



OPTIWAVE 8300 C Handbook

Non-contact Radar (FMCW) Level Meter for marine applications

Supplementary Instructions for ATEX applications



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1.1 Scope of the document

These instructions are applicable only to the explosion-protection version of the radar level transmitter. For all other data, use the Quick Start and Handbook. If you do not have these documents, please contact the nearest KROHNE office or download them from KROHNE's website www.krohne.com.



INFORMATION!

The information in this manual only contains the data applicable to explosion protection. The technical data in the installation and operating manual for the non-Ex version shall be valid in its current version, provided that they are not rendered invalid or are replaced by this manual.



WARNING!

Installation, commissioning and maintenance may only be carried out by "Personnel trained in explosion protection".

1.2 Device description

This device is a 2-wire level transmitter that uses FMCW (Frequency-Modulated Continuous Wave) radar technology. It measures level, volume, distance to surface, and reflectivity of liquids, pastes, slurries and solid particles, granulates and powders. It is suitable for installation on storage tanks, process tanks and stilling wells. Measurements are displayed via a DTM (device type manager) for remote communication or on an optional integrated display screen with wizard-driven setup and online help functions.

The level transmitter is approved for use in potentially explosive atmospheres when equipped with the appropriate options.

Ex ia-approved devices can also be equipped with an external sensor to measure process temperature, pressure, etc.

1.3 Standards and approvals



DANGER!

In compliance with European Directive 94/9/EC (ATEX 100a), the ATEX version of the device described in these Supplementary Instructions conforms to European Standards EN 60079-0:2006, EN 60079-1:2007, EN 60079-11:2007, EN 61241-0:2006, EN 61241-1:2004, EN 61241-11:2006 and EN 60079-26:2007. The Ex ia and Ex d [ia] versions are certified for use in hazardous areas by the KEMA Quality B.V. under KEMA 04ATEX1218 X.



WARNING!

Carefully read the ATEX approval certificate. Obey the boundary conditions.

1.4 Device categories

This device is suitable for use in potentially explosive atmospheres of all flammable substances in Gas Groups IIA, IIB and IIC. It is designed for applications requiring Category 1 G (gases, vapours or mists), 1 D (dust), 1/2 G, 1/2 D, 2 G or 2 D equipment when fitted with the appropriate Ex ia options. It is designed for applications requiring Category 1/2 G, 1/2 D, 2 G or 2 D equipment when fitted with the appropriate Ex d options.



INFORMATION!

Category 1

The device is installed in hazardous areas requiring Category 1 G or 1 D equipment.

Category 1/2

The signal converter is installed in hazardous areas requiring Category 2 G or 2 D equipment.

The probe is installed in hazardous areas requiring Category 1 G or 1 D equipment.

Category 2

The device is installed in hazardous areas requiring Category 2 G or 2 D equipment.

1.5 ATEX nameplates

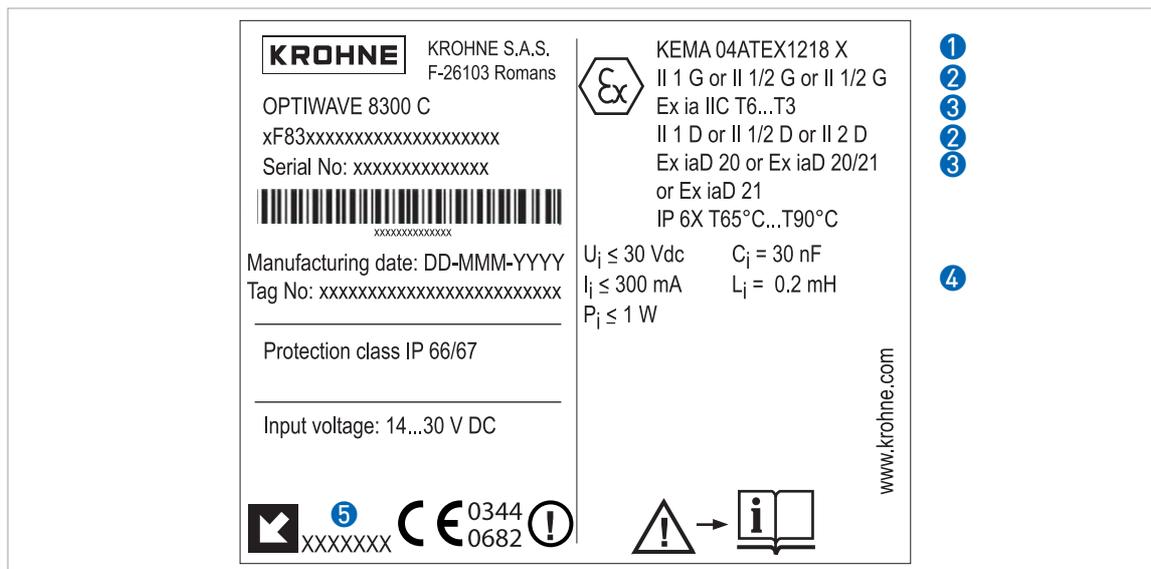


Figure 1-1: Ex ia nameplate (device without external sensor)

- ① ATEX certification agency code. Refer also to **temperature classes**.
- ② Equipment approval categories
- ③ Types of device protection including approved Gas Groups (IIA, IIB or IIC) and temperature classes for hazardous areas and maximum surface temperature (please refer to the certificate)
- ④ Intrinsically-safe circuit data
- ⑤ Cable entry type and size (Aluminium housing: M26 x 1.5, M20 x 1.5, ½NPT or G½; Stainless steel housing: M25 x 1.5, M20 x 1.5, ½NPT or G½)

