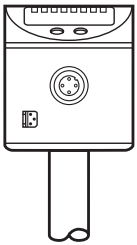
Operating instructions
Electronic level sensor

LK122x

UK



11408957 / 00 08 / 2021

Contents

1 Preliminary note

Technical data, approvals, accessories and further information at www.ifm.com.

1.1 Symbols used

▶ Instructions

> Reaction or result

[…] Designation of keys, buttons or indications

→ Cross-reference

Important note
Non-compliance may result in malfunction or interference.

Information
Supplementary note

2 Safety instructions

- The device described is a subcomponent for integration into a system.
  - The manufacturer of the system is responsible for the safety of the system.
  - The system manufacturer undertakes to perform a risk assessment and to create a documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the manufacturer of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Functions and features).
- Only use the product for permissible media (→ Technical data).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.

- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.

3 Items supplied

- 1 LK122x sensor
- 1 operating instructions
- 1 stainless steel tube clip (for fixing the installation height)

In addition, the following may be necessary for installation and operation:

- 1 climatic tube (for operation of the unit with aqueous media of temperatures > 35 °C). The climatic tube restricts the application area of the unit (→ 4.2).

▶ In the event of incomplete or damaged items supplied please contact ifm electronic.

▶ Only use accessories from ifm electronic.

Accessories: www.ifm.com

The optimum function is not ensured when using components from other manufacturers.

4 Functions and features

4.1 Applications

The unit was especially designed to meet the requirements of machine tool building. It is particularly suitable for monitoring coolant emulsions (also dirty) as well as cutting and hydraulic oils.

The unit has a building authority approval according to the German Federal Water Act (WHG).

When used as overflow prevention according to the German Federal Water Act (WHG), observe the Technical description. → www.ifm.com

4.2 Restriction of the application area

- The unit is not suitable for:
  - acids and alkalis,
  - hygienic and electroplating applications,
  - highly conductive and adhesive media (e.g. glue, shampoo),
  - granulates and bulk material,
  - use in grinders (increased risk of formation of deposits).
- It is possible that foam of good conductivity is detected as level:
  ▶ Check proper function by an application test.
- For water-based media with temperatures > 35 °C install the unit in a climatic tube (accessories).
  ▶ Check proper function by an application test.

When used as overflow prevention according to the German Federal Water Act (WHG), no climatic tube must be used.

5 Getting started

For fast set-up, the example configuration described in the following can be used for most applications. The indicated minimum distances apply exclusively to the described case.

5.1 Example configuration

Unit:	LK1222 (probe length L= 264 mm)
Medium to be detected:	Mineral oil
Installation environment:	Metal tank, installation to fig. 5-1

▶ Install unit.

▶ Observe the distances (x), (u) and (c):

x:	min. 4.0 cm
u:	min. 1.0 cm
c:	max. 14.0 cm

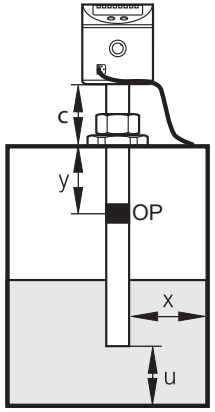
▶ Ground sensor and tank via an electrical connection (→ 8).

▶ Observe the parameter setting sequence:

- [MEdI] = [OIL.2] → 11.2.3
- [OFS] = (u); e.g. (u) = 2.0 cm (→ 6.2.3)
- [OP]: Set the overflow prevention OP at a distance (y) greater than 4.5 cm below the mounting element.

For distances (y) smaller than 4.5 cm there may be malfunctioning and error messages during the adjustment process [cOP].

Fig. 5-1



Step increment and setting range: → 13.2
Calculation aids for [OP]: → 13.3

▶ Adjust overflow prevention OP to [cOP] → 11.2.5

> **The unit is ready for operation.**

▶ Make further settings if necessary.

▶ Check whether the unit operates correctly.

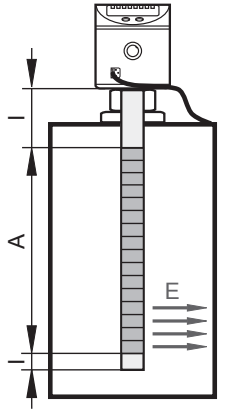
6 Function

6.1 Measuring principle

The sensor determines the level according to the capacitive measuring principle:

- An electrical field [E] is generated and influenced by the medium to be detected. This change to the field causes a measurement signal that is electronically evaluated.
- The dielectric constant of a medium is important for its detection. Media with a high dielectric constant (e.g. water) generate a strong measurement signal, media with a low dielectric constant (e.g. oils) a correspondingly lower signal.
- The active measurement zone of the sensor probe is composed of 16 capacitive measuring segments. They generate measurement signals depending on the degree of coverage.

