



TSR Ex immersion probes

**Controlling devices with
magnetically operated reed contacts,
for signalling or regulation
of liquid levels**



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**Jola Spezialschalter GmbH & Co. KG sells
only business-to-business.**

**The units described in this documentation
may only be installed, connected,
started up, serviced and replaced
by suitably qualified personnel!**

**Subject to deviations from the diagrams
and technical data.**

**The details in this brochure are product
specification descriptions and
do not constitute assured properties
in the legal sense.**



TSR Ex immersion probes

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Types	Probe tube made of stainl. st. 316 Ti		Float made of stainless steel 316 Ti	
	Conne- ction	Ext. Ø	Ext. dimensions	
TSR/FED/E./Variant 0/Ex-1G Ⓔ II 2 G Ex ia IIC T6 Gb	Connecting cable	14 mm	E8: 72 mm Ø E2: 44.5 mm Ø x 52 mm E7: 52 mm Ø x 88 mm E5: 98 mm Ø	3-2-5
TSR/FEW/E5/Variant 0/Ex-1G Ⓔ II 2 G Ex ia IIC T6 Gb		20 mm	E5: 98 mm Ø	
TSR/FHED/E4/Variant 0/Ex-1G Ⓔ II 2 G Ex ia IIC T4 or T3 Gb		14 mm	E4: 97 mm Ø x 80 mm	3-2-7
TSR/FHEW/E4/Variant 0/Ex-1G Ⓔ II 2 G Ex ia IIC T4 or T3 Gb		20 mm		
TSR/ED/E./Variant 0/Ex-0G Ⓔ II 2/1 G Ex ia IIC T6 Ga/Gb	Terminal box	14 mm	E8: 72 mm Ø E2: 44.5 mm Ø x 52 mm E7: 52 mm Ø x 88 mm E5: 98 mm Ø	3-2-9
TSR/EW/E5/Variant 0/Ex-0G Ⓔ II 2/1 G Ex ia IIC T6 Ga/Gb		20 mm	E5: 98 mm Ø	
TSR/FED/E./Variant 0/Ex-0G Ⓔ II 1 G Ex ia IIC T6 Ga	Connecting cable	14 mm	E8: 72 mm Ø E2: 44.5 mm Ø x 52 mm E7: 52 mm Ø x 88 mm E5: 98 mm Ø	3-2-11
TSR/FEW/E5/Variant 0/Ex-0G Ⓔ II 1 G Ex ia IIC T6 Ga		20 mm	E5: 98 mm Ø	
TSR/FED/E./Ex d/Ex-1G Ⓔ II 2 G Ex d IIB T6 Gb	Connecting cable	14 mm	E8: 72 mm Ø E2: 44.5 mm Ø x 52 mm E7: 52 mm Ø x 88 mm E5: 98 mm Ø	3-2-13
TSR/FEW/E5/Ex d/Ex-1G Ⓔ II 2 G Ex d IIB T6 Gb		20 mm	E5: 98 mm Ø	
TSR/FHED/E4/Ex d/Ex-1G Ⓔ II 2 G Ex d IIB T4 or T3 Gb		14 mm	E4: 97 mm Ø x 80 mm	3-2-15
TSR/FHEW/E4/Ex d/Ex-1G Ⓔ II 2 G Ex d IIB T4 or T3 Gb		20 mm		
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TSR Ex immersion probes

