

Reed sensor for bypass level indicators, model BT

EN



Reed Sensor for bypass level indicators model BT
Aluminium housing, bottom mounted

© 2016 WIKA Alexander Wiegand SE & Co. KG

All rights reserved. / Alle Rechte vorbehalten.

WIKA® and KSR® are registered trademarks in various countries.

WIKA® and KSR® sind geschützte Marken in verschiedenen Ländern.

Prior to starting any work, read the operating instructions!

Keep for later use!

Vor Beginn aller Arbeiten Betriebsanleitung lesen!

Zum späteren Gebrauch aufbewahren!



KSR Kuebler Niveau-Messtechnik AG

Heinrich-Kuebler-Platz 1

69439 Zwingenberg am Neckar • Germany

Tel. +49 6263/87-0

Fax +49 6263/87-99

info@ksr-kuebler.com

www.ksr-kuebler.com



Gayesco-WIKA USA

229 Beltway Green Boulevard

Pasadena, Texas 77503

Tel. +1 713 475 0022

Fax +1 713 475 0011

info@wikahouston.com

www.wika.com

Contents

1. General information	4
2. Design and function	5
3. Safety	6
4. Transport, packaging and storage	10
5. Commissioning, operation	11
6. Faults	15
7. Maintenance and cleaning	16
8. Dismounting, return and disposal	18
9. Specifications	19

1. General information

- The magnetic Level sensors described in the operating instructions have been designed and manufactured using state-of-the-art technology. All components are subject to stringent quality and environmental criteria during production. Our management systems are certified to ISO 9001.
- These operating instructions contain important information on handling the instrument. Working safely requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the instrument's range of use.
- The operating instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time. Pass the operating instructions on to the next operator or owner of the instrument.
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The general terms and conditions contained in the sales documentation shall apply.
- Subject to technical modifications.
- Further information:

Internet address: www.ksr-kuebler.com / www.wika.com

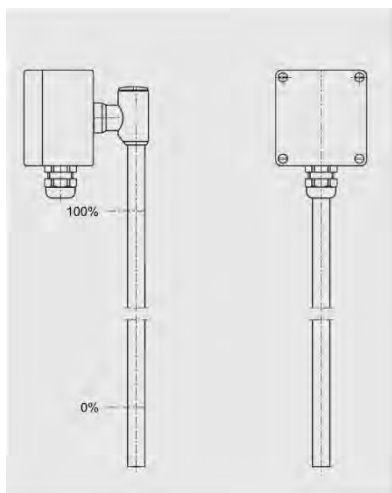
Relevant data sheet: BLR / LM 10.04

2. Design and function

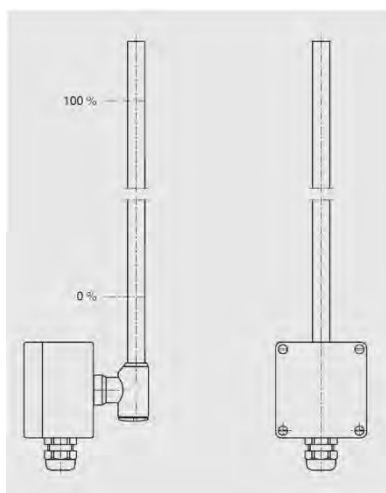
2.1 Functional description

Reed sensors series BT are used for continuous monitoring and recording of the liquid level in connection with transmitters. They operate on the float principle with magnetic transmission in a 3-wire potentiometer circuit.

A magnetic system built into the float actuates reed contacts, through the walls of the bypass chamber and of the sensor tube, in a resistance measuring chain (potentiometer). The float changes its height with the level of the medium it is monitoring. The measured resistance signal is proportional to the level. The measurement voltage is very finely stepped due to the contact separation of the resistance measuring chain and is thus virtually continuous.



Housing top



Housing bottom

2.2 Scope of delivery

Cross-check scope of delivery with delivery note.

3. Safety

3.1 Symbols



DANGER!

... indicates an immediately hazardous situation which might result in death or severe injuries if it is not avoided.



WARNING!

... indicates an potentially hazardous situation which might result in death or severe injuries if it is not avoided.



CAUTION!

... indicates an potentially hazardous situation which might result in light or minor injuries or property or environmental damages if it is not avoided.



