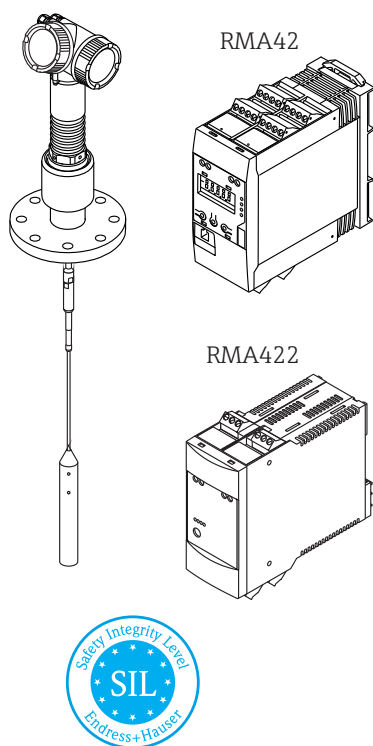


# Special Documentation

## Levelflex FMP54 and FMP54 with process transmitter RMA42 or RMA422

Safety instructions for steam boiler approval



Guided level-radar as part of a limiting device for  
low level water and high level water

### Application

Guided level-radar as part of limiting device for low level water and/or high level water and control in 2-wire and 4-wire version for liquids in tanks to meet the particular requirements as per EN 12952-11 and EN 12953-9.

The measuring device fulfils the requirements concerning

- Electrical safety as per IEC/EN 61010-1
- Functional safety as per IEC 61508
- Explosion protection (depending on the version)
- Electromagnetic compatibility as per EN 61326 and NAMUR recommendation NE 21

### Your benefits

- Used as part of a limiting device as per EN 12952-11/EN 12953-9 for FMP54 (certified by TÜV NORD CERT)
- Used as limiting device as per EN 12952-11/EN 12953-9 for FMP54 with RMA42 or RMA422 (certified by TÜV NORD CERT)
- Permanent self-monitoring
- Continuous measurement
- Measurement is virtually independent of product properties
- Measurement is possible even at strongly agitated surfaces and foam
- Easy commissioning

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## Introduction



General information on steam boiler applications is available in brochure CP00041F "Level measurement in steam boilers".



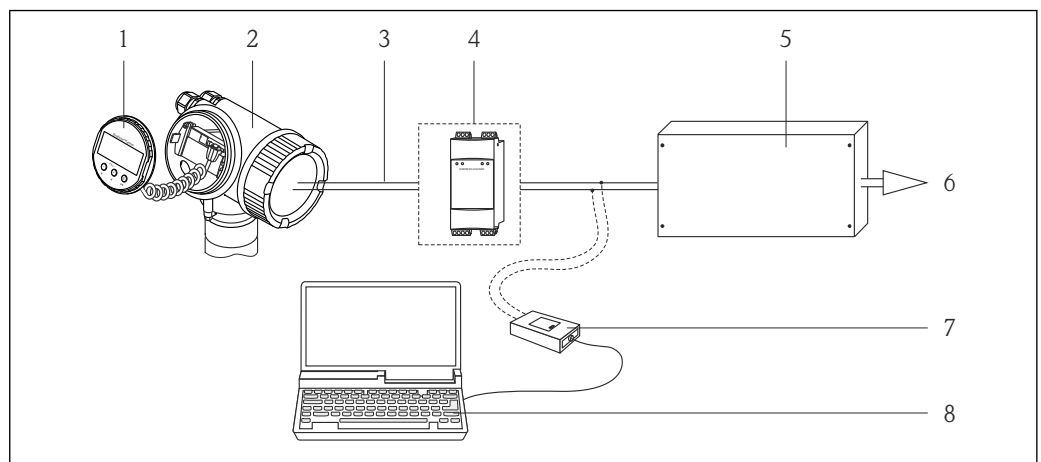
The devices may only be installed and commissioned by suitable and trained staff. Maintenance work and adjustments may only be performed by authorized staff who have received special training.

The nameplate indicates the technical characteristics of the devices. Devices without a device-specific nameplate must not be commissioned or operated!

## Structure of the measuring system

### System components

The measuring system's devices are displayed in the following diagram (example).



A0021663

- 1 display module SD02
- 2 Levelflex FMP54
- 3 4 to 20 mA
- 4 optional: RMA42 or RMA422
- 5 logic unit, e.g. PLC, limit signal transmitter, ...
- 6 actuator
- 7 Commubox FXA291
- 8 computer with operating tool (FieldCare)

An analog safety signal (4 to 20 mA) proportional to the level is generated in the transmitter. This is sent to a process transmitter (optional, e.g. RMA42 or RMA422) and a downstream logic unit (e.g. PLC, limit signal transmitter, etc.) where it is monitored to determine whether it overshoots or undershoots a specified limit value.

For fault monitoring, the logic unit must recognize both HI-alarms ( $\geq 21$  mA) and LO-alarms ( $\leq 3.6$  mA).

### System description/function

The Levelflex is a "downward-looking" measuring system that functions according to the ToF method (ToF = Time of Flight). The distance from the reference point (process connection of the measuring device) to the product surface is measured. High-frequency pulses are injected to a probe and led along the probe. The pulses are reflected by the product surface, received by the electronic evaluation unit and converted into level information. This method is also known as TDR (time domain reflectometry).

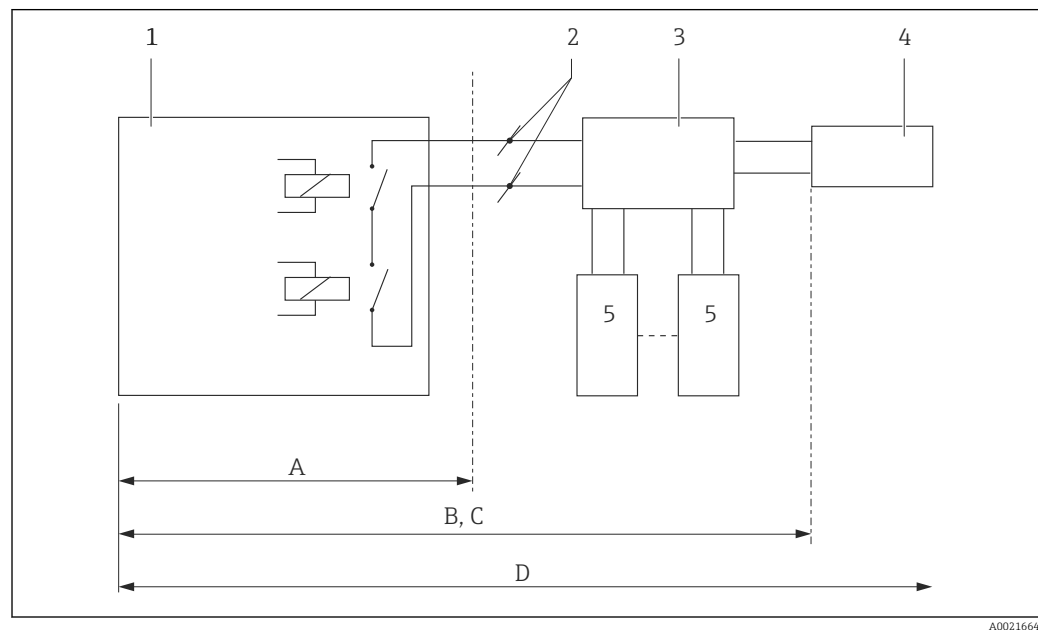
The level measuring device records the minimum or maximum level in a tank for the generation of steam using the time-of-flight measurement method in accordance with the scope of EN 12952-11 and EN 12953-9.

