Safety Manual SM/LMT100/200/300-EN Rev. B

LMT Series
Safety manual for magnetostrictive level transmitter

High accuracy liquid level and interface level detection

K-TEK Level products

Measurement made Easy

This document shall be read in conjuction with LMT series operating manual.



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1 General

1.1 Introduction

This LMT-series is comprised of the LMT100, LMT200 and LMT300 models. This manual provides an overview of the safety aspects that must be observed for the installation and operation of the device.

1.2 Product description

The LMT-series of level transmitters is a modular range of field mounted, microprocessor-based electronic transmitters, utilizing multiple sensor technologies. Accurate and reliable measurement of liquid levels is provided in even the most difficult and hazardous industrial environments. The LMT-series can be configured to provide specific industrial output signals, according to 4-20 mA with HART digital communication. The LMT-series consists of three models: LMT100 (insertion-mounted), LMT200 (mounted on gauge (KM26) and LMT300 (insertion-mounted, sanitary).

1.3 General safety information

The device is constructed in accordance with international and local regulations and is deemed to be operationally safe. Additionally, the device is tested and shipped from the factory in perfect working condition. The information contained within this manual, as well as all applicable documentation and certification, must be observed and adhered to in order to maintain the factory-deployed condition throughout the LMT-series period of operation.

Full compliance with the general safety requirements must be observed during handling, installation, maintence or operation of the device. In addition to providing general information, the individual sections within this manual contain descriptions, processes and / or procedural instructions with specific safety information for that corresponding action.

Only by observing all of the safety information can the user minimize the risk of hazards to personnel and / or the environment. The provided instructions are intended as an overview only and do not contain detailed information on all available models or every conceivable scenario that may arise during setup, operation and / or maintenance work. This document shall be used in conjuction with the operation/instructions manual (3KXL141000R4201 - OI LMT100200-EN).

For additional information, or in the event of specific issues not covered within these operating instructions, please contact the manufacturer. ABB declares the contents of this manual are not part of any prior or existing agreements, commitments or legal relationships and are not intended to amend those that are already in place.

In addition, the user must observe all relevant safety regulations regarding the installation and operation of electrical systems and the relevant standards, regulations and guidelines concerning explosion protection.

1.4 Information on WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment)

This product/solution is not subject to the WEEE Directive 2002/96/EC or corresponding national laws (e.g., the ElektroG-Electrical and Electronic Equipment Act-Germany). Dispose of the product/solution at a specialized recycling facility. Municipal garbage collection points should not be used for this purpose.

According to WEEE Directive 2002/96/EC, only products that are used in private applications may be disposed of at municipal garbage facilities. Proper disposal prevents negative effects on both individuals and the environment and also supports the reuse of valuable raw materials. ABB can accept and dispose of returns for a fee.

1.5 Pressure Equipment Directive (PED) (97/23/CE)

This product conforms to the EC directives listed in the device-specific EC declaration of conformity. It is designed in accordance with safe engineering pratices to meet state of the art safety requirements, has been tested and left the factory in a condition in which they are safe to operate.

1.6 Use of instruction



DANGER - Serious damage to health / risk to life
This symbol in conjunction with the signal word “DANGER” indicates an imminent electrical hazard. Failure to observe this safety information will result in death or severe injury.



WARNING - Bodily injury
This symbol in conjunction with the signal word “WARNING” indicates a potentially dangerous situation. Failure to observe this safety information may result in death or severe injury.



CAUTION - Minor Injuries
This symbol in conjunction with the signal word “CAUTION” indicates a potentially dangerous situation. Failure to observe this safety information may result in minor or moderate injury. This symbol may also be used for property damage warnings.



NOTICE - Property Damage
This symbol indicates a potentially damaging situation. Failure to observe this safety information may result in damage to or destruction of the product and / or other system components.



IMPORTANT (NOTE)
This symbol indicates operator tips, particularly useful information or important information about the product or its further uses. The signal word “IMPORTANT (NOTE)” does not indicate a dangerous or harmful situation.

2 Installation in Hazardous Locations

2.1 Explosives atomspheres installation

For installation requirements in Explosives Atmospheres applications refer to IEC 60079-14 and any local Safety or Electric Code regulations mandatory in your area.

For specific conditions for safe use of the LMT100 / LMT200 & LMT300 refer to section 2.21 of this manual.



WARNING - Bodily injury.
The device can be operated at high levels of pressure and with aggressive media. As a result, serious injury or significant property damage may occur if this device is operated incorrectly.