Information

... highlights useful tips and recommendations and information for efficient and fault-free operation.

3.2 Proper intended use

Level sensors are solely intended for monitoring the liquid level of fluids. The area of use is based on the technical performance limits and materials.

- The fluids must not be contaminated nor contain coarse particles nor tend to crystallize. It must be ensured that the magnetic switch materials that come into contact with the media are sufficiently resistant to the monitored medium. Not suitable for dispersion, abrasive fluids, highly viscous media and paints.
- Compliance with the usage conditions specified in the operating instructions is required.
- Do not operate the unit in direct proximity of ferro-magnetic environments (distance min. 50mm).
- Do not operate the unit in direct proximity of strong electromagnetic fields or in direct proximity of facilities that can be impacted by magnetic fields (distance min. 1m).

- The level sensors must not be exposed to heavy mechanical strain (impact, bending, vibration).
- Compliance with the relevant safety regulations for the use is required.
- Compliance with the technical specifications in these operating instructions is required. Improper use or operation of the unit outside the technical specifications requires immediate shut-down and inspection by an authorized WIKA service technician.

Claims of any kind due to improper use are excluded.



DANGER!

When working on containers, there is a risk of poisoning or suffocation. Work may only be performed using suitable personal safety equipment (e.g. respiratory protection, protective clothing, etc.).

An explosive atmosphere may develop in a container. Measures must be taken to prevent sparking. Work in such areas must be done by qualified personnel in accordance with the relevant safety regulations and guidelines.

3.3 Improper use

Any use that exceeds the technical performance thresholds or that is incompatible with the materials is considered improper use.



WARNING!

Injury due to improper use

Improper use of the unit can result in hazardous situations and injuries.

Do not modify the unit without authorization.

Any use beyond the proper intended use or any other use is considered improper use.

Do not use this unit in safety or emergency off equipment.

3.4 Responsibility of the operator

The unit is used in the industrial sector. The operator is therefore subject to statutory obligations with respect to occupational safety.

Compliance with the safety instructions in these operating instructions and the applicable safety, accident prevention and environmental protection regulations for the area of use of the unit is required.

In order to safely work on the unit, the operator must ensure

- the operating personnel is regularly trained in all matters pertaining to occupational safety, first aid and environmental conservation and is familiar with the operating instructions and, in particular, the safety instructions contained therein
- the unit is suitable for the application in accordance with the proper intended use (check for improper use).

After check, improper use is excluded.

3.5 Personnel qualification



WARNING!

Risk of injury due to insufficient qualifications

Improper use can result in significant personal injury and property damages.

The activities described in these operating instructions may only be performed by specialist technicians with the following qualifications.

Specialist personnel

The specialist personnel authorized by the operator is capable of executing the described work and autonomously detect potential hazards due their technical training, knowledge of measuring and control technology and their experience and knowledge of country-specific regulations, applicable standards and guidelines.

3.6 Personal safety equipment

The personal safety equipment serves to protect the technicians against hazards that might impact the safety or health while working. When executing the various tasks on and with the unit, the technicians must wear personal safety equipment.

Comply with warning signs posted in the work area regarding personal safety equipment!

The required personal safety equipment must be provided by the operator.

4. Transport, packaging and storage

4.1 Transport

Check the magnetic Level sensor for any damage that may have been caused by transport. Obvious damage must be reported immediately.



CAUTION!

Damage due to improper transport

With improper transport, a high level of damage to property can occur.

- Observe the symbols on the packaging.
- Handle packed goods with care

4.2 Transport and storage

Do not remove packaging until just before commissioning.

5. Commissioning, operation

- Observe all instructions given on the shipment packaging for removing the transportation safety devices.
- Remove the magnetic Level sensor carefully from the packaging!
- When unpacking, check all components for any external damage.

5.1 Functional check

Prior to installation, a functional test of the level sensor can be carried out with a resistance measuring instrument and manual movement of the float.

The following table describes the measurements and the expected measured values for the movement of the float, starting from the float stop in the direction of the tank opening.

Resistance measurement of the wire colours	Measured value
BK — BN (R1)	Resistance value rises proportionally with the position of the float.
BU — BN (R2)	Resistance value drops in inverse proportion to the position of the float.
BK — BU (Ri)	Resistance value remains constant, irrespective of the position of the float.