For low level water and/or high level water and control or regulation as part of a safety system:

- Levelflex FMP54 used as part of a limiting device
- Levelflex FMP54 with process transmitter RMA42 or RMA422 used as a limiting device

Levellflex FMP54 can be used in a 2-wire and 4-wire version (both versions with overlying HART communication).

The protection function for the entire boiler is covered by an additional safety system and actuator.



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- A scope of EN 12952-11, EN 12953-9  
B protection system as per 3.40 of EN 50156-1  
C scope of EN 12952-7, EN 12953-6  
D scope of the functional test  
1 limiter (limiting device)  
2 output connections of the limiter  
3 complete safety system (protection system as per EN 50156-1)  
4 power supply  
5 limiter

### Safety system

- self-monitoring
- with redundancy
- with diversity or
- a suitable combination of the above

### Limiter (limiting device)

Can consist of

- measuring sensor
- bypass(es)/external pressure chamber(s)
- timing relay(s)
- testing equipment and
- other associated devices for function and failsafe limiters
- protective tube (in boiler)/Stilling well
- actuator

### Permitted device types

The details in these instructions relate to the device versions listed below and are valid as of the specified software and hardware version. Unless otherwise specified, all subsequent versions can also be used for limiting devices.

### Levelflex FMP54

Feature	Designation	Version
010	Approval	all
020	Power supply; Output	A, B <sup>1)</sup> , C <sup>2)</sup> , K
030	Display; Operation	all
040	Housing	B, C
050	Electrical Connection	all
060	Probe	all
090	Seal	all
100	Process Connection	all
500	Additional Option Language	all
540	Application Package	all
550	Calibration	all
570	Service	all
580	Test; Certificate	all
590	Additional Approval	LX An additional selection of any further versions is possible
600	Probe Design	all
610	Accessory Mounted	all
620	Accessory Enclosed	all
850	Firmware Version	If no version is selected here, the latest approved SIL-able SW is supplied. Alternatively, the following SW version may be selected: <ul style="list-style-type: none"> <li>■ 75 01.01.zz, HART 6, DevRev02</li> <li>■ 74 01.02.zz, HART 6, DevRev03</li> <li>■ 71 01.03.zz, HART 7, DevRev04</li> </ul>

- 1) For this version with one current output and one switching output, only the current output (terminals 1 and 2) is suitable for safety functions. The switching output can, if necessary, be wired for non-safety-oriented purposes.
- 2) For this version with 2 current outputs, only the first output (terminals 1 and 2) is suitable for safety functions. The second output can, if necessary, be wired for non-safety-oriented purposes.



Valid firmware version: as of 01.01.18

Valid hardware version (electronics): as of delivery date January 2012

### Process transmitter RMA42

Feature	Designation	Version
010	Approval	BB, CB, FB, NH, TD
020	Input; Output	D
030	Additional Approval	H3



Valid firmware version: as of 01.01.08

Valid hardware version (electronics): as of 01.00.00

### Process transmitter RMA422

Feature	Designation	Version
010	Approval	K, L
020	Power supply	all
030	Measuring Signal	2
040	Display; Operating	all
050	Output	3
060	Relay	2
070	Additional Option	all



Valid software version: 02.01

### Supplementary device documentation

Documentation	Contents	Comment
Technical Information TI01001F/00 (FMP54) TI00150R/09 (RMA42) TI00072R/09 (RMA422)	<ul style="list-style-type: none"> <li>■ Technical data</li> <li>■ Instructions on accessories</li> </ul>	The documentation is available on the Internet. → <a href="http://www.endress.com">www.endress.com</a>
Operating Instructions (HART) BA01001F/00 (FMP54) BA00287R/09 (RMA42) BA00103R/09 (RMA422)	<ul style="list-style-type: none"> <li>■ Identification</li> <li>■ Installation</li> <li>■ Wiring</li> <li>■ Operation</li> <li>■ Commissioning</li> <li>■ Maintenance</li> <li>■ Accessories</li> <li>■ Troubleshooting</li> <li>■ Technical data</li> <li>■ Appendix: menu diagram</li> </ul>	<ul style="list-style-type: none"> <li>■ The documentation is supplied with the device.</li> <li>■ The documentation is available on the Internet. → <a href="http://www.endress.com">www.endress.com</a></li> </ul>
Description of Device Parameters GP01000F/00 (FMP54)	<ul style="list-style-type: none"> <li>■ Instructions on use</li> <li>■ Levelflex function menu</li> <li>■ Function groups ...</li> <li>■ ...</li> <li>■ Envelope curve</li> <li>■ Troubleshooting</li> <li>■ Function menu index</li> </ul>	The documentation is available on the Internet. → <a href="http://www.endress.com">www.endress.com</a>
Functional Safety Manual SD00326F/00 (FMP54) SD00025R/09 (RMA42) SD00009R/09 (RMA422)	<ul style="list-style-type: none"> <li>■ SIL Declaration of Conformity</li> <li>■ Introduction</li> <li>■ Structure of the measuring system</li> <li>■ Description of the safety requirements and boundary conditions</li> <li>■ Proof-test</li> <li>■ Repairs</li> <li>■ Appendix</li> <li>■ Certificate</li> </ul>	<ul style="list-style-type: none"> <li>■ FMP54 and RMA422 have a SIL 2 rating (MIN, MAX and range)</li> <li>■ The documentation is available on the Internet. → <a href="http://www.endress.com">www.endress.com</a></li> </ul>
Safety Instructions (depending on the selected version "Approval")	Safety, installation and operating instructions for devices, which are suitable for use in potentially explosive atmospheres or as overfill protection (WHG, German Water Resources Act).	Additional safety instructions (XA, ZE) are supplied with certified device versions. Please refer to the nameplate for the relevant safety instructions.
Project Planning Information SD01071F/00	Project planning information for FMP54 and FMP54 with process transmitter RMA42	The documentation is available on the Internet. → <a href="http://www.endress.com">www.endress.com</a>

## Installation and commissioning

### Installation instructions/ engineering

At least two probes are required in redundancy for the measurement of the maximum and minimum level in a steam generator (voting 1oo2, "one out of two"). To increase availability, it is recommended that three probes be installed in a voting 2oo3 ("two out of three").