Construction and operating principle

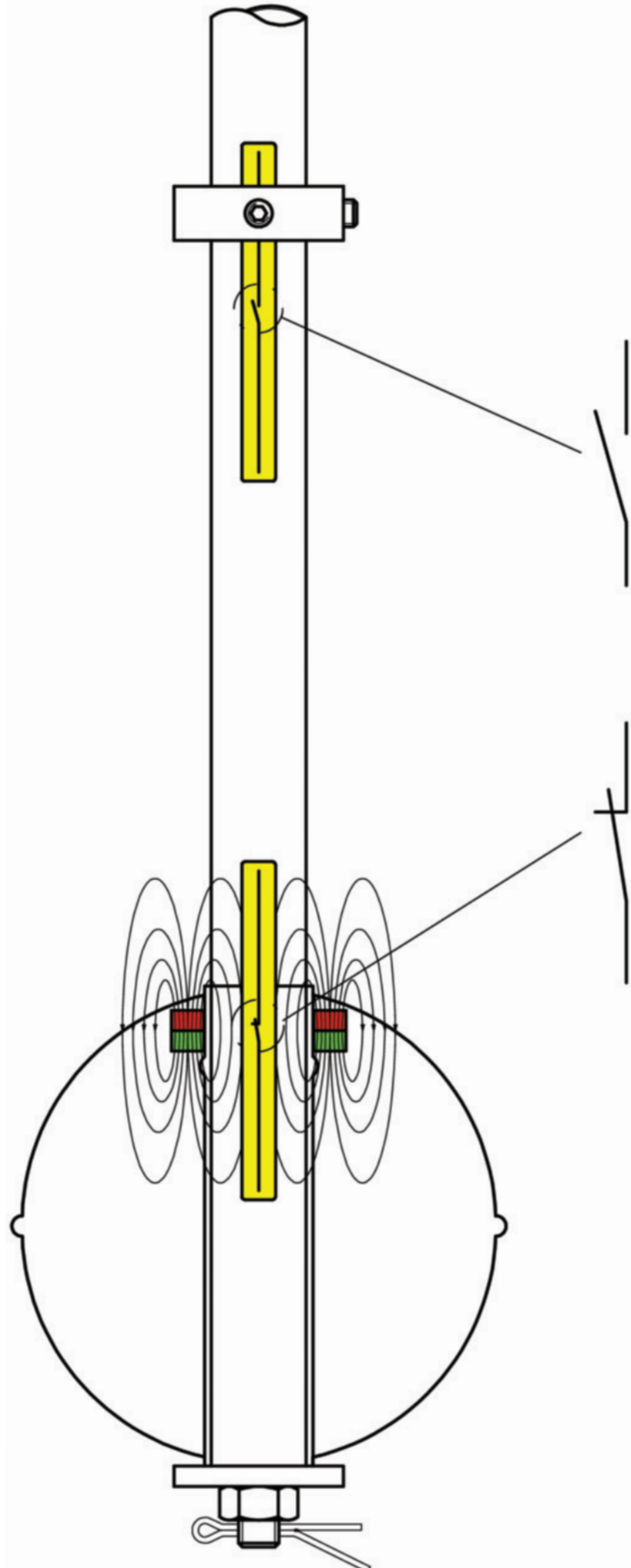
The TSR Ex immersion probes have a probe tube with built-in reed contacts. The float is fitted with a permanent magnet and moves freely up and down the probe tube, activating the reed contacts as it rises and falls.

It should be noted that reed contacts do **not** lock but that they switch only for as long as they are influenced by the magnetic field. Once the float passes beyond a contact upwards or downwards, the latter returns to its original position. However, the contacts can be made to hold by using collars to limit the motion of the float.

Explanation of abbreviations

NO contact = normally open contact
NC contact = normally closed contact
OC contact = changeover contact

Example of a TSR Ex with 2 NO contacts



Application examples

• Automatic emptying of a tank

The float rises with the liquid to the maximum level and trips the NO contact which in turn sets the pump in operation via the sequential circuit.

Liquid is pumped out. When the minimum level is reached, the NC contact at the bottom is activated, thus interrupting the holding circuit via the sequential circuit and finishing the pump operation.

• Automatic filling of a tank

The float falls with the liquid to the minimum level and trips the NO contact which in turn sets the pump in operation via the sequential circuit.

