

Safety instructions for steam boiler approval

Levelflex M FMP45, Levelflex M FMP45 + process transmitter RMA422

Guided level-radar

as limiting device for high level water and low level water





Application

Guided level-radar as limiting device for high level water and low level water 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/IEC 61511
- Explosion protection (depending on the version)
- Electromagnetic compatibility as per EN 61326 and NAMUR recommendation NE 21

Your benefits

- Used as limiting device as per EN 12952-11/EN 12953-9 for FMP45 and FMP45 + RMA422 (certified by TÜV Nord)
- Permanent self-monitoring
- Continuous measurement
- Measurement is virtually independent of product properties
- Measurement is possible even at strongly agitated surfaces and foam
- Easy commissioning



Table of contents

Introduction
Structure of the measuring system
System components
System description/function
Permitted device types
Supplementary device documentation
Installation and commissioning
Installation instructions/engineering
Behavior during normal operation and in case of error
Gas phase compensation
Installation conditions
Instrumentation options
Commissioning
Configuration
Operation
Error of measurement
Maintenance
Maintenance
Checking device operativeness
Testing
5
Repairs
Repairs
Certificates
Levelflex M FMP45 19
Levelflex M FMP45 + process transmitter RMA42220



Introduction

Note!

The device 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 device. A device without a device–specific nameplate must not be commissioned or operated!

Structure of the measuring system



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. 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 21.0 mA) and LO-alarms (\leq 3.6 mA (2-wire), \leq 2.4 mA (4-wire)).

System components

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

System description/function

The Levelflex M 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.

Used as a limiting device for high level water and low level water, the Levelflex FMP45 or the Levelflex FMP45 + process transmitter RMA422 is classified as part of a safety system. It 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.



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)
- Test harness and
- Other associated devices for function and failsafe limiters
- Stilling well/protective tube
- 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 M FMP45				
Feature	Designation	Version		
010	Approval	All		
020	Process Temperature	All		
030	Probe	K, L, M, N, S, T, U, V		
040	Process Connection	All		
050	Power Supply; Output	B, G, H		
060	Operation	All		
070	Type of Probe	All		
080	Housing	All		
090	Cable Entry	All		
100	Additional Option	D, U, V, Y (TSP8N0008)		

Valid software version: as of 01.04.02

Valid hardware version (electronics): as of delivery date August 2008

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		Comment	
Technical Information TI386F/00 (FMP45) TI072R/09 (RMA422)	 Technical data Instructions on accessories 	 The documentation is available on the Internet. → www.endress.com. 	
Operating Instructions (HART) BA279F/00 (FMP45) BA103R/09 (RMA422)	 Identification Installation Wiring Operation Commissioning Maintenance Accessories Troubleshooting Technical data Appendix: menu diagram 	 The documentation is supplied with the device. The documentation is also available on the Internet. → www.endress.com. 	
Operating Instructions (Device Functions) BA245F/00 (FMP45)	 Instructions on use Levelflex M function menu Function groups Envelope curve Troubleshooting Function menu index 	 The documentation is available on the Internet. → www.endress.com. 	
Functional Safety Manual SD174F/00 (FMP45) SD009R/09 (RMA422)	 SIL Declaration of Conformity Introduction Structure of the measuring system Description of the safety requirements and boundary conditions Proof-test Repairs Appendix Certificate 	 FMP45 and RMA422 have a SIL 2 rating (MIN, MAX and range) The documentation is available on the Internet. → www.endress.com. 	
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, XB, XC, ZE, ZD) are supplied with certified device versions. Please refer to the nameplate for the relevant safety instructions.	

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 1002, "one out of two"). To increase availability, it is recommended that three probes be installed in a voting 2003 ("two out of three").			
	The Levelflex M transmitter 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 level sensor must be arranged, installed and protected in such a way that its 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 short-circuit. 			
Behavior during normal	The integrated broken probe detection function must be enabled ($\rightarrow \ge 13$, "Commissioning")!			
operation and in case of error	Voting 1002			
	During normal operationIf the limit value (LLW/HLW) to be monitored is reached, at least one of the sensors shows a message on the display.			
	 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: Failure detection by comparing signals or Failure detection by performing recurrent function testing. The device is no longer single-fault safe. Immediate action is necessary! 			
	Voting 2003			
	During normal operationIf the limit value (LLW/HLW) to be monitored is reached, at least two of the sensors show a message on the display.			
	 In case of error In the event of a dangerous detected device failure (e.g. error current): The system is still single-fault safe (1002). Repair the defective sensor! In the event of a dangerous undetected device failure: Failure detection by comparing signals (1-2, 2-3, 3-1) or Failure detection by performing recurrent function testing. The device is no longer single-fault safe. Immediate action is necessary! 			
	The fault must be acknowledged manually after checking or replacing the probe(s).			

