

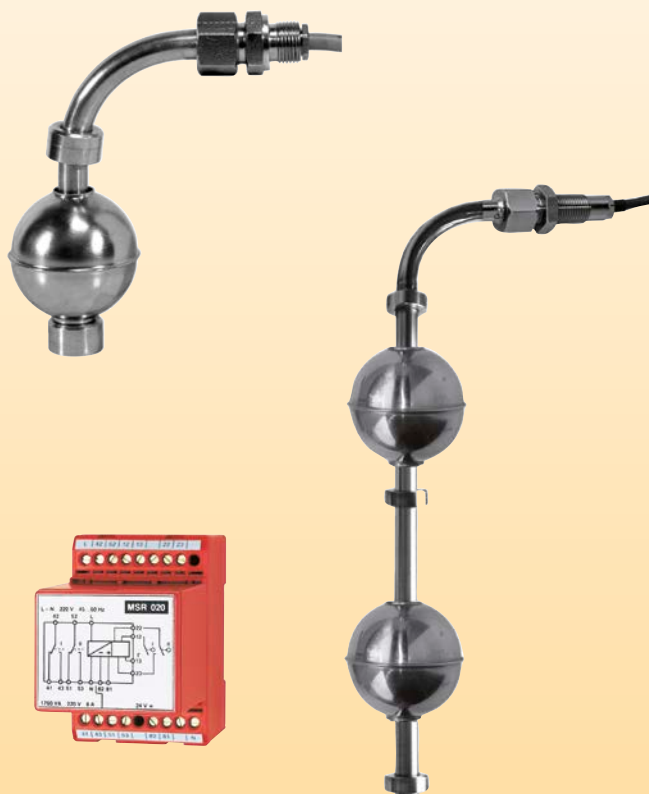


# Magnetic Level Switches for liquids



measuring  
•  
monitoring  
•  
analysing

MS



- Switch points: max. 3
- $p_{max}$ : 100 bar;  $t_{max}$ : 150 °C
- Connection:  
G $\frac{3}{8}$ , G 1 $\frac{1}{2}$ , G2, 1 $\frac{1}{2}$ " NPT,  
2" NPT male, DIN and  
ANSI flanges, special  
connections
- Material:  
stainless steel, brass,  
PVC-U, PP
- ATEX Certification
- Connection heads:  
aluminium, ABS



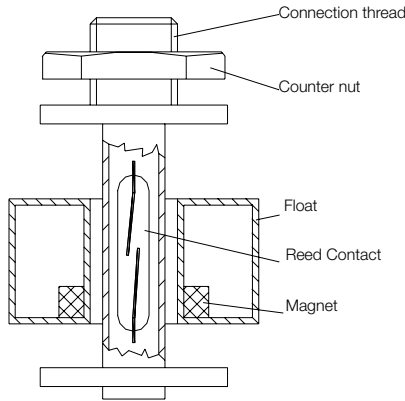
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**Design**



**Description**

Magnetic level switches are used for the monitoring and control of liquid levels in vessels. Magnetic level switches are manufactured to customer specification.

An overview of types available with minimum lengths of measuring tube is set out on the following pages. Please refer to this overview when placing your order. Furthermore any limits can be specified within the limits found in the brochure.

For example:

- Longer measuring tube
- Longer connection cable
- Different cable materials
- Several contacts and different contact operations
- Different materials
- Wide range connections and electrical terminal boxes

**Method of Operation**

Kobold magnetic float switches are fitted with a hermetically sealed contact which is situated in the tube.

The float sliding on the tube contains a ring magnet whose magnetic field switches the sealed contact in a noncontacting fashion. The sealed contacts are available as N/O, N/C or changeover contacts.

The float sliding up and down on the liquid is the only moving part in the Kobold magnetic float switches.

