL-230 directly from a PC.

The DSL-230 has no moving parts, is of rugged design and has an excellent reliability record. Regular maintenance simply involves cleaning the TX and RX lenses, which are easily accessible due to our latched head design. Both the TX and RX heads are supplied with an air purge body, which when connected to a high volume source of clean air, keeps the contaminated stack gas away from the lens surfaces. An Aluminium air purge body is available for use on standard installations and a more advanced Stainless Steel air purge body is available for more demanding installations.

**Specification:**
**Measurement Performance**

| No. | Parameter                      | Units             | Min | Max    | Comment                              |
|-----|--------------------------------|-------------------|-----|--------|--------------------------------------|
| 1   | Path Length (flange to flange) | m                 | 0.5 | 20     | Flange-to-flange separation          |
| 2   | Measuring Range                | mg/m <sup>3</sup> | 0.0 | 1000.0 | User selectable                      |
| 3   | Accuracy                       | %                 | -2  | +2     | Relative to maximum range            |
| 4   | Resolution                     | mg/m <sup>3</sup> |     | 0.1    | Display resolution                   |
| 5   | Damping                        | s                 | 1   | 60     | Selectable                           |
| 6   | Drift with Temperature         | %                 | -2  | +2     | Over any 20°C in the operating range |
| 7   | Operating Wavelength           | nm                | 510 | 540    | Green LED                            |

**Power & Air Requirements**

|    |                              |       |     |     |   |
|----|------------------------------|-------|-----|-----|---|
| 8  | Voltage                      | Vdc   | +24 |     | Optional 90-260Vac PSU available                |
| 9  | Voltage Tolerance            | %     | -10 | +10 |   |
| 10 | Nominal Current Consumption  | mA    |     | 400 |   |
| 11 | Power Up Current Consumption | mA    |     | 400 |   |
| 12 | Air Supply Volume Flow       | L/min | 50  | 200 | To each air-purge body.                         |
| 13 | Air Supply Fitting           |       |     |     | 1" BSP threaded aperture in each air-purge body |

**Cable and Wire**

|    |                                    |       |    |    |  |
|----|------------------------------------|-------|----|----|--|
| 14 | Cable type - TX/RX Interconnection | cores | 6  |    | Screened multi-core, such as Belden 9873 |
| 15 | Cable type - OI/RX Interconnection | cores | 4  |    | Screened multi-core, such as Belden 9873 |
| 16 | Wire Size at Terminal Connections  | AWG   | 20 | 14 |  |

**Interface Options**

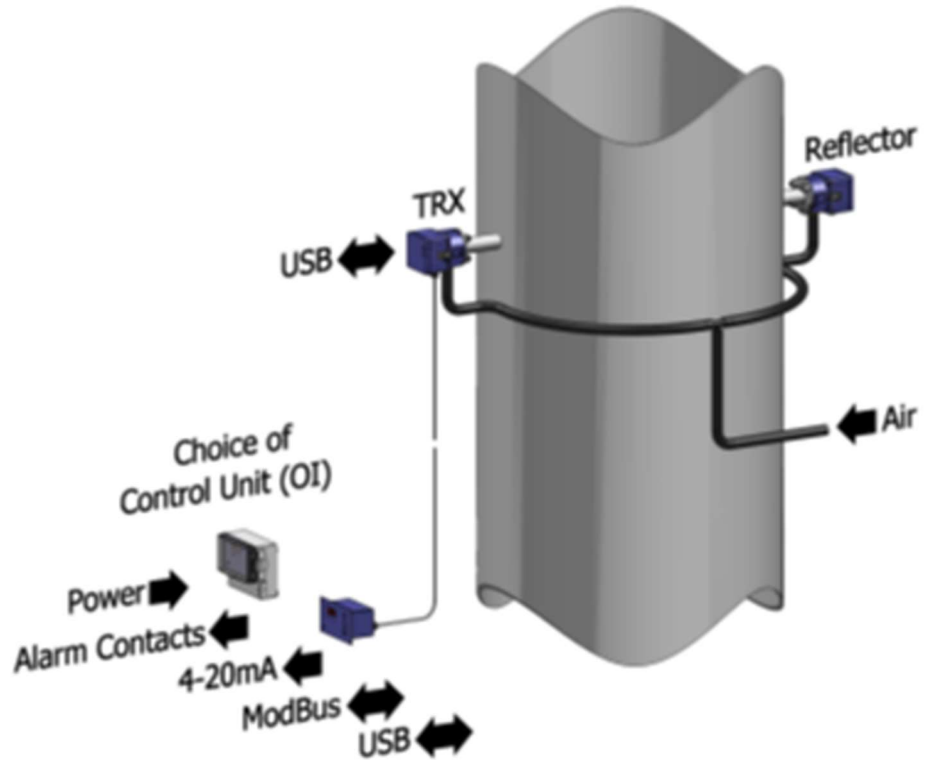
|    |                              |    |   |    |   |
|----|------------------------------|----|---|----|---|
| 17 | Serial Comms                 |    |   |    | ModBus RTU via RS485 (RX)<br>Internal USB (OI), external USB (RX) |
| 18 | Analogue Output (one)        | mA | 4 | 20 | Isolated and scalable   |
| 19 | Digital Relay Contacts (two) | A  | 0 | 3  | @30Vdc (signal level and data valid)                              |