CAUTION - Minor injuries.
Only qualified and authorized personnel are to be tasked with the installation, electrical connection, commissioning and maintenance of the transmitter. Qualified personnel are those individuals who have experience in the installation, electrical connection, commissioning and operation of the transmitter or similar devices and hold the necessary qualifications. These qualifications include:

— Training or instruction – authorization to operate and maintain devices or systems according to safety engineering standards for electrical circuits, high pressures and aggressive media

— Training or instruction in accordance with safety engineering standards regarding maintenance and use of adequate safety systems.

For reasons of safety, ABB recommends that only sufficiently insulated tools, conforming to IEC EN 60900, be used.

Since the transmitter may form a link within a safety chain, it is recommended that the device be replaced immediately if defects are detected. In the event of use in a hazardous area, only non-sparking tools shall be used.

2.2 Safety information for electrical installation

WARNING – Bodily Injury.
Electrical connections may only be established by authorized personnel in accordance with the electrical circuit diagrams. The electrical connection information in the manual must be observed; otherwise, the application protection type may be affected. Ground the measurement system according to requirements.

2.3 Safety information for inspection and maintenance

Corrective maintenance work may be performed only by trained personnel.

- Before removing the device, depressurize the device and any adjacent lines or containers.
- Check whether hazardous materials have been used as measured materials before opening the device. Residual amounts of hazardous substances may still be present in the device and could escape when the device is open
- Within the scope of operator responsibility, check the following as part of a regular inspection:
    - Pressure-bearing walls / lining of the level device
    - Measurement-related function
    - Leak-tightness
    - Wear (corrosion)

2.4 Operator liability

In instances where corrosive and / or abrasive materials are being measured, the user must check the level of resistance of all parts that are coming into contact with these materials. ABB offers guidance in the selection of material but does not accept liability in performing this service. The user must strictly observe the applicable national regulations with regards to installing, functional testing, repairing and maintaining electrical devices.

2.5 Qualified personnel

Installing, commissioning and maintaining the device may be performed only by trained personnel who are authorized by the plant operator. These trained personnel must have read and understood this manual and must comply with its instructions.

2.6 Mounting

Read the following installation instructions carefully before proceeding. Failure to observe the warnings and instructions may cause a malfunction or personal hazard. Before installing the transmitter, ensure the device design meets the requirements of the measurement point from both a measure technology and safety point of view.

This applies in respect to:

- Explosion-protection certification
- Measuring range
- Pressure
- Temperature
- Operating voltage

Check the suitability of the materials in regards to their resistance to the media. This applies to the:

- Gasket
- Process connection and seals
- Float
- Probe
- End connection

In addition, the relevant directives, regulations, standards and accident prevention regulations must be observed. Measurement accuracy is largely dependent on the correct installation of the level transmitter and, if applicable, mounting arrangement. In instances where it is possible, the measuring setup should be free from critical ambient conditions such as large variations in temperature, vibrations or shocks.

2.7 Certification nameplates

Please refer to the section 2.9 of this manual for details.

2.8 Nameplate marking procedure (declaration of protection concept)

Before installing or the first time using the instrument, permanently indicate the protection concept associated with the hazardous area by marking the corresponding box on the product label. Only one box shall be marked. The chosen protection concept cannot be altered and shall govern the use of the product until end of life. If more than one protection concept is marked, all the hazardous area classification becomes invalid, and the transmitter must be removed from the hazardous area immediately.

- If the instrument is not intended for use in any of the applicable hazardous areas classifications, mark the General Purpose box on the product label. (See figure 2-9)

IMPORTANT
Read this manual thoroughly before using this equipment. If you do not understand the content of this manual, contact ABB service personnel.

2.9 Identification

The transmitter is identified by the name plates. (B) The certification plate contains the certification-related parameters for use in a hazardous area.

