

**Bypass Magnetic Switch, model MRS2, MMS,
BGU-AMXPF, BGU-AXPF, BGU-AHTXPF**

EN



**Bypass Magnetic Switch,
Type MRS2 and MMS**



EN Operating Instructions, model MRS2, MMS

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Prior to starting any work, read the operating instructions!
Keep for later use!

Vor Beginn aller Arbeiten Betriebsanleitung lesen!
Zum späteren Gebrauch aufbewahren!



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1. General information

- The magnetic switches described in the operating instructions are designed and manufactured in accordance with the current state-of-the-art. During production, all components are subject to strict quality and environmental criteria. Our management systems are certified in accordance with ISO 9001.
- These operating instructions provide information on how to use the unit. Compliance with all specified safety instructions and work instructions are a prerequisite for working safely.
- Compliance with the local applicable accident prevention regulations and general safety regulations for the area of use of the unit is required.
- The operating instructions are a component of the product and must be kept in the immediate vicinity of the unit where they are accessible to the technicians at all times. Pass on the operating instructions to subsequent users or owners of the unit.
- The technicians must read and understand the operating instructions prior to starting any work.
- The general terms and conditions from the sales documents apply.
- Technical changes reserved.
- Additional information:
 - Internet address: www.ksr-kuebler.com or www.wika.com

2. Design and function

2.1 Functional description

Bypass magnetic switches are non-contact switches. They are mainly made of a switch housing with a built-in reed contact, proximity switch or rotational switch. They are triggered by the magnetic field of a permanent magnet.

The bypass magnetic switches are used to provide a switching function at a pre-determined level in connection with KSR bypass level indicators of type BNA or comparable products. For this, one or several switches can be mounted on the level indicator.

Note:

Magnetic switches and bypass level indicators with built-in float are designed for each other and ensure reliable functioning and trouble-free operation.

When mounting on level indicators of other manufacturers, malfunctions can occur due to a different arrangement of the magnetic fields.

2.2 Scope of delivery

Compare the contents of the delivery with the delivery certificate.

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



CAUTION!

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



Installation, electrotechnical expertise!

For the installation particular electrotechnical expertise is required.



Installation, mechanical expertise!

For the installation particular mechanical expertise is required.



INFORMATION

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

3.2 Proper intended use

The Bypass magnetic switches 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. 50 mm).
- 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. 1 m).
- The magnetic switches may not be subjected to strong mechanical stresses (impact, bending, vibrations). The unit is exclusively designed and constructed for the intended use described here and may only be used accordingly.
- These instructions are intended for technicians who execute the installation and calibration.
- 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 switch for potential transport damage.
Immediately report obvious damage.



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

Comply with all of the instructions on the packaging pertaining to removing the transport locks.

Remove the magnetic switch from the packaging carefully!

When unpacking, check all parts for external damage.

Functional test before assembly:

5.1 Functional check

The functional test is carried out to determine the proper functioning of the switching contacts. You should disconnect the power connection between the control and the switch before the test. You can determine the switching condition e.g. with a continuity tester. You can carry out the functional test by actuating the contact with a permanent magnet with a radial magnetic field in the switching area. For this, you should move the magnet alongside the Magnetic Switch from the bottom towards the top. When doing so, the

contact should switch over. Afterwards, you should move the magnet again from the top towards the bottom. The contact is falling back into its initial position. Instead of the magnet, you can also use the built-in float of the bypass level indicator

During the functional test, unintentional processes can be triggered off in the downstream control. Risk of physical injuries and property damage. Competent technical staff only should connect and disconnect power lines. Do not operate Magnetic Switches in the immediate proximity of powerful electromagnetic fields (distance should be at least 1m). Do not expose Magnetic Switches to strong mechanical loads.



Functional check

Before mounting, the magnetic float switch can be connected as described in chapter 5.3 and the switch points can be operated manually.



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 preparations

Ensure that magnetic switches are clean and have no mechanical damage.

5.3 Mounting



Before mounting in an aggressive environment, you should ensure that the Magnetic Switch's case is resistant to it accordingly. When choosing the place for mounting, you should take into account the system of protection of the used switch.

Magnetic Switches, which have been supplied together with KSR bypass level indicators, are pre-assembled already and should just be adjusted to the desired switching height only.

Mounting is carried out on magnetic roller indicator model BMD via sliding block in the T-Slot and on bypass level indicator model BNA directly with tightening straps.

5.3.1 Mounting the Magnetic Switch on magnetic indicator

The Magnetic Switches will be mounted on the magnetic roller level indicator of the bypass level indicator by means of t-slot stones.

1. Unscrew the fastening screws at the Magnetic Switch with a hexagon socket screw key WAF 3mm by about one turn.
2. Insert the T-slot block(s) into the slot of the magnetic roller indicator from top or bottom.
3. Shift the Magnetic Switch to the level of the desired switching point and fasten it by tightening the screws (the switching point is marked).