The devices can be installed directly in the tank or in a bypass.

A rod probe of suitable length can be used if the limiter is installed in a stilling well (protective tube) or bypass ( $\leq$  DN150) provided by the customer. A coaxial probe must be used if the limiter is freely installed in the boiler or in stilling well or bypass ( $\geq$  DN150).

The devices must be arranged, installed and protected in such a way that their function is not hampered by:


- foam and turbulence in the boiler water
- buildup of dirt
- mechanical influences during operation (e.g. vibrations)
- position changes in relation to the protective tube or other electrodes, which could lead to a shortcircuit

### Behavior during normal operation and in case of error

The integrated broken probe detection function must be enabled ( $\rightarrow$   9, "Commissioning")!

#### Voting 1oo2

During normal operation


If the limit value (low level water/high level water) to be monitored is reached, at least one of the sensors shows a message on the display ( $\rightarrow$   11, "Error of measurement").

In case of error

- In the event of a dangerous detected device failure (e.g. error current): The system is no longer single-fault safe. Immediate action is necessary!
- In the event of a dangerous undetected device failure: The device is no longer single-fault safe. Immediate action is necessary!
  - failure detection by comparing signals or
  - failure detection by performing recurrent function testing

#### Voting 2oo3

During normal operation


If the limit value (low level water/high level water) to be monitored is reached, at least two of the sensors show a message on the display ( $\rightarrow$   11, "Error of measurement").

In case of error

- In the event of a dangerous detected device failure (e.g. error current): The system is still single-fault safe (1oo2). Repair or change the defective sensor!
- In the event of a dangerous undetected device failure: : The system is still single-fault safe (1oo2). Repair or change the defective sensor!
  - failure detection by comparing signals (1-2, 2-3, 3-1) or
  - failure detection by performing recurrent function testing

Some diagnostics are self holding, which means that after elimination of the fault, the error message is still present. The fault must then be acknowledged manually after checking or replacing the probe(s) by short interruption of the power supply or by choosing the "Diagnostics > Device reset > Device reset > Restart device" parameter.



Errors that occur during commissioning or measuring are displayed immediately as plain-text errors on the display. In addition, a unique error code is also output. A description of the error codes is provided in the Operating Instructions ( $\rightarrow$   6, "Supplementary device documentation").

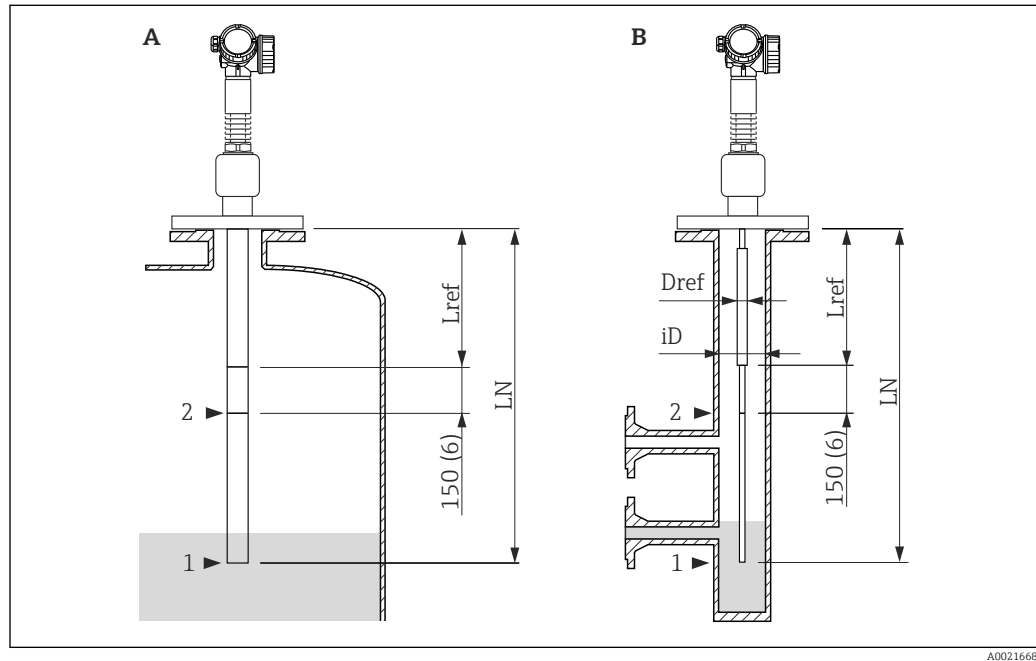
If two or more system or process errors occur, the error with the highest priority is the one shown on the display! Additional pending diagnostic messages can be shown in the "Diagnostic list" submenu.

### Gas phase compensation

If the device version with automatic time-of-flight compensation in steam applications is used, the guidelines on reference length and safety distance to the maximum level (high level water) must be adhered to:

- reference length  $L_{\text{ref}} = 300 \text{ mm}$  (11.8 in) or  $550 \text{ mm}$  (21.7 in) (depending on the device version)
- safety distance =  $150 \text{ mm}$  (6 in)

The useable measuring range of the level probe is between the end of the probe (MIN) and the safety distance (MAX; 150 mm (6 in) below reference length  $L_{ref}$ ). The information specified in the relevant Technical Information must be observed (→ 6, "Supplementary device documentation").



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Unit of measurement mm (in)

- A coax probe
- B rod probe
- $L_{ref}$  reference distance
- $LN$  probe length
- $iD$  inner diameter of the pipe
- $D_{ref}$  diameter of the probe rod
- 1 MIN
- 2 MAX

**i** Coax probes with reference reflection can be installed in all tanks (freely in the tank or in a bypass). Coax probes are ready-mounted and calibrated ex works.

Rod probes are only recommended if a coax probe cannot be installed (e.g. where the diameter of the bypass is very small).

Rod probes with reference reflection are only suitable for installation in stilling wells and bypasses. The diameter  $D_{ref}$  of the probe rod in the range of reference distance  $L_{ref}$  must be appropriately selected in relation to the pipe internal diameter  $iD$ . The pipe must be cylindrical in the range of reference distance  $L_{ref}$ . Changes in the cross-section, e.g. at flange connections, must not exceed 5 % of internal diameter  $iD$ .