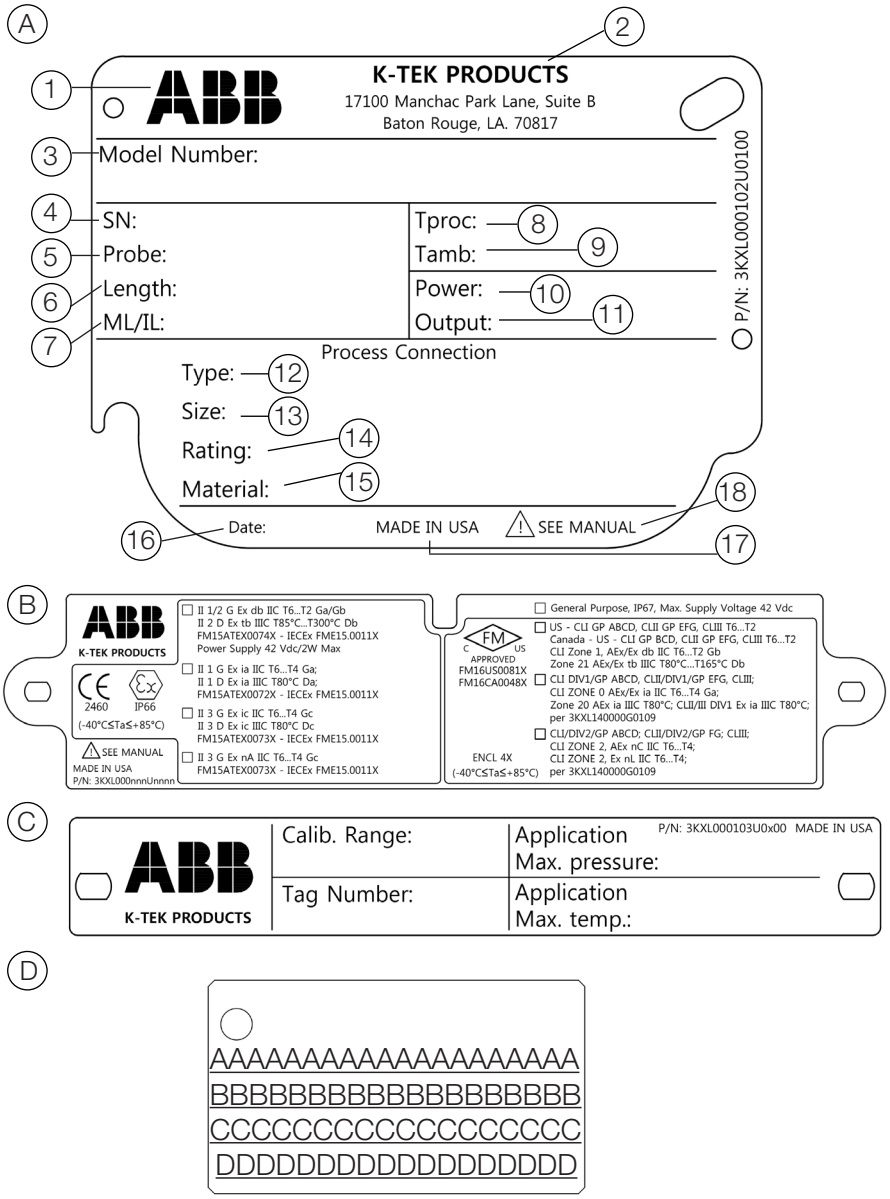
(A) The nameplate provides information (see figure 4-1) concerning the model number, probe length, sensor material, process connection type, process connection material, maximum pressure ratings, power supply, output signal, serial number, maximum processed temperature limits and Maximum ambient temperature limits.

Please refer to the serial number when speaking to ABB service department personnel.

IMPORTANT (NOTE)
The name plates shown here are only examples. The name plates attached to the devise may be different to what you see below.

Figure 2-9 — Name Plates





A. Name plate B. Specific data plate with Ex marking C. Tag plate D. Tag plate with customer specific data
1. Manufactuing Logo 2. Manufacturing Address 3. Model Number 4. Serial Number 5. Probe Material 6. Probe Length
7. ML = Measurement length (LMT200) / IL = Insertion Length (LMT100 / 300) 8. Limits of Measuring Process Temperature
9. Ambient Temperature Range 10. Power Supply 11. Current Output 12. Process Connection Type 13. Process Connection Size
14. Pressure Rating or maximum allowable pressure 15. Process Connection Material 16. Date of Production in yyyy/mm format
17. Country of Manufacture 18. Symbol: Read Instructions Before Use

IMPORTANT (NOTE)
The name plates shown here are only examples. The name plates attached to the devise may be different to what you see here.

2.10 IP Protection and designation

The housing for the LMT-series transmitters is certified as conforming to protection type IP66 (according to IEC 60529) or NEMA 4X (according to NEMA 250).