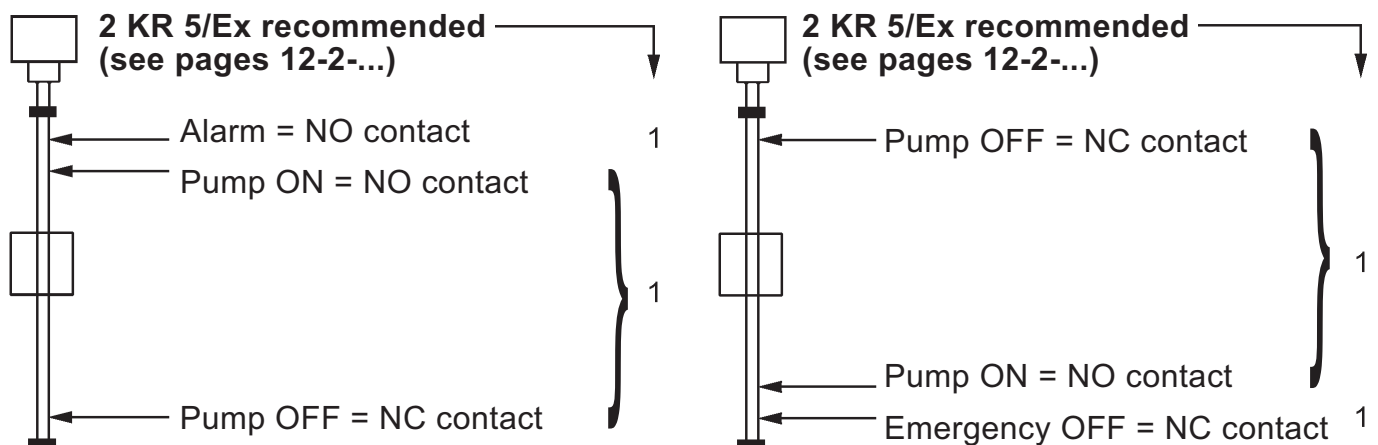
Liquid is then pumped in. When the maximum level is reached, the upper NC contact is activated, thus interrupting the holding circuit via the sequential circuit and finishing the pump operation.

Examples for standard applications

• with 1 float and 1 collar fitted above the upper contact

It is recommended to fit an additional collar above the upper contact. This allows a contact switching after a circuit failure by avoiding that the rising of the liquid brings the float outside the area of influence of the magnet on the contact.

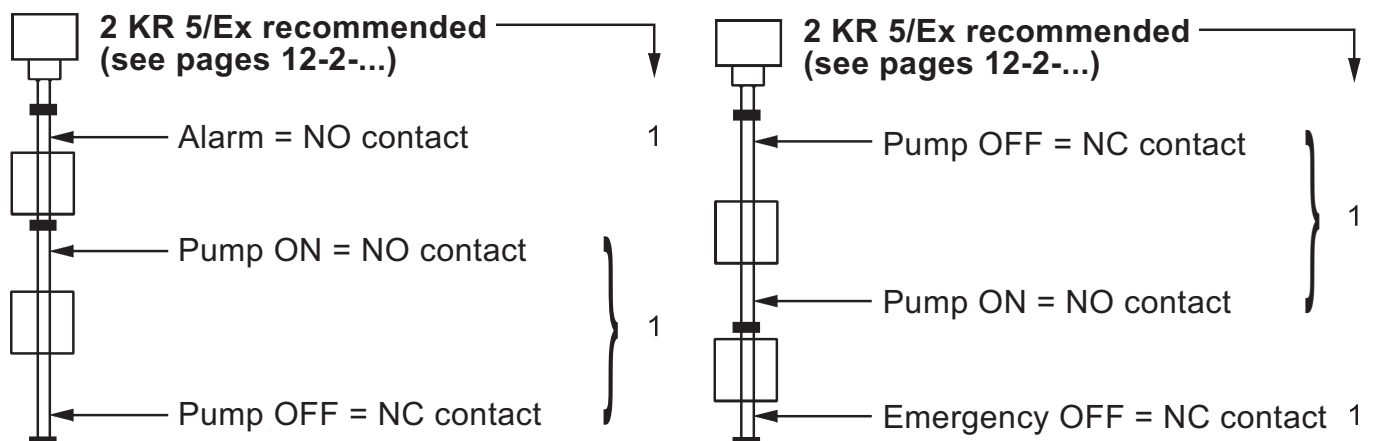
The probe tube should be of such a length that when the float reaches the lower contact, it rests on the holding washer. The recommended distance between the lower contact and the end of probe tube corresponds to the min. distance as specified in the table under the technical data of the individual TSR models.



• with 2 or more floats and corresponding collars

In order to make sure that not only the upper contact and lower contact are held after activation, it is possible to use several floats together with the corresponding collars.

Please respect the min. distances between contacts for these applications.