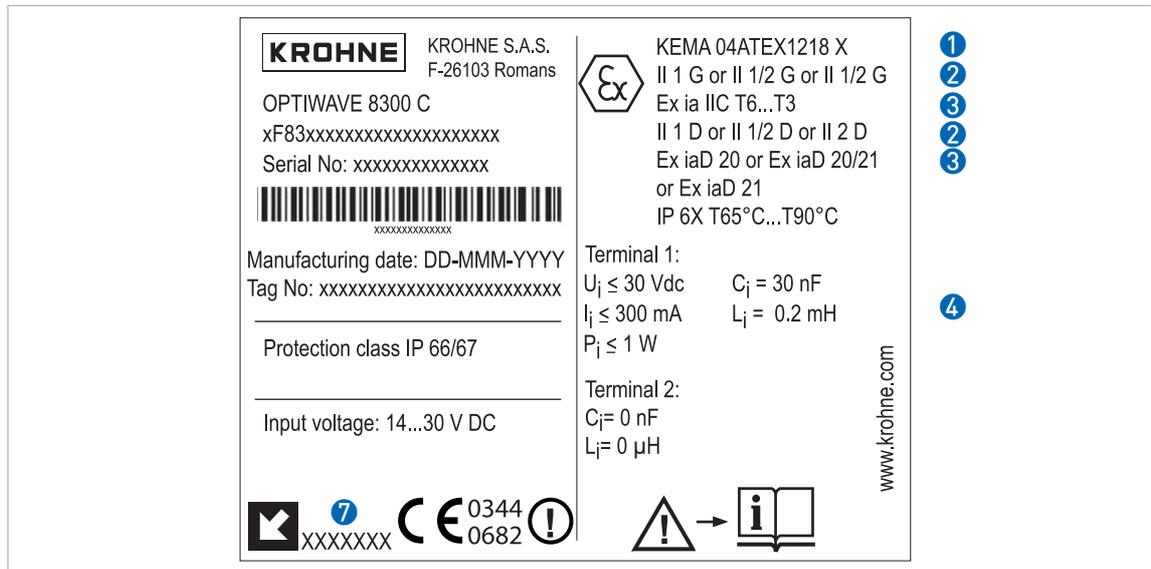


Figure 1-2: Ex ia nameplate (device with external sensor)

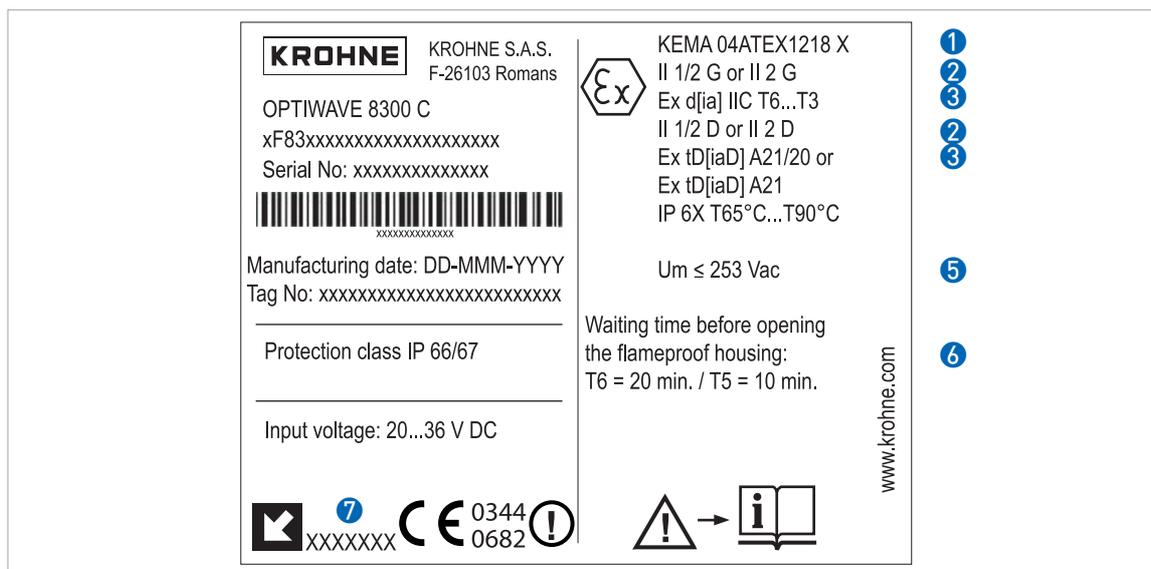


Figure 1-3: Ex d[ia] nameplate

- 1 ATEX certification agency code. Refer also to **temperature classes**.
- 2 Equipment approval categories
- 3 Types of device protection including approved Gas Groups (IIA, IIB or IIC) and temperature classes for hazardous areas and maximum surface temperature (please refer to the certificate)
- 4 Intrinsically-safe circuit data
- 5 Maximum voltage in accordance with EN 60079-0
- 6 Minimum waiting time after power-off before it is safe to open the terminal compartment
- 7 Cable entry type and size [Aluminium housing: M26 x 1.5, M20 x 1.5, ½NPT or G½; Stainless steel housing: M25 x 1.5, M20 x 1.5, ½NPT or G½]

2.1 Precautions

2.1.1 General notes

**WARNING!**

When you install the device, obey the conditions in the EC-Type Examination certificate. These conditions include:

- The special conditions for safe use.
- The Essential Health and Safety Requirements.

