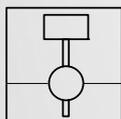


LML-P, LML-S, LML-Ex

Magnetic Immersion Probe for Limit Value Detection

Manual



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1 Introduction

1.1 Content of this Document

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal



Note

This document does not substitute the instruction manual.



Note

For full information on the product, refer to the instruction manual and further documentation on the Internet at www.pepperl-fuchs.com.

The documentation consists of the following parts:

- Present document
- Instruction manual
- Manual
- Brief instructions
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Additional documents

1.2 Safety Information

Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



Danger!

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



Caution!

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

Informative Symbols



Note

This symbol brings important information to your attention.



Action

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

2 Product Specifications

2.1 Function

The device is a sensor for limit detection in liquids.

An integrated ring magnet in the float actuates the contacts on the inside of the probe tube via its magnetic field. If the float leaves the range of the switch contact, the switch contact reassumes its initial status. Using the set collars clipped onto the probe tube, switch points can be prevented from being skipped during rapid changes in fill level. A permanent contact is established in the same way.

Magnetic immersion probe LML-P

The device can have up to three floats. The maximum sliding tube length is 1000 mm. Other lengths are available on request. The sliding tube and process connection are made from plastic.

Magnetic immersion probe LML-S

The device can have up to three floats. The maximum sliding tube length is 3000 mm. The sliding tube and process connection are made from stainless steel.

Magnetic immersion probe LML-Ex

The device is intended for use in explosion-hazardous areas.

The device can have up to three floats. The maximum sliding tube length is 3000 mm. The sliding tube and process connection are made from stainless steel.



Note

See corresponding datasheets for further information.

2.2

Assembly

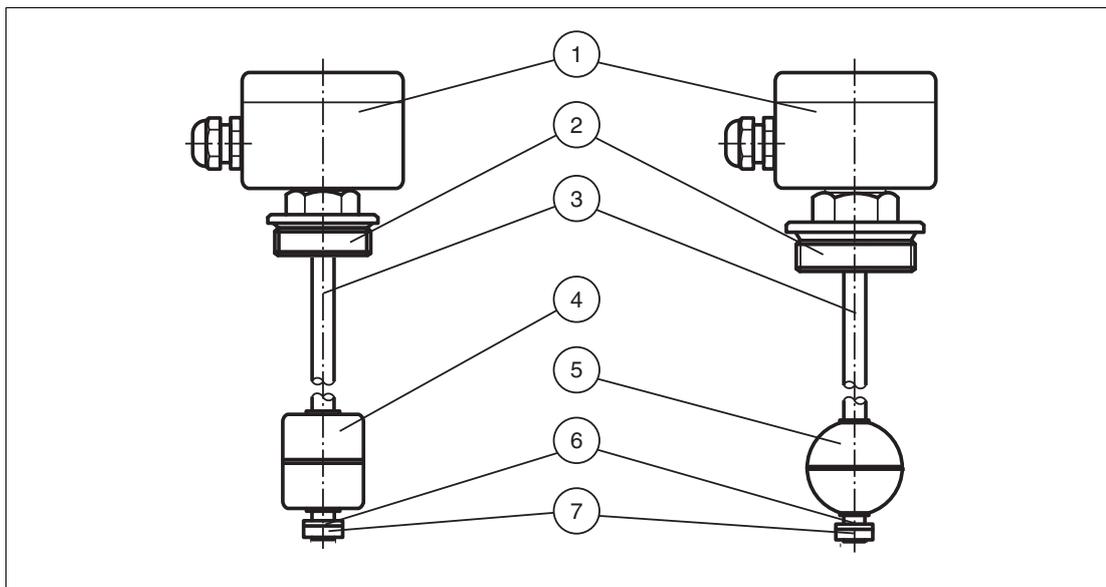


Figure 2.1

- 1 Terminal box
- 2 Process connection, e. g. thread
- 3 Sliding tube
- 4 Float – cylinder
- 5 Float – ball
- 6 Drop protection ring of Teflon
- 7 Set collar

3 Goods Acceptance



Removing the Device from the Transport Packaging and Checking the Device

1. Remove the transport restraints.
2. Carefully remove the device from the shipping packaging.
3. Remove the packaging parts from the device.
4. Check that the order designations on the delivery note and nameplate are identical.
5. Check to ensure the device is not damaged.
6. Check that the float can be easily moved along the sliding tube.