The Magnetic Switches can be mounted on both sides of the magnetic roller level indicators optionally. For this, you should mount the t-slot block on the switch's opposite side. The assembly at works is done on the bypass level indicator's right side.

When mounting several Magnetic Switches on the bypass level indicator, we recommend mounting them on both sides of the magnetic roller indicator alternately. Thus, it is ensured that any desired switching height can be adjusted.



Attention!

Magnetic Switches MRS2, MMS and BGU are designed to be mounted on the right side of the magnetic roller indicator. When mounted on the left side, the switching function is reversed.

5.3.2 Mounting of Magnetic Switch with tightening straps

1. Open the fixing band by loosening the adjustment screw.
2. Slide the fixing band through the opening on the magnetic switch
3. Attach the fixing band to the bypass chamber and tighten via adjustment screw, so that the magnetic switch can still be moved.
4. Slide the magnetic switch to the desired switching height and fix into position by tightening the screw. (The switch point is marked).

Note!

1. When mounting, please pay attention to that the cable entry faces downwards. In order to ensure a safe switching function, the Magnetic Switch's case should sit close to the bypass pipe.
2. The Magnetic Switches do only work in the area between the bypass level indicator's process connections. We cannot guarantee a safe functioning if a switching point is set outside that area.

5.4 Electrical connection

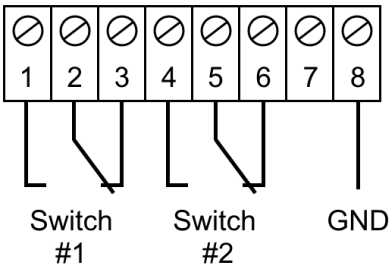


Warning!

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.

- Connection details and switching functions are given on the connection diagram on the instrument and the connection terminals are appropriately marked (exception: versions with only one normally closed or normally open contact).
- Seal the cable gland at the connection housing.
- All wiring and hardware must be in accordance with applicable standards and regulations. KSR Kuebler switches are designed for pilot service or connection to a PLC. They should not be used to directly switch heavy loads as contact damage resulting in failure can occur.
- 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.
- Wire sizing must be determined by the run length with a maximum size of 14 AWG. A ground wire must be provided and connected to the ground block inside the housing



Terminal 1: Switch 1 Normally Open
 Terminal 2: Switch 1 Common
 Terminal 3: Switch 1 Normally Closed

Terminal 4: Switch 2 Normally Open
 Terminal 5: Switch 2 Common
 Terminal 6: Switch 2 Normally Closed

Terminal 7: blank

Terminal 8: Housing Ground

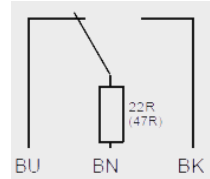
KSR Kuebler DPDT switches are made from two (2) semi-simultaneously acting SPDT magnetic switches. KSR's unique switch mechanism gives fast change-over, with the two switches rapidly, acting as a DPDT type, changing states as the level rises and falls past the desired setpoint.



Warning!

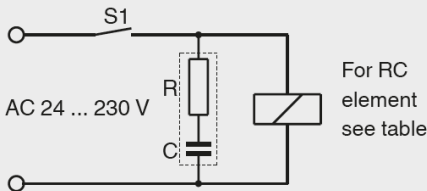
The operation of the Magnetic Switches at inductive or capacitive load can result in the destruction of the reed contact. This can lead to a malfunction of the downstream control and to physical injury or property damage.

With capacitive load, line lengths above 50m, or connection to process control systems with capacitive input a protective resistor of $22\ \Omega$ should be connected in series to the to limit the peak current.

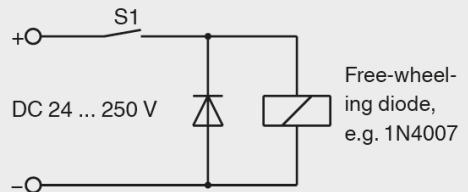


With inductive load, please protect the Magnetic Switches by wiring with a RC module (see appendix) or with a shunt diode. The use of varistors protective wiring is not permitted for the reed contact can be destroyed by occurring peaks.

AC voltage



DC voltage



RC modules for switch protection

Depending on the operating voltage, RC modules should only be used in accordance with the table below.

Other RC modules that those listed here will result in the destruction of the Reed switch.

