SMARTMAC 200 W

Supplementary Instructions

Display and operating unit for SMARTPAT PH/ORP/COND sensors

Intrinsically safe
Equipment protection level Gb
Ex ia IIC T4

KROHNE

1.1 General notes

These supplementary instructions apply to versions of the loop powered display and operating unit for use in hazardous areas that fall in intrinsically safe protection type "i", equipment category II 2 G or EPL Gb. It complements the standard documentation for versions for use in non-hazardous areas.

The information given in these instructions contains only the data relevant to explosion protection. The technical details given in the standard documentation for the non-explosion protected versions remain unchanged unless they will be excluded or replaced by this instruction.

1.2 EU conformity

The manufacturer declares with the EU declaration of conformity on his own responsibility conformity with the protection goals of directive 2014/34/EU for use in hazardous areas with gas.

Conformity with harmonised standards was checked by a notified body in accordance with EN 60079-0:2012 and EN 60079-11:2012.
The EU declaration of conformity for the equipment category II 2G is based on the following EU type examination certificate:

KIWA 16 ATEX 0027 X

The "X" after the certificate number refers to special conditions for safe use of the device, which have been listed in these instructions.
If necessary, the EU type examination certificate can be downloaded from the manufacturer's website.

1.3 Approval according to the IECEx scheme

Conformity for use in hazardous areas with gas was tested in accordance with the IECEx Certification Scheme for Explosive Atmospheres acc. to IEC 60079-0: 2011 and IEC 60079-11: 2011.
The number of the IEC certificate is:

IECEx KIWA 16.0011 X

The "X" after the certificate number refers to special conditions for safe use of the device, which have been listed in these instructions.
If needed, the IEC certificate can be downloaded from the manufacturer's website.

1.4 Approval according to North-America standards

Equipment testing through QPS certifies that the equipment complies with applicable CSA and ANSI/ISA standards. The product is eligible to bear the QPS mark shown with adjacent indicators "C" and "US" for Canada and the USA. The number of the QPS certificate is:

QPS LR1322-6.

You can download the QPS certificate from the manufacturer's website. The accompanying control drawing is included when the equipment is delivered.

1.5 Safety instructions

If these instructions are not followed, there is a risk of explosion.

Assembly, installation, start-up and maintenance may only be performed by personnel trained in explosion protection!

CAUTION!
The operator or his agent is responsible for observing any additional standards, directives or laws if required due to operating conditions or place of installation. This applies in particular to the use of easily detachable process connections when measuring flammable media.

This product shall be used in explosive atmospheres together with approved associated equipment. Follow the instruction manual for the loop powered display and operating unit of the associated equipment when connecting.

The connecting cable between the loop powered display and operating unit and the associated equipment should be an insulated shielded cable; connect the shield to functional earth in a safe area.

WARNING!
The user shall not change the configuration in order to maintain/ensure the explosion protection performance of the display.

WARNING!
For use and maintenance in explosive atmospheres, observe the warning "POTENTIAL ELECTROSTATIC CHARGING HAZARD - see chapter 5.3".

CAUTION!
Operating conditions and place of installation may require compliance with additional standards, directives or laws. The responsibility for compliance rests solely with the operator or his agent.

2.1 Device description

The loop powered display and operating unit is not only used to display measurements values on site but also to configure and calibrate sensors.