TSR/FED/E./Variant 0/Ex-1G and TSR/FEW/E5/Variant 0/Ex-1G

Ex II 2 G Ex ia IIC T6 Gb

immersion probes

with
connecting cable

Technical data	TSR/FED/E./Variant 0/Ex-1G Ex II 2 G Ex ia IIC T6 Gb	TSR/FEW/E5/Variant 0/Ex-1G Ex II 2 G Ex ia IIC T6 Gb
Application	in intrinsically safe circuits in potentially explosive atmospheres zone 1 or 2 EC type examination certificate INERIS 03ATEX0163X	
Probe tube: • material • diameter • length • option	stainless steel 316 Ti, on request hastelloy B or C 14 mm 20 mm according to customer's specification, however max. 3,000 mm max. 6,000 mm angled probe tube for mounting from the side	
Screw-in nipple	G ¹ / ₂ , on request G ³ / ₄ , G1, G1 ¹ / ₂ or G2	G1, on request G1 ¹ / ₂ or G2
Float • E8 • E2 • E7 • E5 • E8, E7 • E2 • E5	stainless steel 316 Ti, on request hastelloy B or C 72 mm Ø — 44.5 mm Ø x 52 mm — 52 mm Ø x 88 mm — 98 mm Ø 98 mm Ø for liquids with a density ≥ 0.70 g/cm ³ — ≥ 0.95 g/cm ³ — ≥ 0.70 g/cm ³ ≥ 0.70 g/cm ³	
Electrical connection	PVC connecting cable, length 1.5 m, on request other cable type or length, cable entry made of nickel-plated brass, on request stainless steel, protection class IP65	
Mounting orientation	vertical	
Temperature range	– 20°C to + 60°C	
Pressure resistance	use only under atmospheric pressures (between 0.8 bar and 1.1 bar), on request pressure resistant version up to max. 10 bar at + 20°C, however only for hydraulic pressures and not suitable for pressure in line with the Pressure Equipment Directive 2014/68/EU	
Contacts: • type • max number: NO or NC OC	reed contacts: NO, NC or OC 4 5 4 5	

Float	Min. distances to be observed (based on liquids with a density of 1 g/cm ³):			
	from the nipple sealing surface to the upper contact	between contacts when using		from the lower contact to the end of the probe tube (when float is falling)
		1 float	2 floats	
E8	80 mm	80 mm	100 mm	55 mm
E2	70 mm		80 mm	65 mm
E7	80 mm		120 mm	70 mm
E5 (TSR/FED/E5)	90 mm		125 mm	60 mm
E5 (TSR/FEW/E5)				65 mm

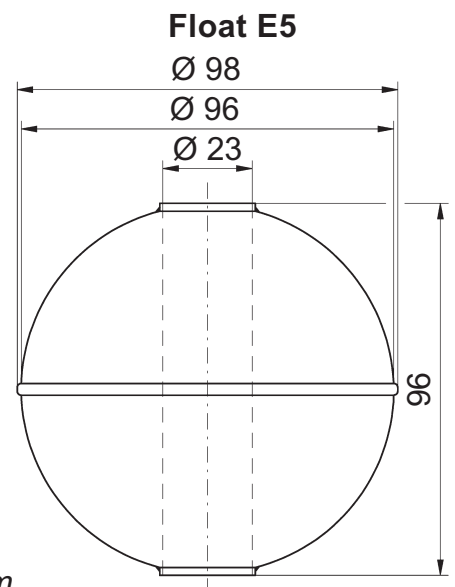
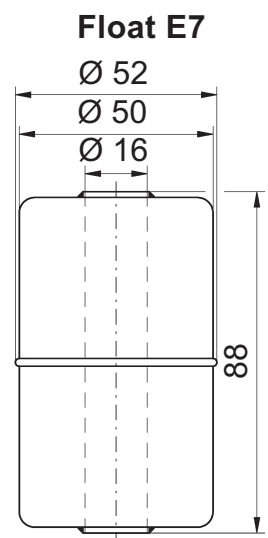
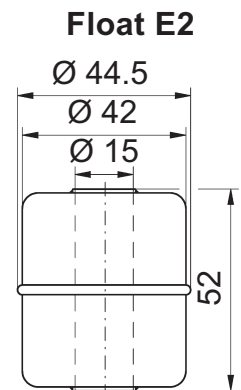
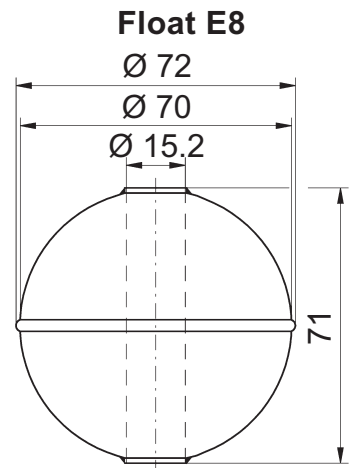
The above equipment will be manufactured in accordance with your specifications.