WARNING!

Ensure that the functional check does not start any unintended processes.

Functional tests must only be carried out with equipment that is approved for use in hazardous area. Tests must be conducted by qualified personnel in accordance with the relevant safety regulations and guidelines.

5.2 Mounting

Normally, the reed sensor is pre-mounted on the bypass or on the top-mounted level indicator. With this, please pay attention to the position of the measuring range marking as well as the distance between the reed sensor and the bypass chamber. The distance should be as low as possible.

5.3 Electrical connection



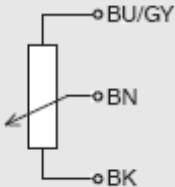
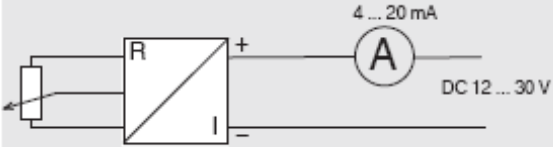
Warning!

Never open cover in hazardous areas while circuits are energized. Follow all safety work procedures and lock out circuits before servicing or inspection.

- The electrical connection must only be made by qualified skilled personnel.
- Wire the level sensor in accordance with the connection diagram of the electrical output (see product label). The connection terminals are appropriately marked.
- Seal the cable gland at the connection housing.
- Install a pour-seal (conduit seal) fitting within 18 inches of the housing to prevent water from entering the housing and for compliance with the National Electrical Code.
- Transmitters with integral electronics (puck and/or display) must be connected in a series loop with the readout or data acquisition device and the power supply. Shielded cable must be used for noise immunity and for Intrinsically Safe applications an agency approved safety barrier must be installed. A ground wire must be provided and connected to the ground block inside the housing.
- To connect a transmitter with a built-in digital display, unscrew and remove the housing cover and carefully remove the plastic label from around the display by grasping each side and pulling upwards. Remove the digital display by carefully pulling up on two diagonal sides of the display. The indicator is held in place by two banana plugs which plug

into the baseboard where the 4 to 20 mA puck is mounted. Field wiring connections are made to a two point, compression type, terminal block located on the baseboard (see Fig. 2 for Explosion Proof or drawing 095-3201-001 Pg. 1 for Intrinsically Safe applications). Attach a ground wire directly to the ground screw inside the housing.

- To connect a transmitter without a built-in display, unscrew and remove the housing cover. Field wiring connections are made directly to the puck (see Fig 3 for Explosion Proof, drawing 095-3201-001 Pg. 2 for single puck Intrinsically Safe applications, or drawing 095-3201-001 Pg. 4 for dual puck Intrinsically Safe applications). Attach a ground wire directly to the ground screw inside the housing.

Electrical output	Connection diagram
<p>The entire assembly corresponds to a 3-wire potentiometer circuit</p>	
<p>Head-mounted transmitter with 4 ... 20 mA</p>	



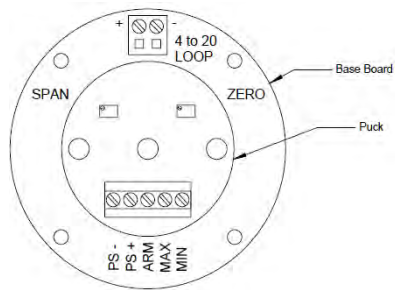
WARNING!

Malfunctions through voltage spikes due to running cables together with mains connection leads or due to large cable lengths.

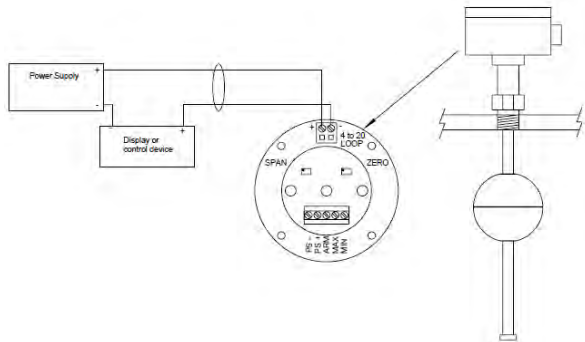
This can lead to a malfunction in the plant and thus lead to injury to personnel or damage to equipment.