Installation and commissioning



Note!

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 ($\rightarrow \exists 6$, "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!

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 max. level must be adhered to:

- Reference length Lref = 300 mm or 550 mm (depending on the device version)
- Safety distance = 150 mm

The useable measuring range of the level probe is between the end of the probe (MIN) and the safety distance (MAX; 150 mm below reference length Lref).

The information specified in the relevant Technical Information TI386F must be observed.





Note!

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 Dref of the probe rod in the range of reference distance Lref must be appropriately selected in relation to the pipe internal diameter iD, \rightarrow the table on the next page. The pipe must be cylindrical in the range of reference distance Lref. Changes in the cross-section, e.g. at flange connections, must not exceed 5% of internal diameter iD.

Modification	Diameter Dref of the probe in the range of Lref	Internal diameter iD of the stilling well/bypass
TSP8N0008	25 mm	45 to 70 mm

* Others on request

After installation, the settings must also be checked, and adjusted if necessary, by qualified staff. For this reason, the rod probe with reference reflection is only available on request.

Installation conditions	Installation and wiring			
	Installation and wiring of the device is described in the relevant Operating Instructions ($\rightarrow \square 6$, "Supplementary device documentation").			
	Note! Correct installation is a prerequisite for safe operation of the device.			
	Orientation			
	The permitted orientation of the device is also described in the Operating Instructions.			
Ċ	Caution! – The angle of inclination of the probe must not exceed 30°. The length of the probe is limited to 1000 mm if installed in a slanted position.			
	System components			
	A suitable transmitter power supply unit, e.g. RMA422, can be used if switching contacts are necessary. When using the 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 switching using contactors for example.			
Instrumentation options	A number of examples are shown (schematically) in the diagrams below for the FMP45 or the FMP45 + RMA422 wiring schemes when used in limiting devices.			
	Other wiring schemes that comply with the certificate are possible.			
	Wiring scheme and signal analysis of the Levelflex M (2-wire or 4-wire version):			
	1 x low level water (NW), 1 x high level water (HW)			
	1 Levelflex M FMP45 420 mA (2-wire / 4-wire) Voting 1002:			

		1 x NW 1 x HW
2 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	Signal comparison recommended

$1\ x$ low level water (NW), $1\ x$ high level water (HW), higher availability

Levelflex M FMP45 (2-wire / 4-wire)	420 mA	Safety PLC
2 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	Voting 2003: 1 x NW 1 x HW
3 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	Signal comparison recommended

SD288en0

SD288en08

2 x low level water (NW), 1 x high level water (HW)

1 Levelflex M FMP45	420 mA		
(2-wire / 4-wire)		Safety PLC	
		Voting 10o2 + comparison (1 - 2): 2 x NW 1 x HW	
2 Levelflex M FMP45	420 mA		
(2-wire / 4-wire)			
		SD:	288en12

2 x low level water (NW), 1 x high level water (HW), higher availability

1 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	Safety PLC
2 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	Voting 1002 + comparison (1 - 2) + comparison (2 - 3)
3 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	+ comparison (1 - 3): 2 x NW 1 x HW

Wiring scheme and signal analysis of the Levelflex M (2-wire or 4-wire version) in conjunction with the RMA422 process transmitter:

1 x low level water (NW), 1 x high level water (HW)



1 x low level water (NW), 1 x high level water (HW), higher availability



2 x low level water (NW), 1 x high level water (HW)



2 x low level water (NW), 1 x high level water (HW), higher availability

Levelflex M FMP45 (2-wire / 4-wire)	420 mA	RMA422	420 mA	Safety PLC
2 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	RMA422	420 mA	Voting 1002 + comparison (1 - 2) + comparison (2 - 3)
3 Levelflex M FMP45 (2-wire / 4-wire)	420 mA	RMA422	420 mA	+ comparison (1 - 3): 2 x NW 1 x HW

2 x low level water (NW), 1 x high level water (HW), control



AI1, AI2 Analog input DO1, DO2 Relay output

AO1, AO2 Analog output

2 x low level water (NW), 1 x high level water (HW), control



Caution!