2.11 Cable connection

Depending on the design supplied, the electrical connection is established via a cable entry, M20 x 1.5 or ½-4 NPT thread.

IMPORTANT NOTE

With Category 3 transmitters for use in "Zone 2", a qualified cable gland for this type of protection must be installed by the customer (see the Hazardous Area Consideration section). M20 x 1.5 threads are located in the electronics housing for this purpose. For transmitters with a flame-proof enclosure (Ex d) type of protection, the housing cover must be secured using the locking screw. The screw plug that may have been supplied with the transmitter must be sealed at the plant using Molykote DX. The installer assumes responsibility for any other type of sealing medium used. Increased force is required to unscrew the housing cover after an interval of several weeks. This is not caused by the threads but is due to the type of gasket.

CAUTION

- The cable entry device shall comply with the requirements of EN 60079-0 and maintain IP 54 or better as required by the installation conditions.
- Field wiring should be rated at least 10°C above the maximum ambient temperature

WARNING

General risks. Cable, cable gland and unused port plug must be in accordance with the intended type of protection (for example, intrinsically safe and explosion-proof) and the degree of protection (for example, IP6x according to IEC EN 60529 or NEMA 4x). See also the addendum for Ex Safety Aspects and IP Protection. In particular, for explosion-proof installation, remove the red, temporary plastic cap and plug the unused opening with a plug certified for explosion containment.

2.12 Grounding

A terminal is available on both the outside of the housing and in the plug for grounding (PE) the transmitter. Both terminals are electrically connected to one another (see Figure 2-12).

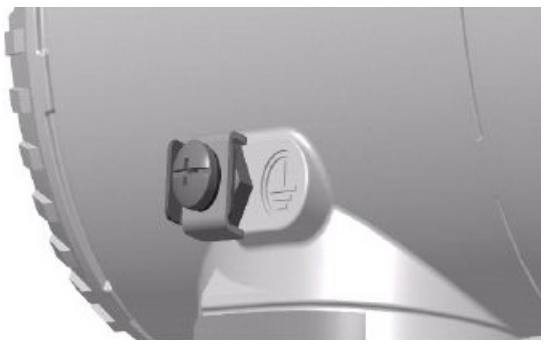


Figure 2-12 — Ground connection on transmitter housing

2.13 Protective grounding

All transmitters are supplied with an external ground connection for protective grounding. Wire this ground connection to a suitable earth ground. For a transmitter measuring loop, an earth ground should maintain a resistance of 5 ohms or less. Use a heavy-duty conductor, at least 15 AWG / 1.6mm2 Ø.

WARNING - General risks.

A protective grounding connection is absolutely necessary to ensure personnel protection, to protect against surge (in case of installation of this option) and to prevent explosions in potentially explosive environments.

2.14 General guidelines

WARNING

Make sure all circuits are de-energized prior to installation.

- The LMT-series has been evaluated as an Installation (Overvoltage) Category 1 / Pollution Degree 2 apparatus, per IEC 1010
- The maximum altitude of operation is 6560 feet (2000 meters).
- The LMT-series is designed with both internal and external protective earth (ground) terminals.
- All field wiring connected to the LMT-series transmitters must comply with National Electric Code or any other applicable regional electric codes.

2.15 Flame-proof / explosion-proof installations

2.15.1 Installation requirements

The LMT-series of level transmitters is designed for use in Division 1 or at the boundary of a Zone 0 and Zone 1 hazardous area.

CAUTION

The flameproof joints of the equipment are not intended to be repaired. Consult the manufacturer if repair of the flameproof joints is necessary.

Cable or conduit entries must be fitted with a suitably certified cable entry device, with or without the use of a suitably approved thread adaptor. Where conduit is used in the installation, an approved conduit seal or stopping box is required immediately after (ATEX/IECEx) or within 18 inches of (FM/FM-C/CSA) the end-user field wiring entrance. Unused cable entry holes shall be closed by a suitably approved Ex d blanking plug.

CAUTION

Internal temperatures of the LMT-series can reach up to 252°F (122°C) when operated at maximum process and maximum ambient temperatures. The service temperature range of cable glands and field wiring shall be chosen accordingly.

Installation and use of apparatus in hazardous locations shall be in accordance with an IEC 60079-14 or applicable regional standards.

