

OPTIWAVE 15XX Supplementary Instructions

OPTIWAVE 1530
OPTIWAVE 1540
OPTIWAVE 1560

ATEX / IECEx supplementary instructions

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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 office or download them from the manufacturer's website.



INFORMATION!

The information in these supplementary instructions only contains the data applicable to explosion protection. The technical data for the non-Ex version in the Handbook shall be valid in its current version, provided that it is not rendered invalid or replaced by these supplementary instructions.



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.

The OPTIWAVE 15XX measures level, volume, distance to surface and reflectivity of liquids, pastes, slurries and granulates. It can be installed on tanks, reactors, open channels, open water, silos, hoppers and bunkers.

Measurements are displayed using a DTM (device type manager) or a mobile application for remote communication

1.3 Standards and approvals

1.3.1 ATEX



DANGER!
Carefully read the EU-Type Examination Certificate for this device. Obey the boundary conditions. You can download the ATEX certificate and the EU manufacturer's declaration from our website.

In compliance with European Directive 2014/34/EU (ATEX 114), the ATEX version of the device described in these Supplementary Instructions agrees with European Standards EN IEC 60079-0:2018, EN 60079-7:2015, EN 60079-11:2012, EN 60079-18:2015, EN 60079-26:2015 and EN 60079-31:2014. The Ex ia, Ex ta, Ex tb and Ex eb mb versions are certified for use in hazardous areas by LCIE under the EU-Type Examination Certificate LCIE 25 ATEX 3012 X.

1.3.2 IECEx



DANGER!
Carefully read the IECEx certificate of conformity for this device. Obey the boundary conditions. You can download the IECEx certificate from our website.

In compliance with the IECEx scheme rules, the IECEx version of the device described in these Supplementary Instructions agrees with International Standards IEC 60079-0:2017, IEC 60079-7:2015, IEC 60079-11:2023, IEC 60079-18:2017, IEC 60079-26:2021 and IEC 60079-31:2022. The Ex ia, Ex ta, Ex tb and Ex eb mb versions are certified for use in hazardous areas by LCIE under Certificate of Conformity IECEx LCIE 25.0017X.

1.4 Device markings

1.4.1 Ex ia-approved devices

The Ex ia-approved device has the marking that follows for Gas Groups:

II 1 G or II 1/2 G Ex ia IIC T4 Ga or Ga/Gb

The Ex ia-approved device is suitable for use in potentially explosive atmospheres of all flammable substances in Gas Groups IIA, IIB and IIC. It is certified for applications requiring EPL Ga or EPL Ga/Gb.

INFORMATION!
EPL Ga equipment can be installed in:
- *zone 0*
- *zone 1, or*
- *zone 2*

EPL Ga/Gb equipment can be also installed in the boundary wall between zone 0 and zone 1 (the antenna is in zone 0 and the signal converter is in zone 1).

The Ex ia-approved device has the marking that follows for Dust Groups:

II 1 D or II 1/2 D Ex ia IIIC T_{200}106°C Da or Da/Db

The Ex ia-approved device is suitable for use in potentially explosive atmospheres of all flammable substances in Dust Groups IIIA, IIIB and IIIC. It is certified for applications requiring EPL Da or EPL Da/Db.

INFORMATION!
EPL Da equipment can be installed in:
- *zone 20*
- *zone 21, or*
- *zone 22*

EPL Db equipment can be installed in:
- *zone 21 or*
- *zone 22*

EPL Da/Db equipment can be also installed in the boundary wall between zone 20 and zone 21 (the antenna is in zone 20 and the signal converter is in zone 21).

1.4.2 Ex eb mb-approved devices

The Ex eb mb-approved device has the marking that follows for Gas Groups:

II 2 G or II 1/2 G Ex eb mb IIC T4 Gb or Ga/Gb

The Ex eb mb-approved device is suitable for use in potentially explosive atmospheres of all flammable substances in Gas Groups IIA, IIB and IIC. It is certified for applications requiring EPL Gb or EPL Ga/Gb.

