



DSL-460 MkII

**Double Pass Opacity / Particulate Monitor
Measures 0-100% Opacity and 0-1000 mg/m³**

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

The DSL-460 is an optical instrument designed to measure the concentration of 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-460 Opacity Monitor uses the double pass light transmission measurement technique, with a folded beam Transceiver / Reflector arrangement, to measure particulate, dust and smoke emissions. A light beam emitted from the Transceiver (TRX) passes across the duct, stack or flue to a Reflector, which then returns the light to the Transceiver where the intensity of the received light is measured. Increased particulate density in the stack gas attenuates the transmitted light and causes the intensity of the received light to fall. This reduction in intensity can be presented as % opacity or when calibrated against standard reference measurements, can be used to calculate the particulate concentration and present a reading in mg/m³.

The light source in the Transceiver 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 in the received signal. The Transceiver has on board temperature measurement to provide stability over the ambient operating temperature range.

The DSL-460 is an intelligent analyser which can operate as a “stand-alone” instrument consisting of the Transceiver head (TRX) and Reflector head, with all electrical connections (including outputs such as the alarm relays, 4-20 mA analogue outputs and Modbus) being made inside the TRX head. As a stand-alone instrument the DSL-460 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.

The DSL-460 is also available with the DSCU operator interface. When supplied with the DSCU all power supply and output connections are made in the DSCU rather than the TRX. The DSCU is a wall mounted control unit consisting of a numeric / directional keypad, a two-line LCD display and a terminal compartment, which allows full command and control of the instrument. The DSCU is suitable for mounting locally to the instrument or remotely, such as in a control room.

The DSL-460 has no moving parts, is of rugged design and has an excellent reliability record. Regular maintenance simply involves cleaning the optical surfaces which are easily accessible due to our latched head design.

Both 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. Alternatively, an air purge body with a built-in Optical Protection Shutter is available, which closes a steel shutter when the clean air source is interrupted, helping to protect the sensitive optics from the contaminated stack gas.

Benefits

- In situ measurement directly in exhaust gas flow
- Integrated visual alignment aid to simplify installation
- Intelligent analyser with optional DSCU operator interface with dual parameter display
- Modulated green LED source for long lifetime stability and immunity to ambient light
- Plug and socket connectors for ease of installation

Specification

Measurement Performance

Item	Parameter	Units	Min	Max	Comment	
1	Path Length (flange to flange)	m	0.5	10	Flange-to-flange separation	
2	Measurement Range	Opacity Particulate Density	% mg/m ³	0.0 0.0	100 1000	Selectable (Optical Density also available)
3	Accuracy	%	-2	+2	Relative to full scale. At 1m path length. (Accuracy is +/-1% at path lengths >5m)	
4	Resolution	% mg/m ³		0.1 0.1	Display resolution	
5	Damping	s	1	60	Selectable	
6	Drift with Temperature	%	-2	+2	Over the full operating temperature	
7	Operating Wavelength	nm	510	540	Green LED	
8	Visual Alignment Aid	%	-1	+1	To first target in the reticle	

Power & Air Requirements

9	Voltage	Vdc	+24		Optional 90-260Vac PSU available
10	Voltage Tolerance	%	-10	+10	
11	Nominal Current Consumption	mA		500	
12	Power Up Current Consumption	mA		500	
13	Air Supply Volume Flow	L/min	150	200	To each air-purge body.
14	Air Supply Fitting	1" BSP threaded aperture in each air-purge body			

Interface Options

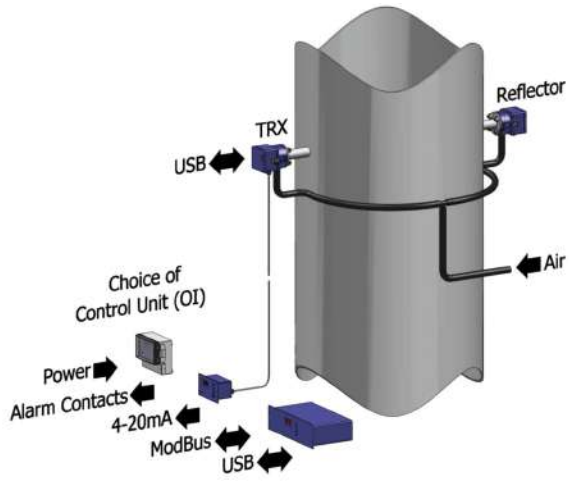
15	Serial Comms				ModBus RTU via RS485 (RX) Internal USB (OI), external USB (RX)
16	Analogue Output (one)	mA	0 /2 /4	20.0	Isolated and scalable
17	Relay Contacts (two)	A	0	3	@30Vdc (signal level and data valid)

