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

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

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/m^3.

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 the TRX and Reflector 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 for 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.

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Specification:

Measurement Performance

No.	Parameter	Units	Min	Max	Comment
1	Path Length (flange to flange)	m	0.5	10	Flange-to-flange separation
2	Measuring Range Opacity	%	0.0	100.0	User selectable
	Particulate Density	mg/m³	0.0	1000.0	(Optical Density also available)
3	Accuracy	%	-2	+2	Relative to full scale. At 1m path length. (Accuracy is +/-1% at path length >5m)
4	Resolution	% mg/m³		0.1 0.1	Display resolution
5	Damping	s	1	60	Selectable
6	Drift with Temperature	%	-2	+2	Over the full operating temperature range
7	Operating Wavelength	nm	510	540	Green LED
8	Visual Alignment Aid	%	-1	+1	To first target in the reticle

Power & Air Requirements

No.	Parameter	Units	Min	Max	Comment
9	Voltage	Vdc	+24		Optional 90-260 Vac PSU available
10	Voltage Tolerance	%	-10	+10	
11	Nominal Current Consumption	mA		500	
12	Power Up Current Consumption	mA		500	
13	Air Supply Volume	L/min	50	200	To each air purge body
14	Air Supply Fitting				1" BSP threaded aperture in each air-purge body

Interface Options

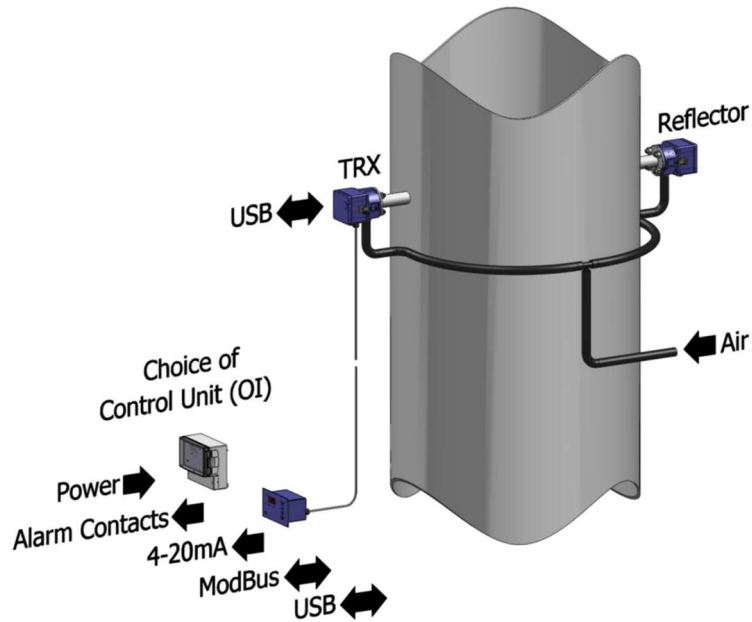| No.	Parameter	Units	Min	Max	Comment
15	Serial Comms				ModBus RTU via RS485 (OI or TRX) Internal USB (OI); external USB (TRX)
16	Analogue Output (one)	mA	0 /2 /4	20.0	Isolated and scalable
17	Relay Contacts (two)	A	0	3	@30 Vdc (level alarm and data valid)

Physical

No.	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 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

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Configuration Options:

Configured with an OI: Wall or Panel Mounting

OR

Stand Alone Configuration

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Dimensions (mm):