After installation, the settings must also be checked, and adjusted if necessary, by qualified staff.

## Installation conditions

### Installation and wiring

**i** Further details are described in the corresponding Operating Instructions (→ 6, "Supplementary device documentation").

**i** Correct installation is a prerequisite for safe operation of the device.

### Orientation

**i** Further details are described in the corresponding Operating Instructions (→ 6, "Supplementary device documentation").

**i** The angle of inclination of the probe must not exceed 30°. The length of the probe is limited to 1000 mm (40 in) if installed in a slanted position.




System components

A suitable transmitter power supply unit, e.g. RMA42 or RMA422, can be used if switching contacts are necessary.

When using the RMA42 or RMA422, ensure that the unit cannot quit a status defined as safe in the event of power failure/power recovery (self-retaining). This can be achieved by means of contactors for example.

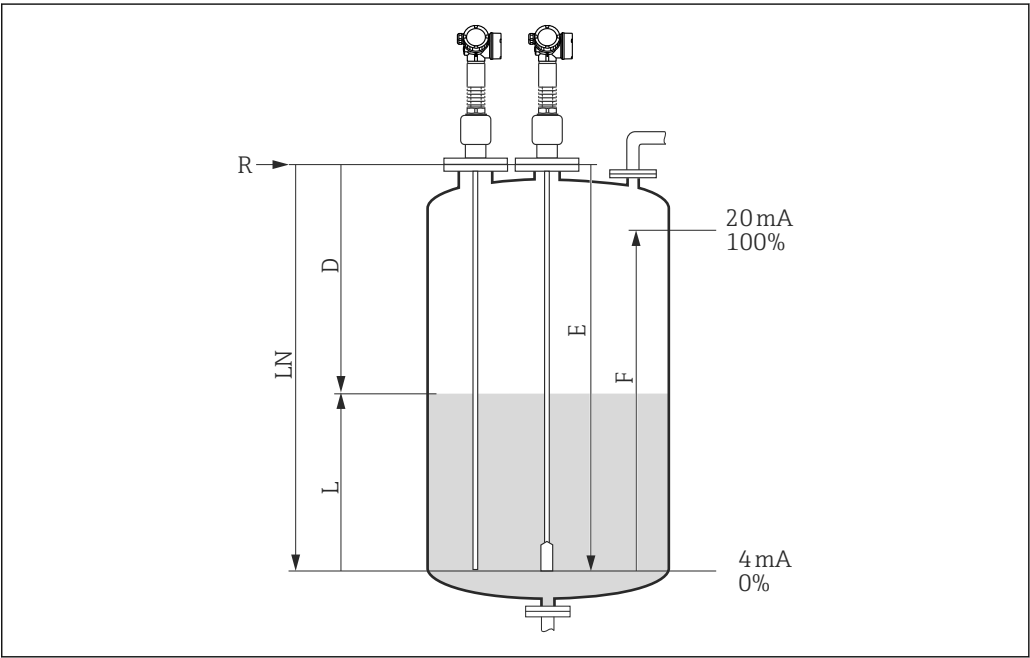
Operation

Parameter configuration for safety-related applications

 Further details are described in the corresponding Functional Safety Manual (→ 6, "Supplementary device documentation").

Commissioning

Configuration of a level measurement



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- R reference point of the measurement
- LN length of probe
- D distance
- L level
- E empty calibration (= Zero point)
- F full calibration (= span)

Step	Parameter	Action
1	Setup → Distance unit	Select distance unit
2	Setup → Operating mode	Select "Level"
3	Setup → Tank type	Select tank type
4	Setup → Tube diameter	Enter the diameter of the bypass or stilling well
5	Setup → Medium group	Select medium group ("water based": DK > 4 or "other": DK ≥ 1.9)
6	Setup → Empty calibration	Enter the distance E between the reference point R and the minimum level (0 %)
7	Setup → Full calibration	Enter distance F between the minimum (0 %) and maximum level (100 %)
8	Setup → Level	Displays the measured level L
9	Setup → Distance	Displays the distance D between the reference point R and the level L

Step	Parameter	Action
10	Setup → Signal quality	Displays the signal quality of the level echo
11	Setup → Mapping → Confirm distance <sup>1)</sup>	Compare the displayed distance to the real distance in order to start the recording of the mapping curve

- 1) Coax probes are precalibrated. Therefore, a reference check is not required. For rod probes with gas phase compensation: → BA01001F/00, section "Checking the reference distance" (→ 6, "Supplementary device documentation").



The integrated broken probe detection function must be enabled!

If this function is switched off, it can be enabled as follows: Expert > Sensor > Sensor diagnostics > Broken probe detection = On

#### Parameter configuration for safety-related applications



Further details are described in the corresponding Functional Safety Manual (→ 6, "Supplementary device documentation").

### Operation

The level sensor can be operated for more than 24 hours without supervision as part of a limiting device. Adhere to the conditions as per EN 12952-7, section 7.3.9 in this regard. 72-hour operation or operation without supervision are thus also covered.

### Behavior of device during operation and in case of error

#### Device behavior in locked state



After locking, additional diagnostics are active and critical parameters in the safety path are set to safe values. Therefore, device behavior in the "locked state" may deviate from the "nonlocked state". If a test phase takes place before the system is finally put into production, it is recommended that this test phase be run in the locked state in order to obtain the most conclusive results possible.

#### Device behavior when switched on

When switched on, the device runs through a diagnostic phase lasting approx. 20 seconds. During this time, the current output is at error current. For 5 seconds during the diagnostic phase, this current is  $\leq 3.6$  mA.

After that, depending on the setting of the "Start-up mode" parameter, the current is:

- at the MIN value:  $\leq 3.6$  mA
- at the MAX value:  $\geq 21$  mA

During the diagnostic phase, no communication is possible via the service interface (CDI) or via HART.

#### Behavior of device on demand

The Levelflex FMP54 outputs a current value corresponding to the limit value to be monitored. This value must be monitored and processed further in an attached logic unit.

#### Device response in the event of alarms or warnings

##### Fault current

In the event of an alarm, the output current is set to the configured value of  $\leq 3.6$  mA or  $\geq 21$  mA.

In some cases (e.g. failure of power supply, a cable open circuit and faults in the current output itself, where the error current  $\geq 21$  mA cannot be set), output currents  $\leq 3.6$  mA irrespective of the configured fault current can occur. In some other cases (e.g. short circuit of cabling), output currents  $\geq 21$  mA can occur irrespective of the configured fault current.

For alarm monitoring, the logic unit must therefore be able to recognize both HI-alarms ( $\geq 21$  mA) and LO-alarms ( $\leq 3.6$  mA).

##### Alarm and warning messages

Additional information is provided by the alarm and warning messages in the form of error codes and associated clear text messages.