Fig. 6-1



I: Inactive zone
A: Active zone (16 active segments)
E: Electrical field
Dimensions → Technical data sheet

6.2 Operating principle / features of the unit

The unit can be flexibly installed in tanks of different sizes.

2 outputs are available:

OUT1	Switching signal for level limit value/IO-Link
OUT-OP	Switching signal for level limit value (overflow prevention)

OUT1 can be freely configured, OUT-OP is fixed to NC and has a fixed hysteresis (a few mm).

6.2.1 Notes on the integrated overflow prevention

With the parameter [OP] (OP = overflow prevention), one of the upper measuring segments is defined as integrated overflow prevention OP.

- The overflow prevention OP is the maximum limit of the measuring range. The switch point [SP1] / [FH1] is always below [OP].
- The overflow prevention OP is assigned to the output OUT-OP!
- Typically the overflow prevention OP reacts when the selected measuring segment has been reached (a few mm before the set OP value).
- The overflow prevention OP reacts immediately and without delay.
- The response of the overflow prevention OP is indicated on the display ("Full" and indication of the current level change every second).

6.2.2 Display and switching functions

The unit displays the current level, selectable in cm or inches. The display unit is defined by parameter setting. The set unit of measurement and the switching status of the outputs are indicated by LEDs.
The unit signals via two switching outputs (OUT1, OUT-OP) that a set limit has been exceeded or that the level is below the limit. The output configuration for the switching output OUT-OP cannot be configured (see above). The following output functions are available for the switching output OUT1:

- Hysteresis function / normally open (fig. 6-2): [ou1] = [Hno]
- Hysteresis function / normally closed (fig. 6-2): [ou1] = [Hnc]

First the switch point [SP1] is set, then the switch-off point [rP1] with the requested difference.

- Window function / normally open (fig. 6-3): [ou1] = [Fno]
- Window function / normally closed (fig. 6-3): [ou1] = [Fnc]

The width of the window can be set by means of the difference between [FH1] and [FL1]. [FH1] = upper value, FL1 = lower value

Fig. 6-2

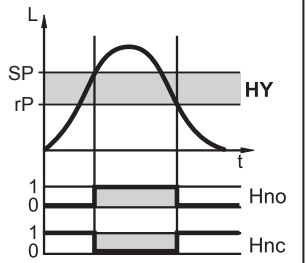
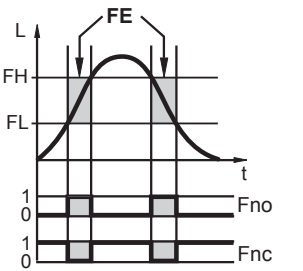


Fig. 6-3



L: Level HY: Hysteresis FE: Window

For the output OUT1 a switch-on and switch-off delay of max. 60 s can be set (e.g. for especially long pump cycles).
→ 11.3.4 and → 11.3.5

6.2.3 Offset for indicating the real level in the tank

The zone between tank bottom and lower edge of the probe can be entered as offset value [OFS]. So display and switch points refer to the actual level (point of reference = tank bottom).

For [OFS] = [0]: The reference point is the lower edge of the measuring probe.

The set offset only refers to the display on the unit. It has no effect on the process value transmitted via IO-Link. The OFS parameter, however, is correctly transmitted via IO-Link and can therefore be taken into account (→ 6.2.5).

6.2.4 Defined state in case of a fault

If a fault is detected or if the signal quality is below a minimum value, the outputs pass into a defined state. For this case, the response of the output OUT1 can be set via the parameter [FOU1] (→ 11.3.7).

The response of the output OUT-OP (overflow prevention) is fixed: it **opens** in case of a fault.

6.2.5 IO-Link function

This unit has an IO-Link communication interface which enables direct access to process and diagnostic data.

In addition it is possible to set the parameters of the unit while it is in operation. Operation of the unit via an IO-Link interface requires an IO-Link capable module (IO-Link master).

With a PC, suitable IO-Link software and an IO-Link adapter cable communication is possible when the system is not in operation.