Note

If any of these conditions are not met, contact your Pepperl+Fuchs distribution center.

4 Mounting and Installation

4.1 Checking the Device Function before Mounting

You have the option of testing the device before it is mounted in the container. To do this, use an ohmmeter.

Checking the Device Function

1. Connect the conductors of the switch point to be tested to the ohmmeter.
2. Lift the float and move it towards the switch point. Depending on the switching function, continuity or no continuity is signaled.
3. Move the float back to its starting position. The switching function must be reversed.
4. Repeat steps 1 to 3 for each switch point.

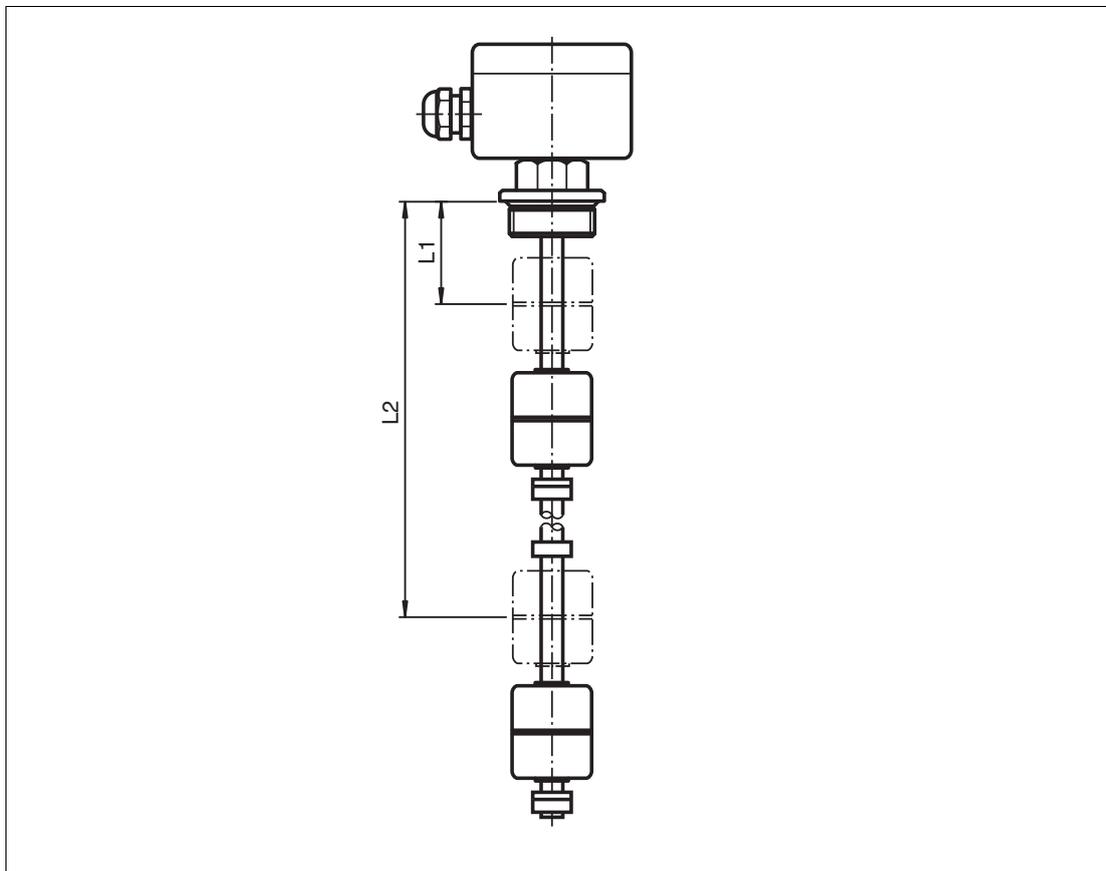


Figure 4.1 Example: functional test of the device with two switching points

Note

The switching point dimensions L1 and L2 refer to the respective measurements from the sealing surface to the center of the float.

4.2

Mounting



Danger!

Danger to life from working in containers

In containers, hazardous substances may be present that can result in poisoning or suffocation.

- Eliminate or reduce hazardous substances.
- Protect persons that come in contact with hazardous substances by means of suitable protective measures, e. g., by respiratory devices or protective clothing.



Danger!

