PENTAIR



GOYEN MECAIR PEM MANUAL

PARTICULATE EMISSION MONITOR

PENTAIR CLEAN AIR SYSTEMS | INSTALLATION AND OPERATION MANUAL – OWNER'S RECORD

PEM MANUAL
PARTICULATE EMISSION MONITOR

Installation and Operation Manual – Owner's Record

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Issue 01 – May 2019

1 INTRODUCTION

PURPOSE OF THIS MANUAL

This manual contains all information necessary for the correct installation, setup, operation, and maintenance of the instrument(s). *The procedures given in this manual must be carried out only by suitably trained and qualified personnel.*

PRODUCT SAFETY

The following symbols are used throughout this manual to indicate procedures that, if not followed correctly, may result in personal injury or damage to the equipment.



WARNING!

Warnings alert the user to a procedure or practice which, if not followed correctly, can result in personal injury or injury of others.



CAUTION!

Cautions alert the user to a procedure or practice which, if not followed correctly, can result in damage to the system or ancillary equipment.

NOTES are used to highlight important information that assists the user in carrying out a procedure or in understanding the text.

Danger from Process

It is possible that the sensor is installed in ducting that contains process particulate (and other flue gas constituents) hazardous to health. This may take one or more of the following forms:

- Particulate which is flammable or explosive;
- Particulate which is toxic or in some other way hazardous to health;
- Particulate contained within high-temperature gas.

Take Precautionary Measures

Unless the process conditions are known to be entirely safe, suitable precautions, such as the use of breathing apparatus or duct purging/detoxifying, must be employed before entry is made into the duct for installation or maintenance purposes. If in doubt, consult your local Safety Officer and/or local safety procedures.

SAFETY PROCEDURES

Always observe the following safety precautions. Personnel installing, operating, or maintaining the equipment are responsible for their personal safety, and for the correct handling and use of the equipment in accordance with the safety procedures detailed in this manual.

Follow all warnings and instructions marked on the product and in this manual. These safety instructions must be followed to avoid possible personal injury, injury to others, and damage to the product.

If the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

Retain these instructions in a safe and known place for future use.



WARNING!

Risk of personal injury or injury to others. All personnel must be fully trained and adhere to local and, where applicable, site-specific health and safety laws and guidelines.

It is the responsibility of the local organizations to enforce safe working practices at all times.



WARNING! – EXPLOSION OR COMBUSTION RISK

Observe the requirements in the certificates, and the precautions and Special Conditions of Use documented in this manual. (Refer also to the Equipment Marking Information on page 5.)



All system components, except the sensor, must be placed in the designated Safe Area.



WARNING! – ELECTRIC SHOCK

Only connect to an earthed supply. This unit is a Class 1 construction and must be connected to a Protective Earth connection (GND).



WARNING! – ELECTRIC SHOCK

This product must be connected to a power supply of the same voltage (V) and frequency (Hz) as indicated on the product rating plate and provided in the Technical Data section on page 6 of this manual.

A supply cable with adequate rating must be used. Temperature de-rating must be considered.



WARNING! – ELECTRIC SHOCK

A suitable approved and rated mains isolation device must be installed. The device must be clearly marked and easily accessible (within a 2 m/6½ ft. radius) to allow the control unit to be switched off when at the unit.

The contact gap of the disconnect device must be at least 3 mm.



CAUTION!

Position the equipment to avoid excessive heat, vibration, humidity, and dust.



CAUTION!

NO USER-REPLACEABLE PARTS INSIDE!

Failure to service or maintain the product, fitting non-approved parts, or carrying out non-approved alterations or servicing can be dangerous and could affect the safety of the product. It may also invalidate the terms and conditions of the product warranty.

LIMITS OF USE

To achieve optimum performance and safe operation the equipment must be operated within the limits detailed in the Technical Data section on page 6 of this manual. Operation outside these limits can result in damage to the equipment or failure to achieve the performance specified.

Pollution Degree 2

This equipment is designed for operation in Pollution Degree 2 environments (non-conductive, transient pollution where occasionally a temporary conductivity caused by condensation must be expected).

Overvoltage Category II

Overvoltage protection for CATII equipment or instruments intended to be supplied for wiring (applicable to both plug-connected and permanently connected equipment).

ADDITIONAL INFORMATION

List of Abbreviations

The following abbreviations and terms are used in this manual:

ACRONYM	MEANING
BSP	British standard pipe parallel (thread standard)
ESP	Electrostatic precipitator

Product Serial Numbers

Record the product serial numbers of your instruments for future reference. The serial number labels can be found on the right-hand side of the sensor and the control unit enclosures. The instruments' serial numbers are also provided on the corresponding Test Record Card.

2 CERTIFICATION

CONFORMANCE AND RELATED STANDARDS

Goyen | Mecair hereby declares that this instrument—within the limits specified in this manual—complies with the essential requirements and other provisions of the following European Union Directives: Low Voltage Directive, EMC Directive, and ATEX Directive.

For details refer to the Declaration of Conformance for this instrument or system (available from Goyen | Mecair or our local representative on request).

ATEX Certification

EN 60079-0:2012 + A11:2013	
Explosive atmospheres. Part 0: Equipment – General requirements	*Specifies general requirements for products to be used in explosive gas or combustible dust atmospheres.*
EN 60079-31:2014	
Explosive atmospheres – Part 31. Equipment dust ignition protection by enclosure "t"	*Specifies requirements for design, construction and testing of electrical equipment and Ex components.*

Note: *IEC 60079-11:2011 was used for reference.*

3 SENSOR SAFETY DESCRIPTION

3.1 HAZARDOUS AREAS APPROVALS

The notified body, Sira[A], has certified the instrument for the following equipment categories. This product has been approved for installation in areas with combustible dusts. *It may not be used in hazardous gas zones*.

3.1.1 Hazardous Zone Classification

The instrument is suitable for use in the following Ex zones:

	INSIDE STACK	OUTSIDE STACK
DUST ZONE	Zone 22	Zone 22

3.1.2 Temperature Limits

Permitted ambient temperature range	–20 to +55°C (–4 to 130°F)
Permitted process temperature	–20 to +250°C (–4 to 480°F)
Maximum surface temperature at the electronics enclosure	+80°C (175°F)
Maximum surface temperature at the probe	+250°C (480°F)

3.2 SAFETY STRATEGY

3.2.1 Principle

The fundamental principle is to make the probe rod suitable for use in dust zone 22 (inside the stack/duct) and to make the rest of the hazardous area system (outside the stack, mounted on the stack wall) suitable for zone 22.

3.2.2 Method used

The method used to achieve safety in the presence of combustible dusts: Protection by enclosure (according to applicable ATEX standards, see the Certification section on page 3 for details).

3.3 MANDATORY GUIDELINES

The following instructions are mandatory and must be adhered to:

1. The instrument must only be installed in metallic ducts or stacks.
2. The instrument must be connected to the duct or stack so as to ensure equipotential bonding:
   a) The instrument floating nut must make good electrical connection with the stack mounting coupling so as to ensure the sensor and stack are 'grounded' together.
   b) An earth-bonding cable of minimum conductor cross-sectional area of 4 mm² must be used to connect the enclosure to a suitable grounding point on the stack. Provision for this connection is made on the base of the enclosure and marked appropriately.
3. The enclosure of the instrument must only be opened if it is assured that no explosive gas or dust atmosphere is present.
4. The lid of the sensor has to be protected against mechanical energy >4J, resp. >2J at the display.

3.4 SPECIFIC CONDITIONS OF SAFE USE

I. A connection shall be made between the earth stud on the probe housing and the duct wall. This connection shall be made as follows:
   - the cable shall have a cross-sectional area of at least 4 mm².
   - the cable shall be connected using an anti-vibration nut and washer or a similar arrangement of comparable integrity.

[A] CSA Group, Hawarden, CH5 3US, United Kingdom (www.siracertification.com).

If the probe is removed while a potentially flammable dust/air mixture is present, this connection shall be maintained during the withdrawal of the probe.

II. The part of this equipment that houses the electronics is suitable for an upper ambient of 55°C and the standard range of atmospheric pressure; the user/ installer shall ensure that maximum process temperatures and pressures do not cause these parameters to be exceeded.

III. Glands and blanking plugs shall maintain the IP66 ingress protection of the enclosure and fitted with a suitable sealing washer.

IV. If the equipment is likely to come into contact with aggressive substances (e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials relied upon for sealing), then it is the responsibility of the user/installer to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection (dust exclusion) is not compromised.

V. Under certain extreme circumstances, the non-metallic labels, window (if present), and insulating bush (if present) may store an ignition-capable level of electrostatic charge. Therefore, the electronics enclosure shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the non-metallic parts shall only be cleaned with a damp cloth.

VI. The equipment shall only be connected to a supply where the prospective short-circuit current does not exceed 1500 A.

3.5 EQUIPMENT MARKING INFORMATION

The PEM sensor unit has two labels applied to its enclosure: a serial number label and a label showing the ATEX-related Ex/CE marking obtained by the manufacturer for this instrument.