2.15.2 Temperature classification

Temperature classifications of the LMT-series are dependent on the process temperature of the coupled vessel. Use the table below to determine temperature class:

Flameproof / Explosion Proof		
Temperature Class (Ex db)	Process Temperature	Ambient Temperature
T6	-196°C to +80°C	-40°C to +57.9°C
T5	-196°C to +95°C	-40°C to +67.4°C
T4	-196°C to +130°C	-40°C to +85°C
T4	-196°C to +195°C	-40°C to +85°C
T3	-196°C to +295°C	-40°C to +85°C
T2	-196°C to +420°C	-40°C to +85°C

2.15.3 Flameproof marking

- ATEX/IECEx
  - II 1/2 G Ex db IIC T6..T2 Ga/Gb FM17ATEX0064X
  - IECEx FME 17.0004X Power Supply 42 Vdc/2W Max
- US & CA CLI Zone 1, AEx/Ex db IIC T6…T2 Gb
  - US - CLI GP ABCD, T6…T2
  - Canada - CLI GP BCD, T6…T2

2.16 Protection by enclosure installation

2.16.1 Installation requirements

Field wiring fittings such as cable glands and conduits must maintain the ingress protection rating of the enclosure (IP6X).

Not suitable for use in uncontrolled dust environments.

2.16.2 Temperature classification

Temperature classifications of the LMT-series are dependent on the process temperature of the coupled vessel. Use the table below to determine temperature class:

Protection by Enclosure		
Temperature Class (Ex db)	Process Temperature	Ambient Temperature
T85°C	-196°C to +80°C	-40°C to +57.9°C
T100°C	-196°C to +95°C	-40°C to +67.4°C
T135°C	-196°C to +130°C	-40°C to +85°C
T135°C	-196°C to +195°C	-40°C to +85°C
T165°C	-196°C to +295°C	-40°C to +85°C
T300°C	-196°C to +420°C	-40°C to +85°C

2.16.3 Protection by enclosure marking

- ATEX/IECEx
  - II 2 D Ex tb IIIC T85°C...T300°C Db FM17ATEX0064X
  - IECEx FME 17.0004X Power Supply 42 Vdc/2W Max
- US & CA Zone 21 AEx/Ex tb IIIC T80°C…T165°C Db
  - US - CLII GP EFG, CLIII T6…T2
  - Canada - CLII GP EFG, CLIII T6…T2

2.17 Intrinsic safety/non-Incendive installation

2.17.1 Installation requirements

Refer to Installation and Control drawing in section 2.22 for details about the installation requirements.

2.17.2 Temperature classification

Refer to Installation and Control drawing in section 2.22 to determine the temperature classification.

2.17.3 Intrinsic / Non-Incendive marking

- ATEX/IECEx
  II 1 G Ex ia IIC T6…T4 Ga
  II 1 D Ex ia IIIC T80°C Da;
  FM17ATEX0062X - IECEx FME 17.0004X
  II 3 G Ex ic IIC T6..T4 Gc
  II 3 D Ex ic IIIC T80°C Dc
  II 3 G Ex nA IIC T6..T4 Gc
  FM17ATEX0063X - IECEx FME 17.0004X
- US & CA
  CLI DIV1/GP ABCD, CLII/DIV1/GP EFG, CLIII;
  CLI ZONE 0 AEx/Ex ia IIC T6…T4 Ga;
  Zone 20 AEx ia IIIC T80°C; CLII/III DIV1 Ex ia IIIC T80°C;
  CLI/DIV2/GP ABCD; CLII/DIV2/GP FG; CLIII;
  CLI ZONE 2, AEx nC IIC T6…T4;
  CLI ZONE 2, Ex nL IIC T6…T4;
  per 3KXL140000G0109

2.18 EPL Ga installation requirements

When non-metallic, probe-covering materials are used (PVC, CPVC, and PVD), there is a risk of ignition from electrostatic discharge due to the flow of non-conductive media (for example, in stirring vessels or pipes). The user must decide on the suitability of the material for the particular application.

The LMT100 and LMT300 may be installed in EPL Ga applications, where only the outer surface of the probe and the wetted part of the process connection are facing the area requiring EPL Ga. Everything else including the internal volume of the instrument and the surrounding of the enclosure must be in area requiring EPL lower than Ga, in other words, the wall of the probe, which always exceeds 1mm thickness and the process connection of the instrument form a partition wall between the areas requiring EPL Ga and any other lower than EPL Ga. The material of the partition wall is determined by the probe and process connection material and are identified in the label of the instrument.

The LMT200 is intended for installations attached to external chambers in areas requiring a lower EPL than Ga.