The IODDs necessary for the configuration of the unit, detailed information about process data structure, diagnostic information, parameter addresses and the necessary information about the required IO-Link hardware and software can be found at www.ifm.com.

6.3 Password protection against inadvertent manipulation

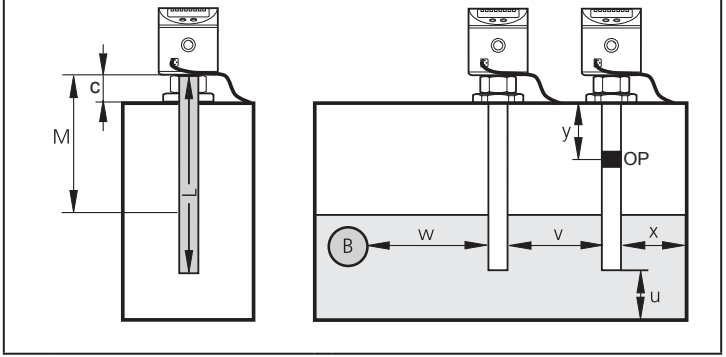
As an option, the sensor can be protected by a password against inadvertent manipulation and unauthorised changes.

Password on delivery: **Not activated!**

For activation/deactivation (→ 11.4)

7 Installation

Fig. 7-1



L: Probe length
M: Zone for mounting elements
c: Maximum outside length
u ... y: Minimum distances
OP: Overflow prevention
B: Metal object inside the tank

Table 7-1

	LK1222		LK1223		LK1224	
	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
L (probe length)	26.4	10.4	47.2	18.6	72.8	28.7
M (mounting zone)	14.0	5.5	23.0	9.1	36.0	14.2
c (max. outside length)*						

* Applies to installation as shown (wall thickness of the tank lid was neglected; mounting element does not protrude inside the tank).
Otherwise note mounting zone M.

It is permitted to fix the mounting elements within the mounting zone (M) (fig. 7-1).

- ▶ Adhere to the maximum permitted outside length (c) according to table 7-1.
- ▶ Observe the minimum distances according to fig. 7-1 and table 7-2.
- ▶ Observe the notes on the integrated overflow prevention OP.

The overflow prevention OP must:

1. be below the mounting element and
2. be set at a minimum distance (y) to it.
   The minimum distance is measured between the lower edge of the mounting element and the OP value.

Table 7-2

	MEdl = CLW.1		MEdl = CLW.2, OIL.1		MEdl = OIL.2	
	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
x	2.0	0.8	3.0	1.2	4.0	1.6
u	1.0	0.4	1.0	0.4	1.0	0.4
y (LK1222)	2.5	1.0	3.5	1.4	4.5	1.8
y (LK1223)	4.5	1.8	5.5	2.2	6.5	2.6
y (LK1224)	6.0	2.4	7.0	2.8	8.0	3.2
v	4.5	1.8	4.5	1.8	4.5	1.8
w	4.0	1.6	5.0	2.0	6.0	2.4

Calculation aids for [OP]: → 13.3

7.1 Other installation notes

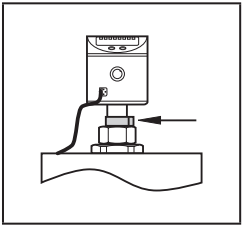
- For mounting in plastic pipes/plastic tanks, the inside pipe diameter must at least be 12.0 cm (4.8 inches). Install sensor in the centre.
- For mounting in metal pipes the inside pipe diameter (d) must be at least:

Table 7-3

	MEdI = CLW.1		MEdI = CLW.2, OIL.1		MEdI = OIL.2	
	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
d	4.0	1.6	6.0	2.4	10.0	4.0

7.1.1 Marking of the installation height

▶ Fix the set installation height with the supplied stainless steel tube clip.



If the sensor is removed from the fixture for maintenance reasons, the clip serves as a limit stop when remounting the sensor. Thus an inadvertent maladjustment of the sensor is excluded. This is in particular necessary for the correct function of the overflow prevention OP.

▶ Fit the stainless steel tube clip using pliers.

▶ Ensure a safe fit.

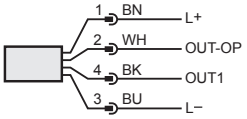
▶ To remove the clip it has to be destroyed.