**DANGER!**

This installation must agree with EN 60079-14: Electrical installations in hazardous areas.

2.1.2 Electrostatic discharge

**DANGER!**

Risk of electrostatic discharge from the blue plastic sun cover. Make sure that all personnel and equipment are correctly grounded.

Take the necessary antistatic precautions if you:

- handle,
- install or
- use

the instrument in potentially explosive atmospheres. Do not install in a location (near to ventilation systems, for example) where the electrostatic charge can increase.

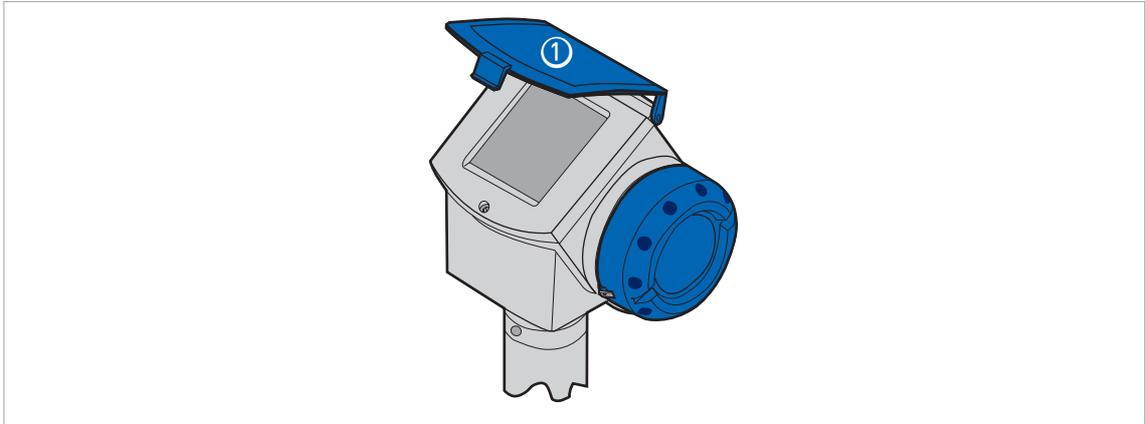


Figure 2-1: Risk of ESD: sun cover

① Sun cover

2.1.3 Special conditions



WARNING!

Aluminium housing: Possible source of ignition in a potentially explosive atmosphere.

The housing is made of either aluminium alloy or stainless steel. If the device has an aluminium alloy housing, make sure that iron/steel objects do not hit or rub against the device.

2.1.4 Optional purging system

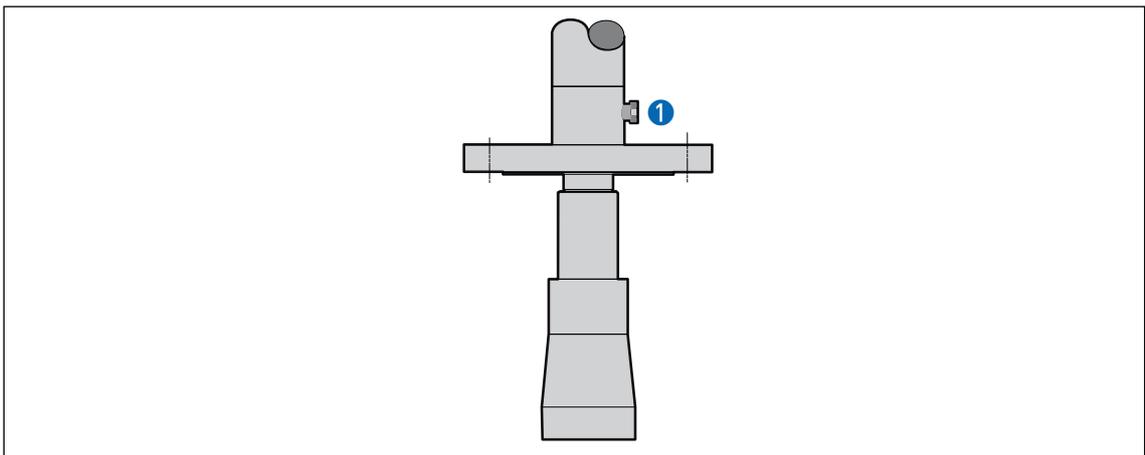


Figure 2-2: Optional purging system

① NPTF 1/4 purging connection (optional)



INFORMATION!

If delivered with the device, the purging connection is plugged with a NPTF 1/4 screw and engaged on a minimum of 3 1/2 threads.

Connection and operation of the purging connection are the responsibility of the user. The operator is also responsible for selection of a suitable fluid to purge the device.



- If the screw is removed, make sure that the installation agrees with the Ex requirements for the purging system.

2.2 Operating conditions

The allowable ambient temperature and corresponding flange temperature range for the instrument depends on the ATEX equipment category and temperature classes marked on the nameplate.

2.2.1 Ambient and flange temperature

The ATEX equipment category and temperature class give the ambient temperature and related flange temperature ranges for the device.



WARNING!

The gasket temperature must not be more or less than the approved limits.