**TSR/FED/E8/
Variant 0/Ex-1G**
 ⚡ II 2 G **Ex ia** IIC T6 Gb
 with
 supplementary collar



**TSR/FEW/E5/
Variant 0/Ex-1G**
 ⚡ II 2 G **Ex ia** IIC T6 Gb
 with
 supplementary collar



The use of this equipment requires a connection to certified intrinsically safe currents. We can supply appropriate protection relays suitable to produce these currents.

For inquiries or orders, please complete the questionnaire on page 3-2-17.

Dimensions in mm



TSR/FHED/E4/Variant 0/Ex-1G and TSR/FHEW/E4/Variant 0/Ex-1G

Ex II 2 G Ex ia IIC T4 or T3 Gb

immersion probes

with
connecting cable

Technical data	TSR/FHED/E4/Variant 0/Ex-1G Ex II 2 G Ex ia IIC T. Gb	TSR/FHEW/E4/Variant 0/Ex-1G Ex II 2 G Ex ia IIC T. Gb
Application	for use in intrinsically safe circuits in potentially explosive atmospheres zone 1 or 2 EC type examination certificate INERIS 03ATEX0163X	
Probe tube: • material • diameter • length • option	stainless steel 316 Ti, on request hastelloy B or C 14 mm 20 mm according to customer's specification, however max. 3,000 mm max. 6,000 mm angled probe tube for mounting from the side	
Screw-in nipple	G ³ / ₄ , on request G ¹ / ₂ , G1, G1 ¹ / ₂ or G2	G1, on request G1 ¹ / ₂ or G2
Float • E4	stainless steel 316 Ti, on request hastelloy B or C Ø 97 mm x 80 mm, for liquids with a density ≥ 0.70 g/cm ³	
Electrical connection	silicon connecting cable, length 1.5 m, on request PTFE and other length, cable entry made of nickel-plated brass, on request stainless steel, protection class IP65	
Mounting orientation	vertical	
Temperature range: • T4 • T3	- 20°C to + 110°C - 20°C to + 125°C	
Pressure resistance	use only under atmospheric pressures (between 0.8 bar and 1.1 bar), on request pressure resistant version up to max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressure in line with the Pressure Equipment Directive 2014/68/EU	
Contacts: • type • max. number: NO or NC OC	reed contacts: NO, NC or OC 2 5 2 5	

Float	Min. distances to be observed (based on liquids with a density of 1 g/cm ³):			
	from the nipple sealing surface to the upper contact	between contacts when using		from the lower contact to the end of the probe tube (when float is falling)
E4	90 mm	1 float 80 mm	2 floats 110 mm	60 mm

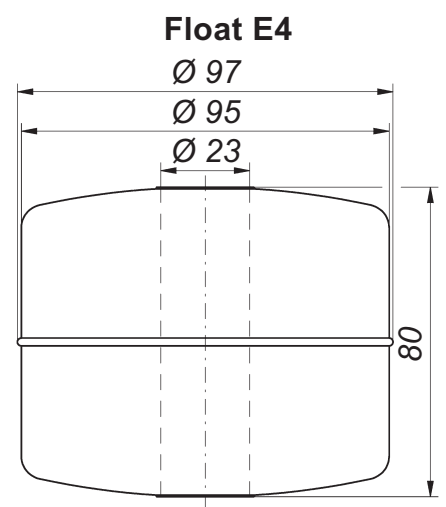
The above equipment will be manufactured in accordance with your specifications.



**TSR/FHED/E4/
Variant 0/Ex-1G Ex II 2 G
Ex ia IIC T4 or T3 Gb
with
G1 screw-in nipple
in place of G $\frac{3}{4}$
and with
supplementary collar**



**TSR/FHEW/E4/
Variant 0/Ex-1G Ex II 2 G
Ex ia IIC T4 or T3 Gb
with
supplementary collar**



Dimensions in mm

The use of this equipment requires a connection to certified intrinsically safe currents.
We can supply appropriate protection relays suitable to produce these currents.

For inquiries or orders, please complete the questionnaire on page 3-2-17.