Further components necessary for signal analysis!



AI1, AI2 Analog input DO1, DO2 Relay output

AO1, AO2 Analog output

Commissioning

Commissioning of the device is described in the relevant Operating Instructions ($\rightarrow \square 6$, "Supplementary device documentation").

Caution!

The integrated broken probe detection function must be enabled!

If this function is switched off, it can be enabled as follows:

Case A

FMP45 without gas phase compensation:

- 1. With the probe uncovered, perform a mapping ("Range of mapping" (052) and "Start mapping." (053)).
- 2. Activate the "Broken probe det" (019) function in the "Safety settings" (01) function group.

To ensure that the broken probe detection function works correctly, a mapping must have been performed in the tank beforehand.

The mapping must be at least 1 m in length since it has to cover the launch area.

Case B

FMP45 with gas phase compensation:

- 1. The value 300 must be entered in the "Unlock parameter" (0A4) in the "Diagnostics" (0A) function group.
- Adjusting the threshold for broken probe detection: In the "Broken probe" (0D9) submenu in the "Service" (0D) function group, change the "Reflection factor" (0D93) parameter from 0.4 to 1.1.
- 3. Activate the "Broken probe det" (019) function in the "Safety settings" (01) function group.
- 4. To lock, enter the value 100 in the "Unlock parameter" (0A4) in the "Diagnostics" (0A) function group.

Optional (only possible via FieldCare):

Read the envelope curves to verify the settings.

Under "Read curve", click "Threshold broken probe" and check whether the broken probe threshold at the zero point is approx. 100 mV lower than the largest negative reflection of the launch.



Note!

A number of parameters are preconfigured in devices with automatic time-of-flight compensation (gas phase compensation) and they must not be changed ($\rightarrow \square$ 18, Section "Repairs").

Also note the following in devices with automatic time-of-flight compensation (gas phase compensation):

- The probe length must be configured to the value "2 times the physical probe length LN" as the expected shifts of the level echo are in this range.
- If a reset was carried out, the initial settings made in delivery status must be restored (\rightarrow parameter values in table , $\rightarrow \triangleq 18$).
- If the "Medium property" parameter was changed, the "upper block. distance" parameter must be reconfigured subsequently (\rightarrow parameter value in table, $\rightarrow \triangleq 18$).

Configuration

The configuration is performed as follows depending on the application:

Steam boiler approval without WHG, without gas phase compensation

Option 1

 The parameters are safety-oriented with the "WHG" setting in 018 (→ information in the following table). Modifications are not possible as the settings are locked.

$Option \ 2$

• As an alternative to activating the "WHG" setting, it is also possible to make the safety-oriented setting manually. In doing so, please observe the information in the table below.

Steam boiler approval with WHG, without gas phase compensation

 The parameters are safety-oriented with the "WHG" setting in 018 (→ information in the following table). Modifications are not possible as the settings are locked.

Steam boiler approval without WHG, with gas phase compensation



The "WHG" setting may not be selected in 018.

• The safety-oriented setting must be made manually. In doing so, please observe the information in the table below!

"threshold near", "threshold attenuation constant" and "threshold far" are preset at the factory and may not be modified.



Note!

Note!

The parameters in *italics* are located on the service level, which can be opened with the code "300".