Equipment category II 1 G (Ex ia instruments only)

Temperature class	Ambient temperature		Flange temperature	
	[°C]	[°F]	[°C]	[°F]
T6	-20...+60	-4...+140	-20...+60	-4...+140

Equipment category II 1/2 G

Temperature class	Ambient temperature		Flange temperature	
	[°C]	[°F]	[°C]	[°F]
T6	-40...+60	-40...+140	-20...+60	-4...+140
T5	-40...+75	-40...+167	-20...+60	-4...+140
T4	-40...+85	-40...+185	-20...+60	-4...+140

Equipment category II 2 G

Temperature class	Ambient temperature		Flange temperature	
	[°C]	[°F]	[°C]	[°F]
T6	-40...+60	-40...+140	-40...+60 ①	-40...+140 ①
	-40...+55	-40...+131	-40...+80 ①	-40...+176 ①
T5	-40...+75	-40...+167	-40...+75 ①	-40...+167 ①
	-40...+70	-40...+158	-40...+95 ①	-40...+203 ①
T4	-40...+85	-40...+185	-40...+85 ①	-40...+185 ①
	-40...+80	-40...+176	-40...+110 ①	-40...+230 ①
	-40...+75	-40...+167	-40...+135 ①	-40...+275 ①
T3	-40...+70	-40...+158	-40...+150 ①	-40...+302 ①
	-40...+65	-40...+149	-40...+180 ①	-40...+356 ①
	-40...+60	-40...+140	-40...+200 ①	-40...+392 ①

① -50°C/-58°F, if an EPDM gasket is used

Equipment category II 1 D (Ex ia instruments only), II 1/2 D and II 2 D

Ambient temperature		Flange temperature	
[°C]	[°F]	[°C]	[°F]
-40...+60	-40...+140	-40...+200 ①	-40...+392 ①

① -50°C/-58°F, if an EPDM gasket is used

2.2.2 Maximum surface temperature of the housing

Equipment category II 1 D, II 1/2 D and II 2 D

Max. ambient temperature		Max. flange temperature		Max. surface temperature	
[°C]	[°F]	[°C]	[°F]	[°C]	[°F]
+55	+131	+80	+176	+65	+149
+70	+158	+95	+203	+80	+176
+75	+167	+135	+275	+86	+186
+60	+140	+200	+392	+90	+194

2.2.3 Process pressure

Equipment category	Allowable process pressure	
	[kPa]	[psi]
1 G, 1 D, 1/2 G or 1/2 D	80...110 ①	11.6...16 ①
Others	As per non-Ex instrument	As per non-Ex instrument

① atmospheric pressure

3.1 General notes



WARNING!

- De-energize the circuit.
- Use the applicable cable glands for the cable entry openings in the housing (Aluminium housing: M26 x 1.5, M20 x 1.5, ½NPT or G½; Stainless steel housing: M25 x 1.5, M20 x 1.5, ½NPT or G½). For the cable entry size, refer to the device nameplate.
- If ambient temperature >60°C, use heat-resistant cables and cable glands certified for continuous operation above 80°C.

3.2 Terminal compartment

3.2.1 How to open the terminal compartment

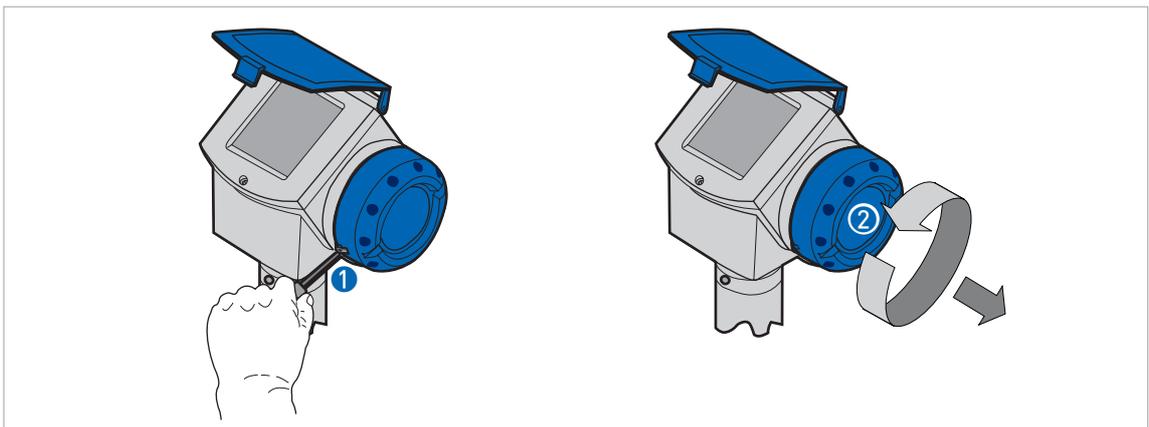


Figure 3-1: How to open the terminal compartment

- ① Cover stop
- ② Terminal compartment cover



WARNING!

Do not remove the terminal compartment cover while the electrical power is connected.



- De-energize the circuit.
- After the time given in the table that follows, remove the cover stop ①.
- ➡ Use a 3 mm allen wrench.
- Remove the terminal compartment cover ②.

Time necessary to de-energize an Ex d [ia]-approved device

Temperature class	Time to de-energize the Ex d [ia]-approved device	
	[minutes]	
T6	20	
T5	10	
T4, T3, T2	Not necessary	

3.2.2 How to close the terminal compartment



WARNING!

Ex d [ia] applications: obey the instructions that follow:



- ① Attach the terminal compartment cover ②.
- ➡ Turn the terminal compartment cover carefully to prevent damage to the thread and the gasket.
- ② Make sure that the terminal compartment cover is tight.
- ③ Attach the cover stop ①.
- ➡ Use a 3 mm allen wrench.
- ④ Make sure that the cover stop ① screw is tight.