Explosion hazard from sparking when using the device

Improper use of the device in a potentially explosive atmosphere can cause sparks that can ignite the surrounding atmosphere.

- Do not remove the drop protection rings.
Drop protection rings of teflon prevent sparking on impact of the float on the set collar. Operating the device without drop protection rings is prohibited.
- If you are using floats of titanium: Keep the maximum permissible ambient temperature by ensuring a sufficient distance between the process connection and the medium.



Mounting the Device

1. Observe the safety information given in the instruction manual.
2. Prior to installation, ensure that the installation opening on the container and the securing device on the float match in terms of size and dimensioning.
3. Install the device in the container from the outside. The device is installed in a vertical position. The angle of installation must not deviate from the vertical position by more than 30°, see Figure 4.2
4. Screw in the device using the full length of the thread (1). Use suitable seals.

For variants with floats fitted that are larger in diameter than the core diameter of the installation opening, proceed as follows.



Mounting the Device

1. Mark the top of the float (4) (e. g. with "top").
2. Mark the position of the set collars to be removed (6).
3. Remove the set collars (6) and drop protection rings (5).
4. Remove the float (4).
5. Install the device.
6. Install the float (4), set collars (6) and drop protection rings (5) from inside the container. Pay attention to the markings.

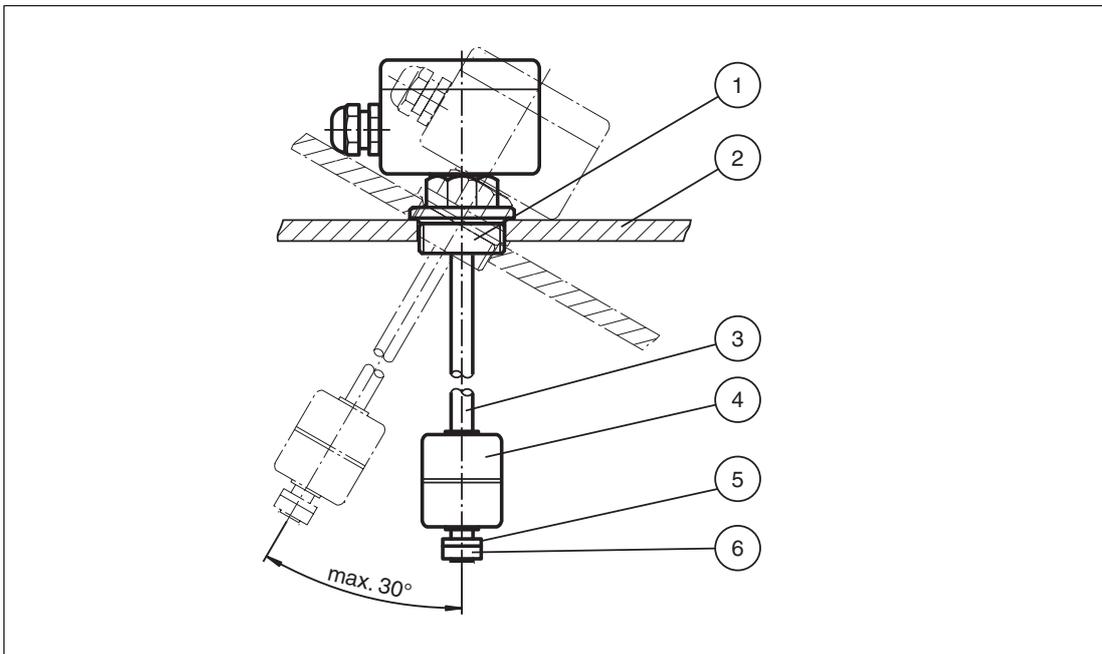


Figure 4.2 Principal device mounting

- | | |
|---|----------------------|
| 1 | Process connection |
| 2 | Container |
| 3 | Sliding tube |
| 4 | Float |
| 5 | Drop protection ring |
| 6 | Set collar |



Note

Further information can be found in the chapter "Dimensions", see chapter 9.2.

4.3

Connection



Danger!

Danger to life from electric shock

Working on live parts at voltages higher than 50 V AC or 120 V DC can result in electric shock.

1. De-energize the device.
 2. Secure the circuit against reconnection.
 3. Verify that the device is de-energized at all poles.
 4. Provide protection from adjacent live parts, if present.
-



Danger!