TSR/ED/E./Variant 0/Ex-0G and TSR/EW/E5/Variant 0/Ex-0G Ex II 2/1 G Ex ia IIC T6 Ga/Gb immersion probes

with
terminal box

Technical data	TSR/ED/E./Variant 0/Ex-0G Ex II 2/1 G Ex ia IIC T6 Ga/Gb	TSR/EW/E5/Variant 0/Ex-0G Ex II 2/1 G Ex ia IIC T6 Ga/Gb
Application	in intrinsically safe circuits in potentially explosive atmospheres • probe tube and float: zone 0, 1 or 2 • terminal box: zone 1 or 2 EC type examination certificate INERIS 03ATEX0163X	
Probe tube: • material • diameter • length	stainless steel 316 Ti, on request hastelloy B or C 14 mm according to customer's specification, however max. 3,000 mm	20 mm max. 6,000 mm
Screw-in nipple	G ¹ / ₂ , on request G ³ / ₄ , G1, G1 ¹ / ₂ or G2	G1, on request G1 ¹ / ₂ or G2
Float • E8 • E2 • E7 • E5 • E8, E7 • E2 • E5	stainless steel 316 Ti, on request hastelloy B or C 72 mm Ø 44.5 mm Ø x 52 mm 52 mm Ø x 88 mm 98 mm Ø for liquids with a density ≥ 0.70 g/cm ³ ≥ 0.95 g/cm ³ ≥ 0.70 g/cm ³	— — — 98 mm Ø — — ≥ 0.70 g/cm ³
Electrical connection • max. 12 terminals • max. 18 terminals	terminal box, protection class IP65 A 308 made of antistatic (conductive) PP, 120 x 80 x 55 mm A 113a made of antistatic (conductive) glass fibre reinforced polyester, 160 x 160 x 90 mm	
Mounting orientation Temperature range Pressure resistance	vertical – 20°C to + 60°C use only under atmospheric pressures (between 0.8 bar and 1.1 bar), on request pressure resistant version up to max. 10 bar at + 20°C, however only for hydraulic pressures and not suitable for pressure in line with the Pressure Equipment Directive 2014/68/EU	
Contacts: • type • max. number: NO or NC OC	reed contacts: NO, NC or OC 4 4	
		5 5

Float	Min. distances to be observed (based on liquids with a density of 1 g/cm³):			
	from the nipple sealing surface to the upper contact	between contacts when using		from the lower contact to the end of the probe tube (when float is falling)
		1 float	2 floats	
E8	80 mm	80 mm	100 mm	55 mm
E2	70 mm		80 mm	65 mm
E7	80 mm		120 mm	70 mm
E5 (TSR/ED/E5)	90 mm		125 mm	60 mm
E5 (TSR/EW/E5)				65 mm

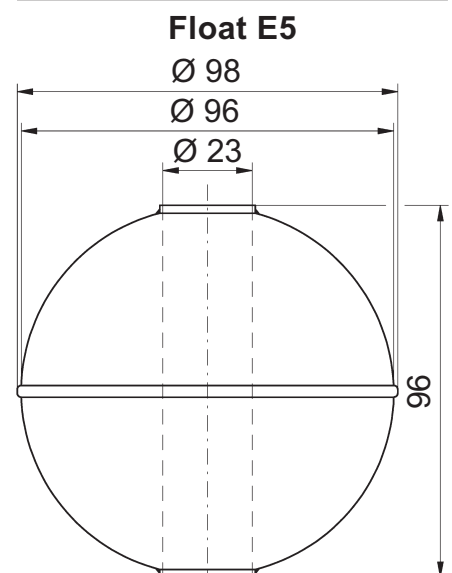
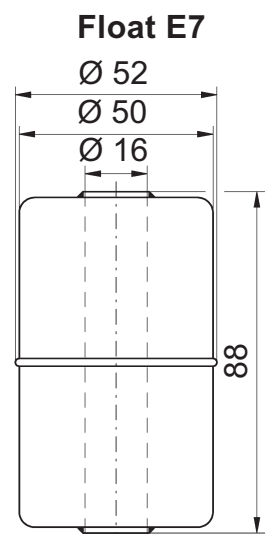
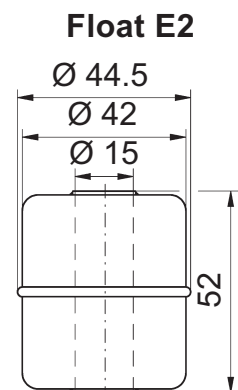
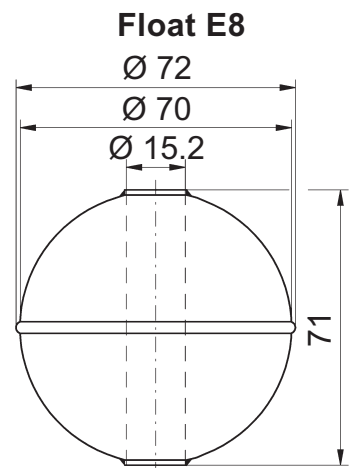
The above equipment will be manufactured in accordance with your specifications.