8 Electrical connection

The unit must be connected by a qualified electrician.
The national and international regulations for the installation of electrical equipment must be adhered to.
Voltage supply according to EN 50178, SELV, PELV

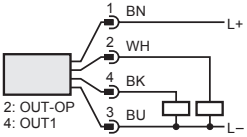
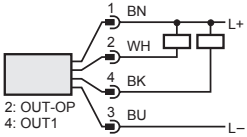
- ▶ Disconnect power.
- ▶ Connect the unit as follows:

Core colours	
BK	Black
BN	Brown
BU	Blue
WH	White



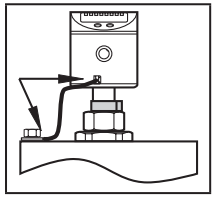
OUT1: Switching output / IO-Link
OUT-OP: Overflow prevention
Colours to DIN EN 60947-5-2

Example circuits

2 x positive switching	2 x negative switching
	

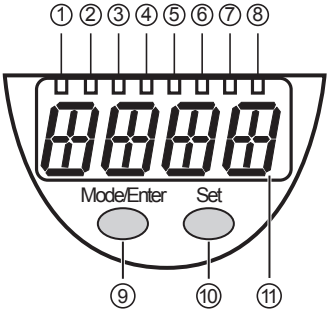
For safe function, the sensor housing must be electrically connected to the counter-electrode (grounding).

- ▶ For this, use the housing connection (see drawing) and a short piece of cable with a core cross-section of at least 1.5 mm^2.



When using metal tanks, the tank wall serves as the counter-electrode.
For plastic tanks, a counter-electrode must be provided, e.g. a metal plate inside the tank in parallel with the probe. Adhere to minimum distances to the probe.

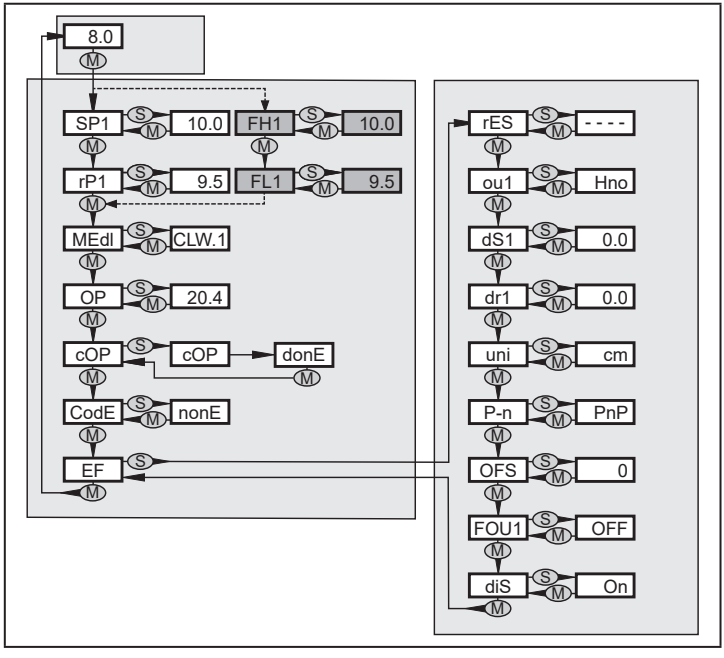
9 Operating and display elements



1 to 8: Indicator LEDs	
LED 1	Indication in centimetres
LED 2	Indication in inches
LEDs 3 - 6	Not used
LED 7	Switching status OUT-OP (overflow prevention) LED on: No overflow, overflow prevention point OP not reached LED off: Tank is full, overflow prevention point OP is reached
LED 8	Switching status OUT1 (on when the output is switched)
9: [Mode/Enter] button	
- Selection of the parameters and acknowledgement of the parameter values	
10: [Set] button	
- Setting of the parameter values (continuously by holding pressed; incrementally by pressing once)	
11: Alphanumeric display, 4 digits	
- Indication of the current level - Display of the parameters and parameter values. - Display of the operating and fault indication	

10 Menu

10.1 Menu structure



Menu item only visible at factory setting (→ 15).

Menu item only visible if certain parameters have been selected.

10.2 Password protection

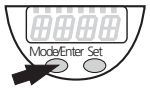
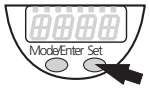
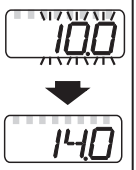
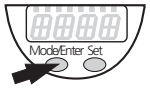
If the password protection is activated, the parameter [KEy.C] is displayed upon opening of the menu. Under this parameter, the password can be entered.

When the password has been entered, there is full write and read access to all parameters. If no button is pressed for 2 minutes, the password protection becomes active again.