FieldCare/ Display - plain text displa	Value/parameter y	Display VU331	Comment
Safaty sattings			
Salety settings		010	
output on ALARM	Max. 110 %, 22 mA	010	Parameter must be configured in this way
outp. echo loss	ALARM	012	Parameter must be configured in this way
delay time	1 s	014	\rightarrow Note 1
in safety distance	self holding	016	\rightarrow Note 3
Filtering/averaging/delay	1		
For software 01.02.zz:			
envelope statistics	0	0D21	\rightarrow Note 2
For software 01.04.zz:		!	
envelope statistics up	0	0D23	\rightarrow Note 2
envelope statistics down	0	0D24	\rightarrow Note 2
max, low pass	10 s	0D14	\rightarrow Note 2
mail to the pass			
delta at min.	0 mm	0D15	\rightarrow Note 2
delta at min. General:	0 mm	0D15	\rightarrow Note 2
delta at min. General: MAM filt. length	0 mm	0D15 0D11	\rightarrow Note 2 \rightarrow Note 2
delta at min. General: MAM filt. length MAM filt. border	0 mm 5 1	0D15 0D11 0D12	$\rightarrow \text{Note } 2$ $\rightarrow \text{Note } 2$ $\rightarrow \text{Note } 2$

FieldCare/ Display - plain text display	Value/parameter	Display VU331	Comment
Echo detection			
For software 01.04.zz:			
detection window	Off	0A7	Parameter must be configured in this way
merging echoes	parable fit	0D25	Parameter must be configured in this way
General:			
threshold near	0.04*0D85, if "Tank prop." (002) = coax probe (4), 0.07*0D85, otherwise	0D35	\rightarrow Note 3, 5
threshold attenuation constant	= 0D86	0D36	\rightarrow Note 3, 5
threshold far	0.04*0D87, if "Tank prop." (002) = coax probe (4), 0.07*0D87, otherwise	0D37	\rightarrow Note 3, 5
EOP evaluation	On	0D61	\rightarrow Note 3
EOP in upper area	echo preferred (factory setting)	0D62	Parameter must be configured in this way \rightarrow also Note 4
First echo factor	6 dB	0D51	\rightarrow Note 3
Max. filling speed	0 mm/s (factory setting)	0D15	Parameter must be configured in this way
Max. drain speed	0 mm/s (factory setting)	0D16	Parameter must be configured in this way
Other			
hysterese width	0 mm (factory setting)	0D14	Parameter \boldsymbol{must} be configured in this way
Communication address	0	060	Parameter must be configured in this way
Current output mode	"Standard" if previously "fixed current"	063	Parameter must be configured in this way
Simulation	Sim./OFF	065	Parameter must be configured in this way

Note!

- 1. This parameter determines the reaction time of the device in the event of echo loss; a setting of less than 30 s is recommended.
- 2. This parameter determines the reaction time of the device; deviating settings are possible. In case of changes in **"process cond." (004)** it is automatically adjusted. The corresponding reaction time is indicated in the documentation BA245F.
- 3. This parameter can be selected differently, depending on the application.
- 4. In the "Tank properties" (002) function, "aluminum tank" may not be used!
- 5. In the case of devices with gas phase compensation, these parameters are preset at the factory and may not be modified.

A measuring condition (echo) which results in an ALARM in the "Safety distance SD" area can be reset or deleted by

- confirming the ALARM in Pos. 017 locally by means of the VU331 LCD display;
- confirming the alarm via the communication protocol (HART) (FieldCare: "ackn. alarm" under safety settings).

Locking

The device must be locked once the Levelflex M has been calibrated as per the Operating Instructions. To do this, hardware locking (recommended) or software locking can be activated.

Type of locking	Code/action	Position/VU331 display
Hardware (recommended)	3 keys together "lock"	Locally via VU331 display (keys $\stackrel{+}{}$ and $\stackrel{-}{}$ and $\stackrel{\mathbb{E}}{}$)
	\downarrow	
Software	100	0A4

Unlocking

The device is unlocked by firstly removing the hardware lock by locally pressing all the three keys together via the VU331 LCD display and then by setting the "Overfill protection" parameter (Position 018) to "Standard" if necessary.

Type of unlocking	Code/action	Position/VU331 display
Hardware; if locked	3 keys together "unlock"	Locally via VU331 display (keys * and = and =)
	\downarrow	
Software	Standard	018

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.

Device response after power interruption

After the device is switched on or after power interruption, the measured value is only available after 17 s.

Error of measurement

Levelflex M FMP45

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 (\rightarrow TI386F/00).

The impact on the measuring signal can be compensated with the gas phase compensation option (product version "U, V, Y (TSP8N0008)").

If the gas phase compensation option is used, the greater the reference distance Lref and smaller the measuring range, the higher the accuracy under reference operating conditions:





Note!