The following table shows the correlation between the error code and the current output:

Error code <sup>1)</sup>	Current output (message type)	Note
Fxxx	$\geq 21 \text{ mA}$ or $\leq 3.6 \text{ mA}$	xxx = three-digit number
Mxxx	corresponding to measuring mode	xxx = three-digit number
Cxxx	corresponding to measuring mode	xxx = three-digit number
Sxxx	corresponding to measuring mode	xxx = three-digit number

1) The error codes are listed in the Operating Instructions

*Exceptions:*

Error code <sup>1)</sup>	Current output (message type)	Note
M272	$\geq 21 \text{ mA}$ or $\leq 3.6 \text{ mA}$	Main electronic failure
C484	$\geq 21 \text{ mA}$ or $\leq 3.6 \text{ mA}$	Simulation failure mode
S942	$\geq 21 \text{ mA}$ or $\leq 3.6 \text{ mA}$	In safety distance

1) The error codes are listed in the Operating Instructions



When locking is active on the device, additional diagnostics are activated (e.g. a comparison between the readback-current with the nominal value). If one of these diagnostics results in an error message (e.g. F803 loop current) and the locking is then deactivated, the error message remains while the error persists, even if the diagnostics is no longer active in the unlocked state. In this case, the device must be disconnected briefly from the power supply (e.g. by unplugging the terminals). When the device is then restarted, a self-check is carried out, and the error message is reset where applicable.

## Error of measurement

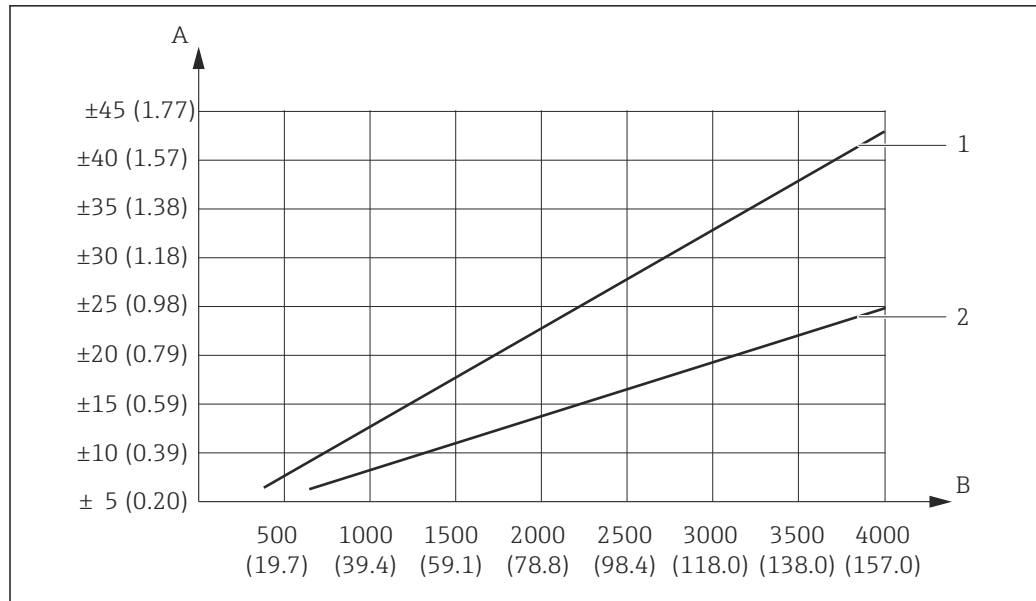
### Levelflex FMP54

The measured error (full scale) is 2 % for use of Levelflex FMP54 as part of limiting device or for use of Levelflex FMP54 with process transmitter RMA42 or RMA422 as a limiting device.

Under the influence of the gas phase, the propagation speed of the measuring signals changes with the result that a greater error of measurement is to be expected as the pressure increases. A level that is too low is displayed systematically.

The impact on the measuring signal can be compensated with the gas phase compensation option (Feature 540 "Application Package", version "EF", "EG").

If the gas phase compensation option is used, the greater the reference distance  $L_{\text{ref}}$  and smaller the measuring range, the higher the accuracy under reference operating conditions:



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- A measuring error  
B distance liquid/flange  
1 reference distance  $L_{ref} = 300 \text{ mm (11.8 in)}$   
2 reference distance  $L_{ref} = 550 \text{ mm (21.7 in)}$

**i** If there are fast changes in pressure, there may be an additional error, since the measured reference distance is filtered with the time constant of the level measurement. Furthermore, states of non-equilibrium (e.g. caused by heating) can lead to density and pressure gradients in the medium as well as to condensation of steam at the probe. As a result, levels that are somewhat different may be measured at different places in the tank. Application-specific influences of this type can increase the specified error of measurement (typically up to a factor 2 to 3).

#### Process transmitter RMA42

The measured error (full scale) is 2 % for use of process transmitter RMA42 in limiting devices.

#### Process transmitter RMA422

The measured error (full scale) is 2 % for use of process transmitter RMA422 in limiting devices.

## Maintenance

### Maintenance

**i** Further details are described in the corresponding Operating Instructions (→ 6, "Supplementary device documentation").

To ensure process safety during configuration, testing and maintenance work on the device alternative monitoring measures must be taken.

#### CAUTION

**During operation, the Levelflex FMP54 is hot. Steam or hot water can come out when the probe is released!**

Risk of burns/scalds

- ▶ Only carry out installation and maintenance work when the device has cooled down!
- ▶ Only disassemble the Levelflex FMP54 when the boiler pressure is 0 bar (0 psi)!

## Checking device operativeness

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### Testing

The operativeness and safety of the limiter must be checked at regular intervals.

Perform the proof-test so that correct functioning of the limiting device is verified in combination with all components. To do this, check the measurement and trip function, e.g. by reducing or increasing the water level.



Further details are described in the corresponding Functional Safety Manual (→ 6, "Supplementary device documentation").

## Repairs

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### Repairs



Further details are described in the corresponding Functional Safety Manual (→ 6, "Supplementary device documentation").