If no password or a wrong password is entered, there is only read access to the parameters. Attempts to change parameters are acknowledged by the message [CodE].

11 Parameter setting

11.1 Parameter setting in general

1			▶ Press [Mode/Enter] until the required parameter is displayed. To select parameters in the extended menu (menu level 2): ▶ Select [EF] and briefly press [Set].
2			▶ Press and hold [Set]. > The current parameter value flashes for 5 s. > Value is increased* (step by step by pressing the button once or continuously by keeping the button pressed).
3			▶ Briefly press [Mode/Enter] (= confirmation). > The parameter is displayed again; the new parameter value is effective.
4	Change more parameters: ▶ Start again with step 1.		Finishing the parameter setting: ▶ Wait for 30 s or press and hold [Mode/Enter]. > The current measured value is displayed. ▶ Release [Mode/Enter]. > The parameter setting is finished.

* Decrease the value: Let the display move to the maximum setting value.
Then the cycle starts again at the minimum setting value.

Timeout: If no button is pressed for 30s during programming, the unit returns to the operating mode with unchanged values (exception: cOP).

Locking/unlocking: The unit can be locked electronically to prevent unauthorised setting (factory setting: not locked).

▶ Make sure that the unit is in the normal operating mode.

To lock the unit:
▶ Press both buttons simultaneously for 10 s.
> [Loc] is displayed.

To unlock the unit:
▶ Press both buttons simultaneously for 10 s.
> [uLoc] is displayed.

The unit can be configured before or after installation.
Exception: To adjust the overflow prevention [cOP], the unit **must** be installed in the tank.

11.2 Basic settings

Setting ranges of all parameters: → 13
Factory settings of all parameters: → 15

11.2.1 Set unit of measurement [uni]

▶ Enter [uni] before entering the values for SPx, rPx, OP or OFS.
This avoids unintentional wrong settings.

▶ Select [uni] ▶ Determine unit of measurement: [cm], [inch]	**uni**

11.2.2 Set offset [OFS]

The zone between tank bottom and lower edge of the measuring probe can be entered as offset value (→ 6.2.3).

▶ Set [OFS] before entering the values for SPx, rPx or OP.
This avoids unintentional wrong settings.

▶ Select [OFS]. ▶ Set the value for the offset. Note the set unit of measurement [uni].	**OFS**

11.2.3 Set medium [MEdI]

▶ Select [MEdI] and set the corresponding sensitivity:		**MEdI**
[CLW.1] =	Water, water-based media, coolant emulsions	
[CLW.2] =	Water, water-based media, coolant emulsions at temperatures > 35 °C (installation in climatic tube). Restricted application area of the unit with climatic tube (→ 4.2)	
[OIL.1] =	Oils with an increased dielectric constant (e.g. some synthetic oils)	
[OIL.2] =	Oils with a low dielectric constant (e.g. mineral oils)	

▶ In case of doubt, select [OIL.2] for oils.

▶ Check proper function by an application test!

The settings [CLW.1] and [CLW.2] suppress deposits (e.g. metal swarf).

The settings [OIL.1] and [OIL.2] suppress a bottom layer of higher dielectric water or swarf which is a few cm high. If no oil layer is present (or if it is very thin), the bottom layer is detected.

11.2.4 Set overflow prevention [OP]

▶ Comply with minimum distances and installation instructions. ▶ Select [OP]. ▶ Define the position of the overflow prevention OP.	**OP**

▶ Set [OP] before [SP1] or [FH1].

> If [OP] is reduced to a value ≤ [SP1] / [FH1] after setting [SP1] / [FH1], [SP1] / [FH1] shifts downwards.

> If [OP] is increased, [SP1] / [FH1] also increases if [OP] and [SP1] / [FH1] are close together (1 x step increment).

11.2.5 Adjust the overflow prevention [cOP]

Only adjust the overflow prevention OP when the unit is installed.
If possible, carry out the adjustment when the tank is empty.

The tank may be partly filled.

▶ Make sure that the overflow prevention OP is **not** covered by the medium. Observe the minimum distance between the overflow prevention OP and the level (→ table 11-1).