INFORMATION!
EPL Gb equipment can be installed in:
- *zone 1, or*
- *zone 2*

EPL Ga/Gb equipment can be also installed in the boundary wall between zone 0 and zone 1 (the antenna is in zone 0 and the signal converter is in zone 1).

1.4.3 Ex ta- and Ex tb- approved devices

The Ex ta- and Ex tb- approved device has the marking that follows for Dust Groups:

II 1 D or II 1/2 D or II 2 D Ex ta IIIC T_{200}106°C Da or Da/Db or Ex tb IIIC T86°C Db or Da/Db

The Ex ta- and Ex tb-approved devices are suitable for use in potentially explosive atmospheres of all flammable substances in Dust Groups IIIA, IIIB and IIIC. They are certified for applications requiring EPL Da or EPL Db or EPL Da/Db.

INFORMATION!
EPL Da equipment can be installed in:
- *zone 20*
- *zone 21, or*
- *zone 22*

EPL Db equipment can be installed in:
- *zone 21 or*
- *zone 22*

EPL Da/Db equipment can be also installed in the boundary wall between zone 20 and zone 21 (the antenna is in zone 20 and the signal converter is in zone 21).

1.5 Nameplate

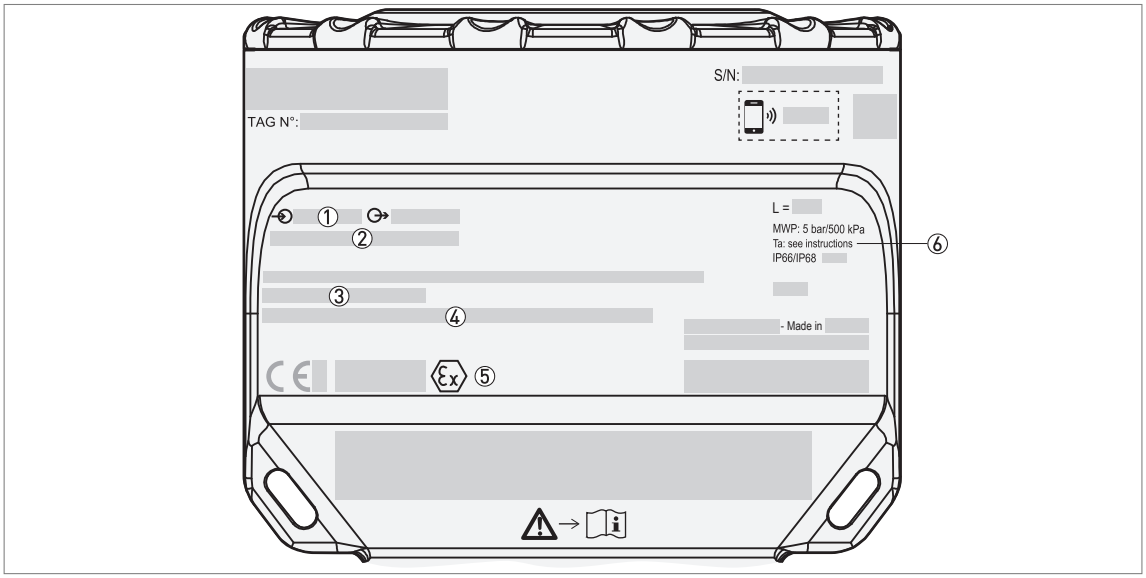


Figure 1-1: Nameplate (marking on the IP68 housing with a welded cover)

① Input voltage range and maximum current
② **Ex ia approval:** Intrinsically safe circuit data.
Ex eb mb approval: Maximum voltage.
③ ATEX and IECEx certificate numbers
④ Types of device protection for explosive gas and explosive dust atmospheres
⑤ ATEX approval logo. No logo is shown for the IECEx approval.
⑥ Ambient temperature range - see the INFORMATION! note that follows

INFORMATION!
Ambient temperature range: for more data, refer to Ambient and process connection temperatures on page 10.

