Loop powered indicator

Intrinsically safe
Equipment Protection Level Ga and Da
Class I/II/III, Division 1
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1.1 General notes

This supplementary instructions applies to explosion-protected versions of the Loop powered display. It completes the standard documentation for non-explosion protected versions.

The information given in this instruction 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 EC conformity

The manufacturer declares with the EC declaration of conformity, in which the applied standards are also specified, on his own responsibility conformity with the protection goals of the ATEX directive for use in hazardous areas with gas and dust.

The EC declaration of conformity is based on the EC type examination certificate:

DEKRA 13 ATEX 0218 X

You can download the EC Type Examination Certificate from the manufacturer’s website.

1.3 Approval according to the IECEx scheme

Conformity with IEC standards was tested in accordance with the IECEx certification scheme for Explosive Atmospheres acc. to IEC 60079-0:2011 and IEC 60079-11:2011 and IEC 60079-26: 2006.

The number of the IECEx certificate is:

IECEx DEK 13.0086X

You can download the IECEx certificate from the manufacturer’s website or from the official IECEx website www.iecex.com.
1.4 Approval according to North-America standards

Examination of the device by CSA attests the loop powered display SD 200 W and SD 200 R in compliance with the CSA and ANSI/ISA standards as applicable. The product is eligible to bear the CSA mark shown with adjacent indicators ‘C’ and ‘US’ for Canada and US. The number of the CSA certificate is:

CSA 14.2726570

You can download the CSA certificate from the manufacturer’s website. The associated Control Drawing CD1105.01 is attached in the Appendix.

1.5 Approval according to Chinese standards

SD200W and SD200R loop powered display has been certified by National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI). This product is in accordance with the following standards:

- GB 3836.1-2010 Explosive atmospheres - Part 1: Equipment-General requirements
- GB 3836.4-2010 Explosive atmospheres - Part 4: Equipment protection by intrinsic safety "i".
- GB 3836.20-2010 Explosive atmospheres - Part 20: Equipment with equipment protection 'level (EPL) Ga.
- GB 12476.1-2013 Electrical apparatus for use in the presence of combustible dust - Part 1: General requirements.
- GB 12476.4-2010 Electrical apparatus for use in the presence of combustible dust - Part 4: Protection by intrinsic safety "iD".

The certificate number is:

GYJ15.1033 X
1.6 Safety instructions

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

The connecting cable between the loop powered display and associated apparatus should be of insulated screen cable type; connect the cable screen functionally to earth ground at safe area.

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

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 3.2”.

WARNING!
When the loop powered display is used in a potentially explosive atmosphere requiring apparatus of equipment protection level Ga, end user shall take measures to protect the loop powered display with aluminium alloy enclosure from an ignition source due to impact or friction.

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 DEVICE DESCRIPTION

2.1 SD 200 R

![Diagram of SD 200 R indicator]

Figure 2-1: Construction of the indicator

1. Measuring value
2. Status information
3. Measuring parameter
4. Operation key CLEAR
5. Operation key SELECT
6. Operation key PROG/ENTER

2.2 SD 200 W

![Diagram of SD 200 W indicator]

Figure 2-2: Construction of the indicator

1. Measuring value
2. Measuring parameter
3. Status information
4. Operation key CLEAR
5. Operation key SELECT
6. Operation key PROG/ENTER
2.3 Nameplate SD 200 R

![Diagram of Nameplate SD 200 R](image)

Figure 2-3: Example for a nameplate on the indicator body

1. Ex approvals
2. Order code
3. Intrinsically safe indication and ingress protection
4. Manufacturer and product name
5. Serial number
6. CE marking
7. Electrical data
8. Power supply

**INFORMATION!**

Look at the device nameplate to ensure that the device is delivered according to your order.
2 DEVICE DESCRIPTION

2.4 Nameplate 200 W

Figure 2-4: Example for a nameplate (inside)

1. Product name
2. Order code
3. Serial number
4. Ambient temperature
5. Manufacturer
6. Power supply
7. Ex approvals
8. CE marking

Figure 2-5: Example for a nameplate (outside)

1. Product name
2. Ex approval
3. Manufacturer
4. Temperature ambient
5. Order code
6. CE marking
7. Serial number

INFORMATION!
Look at the device nameplate to ensure that the device is delivered according to your order.
2.5 Approval for zone classified locations

In type of protection "Intrinsic Safety" the device meets the requirements of IEC 60079-11. The explosion protection is ensured by limitation of the current and voltage so that no ignitable energy can occur. The Equipment Protection Levels (EPL) Ga and Da allow the use within Zone 0...Zone 2 and Zone 20...Zone 22 classified locations.

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

Ex ii 1 G Ex ia IIC T4 Ga and II 1 D Ex ia IIIC T100°C Da

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

Ex ia IIC T4 Ga and Ex ia IIIC T100°C Da

The marking of the display in accordance with the Canadian and US requirements for Zone classified locations is as follows:

Ex ia IIIC / Class I, Zone 0 AEx ia IIIC T4

Components of the Ex marking and their definition

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Group II classified equipment</td>
</tr>
<tr>
<td>1</td>
<td>Equipment category 1</td>
</tr>
<tr>
<td>G</td>
<td>Gas explosion protection</td>
</tr>
<tr>
<td>D</td>
<td>Dust explosion protection</td>
</tr>
<tr>
<td>Ex ia</td>
<td>Equipment protection by intrinsic safety, level of protection ia</td>
</tr>
<tr>
<td>IIIC</td>
<td>Gas group IIIC approved, suitable for gas groups IIA, IIB, IIC</td>
</tr>
<tr>
<td>IIIC</td>
<td>Dust group IIIC approved, suitable for dust groups IIIA, IIIB, IIIC</td>
</tr>
<tr>
<td>T4</td>
<td>Temperature class T4 approved, suitable for T4...T1</td>
</tr>
<tr>
<td>T 100°C</td>
<td>Maximum surface temperature at Ta = 70°C with 5 mm dust layer</td>
</tr>
<tr>
<td>Ga</td>
<td>EPL Ga approved, suitable in Zone 0...Zone 2</td>
</tr>
<tr>
<td>Da</td>
<td>EPL Da approved, suitable in Zone 20...Zone 22</td>
</tr>
</tbody>
</table>

Components of the Ex marking and their definition

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>Gas explosion protection</td>
</tr>
<tr>
<td>Ex ia</td>
<td>Equipment protection by intrinsic safety, level of protection ia</td>
</tr>
<tr>
<td>Zone 0 AEx</td>
<td>Zone 0 approved according to US standards</td>
</tr>
<tr>
<td>IIIC</td>
<td>Gas group IIIC approved, suitable for gas groups IIA, IIB, IIC</td>
</tr>
<tr>
<td>T4</td>
<td>Temperature class T4 approved, suitable for T4...T1</td>
</tr>
</tbody>
</table>
2.6 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:

°C, IS Class I/II/III, Division 1, Groups A to G

<table>
<thead>
<tr>
<th>Components of the Ex marking and their definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS</td>
</tr>
<tr>
<td>Class I/II/III</td>
</tr>
<tr>
<td>Division 1</td>
</tr>
<tr>
<td>Groups A to G</td>
</tr>
</tbody>
</table>

2.7 Electrical data

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

- $U_i = 30 \text{ V}$
- $I_i = 200 \text{ mA}$
- $P_i = 1.2 \text{ W}$
- $L_i = 0 \text{ mH}$
- $C_i = 0 \text{ nF}$

**CAUTION!**

Capacity and inductance of the connecting cable have to be considered.
### 2.8 Temperature classes

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

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Permissible ambient temperature in °C</th>
<th>Permissible ambient temperature in °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4...T1</td>
<td>-30...+70°C</td>
<td>-22...+158°F</td>
</tr>
</tbody>
</table>

The maximum permissible temperature is valid under the following conditions:

- The device is operated in its intended 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.
3 INSTALLATION

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.
- The silicon gasket is suitable for the intended use.

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

3.2 Electrostatic charge

In order to avoid ignition hazards due to electrostatic charge, the display 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).

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.
- The silicon gasket is suitable for the intended use.

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

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 hazardous area or carefully insulate them from each other and from ground (test voltage ≥ 500 V<sub>eff</sub>).

4.2 Power supply

**WARNING!**
Substitution of components may impair intrinsic safety.

The device does not require a separate power supply. The required supply for the electronics is provided via the 4...20 mA current output.

![Figure 4-1: Overview terminal connections 4...20 mA input for Ex-approved device.](image)

- Safe area
- Hazardous area
- I.S. certified barrier, power supply
  (for further information refer to Electrical data on page 10)
- Current output signal 4...20 mA
- Terminal connectors SD 200 series

The cable parameters are determined by the parameters of the system into which the SD 200 series loop powered displays are to be connected.

**INFORMATION!**
The device is isolated and can be placed anywhere within the loop.
5.1 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 hazardous area.
6.1 Control drawing CD1105.01

- The installation must comply with national requirements (e.g., in Canada, the Canadian Electrical Code, Part 1 Appendix F and in USA, the National Electrical Code, NFPA 70, Article 504 and ANSI/ISA-RP 12.5).
- Warning: Substitution of components may impair intrinsic safety.
- For the circuits connected to terminals 4 and 5, the output parameters of the connected barriers or hazardous location apparatus must meet the following requirements:
  - \( V_{os} \) is the lowest limits of the CSA / FM Approved apparatus in the circuit
  - \( I_{os} \) is the lowest limits of the CSA / FM Approved apparatus in the circuit
  - \( P_{max} \) is the lowest limits of the CSA / FM Approved apparatus in the circuit
  - \( C_{a} \) is the sum of the cable capacitance and the internal capacitance \( C_{i} \) of each CSA / FM Approved apparatus installed in the circuit
  - \( L_{a} \) is the sum of the cable inductance and the internal inductance \( L_{i} \) of each CSA / FM Approved apparatus installed in the circuit

- Hazardous Location Apparatus – switches, thermocouples or non-inductive resistance devices, or CSA / FM – Certified Apparatus – should be connected in accordance with the manufacturer’s installation instructions.
- The cable parameters are determined by the parameters of the system into which the SD 200 - Series Loop Powered Displays are to be connected.

The entity parameters for SD 200 - Series Loop Powered Displays are as follows:

<table>
<thead>
<tr>
<th>Terminals 4 and 5 – Input parameters:</th>
<th>( V_{max} )</th>
<th>30V</th>
<th>( G_{i} )</th>
<th>DnF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( I_{max} )</td>
<td>200mA</td>
<td>( L_{i} )</td>
<td>Does</td>
</tr>
<tr>
<td></td>
<td>( P_{max} )</td>
<td>1.2W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
KROHNE – Process instrumentation and measurement solutions

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Head Office KROHNE Messtechnik GmbH
Ludwig-Krohne-Str. 5
47058 Duisburg (Germany)
Tel.: +49 203 301 0
Fax: +49 203 301 10389
info@krohne.com

The current list of all KROHNE contacts and addresses can be found at:
www.krohne.com