**Advantages**

- Simple installation
- Long electrical service life due to sealed contacts
- High-degree of operational reliability with air gap between measuring tube and floats
- Several levels can be monitored with one float
- Open/close function or changeover contact available

**Model Codes**

	<b>MS05</b>	<b>E</b>	<b>R10</b>	<b>SCX</b>	<b>P</b>
<b>0</b>	_____				
<b>Model</b>	_____				
<b>Measuring tube material</b>	_____				
<b>E</b>	= stainless steel 1.4404				
<b>M</b>	= brass				
<b>P</b>	= PVC				
<b>Process connection</b>	_____				
<b>R10</b>	= G 3/8				
<b>2R8...9AC</b>	= connection box with thread or flange connection				
<b>No. of contacts and function*</b>	_____				
<b>S</b>	= N/O contact				
<b>C</b>	= N/C contact				
<b>W</b>	= changeover contact				
<b>X</b>	= no contact				
<b>Electr. connection</b>	_____				
<b>0</b>	= with housing				
<b>P</b>	= 1 m PVC cable				
<b>S</b>	= 1 m silicone cable				
<b>Y</b>	= special length and type				
<b>ATEX</b>	_____				
<b>0</b>	= without				
<b>E</b>	= ATEX				

Non-standard versions on request

**\*Please note:**

Contact state referred to empty tank.

Simply link letters for several contacts.

The first letter represents the topmost contact, the second letter the second contact from the top, and so on. The position of the contacts, measured from the sealing edge of the connection screwing, must also be specified.

**L1** = highest contact (mm) from the top (sealing edge)

**L2** = second contact (mm) from the top (sealing edge) and so forth



**Float Design**

Model	Form	Materials	Float outside-Ø [mm]	Height [mm]	Bore hole Ø [mm]	Min. liquid density [kg/dm³]	Max. temperature	Nominal pressure at 20 °C
MS-05	Cylinder hollow	PP	42	40	14	>0.5	80 °C	3 bar
MS-06 <sup>1)</sup>	Cylinder solid material	PP	40	20	14	>0.9	90 °C	100 bar
MS-07	Cylinder hollow	PVC-U	42	40	14	>0.65	55 °C	3 bar
MS-10	Ball hollow	Stainless steel 1.4404	52	52	15	>0.6	150 °C	30 bar

<sup>1)</sup> For MS-06 model, one float is required for each switch point  
 For all other floats two contacts can be operated with one float

**ATEX Certificate**

Ⓜ II 1 GD Ex ia IIC T6 Ga / Ex ia IIIC T85 °C Da  
 -20 ≤ Ta ≤ +60 °C

**Connection cable**

PVC: max. 70 °C (standard)  
 Silicone: max. 150 °C

Please note max.-values of every single model

**Technical Details**

Hysteresis: 5 mm difference in level

Non-standard versions available

**Damping tube for agitated liquids**

Float switches with damping tube for agitated or dirty liquids can be supplied upon request.

**Temperature monitoring**

Float switches with integrated temperature switch, fixed switch point between 60 °C and 150 °C upon request.

**Option: Pt 100 available**

**Supplementary devices:**

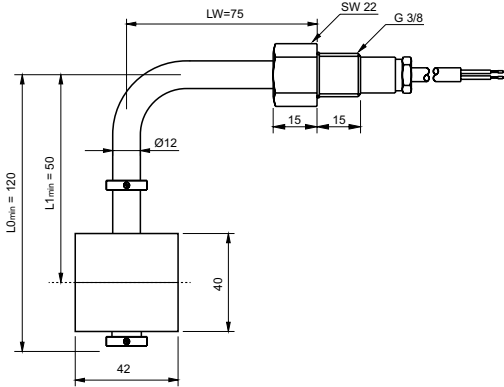
**1. Contact protection relays**

We recommend the use of contact protection relays in conjunction with sealed contacts.

Contact protection relays have the following advantages:

- No contact overloads arising from sparking and high currents, which can, for example, be caused by self-induced e.m.f.'s when switching solenoid valves.
- Float switches are electrically isolated from the high voltage power supply system.
- Protection for persons who come into contact with liquids according to VDE 0100.
- Standard models:  
 Model MSR-10, 1 channel  
 Model MSR-20, 2 channels  
 Model MSR-11, 1 changeover bistable
- ATEX-models:  
 Model KFD2-SR2-Ex1.W 1 channel, 1 relay output, supply 24 V<sub>DC</sub>  
 Model KFA6-SR2-Ex1.W 1 channel, 1 relay output, supply 230 V<sub>AC</sub>  
 Model KFD2-SR2-Ex2.W 2 channels, 2 relays output, supply 24 V<sub>DC</sub>  
 Model KFA6-SR2-Ex2.W 2 channels, 2 relays output, supply 230 V<sub>AC</sub>