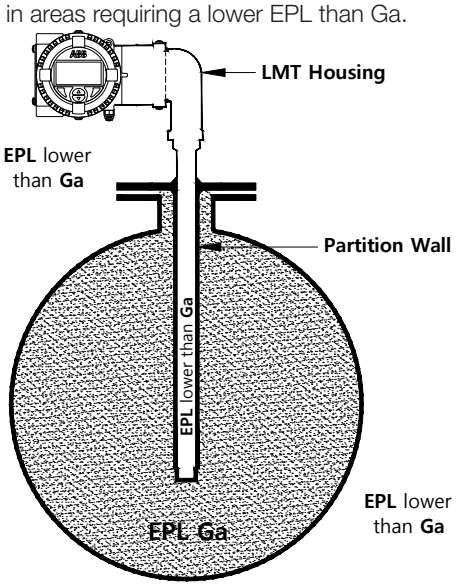


Figure 2.18

2.19 Applicable standards

US Approval

FM Class 3600 2011 - Electrical Equipment for Use in Hazardous (Classified) Locations General Requirements

FM Class 3615 2006 - Explosionproof Electrical Equipment

FM Class 3610 2010 - Intrinsically Safe Apparatus and Associated Apparatus for Use in Hazardous (Classified) Locations

FM Class 3611 2004 - Nonincendive Electrical Equipment for Use Hazardous (Classified) Locations

FM Class 3616 2011 - Dust-Ignitionproof Electrical Equipment

FM Class 3810 2005 - Electrical Equipment for Measurement, Control and Laboratory Use

ANSI/ISA 60079-0 2013 - Explosive atmospheres – Part 0: Equipment – General requirements

ANSI/UL 60079-1 2015 - Explosive atmospheres – Part 1: Equipment Protection by Flameproof Enclosures “d”

ANSI/ISA 60079-11 2014 - Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

ANSI/ISA 60079-15 2013 - Explosive atmospheres - Part 15: Equipment protection by type of protection “n”

ANSI/ISA 60079-31 2015 - Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure “t”

ANSI/NEMA 250 1991 - Enclosures for Electrical Equipment (1000 Volts Maximum)

ANSI/IEC 60529 2004 - Degrees of Protection Provided by Enclosures (IP Code)

Canadian Approval

CSA-C22.2 No. 0.4 (Reaffirmed) 2004 (2013) - Bonding and Grounding of Electrical Equipment

CSA-C22.2 No. 0.5 (Reaffirmed) 1982 (2012) - Threaded Conduit Entries

CSA-C22.2 No. 25 (Reaffirmed) 1966 (2014) - Enclosures for Use in Class II Groups E, F, and G Hazardous Locations

CSA-C22.2 No. 30 (Reaffirmed) 1986 (2012) - Explosion-proof Enclosures for Use in Class I Hazardous Locations

CSA-C22.2 No. 94 (Reaffirmed) 1991 (2011) - Special Purpose Enclosures

CSA-C22.2 No. 157-M1992 - Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations

CSA-C22.2 No. 213-M1987 - Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

CSA-C22.2 No. 60529 (Reaffirmed) 2005 (2010) - Degrees of Protection Provided by Enclosures (IP Code)

CAN/CSA-C22.2 No. 60079-0 2015 - Explosive atmospheres – Part 0: Equipment – General requirements

CAN/CSA-C22.2 No. 60079-1 2011 - Explosive atmospheres – Part 1: Equipment Protection by Flameproof Enclosures “d”

CAN/CSA-C22.2 No. 60079-11 2014 - Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

CAN/CSA-C22.2 No. 60079-15 2012 - Explosive atmospheres - Part 15: Equipment protection by type of protection “n”

CAN/CSA-C22.2 No. 60079-31 2015 - Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure “t”

CSA 61010-1 2012 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1, General Requirements

ATEX Certification

EN 60079-0 +A11 2012 2013 - Explosive atmospheres – Part 0: Equipment – General Requirements

EN 60079-1 2014 - Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures “d”

EN 60079-11 : 2012 - Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

EN 60079-15 : 2010 - Explosive atmospheres - Part 15: Equipment protection by type of protection “n”

EN 60079-26 2015 - Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

EN 60079-31 2014 - Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure “t”

EN 60529 +A2 1991 2013 - Degrees of protection provided by enclosures (IP code)

IECEx Certification

IEC 60079-0 : 2011 Edition:6.0 - Explosive atmospheres - Part 0: General requirements