Danger to life from incorrect installation

Incorrect installation of cables and connection lines can compromise the function and the electrical safety of the device.

- Observe the permissible core cross section of the conductor.
 - When using stranded conductors, crimp wire end ferrules on the conductor ends.
 - Use only one conductor per terminal.
 - When installing the conductors the insulation must reach up to the terminal.
 - Observe the tightening torque of the terminal screws.
-



Connecting the Device

1. Observe the safety information given in the instruction manual.
2. Remove the cover on the terminal box.
3. Route the cable through the cable gland into the terminal box.
4. Connect the conductors in the terminals as required for the relevant application, see following figures.
5. Refit the cover of the terminal box.

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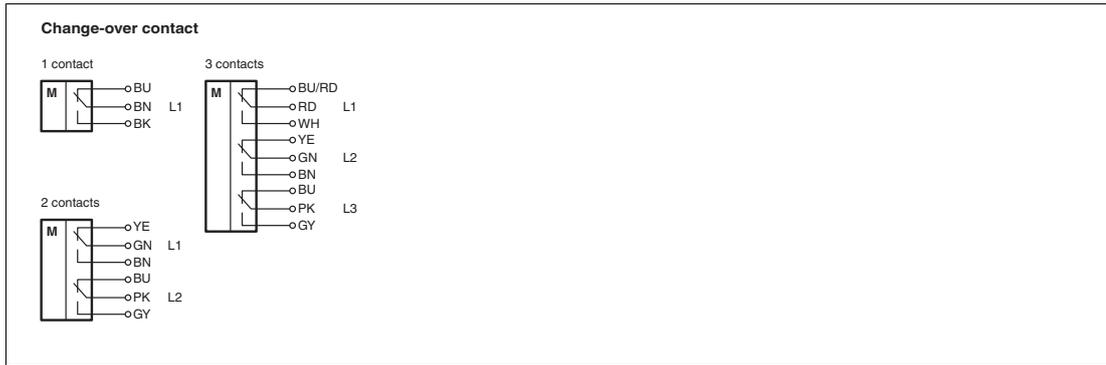


Figure 4.3 Connection of magnetic immersion probe LML-P, LML-S

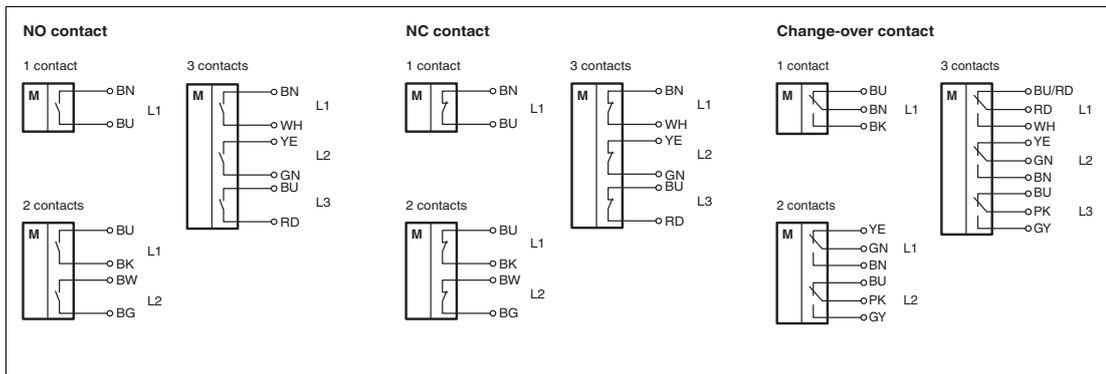


Figure 4.4 Connection of magnetic immersion probe LML-Ex

- BG** Blue-Gray
- BK** Black
- BN** Brown
- BU** Blue
- BW** Brown-White
- GN** Green
- GY** Gray
- PK** Pink
- RD** Red
- YE** Yellow
- WH** White



Establishing Equipotential Bonding

A PE terminal is available in the terminal box for the device.

1. For devices without grounding terminal: Establish an electrical connection to the container via the process connection.
2. For devices with grounding terminal: Establish equipotential bonding via the grounding terminal.

5

Operation

EN

5.1

Checking the Device Function



Danger!

Danger to life from electric shock

Working on live parts at voltages higher than 50 V AC or 120 V DC can result in electric shock.