2.1 Specific conditions of use

Electrostatic discharge

Risk of electrostatic discharge (ESD) from the housing and the weather protection cover.
An electrostatic discharge can cause an explosion in potentially explosive atmospheres.
For more data, refer to *Electrostatic discharge* on page 9.

Impact resistance

The device housing agrees with the test specified in EN IEC 60079-0 for a low risk of mechanical danger. For more data, refer to *Impact resistance* on page 10.

Earthing

This device is class 3 equipment (SELV) and must be energized with a low voltage. For more data about the supply voltage, refer to *Maximum intrinsically safe values for the electrical circuit* on page 12 and refer to *Supply voltage* on page 13.

2.2 Precautions

2.2.1 General notes

This radar level transmitter has a PVDF housing. The partition wall has a thickness of more than 1 mm.

When you install the device, obey the instructions that follow for safe operation.



DANGER!
This installation must agree with IEC / EN 60079-14: Explosive atmospheres – Part 14: Electrical installations design, selection and erection.

Make sure that:

- you can get access to the device,
- there is sufficient space around the device for inspections,
- a constant vibration is not applied to the equipment,
- you can refer to the device nameplate (if it is necessary, remove the weather protection cover accessory to read the nameplate), and
- there are no external forces applied on the device.



CAUTION!
Do not install devices in areas where there is a flow of abrasive dust. If it is necessary to install the device in an area where there is abrasive dust, then use protective equipment to prevent damage to the device.

2.2.2 Electrostatic discharge

DANGER!
Risk of electrostatic discharge (ESD) from the housing and the weather protection cover.
An electrostatic discharge can cause an explosion in potentially explosive atmospheres.

To avoid ignition hazards due to electrostatic charge, devices must not be used in areas where they are exposed to processes that generate strong charges.

Processes that generate strong charges are for example:

- Mechanical friction and cutting processes
- Spraying of electrons (e.g. in the vicinity of electrostatic painting systems)
- Pneumatically conveyed dusts

WARNING!
Electrostatic charging of the housing surface by friction must be avoided.
The device must not be cleaned with a dry cloth.

ESD warning

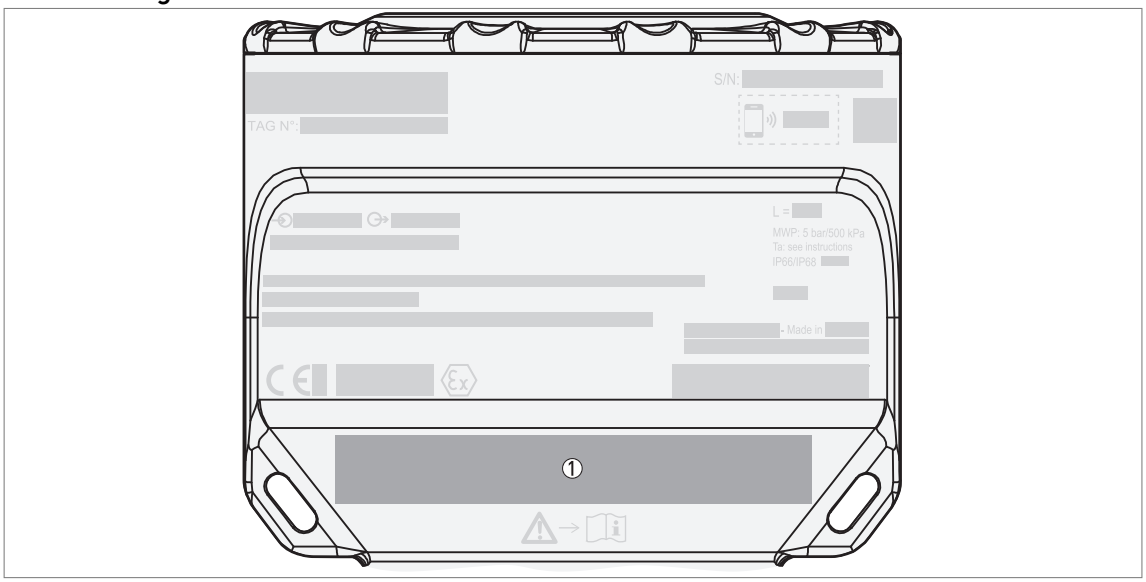


Figure 2-1: ESD warning (on the device nameplate)

① Text: Warning! Potential electrostatic hazard – see instructions

WARNING!
If the device has a weather protection cover, then make sure that the personnel can see the ESD warning symbol on the cover. Obey precautions to decrease the risk of electrostatic discharge.