3.3 Terminal tightening capacity

The terminal tightening capacity for current output terminals 1 and 2 is:

Type of wire	Terminal tightening capacity	
	[mm ²]	[inches ²]
Rigid	4	0.0062
Flexible	2.5	0.0039

3.4 Equipotential bonding system

There is a terminal in the terminal compartment and another on the side of the converter support pillar that can be used equipotential bonding conductors.

3.5 Ex ia equipment

3.5.1 How to connect the electrical cables

**INFORMATION!**

- Cable entries are supplied on customer demand. If you supply the cable entries, this part must have a degree of ingress protection $IP \geq 6x$ (EN 60529).



- Use the electrical connection procedure in the Handbook.
- If possible, use galvanically-isolated equipment.
- Supply the Ex i equipment connected to the instrument. Use only certified intrinsically-safe equipment.
- Connect only to separate certified, intrinsically-safe circuits. Make sure that the electrical circuit characteristics are not more than the values below.

Maximum intrinsically-safe values for the electrical circuit

Level transmitter without external sensor (output terminal 1 or 2)

- $U_i \leq 30$ V
- $I_i \leq 300$ mA
- $P_i \leq 1$ W
- $C_i = 30$ nF
- $L_i = 0.2$ mH

Level transmitter with external sensor: output terminal 1

- $U_i \leq 30$ V
- $I_i \leq 300$ mA
- $P_i \leq 1$ W
- $C_i = 30$ nF
- $L_i = 0.2$ mH

Level transmitter with external sensor: output terminal 2

- $C_i = 0$ nF
- $L_i = 0$ mH

3.5.2 Supply voltage

Level transmitter without external sensor

Current output terminal	Minimum voltage at output terminal [VDC]	Maximum voltage at output terminal [VDC]
1 (U _{S1})	14 ①	30 ①
2 (U _{S2}) ②	10 ①	30 ①

① for a current output of 22 mA

② use a second power supply. This power supply energizes current output terminal 2 only.

Level transmitter with external sensor

Current output terminal	Minimum voltage at output terminal [VDC]	Maximum voltage at output terminal [VDC]
1 (U _{S1})	14 ①	30 ①
2 (U _{S2}) ②	③	③

① for a current output of 22 mA

② use a second power supply. This power supply energizes current output terminal 2 only.

③ for more data, refer to the data sheet for the external sensor

3.5.3 Electrical schema

Without an external sensor

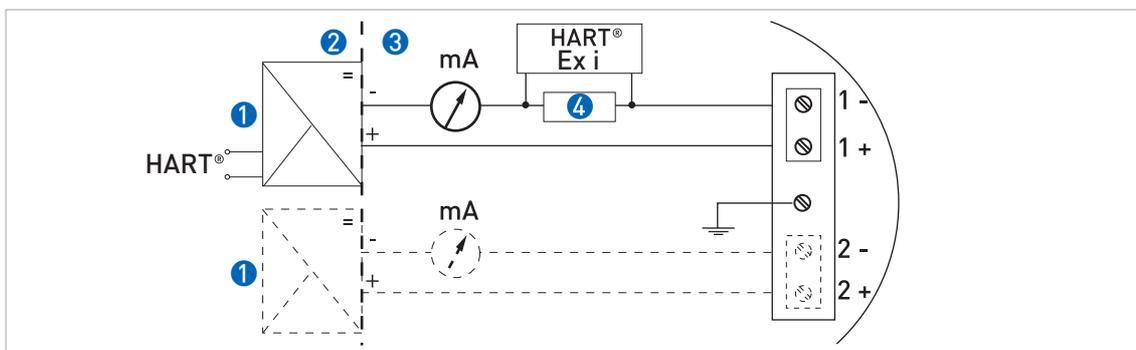


Figure 3-2: Electrical schema for Ex i-approved equipment without an external sensor

① Intrinsically-safe power supply (use second power supply for optional terminal 2)

② Non-Ex zone

③ Ex zone

④ Resistor for HART® communication

With an external sensor

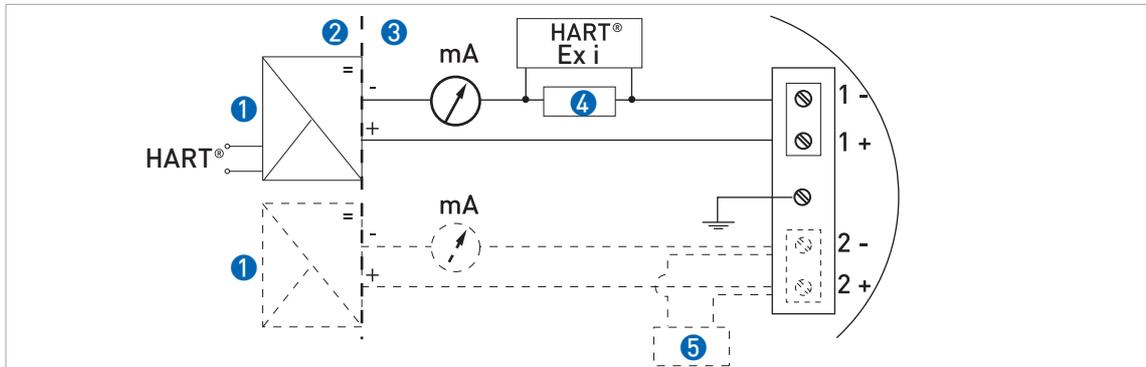


Figure 3-3: Electrical schema for Ex i-approved equipment with an external sensor

- ① Intrinsically-safe power supply (use second power supply for optional terminal 2)
- ② Non-Ex zone
- ③ Ex zone
- ④ Resistor for HART® communication
- ⑤ External sensor

3.6 Ex d [ia] equipment

3.6.1 General notes

Ex d [ia]-approved equipment have two separate compartments. The electronics in the electronics block compartment are Ex ia-approved and the terminals compartment is Ex d-approved.