- Use shielded connection leads
- Ground connection leads at one end

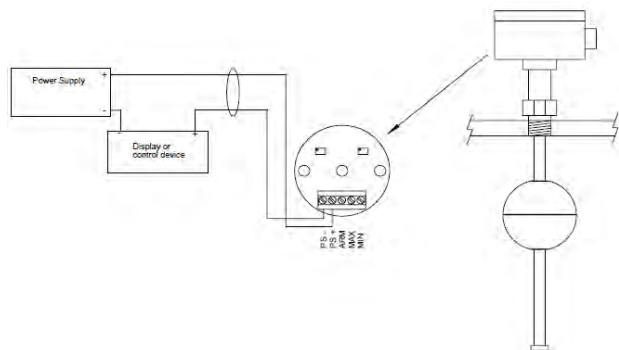
Always observe the mounting and operating instructions of accessories when commissioning them.



PCB layout and components



Wiring for transmitters with integral display



Wiring for transmitters without integral display

6. Faults



The following table contains the most frequent causes of faults and the necessary countermeasures.

Faults	Causes	Measures
No signal, non-linear or undefined signal	Electrical connection incorrect	See chapter 5.4 "Electrical connection". Check assignment with the aid of the connection diagram.
	Measuring chain defective	Return to the factory
	Head-mounted transmitter defective	Return to the factory
	Head-mounted transmitter adjusted incorrectly	Change settings acc. to manual of head-mounted transmitter or return to the factory



CAUTION!

Physical injuries and damage to property and the environment

If faults cannot be eliminated by means of the listed measures, the instrument must be taken out of operation immediately.

- Ensure that there is no longer any pressure present and protect against being put into operation accidentally.
- Contact the manufacturer.
- If a return is needed, please follow the instructions given in chapter 8.2 "Return".

7. Maintenance and cleaning

7.1 Maintenance

When used properly, the level sensors work maintenance-free. They must be subjected to visual inspection within the context of regular maintenance, however, and included in the vessel pressure test.



DANGER!

Work on vessels involves the danger of intoxication and suffocation. No work is allowed to be carried out unless by taking suitable personal protective measures (e.g. respiratory protection apparatus, protective outfit etc.).

Repairs must only be carried out by the manufacturer.



Perfect functioning of the level sensors can only be guaranteed when original accessories and spare parts are used.

7.2 Cleaning



CAUTION!

Physical injuries and damage to property and the environment

Improper cleaning may lead to physical injuries and damage to property and the environment. Residual media in the dismantled instrument can result in a risk to persons, the environment and equipment.

- Rinse or clean the removed instrument.
- Sufficient precautionary measures must be taken.

1. Prior to cleaning the unit, properly disconnect it from the process and the power supply.
2. Carefully clean the unit with a damp cloth.
3. Do not let electrical connections come into contact with moisture!



CAUTION!

Damage to property

Improper cleaning may lead to damage to the instrument!

- Do not use any aggressive cleaning agents.
- Do not use any pointed and hard objects for cleaning.

8. Dismounting, return and disposal



WARNING!

Physical injuries and damage to property and the environment through residual media

Residual media in the dismantled instrument can result in a risk to persons, the environment and equipment.

- Wash or clean the dismantled instrument, in order to protect persons and the environment from exposure to residual media.

8.1 Dismounting

Only disconnect the measuring instrument once the system has been depressurised and the power disconnected!

8.2 Return

Wash or clean the dismantled magnetic Level sensor before returning it, in order to protect personnel and the environment from exposure to residual media.



Information on returns can be found under the heading “Service” on our local website.

8.3 Disposal

Incorrect disposal can put the environment at risk.

Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

9. Specifications

Models

Model	Description	Rating ^{*)}	Marking
BT	Reed level sensor aluminium housing	NI	CL I, Div 2, GP ABCD, T4 Ta = 60°C, Type 4
BTX	Reed level sensor aluminium housing	XP	CL I, Div 1, GP BCD T6 Ta = 60°C
		DIP	CL II, III, Div 1, GP EFG T3C Ta = 60°C
		NI	CL I, Div 2, GP ABCD, T4 Ta = 60°C, Type 4
BTXI	Reed level sensor aluminium housing with indicator	XP	CL I, Div 1, GP BCD T6 Ta = 60°C
		DIP	CL II, III, Div 1, GP EFG T3C Ta = 60°C
		NI	CL I, Div 2, GP ABCD, T4 Ta = 60°C, Type 4