	ATEX
DUST ZONE	**ZONE 22**
Certificate number:	Sira 10ATEX4144X
Certification code:	**Outside stack (electronics enclosure):** Ex tc IIIC T80°C Dc IP66 Ta = –20°C to +55°C **Inside stack (probe[B]):** Ex tc IIIC Dc IP66 Ta = –20°C to +250°C II 3D
Manufacturer's name:	PCME Ltd.
Manufacturing address:	St Ives, Cambs, PE27 3GH, UK
Model number:	*as applicable*
Year of manufacture:	*as applicable*

[B] The probe does not generate heat, so the surface temperature is dependent upon the stack temperature. This is a maximum of +250°C (480°F), depending on the build.

4 PRODUCT DESCRIPTION

4.1 OVERVIEW

The instrument is designed for use as a standalone sensor. It has various outputs for connection to plant CEM systems. There is no logging capability in the instrument.

4.2 TECHNICAL DATA

4.2.1 Process and Application Conditions

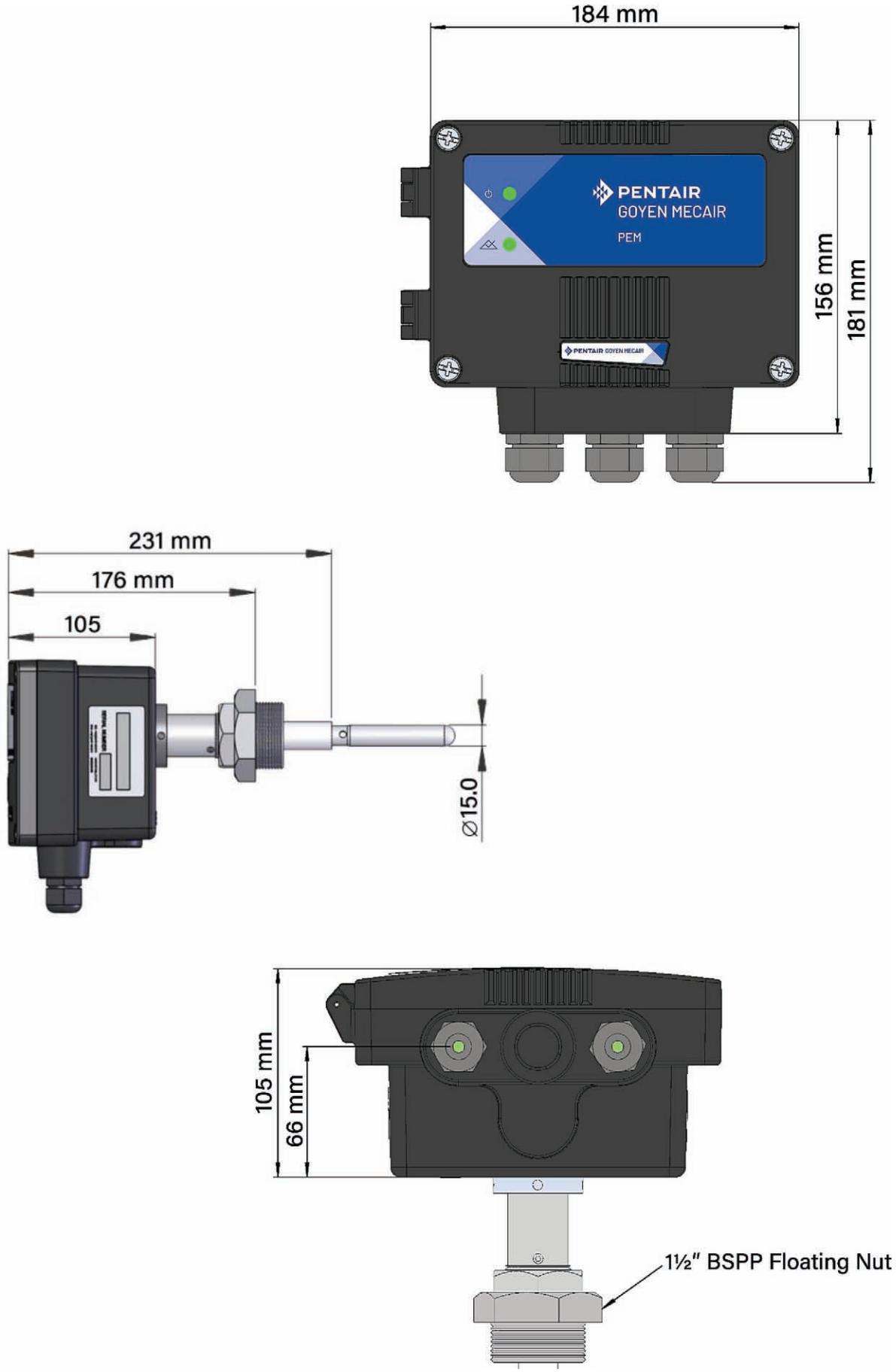
Stack temperature range[C]	–20 to 250°C (–4 to 480°F)
Application conditions	Suitable for measurement in non-condensing flue gases. ***Note:*** *not suitable for use downstream of ESPs or in applications with water droplets.*
Minimum detection level	<0.1 mg/m³
Measurement range	up to 500 mg/m³
Scaling method	Scaling Factor (mg/m³)
Ambient temperature C	–20 to 55°C (–4 to 130°F)

4.2.2 Sensor Specification

PEM SENSOR	
Sensor variant	Standard sensor: 0–250°C (up to 480°F)
Sensor type	Ex dust stack monitor with Mk5 enclosure with stainless steel probe.
Enclosure dimensions	W 184 × H 181 × D 105 mm (7.2 × 7 × 4 in., nom.), incl. cable glands
Enclosure rating	IP66 (with hinged lid closed)
Enclosure material	LM6M (epoxy coated)
Outputs	• 4–20 mA output (isolated, 500 Ω) • Fault alarm relay (SPST 1 A @ 24 V DC), fail safe • RS-485 output (Modbus)
Inputs	Plant stop signal (output to zero when plant is off)
Power requirements	115–240 V AC, 50/60 Hz, 32 mA
Cable entries	3 × M20 cable glands
Stack connection	1.5″ BSP
User controls	4 × Setup keys (internal keypad)
External indicators	2 × LEDs (for power and fault alarms)

[C] At monitoring point. Please note that imperial temperatures given are nominal values.

4.2.3 Dimensioned Drawings – Sensor



4.2.4 Sensor Options

Quality assurance	• Electronic drift checks (manual) • Short-circuit check
Probe rod lengths	100 mm (4″), 200 mm (8″), 300 mm (12″), 400 mm (16″), 500 mm (20″), 600 mm (24″), 800 mm (32″), 1000 mm (40″). **Note:** Imperial measurements are nominal values.
Hazardous zones classification	ATEX dust zone 22 (Cat. 3)

4.2.5 Cabling

All cabling must be suitable for use in hazardous zones.

Cabling should be rated for use up to +65°C (150°F) at least to allow for an ambient temperature of up to +50°C (120°F). Cables supplied by Goyen | Mecair meet these requirements.

The power-supply cord shall be not lighter than a light PVC-sheathed flexible cord according to IEC 60227 (designation H03 VV-F or H03 VV H2-F).

The conductor area shall be no less than 0.75 mm².

For special instructions and requirements relating to the installation of sensors in hazardous zones refer to the Sensor Safety Description on page 4 and to the Sensor Installation section on page 9.

Maximum cable lengths	RS-485: 1,000 m (0.6 mi/3,300 ft, nom.)

5 SENSOR INSTALLATION

This chapter provides information on unpacking, installing, and setting up the instrument. It also includes information on requirements and safety guidelines.

5.1 UNPACKING AND STORAGE

Remove all transit packaging. Inspect the sensor for signs of damage. If it is damaged, contact Goyen | Mecair immediately. If the equipment is to be stored prior to installation, then repack it in the original transit packaging and store in a dry environment.

No responsibility for damage arising from the use of non-approved packaging will be accepted.

NOTE: Ensure all items and accessories specified are present. If not, contact Goyen | Mecair or our local representative.

5.2 PREREQUISITES AND GUIDELINES

5.2.1 Safety Information



WARNING! – DANGER FROM PROCESS

It is possible that the sensors are to be installed in ducting containing process particulate that is a hazard to health.

Unless the process conditions are known to be entirely safe, suitable precautions such as the use of breathing apparatus or duct purging/detoxifying must be employed before any entry is made into the duct for installation or maintenance purposes. If in doubt, consult your local Safety Officer and/or local safety procedures.



WARNING! – ELECTRIC SHOCK

A suitable approved and rated two-pole mains isolation device must be clearly marked and installed close to the sensor unit (within a 2 m/6½ ft radius) and readily accessible.



WARNING! – ELECTRIC SHOCK

(1) Ensure that only suitable and rated cables types are used for power supply and interconnection of equipment.

(2) When wiring the mains cable, ensure that the Protective Earth wire (GND) is the longest one, so that if the cable is pulled out accidentally, the earth wire disconnects last.

5.2.2 Choosing the Best Position for the Sensor

When selecting a mounting location for the sensor, the following guidelines are based on the related standards[D] and should be taken into consideration to ensure optimum performance of the instrument, safety, and for compliance purposes.

The best position for the sensor unit is in a section of ductwork where the particulate has an even distribution and the flow is linear. This would ideally be in a vertical or horizontal section of duct that has no bends or obstructions for at least three duct diameters downstream or upstream. In many applications, a compromise must be made, but the sensor should be fitted in a position that satisfies the majority of the below requirements.