## Certificates

Levelflex FMP54



# ZERTIFIKAT CERTIFICATE

Hiermit wird bescheinigt, dass das unten beschriebene Produkt der Firma  
*This certifies that the product mentioned below from company*

**Endress+Hauser SE+Co. KG**  
**Hauptstrasse 1**  
**79689 Maulburg**  
**Deutschland**

die Anforderungen der folgenden Prüfunterlage(n) erfüllt.  
*meets the requirements of the following test regulations.*

<b>Geprüft nach:</b>	<b>EN 12952-11:2007</b>
<i>Tested in accordance with:</i>	<b>EN 12953-9:2007</b>

<b>Beschreibung des Produktes:</b>	<b>Geführtes Füllstand-Radar</b>
<i>(Details s. Anlage 1)</i>	<i>Guided Level Radar</i>
<i>Description of product:</i>	
<i>(Details see Annex 1)</i>	

<b>Typenbezeichnung:</b>	<b>Levelflex FMP54</b>
<i>Type Designation:</i>	<b>als Teil einer Begrenzungseinrichtung für Niedrigwasser (NW) und Hochwasser (HW)</b>
	<b>bzw. für NW/HW und Regelung in 2-Draht oder 4-Drahtausführung</b>
	<i>Levelflex FMP54</i>
	<i>as part of a limit device for low water level (NW) and high water level (HW) and for NW/HW</i>
	<i>and control in 2-wire or 4-wire version</i>

**Dieses Zertifikat bescheinigt das Ergebnis der Prüfung an dem vorgestellten Prüfgegenstand. Eine allgemein gültige Aussage über die Qualität der Produkte aus der laufenden Fertigung kann hieraus nicht abgeleitet werden.**  
*This certifies the result of the examination of the product sample submitted by the manufacturer. A general statement concerning the quality of the products from the series manufacture cannot be derived there from.*

Registrier-Nr. / Registered No. 44 799 13761302 Prüfbericht Nr. / Test Report No. 35234278/35234279/35234520 Aktenzeichen / File reference 8003000277 / 3523 4278	Gültigkeit / Validity von / from 2019-03-14 bis / until 2024-03-13
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 Zertifizierungsstelle TÜV NORD CERT GmbH  
*Certification Body of TÜV NORD CERT GmbH*

Essen, 2019-03-14

TÜV NORD CERT GmbH    Langemarckstraße 20    45141 Essen

[www.tuev-nord-cert.de](http://www.tuev-nord-cert.de)    [technology@tuev-nord.de](mailto:technology@tuev-nord.de)

Bitte beachten Sie auch die umseitigen Hinweise <sup>1)</sup>  
*Please also pay attention to the information stated overleaf <sup>1)</sup>*

A0039168

1) Only refers to general terms and conditions and is therefore not shown



## ANLAGE ANNEX

Anlage 1, Seite 1 von 2  
Annex 1, page 1 of 2

zum Zertifikat Registrier-Nr. / to Certificate Registration No. 44 799 13761302

Allgemeine Angaben  
General Information

Siehe auch Seite 1 des Zertifikats  
See also page 1 of the certificate

Produktbeschreibung:  
Product description:

Messeinrichtung bestehend aus:  
Standaufnehmer in Form von Stab-, Seil- oder Koaxsonden mit integriertem Messumformer (Elektronikeinsatz) und elektrischem Ausgangssignal, der nach der Laufzeitmethode arbeitet.  
Hochfrequenzimpulse werden auf die Sonde eingekoppelt und entlang der Sonde geführt. Die Impulse werden von der Produktoberfläche reflektiert, von der Auswerteelektronik empfangen und in die Füllstandinformation umgesetzt.  
Measuring equipment consisting of:  
Level sensor in form of rod-, rope- or coax probes with integrated transmitter (electronic insert) and electrical output signal with functional principle of the time of flight method.  
High-frequency pulses are injected to a probe and led along the probe. The Pulses are reflected by the product surface, received by the electronic evaluation unit and converted into level information.

Teilprüfungen:  
Partial tests:

EN 12952-11:2007, Abschnitte 4 und 5 sowie Anhang D  
EN 12953-9:2007, Abschnitte 4 und 5 sowie Anhang D

Typenbezeichnung:  
Type designation:

Levelflex FMP54  
als Teil einer Begrenzungseinrichtung für Niedrigwasser (NW) und Hochwasser (HW) bzw. für NW/HW und Regelung in 2-Draht oder 4-Drahtausführung  
Levelflex FMP54  
as part of a limit device for low water level (NW) and high water level (HW) and for NW/HW and control in 2-wire or 4-wire version

  
Zertifizierungsstelle TÜV NORD CERT GmbH  
Certification Body of TÜV NORD CERT GmbH

Essen, 2019-03-14

TÜV NORD CERT GmbH    Langemarckstraße 20    45141 Essen    [www.tuev-nord-cert.de](http://www.tuev-nord-cert.de)    [technology@tuev-nord.de](mailto:technology@tuev-nord.de)

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## ANLAGE ANNEX

Anlage 1, Seite 2 von 2  
Annex 1, page 2 of 2

**zum Zertifikat Registrier-Nr. / to Certificate Registration No. 44 799 13761302**

**Besondere Bedingungen zur  
sicheren Verwendung:**  
*Special conditions for safe use:*

- Die Hinweise in der zugehörigen Betriebsanleitung und den Sicherheitshinweisen sind zu beachten.
- Es ist zu beachten, dass nach einem Spannungsausfall der Messwert erst nach 20 Sekunden wieder verfügbar ist.
- Soll das Messgerät für bis zu 72 Stunden ohne Beaufsichtigung als Teil einer Begrenzungseinrichtung betrieben werden, sind besondere Maßnahmen gemäß EN 12952-7:2012, Abschnitt 7.1 zu ergreifen.
- The instructions of the associated Operating Manual and Safety Instructions shall be considered.
- It should be noted that after a power failure the measured value is only available again after 20 seconds.
- If the measuring instrument is to be operated for up to 72 hours without supervision as part of a limiting device, special measures have to be taken in accordance with EN 12952-7:2012, clause 7.1.

**Technische Daten:**  
*Technical data:*

**Ausgangssignale:**  
**Analogausgänge 4 .... 20 mA**  
*Output signals:*  
*Analog outputs 4 ... 20 mA*



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Levelflex FMP54 with  
process transmitter RMA42



# ZERTIFIKAT CERTIFICATE

Hiermit wird bescheinigt, dass das unten beschriebene Produkt der Firma  
*This certifies that the product mentioned below from company*

**Endress+Hauser SE+Co. KG**  
**Hauptstrasse 1**  
**79689 Maulburg**  
**Deutschland**

die Anforderungen der folgenden Prüfunterlage(n) erfüllt.  
*meets the requirements of the following test regulations.*

<b>Geprüft nach:</b> <i>Tested in accordance with:</i>	<b>EN 12952-11:2007</b> <b>EN 12953-9:2007</b>
<b>Beschreibung des Produktes:</b> <b>(Details s. Anlage 1)</b> <i>Description of product:</i> <i>(Details see Annex 1)</i>	<b>Geführtes Füllstand-Radar mit Prozessstransmitter</b> <i>Guided Level Radar with process transmitter</i>
<b>Typenbezeichnung:</b> <i>Type Designation:</i>	<b>Levelflex FMP54 mit Prozessstransmitter RMA42</b> <b>als Begrenzungseinrichtung für Niedrigwasser (NW) und Hochwasser (HW) bzw. für</b> <b>NW/HW und Regelung in 2-Draht oder 4-Drahtausführung</b> <i>Levelflex FMP54 with process transmitter RMA42</i> <i>as limit device for low water level (NW) and high water level (HW) and for NW/HW and</i> <i>control in 2-wire or 4-wire version</i>