***) Ratings (FM-approved for the United States of America)**

XP: Explosionproof for Class I, Division 1, Groups B, C and D

DIP: Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G

NI: Nonincendive for Class I, Division 2 Groups A, B, C and D hazardous (classified) locations, indoors and outdoors (Type 4, 4X)

Type code

Field-No.	Code	Description
Basic type		
1	BT	Reed level sensor, NI
	BTX	Reed level sensor, XP, DIP, NI
	BTXI	Reed level sensor with indicator, XP, DIP, NI
Resolution		
2	aa	Resolution in mm (2 digits)
Length		
3	bbbb	Length in inches (4 digits)

Type: (1) (2) (3)
Type: - -

For further specifications see data sheet BLR and LM 20.02.

CERTIFICATE OF CONFORMITY



- HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS
- Certificate No: FM18US0215
- Equipment:
(Type Reference and Name) *Series F, MMS, MRS, S, SS Level Switch and Series BT, HT, ST, T, TD, TP, HTP Level Transmitter*
- Name of Listing Company: KSR Kuebler Niveau-Messtechnik AG
- Address of Listing Company: Heinrich-Kuebler-Platz 1,
D-69439 ZwIngenberg,
Germany
- The examination and test results are recorded in confidential report number:
3D4A0.AE dated 8th March 1999
- FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:
FM Class 3600:2018, FM Class 3611 2004, FM Class 3615:2018, FM Class 3810: 2018,
NEMA 250:1991
- If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
- This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
- Equipment Ratings:
Explosionproof for Class I, Division 1, Groups B, C and D; Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G; Nonincendive for Class I, Division 2 Groups A, B, C and D hazardous (classified) locations, indoors and outdoors (Type 4, 4X)
- The marking of the equipment shall include:

Certificate issued by:

J.E. Marquedant
VP, Manager, Electrical Systems

27 August 2018

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

F 347 (Mar 16)

Page 1 of 6

SCHEDULE



US Certificate Of Conformity No: FM18US0215

BT-a-b. Level Transmitter.

CL I, Div 2, GP ABCD, T4 Ta = 60°C, Type 4

BTX-a-b, BTXi-a-b. Level Transmitter.

CL I, Div 1, GP BCD T6 Ta = 60°C;
CL II, III, Div 1, GP EFG T3C Ta = 60°C;
CL I, Div 2, GP ABCD, T4 Ta = 60°C, Type 4

HT12abcdefg. Level Transmitter.

HT14abcdefg, HT18abcdefg. Level Transmitter.
HTD14abcdefg, HTD18abcdefg. Level Transmitter.

ST14abcdefgh, ST18abcdefgh. Level Transmitter.

T12abcdefg. Level Transmitter.
T14abcdefg, T18abcdefg. Level Transmitter.
T48abcdefg0. Level Transmitter.
TD14abcdefg, TD18abcdefg. Level Transmitter.
TD48abcdefg0. Level Transmitter.
CL I, Div 1, GP BCD T6 Ta = 60°C;
CL II, III, Div 1, GP EFG T6 Ta = 60°C;
CL I, Div 2, GP ABCD, T4 Ta = 60°C, Type 4/4X

TP16abcdefg, TP20abcdefg. Level Transmitter.

CL I, Div 2, GP ABCD, T4 Ta = 60°C, Type 4/4X

F50abdefg or F70abdefg. Level Switch.

CL I, Div 1, GP BCD T6 Ta = 77°C;
CL II, III, Div 1, GP EFG, Type 4

S12abcdefg. Level Switch.

S18abcdefg. Level Switch.
S48abcdefg. Level Switch.
SS14abcdefgh. Level Switch.
SS18abcdefgh. Level Switch.
CL I, Div 1, GP BCD T6 Ta = 77°C;
CL II, III, Div 1, GP EFG, T6 Ta = 77°C, Type 4/4X

SP12abcdefS and SP20abcdefS. Level Switch.

Type 4/4X

MRS-2-XP, MMS-5-XP. Level Switch.

MRS-2-XP-HT. Level Switch.

Type 4

12. Description of Equipment:

General – Model F, MMS, MRS, S, SS Level Switches, and BT, HT, ST, T, TD, TP, HTP Level Transmitters measure the level of a liquid using a magnetically coupled float.