NOTE: The sensor must be fitted to metal ductwork in order to be electrically screened from interference signals (see Grounding the Sensor on the next page).

[D] The definitive guide for isokinetic sampling port location is given in standards ISO 9096 and EN 13284-1.

5.2.3 Location Requirements

When selecting a mounting location for the sensor the following should be taken into consideration for optimum performance:

- In the longest, straightest, unrestricted section of ductwork available.
- In metallic ductwork (for non-metallic ductwork contact Goyen | Mecair).
- Away from ambient or radiated temperatures greater than +50°C (120°F).
- Where possible, the equipment should be mounted out of direct sunlight, precipitation, and away from running water.
- **Hazardous Zones:** refer to the Sensor Safety Description on page 4 for details of ATEX-related special conditions and requirements.

5.2.4 Cabling Guidelines

Cables should be fixed such that they are free from excessive vibration and not under strain. Cables should be secured in accordance with good engineering practice (e.g. using cable trays where possible) and careful consideration should be given to the positioning of cables so that they are not damaged easily. Cables should be routed to avoid sources of large electromagnetic fields, such as heavy switching gear. Care taken during the installation of the cables ensures a long, maintenance-free life and avoids possible damage to the control unit and sensor.

In summary, the cabling should be installed such that:

- Heavy vibration is minimized to prevent fatigue and failure.
- It is not vulnerable to accidental damage.
- It is away from sources of large electromagnetic fields (if possible).

5.2.5 Grounding the Sensor

For PEM sensors it is essential that the sensor body is grounded to the stack wall. This is necessary for Ex safety. In addition, poorly grounded sensors may pick up external noise producing false high readings.

Ensure the installation complies with the following:

- The sensor may only be fitted to a metal duct or stack, if the stack is not metallic or you are concerned that the stack may not provide a suitably earthed shield for the sensor, please contact Goyen | Mecair.
- The grounding strap (or earth wire) provided may be connected to ensure the sensor body is securely grounded to the metallic stack wall. The sensor is electrically grounded to the ductwork by the mechanical connection made between the sensor and the socket, and by the external grounding strap.

NOTE: The grounding strap must be connected between sensor enclosure and stack wall. Relying on the stack connection only is not acceptable in hazardous areas!

- When connecting the grounding strap between sensor enclosure and stack wall leave sufficient length so that the sensor can be removed and placed on the ground or platform for maintenance without disconnecting.
- For threaded connections: **Do NOT put PTFE tape around the thread** (as this can compromise the sensor grounding connection)!
- If necessary, remove excessive rust from the thread and socket and apply a copper-loaded grease.

5.2.6 Running Cables between Sensor and Power Supply



CAUTION!

Do NOT route cables where they may be at risk from lightning damage (e.g. over exposed roofs).

- To prevent water from entering the instrument, mount all instruments and accessories with the cable entry glands facing downward.
- After inserting and connecting a cable, fasten the cable glands tightly onto the cable to form a seal. Leave a little slack in the cores.
- Cable sheathing must always penetrate the cable entry gland fully, and the gland must be fastened tightly to it.
- Where a cable run approaches the instrument from above, it must be run underneath the instrument and then curved up to the cable gland.
- Leave sufficient slack in the cable to allow the sensor unit to be removed and placed on the ground/platform for servicing.

- Support cables at appropriate intervals. Where possible, use cable trays.

NOTE: For EMC reasons (interference rejection and surge handling), all of the cable trays carrying signal cables should be electrically continuous (i.e. the sections should be interconnected by heavy-gauge electrical wiring) and they should be connected to Earth at multiple points along their length. Cable trays are typically secured to grounded metal structures, which satisfies this requirement.

- The cable screen must be terminated correctly.
- Any unused cable glands must be blanked using an appropriate device.
- When connecting the sensor, the 4 off screws securing the enclosure cover lid should be coated with a small amount of copper grease before refitting and securing the lid. *Do not over-tighten the screws*.

5.3 MOUNTING THE SENSOR

5.3.1 Safety Information

CAUTION! – PROBE DAMAGE

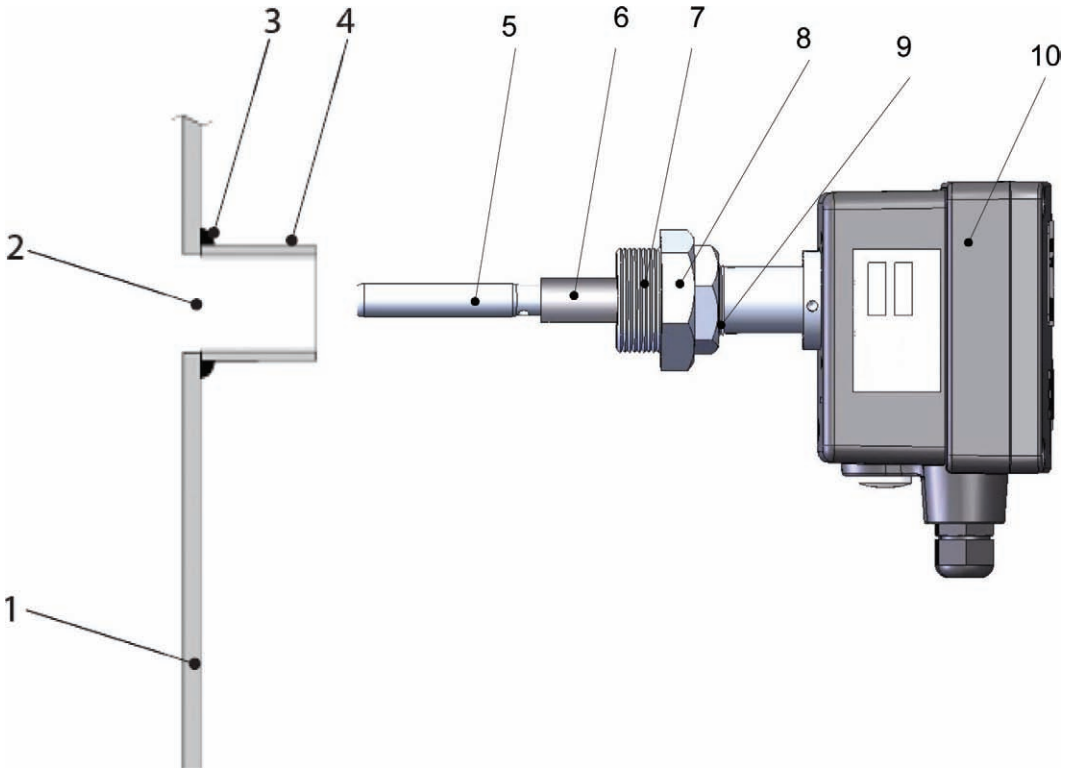
Take care when handling the sensor to avoid bending or damaging the probe. Probe damage may result in inaccurate measurements.

CAUTION!

Do NOT try to rotate the sensor by turning its enclosure as this can damage the sensor.

5.3.2 Fitting the Sensor to the Stack

Figure 1: Fitting the sensor to the stack



1 Stack wall
2 Stack wall opening/port hole for probe (at least ∅ 45 mm)
3 Weld all round
4 1.5″ BSP socket
5 Probe rod
6 Insulator
7 1.5″ BSP thread
8 Floating nut
9 Lock nut
10 Sensor enclosure

1. Drill a hole with an ID of at least Ø 45 mm in the stack/duct where the sensor is to be located.
2. Fit a 1.5″ BSP socket, which must be securely welded to the stack. Ensure the BSP socket is 90° to the stack or at a slight upward angle of about 5°, so the sensor probe points downwards allowing condensate to drain off into the stack.
3. Insert the sensor probe into the socket and secure with the floating nut. Ensure the sensor enclosure is upright with the cable entry glands at the bottom and is adequately supported when tightening the floating nut.

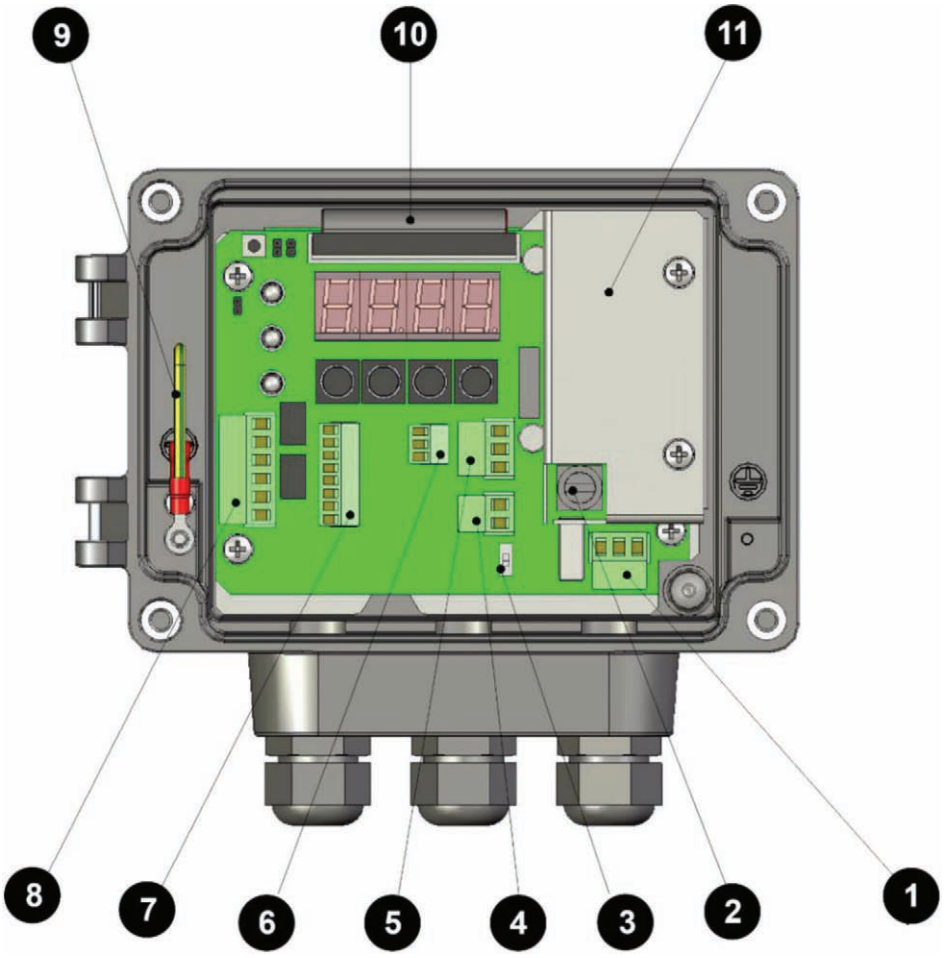
NOTE: Ensure the grounding strap connects the sensor securely to the stack/duct via the earth stud assembly at the rear of the sensor enclosure.