Figure 2-2: Risk of ESD

① Weather protection cover
② Device housing
③ Text: Warning: Potential electrostatic charging hazard – see instructions

2.2.3 Impact resistance

Install the device in a safe location to prevent damage from mechanical hazards. Make sure that the energy of an impact (mechanical shock) is not more than 4 J.

2.3 Ambient and process connection temperatures

WARNING!
An explosive atmosphere is a mixture of air and flammable gases, vapour, mist or dust in atmospheric conditions. If you do not use the device in these conditions (T_{atm} = -20...+60°C and p_{atm} = 0.8...1.1 barg), do an analysis of the risk of ignition.

T_{atm} = atmospheric temperature and p_{atm} = atmospheric pressure.

WARNING!
Devices with a G (ISO 228-1) threaded connection are supplied with an FKM/FPM gasket. The process connection temperature range must agree with the temperature limits of the gasket material (FKM/FPM: -15...+80°C / -5...+176°F).

WARNING!
Make sure that the process connection temperature range is not more or less than the values given in this chapter. Make sure that the ambient temperature range is not more or less than the values given in this section.

INFORMATION!
The reference point for the process temperature is the bearing surface of the threaded connection of the device. In the section that follows, this reference point will be referred to as the "process connection temperature".

The values that follow are applicable in these conditions:

- Device installation must agree with the instructions given in the handbook.
- Make sure that the device temperature does not increase because of other heat sources (sunlight, adjacent system components etc.). The device must be operated in the permitted ambient temperature range.
- Do not put insulation around the device. Make sure that the airflow around the signal converter is sufficient.

The ambient, storage and process connection temperature range is related to the device options selected:

Ex marking	Maximum ambient temperature	Process connection temperature	Process pressure
	[°C]	[°C]	[bar]
Ex ia IIC T4 Ga or Ga/Gb	+77	-25...+80	-1...5
Ex ia IIIC T_{200}106°C Ga or Ga/Gb	+67		
Ex eb mb IIC T4 Gb or Ga/Gb	+77		
Ex ta IIIC T_{200}106°C Da or Da/Db	+67		
Ex tb IIIC T86°C Db or Da/Db	+77		



WARNING!
Explosive dust atmospheres: *The maximum surface temperature of the device is +106°C.*

3.1 General notes



WARNING!
De-energize the circuit before you connect or disconnect the device.

3.2 Ex ia equipment

3.2.1 How to connect the electrical cables



DANGER!
Only connect the equipment to associated intrinsically safe apparatus. These combinations must agree with the requirements of the standard EN IEC 60079-25. Incorrect combinations can cause an explosion in potentially explosive atmospheres.



- Use the electrical connection procedure in the handbook.
- Put the electrical wires in position and safely attach them to prevent damage. The electrical wires must also be a sufficient distance from hot surfaces.
- Make sure that unused electrical wires are safely connected to the ground potential of the hazardous area. If this is not possible, make sure that each of the unused electrical wires are safely isolated (other electrical wires, ground etc.) and rated for a test voltage ≥ 500 V_{RMS}.
- If it is necessary, make sure the electrical wire insulation gives good protection from corrosion.
- Connect only to separate certified, intrinsically safe circuits. Make sure that the electrical circuit characteristics are not more than the values that follow.
- Do not remove more than 6 mm / 0.2¨ of insulation from the wire.