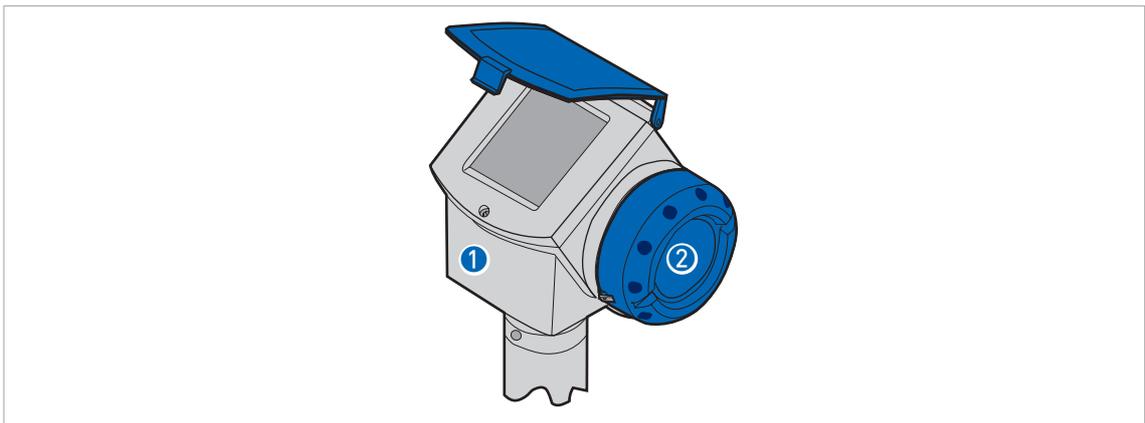


Figure 3-4: Compartments in Ex d [ia]-approved equipment

- ① Electronics block (Ex ia) compartment
- ② Terminal (Ex d) compartment



NOTE!

If you must open the electronics block compartment and remove the electronics blocks for servicing, it is not necessary to disconnect the wires in the Ex d compartment.

**INFORMATION!**

The flamepath dimensions are better than the values specified in the European Standard EN 60079-1 (minimum length 14.5 mm and maximum gap 118 µm).

3.6.2 How to connect the electrical cables

**INFORMATION!**

Cable entries are supplied on customer demand. If you supply the cable entries, this part must have a degree of ingress protection $IP \geq 6x$ (EN 60529).



- Use only flameproof and Ex d-approved cable entries and plugs.
- If you use only one cable entry, seal the other one with an Ex d-approved plug.
- All Ex d-approved installations must agree with European standards EN 60079-1.

**Conduit entries**

- Connect the instrument to an Ex d-approved conduit system.
- Install the applicable Ex d-approved sealing device. It must be installed adjacent to the housing. For further information, refer to European Standard EN 60079-1.
- If you use only one cable entry, seal the other one with an Ex d-approved plug.

**Load resistor**

- Connect the load resistor to the positive terminal of the power supply
- Ground the negative connection.
- If the load resistor has to be connected to the negative terminal, the loop resistance must not be more than 250 ohms.

**CAUTION!**

Do not ground the positive connection.

3.6.3 Supply voltage

Current output terminal	Minimum voltage at output terminal [VDC]	Maximum voltage at output terminal [VDC]
1 [U _{S1}]	20 ①	36 ①
2 [U _{S2}] ②	10 ①	30 ①

① for a current output of 22 mA

② use a second power supply. This power supply energizes current output terminal 2 only.

3.6.4 Electrical schema

**CAUTION!**

Make sure that you connect the load resistor to the positive side.

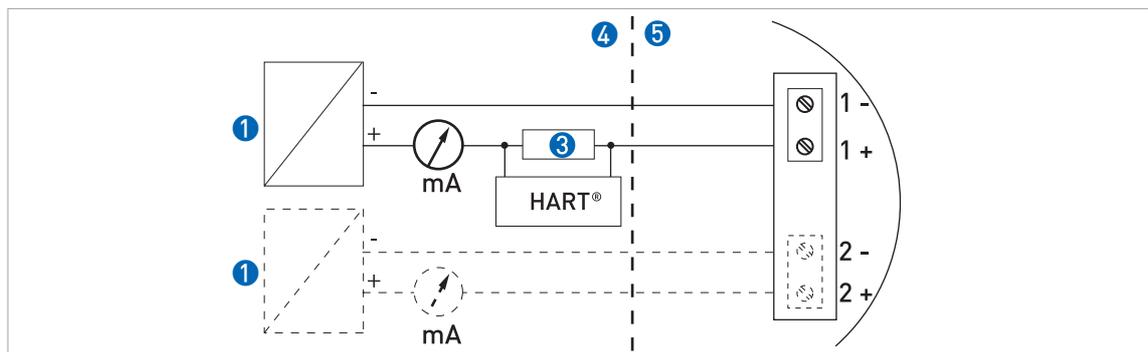


Figure 3-5: Electrical schema for Ex d [ia]-approved equipment (with galvanic isolation)