1. De-energize the device.
 2. Secure the circuit against reconnection.
 3. Verify that the device is de-energized at all poles.
 4. Provide protection from adjacent live parts, if present.
-



Checking the Device Function

When the device is installed, a functional inspection can only be performed from inside the container. We recommend removing the device and checking the function while the device is removed.

1. Disconnect the circuit.
2. Remove the device from the container.
3. Perform a functional inspection on the device as described in the chapter "Checking the Device Function before Mounting". See chapter 4.1.
4. Place the device in the container.
5. Connect the device.

6 Troubleshooting

The following table lists the most frequent causes of malfunctions and the necessary countermeasures.

Malfunction	Possible cause	Corrective action
No switching function or undefined switching function	False terminal connection	Compare with connection diagram, see chapter 4.3
	Insulation	Check terminals
	Set collars out of position or replaced incorrectly after the sliding tube is removed.	Control position of set collar
	Reed contact defective due to mechanical vibrations.	Return to the manufacturer, see chapter 8
False switching point dimensions	Float installed incorrectly.	Turn float around.
	False ordering information	Please contact the manufacturer.
Device cannot be attached at the intended position on the container	Thread or flange dimensions of the device do not agree.	Reworking of the container
	Thread of mounting plug on container defective.	Replacement of the mounting plug
	Bolt threading on the device defective.	Return to the manufacturer, see chapter 8

Table 6.1



Note

Please contact Pepperl+Fuchs for more information.

7

Maintenance



Danger!

Danger to life from working in containers

In containers, hazardous substances may be present that can result in poisoning or suffocation.

- Eliminate or reduce hazardous substances.
- Protect persons that come in contact with hazardous substances by means of suitable protective measures, e. g., by respiratory devices or protective clothing.

The device is maintenance free.

Checking the Condition of the Device



1. Visually check the condition of the device as part of regular inspection work.
2. Include the device when pressure testing the container.



Note

See corresponding datasheets for further information.



Cleaning the Device

1. Clean the device as necessary.
2. Take care not to damage the device.

8 Repair, Return, and Disposal

Repair



Danger!

Danger to life from using damaged or repaired devices.

Using a defective or repaired device can compromise its function and its electrical safety.

- Do not use a damaged or polluted device.
- The device must not be repaired, changed or manipulated.
- If there is a defect, always replace the device with an original device from Pepperl+Fuchs.

Return

If there is a defect, always send back the device to Pepperl+Fuchs.

Take the following precautions before you return the device to Pepperl+Fuchs.

- Remove all adhering residues from the device. These residues can be hazardous to health.
- Fill in the form "Declaration of Contamination". You can find this form on the product detail page at www.pepperl-fuchs.com.
- Enclose the filled in "Declaration of Contamination" form with the device.
- Pepperl+Fuchs can examine and repair a returned device, only if a completed form is included in the return.

If needed, include special handling instructions with the device.

Specify the following information:

- Chemical and physical characteristics of the product
- Description of the application
- Description of the error that occurred (specify error code if possible)
- Operating time of the device

Disposal

Observe the following notes during disposal:

- Observe valid federal/national regulations.
- Ensure proper separation and reuse of the device components.

9 Technical Specifications

9.1 Technical Specifications

Magnetic Immersion Probe LML-P

General specifications		
Function principle	change-over contact, up to 3 contacts	
Supply		
Rated voltage U_n	250 V AC/DC	
Current consumption	1 A	
Power consumption	40 VA	
Directive conformity		
Low voltage		
	Directive 2014/35/EU	EN 61010-1:2010
Conformity		
Degree of protection	IEC 60529:2000	
Operating conditions		
Process conditions		
	Process temperature	<ul style="list-style-type: none"> • version PP: -10 ... 80 °C (14 ... 176 °F) • version PVDF: -10 ... 100 °C (14 ... 212 °F)
	Process pressure (static pressure)	≤ 3 bar (43.5 psi)
	Density	≥ 0.8 g/cm ³
Ambient conditions		
Ambient temperature	-20 ... 70 °C (-4 ... 158 °F)	