TRX

153

120

122

Ø127

Reflector

122

120

Ø127

153
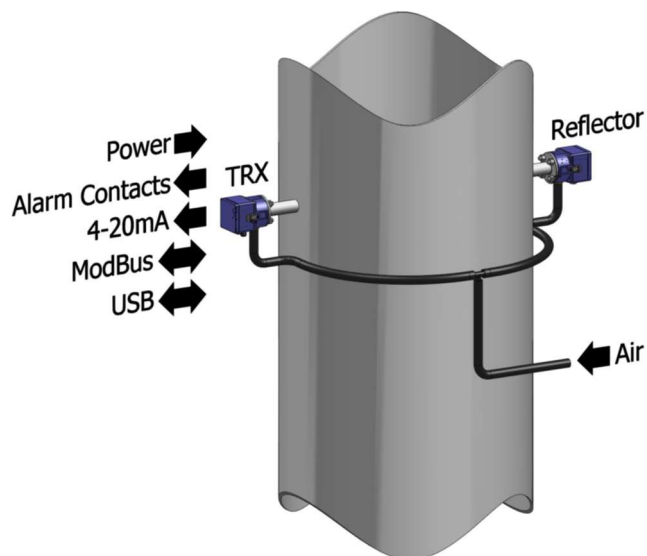
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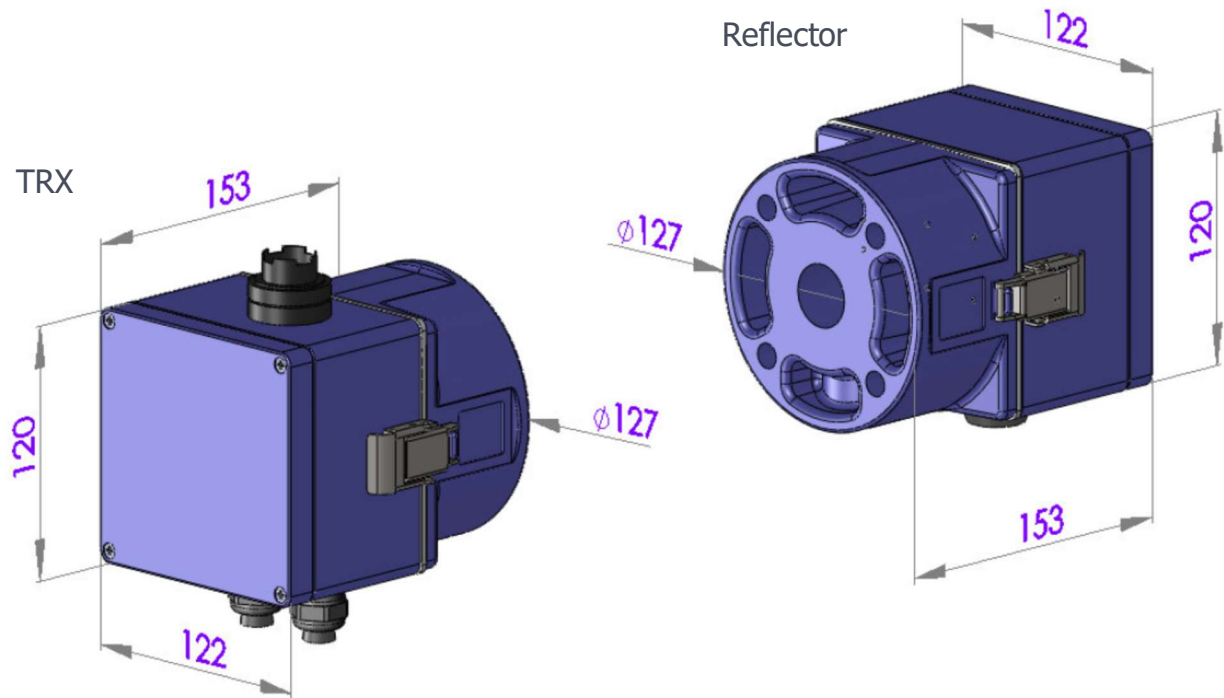
Ordering Details:

DSL-460-XXXX-MkIII

A = Aluminium air-purge body (standard application)
S = Stainless steel air-purge body (demanding application)