▶ Select [cOP]. ▶ Press [SET] and keep it pressed. > [cOP] flashes for some seconds; then the continuous display indicates that the adjustment is being made. > If the adjustment is successful, [donE] is displayed. ▶ Confirm with [Mode/Enter]. > If the adjustment is not successful, [FAIL] is displayed. ▶ Possibly lower the level or correct the position of the overflow prevention [OP] and repeat the adjustment operation.	**cOP**

UK

Minimum distance between the overflow prevention OP and the level during adjustment:

Table 11-1

	[cm]	[inch]
LK1222	2.0	0.8
LK1223	3.5	1.4
LK1224	5.0	2.0

The position of the overflow prevention OP can be determined by calling up the parameter [OP]. Note the offset if necessary.

The current level is to be determined manually since the unit is not yet ready for operation before the adjustment.

An adjustment of the overflow prevention [cOP] must be carried out each time:

- [MEdI] or [OP] was changed. In this case ≡≡≡≡ is displayed.
- the installation position (height, orientation) was changed.
- the connection between the sensor and the tank ground (e.g. length of the jumper cable) was changed.

11.3 Setting the output signals for OUT1

Output OUT-OP (overflow prevention) is fixed to NC [Hnc] for safety reasons. The principle of normally closed operation ensures that wire break or cable break is also detected.

11.3.1 Setting the output function [ou1]

▶ Select [ou1] and set the switching function: [Hno] = Hysteresis function / normally open [Hnc] = Hysteresis function / normally closed [Fno] = Window function / normally open [Fnc] = Window function / normally closed	**ou1**

11.3.2 Define switching limits [SP1] / [rp1] (hysteresis function)

▶ Make sure that for [ou1] the function [Hno] or [Hnc] is set. ▶ First set [SP1], then [rP1]. ▶ Select [SP1] and set the value at which output OUT1 switches.	**SP1**
▶ Select [rP1] and set the value at which the output switches off.	**rP1**

[rP1] is always lower than [SP1]. The unit only accepts values which are lower than the value for [SP1]. If [SP1] is shifted, [rP1] also shifts provided that the lower end of the setting range is not reached.

11.3.3 Define switching limits [FH1] / [FL1] (window function)

▶ Make sure that for [ou1] the function [Fno] or [Fnc] is set. ▶ First set [FH1], then [FL1]. ▶ Select [FH1] and set the upper limit of the acceptable range.	**FH1**
▶ Select [FL1] and set the lower limit of the acceptable range.	**FL1**

[FL1] is always lower than [FH1]. The unit only accepts values which are lower than the value for [FH1]. If [FH1] is shifted, [FL1] also shifts provided that the lower end of the setting range is not reached.

11.3.4 Set switch-on delay [dS1]

▶ Select [dS1] and set the value between 0.0 and 60 s. In accordance with VDMA, the switch-on delay has an effect on [SP1]. The setting for [ou1] has no significance.	**dS1**

11.3.5 Set switch-off delay [dr1]

▶ Select [dr1] and set the value between 0.0 and 60 s. In accordance with VDMA, the switch-off delay has an effect on [rP1]. The setting for [ou1] has no significance.	**dr1**

11.3.6 Define switching logic [P-n]

▶ Select [P-n] and set [PnP] or [nPn].	**P-n**

11.3.7 Set response of the output in case of a fault [FOU1]

The response of the output OUT-OP (overflow prevention) is fixed: OUT-OP **opens** in case of a fault!

▶ Select [FOU1] and set the value: [On] = Output switches ON in case of a fault. [OFF] = Output switches OFF in case of a fault. A fault is for example: defective hardware or signal quality too low. Overflow is not considered to be a fault (→ 12.3).	**FOU1**

11.3.8 Configure display [diS]

▶ Select [diS] and set the value: [On] = The display is switched on in the operating mode. Update of the measured values every 500 ms [OFF] = The display is switched off in the operating mode. When one of the buttons is pressed, the current measured value is displayed for 30 s. The indicator LEDs remain active even if the display is deactivated.	**diS**

11.3.9 Reset all parameters to factory setting [rES]

▶ Select [rES] ▶ Press and hold [Set] until [----] is displayed. ▶ Briefly press [Mode/Enter]. > The unit reboots and the factory settings are restored.	**rES**

11.4 Changing the password [CodE]

The password protects all parameters from unauthorised change. If the password protection is activated, the parameters can still be read, only the write access is blocked.

Password on delivery: **Not activated!**

If the password is lost, changing the parameters is no longer possible. In this case, the unit needs to be sent back to the manufacturer!

