

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



- In situ measurement directly in exhaust gas flow using the widely accepted light transmission technique
- Measurement reading as % Opacity
- Modulated green LED source for long lifetime stability and immunity to ambient light
- Rugged 316 stainless steel construction
- Choice of interface options enabling easy integration
- Free utility software for PC based setup, control, and data logging
- Optional Operator Interface with different mounting configurations

The CEL-022 is an optical instrument designed to measure the visible opacity (0-100%) of exhaust gas in a duct, stack, or flue; typically the exhaust gas from an industrial combustion process or air filtration system.

The CEL-022 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 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.

The CEL-022 is available with or without an Operator Interface (control unit), so for the most cost effective monitoring solution the CEL-022 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 CEL-022 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 CEL-022 directly from a PC.

The CEL-022 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.

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Directors: TA Dunnington FRSA, MG Hope Company Registration No: 859061 VAT Registration No: GB208618366

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 | % | 0.0 | 100.0 | User selectable |
| 3 | Accuracy | % | -2 | +2 | |
| 4 | Resolution | % | | 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 (OI or TRX) 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 | Ingress Protection: - OI Wall Mounted - OI Panel Mounted | | IP65 IP64 | | Hinged door and terminal compartment shut. 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. (Higher temperatures on request) |
| 25 | Regulatory Compliance | | | | 89/336/EEC (Electromagnetic Radiation) 73/23/EEC (Low Voltage) |
| 26 | Materials: - TX/RX Heads | 316 Stainless Steel (powder coated) | | | |
| 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 |

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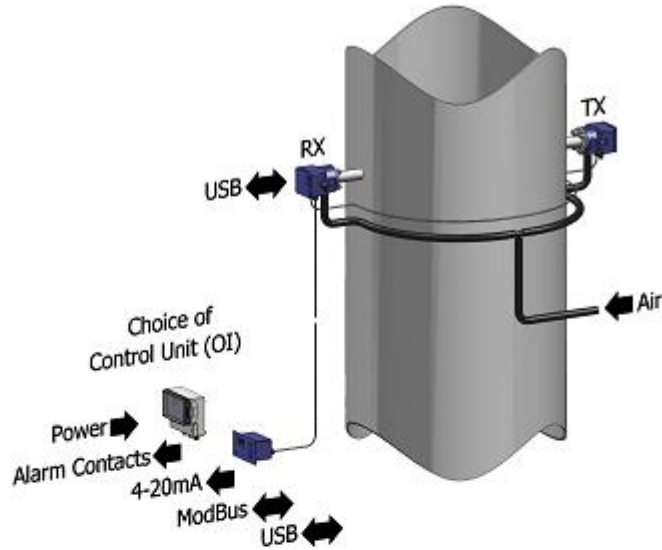
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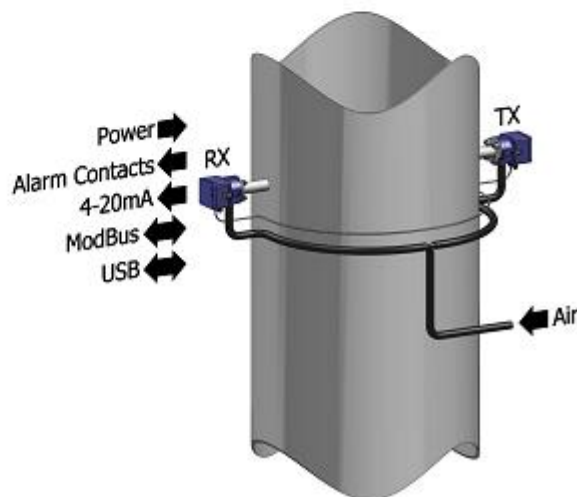
Configuration Options:

Configured with an
OI: Wall or Panel
Mounting



OR

Stand Alone
Configuration

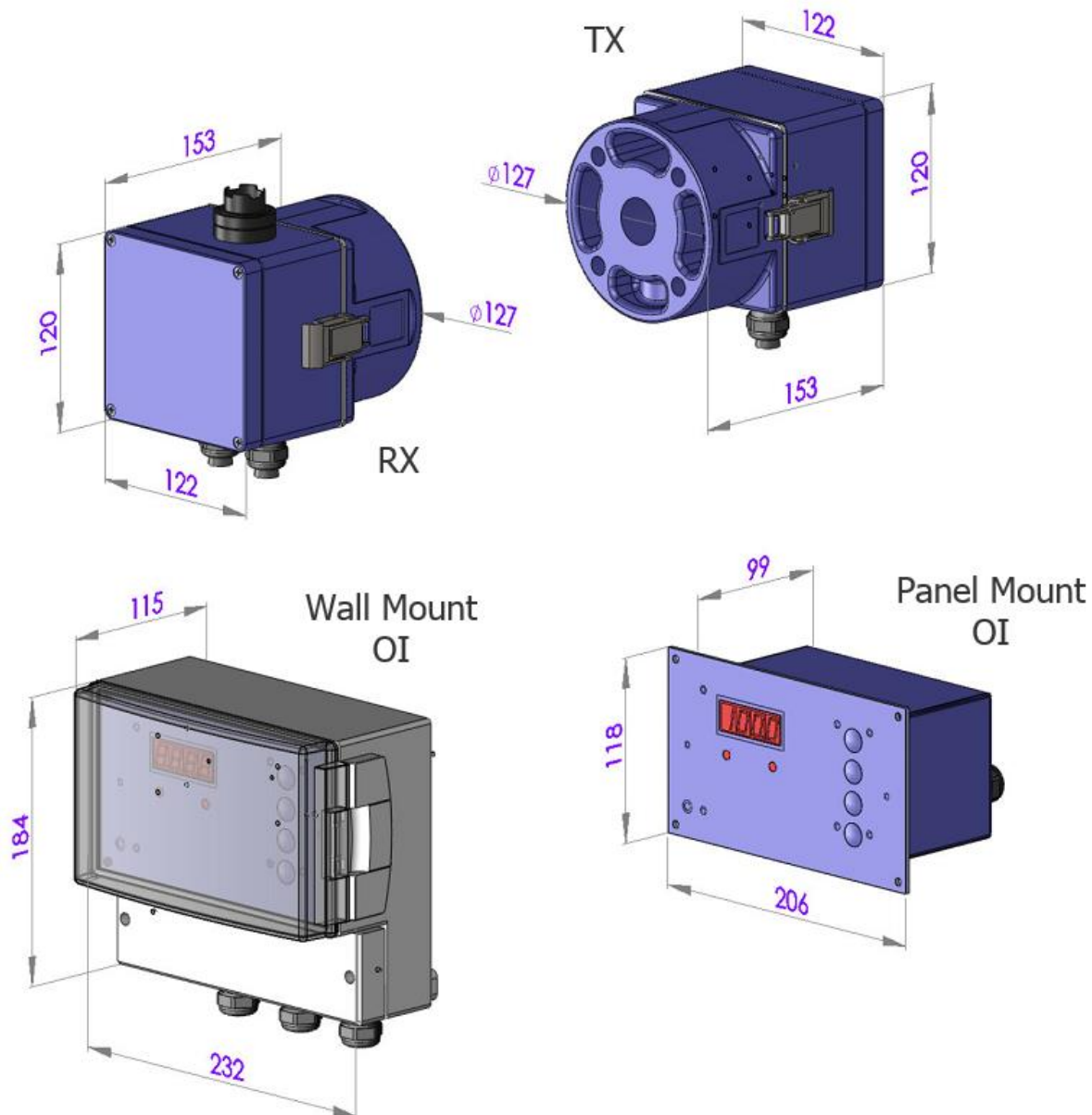


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Dimensions (mm):



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Ordering Details:

CEL-022 MkIII X X X X

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

D = 24 Vdc powered
A = 90-260 Vac powered

N = No OI
W = Wall mounted OI
P = Panel mounted

S = Short path length version
(0.5 - 5m flange to flange separation)
L = Long path length version
(3 - 20m flange to flange separation)

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Options & Accessories:

| Description | Order Code | Notes |
|--|------------|--|
| Mounting Flange | 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 | ASY-080 | Hinged stainless steel weather / heat cover for protecting externally mounted heads. |
| Laser Alignment Tool | DSL-LAT08 | Tool to aid the alignment of the two heads across the stack. |
| 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 | ASY-181 | For use with compressed air purge. Includes pressure regulator, in-line filters, and compressed air adaptors for the purge body. |
| Calibration Head | DSL-CH350A | For use between the RX head and the purge body to perform calibration checking. |
| Calibrated Opacity Filters | ASY-190 | Calibration filter, approx 8% opacity |
| | ASY-133 | Calibration filter, approx 20% opacity |
| | ASY-183 | Calibration filter, approx 35% opacity |

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| | | |
|-----------------------|---------|--|
| Interconnecting Cable | CBL-046 | 8-core, screened, 20AWG, DEF STAN 61-12 Part5 LSHZ. Max length 300m. |
| Boxed PSU | PSU-005 | Multi AC input, 24Vdc output 75W, IP67 rated enclosure |

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

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