IEC 60079-1 : 2014-06 Edition:7.0 - Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures “d”

IEC 60079-11 : 2011 Edition:6.0 - Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

IEC 60079-15 : 2010 Edition:4 - Explosive atmospheres - Part 15: Equipment protection by type of protection “n”

IEC 60079-26 : 2014-10 Edition:3.0 - Explosive atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga

IEC 60079-31 : 2013 Edition:2 - Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure “t”

IEC 60529:1989/AMD2:2013 - Degrees of protection provided by enclosures (IP code)

2.20 Technical limit values

The device is designed for use exclusively within the values stated on the name plate and within the technical limit values specified on the data sheets.

The following technical limit values must be observed:

- The maximum working pressure must not be exceeded.
- The maximum ambient operating temperature must not be exceeded.
- The maximum process temperature must not be exceeded.
- The housing protection type must be observed.

DANGER - Serious damage to health / risk to life

Explosion hazard. Do not open or disconnect equipment when a flammable or combustible atmosphere is present.

NOTICE - Property damage

Always use thread sealant or conduit seal in order to maintain enclosure Type 4X and IP66/IP67 rating

2.21 Specific conditions for use

CAUTION

- Where EPL Da (1D) is required, the equipment housing shall not be subjected to uncontrolled dust layers.
- When EPL Ga or Da (1G or 1D) is required (for example in Zone 0 or Zone 20 hazardous areas), parts of the equipment containing light metals (Aluminum, Magnesium, Titanium and Zirconium) shall be protected from impact so that impact of friction sparks cannot occur, taking into account rare malfunction.
- When non-metallic, probe-covering materials are used (PFA, FEP, PVC, CPVC, and PVDF), there is a risk of ignition from electrostatic discharge due to the flow of non-conductive media (for example, in stirring vessels or pipes). The user must decide on the suitability of the material for the particular application.
- If additional non-conductive paint/coatings are applied to the process connection flange or instrument housing (for example, to provide additional corrosion resistance) there may exist a risk of electrostatic discharge due to charge build-up on the non-conductive paint/coating layer. The user shall take appropriate mitigations measures in accordance with their own risk assessment.
- The flameproof joints of the equipment are not intended to be repaired. Consult the manufacturer if repair of the flameproof joints is necessary.
- For EPL Ga installations - The LMT main electronics enclosure option j = D1 or D2 contains aluminium and is considered to present a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
- When EPL Ga or Da is required (for example in Zone 0 or Zone 20 hazardous areas), parts of the equipment containing light metals (Aluminium, Titanium, Zirconium or Magnesium) shall be protected from impact so that impact or friction sparks cannot occur, taking into account rare malfunction. Measures to prevent impact or friction sparks when using the equipment containing light metals include but are not limited to:

  - Mounting the probe vertically
  - No mechanical agitation shall be used
  - Use of stilling wells to mitigate effect of agitation.
  - Limit rate of change of level to values such that friction sparks cannot occur
- The user shall take the appropriate mitigation measures in accordance with their own risk assessment to prevent any other conditions capable of producing impact or friction sparks.
- When the manufacturer of the equipment has not identified the type of protection on the label, the user shall, on installation, mark the label with the type of protection used.

IMPORTANT

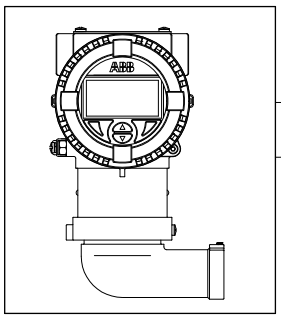
For cable glands, please refer to your supplier's data sheet for proper installation.

NOTICE

It is the customer's responsibility to use appropriate cable gland, screw plug, lube and/or sealant for the cable entry ports. The installer assumes responsibility for any other type of sealing medium used. At this point, we wish to draw your attention to the fact that increased force will be required to unscrew the housing cover after an interval of several weeks. This is not caused by the threads, but instead is solely due to the type of gasket.