**Dieses Zertifikat bescheinigt das Ergebnis der Prüfung an dem vorgestellten Prüfgegenstand. Eine allgemein gültige Aussage über die Qualität der Produkte aus der laufenden Fertigung kann hieraus nicht abgeleitet werden.**  
*This certifies the result of the examination of the product sample submitted by the manufacturer. A general statement concerning the quality of the products from the series manufacture cannot be derived there from.*

<b>Registrier-Nr. / Registered No.</b> 44 799 13761303 <b>Prüfbericht Nr. / Test Report No.</b> 35234278/35234279/35234520 <b>Aktenzeichen / File reference</b> 8003000277 / 3523 4279	<b>Gültigkeit / Validity</b> von / from 2019-03-14 bis / until 2024-03-13
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**Zertifizierungsstelle TÜV NORD CERT GmbH**  
*Certification Body of TÜV NORD CERT GmbH*

**Essen, 2019-03-14**

**TÜV NORD CERT GmbH**    **Langemarckstraße 20**    **45141 Essen**    **www.tuev-nord-cert.de**    **technology@tuev-nord.de**

Bitte beachten Sie auch die umseitigen Hinweise <sup>1)</sup>  
*Please also pay attention to the information stated overleaf <sup>1)</sup>*

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1)    Only refers to general terms and conditions and is therefore not shown



## ANLAGE ANNEX

Anlage 1, Seite 1 von 2  
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zum Zertifikat Registrier-Nr. / to Certificate Registration No. 44 799 13761303

Allgemeine Angaben  
General Information

Siehe auch Seite 1 des Zertifikats  
See also page 1 of the certificate

Produktbeschreibung:  
Product description:

Messeinrichtung bestehend aus:

- Standaufnehmer in Form von Stab-, Seil- oder Koaxsonden mit integriertem Messumformer (Elektronikeinsatz) und elektrischem Ausgangssignal, der nach der Laufzeitmethode arbeitet. Hochfrequenzimpulse werden auf die Sonde eingekoppelt und entlang der Sonde geführt. Die Impulse werden von der Produktoberfläche reflektiert, von der Auswerteelektronik empfangen und in die Füllstandinformation umgesetzt.
  - Prozesstransmitter zur Erfassung und Weiterverarbeitung analoger Messsignale.
- Measuring equipment consisting of:
- Level sensor in form of rod-, rope- or coax probes with integrated transmitter (electronic insert) and electrical output signal with functional principle of time of flight method. High-frequency pulses are injected to a probe and led along the probe. The Pulses are reflected by the product surface, received by the electronic evaluation unit and converted into level information
  - Process transmitter for registration and processing of analog measuring signals.

Teilprüfungen:  
Partial tests:

EN 12952-11:2007, Abschnitte 4 und 5 sowie Anhang D  
EN 12953-9:2007, Abschnitte 4 und 5 sowie Anhang D

Typenbezeichnung:  
Type designation:

Levellflex FMP54 mit Prozesstransmitter RMA42  
als Begrenzungseinrichtung für Niedrigwasser (NW) und Hochwasser (HW) bzw. für NW/HW und Regelung in 2-Draht oder 4-Drahtausführung.  
Levellflex FMP54 with process transmitter RMA42  
as limit equipment for low water level (NW) and high water level (HW) and for NW/HW and control in 2-wire or 4-wire version.

  
Zertifizierungsstelle TÜV NORD CERT GmbH  
Certification Body of TÜV NORD CERT GmbH

Essen, 2019-03-14

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## ANLAGE ANNEX

Anlage 1, Seite 2 von 2  
Annex 1, page 2 of 2

zum Zertifikat Registrier-Nr. / to Certificate Registration No. 44 799 13761303

**Besondere Bedingungen zur  
sicheren Verwendung:**  
*Special conditions for safe use:*

- Die Hinweise in der zugehörigen Betriebsanleitung und den Sicherheitshinweisen sind zu beachten.
- Es ist zu beachten, dass nach einem Spannungsausfall der Messwert erst nach 20 Sekunden wieder verfügbar ist.
- Soll das Gerät für bis zu 72 Stunden ohne Beaufsichtigung als Begrenzungseinrichtung betrieben werden, sind besondere Maßnahmen gemäß EN 12952-7:2012, Abschnitt 7.1 zu ergreifen.
- The instructions of the associated Operating Manual and Safety Instructions shall be considered.
- It should be noted that after a power failure the measured value is only available again after 20 seconds.
- If the instrument is to be operated for up to 72 hours without supervision as limiting device, special measures have to be taken in accordance with EN 12952-7:2012, clause 7.1.

**Technische Daten:**  
*Technical data:*

**Ausgangssignale:**  
Analogausgänge 4 .... 20 mA und/oder Relaisausgänge. Durch die galvanische Trennung der Stromausgänge des RMA42 ist die Rückwirkungsfreiheit erfüllt. Somit darf diese Kombination aus zwei FMP54 mit zwei RMA42 als Begrenzungseinrichtung für HW und NW bzw. für HW/NW und Regelung in 2-Draht oder 4-Drahtausführung für Dampfkessel eingesetzt werden  
*Output signals:*  
Analog outputs 4 ... 20 mA and/or relay outputs. The galvanic isolation of the current outputs of the RMA42 ensures interference freeness. Therefore this combination of two FMP54 with two RMA42 is allowed for use as limit device for HW and NW and for HW/NW an control in 2-wire or 4-wire version for steam boilers.