Cylindrical float made of polypropylene



Technical Details

N/O contact*:	230 V <sub>AC/DC</sub> / 1 A / 60 VA ATEX-version: U <sub>i</sub> ; 40 V
N/C contact*:	230 V <sub>AC/DC</sub> / 1 A / 60 VA ATEX-version: U <sub>i</sub> ; 40 V
Changeover contact:	230 V <sub>AC/DC</sub> / 1 A / 60 VA ATEX-version: U <sub>i</sub> ; 40 V

\* Note: contact state referred to empty tank and switch point distance refer to a density 1.0 kg/dm<sup>3</sup>

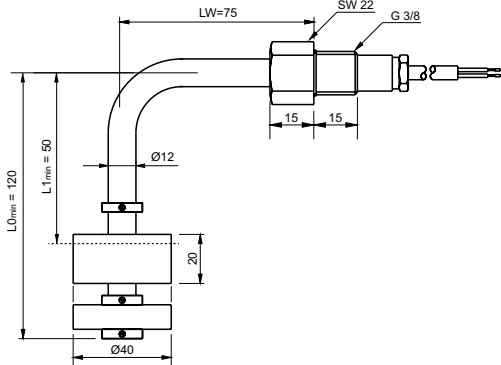
Cable length:	1 m
Installation position:	lateral ±30°
Protection type:	IP65
Min. liquid density:	>0.5 kg/dm <sup>3</sup>
Max. pressure (at 20°C):	3 bar
Max. temp. PVC cable:	70°C
Max. temp. silicone cable:	80°C
Max. length of guide tube:	4 m
Connection heads:	see »Connecting Flanges«
Switch point min. distance from end of guide tube:	45 mm (for special length)
Switch point min. distance between contacts:	between L1 and L2: 45±3 mm between L2 and L3: 54±3 mm
Hysteresis:	5 mm

Model	Guide tube <sup>1)</sup>	Process connection	Contact L1	Contact L2	Contact L3	Electr. connection	ATEX
MS-05 (PP float)	M = brass E = 1.4404	R10 = G <sup>3</sup> / <sub>8</sub> XXX = see »Connecting Flanges«	S = N/O C = N/C W = SPDT	X = w/o S = N/O C = N/C W = SPDT	X = w/o S = N/O C = N/C W = SPDT	0 =with housing P =1 m PVC-cable S =1 m silicone cable Y <sup>2)</sup> =special length and type	0 = without E = ATEX

<sup>1)</sup> Please specify in writing total and switching lengths

<sup>2)</sup> Please specify in writing length and type of cable.

High-pressure applications



Technical Details

N/O contact\*: 230 V<sub>AC/DC</sub> / 1 A / 60 VA  
ATEX-version: U; 40 V

N/C contact\*: 230 V<sub>AC/DC</sub> / 1 A / 60 VA  
ATEX-version: U; 40 V

Changeover contact: 230 V<sub>AC/DC</sub> / 1 A / 60 VA  
ATEX-version: U; 40 V

\* Note: contact state referred to empty tank and switch point distance refer to a density 1.0 kg/dm<sup>3</sup>

Cable length: 1 m

Installation position: lateral ±30°

Protection type: IP65

Min. liquid density >0.9 kg/dm<sup>3</sup>

Max. pressure (at 20°C): 100 bar

Max. temp. PVC cable: 70°C

Max. temp. silicone cable: 90°C

Max. length of guide tube: 4 m

Connection heads: see »Connecting Flanges«

Switch point min. distance from end of guide tube: 50 mm (for special length)

Switch point min. distance between contacts:

- between L1 and L2: 70 ± 7 mm
- between L2 and L3: 70 ± 7 mm

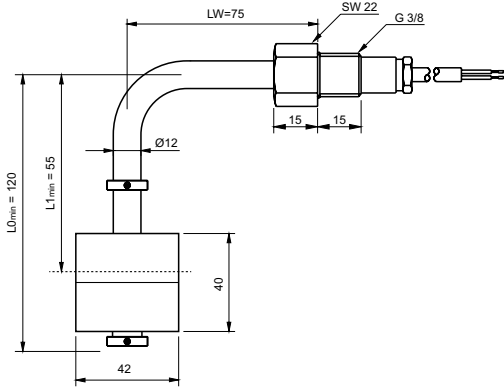
Hysteresis: 5 mm

Model	Guide tube <sup>1)</sup>	Process connection	Contact L1	Contact L2	Contact L3	Electr. connection	ATEX
MS-06 (PP float)	<b>M</b> = brass <b>E</b> = 1.4404	<b>R10</b> = G <sup>3</sup> / <sub>8</sub> <b>XXX</b> = see »Connecting Flanges«	<b>S</b> = N/O <b>C</b> = N/C <b>W</b> = SPDT	<b>X</b> = w/o <b>S</b> = N/O <b>C</b> = N/C <b>W</b> = SPDT	<b>X</b> = w/o <b>S</b> = N/O <b>C</b> = N/C <b>W</b> = SPDT	<b>0</b> = with housing <b>P</b> = 1 m PVC-cable <b>S</b> = 1 m silicone cable <b>Y</b> <sup>2)</sup> = special length and type	<b>0</b> = without <b>E</b> = ATEX

<sup>1)</sup> Please specify in writing total and switching lengths

<sup>2)</sup> Please specify in writing length and type of cable

Cylindrical float and tube made of PVC



Technical Details

N/O contact*:	230 V <sub>AC/DC</sub> / 1 A / 60 VA ATEX-version: U; 40 V
N/C contact*:	230 V <sub>AC/DC</sub> / 1 A / 60 VA ATEX-version: U; 40 V
Changeover contact:	230 V <sub>AC/DC</sub> / 1 A / 60 VA ATEX-version: U; 40 V

\* Note: contact state referred to empty tank and switch point distance refer to a density 1.0 kg/dm<sup>3</sup>

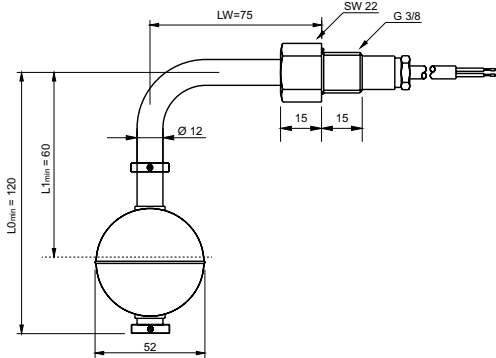
Cable length:	1 m
Installation position:	lateral ±30°
Protection type:	IP 65
Min. liquid density:	>0.65 kg/dm <sup>3</sup>
Max. pressure (at 20°C):	3 bar
Max. temp. PVC cable:	55°C
Max. temp. silicone cable:	55°C
Max. length of guide tube:	2 m
Connection heads:	see »Connecting Flanges«
Switch point min. distance from end of guide tube:	57 mm (for special length)
Switch point min. distance between contacts:	between L1 and L2: 45 ± 3 mm between L2 and L3: 54 ± 3 mm
Hysteresis:	5 mm

Model	Guide tube <sup>1)</sup>	Process connection	Contact L1	Contact L2	Contact L3	Electr. connection	ATEX
MS-07 (PVC float)	P = PVC	R10 = G <sup>3</sup> / <sub>8</sub> XXX = see »Connecting Flanges	S = N/O C = N/C W = SPDT	X = w/o S = N/O C = N/C W = SPDT	X = w/o S = N/O C = N/C W = SPDT	0 = with housing P = 1 m PVC-cable S = 1 m silicone cable Y2) = special length and type	0 = without E = ATEX

<sup>1)</sup> Please specify in writing total and switching lengths

<sup>2)</sup> Please specify in writing length and type of cable.

