acoem

SM-202M

Smoke Opacity Monitor
For monitoring marine emissions

Designed specifically for monitoring smoke opacity emissions within the marine industry.

The SM-202M Smoke Opacity Monitor is an optical instrument designed to measure the visible opacity (0-100%) caused by dust, smoke, and particulate emissions present in the exhaust gas flow of a duct, stack, or flue.

The SM-202M 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. This reduction in intensity is measured and presented as % opacity. The higher the level of smoke present, the more light lost and therefore, the greater the opacity.

The light source in the Transmitter is a high intensity, high reliability red 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 unit is supplied with a panel mountable Operator Interface (OI) and all power supply and output connections are made in the OI. The OI has a bright 4-digit LED display and a simple 4 button keypad, which allow full command and control of the instrument.

The SM-202M is of rugged design and has an excellent reliability record. With no moving parts, 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 are supplied with an air purge body, which when connected to a high-volume source of clean air, (a blower is recommended), will resist particle deposition on the lenses and further lengthen service intervals.

Benefits

- **In-situ measurement directly in exhaust gas flow**
- **Measurement reading as % opacity, smoke density as mg/m3 or Ringelmann**
- **Modulated LED source for long lifetime and immunity to ambient light**
- **Rugged 316L stainless steel construction**
- **Panel mounting operator interface enabling local monitoring and control of the instrument**
- **Choice of interface options enabling easy integration into ship's control system**

Specification

Measurement Performance

Item	Parameter	Units	Min	Max	Comment
1	**Path Length (flange to flange)**	m	0.5	5	Flange-to-flange separation
2	**Measurement Range** Transmission Opacity Smoke Density Ringelmann	 % mg/m³	 0 0 0 0	 1.000 100 1000 5	The displayed units and measurement range can be user selected to suit requirements. Other measurement units also available
3	**Display Resolution** Transmission Opacity Smoke Density Ringelmann	 % mg/m³		 0.001 0.1 0.1 1	
4	**Accuracy** Opacity	 %	 -2	 +2	
5	**Damping**	s	1	999	Default setting is 10s
6	**Drift with Temperature**	%	-2	+2	Over operating range
7	**Operating Wavelength**	nm	620	640	Red LED

Power & Air Requirements

8	**Voltage**	Vdc	105	240	50/60 Hz
9	**Nominal Current Consumption**	A		1.0	
10	**Power Up Current Consumption**	A		1.0	
11	**Air Supply Volume Flow**	L/min	50	200	To each air-purge body.
12	**Air Supply Fitting**		1" BSP threaded aperture in each air-purge body		

Cable and Wire

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

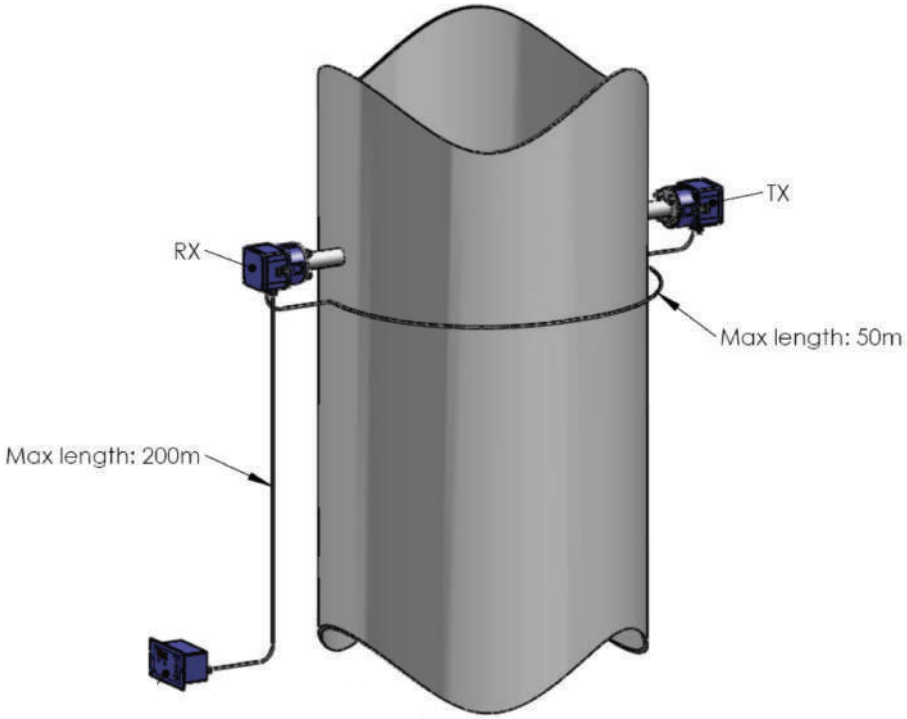
Interface Options

Item	Parameter	Units	Min	Max	Comment
16	**Serial Comms**				RS232 to the OI
17	**Analogue Output (one)** Current Voltage	 mA V	 4 0	 20 10	Isolated and scalable
18	**Digital Relay Contacts (two)**	A	0	3	@30Vac (signal level and data valid)