2.22 Intrinsic safety installation drawing

REV	REASON	APPROVED	DATE
NC	ECN1213	MS	10/21/16



LMT100, LMT200 OR LMT300 TRANSMITTER

(US) (IS) Class I, Div 1, Groups A,B,C,D; Class II, Div 1, Groups E,F,G; Class III
Class 1 Zone 0 AEx ia IIC T6...T4; Zone 20 AEx ia IIIC T80°C
(NI) Class I, Div 2, Groups A,B,C,D; Class II, Div 2, Groups F,G; Class III
(nA) Class I Zone 2 AEx nA IIC T6...T4
(nC) Class I Zone 2 AEx nC IIC T6...T4

(CA) (IS) Class I, Div 1, Groups A,B,C,D; Class II, Div 1, Groups E,F,G Class III
Class 1 Zone 0 Ex ia IIC T6...T4; CLII/III DIV1 Ex ia IIIC T80°C
(NI) Class I, Div 2, Groups A,B,C,D; Class II, Div 2, Groups F,G; Class III
(nA) Class I Zone 2 Ex nA IIC T6...T4
(nL) Class I Zone 2 Ex nL IIC T6...T4

(ATEX & IECEx)
(IS) II 1 G Ex ia IIC T6...T4 Ga;
II 1 G Ex ic IIC T6...T4 Gc
II 1 D Ex ia IIIC T80°C Da;
II 1 D Ex ic IIIC T80°C Dc
II 3 G Ex ic IIC T6...T4 Gc

REFER TO SHEET 2 FOR NOTES.

CRITICAL / SCHEDULE DOCUMENT
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K-TEK PRODUCTS
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Title: INSTALLATION AND CONTROL DRAWING FOR LMT HART VARIANT			Resp. BU: K-TEK LEVEL PRODUCTS / Lang.: EN
Doc. Type: CERTIFICATION DRAWING			Rev. Date: 10/21/16
Prepared by: Norman W Guidry	Approved by: MS Sreekanth		Rev.: NC
Part No.: 3KXL140000G0109	Drawing No.: 3KXL140000G0109		Sheet: 1 of 2

REV	REASON	APPROVED	DATE
NC	ECN1213	MS	10/21/16

NOTES:

1. INPUT PARAMETERS FOR **L1 DISPLAY OPTION**.

TEMPERATURE CLASS - GAS	TEMPERATURE CLASS - DUST	MINIMUM AMBIENT (°C)	MAXIMUM AMBIENT (°C)	MAXIMUM INPUT - CURRENT Imax (mA)	POWER (W)
T4	T135°C	-40°C	+85°C	100	0.75
T4	T135°C	-40°C	+70°C	160	1
T5	T100°C	-40°C	+40°C	100	1.4
T6	T85°C	-40°C	+40°C	50	0.4

INPUT PARAMETERS FOR **L2 DISPLAY OPTION**.

TEMPERATURE CLASS - GAS	TEMPERATURE CLASS - DUST	MINIMUM AMBIENT (°C)	MAXIMUM AMBIENT (°C)	MAXIMUM INPUT - CURRENT Imax (mA)	POWER (W)
T4	T135°C	-40°C	+60°C	100	0.75
T4	T135°C	-40°C	+60°C	160	1
T5	T100°C	-40°C	+56°C	100	1.4
T6	T85°C	-40°C	+44°C	50	0.4

2. DUST TIGHT CONDUIT SEAL MUST BE USED WHEN INSTALLED IN CLASS II & CLASS III ENVIRONMENTS.
3. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250V.
4. FOR ENTITY MODEL SAFETY BARRIER MUST MEET THE FOLLOWING REQUIREMENTS: V(OC) or V(T)<=V(Max), I(SC) or I(T)<=I(Max), C(A)>(C(I)+C(Cable)), L(A)>(L(I)+L(Cable))
5. FOR DIV 2 APPLICATIONS, THE TRANSMITTER MUST EITHER BE INSTALLED IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE FOR DIVISION 2 WIRING METHODS OR CONNECT TO AN FMRC APPROVED BARRIER.
6. ASSOCIATED EQUIPMENT MUST BE FMRC APPROVED.
7. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA RP12.6 (EXCEPT CHAPTER 5 FOR FISCO INSTALLATIONS) "INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL ELECTRICAL CODE® (ANSI/NFPA 70) SECTIONS 504 AND 505.
8. SYSTEM CALCULATIONS: ADD CABLE CAPACITANCE & INDUCTANCE TO TRANSMITTER ENTITY PARAMETERS (I.E. ALL FIELD INSTALLED CAPACITANCE AND INDUCTANCE MUST BE CONSIDERED) IF CABLE PARAMETERS ARE NOT KNOWN, 60pF/ft & 0.2uH/ft SHOULD BE USED.
9. **WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS.

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3.0 Functional safety (for future use)

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