4. Tighten the lock nut. When tightening the lock nut ensure the floating nut is held securely with a wrench.

5.4 CONNECTING THE SENSOR

5.4.1 Sensor Connections

Figure 2: Sensor PCB connections



1 Power IN (mains/AC)
2 Fuse holder (mains fuse)
3 Bus termination switch (set to T/terminated)
4 4–20 mA output
5 RS-485 connector
6 *not in use*
7 *do not use*
8 Fault relay (Relay 1)
9 Lid earthing strap (*do not remove*)
10 Connection to CPU board (*do not remove*)
11 Power supply/PSU cover (*do not remove*)

5.4.2 Connecting the Sensor Power Supply

WARNING!

Ensure the cabling is not connected to control unit power during wiring.

WARNING! – ELECTRIC SHOCK

This equipment contains lethal voltages!

Do not reverse Live (L) and Neutral (N) – the neutral line is not fused!

Hazardous voltages are still present when the main power supply fuse has failed!

The label on the PSU cover and the markings on the power connector indicate the voltage required.

Connect only to a power supply with a voltage corresponding to that on the rating plate.

Connecting the Cables

Easily accessible disconnect devices, such as switches or circuit breakers along with a separate fuse, must be fitted to the power supply wiring for mains-powered sensors. These must be located so they can be reached easily (within a 2 m/6½ ft radius of the unit). The isolation devices should connect/disconnect both mains Live (L) and mains Neutral (N) and must be clearly marked as the disconnecting device for the instrument.

5.4.3 Wiring the Mains Power Supply

1. Undo the 4 off screws and open the hinged sensor enclosure lid.
2. Note the label on the power supply/PSU cover (see Figure 3 below).
3. Referring to Figure 4 on the next page, undo the 2 off screws and remove the PSU cover.
4. Route the power supply cable through the right-hand cable gland and connect to the mains power terminals as outlined in the following table.

MAINS PIN CONNECTIONS (L–R):			
		WIRE COLOUR	POWER IN connector
L	Live		
PE ⏚	Protective Earth (GND)		
N	Neutral		

Figure 3: Power supply label (mains power)

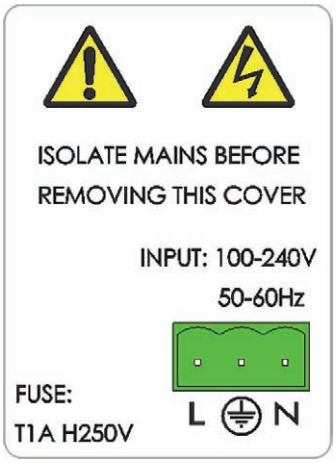
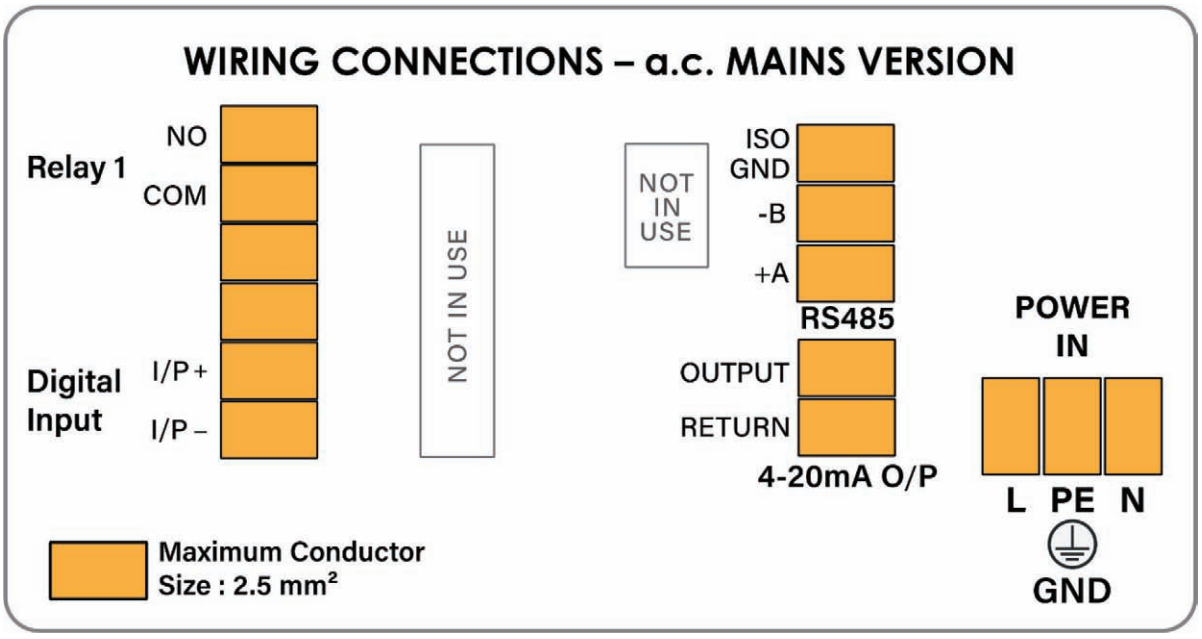


Figure 4: Sensor wiring label (inside enclosure lid)

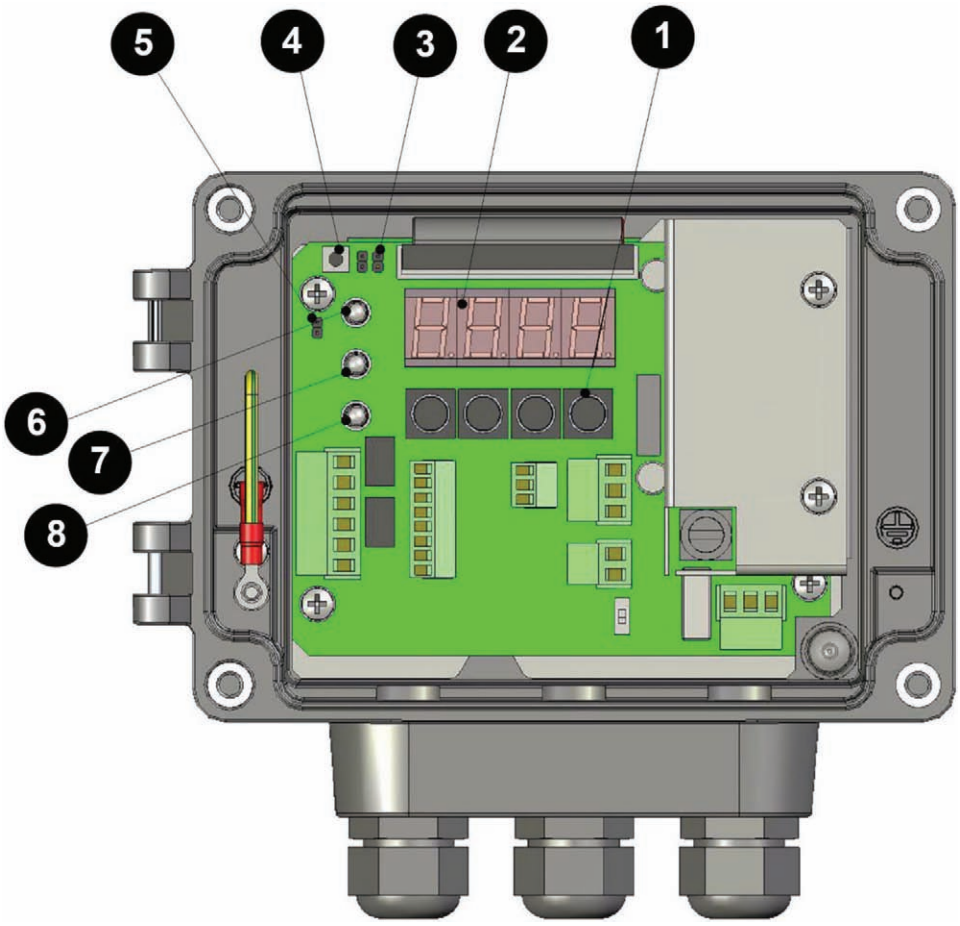


5. Replace and secure the PSU cover.
6. Close the enclosure lid and secure with the 4 off screws. *Do not over-tighten.*
7. Switch ON power to the sensor.