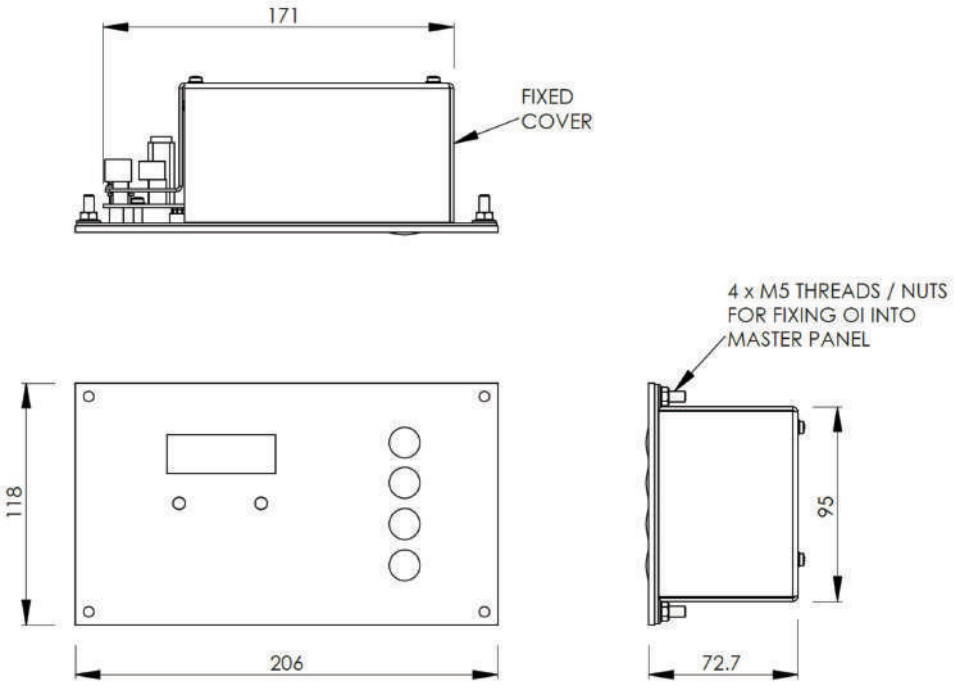
Physical

19	**Ingress Protection:** – TX/RX Heads		IP65		For external use
20	**Ingress Protection:** – OI Panel Mounted		IP64		From front face of panel when installed
21	**Ambient Operating Temperature**	°C	-20	+55	Air temperature around the heads.
22	**Operating Humidity**	%		100	Air humidity around the heads.
23	**Gas Temperature**	°C		+600	Heat insulating gaskets included. (Higher temperatures on request)
24	**Regulatory Compliance**				2014/30/EU (Electromagnetic Radiation) 2014/35/EU (Low Voltage)
25	**Materials:** – TX/RX Heads – Air-Purge Bodies – OI	AISI/SAE 316L stainless steel Powder coated cast aluminium (Stainless steel option available) Steel back-box; aluminium front panel with PU laminate overlay			
26	**Weight** – TX/RX Heads – OI	kg		2.5 1.1	Including air purge body
27	**Warranty**	months	24		Return to base warranty. Extensions available