  
Zertifizierungsstelle TÜV NORD CERT GmbH  
Certification Body of TÜV NORD CERT GmbH

Essen, 2019-03-14

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Levelflex FMP54 with  
process transmitter RMA422



## ZERTIFIKAT CERTIFICATE

Hiermit wird bescheinigt, dass das unten beschriebene Produkt der Firma  
*This certifies that the product mentioned below from company*

**Endress+Hauser SE+Co. KG**  
Hauptstrasse 1  
79689 Maulburg  
Deutschland

die Anforderungen der folgenden Prüfunterlage(n) erfüllt.  
*meets the requirements of the following test regulations.*

<b>Geprüft nach:</b>	<b>EN 12952-11:2007</b>
<i>Tested in accordance with:</i>	<b>EN 12953-9:2007</b>

<b>Beschreibung des Produktes:</b>	<b>Geführtes Füllstand-Radar mit Prozessstransmitter</b>
<b>(Details s. Anlage 1)</b>	<i>Guided Level Radar with process transmitter</i>
<i>Description of product:</i>	
<i>(Details see Annex 1)</i>	

<b>Typenbezeichnung:</b>	<b>Levelflex FMP54 mit Prozessstransmitter RMA422</b>
<i>Type Designation:</i>	<b>als Begrenzungseinrichtung für Niedrigwasser (NW) und Hochwasser (HW) bzw. für NW/HW und Regelung in 2-Draht oder 4-Drahtausführung</b>
	<i>Levelflex FMP54 with process transmitter RMA422</i>
	<i>as limit device for low water level (NW) and high water level (HW) and for NW/HW and control in 2-wire or 4-wire version</i>

**Dieses Zertifikat bescheinigt das Ergebnis der Prüfung an dem vorgestellten Prüfgegenstand. Eine allgemein gültige Aussage über die Qualität der Produkte aus der laufenden Fertigung kann hieraus nicht abgeleitet werden.**  
*This certifies the result of the examination of the product sample submitted by the manufacturer. A general statement concerning the quality of the products from the series manufacture cannot be derived there from.*

Registrier-Nr. / Registered No. 44 799 13761304 Prüfbericht Nr. / Test Report No. 35234278/35234279/35234520 Aktenzeichen / File reference 8003000277 / 3523 4520	Gültigkeit / Validity von / from 2019-03-14 bis / until 2024-03-13
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 Zertifizierungsstelle TÜV NORD CERT GmbH  
 Certification Body of TÜV NORD CERT GmbH

Essen, 2019-03-14

TÜV NORD CERT GmbH    Langemarckstraße 20    45141 Essen

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Bitte beachten Sie auch die umseitigen Hinweise <sup>1)</sup>  
*Please also pay attention to the information stated overleaf <sup>1)</sup>*

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1) Only refers to general terms and conditions and is therefore not shown



## ANLAGE ANNEX

Anlage 1, Seite 1 von 2  
Annex 1, page 1 of 2

zum Zertifikat Registrier-Nr. / to Certificate Registration No. 44 799 13761304

Allgemeine Angaben  
General Information

Siehe Seite 1 des Zertifikates  
See also page 1 of the certificate

Produktbeschreibung:  
Product description:

Messeinrichtung bestehend aus:

- Standaufnehmer in Form von Stab-, Seil- oder Koaxsonden mit integriertem Messumformer (Elektronikeinsatz) und elektrischem Ausgangssignal, der nach der Laufzeitmethode arbeitet. Hochfrequenzimpulse werden auf die Sonde eingekoppelt und entlang der Sonde geführt. Die Impulse werden von der Produktoberfläche reflektiert, von der Auswertelektronik empfangen und in die Füllstandinformation umgesetzt.
  - Prozesstransmitter zur Erfassung und Weiterverarbeitung analoger Messsignale.
- Measuring equipment consisting of:
- Level sensor in form of rod-, rope- or coax probes with integrated transmitter (electronic insert) and electrical output signal with functional principle of time of flight method. High-frequency pulses are injected to a probe and led along the probe. The Pulses are reflected by the product surface, received by the electronic evaluation unit and converted into level information
  - Process transmitter for registration and processing of analog measuring signals.

Teilprüfungen:  
Partial tests:

EN 12952-11:2007, Abschnitte 4 und 5 sowie Anhang D  
EN 12953-9:2007, Abschnitte 4 und 5 sowie Anhang D

Typenbezeichnung:  
Type designation:

Levelflex FMP54 mit Prozesstransmitter RMA422  
als Begrenzungseinrichtung für Niedrigwasser (NW) und Hochwasser (HW) bzw. für NW/HW und Regelung in 2-Draht oder 4-Drahtausführung.  
Levelflex FMP54 with process transmitter RMA422  
as limit device for low water level (NW) and high water level (HW) and for NW/HW and control in 2-wire or 4-wire version.

  
Zertifizierungsstelle TÜV NORD CERT GmbH  
Certification Body of TÜV NORD CERT GmbH

Essen, 2019-03-14

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## ANLAGE ANNEX

Anlage 1, Seite 2 von 2  
Annex 1, page 2 of 2

**zum Zertifikat Registrier-Nr. / to Certificate Registration No. 44 799 13761304**

<p><b>Besondere Bedingungen zur sicheren Verwendung:</b> <i>Special conditions for safe use:</i></p>	<ul style="list-style-type: none"> <li>• Die Hinweise in der zugehörigen Betriebsanleitung und den Sicherheitshinweisen sind zu beachten.</li> <li>• Es ist zu beachten, dass nach einem Spannungsausfall der Messwert erst nach 20 Sekunden wieder verfügbar ist.</li> <li>• Soll das Gerät für bis zu 72 Stunden ohne Beaufsichtigung als Begrenzungseinrichtung betrieben werden, sind besondere Maßnahmen gemäß EN 12952-7:2012, Abschnitt 7.1 zu ergreifen.</li> <li>• The instructions of the associated Operating Manual and Safety Instructions shall be considered.</li> <li>• It should be noted that after a power failure the measured value is only available again after 20 seconds.</li> <li>• If the instrument is to be operated for up to 72 hours without supervision as limiting device, special measures have to be taken in accordance with EN 12952-7:2012, clause 7.1.</li> </ul>
<p><b>Technische Daten:</b> <i>Technical data:</i></p>	<p><b>Ausgangssignale:</b> Analogausgänge 4 .... 20 mA und/oder Relaisausgänge. Durch die galvanische Trennung der Stromausgänge des RMA422 ist die Rückwirkungsfreiheit erfüllt. Somit darf diese Kombination aus zwei FMP54 mit zwei RMA422 als Begrenzungseinrichtung für HW und NW bzw. für HW/NW und Regelung in 2-Draht oder 4-Drahtausführung für Dampfkessel eingesetzt werden</p> <p><i>Output signals:</i> Analog outputs 4 ... 20 mA and/or relay outputs. The galvanic isolation of the current outputs of the RMA422 ensures interference freeness. Therefore this combination of two FMP54 with two RMA422 is allowed for use as limit device for HW and NW and for HW/NW an control in 2-wire or 4-wire version for steam boilers.</p>



Zertifizierungsstelle TÜV NORD CERT GmbH  
Certification Body of TÜV NORD CERT GmbH

Essen, 2019-03-14

TÜV NORD CERT GmbH
Langemarckstraße 20
45141 Essen
www.tuev-nord-cert.de
technology@tuev-nord.de

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[www.addresses.endress.com](http://www.addresses.endress.com)

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