6 USER CONTROLS AND MENU SELECTION

6.1 OVERVIEW OF INTERNAL CONTROLS

Figure 5: Internal sensor controls



1 Navigation buttons (LEFT, DOWN, UP, RIGHT)
2 Four-digit LED display
3 Menu selection (with jumper)[E]
4 Reset button
5 Firmware upgrade link LK2[F]
6 Power/status LED
7 *not in use*
8 Self-check LED

[E] LK4 (fitted right) = Standard menu, LK3 (fitted left) = Engineering menu
[F] Leave jumper fitted except during firmware upgrades.

6.2 NAVIGATION AND BASIC FUNCTIONALITY

The sensor settings are organised into a list of menu headings.

- **Navigation:** use the UP and DOWN keys to scroll between menu headings. Use the RIGHT button to view or edit the settings associated with each menu heading and the LEFT button to return to the previous setting.
- The **first menu heading** contains all the readings available for the instrument: the dust reading and the sensor self-check results.
- **Return to the top of the menu** at any time to view the dust reading by pressing the RESET button at the top left of the display.
- If a **password** has been set, then to edit settings you must first go down to the Password menu and enter this (see below for details).

6.2.1 Accessing Menus and Menu Options

1. Press the **RESET** button at the top left of the display: this returns you to the current dust reading.
2. Press LEFT to display the **DUST** reading (main menu; see also the menu maps at the start of sections 7 and 8).
3. Press DOWN to scroll through the menu headings. The menu is circular, pressing DOWN from the **RUN.T** menu returns you to the DUST menu.
4. Press RIGHT repeatedly to view the current settings associated with that menu heading. Press LEFT to return to the previous setting.

NOTE: Additional settings are available in the Engineering menu (move the jumper from LK4 to LK3 and press the RESET button to access this). For more information on menu levels and functions see section 8 on page 20.

6.2.2 Changing a Setting

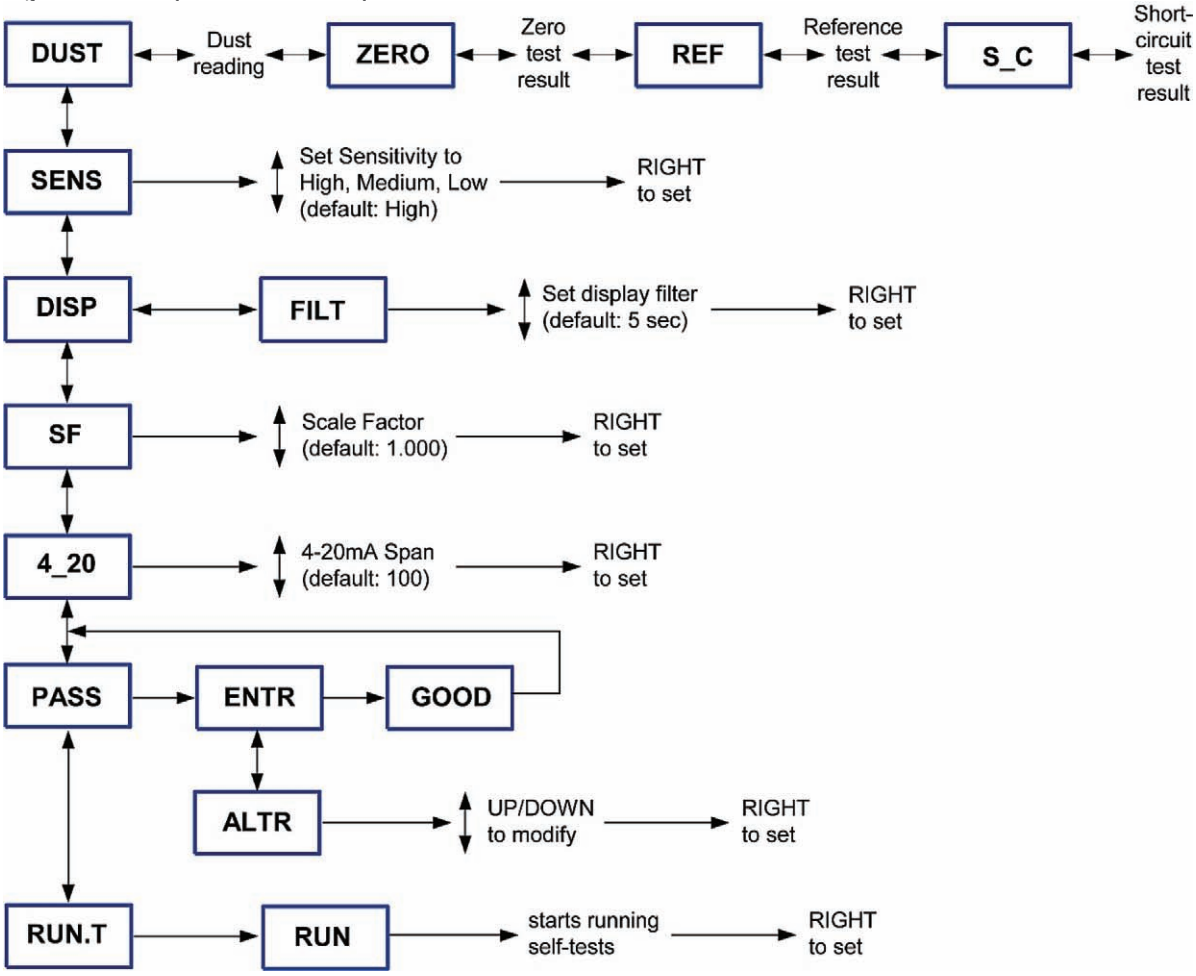
1. Enter the password, if required (see section 7.2 on page 18).
2. Scroll DOWN and press RIGHT to access the required menu settings.
3. In adjusting mode, the first, left-hand digit of the numerical value will flash.
4. Use the UP and DOWN keys to alter the numerical value. Press LEFT/RIGHT to move between digits. Having entered the last digit, press RIGHT again to accept the value. The number will flash momentarily then the accepted value will be displayed solid.
5. Press LEFT/RIGHT to move onto the next menu item or to get back to the menu heading, so you can scroll to other menu headings.

7 INSTRUMENT SETTINGS: STANDARD MENU

7.1 STANDARD MENU

7.1.1 Scaling Factor (mg/m³)

Figure 6: Scaling method – Scaling Factor



MENU	MEANING	DESCRIPTION
DUST		Displays dust emissions and self-check readings
SENS	Sensitivity	Adjust the instrument sensitivity
DISP	Display Smoothing	Adjust the filter for smoothing the reading on the display
SF	Scaling Factor	Adjust the scaling factor applied to the dust reading
4_20	4–20 mA Output	Adjust the span of the 4–20 mA output
PASS	Password	Enter a password to allow adjustment of settings
RUN.T	Run self-tests	Manually activate the self-tests

7.2 ENTERING OR CHANGING THE PASSWORD [PASS]

If a password has been set, this must be entered before values can be changed. Note that the factory default password is **0000**.

1. Scroll DOWN to the **PASS** (Password) menu heading.
2. Press RIGHT: display shows **ENTR** (Enter). Press RIGHT again: the left-hand digit will start to flash.
3. Use the UP/DOWN keys to enter each digit in turn from left to right. Press RIGHT to move from one digit to the next.
4. After you have entered the 4th digit, press RIGHT again.
   a) If you have entered an invalid password, the display will show **BAD**. Press RIGHT to re-enter your password.
   b) If you have entered the correct password, the display will show **GOOD**. Press RIGHT. You will then be given the option to alter the current password (display shows **ALTR**). Press RIGHT then enter a new password if required (otherwise just keep pressing RIGHT to leave the password unchanged).

7.3 SENSITIVITY [SENS]

NOTE: The sensor sensitivity should be set before attempting to scale the instrument. If the sensitivity is adjusted at a later stage, the instrument must be re-scaled.

The sensor has three sensitivities: High (default), Medium and Low. The first step to setting up the sensor is to set the instrument to a sensible sensitivity level. The recommended procedure is to install the sensor and note the reading under normal operating conditions.

- **HIGH sensitivity** (default) – if the reading before scaling is between 0 and 100, leave on High sensitivity;
- **MEDIUM/LOW sensitivity** – if the reading before scaling is >100, reduce to Medium or Low sensitivity.

7.4 DISPLAY SMOOTHING [DISP]

The display smoothing function allows a rapidly fluctuating dust reading to be 'smoothed out', thus providing a more stable displayed value. The filter used is a *walking window* filter. Smoothing applied to the display is also used to calculate alarm conditions for the alarm relays. The 4–20 mA output is smoothed independently via the 4–20 mA Settings menu.

7.4.1 Changing the Display Smoothing Filter

1. Enter the password, if required (see section 7.2 above).
2. Scroll DOWN to the **DISP** menu heading.
3. Press RIGHT: display shows **FILT**.
4. Press RIGHT again: display shows the filter time in seconds (default: 0005 = 5 s).
5. Adjust the value then press RIGHT to return to **DISP**.