▶ Select [CodE] and enter a new password (4-digit number between 1000 und 9999). ▶ Keep the password in a safe place. ▶ To deactivate the password protection select the value [nonE]; to do so, a full cycle of all values is necessary.	**CodE**

11.5 Enter password [KEy.C]

Only visible if the password protection is activated.The parameter is displayed immediately after opening the user menu. ▶ Select [KEy.C] and enter the correct password. > When the correct password is entered, there is full write and read access to all operating parameters of the unit. > When a wrong password is entered, [FAIL] is displayed and there is only read access.	**KEy.C**

12 Operation

After switch-on of the operating voltage, the unit is in the operating mode (= normal operating mode). It carries out its measurement and evaluation functions and generates output signals according to the set parameters.

▶ Check whether the unit operates correctly.

12.1 Operation indication

[----] (continuous)	Initialisation phase after power on
[numerical value] + LED 1	Current level in cm
[numerical value] + LED 2	Current level in inches
LED 7	Switching status OUT-OP: • LED on: No overflow (overflow prevention point OP not reached) • LED off: Tank is full (overflow prevention point OP is reached)!
LED 8	Switching status OUT1 (on when switching output OUT1 is switched)
[----]	Level below the active zone
[FULL] + [numerical value] alternately	The overflow prevention OP is reached (overflow warning) or the level is above the active zone
≡≡≡≡	Adjustment [cOP] of the overflow prevention OP necessary
[Loc]	Unit locked via operating keys; parameter setting not possible For unlocking press the two setting buttons for 10 s.
[uLoc]	Unit is unlocked / parameter setting is possible again
[C.Loc]	The unit is temporarily locked; parameter setting via IO-Link is active (temporary locking)
[S.Loc]	Unit is permanently locked via software. This locking can only be removed with a parameter setting software.
[CodE]	The unit is password protected. Before the unit can be configured, the correct password must be entered. Use parameter [KEy.C] to enter the password (→ 11.5).

12.2 Read the set parameters

▶ Briefly press [Mode/Enter] (if required, repeat several times).
> Menu structure is scrolled until the required parameter has been reached.
▶ Briefly press [Set].
> Respective parameter value is displayed for 30 s.

12.3 Error indications

	Possible cause	Recommended measures
[Err]	Fault in the electronics	▶ Replace the unit.
[SEnS]	• Interfering sources (e.g. EMC) • Faulty wiring • Problems with the supply voltage	▶ Check electrical connection. ▶ Check connection between the sensor and the tank ground.
[FAIL]	Wrong password or error during adjustment of the overflow prevention OP: • Overflow prevention covered by the medium during adjustment. • Overflow prevention soiled. • Minimum distances too short • Mounting element detected below the overflow prevention • Measured value not constant	▶ Enter a valid password In case of adjustment errors: ▶ Lower the level, if possible. ▶ Clean the probe. ▶ Observe the notes on installation. ▶ Correct the position of the overflow prevention OP. ▶ Repeat the adjustment.
[SC1] + LED 8	Flashing: Short circuit in switching output OUT1	▶ Remove the short circuit.
[SC.OP] + LED 7	Flashing: Short circuit in switching output OUT-OP	▶ Remove the short circuit.
[SC] + LED 7 [SC] + LED 8	Flashing: Short circuit in both switching outputs.	▶ Remove the short circuit.
[PARA]	Faulty data set	▶ Reset to factory settings [rES].

12.4 Output response in different operating states

	OUT1	OUT-OP (overflow prevention)
Initialisation phase	OFF	OFF
Overflow prevention OP not adjusted	OFF	OFF
Overflow prevention OP adjusted, normal operation	According to the level and [ou1] setting	ON
Fault	OFF for [FOU1] = [OFF] ON for [FOU1] = [On]	OFF
Overflow prevention point reached	According to the level and [ou1] setting	OFF

13 Technical data

Technical data and scale drawing at www.ifm.com

13.1 Setting values [OFS]

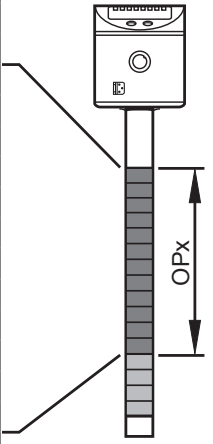
Table 13-1

	[cm]		[inch]	
Setting range	0...200.0		0...78.8	
	LK1222 LK1223	LK1224	LK1222 LK1223	LK1224
Step increment	0.5	1	0.2	0.5