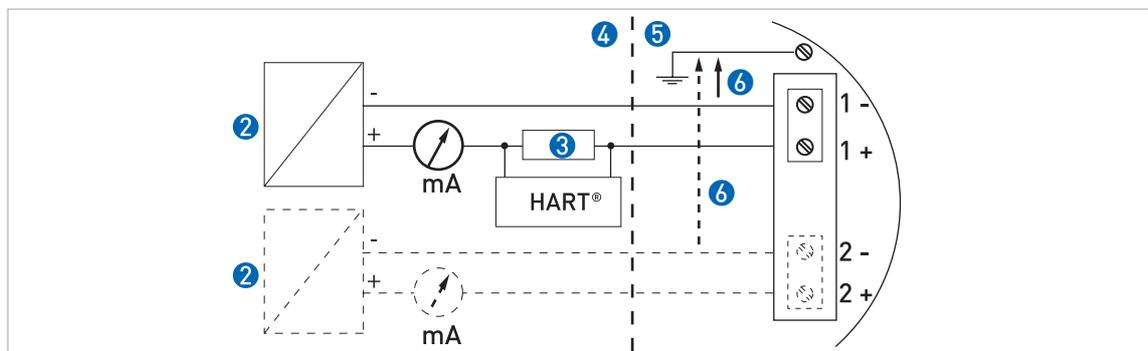


Figure 3-6: Electrical schema for Ex d [ia]-approved equipment (without galvanic isolation)

- ① Galvanically-isolated power supply (use a second power supply for optional terminal 2)
- ② Power supply (use a second power supply for optional terminal 2)
- ③ Resistor for HART® communication
- ④ Non-Ex zone
- ⑤ Ex zone
- ⑥ $|U| < 5 V$

**WARNING!**

Make sure that it is safe to supply electrical power. Do a start-up check:



- Are the wetted components (gasket, flange and antenna) resistant to corrosion by the tank product?
- Does the information given on the nameplate agree with the application?
- Did you connect the equipotential bonding system correctly?
- **Ex d applications:** Are the cable entries, plugs and adaptors Ex d-approved?
- **Ex i applications:** Are you using an intrinsic barrier within the correct parameters? Refer to the "Ex i equipment" section. The electrical circuit characteristics must not be more than the maximum intrinsically-safe values.
- Did you install the correct cable entries? Is the terminal compartment correctly sealed?
- Does the optional purging system agree with Ex requirements?

5.1 Periodic maintenance

No maintenance is necessary.

5.2 Keep the instrument clean



WARNING!

Do not let more than 5 mm/0.2" of dust collect on the top of the instrument. This is a possible source of ignition in a potentially explosive atmosphere.



DANGER!

Risk of electrostatic discharge from the blue plastic sun cover.

Obey these instructions:



- Keep the thread of the terminal compartment cover clean.
- If dirt collects on the instrument, clean it. Wipe the plastic sun cover with a damp cloth.

5.3 Returning the device to the manufacturer

5.3.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.



CAUTION!

Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

- *Due to statutory regulations on environmental protection and safeguarding the health and safety of our personnel, manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.*
- *This means that the manufacturer can only service this device if it is accompanied by the following certificate (see next section) confirming that the device is safe to handle.*



CAUTION!

If the device has been operated with toxic, caustic, flammable or water-endangering products, you are kindly requested:

- *to check and ensure, if necessary by rinsing or neutralizing, that all cavities are free from such dangerous substances,*
- *to enclose a certificate with the device confirming that is safe to handle and stating the product used.*

5.3.2 Form (for copying) to accompany a returned instrument

Company:		Address:	
Department:		Name:	
Tel. No.:		Fax No.:	
The meter enclosed, type:			
KROHNE Commission or Series No.:			
has been operated with the following liquid:			
Because this liquid is:	hazardous to water		
	toxic		
	caustic		
	flammable		
	We have checked that all cavities in the unit are free from such substances.		
	We have flushed out and neutralized all cavities in the unit.		
We herewith confirm that in returning this unit there is no risk to man or environment through any residual liquid contained in it.			
Date:		Company stamp:	
Signature:			

(1) **EC-TYPE EXAMINATION CERTIFICATE**(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**(3) EC-Type Examination Certificate Number: **KEMA 04ATEX1218 X** Issue Number: **3**(4) Equipment: **Radar Level Transmitter OPTIWAVE 7300 C**
Type VF70 4 and Type SF70 9
Radar Level Transmitter OPTIWAVE 8300 C
Type VF834 and Type SF839(5) Manufacturer: **Krohne S.A.S.**(6) Address: **Les Ors, 26103 Romans, France**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number 211153700/2.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2006	EN 60079-1 : 2007	EN 61241-0 : 2006	EN 61241-1 : 2004
EN 60079-11 : 2007	EN 60079-26 : 2007	EN 61241-11 : 2006	

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:



II 1 G or II 1/2 G or II 2 G	Ex ia IIC or Ex ia IIB or Ex ia IIA T6 ... T3
II 1 D or II 1/2 D or II 2 D	Ex iaD 20 or Ex iaD 20/21 or Ex iaD 21 IP6X T65 °C ... T90 °C
or	
II 1/2 G or II 2 G	Ex d[ia] IIC or Ex d[ia] IIB or Ex d[ia] IIA T6 ... T3
II 1/2 D or II 2 D	Ex tD[iaD] A21/20 or Ex tD[iaD] A21 IP6X T65 °C ... T90 °C

This certificate is issued on 6 August 2008 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.

C.G. van Es
Certification Manager

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Experience you can trust.