If there are fast changes in pressure, there may be an additional error, since the measured reference distance is filtered with twice 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 RMA422

The measured error (full scale) is 1 % for use of process transmitter RMA422 in limiting devices.

maintenance work on the device. Caution! - During operation, the Levelflex M FMP45 is hot! Risk of serious burns to the hands and arms. - Steam or hot water can come out when the probe is released! Risk of serious scalding to the whole body! - Only carry out installation and maintenance work when the device has cooled down! - Only disassemble the Levelflex M FMP45 when the boiler pressure is 0 bar! Checking device operativeness

instructions on maintenance and recalibration.

Maintenance

Testing

Maintenance

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.

Please refer to the relevant Operating Instructions ($\rightarrow \square 6$, "Supplementary device documentation") for

Alternative monitoring measures must be taken to ensure process safety during configuration, testing and



Suitable test sequences for Levelflex M are described in SD174F, chapter "Proof-test".

Repairs

Note!

Repairs

Repairs on the devices must always be carried out by Endress+Hauser. Safety functions cannot be guaranteed if repairs are carried out by anybody else.

Exception in the case of Levelflex M FMP45:

The following components can be replaced by the customer if the person responsible for doing so has been trained beforehand by Endress+Hauser:

- Terminal module (2-wire)
- Power supply (4-wire)
- Probe rods and ropes

Contrary to the guidelines in the Operating Instructions, the following parameters are preconfigured in devices with automatic time-of-flight compensation (gas phase compensation) and must be reconfigured after the electronics has been replaced:

Function group	Parameter	Value
Basic setup	medium property	> 7
	tank property	Coax probe (with coax probe), bypass/pipe (with rod probe)
Extended calibr.	upper block. distance	Lref + 50 mm
Length adjustment	probe length	2 x LN
Extended calibr.	present map distance	0 mm (mapping deleted)
Safety settings	broken probe detection	ON
Service/broken probe	LBD broken probe	LN + 100 mm
	reflection factor	1.1
Service/algorithm 2	reference dist.	Lref
Service/algorithm 2	ref. dist. win.	Lref
Service/algorithm 2	ref. dist. polarity	negative

Levelflex M FMP45

			\frown
		TUN	NORD
	Zert	ifikat	
	Cen	lificate	
	Regis	trier-Nr.	
	Regist 44 799 0	ered No. 8 554124	
Zeichen des Auftraggebers Customer's reference	Auftragsdatum Date of order 13.03.2008	Aktenzeichen File reference 8000554124	Prüfbericht Nr. Test report no. WB 8107/08
Name und Anschrift des Auftraggebers	Endress+Hauser GmbH+C Hauptstraße 1 79689 Maulburg Deutschland	50. KG	Name and address of the customer
Geprüft nach:	EN 12952-11:2007 und EN 5.5 Überprüfung der Funk Tabelle 1, Pos. A 5.6 Fehlermeldung Anhang D	12953-9:2007 tionsfähigkeit gem.	Tested in accordance with
Bezeichnung, Typ	Levelflex M Typ FMP 45 Begrenzungseinrichtung Niedrigwasser (NW)	. (Geführtes Füllstand-Radar) als für Hochwasser (HW) und	Designation, Type
Beschreibung des Produktes (Details s. Anlage 1)	Standaufnehmer in Form von Stab-, Seil- oder Koaxsonden mit integriertem Messumformer (Elektronikeinsatz) und elektrischem Ausgangssignal, der nach der Laufzeit- methode 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		Description of product (Details see Annex 1)
Bemerkung	 Nach einer Spannungsunterbrechung ist zu beachten, dass de Messwert erst nach 17s wieder zur Verfügung steht. Der Standaufnehmer kann für mehr als 24 Stunden ohne Beaufsichtigung als Teil einer Begrenzungseinrichtung betrieben werden, wenn die Anforderungen gem. EN 12952-7:2002, Abschnitt 7.3.9 eingehalten werden. Damit ist auch der 72 Stunden Betrieb bzw. der Betrieb ohne Beobachtung abgedeckt. 		e g e
TÜV NORD CERT GmbH Zertifizierungsstelle für Produ Certification body for product sat	ktsicherheit fety		
Khleett	Bitte beachten sie auch	die umseitigen Hinwei≤e*	Hannover, 17.07.2008 Hannover, 2008-07-17
	Please also pay attention to	the information stated overleaf	