For reed contacts from 40 - 100VA

Voltage	Resistance	Capacity	Type
AC 24 V	$47\ \Omega$	$0,33\ \mu\text{F}$	B 3/24

AC 48 V	100 Ω	0,33 μ F	B 3/48
AC 115 V	470 Ω	0,33 μ F	B 3/115
AC 230 V	1000 Ω	0,33 μ F	B 3/230

5.5 Commissioning

You should set the Magnetic Switches to their defined initial state before putting them into operation. For this, you should push the bypass level indicator's float inside the pipe slowly from the bottom towards the top and afterwards to the bottom again. If this is not possible anymore, you may even pass the float alongside the Magnetic Switch from the bottom towards the top and afterwards to the bottom again. Pay attention to the identification „top“ at the float.

When retrofitting Magnetic Switches, you should set these to their defined initial state in the same way. If a float is not available, you may even use a permanent magnet of any radial polarity for this procedure.

Due to the bistable switching behaviour of the Magnetic Switches, a defined initial state before putting them into service is mandatory. Otherwise, there is a risk that a defective switching function is triggered off in the downstream control through a false contact position upon initial start-up.

Adjustment of the Magnetic Switch

Unscrew the fastening screw(s) and shift the Magnetic Switch to the level of the desired switching point.

Tighten the fastening screw again afterwards.

6. Faults



The most frequent root causes and required countermeasures are listed in the following table.

Faults	Causes	Measures
Bypass magnetic switch cannot be mounted at the intended position on the Bypass	Collision with other attachments	Modification of the attachments or return shipment to the factory
No or undefined switching function	Electrical connection incorrect	See chapter 5.4 “Electrical connection”. Check assignment with the aid of the connection diagram.
	Electrical connection incorrect	See chapter 5.3
	Reed contact defective	Return shipment to factory
	Incorrect switching function	Change terminal assignment
	Switching position incorrect	New positioning of the magnetic switch
	Ragged cable	Return shipment to factory
	Switch are not triggered by the float magnet	



CAUTION!

Bodily injuries, property and environmental damages

If faults cannot be rectified with the help of the listed measures, immediately shut the unit off.

- Ensure the pressure is switched off and secure the unit against unintentionally being switched on.
- Contact the manufacturer.
- If return shipment is necessary, follow the instructions in Chapter 8.2 “Return Shipment”.

7. Maintenance and cleaning

7.1 Maintenance

Bypass magnetic switches Type MRS2 and MMS do not require maintenance if operated properly.

The switches should be repaired by the manufacturer or by persons authorized by the manufacturer only. You should observe the international and national regulations regarding the implementation of the repair. Please use KSR-Kuebler spare parts only, for otherwise the conformity with the approval of the type of protection cannot be guaranteed.



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.).



NOTICE!

Fault-free functionality of the magnetic switch can only be guaranteed if original KSR Kuebler 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!

Property damage

Improper cleaning will damage the unit!

- Do not use any aggressive cleaning agents.
- Do not use any hard or sharp objects for cleaning.

8. Dismounting, return and disposal



WARNING!

Bodily injuries, property and environmental damages due to measuring material residues

Measuring material residues in a disassembled unit can result in risks to persons, the environment and equipment.

- Wear the necessary protective equipment
- Flush and clean the disassembled unit in order to protect persons and the environment from risks posed by adhering measuring material residues.

8.1 Disassembly

Only disassemble the measuring unit when it has been disconnected from the pressure and voltage!

If necessary, the container must be relaxed.

8.2 Return shipment

Use the original packaging or suitable transport packing for the return shipment of the unit.

Instructions for return shipment can be found in the “Service” section on our local website.

8.3 Disposal

Incorrect disposal can result in risks to the environment.

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

9. Specifications

Models

Model	Description
MRS2-XP	Reed switch SPDT (-100 ... +150°C)
MRS2-XP-DPDT	Reed switch DPDT (double reed) (-100 ... +150°C)
MRS2-XP-HT	Reed switch SPDT for high temperature (-100 ... +350°C)
MMS2-XP	Microswitch SPDT (-40 ... +150°C)
BGU-AXPF	Reed switch SPDT (-100 ... +150°C)
BGU-AHTXPF	Reed switch SPDT for high temperature (-100 ... +350°C)
BGU-AMXPF	Microswitch SPDT (-40 ... +150°C)

Switch rating

Model	Switching power
MRS2-XP MRS2-XP-DPDT MRS2-XP-HT BGU-AXPF BGU-AHTXPF	max. AC 230 V; 40 VA; 1 A max. DC 230 V; 20 W; 0.5 A
MMS5-XP BGU-AMXPF	AC max. 230V; 180VA; 5A DC max. 230V; 180W; 5A

Marking

Model	Rating*)	Marking
MRS2-XP MRS2-XP-DPDT MRS2-XP-HT MMS2-XP BGU-AXPF BGU-AHTXPF BGU-AMXPF	XP DIP	XP / I / 1 / BCD / T6 Ta = 77°C, DIP / II,III / 1 / EFG / T6 Ta = 77°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

Detailed information about bypass magnetic switches can be found separately in the following data sheets:

- Bypass Magnetic Switch; Type BGU; see data sheet BGU
- Bypass Magnetic Switch, Type MRS / MMS

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, ELS-SAF, BGU-AXPF, BGU-AMXPF, BGU-AHTXPF, FLS-SAF Level Switch and Series BT, HT, ST, T, TD, TP, HTP, BLR-SBF, FLR-SBF Level Transmitter*
- Name of Listing Company: KSR Kuebler Niveau-Messtechnik GmbH
- 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)

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

26 January 2021

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

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11. The marking of the equipment shall include:

BT-a-b, Level Transmitter.