Construction – Model F, MMS, MRS, S, SS Level Switches, and BT, HT, ST, T, TD, TP, HTP Level Transmitters are coupled to a sensing tube probe assembly. The probe assembly is threaded into an electronics housing where all input/output connections are made.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA

T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

F 347 (Mar 16)

Page 2 of 6

SCHEDULE



US Certificate Of Conformity No: FM18US0215

Ratings – See section 11 for the ambient temperature specifics of the Model F, MMS, MRS, S, SS Level Switches, and BT, HT, ST, T, TD, TP, HTP Level Transmitters.

BT-a-b, Level Transmitter.

- a = Resolution in mm (2 digits).
- b = Length in inches (4 digits).

BTX-a-b, BTXI-a-b, Level Transmitter.

- a = Resolution in mm (2 digits).
- b = Length in inches (4 digits).

HT12abcdefg, Level Transmitter.

- a = Resolution A, D or F.
- b = Wetted parts material S, L, B, C or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N05, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0, 1 or 3.
- g = Housing 4, 7, 8 or 9 (4 intrinsically safe and nonincendive only).

HT14abcdefg, HT18abcdefg, Level Transmitter.

- a = Resolution A, D or F.
- b = Wetted parts material S, L, B, C or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0, 1 or 3.
- g = Housing 4, 7, 8 or 9 (4 intrinsically safe and nonincendive only).

HTD14abcdefg, HTD18abcdefg, Level Transmitter.

- a = Resolution A, D or F.
- b = Wetted parts material S, L, B, C or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0 or 1.
- g = Housing 7, 8 or 9.

ST14abcdefg, ST18abcdefg, Level Transmitter.

- a = Resolution A, D or F.
- b = Wetted parts material S or L.
- c = Sensor length inches (3 digits).
- d = Connection 10, 15, 20, 25, 30, 40, 50, 60 or AD.
- e = Connection rating S or N.
- f = Electronics option 0, 1 or 3.
- g = Housing 4, 7, 8 or 9 (4 intrinsically safe and nonincendive only).
- h = Float stop 1, 2 or 4.

T12abcdefg, Level Transmitter.

- a = Resolution A, B, C, D, E, F, G or H.
- b = Wetted parts material S, L, C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N05, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0, 1 or 3.
- g = Housing 4, 6, 7, 8 or 9 (4, 6 intrinsically safe and nonincendive only).

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE



US Certificate Of Conformity No: FM18US0215

T14abcdefg, T18abcdefg. Level Transmitter.

- a = Resolution A, B, C, D, E, F, G or H.
- b = Wetted parts material S, L, C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0, 1 or 3.
- g = Housing 4, 6, 7, 8 or 9 (4, 6 intrinsically safe and nonincendive only).

T48abcdefg0. Level Transmitter.

- a = Resolution A, B, C, D, E, F, G or H.
- b = Wetted parts material S, L, C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F20, F25, F30, F40, F50, F60, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0, 1 or 3.
- g = Housing 4, 6, 7, 8 or 9 (4, 6 intrinsically safe and nonincendive only).

TD14abcdefg, TD18abcdefg. Level Transmitter.

- a = Resolution A, B, C, D, E, F, G or H.
- b = Wetted parts material S, L, C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0 or 1.
- g = Housing 7, 8 or 9.

TD48abcdefg0. Level Transmitter.

- a = Resolution A, B, C, D, E, F, G or H.
- b = Wetted parts material S, L, C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F20, F25, F30, F40, F50, F60, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Electronics option 0 or 1.
- g = Housing 4, 6, 7, 8 or 9 (4, 6 intrinsically safe and nonincendive only).

TP16abcdefg, TP20abcdefg. Level Transmitter.

- a = Resolution A, B, C, D, E, F, G or H.
- b = Wetted parts material V, P or K.
- c = Sensor length inches (3 digits).
- d = Connection type F10, F15, F20, F25, F30, F40, F50, F60, N75, N10, N15, N20, NAD.
- e = Connection rating A or D.
- f = Electronics option 0, 1 or 3.
- g = Housing 1, 4, 7 or 9.

SP12abcdeFS and SP20abcdeFS. Level Switch.