**Ball float made of stainless steel 1.4404**



**Technical Details**

- N/O contact\*: 230 V<sub>AC/DC</sub> / 1 A / 60 VA  
ATEX-version: U; 40 V
- N/C contact\*: 230 V<sub>AC/DC</sub> / 1 A / 60 VA  
ATEX-version: U; 40 V
- Changeover contact: 230 V<sub>AC/DC</sub> / 1 A / 60 VA  
ATEX-version: U; 40 V

\* Note: contact state referred to empty tank and switch point distance refer to a density 1.0 kg/dm<sup>3</sup>

- Cable length: 1 m
- Installation position: lateral ±30°
- Protection type: IP65
- Min. liquid density: >0.6 kg/dm<sup>3</sup>
- Max. pressure (at 20°C): 30 bar
- Max. temp. PVC cable: 70°C
- Max. temp. silicone cable: 150°C
- Max. length of guide tube: 4 m
- Connection heads: see »Connecting Flanges«
- Switch point min. distance from end of guide tube: 55 mm (for special length)
- Switch point min. distance between contacts:
  - between L1 and L2: 45±3 mm
  - between L2 and L3: 66±3 mm
- Hysteresis: 5 mm

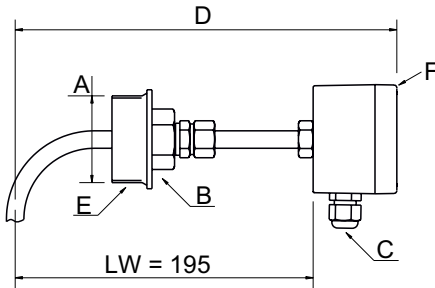
Model	Guide tube <sup>1)</sup>	Process connection	Contact L1	Contact L2	Contact L3	Electr. connection	ATEX
<b>MS-10</b> (1.4404 float)	<b>M</b> = brass <b>E</b> = 1.4404	<b>R10</b> = G <sup>3</sup> / <sub>8</sub> <b>XXX</b> = see »Connecting Flanges«	<b>S</b> = N/O <b>C</b> = N/C <b>W</b> = SPDT	<b>X</b> = w/o <b>S</b> = N/O <b>C</b> = N/C <b>W</b> = SPDT	<b>X</b> = w/o <b>S</b> = N/O <b>C</b> = N/C <b>W</b> = SPDT	<b>0</b> = with housing <b>P</b> = 1 m PVC-cable <b>S</b> = 1 m silicone cable <b>Y2</b> = special length and type	<b>0</b> = without <b>E</b> = ATEX

<sup>1)</sup> Please specify in writing total and switching lengths  
<sup>2)</sup> Please specify in writing length and type of cable.

Model 2/4

Aluminium housing

Dimensions and materials



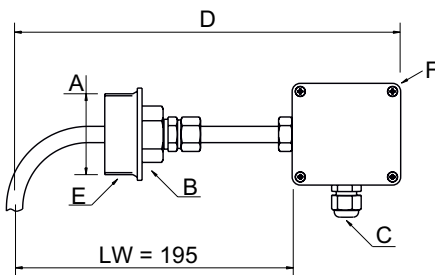
Model	Process connection (A)*	Width across flats (B)	Electrical connection (C)	Overall width (D)	Sliding screwed fitting (E)	Housing (F)	t <sub>max</sub>
2...	...R8 = G 1½ ...R9 = G 2 ...N8 = 1½" NPT ...N9 = 2" NPT	30AF 36AF 30AF 36AF	M16 x 1.5	253 mm	brass	Al	90°C
4...	...R8 = G 1½ ...R9 = G 2 ...N8 = 1½" NPT ...N9 = 2" NPT	30AF 36AF 30AF 36AF	M16 x 1.5	253 mm	1.4404	Al	90°C

\* Size of process connection must be according with float size

Model 5

ABS Housing

Dimensions and materials



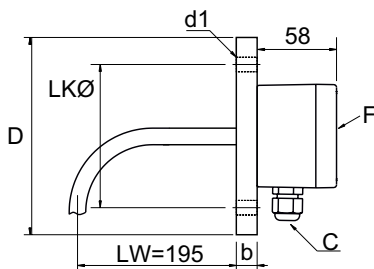
Model	Process connection (A)*	Width across flats (B)	Electrical connection (C)	Overall width (D)	Sliding screwed fitting (E)	Housing (F)	t <sub>max</sub>
5...	...R8 = G 1½ ...R9 = G 2 ...N8 = 1½" NPT ...N9 = 2" NPT	30AF 36AF 30AF 36AF	M16 x 1.5	278 mm	PVC	ABS	55°C