**TSR/ED/E8/
Variant 0/Ex-0G Ex ia IIC T6 Ga/Gb
with
supplementary collar**



**TSR/EW/E5/
Variant 0/Ex-0G Ex ia IIC T6 Ga/Gb
with
supplementary collar**



The use of this equipment requires a connection to certified intrinsically safe currents.
We can supply appropriate protection relays suitable to produce these currents.

For inquiries or orders, please complete the questionnaire on page 3-2-17.

Dimensions in mm



TSR/FED/E./Variant 0/Ex-0G and TSR/FEW/E5/Variant 0/Ex-0G

Ex II 1 G Ex ia IIC T6 Ga

immersion probes

with
connecting cable

Technical data	TSR/FED/E./Variant 0/Ex-0G Ex II 1 G Ex ia IIC T6 Ga	TSR/FEW/E5/Variant 0/Ex-0G Ex II 1 G Ex ia IIC T6 Ga
Application	in intrinsically safe circuits in potentially explosive atmospheres zone 0, 1 or 2 EC type examination certificate INERIS 03ATEX0163X	
Probe tube: • material • diameter • length	stainless steel 316 Ti, on request hastelloy B or C 14 mm 20 mm according to customer's specification, however max. 3,000 mm max. 6,000 mm	
Screw-in nipple	G ¹ / ₂ , on request G ³ / ₄ , G1, G1 ¹ / ₂ or G2	G1, on request G1 ¹ / ₂ or G2
Float • E8 • E2 • E7 • E5 • E8, E7 • E2 • E5	stainless steel 316 Ti, on request hastelloy B or C 72 mm Ø 44.5 mm Ø x 52 mm 52 mm Ø x 88 mm 98 mm Ø for liquids with a density ≥ 0.70 g/cm ³ ≥ 0.95 g/cm ³ ≥ 0.70 g/cm ³	— — — 98 mm Ø — — ≥ 0.70 g/cm ³
Electrical connection	antistatic (conductive) PURLF connecting cable, length 1.5 m, on request other length (max. 10 m), cable entry made of nickel-plated brass, on request stainless steel, protection class IP65	
Mounting orientation	vertical	
Temperature range	– 20°C to + 60°C	
Pressure resistance	use only under atmospheric pressures (between 0.8 bar and 1.1 bar), on request pressure resistant version up to max. 10 bar at + 20°C, however only for hydraulic pressures and not suitable for pressure in line with the Pressure Equipment Directive 2014/68/EU	
Contacts: • type • max. number: NO or NC OC	reed contacts: NO, NC or OC 4 4	5 5

Float	Min. distances to be observed (based on liquids with a density of 1 g/cm³):			
	from the nipple sealing surface to the upper contact	between contacts when using		from the lower contact to the end of the probe tube (when float is falling)
		1 float	2 floats	
E8	80 mm	80 mm	100 mm	55 mm
E2	70 mm		80 mm	65 mm
E7	80 mm		120 mm	70 mm
E5 (TSR/FED/E5)	90 mm		125 mm	60 mm
E5 (TSR/FEW/E5)				65 mm