Table 9.1

Magnetic Immersion Probe LML-S

General specifications		
Function principle		change-over contact, up to 3 contacts
Supply		
Rated voltage U_n		250 V AC/DC
Current consumption		1 A
Power consumption		40 VA
Directive conformity		
Low voltage		
	Directive 2014/35/EU	EN 61010-1:2010
Conformity		
Degree of protection		IEC 60529:2000
Operating conditions		
Process conditions		
	Process temperature	<ul style="list-style-type: none"> • version LML: -30 ... 150 °C (-22 ... 302 °F) • version LML-PVC1: -10 ... 80 °C (14 ... 176 °F)
	Process pressure (static pressure)	≤ 25 bar (362.6 psi)
	Density	<ul style="list-style-type: none"> • version S2: ≥ 0.8 g/cm³ • version S3: ≥ 0.7 g/cm³
Ambient conditions		
Ambient temperature		-20 ... 70 °C (-4 ... 158 °F)

Table 9.2

Magnetic Immersion Probe LML-Ex

General specifications		
Function principle	NC contact, NO contact, change-over contact, up to 3 contacts	
Directive conformity		
Electromagnetic compatibility		
	Directive 2014/30/EU	EN 61000-6-2:2006 , EN 61000-6-4:2011
Conformity		
Degree of protection	IEC 60529:2000	
Operating conditions		
Process conditions		
	Process temperature	-30 ... 150 °C (-22 ... 302 °F)
	Process pressure (static pressure)	≤ 25 bar (362.6 psi)
	Density	<ul style="list-style-type: none"> • version S2: ≥ 0.8 g/cm³ • version S3: ≥ 0.7 g/cm³
Ambient conditions		
Ambient temperature	terminal box: -50 ... 60 °C (-58 ... 140 °F)	
Data for application in connection with Ex-areas		
EC-Type Examination Certificate	KEMA 03 ATEX 1496 X	
	Group, category, type of protection, temperature class	⊕ II 1/2G EEx ia IIC T3...T6
	Voltage U _i	36 V
	Current I _i	100 mA
	Internal capacitance C _i	0 nF
	Internal inductance L _i	0 μH
Directive conformity		
	Directive 2014/34/EU	EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2007

Table 9.3

**Note**

See corresponding datasheets for further information.