- a = Number of switches 1, 2, 3 or 4.
- b = Wetted parts material V, P or K.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N05 (SP12 only), N10, N15, N20 or NAD.
- e = Connection rating A or D.
- f = Housing 1, 4, 5 or 7.

F50abdefg or F70abcdefg. Level Switch.

- a = Number of switches 1, 2, 3 or 4.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA

T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

F 347 (Mar 16)

Page 4 of 6

SCHEDULE



US Certificate Of Conformity No: FM18US0215

- b = Wetted parts material S, L, C, B or T.
- c = Chamber A, B or K.
- d = Connection orientation H or V.
- e = Connection F05, F75, F10, F15, F20, N05, N75 or N10.
- f = Connection rating A, B, C or D.
- g = Housing 4, 5 or 7 (4, 5 nonhazardous location rated).

MRS-2-XP, MMS-5-XP. Level Switch.

MRS-2-XP-HT. Level Switch.

S12abcdefg. Level Switch.

- a = Number of switches 1, 2, 3 or 4.
- b = Wetted parts material S, L C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N05, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Housing 4, 5, 7 or 8 (4, 5 nonhazardous location rated).
- g = Switch temperature S, L or H.

S18abcdefg. Level Switch.

- a = Number of switches 1, 2, 3, 4, 5 or 6.
- b = Wetted parts material S, L C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F10, F15, F20, F25, F30, F40, F50, F60, N75, N10, N15, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Housing 4, 5, 7, 8 or 9 (4, 5 nonhazardous location rated).
- g = Switch temperature S, L or H.

S48abcdefg. Level Switch.

- a = Number of switches 1, 2, 3, 4, 5 or 6 (4 max for S12).
- b = Wetted parts material S, L C, B or T.
- c = Sensor length inches (3 digits).
- d = Connection F20, F25, F30, F40, F50, F60, N20 or NAD.
- e = Connection rating A, B, C or D.
- f = Housing 4, 7, 8 or 9 (4 nonhazardous location rated).
- g = Switch temperature S, L or H.

SS14abcdeh. Level Switch.

- a = Number of switches 1, 2, 3 or 4.
- b = Wetted parts material S or L.
- c = Sensor length inches (3 digits).
- d = Connection 10, 15, 20, 25, 30, 40, 50, 60 or AD.
- e = Connection rating S or N.
- f = Housing 4, 7 or 8 (4 nonhazardous location rated).
- g = Switch temperature S, L or H.
- h = Float stop 1, 2 or 4.

SS18abcdeh. Level Switch.

- a = Number of switches 1, 2, 3, 4, 5 or 6.
- b = Wetted parts material S or L.
- c = Sensor length inches (3 digits).
- d = Connection 10, 15, 20, 25, 30, 40, 50, 60 or AD.
- e = Connection rating S or N.
- f = Housing 4, 7, 8 or 9 (4 nonhazardous location rated).

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmaprovals.com www.fmaprovals.com

F 347 (Mar 16)

Page 5 of 6

SCHEDULE



US Certificate Of Conformity No: FM18US0215

g = Switch temperature S, L or H.
h = Float stop 1, 2 or 4.

13. **Specific Conditions of Use:**

None

14. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

16. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
8 th March 1999	Original Issue.
27 th August 2018	<u>Supplement 2:</u> Report Reference: – RR214205 dated 27 th August 2018 Description of the Change: Company transfer of Project ID 3D4A0.AE listed in this certificate from KSR Kuebler of America to KSR Kuebler Niveau-Messtechnik AG. Standard editions FM3600, FM3615 and FM3810 have been updated as the new standard edition changes are non-technical. Certificate updated to new format.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

F 347 (Mar 16)

Page 6 of 6

KSR Kuebler subsidiaries worldwide can be found online at www.ksr-kuebler.com.
WIKA subsidiaries worldwide can be found online at www.wika.com.



KSR Kuebler Niveau-Messtechnik AG

Heinrich-Kuebler-Platz 1
69439 Zwingenberg am Neckar • Germany
Tel. +49 6263/87-0
Fax +49 6263/87-99
info@ksr-kuebler.com
www.ksr-kuebler.com



Gayesco-WIKA USA

229 Beltway Green Boulevard
Pasadena, Texas 77503
Tel. +1 713 475 0022
Fax +1 713 475 0011
info@wikahouston.com
www.wika.com