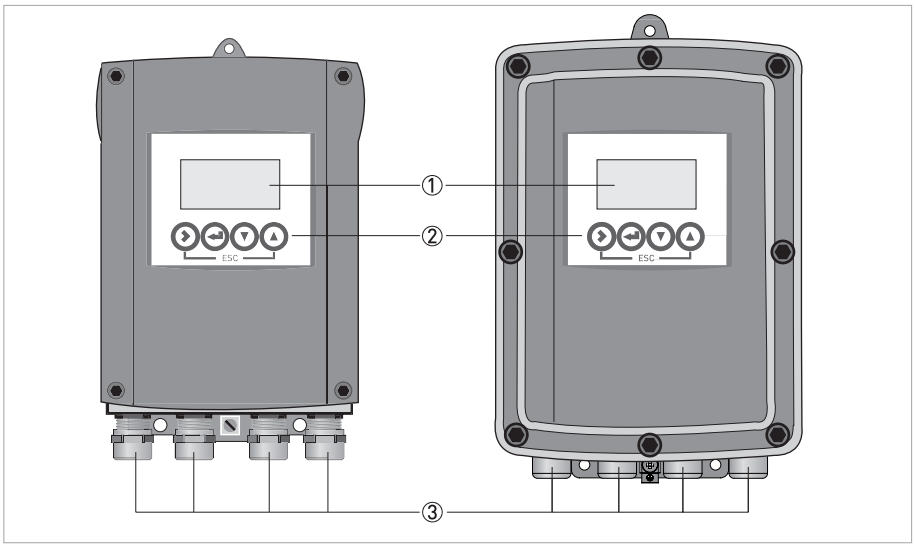

Figure 2-1: Device description (left - die-cast aluminium / right - stainless steel)

① Display
② Operation keys
③ Cable glands

2.2 Marking SMARTMAC 200 W

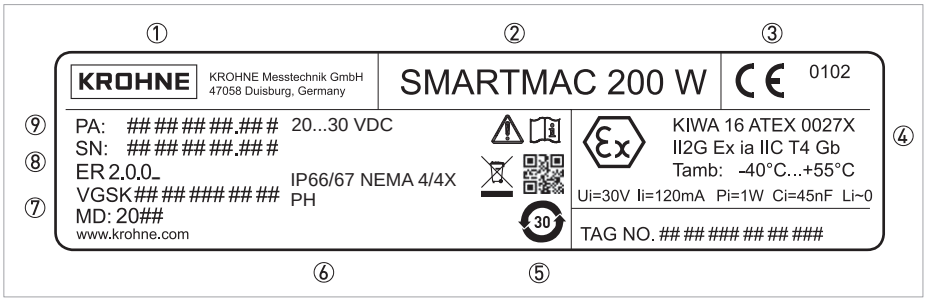

Figure 2-2: Example of a nameplate on the indicator body

① Manufacturer
② Device name
③ CE marking
④ Ex marking
⑤ China RoHS,
Data matrix code (serial number),
Electronic / Electric device waste marking,
Observe the operation and installation instruction
⑥ Power supply data,
Ingress protection
Parameter of measuring unit
⑦ Order code,
Manufacturing date,
Internet address of manufacturer
⑧ Electronic revision,
Serial number
⑨ Production order

INFORMATION!
Look at the device nameplate to ensure that the device is in accordance with your order.

2.3 Approval for zone classified locations

The device meets the requirements of IEC 60079-11 for protection type "Intrinsic Safety". Explosion protection is ensured by limiting the current and voltage so that no ignitable energy can occur. The equipment protection level (EPL) Gb enables use in areas classified as Zone 1...Zone 2.

The marking of the display in accordance with the requirements of the ATEX directive is as follows:


II 2 G Ex ia IIC T4 Gb

The marking of the display in accordance with the requirements of the IECEx scheme is as follows:

Ex ia IIC T4 Gb

Components of the Ex marking and their definition	
II	Group II classified equipment
2	Equipment category 2
G	Gas explosion protection
Ex ia	Equipment protection by intrinsic safety, level of protection ia
IIC	Gas group IIC approved, suitable for gas groups IIA, IIB, IIC
T4	Temperature class T4 approved, suitable for T4...T1
Gb	EPL Gb approved, suitable in Zone 1...Zone 2

The marking of the display in accordance with the Canadian and US requirements for Zone classified locations in accordance with NEC 505 (National Electrical Code) is as follows:


Ex ia IIC T4 Gb / Class I, Zone 1 AEx ia IIC T4 Gb

Components of the Ex marking and their definition	
Class I	Gas explosion protection
Ex ia	Equipment protection by intrinsic safety, level of protection ia
Zone 1 AEx	Zone 1 approved according to US standards
IIC	Gas group IIC approved, suitable for gas groups IIA, IIB, IIC
T4	Temperature class T4 approved, suitable for T4...T1
Gb	EPL Gb approved, suitable in Zone 1...Zone 2

2.4 Approval for division classified locations

In type of protection "Intrinsic Safety" the device meets the requirements of Canadian and US standards for the Division concept according to NEC 500. The explosion protection is ensured by limitation of the current and voltage so that no ignitable energy can occur.
The marking of the display in accordance with the requirements of the applicable National Electrical Code (NEC 500) and the Canadian Electrical Code (CEC) is as follows:

IS Class I, Division 1, Groups A, B, C, D, T4

Components of the Ex marking and their definition	
IS	Intrinsically safe equipment
Class I	Explosion protection for gas
Division 1	Division 1 approved, suitable for Division 1, Division 2
Groups A, B, C, D	Gas groups A, B, C and D approved
T4	Temperature class T4 approved, suitable for T4...T1

2.5 Temperature classes

The permissible temperature range of the device for use in temperature class T4...T1 is:

Temperature-class	Permissible ambient temperature in [°C]	Permissible ambient temperature in [°F]
T4...T1	-40...+55°C	-40...+131°F

The maximum permissible temperature is valid under the following conditions:

- The device is operated in its intended mounting position.
- The device is not exposed to heat radiation (e.g. direct sunlight, adjoining hot parts).
- Insulation does not obstruct the ventilation of the device.

2.6 Electrical data

Connect the device only to intrinsically-safe certified circuits. Observe the following maximum values for the display when connecting:

- U_i = 30 V
- I_i = 120 mA
- P_i = 1 W
- L_i = 0 mH
- C_i = 45 nF

CAUTION!
The capacity and inductance of the connecting cable between the supply device, display and operating unit and connected sensor as well as the capacity and inductance of the sensor must also be taken into account.

WARNING!
Also, when operating the indicators outside of the hazardous area, the connection must be made to an intrinsically safe circuit. When connecting to non-intrinsically safe circuits, there is a risk of damage to the safety-defining components.

3.1 Installation

DANGER!

Installation and setup must be carried out according to the applicable installation standards (e.g. EN 60079-14) by qualified personnel trained in explosion protection. Observe the information contained in the manuals and the supplementary instructions. The installation must always comply with the following requirements:

- *No external forces are affecting the display.*
- *The device is accessible for any necessary visual inspections and can be viewed from all sides.*
- *The nameplate is clearly visible.*
- *It can be operated from a location with secure footing.*

4.1 General notes

The intrinsically safe equipment is electrically connected in the display and operating unit. The circuit is designed in protection type "intrinsically safe" and galvanically isolated from ground (test voltage ≥ 500 V_{eff}).

In order to avoid risks, always observe the following points when electrically connecting a device:

- Ensure that all connecting cables conform to the valid installation standards (e.g. IEC 60079-14) and withstand the maximum operating temperature.
- Securely lay the connecting cables and sufficiently protect them against damage.
- Securely connect all the cores not in use with the ground potential of the explosive area or carefully insulate them from each other and from ground (test voltage ≥ 500V_{eff}).
- Supplied blind plugs / cable entries guarantee protection against foreign objects and water (protection category) IP66 / 67 according to EN 60529.
- The outer diameter of the connecting cable must be within the sealing range of the cable entry (8...13 mm / 0.31...0.51").
- Unused cable entries are to be closed (>IP66 / 67).

Ensure that the gaskets and incised gasket ring are tight.

4.2 Power supply

WARNING!
Substitution of components may impair intrinsic safety.

The device does not require a separate power supply. The necessary supply for the display and operating unit and connected sensor comes via the current output 4...20 mA (loop powered).

The cable parameters are determined by the parameters of the system to which the loop

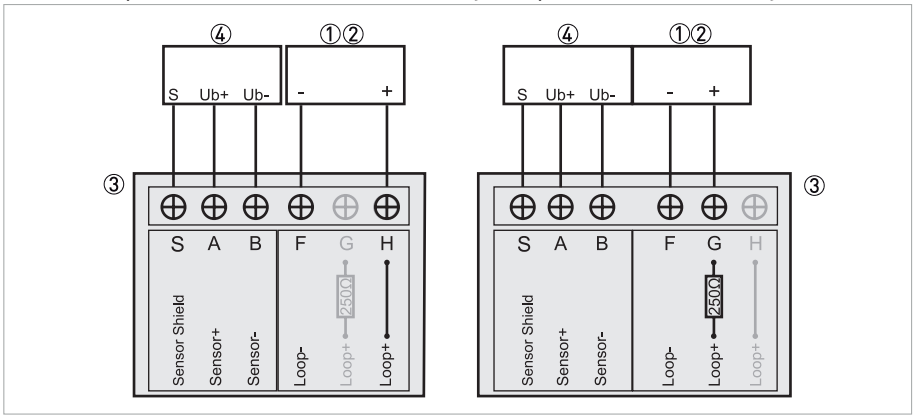

Figure 4-1: Overview terminal connections 4...20 mA input for Ex-approved device.