9.2 Dimensions

9.2.1 Magnetic Immersion Probe LML-P

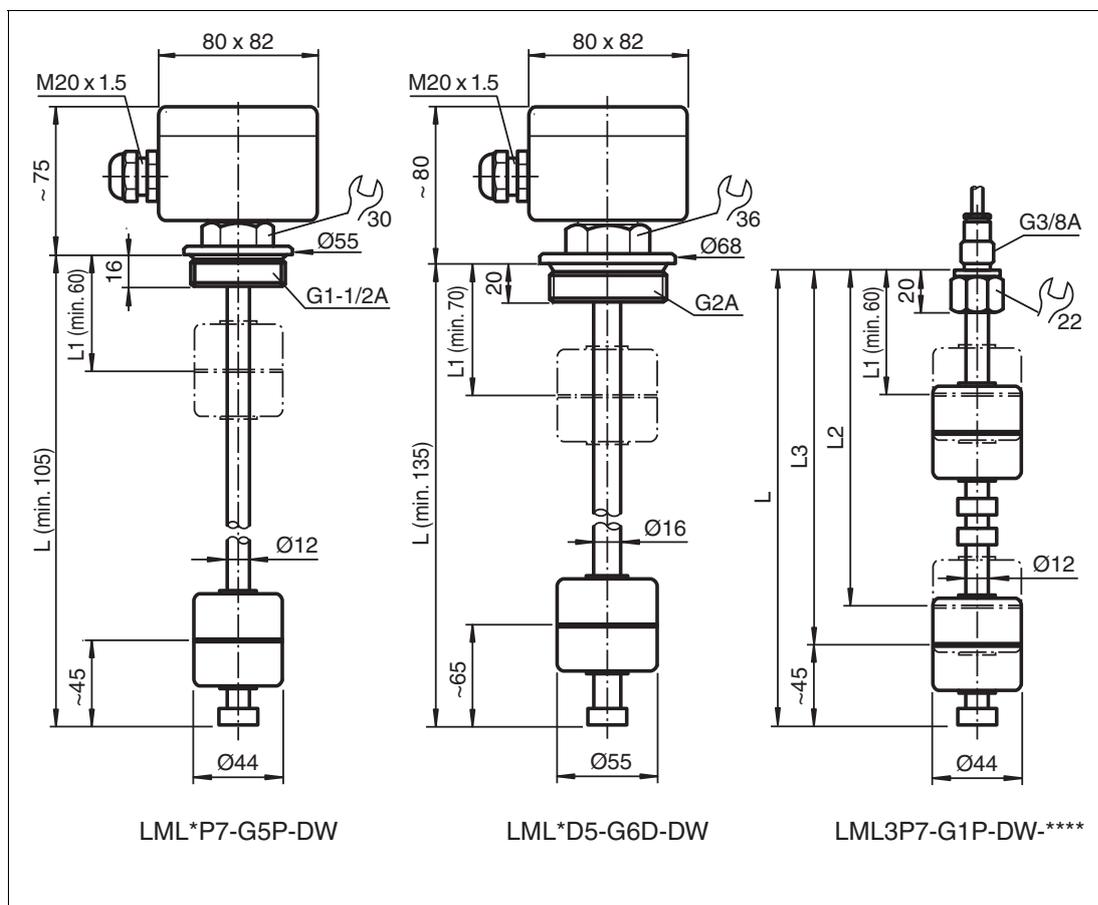


Figure 9.1

- L** Specified length, max. 1000 mm, other lengths on request
 Specify the location of the contacts when placing your order. The tube length L will be defined corresponding to the lowest contact location.
 Minimum distance between L1 and L2: 20 mm
 If you are using 3 contacts, observe the following distances:
- minimum distance between L1 and L2: 80 mm (for PVDF: 100 mm)
 - minimum distance between L2 and L3: 20 mm