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

BTX-a-b, BTXi-a-b, BLR-SBF 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

HT12abcdeffg, Level Transmitter.

HT14abcdeffg, HT18abcdeffg, Level Transmitter.

HTD14abcdeffg, HTD18abcdeffg, Level Transmitter.

ST14abcdeffgh, ST18abcdeffgh, Level Transmitter.

T12abcdeffg, Level Transmitter.T14abcdeffg, T18abcdeffg, Level Transmitter.T48abcdeffg0, Level Transmitter.

TD14abcdeffg, TD18abcdeffg, Level Transmitter.

TD48abcdeffg0, Level Transmitter.

FLR-SBF, 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

TP16abcdeffg, TP20abcdeffg, Level Transmitter.

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

F50abcdeffg, F70abcdeffg or ELS-SAF Level Switch.

CL I, Div 1, GP BCD T6 Ta = 77°C;

CL II, III, Div 1, GP EFG, Type 4

S12abcdeffg, Level Switch.

S18abcdeffg, Level Switch.

S48abcdeffg, Level Switch.

SS14abcdeffgh, Level Switch.

SS18abcdeffgh, Level Switch.

FLS-SAF, 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

SP12abcdeffgS and SP20abcdeffgS, Level Switch.

Type 4/4X

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

MRS-2-XP-HT, Level Switch.

BGU-AMXPF, BGU-AXPF or BGU-AHTXPF, Level Switch.

Type 4

12. Description of Equipment:

General – Model F, MMS, MRS, S, SS, ELS-SAF, BGU-AXPF, BGU-AMXPF, BGU-AHTXPF, FLS-SAF Level Switches, and BT, HT, ST, T, TD, TP, HTP, BLR-SBF, FLR-SBF Level Transmitters measure the level of a liquid using a magnetically coupled float.

Construction – Model F, MMS, MRS, S, SS, ELS-SAF, BGU-AXPF, BGU-AMXPF, BGU-AHTXPF, FLS-SAF

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

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Level Switches, and BT, HT, ST, T, TD, TP, HTP, BLR-SBF, FLR-SBF 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.

Ratings – See section 11 for the ambient temperature specifics of the Model F, MMS, MRS, S, SS, ELS-SAF, BGU-AXPF, BGU-AMXPF, BGU-AHTXPF, FLS-SAF Level Switches, and BT, HT, ST, T, TD, TP, HTP, BLR-SBF, FLR-SBF 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).

BLR-ab. Level Transmitter.

- a = S, Standard (Metal housing)
- b = B, with head-mounted transmitter

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.

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

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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).

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).

FLR-ab. Level Transmitter.

a = S, Standard (Metal housing)
b = B, Connection housing with Head transmitter

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.

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

F50abcdeFG or F70abcdeFG. Level Switch.

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

ELS-ab. Level Switch.

- a = S, Stainless steel
- b = A, Terminal housing / plug > 50V (low voltage)

MRS-2-XP, BGU-AXPFMMS-5-XP or BGU-AMXPF. Level Switch.

MRS-2-XP-HT or BGU-AHTXPF. 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.

FLS-ab. Level Switch

- a = S, Standard (Metal housing)
- b = B, Connection housing with Head transmitter

S48abcdeFG. Level Switch.

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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, F80, 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.

SS14abcdefgh. 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.

SS18abcdefgh. 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).
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.

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US Certificate Of Conformity No: FM18US0215

27 th August 2018	<p><u>Supplement 2:</u> Report Reference: – RR214205 dated 27th 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.</p>
26 th January 2021	<p><u>Supplement 3:</u> Report Reference: – RR226046 dated 26th January 2021. Description of the Change: Change of company name from KSR KUEBLER Niveau-Messtechnik AG to KSR KUEBLER Niveau-Messtechnik GmbH. Extension of type designation without any technical or design changes. Model ELS-SAF, BGU-AXPF, BGU-AMXPF, BGU-AHTXPF, FLS-SAF Level Switches and BLR-SBF, FLR-SBF Level Transmitters are new codes but are the same design as in the existing approval.</p>

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