Physical

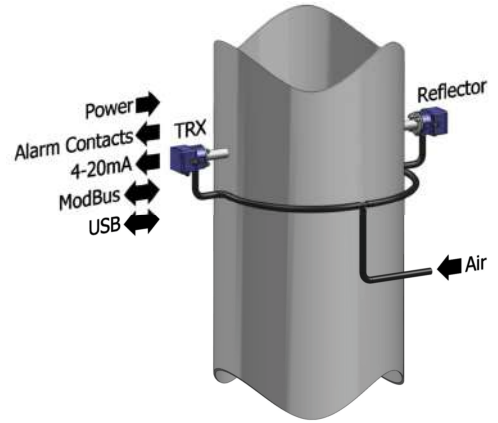
Item	Parameter	Units	Min	Max	Comment
18	Ingress Protection		IP65		For external use
19	Ambient Operating Temperature	°C	-20	+55	Air temperature around the heads.
20	Operating Humidity	%		100	Air humidity around the heads.
21	Gas Temperature	°C		+600	Heat insulating gaskets included (Higher temperatures on request)
22	Regulatory Compliance				2014/30/EU (Electromagnetic Radiation) 2014/35/EU (Low Voltage)
23	Materials: - TRX/Reflector Heads - Air Purge Bodies		AISI/SAE 316L stainless steel (powder coated) Powder coated cast aluminium (optional stainless steel version available)		
24	Weight	kg		2.5	Head plus air-purge body
25	Warranty	months	24		Return to base warranty. Extensions available