9.2.2 Magnetic Immersion Probe LML-S

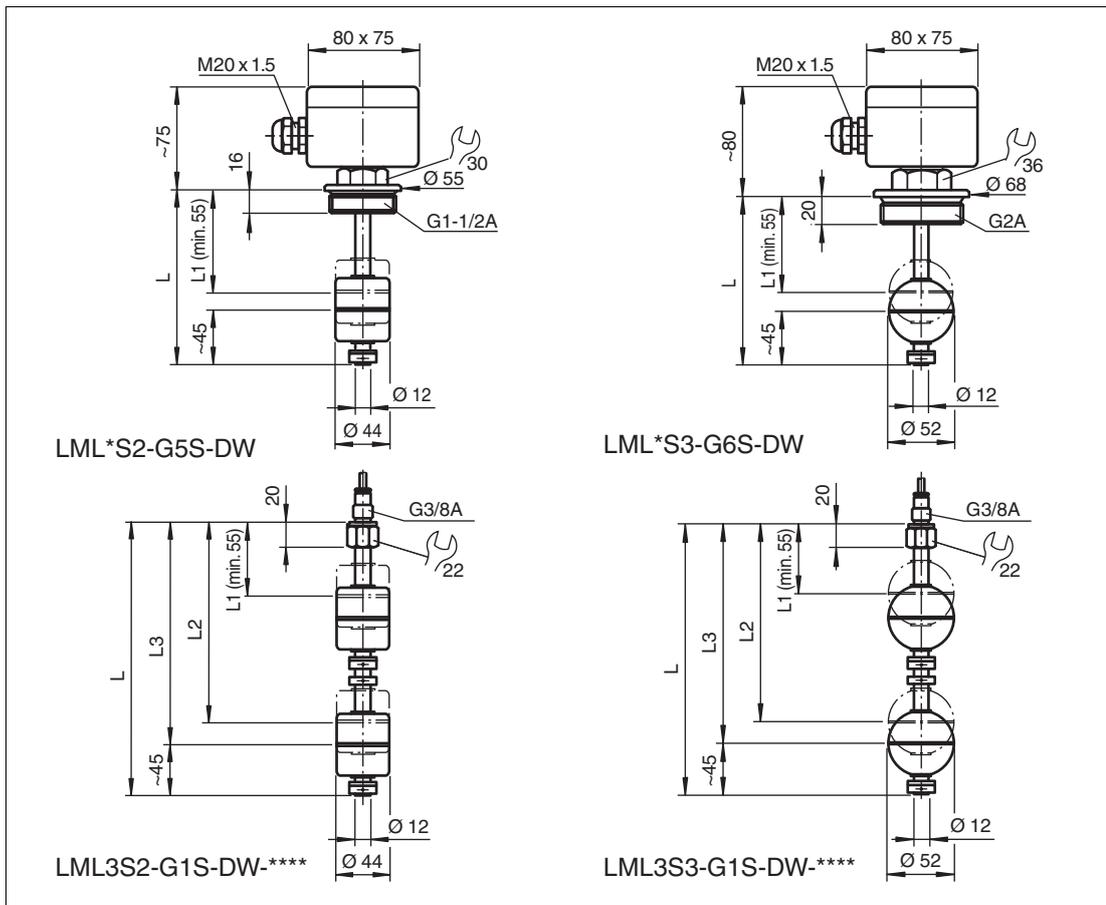


Figure 9.2

- L** Specified length, max. 3000 mm
 Specify the location of the contacts when placing your order. The tube length L will be defined corresponding to the lowest contact location.
 Minimum distance between L1 and L2: 20 mm
 If you are using 3 contacts, observe the following distances:
- Minimum distance between L1 and L2: 80 mm
 - Minimum distance between L2 and L3: 20 mm

9.2.3 Magnetic Immersion Probe LML-Ex

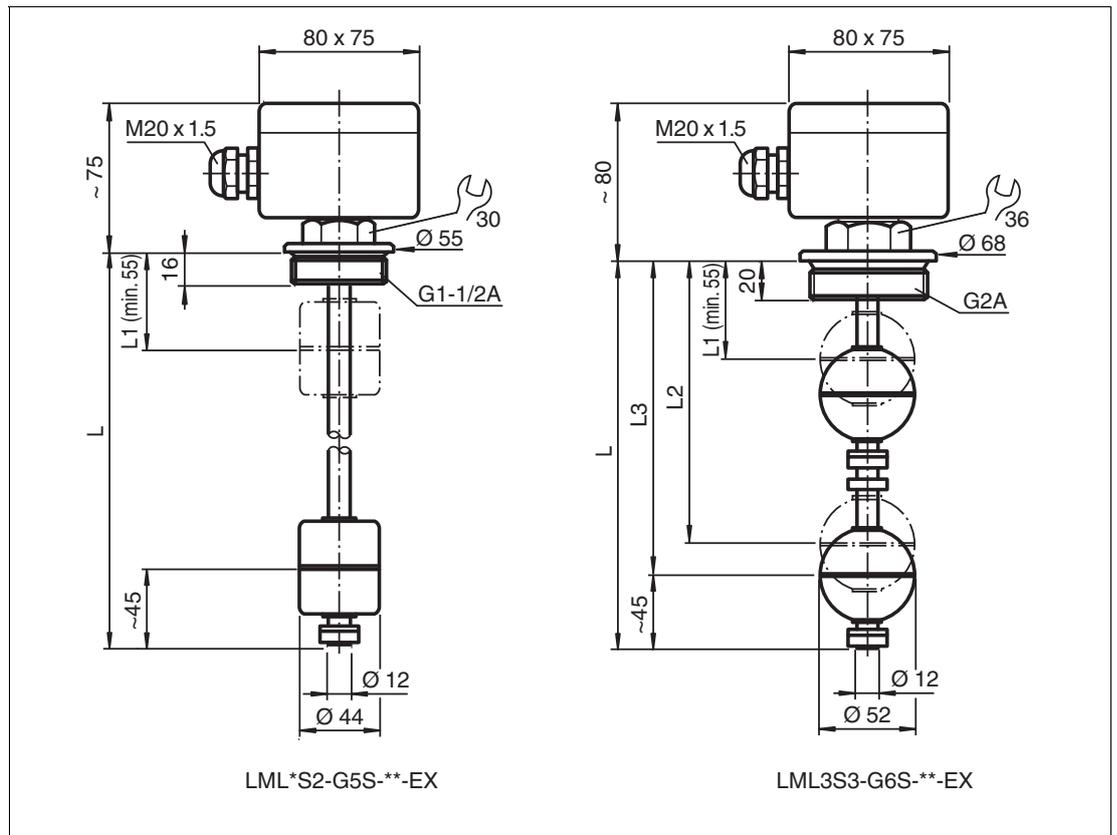


Figure 9.3

- L** Specified length, max. 3000 mm
Specify the location of the contacts when placing your order. The tube length L will be defined corresponding to the lowest contact location.
Minimum distance between L1 and L2: 20 mm
If you are using 3 contacts, observe the following distances:
 - Minimum distance between L1 and L2: 80 mm
 - Minimum distance between L2 and L3: 20 mm

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- Electrical Ex Equipment
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- Industrial HMI
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- HART Interface Solutions
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