NOTE on the range of allowed values –
FILTER: this is an integer value. Allows values between 1 and 9999 secs.

7.5 SCALING METHOD

7.5.1 Setting a Scaling Factor [SF]

The Scaling Factor [SF] is used to scale the raw dust reading to provide a mg/m³ reading within the instrument (see section 7.1.1 on page 17 for the menu map). Alternatively, you may output the raw dust reading to your own system (using analogue or Modbus outputs), then calibrate the reading within your system (see Appendix A – Scaling on page 29). The SF scales the raw reading as follows:

$$\text{Dust reading (mg/m}^3\text{)} = \text{Raw instrument reading} \times \text{SF}$$

The Scaling Factor [SF] is applied to the displayed reading. This is then used by analogue (4–20 mA) outputs.

Adjusting the Scaling Factor [SF]

1. Enter the password, if required (see section 7.2 above).
2. Scroll DOWN to the **SF** menu heading.
3. Press RIGHT: display shows the current scaling factor (default: 1.000)
4. Adjust each digit value using the UP/DOWN keys, then press RIGHT to move to the next digit.
5. After editing the 4th digit press RIGHT again: the decimal point starts to flash. Use UP/DOWN to adjust the position of the decimal point.
6. Press RIGHT to return to the **SF** menu heading.

NOTE on the range of allowed values:
The default SF is 1.000. The range of allowed values is 0.001 to 9999.

7.5.2 4–20 mA Span [4_20]

The 4–20 mA settings menu allows the span of the 4–20 mA outputs to be set. The **Span** value sets the relationship between the reading on the display and the current output from the 4–20 mA.

For example, if the Span value is set to **100.0** (default), then a display reading of '100.0' will output 20 mA. Display values >100.0 will be clipped at 20 mA. A reading of '0.000' will always output a value of 4 mA.

Adjusting the 4–20 mA Settings

1. Enter the password, if required (see section 7.2 on page 18).
2. Scroll DOWN to the **4_20** menu heading.
3. Press RIGHT: display shows the span value (default 100.0).
4. Adjust the value then press RIGHT to return to the main menu heading.

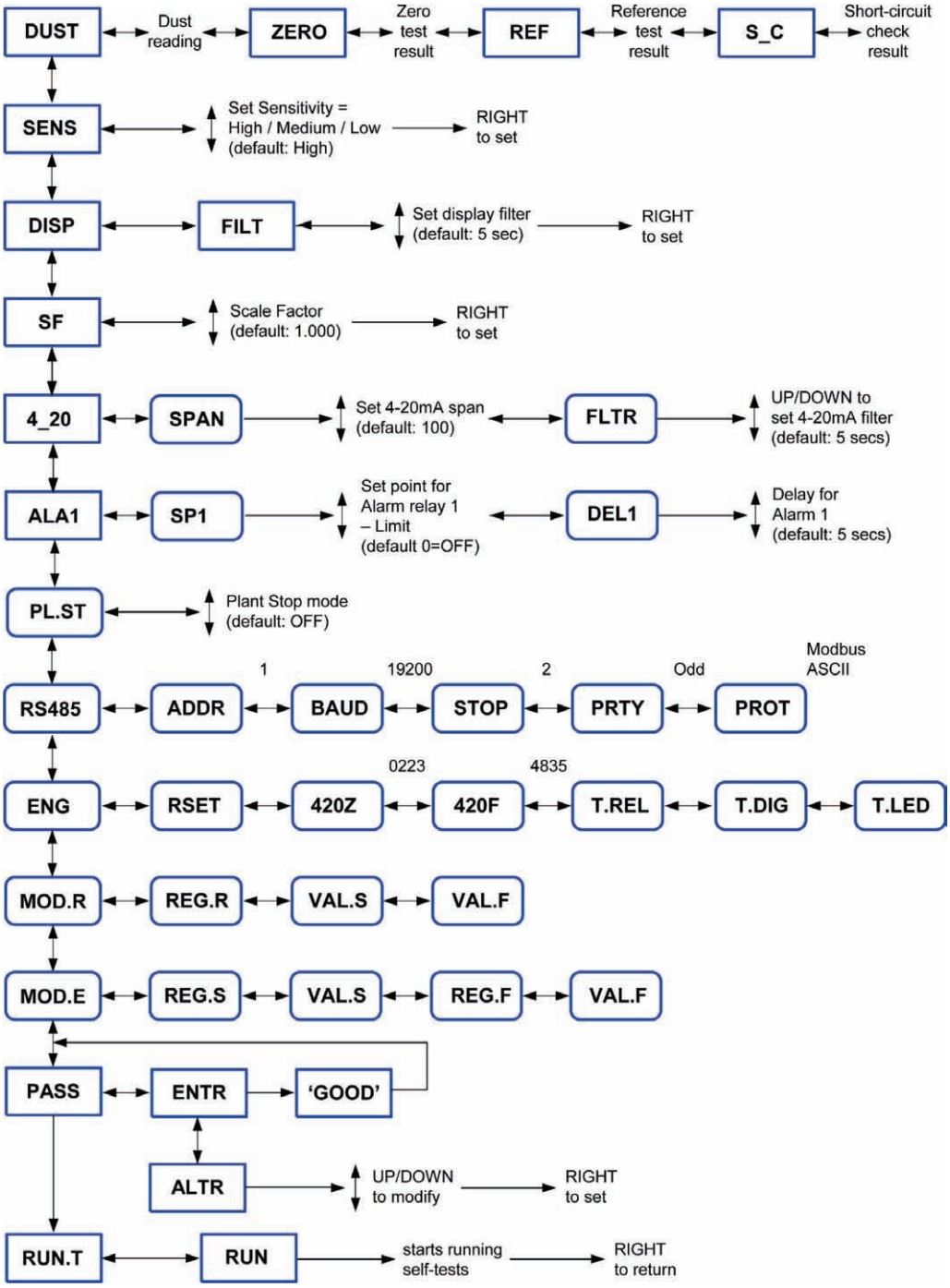
NOTE on the range of allowed values:

SPAN: the decimal point is fixed after the 3rd digit. This allows values from 000.1 to 999.9. The 4–20 mA output has an independent filter (default: 5 s). See below on how to change this.

The 4–20 mA output has an independent filter (the FLTR menu). To change this, refer to the Engineering menu section (see page 20) for details and instructions.

8 INSTRUMENT SETTINGS: ENGINEERING MENU

Figure 7: Menu map – Engineering menu



8.1 ADVANCED FUNCTIONS

MENU	MEANING	DESCRIPTION
4_20 FLTR	4–20 mA output settings	Adjust filter on the 4–20 mA output
ALA1	Alarm settings for Relay 1	View/adjust the alarm set point and delay for Relay 1
PL.ST	Plant Stop	Adjust the behaviour of the plant run/plant stop feature
R485	Modbus RS-485 output	Adjust the settings for the Modbus RS-485 output
ENG	Engineering functions	• 4–20 mA trim settings • Test functions • Factory reset

8.1.1 Switching to the Engineering (ENG) Menu

1. Move the jumper from **LK4** to **LK3**.
2. Press the RESET button.

The additional menus are now available. See Figure 7 on page 20 of this manual for the full Engineering menu. Note that the menu shown is based on scaling option 2 [%], see Figure 6 on page 17 or basic menu functions for scaling option 1 [SF].

8.2 4–20 MA FILTER [4_20 FLTR]

The 4–20 mA settings menu allows the Filter [FLTR] of the 4–20 mA outputs to be set. The Filter value sets the amount of smoothing on the output (a *walking window* filter). To set the 4–20 mA to track the display output you need to set the filter time here to the same value as the display filter time.

For logging purposes, you may wish to leave the 4–20 mA unfiltered (default: 1 s) and only set the display filter.

8.2.1 Changing the 4–20 mA Filter

1. Enter the password, if required (see section 7.2 on page 18).
2. Scroll DOWN to the **4_20** menu heading.
3. Press RIGHT: display shows **FLTR**.
4. Press RIGHT again: display shows the 4–20 mA filter time (default 0005 = 5 s).
5. Adjust the value then press RIGHT to return to the main menu heading.

NOTE on the range of allowed values:
FILTER: this is an integer value. Allows values between 1 and 9999 seconds.

8.3 EMISSION ALARM SETTINGS [ALA1]

The Alarm Settings menu [ALA1] is used to set up emission alarms used to activate alarm relays in the sensor. Alternatively, you can output the dust reading to your own system (using analogue or Modbus outputs), then set emission alarms in your own system. The ALA1 menu applies to Relay 1. The alarm uses the value from the display to generate alarms.

MENU	RELAY	ALARM LED
ALA1	Relay 1 (this is also activated in case of a self-test fail)	**GREEN** > **RED** (Limit alarm)

8.3.1 Set Point [SP1]

The alarms can be set with different set points; this allows you to set a Limit (High High) alarm level (refer to the menu map on page 20). It is recommended to set the Limit Alarm to your regulatory compliance emission limit.

To disable an alarm trigger point, set the Set Point value to **000.0**. (Note that set points are disabled by default.)

8.3.2 Averaging Filter

Averaging for the alarms depends on the smoothing filter set in the Display menu [**DISP | FILT**]. For regulatory compliance it is recommended to set up to the averaging time specified in your regulation.