**Physical**

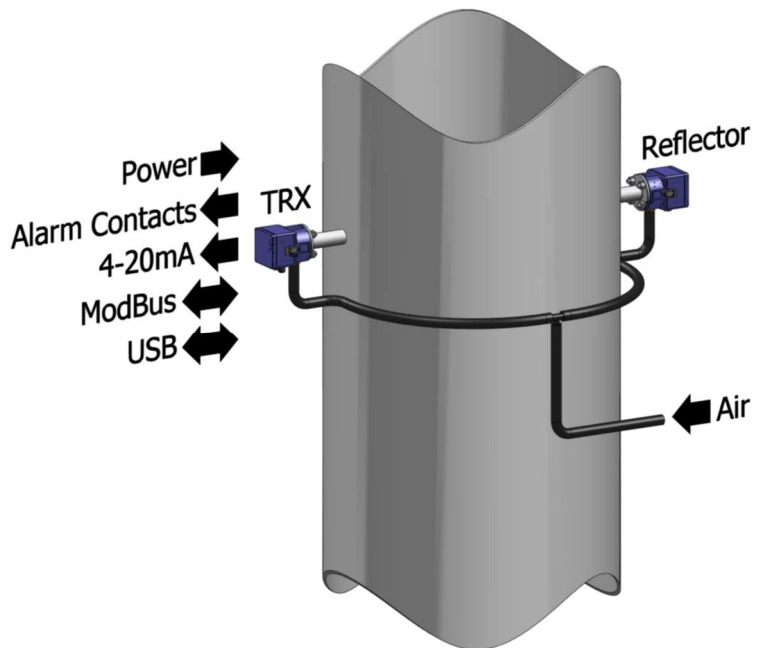
|    |                                   |   |      |      |   |
|----|-----------------------------------|---|------|------|---|
| 20 | Ingress Protection: - TX/RX Heads |   | IP65 |      | For external use  |
| 21 | - OI Wall Mounted                 |   | IP65 |      | Hinged door and terminal compartment shut.                            |
|    | - OI Panel Mounted                |   | IP64 |      | From front face of panel when installed.                              |
| 22 | Ambient Operating Temperature     | °C  | -20  | +55  | Air temperature around the heads.                                     |
| 23 | Operating Humidity                | %   |      | 100  | Air humidity around the heads.  |
| 24 | Gas Temperature                   | °C  |      | +600 | Heat insulating gaskets included.<br>(Higher temperatures on request) |
| 25 | Regulatory Compliance             |   |      |      | 2014/30/EU (Electromagnetic Radiation)<br>2014/35/EU (Low Voltage)    |
| 26 | Materials: - TX/RX Heads          | AISI/SAE 316L stainless steel   |      |      |   |
| 27 | Materials: - Air-Purge Bodies     | Powder coated cast aluminium or stainless steel for demanding installations                                   |      |      |   |
| 28 | Materials: - OI Wall Mounted      | UL rated polycarbonate enclosure; aluminium front panel with PU laminate overlay and with nylon cable glands. |      |      |   |
|    | - OI Panel Mounted                | Powder coated steel back-box; aluminium front panel with PU laminate overlay and with nylon cable glands      |      |      |   |
| 29 | Weight                            | kg  |      | 2.5  | TX or RX head plus Aluminium Air-Purge body                           |
| 30 | Weight: - OI Wall Mounted         | kg  |      | 1.3  |   |
|    | - OI Panel Mounted                |   |      | 1.3  |   |
| 31 | Warranty                          | months  | 24   |      | Return to base warranty. Extensions available                         |