13.2 Setting values [OP]

Table 13-2

LK1222		LK1223		LK1224	
[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
20.4	8.0	40.7	16.0	61	23.9
19.1	7.5	38.3	15.1	57	22.4
17.9	7.1	35.8	14.1	53	21.0
16.7	6.6	33.4	13.1	50	19.5
15.5	6.1	31.0	12.2	46	18.1
14.3	5.6	28.5	11.2	42	16.7
13.0	5.1	26.1	10.3	39	15.2
11.8	4.7	23.6	9.3	35	13.8
10.6	4.2	21.2	8.3	31	12.3
9.4	3.7	18.8	7.4	28	10.9
8.2	3.2	16.3	6.4	24	9.5
6.9	2.7	13.9	5.5	20	8.0



OPx: Setting range [OP]

The indicated values for [OP] refer to the lower edge of the probe.
The values apply if [OFS] = [0].
If [OFS] > [0], they increase by the set offset value.

13.3 Calculation aids [OP]

For proper functioning of the overflow prevention OP the minimum distance (y) (fig. 13-1) must be observed (→ 7).

The following applies (fig. 13-1):

B + c = L + u and **B = z + y**	B: Tank height c: Outside length (maximum → 7) y: Required response level OP from the cover (minimum → 7, maximum → 13.2)	L: Probe length u: Distance between probe and tank bottom z: Required response level OP from the bottom (maximum: z < L - c - y or z < B - y)

UK

13.3.1 Definition "from the cover“

Required distance (y) of the overflow prevention OP "from the cover" is defined.

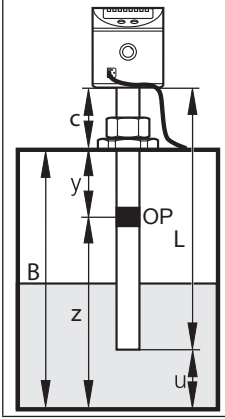
- Without offset ([OFS] = [0]): [OP] = L - c - y
- With offset ([OFS] = u): [OP] = L - c - y + u
  or
  [OP] = B - y

Example:
c = 3.0 cm, y = 5.0 cm, u = 1.0 cm

Without offset: [OP] = 26.4 cm - 3.0 cm - 5.0 cm
= 18.4 cm

With offset: [OP] = 26.4 cm - 3.0 cm - 5.0 cm + 1.0 cm
= 19.4 cm

Fig. 13-1



13.3.2 Definition "from the bottom"

Response level (z) of the overflow prevention OP from the tank bottom is defined.

- Without offset ([OFS] = [0]): [OP] = z - u
- With offset ([OFS] = u): [OP] = z

Example:
z = 18.0 cm (from the tank bottom), u = 1.0 cm
Without offset: [OP] = 18.0 cm - 1.0 cm = 17.0 cm
With offset: [OP] = 18.0 cm
Round the calculated value to the next lower adjustable value (→ 13.2).

13.4 Setting ranges [SP1] / [FH1] and [rP1] / [FL1]

Table 13-3

	LK1222		LK1223		LK1224	
	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
[SP1] / [FH1]	2.5...20.0	1.0...7.8	3.5...39.0	1.4...15.4	6...59	2.5...23.5
[rP1] / [FL1]	2.0...19.5	0.8...7.6	3.0...38.5	1.2...15.2	5...58	2.0...23.0
Step increment	0.5	0.2	0.5	0.2	1	0.5

The indicated values refer to the lower edge of the probe.
The values apply if [OFS] = [0].
If [OFS] > [0], they increase by the set offset value.

14 Maintenance/cleaning/change of medium

When removing or installing the unit for maintenance and cleaning:

▶ Make sure that the stainless steel tube clip is fixed to the sensor.

> It must be possible to exactly reproduce the installation height and position.

▶ Remove the sensor and clean it/carry out maintenance.

▶ Install sensor exactly in the same position as before.

▶ Otherwise check the parameter [OP] and carry out [cOP] once again.

After a change of the medium with considerably differing dielectric constants (e.g. oil and water):

▶ Adapt parameter [MEdI] (→ 11.2.3).

15 Factory setting

	Factory setting			User settings
	LK1222	LK1223	LK1224	
SP1	10.0	19.5	29	
rP1	9.5	19.0	28	
OP	20.4	40.7	61	
MEdI	CLW.1			
cOP	----			
CodE	nonE			
rES	----			
ou1	Hno			
dS1	0.0			
dr1	0.0			
uni	cm			
P-n	PnP			
OFS	0			
FOU1	OFF			
diS	On			