\* Size of process connection must be according with float size

Model 9

Flange according to DIN EN 1092-1 PN16/ANSI B 16.5 150 lbs RF

Dimensions and materials



Model	Flange size 1.4404	D	b	LK Ø	d1	Electrical connection (C)	Housing (F)	t <sub>max</sub>
9...	...F8 = DN 40	150	16	110	4 x Ø18	M16 x 1,5	Al	90°C
	...F9 = DN 50	165	18	125				
	...F0 = DN 65	185	18	145	4 x Ø18			
	...FB = DN 80	200	20	160	4 x Ø18			
	...FC = DN 100	220	20	180	4 x Ø18			
	...FD = DN 125	250	22	210	4 x Ø18			
	...A8 = 1½"	127	17.5	98.6	4 x Ø15.7			
	...A9 = 2"	152.4	19.1	120.7	4 x Ø19.1			
	...A0 = 2½"	177.8	22.4	139.7	4 x Ø19.1			
	...AB = 3"	190.5	23.9	152.4	4 x Ø19.1			
	...AV = 3½"	215.0	23.9	177.8	8 x Ø19.1			
	...AC = 4"	228.6	23.9	190.5	8 x Ø19.1			





## Technical Details

### Model MSR

Power supply:	230 V <sub>AC</sub> -10/+6% 50-60 Hz
Power consumption:	max. 6 VA
Relay output:	MSR-010 (1 floating changeover contact) MSR-020 (2 floating changeover contact) MSR-011 (1 floating changeover contact bistable) max. 250 V <sub>AC</sub> 8 A
Details:	see datasheet

### Model KFA6-SR2-Ex2.W (Double channel)

ATEX-approval:	Ⓔ II (1) G [Ex ia] IIC, II (1)D [Ex ia] IIIC
Ex / I.S. data, ATEX:	
U <sub>o</sub> :	10.6 V
I <sub>o</sub> :	19.1 mA
P <sub>o</sub> :	51 mW
U <sub>m</sub> :	253 V <sub>AC</sub>
Power supply:	207...253 V <sub>AC</sub> , 45...65 Hz
Power consumption:	max. 1 W
Relay Output:	max. 253 V <sub>AC</sub> 2 A
Details:	see datasheet

### Model KFD2-SR2-Ex2.W (Double channel)

ATEX-approval:	Ⓔ II(1) G [Ex ia] IIC , II (1) D [Ex ia] IIIC
Ex / I.S. data, ATEX:	
U <sub>o</sub> :	10.5 V
I <sub>o</sub> :	13 mA
P <sub>o</sub> :	34 mW
U <sub>m</sub> :	253 V <sub>AC</sub>
Power supply:	20...30 V <sub>DC</sub> , 45...65 Hz
Power consumption:	max. 0.9 W
Relay Output:	max. 253 V <sub>AC</sub> 2 A
Details:	see datasheet

### Model KFA6-SR2-Ex1.W (Single channel)

ATEX-approval:	Ⓔ II(1) G [Ex ia] IIC , II (1) D [Ex ia] IIIC
Ex / I.S. data, ATEX:	
U <sub>o</sub> :	10.6 V
I <sub>o</sub> :	19.1 mA
P <sub>o</sub> :	51 mW
U <sub>m</sub> :	253 V <sub>AC</sub>
Power supply:	207 ... 253 V <sub>AC</sub> , 45 ... 65 Hz
Power consumption:	max. 1 W
Relay Output:	max. 253 V <sub>AC</sub> 2A
Details:	see datasheet

### Model KFD2-SR2-Ex1.W (Single channel)

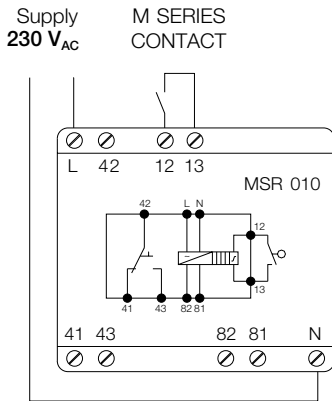
ATEX-approval:	Ⓔ II(1) G [Ex ia] IIC , II (1) D [Ex ia] IIIC
Ex / I.S. data, ATEX:	
U <sub>o</sub> :	10.5 V
I <sub>o</sub> :	13 mA
P <sub>o</sub> :	34 mW
U <sub>m</sub> :	253 V <sub>AC</sub>
Power supply:	20 ... 30 V <sub>DC</sub> , 45 ... 65 Hz
Power consumption:	max. 0.9 W
Relay Output:	max. 253 V <sub>AC</sub> 2A
Details:	see datasheet