D = 24 Vdc powered
A = 100-240 Vac powered

N = No OI

S = Short path length version
    (0.5 - 4m flange to flange separation)
L = Long path length version
    (2 - 10m flange to flange separation)
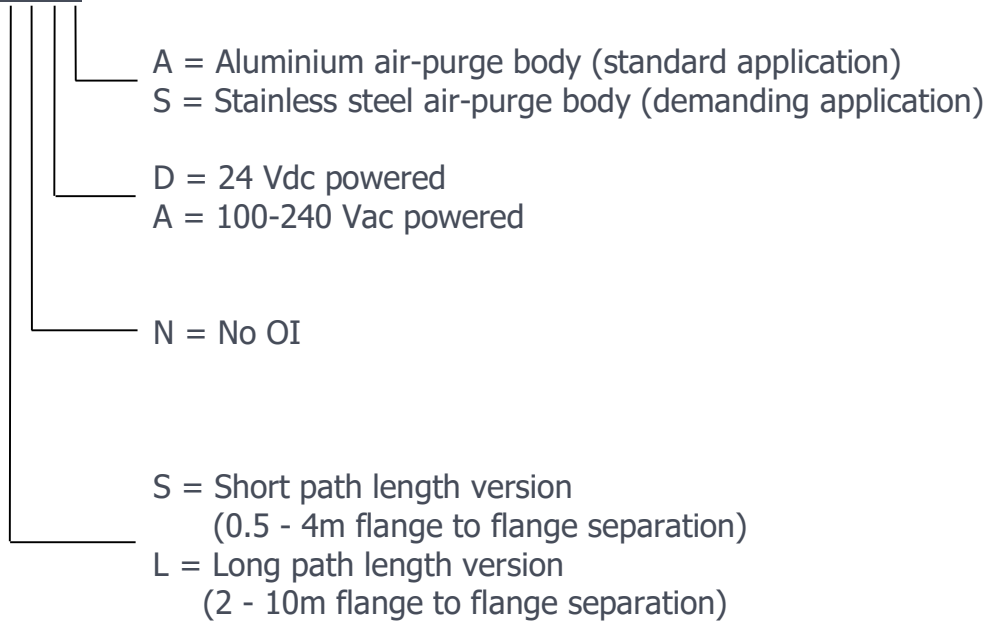
Options & Accessories:

Description	Order Code	Notes
Mounting Flange & Fixing Kit	ASY-067	1.5" ANSI 150 flange pattern with 240mm long extension tube (set of 2).
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	ASY-080	Hinged stainless steel weather / heat cover for protecting externally mounted heads.
Power / Comms Cable Assembly	CBL-119	2m cable with connector
Outputs Cable Assembly	CBL-092	2m cable with connector
Cable	CBL-046	8-core, screened, 20AWG, DEF STAN 61-12 Part5 LSHZ. Max length 300m.
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.

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Blower Kit			
	BK-40B-110	Blower kit for purge air; 110 Vac; single phase	
	BK-40B-240	Blower kit for purge air; 240 Vac; single phase	
	BK-40B-415	Blower kit for purge air; 415 Vac; three phase	

Compressed Air Kit		
	DSL-CAK-2	For use with compressed air purge. Includes pressure regulator, in-line filters, and compressed air adaptors for the purge body.

DSCU		
	DSL-DSCU-4 DSL-DSCU-8	4 analogue outputs and relays 8 analogue outputs and relays

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Calibration Head	DSL-CH350BA	For use between the TRX head and the purge body to perform calibration checking with aluminium type air-purge bodies.
	DSL-CH350BS	For use between the TRX head and the purge body to perform calibration checking with stainless steel type air-purge bodies.
Zero Mirror for Calibration Checking	ASY-292	**DSL-460S**: path lengths 0.5m to 1.5m **DSL-460L**: path lengths 2.0m to 4.0m
	ASY-287	**DSL-460S**: path lengths 1.5m to 4.0m **DSL-460L**: path lengths 4.0m to 8.0m
	ASY-293	**DSL-460L**: path lengths 8.0m to 10.0m
Calibrated Opacity Filters	ASY-190	Calibration filter, approx 8% opacity
	ASY-133	Calibration filter, approx 20% opacity
(other values available on request)	ASY-183	Calibration filter, approx 35% opacity

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

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