Typical values are: 30 min (= 1800 s) or 1 hour (= 3600 s).

HINT: Lower filter times can be used if you need to quickly detect sudden changes in dust reading.

8.3.3 Alarm Delay [DEL1]

The alarm delay is used to prevent temporary high dust spikes – typically generated on process start-up or during bag-filter cleaning – from generating unnecessary alarms. The default alarm delay is 5 seconds. Increase this as required to the duration of the dust spikes you are seeing.

NOTES:

(i) Averaging is done using a *walking window* filter. This means the average values used to generate alarms may differ from the average logged data which uses simple averaging.

(ii) The averaging filter is reset on power up, after pressing the RESET button and after making setting adjustments. During the initial period the reading will be an average of a shorter period than the averaging time. This may result in unwanted alarms.

8.3.4 Change the Alarm Settings – Relay 1 [ALA1]

1. Enter password, if required (see section 7.2 on page 18).
2. Scroll DOWN to the **ALA1** (Alarm 1) menu heading.
3. Press RIGHT: display shows **SP1** (Set Point 1).
4. Press RIGHT again: display shows the set point value (default: 000.0).
5. Adjust the value then press RIGHT: display now shows **DEL1** (Delay 1).
6. Press RIGHT again: display shows the alarm 1 delay in seconds (default: 0005 = 5 seconds).
7. Adjust the value then press RIGHT to return to the **ALA1** menu heading.

NOTE on range of allowed values:

Set Point: the decimal point is fixed after the 3rd digit. This allows values from 000.1 to 999.9

Delay: this is an integer value. Allows values between 1 and 9999 seconds.

8.4 PLANT STOP FUNCTION [PL.ST]

The digital input to the sensor can be used to disable outputs from the sensor during periods when the plant is not operating.

Connect a digital input from your plant control system to the digital input labelled **IP+/IP–** on the sensor (see Figure 4 on page 14 for the location of this item). It requires 24 V to be applied across the input to close it.

When the PLANT STOP function is enabled it functions as follows:

- When the digital input is **CLOSED**, this indicates to the sensor that the process is running and the sensor generates outputs as normal.
- When the digital input is **OPEN**, this indicates to the sensor that the process has stopped. The following changes are made:
  a) Emission alarms are disabled.
  b) The 4–20 mA output is set to 4 mA.
  c) The display value and 4–20 mA output are set, either to 0.000 or to the normal dust reading, depending on the setting of the PLANT STOP option (i.e. ZERO or DUST).

8.4.1 Enable the Plant Stop Option

1. Enter the password, if required (see section 7.2 on page 18).
2. Scroll DOWN to the **PL.ST** (Plant Stop) menu heading.
3. Press RIGHT: display shows the status of the Plant Stop option (default: OFF).
4. Use UP/DOWN to toggle between settings (see the table below).
5. Press RIGHT to confirm and return to the **PL.ST** menu heading.

8.4.2 Summary of Plant Stop Behaviour

SETTING	EMISSION ALARMS	DISPLAY READING	4–20 mA OUTPUT
OFF	Enabled	Dust	Dust
ZERO	Disabled	0.00	4 mA
DUST	Disabled	Dust	4 mA

8.5 COMMS SETTINGS

8.5.1 RS-485 Settings [R485]

The RS485 menu is available to adjust communications settings when connecting to the sensor via the RS-485 port.

8.5.2 Changing the RS-485 Settings

1. Enter the password, if required (see section 7.2 on page 18).
2. Scroll DOWN to the **RS485** (RS-485 settings) menu heading.

3. Press RIGHT to scroll through and adjust the different RS-485 settings as shown in the below table.
4. Press RIGHT again to return to the **R485** menu heading.

MENU	MEANING	DEFAULT VALUE	RANGE OF VALUES
ADDR	Modbus address	1	1–255
BAUD	Baud rate	19200	200, 600, 1200, 2400, 4800, 9600, 19.2k
STOP	Stop bits	2	0, 1, 2
PRTY	Parity	Odd	Odd, Even, None
PROT	Modbus protocol	ASCII	ASCII, RTU

8.6 ENGINEERING SETTINGS [ENG]

MENU	DESCRIPTION
RSET	Resets the sensor to factory (default) values.
420Z	Trims the 4–20 mA Zero Offset (4 mA).
420F	Trims the 4–20 mA Full Scale (20 mA).
T.REL	Tests the relays.
T.DIG	Tests the digital input.
T.LED	Tests the LEDs.

8.6.1 Resetting the Sensor [RSET]



CAUTION! – LOSS OF DATA

Performing a Reset can stop the sensor from working!

A reset will put all instrument settings back to their default values. The procedure given in this section must, therefore, be carried out only by suitably trained and qualified personnel.

This function may be used to return the sensor to its factory pre-sets, if necessary.

1. Scroll DOWN to the **ENG** (Engineering) menu.
2. Press RIGHT to access the **RSET** submenu.
3. Press RIGHT again to display **0000** and press UP to set the value to **0001**.
4. When ready, press RIGHT to initiate the reset.

8.6.2 Trimming the 4–20 mA Outputs [420Z, 420F]

1. Enter the password, if required (see section 7.2 on page 18).
2. Scroll DOWN to the ENG (Engineering) menu heading.
3. Press RIGHT to access the **420Z** and **420F** settings.

When you enter the **4–20 mA Zero [420Z]** setting the sensor will nominally output 4 mA. Use the UP/DOWN buttons to adjust the 4–20 mA Zero calibration value (default: 223) to trim the 4 mA value.

Similarly, when you enter the **4–20 mA Full Scale [420F]** setting the sensor will nominally output 20 mA. Use the UP/DOWN keys to adjust the 4–20 mA Full Scale calibration value (default: 2230) to trim the 20 mA value (default: 4835).

8.6.3 Test Functions [T.REL, T.DIG, T.LED]

The table below shows the operation of the test functions. Use the UP/DOWN buttons to change the values.

MENU	SETTING	RESULT (OF TEST FUNCTION)
Relays [T.REL]	Set to 0	Relay(s) closed
	Set to 1	Relay1 open
Digital Input [T.DIG]	Open	Display 0000
	Apply 24 V to close	Display 0001
LEDs [T.LED]	Set to 0	All LEDs = GREEN
	Set to 3	Self-Check LED = RED

8.7 MODBUS DIAGNOSTICS [MOD.R, MOD.E]

8.7.1 Reading Modbus Register Values [MOD.R]

Scroll to the **MOD.R** menu.

REG.R	Enter register number to read (as a short).
VAL.S	Displays the value as a short (S).
VAL.F	Displays the value as a float (F).

8.7.2 Editing Modbus Register Values [MOD.E]



CAUTION! – LOSS OF DATA

Take care when adjusting the register values as this may stop the sensor from functioning correctly!

Scroll to the **MOD.E** menu.

REG.S	Enter register number to write to.
VAL.S	Enter the value to write as a short.
REG.F	Enter register number to write to.
VAL.F	Enter the value to write as a float.

9 QUALITY ASSURANCE AND SELF-TESTS

9.1 SENSOR SELF-CHECKS

Self-tests are available to provide monitoring of the integrity of your sensor(s). The sensor can provide alarm notification of self-test failures.

- **ZERO / REF checks:** sensor checks to test for faults with the sensor hardware.
- **SHORT-CIRCUIT (Contamination) check:** if available, this sensor self-check indicates the probe needs cleaning. The short-circuit check performs a test for contamination between the probe rod and the base of the probe by checking for the existence of an electrical short circuit.

9.1.1 Self-check Thresholds

SELF-TESTS	MINIMUM PASS LEVEL	IDEAL LEVEL	MAXIMUM PASS LEVEL	REFER TO
Zero check	–	<10	20	
Reference check	950	1000	1120	*Note 1*
Short-circuit check – Ex variants (Dust zone 22)	900	1000	1150	*Note 2*

Note 1 *– Values given are calculated based on the min./max. Reference check (Ref) pass levels, respectively. Values have been rounded to the nearest tens.*
Example: min. pass level: 950 + 5% = 998 (~1000) and max. pass level: 1120 + 25% = 1400.

Note 2 *– Applicable to standard sensors (up to 250°C) and Ex sensors for Dust zone 22. Refer to the pass levels recorded in the Test Report for your instrument.*

9.1.2 Self-check Frequency

- The Zero and Reference drift checks are initiated manually on demand and will run in succession. If either of the tests fail, an alarm is generated.
- The Short-circuit check runs automatically on an hourly cycle. If the test fails, the test is repeated in 10-minute intervals (i.e. at 20 and 30 minutes). If the test fails on all three occasions, then an alarm is generated.

NOTE: The short-circuit check may be performed outside the stack (e.g. on a bench). However, without adequate shielding background noise will cause the short-circuit check to fail on high sensitivity. If tested out of stack, place the sensor rod in an earthed shield tube and earth the sensor base or enclosure to the shield tube.

9.1.3 Running Self-tests [RUN.T]

1. Scroll down to the **RUN.T** menu heading.
2. Press RIGHT: the display now shows **RUN**.
3. Press RIGHT again to confirm and run the tests.
4. The Self-check LED starts flashing. All self-checks now run in succession taking a total time of about 60 seconds.
5. Once the tests have completed, return to the main **DUST** menu to view the self-test results (see next section).