Cartificates

* Only refers to general terms and conditions and is therefore not shown

	75	VNORD
	Zertifikat	
	Certificate	
	Registrier-Nr. Registration No.	
	44 799 09 371035	
Zeichen des Auftraggeber Customer's reference 	s Auftragsdatum Aktenzeichen Date of order File reference 07.05.2009 8000371035	Prüfbericht Nr. Test report no. 09 799 371035
Name und Anschrift des Auftraggebers	Endress+Hauser GmbH+Co. KG Hauptstraße 1 79689 Maulburg Deutschland	Customer's name and address
Geprüft nach	EN 12952-11:2007 und EN 12953-9:2007 5.5 Überprüfung der Funktionsfähigkeit gem. Tabelle 1, Pos. A 5.6 Fehlermeldung, Anhang D EN 61508:2001	Tested in accordance with
Beschreibung des Produktes (Details siehe Anhang 1)	Geführtes Füllstand-Radar Guided Level Radar	Description of product (Details see Annex 1)
Typenbezeichnung	Levelflex M Typ FMP45 mit Prozessmessumformer Typ RMA422 als Begrenzungseinrichtung für HW und NW bzw. für NW/HW und Regelung in 2-Draht oder 4-Drahtausführung	Type Description
Geräte-Nr.		Serial-no.
Bemerkung	 Nach einer Spannungsunterbrechung ist zu beachten, dass der Messwert erst nach 17s wieder zur Verfügung steht. Die Messeinrichtung kann für mehr als 24 Stunden ohne Beaufsichtigung als Teil einer Begrenzungseinrichtung betrieben werden, wenn die Anfor- derungen gem. EN 12952-7:2002, Abschnitt 7.3.9 eingehalten werden. Damit ist auch der 72 Stunden Betrieb bzw. der Betrieb ohne Beobachtung abge- deckt. 	Remark
Dieses Zertifikat bescheinig Qualität der Produkte aus d This certifies the result of th of the products from the ser	t das Ergebnis der Prüfung an dem vorgestellten Prüfgegenstand. Eine allgemein gi er laufenden Fertigung kann hieraus nicht abgeleitet werden. e examination of the product sample submitted by the manufacturer. A general state ies manufacture cannot be derived there from.	Itige Aussage über die ament concerning the quality
TÜV NORD CERT GmbH Zertifizierungsstelle Certification body for produ	uct safety	
Chloleft		Hannover, 17.08.2009
	Bitte beachten sie auch die umseitigen Hinweise	Hannover, 2009-08-17
Gesc	глеазе ако рау ашенион ю the information stated overleaf häftsstelle Hannover. Am TÜV 1, 30519 Hannover. Fon +49 (0)511 986 1455. Fax +49 (0)511 98	6 1590

Anhang 1 zum Zertifikat Nr.:		TJV NORD	
44 799 09 371035			
Rev. 1			
Aktenzeichen: 8000371035 File reference		Seite 1 von 1 Page 1 of 1	
Allgemeine Angaben General information	Siehe Seite 1 des Zertifikates See also page 1 of the Certificate		
Typenbezeichnung Type Description	Levelflex M Typ FMP45 (Geführtes Füllstand Prozessmessumformer Typ RMA422 (Software- als Begrenzungseinrichtung für HW und NW bz und Regelung in 2-Draht oder 4-Drahtausführur	-Radar) mit Version 2.01) w. für NW/HW Ig	
Beschreibung des Produktes Description of product	 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. Prozessmessumformer zur Erfassung und Weiterverarbeitung 		
Ausgangssignale Output signals	Analogausgänge 4 bis 20 mA und/oder Relaisa	ısgänge	
TÜV NORD CERT GmbH Zertifizierungsstelle Certification body for product safety			
111.011.0		Hannover 17.08.2000	

Instruments International

Endress+Hauser Instruments International AG Kaegenstrasse 2 4153 Reinach Switzerland

Tel. +41 61 715 81 00 Fax +41 61 715 25 00 www.endress.com info@ii.endress.com



SD288F/00/EN/04.10 71116347 FM+SGML 6.0