Configuration Options

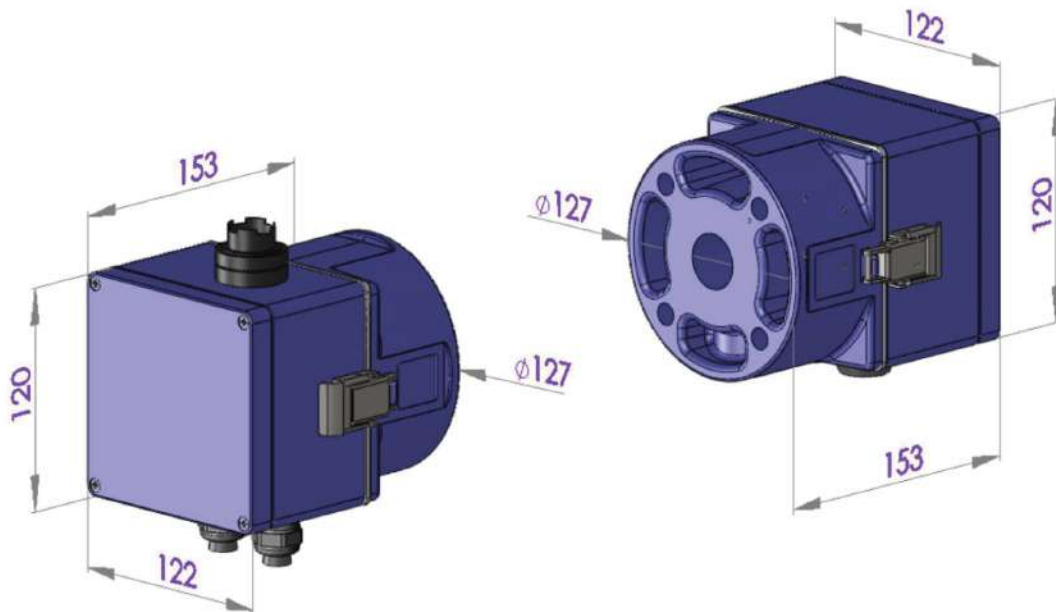
Configured with a DSCU



Stand Alone Configuration

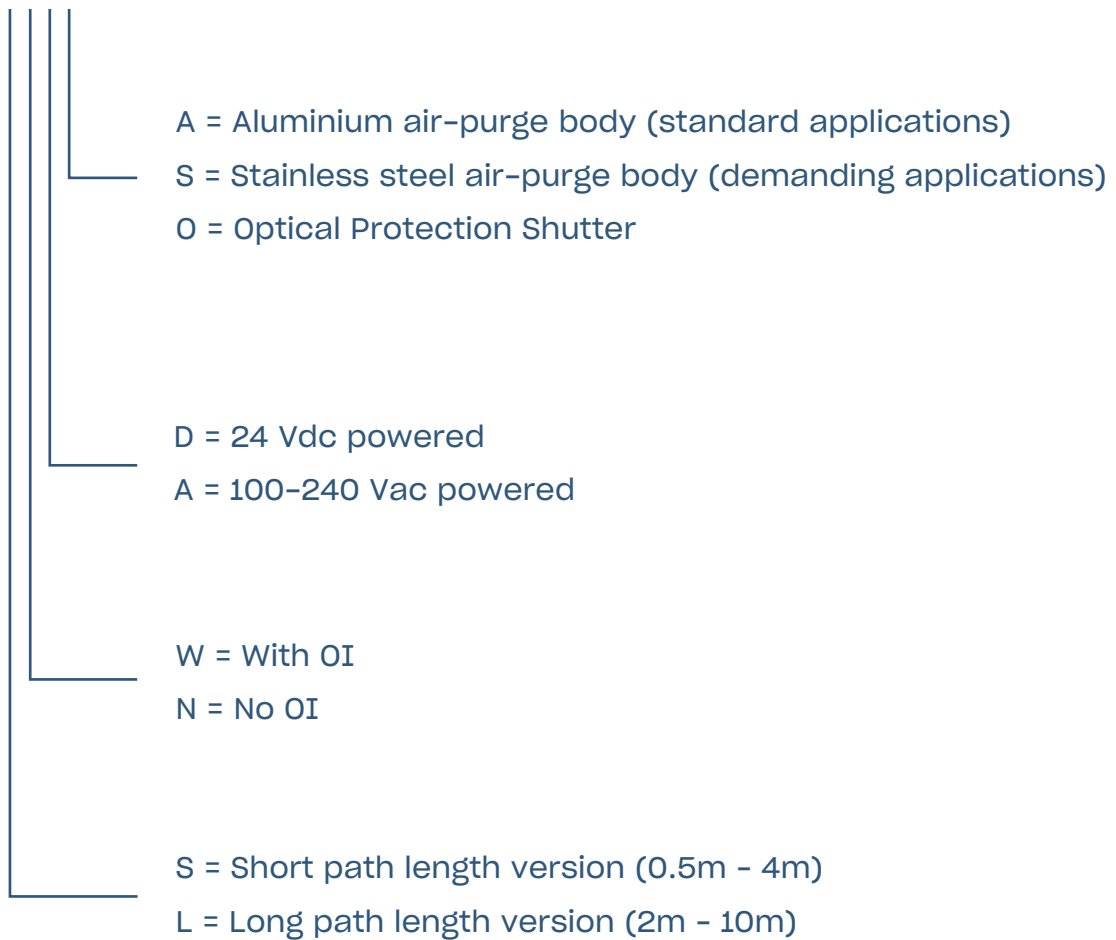


Dimensions (mm)



Ordering Details

DSL-460-XXXX-MKIII



Options & Accessories

Description	Order Code	Notes
<p>Mounting Flange & Fixing Kit</p> 	ASY-067	1.5" ANSI 150 flange pattern with 240mm long extension tube (set of 2).
<p>Fixing Kit for use with Aluminium Air purge body or Optical Protection Shutter</p>	ASY-071	Contains M14 x 100mm studding, flat washers, spring washers and M14 nuts.
<p>Fixing Kit for use with Stainless Steel Air Purge Body</p>	ASY-245	Contains M14 x 100mm studding, flat washers, spring washers and M14 nuts.
<p>Weather Cover</p> 	ASY-080	Hinged stainless steel weather / heat cover for protecting externally mounted heads.
<p>Power / Comms Cable Assemblies</p>	CBL-241 CBL-242 CBL-243	10m cable with connector 20m cable with connector 50m cable with connector
<p>Outputs Cable Assemblies</p>	CBL-238 CBL-239 CBL-240	10m cable with connector 20m cable with connector 50m cable with connector

Description	Order Code	Notes
Connector Bodies	DSL-8-CP	Connector Bodies for Power / Comms & Output.
Cable	CBL-099	7-core, screened LSHZ cable.
Boxed PSU	DSL-PSU-25	Multi AC input, 24Vdc output 25W, IP67 rated enclosure
Laser Alignment Tool 	DSL-LAT08	Tool to aid the alignment of the reflector head across the stack.
Blower Kit 	DSL-BK40B-110	Blower kit for purge air. 110 Vac; single phase
	DSL-BK40B-230	Blower kit for purge air. 230 Vac; single phase
	DSL-BK40B-415	Blower kit for purge air. 415 Vac; three phase
Compressed Air Kit 	DSL-CAK-2	<p>For use with compressed air purge.</p> <p>Includes pressure regulator, in-line filters, and compressed air adaptors for the purge body.</p>

Description	Order Code	Notes
DSCU 	DSL-DSCU-1 DSL-DSCU-4 DSL-DSCU-8	1 analogue output and relay 4 analogue outputs and relays 8 analogue outputs and relays
Calibration Head 	DSL-CH350BA DSL-CH350BS	For use between the RX head and the purge body to perform calibration checking with aluminium type airpurge bodies. (Calibration head only, no filters included). For use between the RX head and the purge body to perform calibration checking with stainless steel type airpurge bodies. (Calibration head only, no filters included).
Zero Mirror for Calibration Checking 	ASY-292 ASY-287 ASY-293	DSL-460S: path lengths 0.5m to 1.5m DSL-460L: path lengths 2.0m to 4.0m DSL-460S: path lengths 1.5m to 4.0m DSL-460L: path lengths 4.0m to 8.0m DSL-460L: path lengths 8.0m to 10.0m
Calibrated Opacity Filters  (other values available on request)	ASY-190 ASY-133 ASY-183	Calibration filter, approx. 8% opacity Calibration filter, approx. 20% opacity Calibration filter, approx. 35% opacity

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