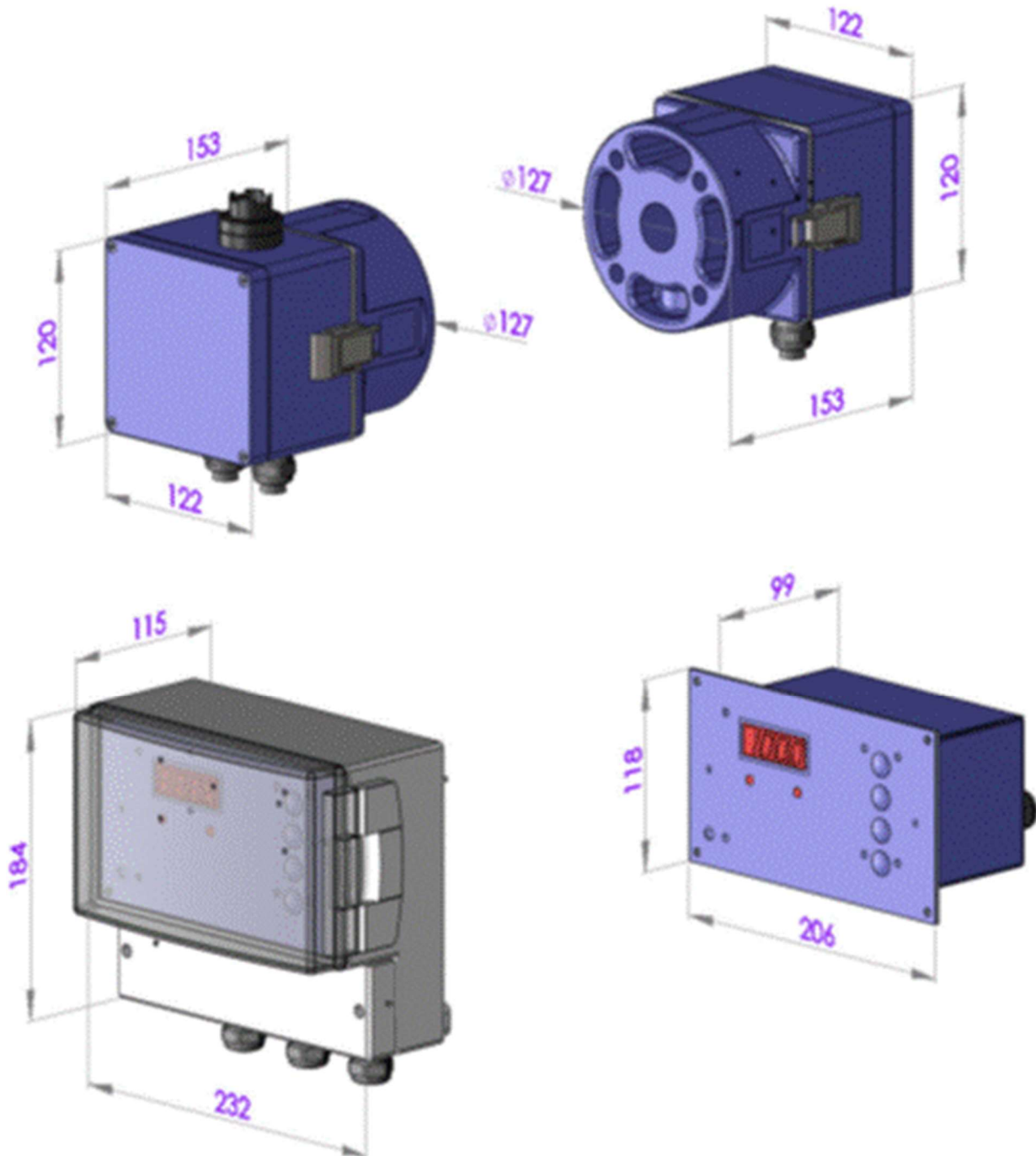
**Configuration Options:**

**Configured with an OI: Wall or Panel Mounting**



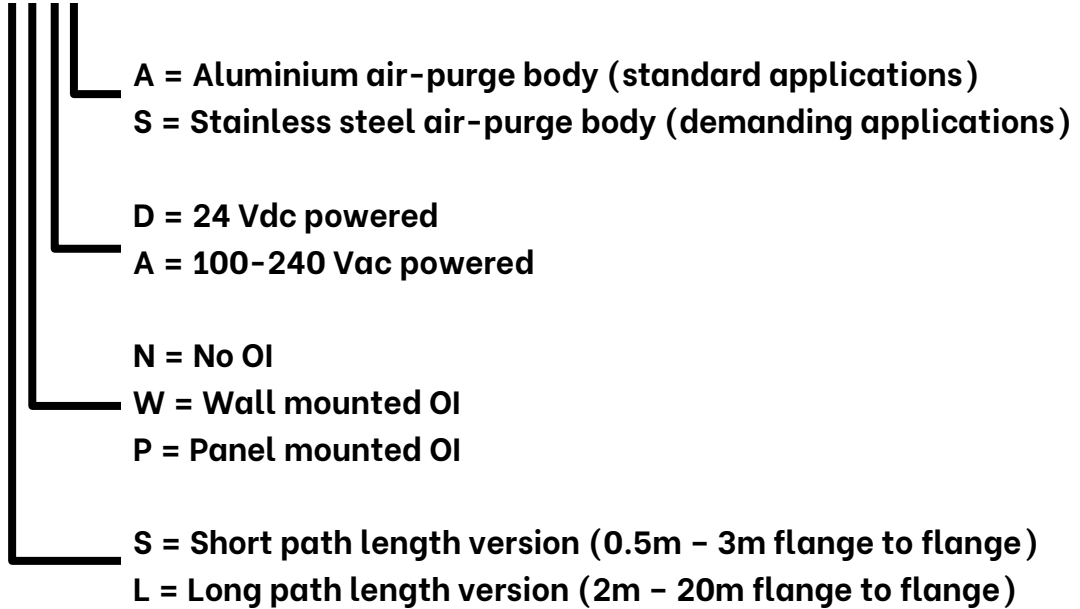
**Stand Alone Configuration**






**Dimensions (mm):**

**Ordering Details:**

DSL-230-XXXX-MKIII



**Options & Accessories:**

| Description   | Order Code | Notes  |
|---|------------|--|
| Mounting Flange<br>        | ASY-067    | 1.5" ANSI 150 flange pattern with 240mm long extension tube (x2).                    |
| Fixing Kit for use with Aluminium Air Purge Body  | ASY-071    | Contains M14 x 100mm studding, flat washers, spring washers and M14 nuts.            |
| Fixing Kit for use with Stainless Steel Air Purge Body  | ASY-245    | Contains M14 x 100mm studding, flat washers, spring washers and M14 nuts.            |
| Weather Cover<br>        | ASY-080    | Hinged stainless steel weather / heat cover for protecting externally mounted heads. |
| Screened Cable  | CBL-099    | 7-core, screened LSZH cable.   |
| Boxed PSU   | DSL-PSU-25 | Multi AC input, 24Vdc output 75W, IP67 rated enclosure                               |
| Laser Alignment Tool<br> | DSL-LAT08  | Tool to aid the alignment of the two heads across the stack.                         |



|  |               |  |
|--|---------------|--|
| Blower Kit<br>  | DSL-BK40B-110 | Blower kit for purge air.<br>110 Vac; single phase   |
|  | DSL-BK40B-230 | Blower kit for purge air.<br>230 Vac; single phase   |
|  | DSL-BK40B-415 | Blower kit for purge air.<br>415 Vac; three phase  |
| Compressed Air Kit<br>   | DSL-CAK-2     | For use with compressed air purge.<br><br>Includes pressure regulator, in-line filters, and compressed air adaptors for the purge body.                                  |
| Calibration Head<br>  | DSL-CH350BA   | For use between the RX head and the purge body to perform calibration checking with aluminium type air-purge bodies. (Calibration head only, no filters included).       |
|  | DSL-CH350BS   | For use between the RX head and the purge body to perform calibration checking with stainless steel type air-purge bodies. (Calibration head only, no filters included). |
| Calibrated Opacity Filters<br><br>(other values available on request) | ASY-190       | Calibration filter, approx. 8% opacity   |
|  | ASY-133       | Calibration filter, approx. 20% opacity  |
|  | ASY-183       | Calibration filter, approx. 35% opacity  |

Note that the actual part may differ from the above representative pictures.