9.1.4 Viewing Self-test Results

1. Go to the **DUST** reading (this is the top menu item).
2. Repeatedly press RIGHT to toggle through the self-test result as follows

ZERO	Zero test result
REF	Reference test result
S_C	Short-circuit (contamination) test result

NOTES:

(i) If the tests have not run yet, then ' **- -** ' is displayed.

(ii) While the tests are running no values will be shown. Wait for the green LED to stop flashing (see next section).

9.2 SELF-TEST LED

The Self-test LED is used to indicate a self-test failure.

Self-Test LED solid GREEN	Self-tests PASS
Self-Test LED flashing GREEN	Self-tests are RUNNING
Self-Test LED RED	Self-tests FAIL (Relay 1 activates)

10 MAINTENANCE

10.1 SAFETY INFORMATION



WARNING! – ELECTRIC SHOCK

This section is intended for trained service engineers only.

Only trained and competent personnel should work inside the instrument with mains power connected and switched on.



WARNING! – DANGER FROM PROCESS

It is possible that the sensors are to be installed in ducting containing process particulate that is a hazard to health.

Unless the process conditions are known to be entirely safe, suitable precautions such as the use of breathing apparatus or duct purging/ detoxifying must be employed before any entry is made into the duct for installation or maintenance purposes.

If in doubt, consult the local Safety Officer and/or local safety procedures.



CAUTION!

Do NOT try to rotate the sensor by turning its enclosure as this can seriously damage the sensor.

10.2 SENSOR HANDLING IN HAZARDOUS AREAS

10.2.1 Removing the Sensor from the Stack



WARNING! – NON-ISOLATED EQUIPMENT

Do NOT electrically disconnect the enclosure from the stack (i.e. break the ground/earth connection) in the presence of hazardous dusts. Circulating currents in the ground system could create an ignition hazard.

To disconnect the probe safely, remove the sensor from the stack, then isolate or disconnect the sensor from the power source/control unit by unplugging the connection wire (in the designated Safe Area), as applicable.

Only once the sensor has been isolated from the power source/control unit is it safe to disconnect the earth connection between sensor enclosure and stack wall.

1. Switch OFF power to the sensor.
2. Remove the sensor in the usual way, ensuring that the grounding strap (earth wire) remains connected.
3. With the power OFF and the grounding strap in position, disconnect the sensor from the cable as follows:
   a) Open the enclosure (see below for instructions).
   b) Disconnect the cable (secure the bare wires in a safe dust-free manner).
   c) Disconnect the grounding strap.

10.2.2 Opening the Sensor Enclosure in a Hazardous Area



WARNING! – EXPLOSION OR COMBUSTION RISK

The equipment may be opened only when it is de-energized or the area has been designated as 'safe' at that time.

1. Switch OFF and isolate mains power.
2. Open the enclosure by unscrewing the hinged lid.
3. Ensure no dust has settled in enclosure before replacing and securing the lid.

10.3 INSPECTING AND CLEANING THE SENSOR

CAUTION!

(1) Do not allow moisture to penetrate the units.

(2) Wipe the outside of the enclosures with a dry or damp (but not wet) cloth only.

(3) Do NOT use solvents or oil-based cleaners to remove contamination or accumulations of dirt as these can damage the surfaces, and the seals and insulator on the sensor.

(4) An abrasive, such as wire wool, or wire brushes may be used on the sensor metal parts only.

The nature of many processes is such that a build-up of particulate may develop on the sensor rod. This build-up will normally have no effect on the performance of the instrument, but it is recommended that the build-up is removed periodically.

If the probe rod requires cleaning, remove the sensor from the duct and thoroughly clean the entire rod, paying particular attention to the area of the non-metallic insulator and about 25 mm (1″) of the metal parts either side of the insulator (the aim is to prevent shorting across the insulator). The cleaning may be performed using wire wool. For sticky or stubborn deposits, a cleaning agent may be used (use a fast-drying solvent cleaner –*not water*). Always ensure that the probe rod is thoroughly dried before refitting the sensor.

The instructions below cover the standard sensor. All sensor parts should be cleaned as outlined in this section.

Always refer to the Safety Information at the start of this section before commencing cleaning procedures.

IMPORTANT NOTES:

(i) Where an air purge is attached to the sensor, this must remain switched ON, until the sensor has been fully removed from the stack/duct.

(ii) The purge air section must be fitted to the sensor and purge air must be connected and switched ON before the sensor is re-inserted into the duct.

(iii) *Do not disconnect the grounding strap.* The grounding strap (or wire) should be long enough to remove the sensor from the stack/duct and place it on the ground or platform without disconnecting the sensor.

1. Switch OFF and isolate mains power.
2. Referring to the installation diagram (see Figure 1 on page 11), fully loosen the lock nut.
3. If the thread behind the lock nut is very dirty, this should be cleaned before loosening the nuts.
4. Undo the floating nut and carefully remove the sensor from the process.
5. Fully release the floating nut, then move both the floating and lock nuts back from their positions.
6. Check that the lock nut and floating nut move freely.
7. Apply a small amount of copper slip or grease to the mounting thread. This prevents binding and helps ensure a good grounding is maintained with the stack.
8. Using a damp cloth or stiff brush remove any contamination from the probe rod, insulator, and the back of the sensor enclosure.

   NOTE: Clean the sensor parts using a rotational cleaning action to prevent scratches, particularly along the sensor probe (especially when using wire wool).

9. Ensure the sealed connectors are secure and undamaged.
10. Inspect the connecting cables (where possible) to ensure they are not damaged or stressed.
11. Check that no moisture or foreign bodies have entered the sensor enclosure, then refit the cover lid and secure with the 4 off screws.
12. Reconnect the grounding strap (earth wire) between sensor and stack.
13. Replace the sensor in the stack. Tighten the floating nut, then fully tighten the lock nut to secure the sensor in position.
14. Restore power to return the sensor to normal operation.
15. Run the sensor self-checks to ascertain the correct functioning of the sensor (refer to section 9.1 on page 25 for details).

APPENDIX A – SCALING

A.1 INTRODUCTION

The readings from a PEM sensor can be scaled to show the dust concentration in mg/m³. The sensor readings are scaled with reference to an isokinetic extractive sample, carried out to standards defined by your local environmental authority or government agency.

NOTE: Scaling of each sensor is necessary on an annual basis as a minimum and should be carried out either by Goyen | Mecair or an authorized representative.

The Scaling procedure is carried out to calculate a Scaling Factor used to multiply the raw sensor readings into a true dust concentration directly in mg/m³. The use of a simple scaling factor is possible since the response of the instrument is directly proportional to the dust concentration over a predefined range.

CALCULATING THE SCALING FACTOR

The basic method to calculate a new Scaling Factor (SF) a sensor uses the following formula:

New SF = Current SF × (Test Result/Sensor Average)

where

- The Test Result is the result obtained from a single stack emission test.
- The Current Scaling Factor is the SF entered into the instrument at the time of sampling. (The default setting is 1.0.)
- The Sensor Average is the average of the readings displayed using the Current Scaling Factor.

Example:

- Sampling test result = 50 mg/m³
- Current Scaling Factor setting = 2.5
- Instrument average = 20 units
- New Scaling Factor = 2.5 × (50/20) = 6.25

A.2 SCALING PROCEDURE

To obtain a valid, new Scaling Factor, carry out the following procedure:

1. Ensure that the sensor is running correctly and that the plant is running normally with representative conditions.
2. Record the sensor's Display Smoothing [DISP] setting, then change the DISP setting to match the length of the sampling run to be carried out (in seconds; see section 7.4.1 on page 18 for details).
3. Record the current Scaling Factor.
4. Carry out an isokinetic test. At the end of the isokinetic test immediately record the sensor average from the display of the sensor ('Sensor Average').
5. Reset the Display Smoothing [DISP] setting (as noted in step 2; the default is 0005 = 5 seconds).
6. Obtain the isokinetic sampling result ('Test Result'; usually available in 2–4 weeks).
7. Calculate the new Scaling Factor (see box above).
8. Enter the new Scaling Factor (see section 7.5.1 on page 18 for details).

GENERAL NOTICES

COMPLIANCE

Waste of Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU)



This symbol if marked on the product or its packing indicates that this product must not be disposed of with general household waste. In some countries and the European Union regions, separate collection systems have been set up to handle the recycling of electrical and electronic waste.

Disposing of this product correctly helps prevent potentially negative consequences for the environment and human health. The recycling of materials helps conserve natural resources.

In countries outside the EU:

Dispose of this product at a collection point for the recycling of electrical and electronic equipment according to local government regulations.

RoHS Compliance Statement

Goyen | Mecair is compliant with EU Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive).

List of Materials (ISO 14001)

The information is being provided to comply with ISO 14001 Environmental Management, which is part of EMAS, the European Eco-Management and Audit Scheme to reduce waste and energy use, helping organizations improve efficiency, and providing assurance to internal and external stakeholders that environmental impact is being measured and improved.

The following table provide a list of materials used in the construction of this product.

SENSOR – MATERIALS	WHERE USED
316 Stainless steel	Rod and sensor body
Aluminium alloy	Enclosure body
Electronic components	Sensor electronics
Fibreglass	PCB
PTFE	Insulator (for standard versions)
Viton®	O-rings

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