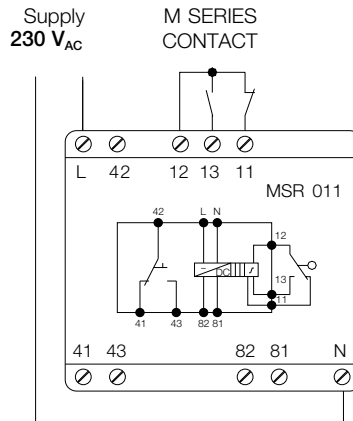
## Wiring diagram contact protection relay Model MS

### Standard models

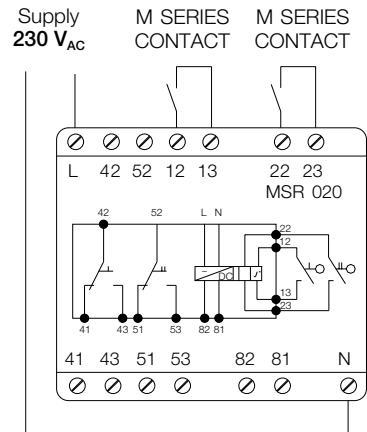
**MSR010**



**MSR011**



**MSR020**



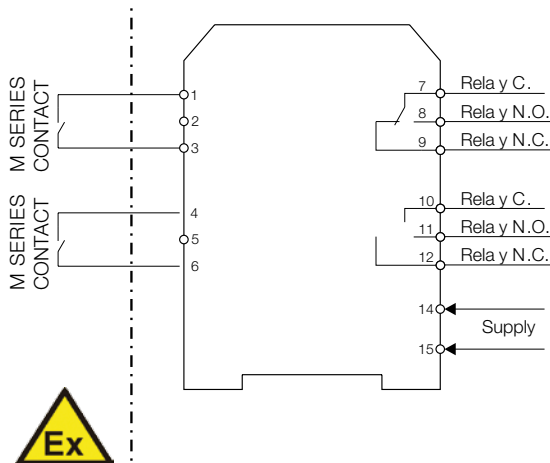
### ATEX-models

**KFD2-SR2-Ex2.W (Double channel)**  
**KFA6-SR2-Ex2.W (Double channel)**

**KFD2-SR2-Ex1.W (Single channel)**  
**KFA6-SR2-Ex1.W (Single channel)**

Hazardous Zone

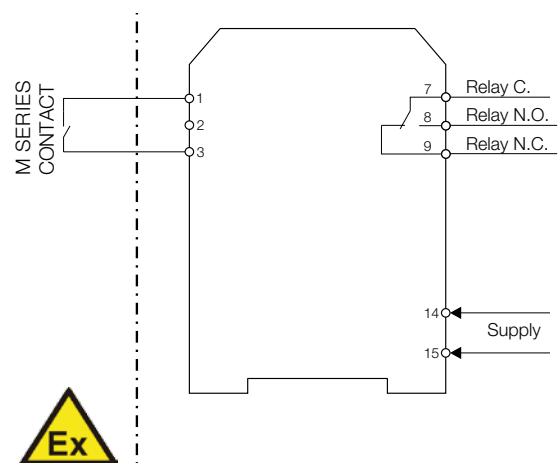
Safe Zone



**KFA6-SR2-Ex2.W supply: 207 ... 253 V<sub>AC</sub>**  
**KFD2-SR2-Ex2.W supply: 24 V<sub>DC</sub>**

Hazardous Zone

Safe Zone



**KFA6-SR2-Ex1.W supply: 207 ... 253 V<sub>AC</sub>**  
**KFD2-SR2-Ex1.W supply: 24 V<sub>DC</sub>**