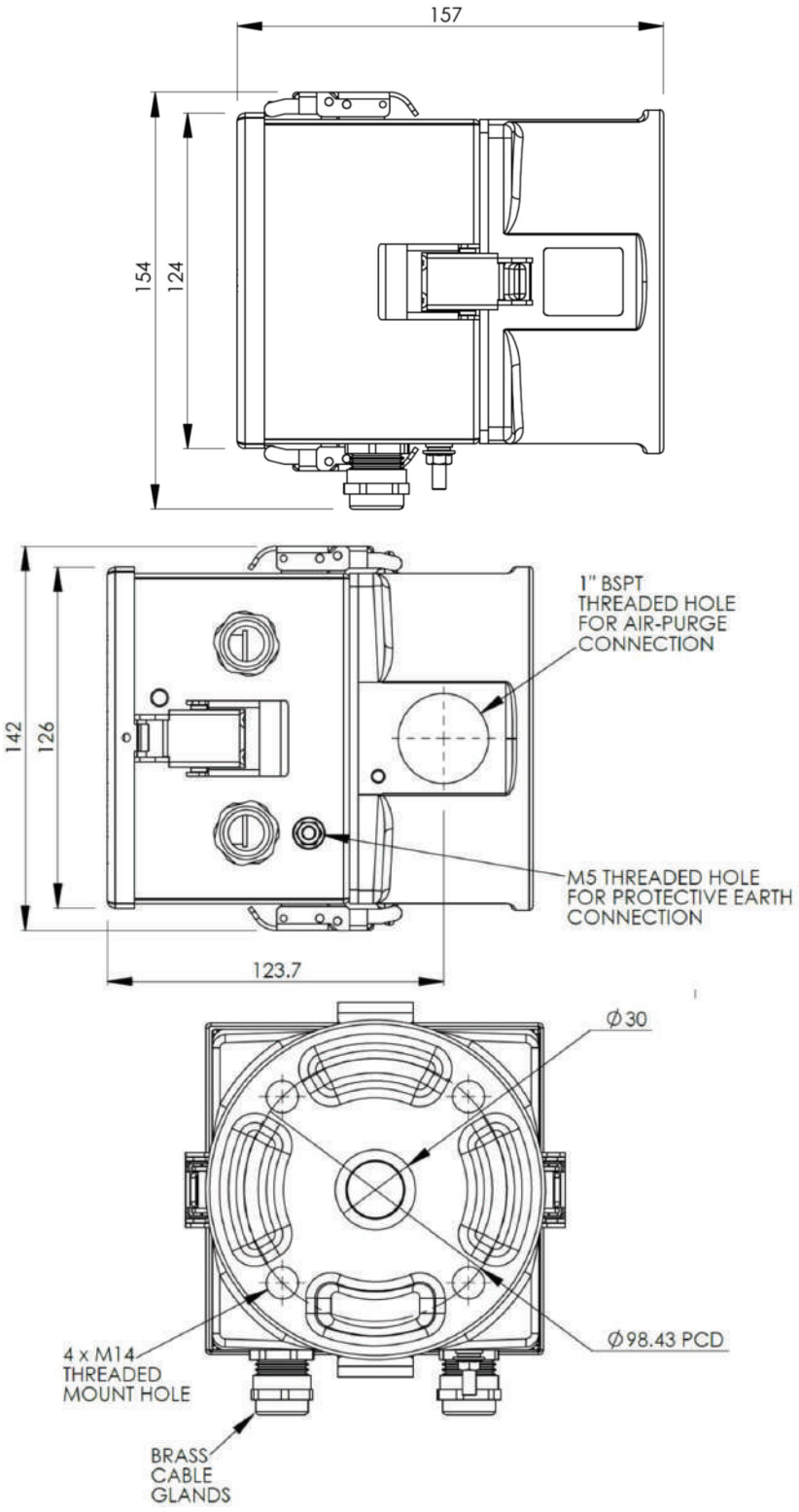
Configuration



OI Dimensions (mm)



TX / RX Dimensions (mm)



Note: The head shown is the RX head (two cable glands). The TX head (one cable gland) has exactly the same dimensions, but has one less cable gland.

Options & Accessories

Description	Order Code	Notes
Mounting Flange 	ASY-067	1.5” ANSI 150 flange pattern with 240mm long extension tube (x2).
Fixing Kit	ASY-071	Contains M14 x 100mm studding, flat washers, spring washers and M14 nuts.
Laser Alignment Tool 	DSL-LAT08A	Tool to aid the alignment of the two heads 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	For use with compressed air purge. Includes pressure regulator, in-line filters, and compressed air adaptors for the purge bodies.

Description	Order Code	Notes
Calibration Head 	DSL-CH350BA	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).
Weather Cover	ASY-080	Hinged stainless steel weather / heatcover for protecting externally mounted heads.
Screened Cable	CBL-099	7-Core, screened, LSZH cable.
Calibrated Opacity Filters  (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.

ISO 9001
QUALITY MANAGEMENT

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CREATING ENVIRONMENTS OF POSSIBILITY

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