Figure 6-1: ATEX certificate, page 1 of 5

(13) **SCHEDULE**(14) **to EC-Type Examination Certificate KEMA 04ATEX1218 X** Issue No. 3(15) **Description**

The Radar Level Transmitters, OPTIWAVE 7300 C Type VF70 4 and Type SF70 9, and OPTIWAVE 8300 C Type VF834 and Type SF839 are used for continuous level measurement of flammable or non-flammable liquids or solid particles, granulates or powders within storage or process tanks or in a stilling well.

The distance between the antenna and the surface of the process medium is measured using a frequency modulated continuous wave radar.

The 2-wire transmitter is loop powered. The output signal is a 4 - 20 mA current signal with digital communication (HART protocol).

Either the Radar Level Transmitter is completely in type of protection intrinsic safety "i" or the transmitter is provided with the power supply compartment in type of protection flameproof enclosures "d". In the latter version a zener barrier circuit board is integrated in the power supply module.

Optionally, the transmitter may be provided with a second 4 - 20 mA current output and with display and adjustment capabilities (HMI option).

Optionally, the intrinsically safe version of Radar Level Transmitter OPTIWAVE 8300 C can be equipped with a certified external sensor for measuring of, for example, process temperature or pressure.

The ambient temperature range and the flange temperature range, depending on the equipment category required in the area where the transmitter is installed, are as listed in the following table:

Equipment category	Ambient temperature range	Flange temperature range
II 1 G	-20 °C ... +60 °C	-20 °C ... +60 °C
II 1/2 G	-40 °C ... +85 °C	-20 °C ... +60 °C
II 2 G	-40 °C ... +85 °C	-40 °C ¹⁾ ... +200 °C
II 1 D, II 1/2 D, II 2 D	-40 °C ... +85 °C	-40 °C ¹⁾ ... +200 °C

¹⁾ A flange temperature ≥ -50 °C is allowed if EPDM gaskets are used.

The temperature class, depending on the ambient temperature and the flange temperature is for the different versions as listed in following table:

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Equipment category	Max. ambient temperature	Max. flange temperature	Temperature class
II 1 G	60 °C	60 °C	T6
II 1/2 G	60 °C	60 °C	T6
	75 °C	60 °C	T5
	85 °C	60 °C	T4
II 2 G	60 °C	60 °C	T6
	55 °C	80 °C	
	75 °C	75 °C	T5
	70 °C	95 °C	
	85 °C	85 °C	T4
	80 °C	110 °C	
	75 °C	135 °C	
	70 °C	150 °C	T3
	65 °C	180 °C	
60 °C	200 °C		

The maximum surface temperature of the electronics enclosure "T", depending on the ambient temperature and the flange temperature, is as listed in following table:

Max. ambient temperature	Max. flange temperature	Surface temperature "T"
55 °C	80 °C	65 °C
70 °C	95 °C	80 °C
75 °C	135 °C	86 °C
60 °C	200 °C	90 °C

The enclosure provides a degree of protection of at least IP6X as per EN 60529.

Electrical dataApparatus in type of protection intrinsic safety "i"

Supply and output circuit (terminals output 1, + and -):
in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:
 $U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 30 \text{ nF}$; $L_i = 200 \text{ }\mu\text{H}$.

Output circuit (terminals output 2, + and -):
in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:
 $U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 30 \text{ nF}$; $L_i = 200 \text{ }\mu\text{H}$.

The optional second current output circuit is infallibly galvanically isolated from the supply and output circuit and from the earthed parts of the transmitter.

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If Radar Level Transmitter OPTIWAVE 8300 C is equipped with an external sensor, this sensor is connected to terminals output 2, + and -. The electrical data of this sensor apply.

Apparatus in type of protection flameproof enclosures "d"

Power supply max. 36 Vdc
 Output 4 - 20 mA
 Intrinsically safe circuits $U_m = 253 \text{ V}$

Installation instructions

Apparatus in type of protection intrinsic safety "i"

When the Radar Level Transmitter is used in explosive atmospheres caused by air/dust mixtures, cable entry devices shall be used that provide a degree of protection of at least IP6X, that are suitable for the application and are correctly installed.

Apparatus in type of protection flameproof enclosures "d"

When used in a potentially explosive atmosphere, requiring the use of apparatus of equipment category 2 G, flameproof certified cable entry devices shall be used that are suitable for the application and correctly installed. With the use of conduit, a suitable certified sealing device such as a stopping box with setting compound shall be provided immediately at the entrance to the flameproof enclosure.

When used in a potentially explosive atmosphere, requiring the use of apparatus of equipment category 2 D, certified cable entry devices shall be used that provide a degree of protection of at least IP6X, that are suitable for the application and are correctly installed.

Unused openings shall be closed with suitable certified blanking elements.

When the ambient temperature exceeds 70 °C, the cables, cable entry devices and blanking elements shall be suitable for at least 60 °C.

Routine tests

Routine tests according to Clause 16 of EN 60079-1 are not required since the type test has been made at a static pressure of four times the reference pressure.

(16) **Test Report**

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Figure 6-4: ATEX certificate, page 4 of 5



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(17) **Special conditions for safe use**

For the version of enclosure of the Radar Level Transmitter made of aluminium alloy, when used in a potentially explosive atmosphere requiring the use of apparatus of equipment category 1 G, the apparatus must be installed so, that even in the event of rare incidents, an ignition source due to impact or friction between the enclosure and iron/steel is excluded.

The flamepath dimensions of the bushing are better than the values specified in EN 60079-1 (minimum length is 14,5 mm, maximum gap is 0,118 mm).

Also, see description and installation instructions above.

(18) **Essential Health and Safety Requirements**

Assured by compliance with the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. 211153700/2

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