① I.S. certified barrier, power supply
② Current output signal 4...20 mA
③ Terminal connectors SMARTMAC 200 W
④ I.S. certified sensor

powered display and operating unit and sensor are to be connected.

INFORMATION!
The device is galvanically isolated from ground and can be placed anywhere within the loop.

4.3 Grounding and equipotential bonding

If the device is not sufficiently electrostatically grounded via mounting, a ground connection must be established using the ground terminal ①. The position of the ground terminal is illustrated below.

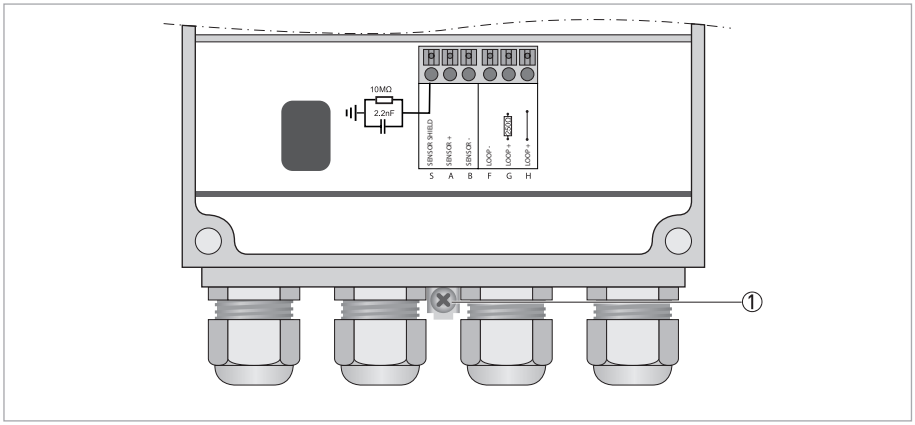

Figure 4-2: Terminal compartment

① Ground connection

5.1 Start-up

Start-up may only occur when the display and operating unit:

- is correctly installed in the system and connected.
- has been checked for the proper state with regard to its installation and connection requirements.

The user of the system must have it checked before start-up in compliance with the national regulations for checks before startup.

5.2 Operation

The display and operating unit must be operated in such a way that it remains within the maximum and minimum permissible temperatures and the electrical limit values.

The display and operating unit may only be operated if the equipment parts necessary for safety are effective in the long run, and are not rendered inoperable during operation.

The display and operating unit may be operated during operation.

The display and operating unit (protection type intrinsic safety) may even be opened in an energised state in hazardous areas. Work on electrical connections (e.g. configuration via the HART ® interface) is also permitted in an energised state. Close the terminal compartment immediately after work has been completed.

5.3 Electrostatic charge

In order to avoid ignition hazards due to electrostatic charge, painted display and operating units shall not be used in areas with:

- processes that generate strong charges,
- mechanical friction and cutting processes,
- spraying of electrons (e.g. in the vicinity of electrostatic painting systems).
- pneumatically conveyed dust is exposed.

WARNING!
Electrostatic charging of the housing surface by friction must be avoided.
The display shall be cleaned only with a moist cloth.

6.1 Maintenance

Maintenance work of a safety-relevant nature within the meaning of explosion protection may only be carried out by the manufacturer, his authorised representative or under the supervision of authorised inspectors.

For systems in hazardous areas, regular checks are required in order to maintain the proper condition.

The following checks are recommended:

- Check the housing, the cable entries and the feed lines for corrosion and/or damage.

Close the cover once maintenance work on the display and operating unit has been completed.

6.2 Dismantling

In order to prevent injury or material damage when replacing the display, always observe the following points:

- Before dismantling the electrical connecting lines of the device, ensure that all the cables leading to the display are de-energised themselves and to the reference potential of the explosive area.

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