3.2.2 Maximum intrinsically safe values for the electrical circuit

Intrinsically safe values for the electrical circuit				
U_i	I_i	P_i	C_i	L_i
[V]	[mA]	[W]	[nF]	[µH]
≤ 30	≤ 300	≤ 1	= 2 ①	= 0 ②

① IP68 housing version (integral cable version): add 0.042 nF for each metre of electrical cable supplied
② IP68 housing version (integral cable version): add 0.7 µH for each metre of electrical cable supplied

3.2.3 Supply voltage

Terminals	Minimum DC voltage at output terminals	Maximum DC voltage at output terminals
	[V]	
Terminals + / -	12	30

3.3 Ex eb mb, Ex ta and Ex tb equipment

3.3.1 How to connect the electrical cables

- Use the electrical connection procedure in the Handbook.
- Put the electrical wires in position and safely attach them to prevent damage. The electrical wires must also be a sufficient distance from hot surfaces.
- If it is necessary, make sure that the electrical wire insulation gives good protection from corrosion.
- Make sure that the device is connected to a PELV (protective extra-low voltage) circuit.
- Make sure that electrical wires are isolated from the ground of the hazardous area.
- Make sure that unused electrical wires and shields are safely connected to the ground potential of the hazardous area. If this is not possible, make sure that each of the unused electrical wires are safely isolated (other electrical wires, ground etc.) and rated for a test voltage ≥ 1500 V_{RMS}.
- **Electrical wires without ferrules:** Do not remove more than 6 mm of insulation from the wire.
- **Electrical wires with ferrules:** Make sure that the ferrule has a plastic sleeve and that you remove more than 8 mm of insulation from the wire.

3.3.2 Supply voltage

Terminals	Minimum DC voltage at output terminals	Maximum DC voltage at output terminals
	[V]	
+ / -	12	35

3.3.3 Maximum voltage for the electrical circuit

This voltage data is only applicable to the Ex eb mb protection type.

U_m = 35 V DC

For the minimum and maximum supply voltage at the terminals, refer to *Supply voltage* on page 13.

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

- Are the wetted components (gasket, housing and accessories) resistant to corrosion by the tank product?
- Does the information given on the nameplate agree with the application?
- **Ex i applications:** Are you using an intrinsically safe barrier within the correct parameters? For more data, refer to *Ex ia equipment* on page 12. The electrical circuit characteristics must not be more than the maximum intrinsically safe values.

5.1 Periodic maintenance

In normal operational conditions, no maintenance is necessary.

We recommend that you do a regular inspection of the device to make sure that:

- there is no damage or corrosion,
- the process connection is tight,
- the electrical cable is not worn, and
- the power supply terminals are tight.

If it is necessary, maintenance must be done by approved personnel (the manufacturer or personnel approved by the manufacturer).

INFORMATION!
For maintenance and inspection of electrical installations, refer to EN IEC 60079-17.

5.2 Repairs

Only the manufacturer can repair the device and replace components.

5.3 Cleaning

WARNING!
If you use a cleaning agent, make sure that it is compatible with the device. For more data about these materials, refer to the handbook (technical data).

Obey these instructions:

- Keep the device clean to prevent dust contamination.
- Do not blow dust with compressed air.
- Clean the device with a damp cloth.

5.4 Returning the device to the manufacturer

5.4.1 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.



WARNING!
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 the personnel, the 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.*



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

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

5.4.2 Form (for copying) to accompany a returned device



CAUTION!
To avoid any risk for our service personnel, this form has to be accessible from outside of the packaging with the returned device.

Company:		Address:
Department:		Name:
Telephone number: Fax number:		Email address:
Manufacturer order number or serial number:		
The device has been operated with the following medium:		
This medium is:		radioactive
		water-hazardous
		toxic
		caustic
		flammable
		We checked that all cavities in the device are free from such substances.
		We have flushed out and neutralized all cavities in the device.
We hereby confirm that there is no risk to persons or the environment caused by any residual media contained in this device when it is returned.		
Date:		Signature:
Stamp:		

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- Process instrumentation for flow, level, temperature, pressure measurement and process analytics
- Flow metering, monitoring, wireless and remote metering solutions
- Engineering, commissioning, calibration, maintenance and training services

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

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

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