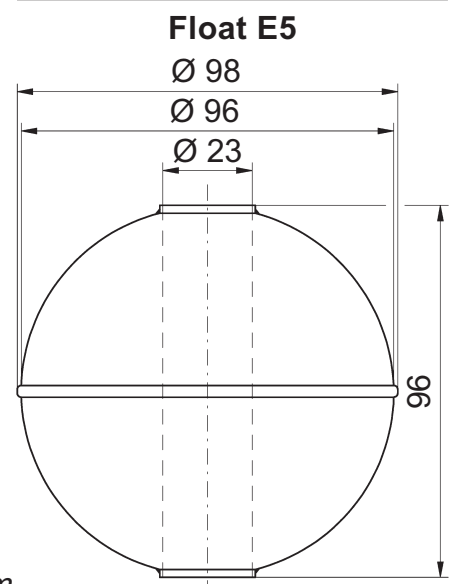
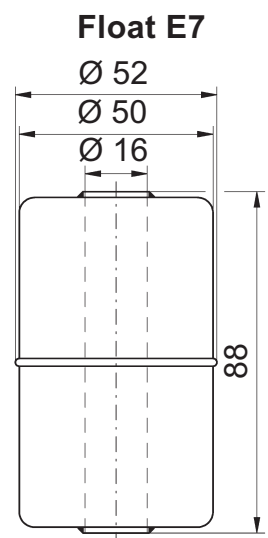
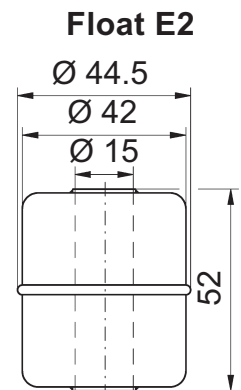
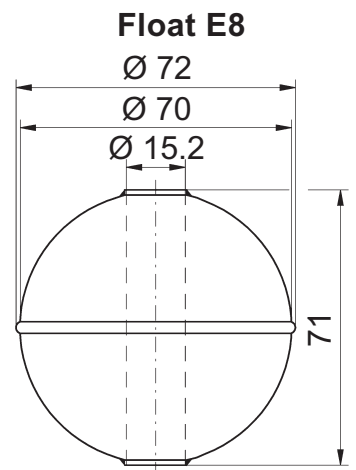
The above equipment will be manufactured in accordance with your specifications.



**TSR/FED/E8/
Variant 0/Ex-0G Ex II 1 G
Ex ia IIC T6 Ga
with
supplementary collar**



**TSR/FEW/E5/
Variant 0/Ex-0G Ex II 1 G
Ex ia IIC T6 Ga
with
supplementary collar**



The use of this equipment requires a connection to certified intrinsically safe currents.
We can supply appropriate protection relays suitable to produce these currents.

For inquiries or orders, please complete the questionnaire on page 3-2-17.

Dimensions in mm



TSR/FED/E./Ex d/Ex-1G and TSR/FEW/E5/Ex d/Ex-1G II 2 G Ex d IIB T6 Gb immersion probes

with
connecting cable

Technical data	TSR/FED/E./Ex d/Ex-1G II 2 G Ex d IIB T6 Gb	TSR/FEW/E5/Ex d/Ex-1G II 2 G Ex d IIB T6 Gb
Application	in potentially explosive atmospheres zone 1 or 2 EC type examination certificate INERIS 03ATEX0163X between AC/DC 24 V and 250 V between AC 100 mA and 2 A (0.4 A) max. 100 VA	
Switching voltage Switching current Switching capacity		
Probe tube: • material • diameter • length	stainless steel 316 Ti, on request hastelloy B or C 14 mm 20 mm according to customer's specification, however max. 1,500 mm max. 3,000 mm	
Screw-in nipple	G ³ / ₄ , on request G1, G1½ or G2	G1, on request G1½ or G2
Float • E8 • E2 • E7 • E5 • E8, E7 • E2 • E5	stainless steel 316 Ti, on request hastelloy B or C 72 mm Ø 44.5 mm Ø x 52 mm 52 mm Ø x 88 mm 98 mm Ø for liquids with a density ≥ 0.70 g/cm ³ ≥ 0.95 g/cm ³ ≥ 0.70 g/cm ³	— — — 98 mm Ø — — ≥ 0.70 g/cm ³
Electrical connection	PUR connecting cable, length 1.5 m, on request other cable type or length, cable entry made of nickel-plated brass, on request stainless steel, protection class IP65	
Mounting orientation Temperature range Pressure resistance	vertical – 20°C to + 60°C use only under atmospheric pressures (between 0.8 bar and 1.1 bar), on request pressure resistant version up to max. 10 bar at + 20°C, however only for hydraulic pressures and not suitable for pressure in line with the Pressure Equipment Directive 2014/68/EU	
Contacts: • type • max. number: NO or NC OC	reed contacts: NO, NC or OC 3 2	

Float	Min. distances to be observed (based on liquids with a density of 1 g/cm³):			
	from the nipple sealing surface to the upper contact	between contacts when using		from the lower contact to the end of the probe tube (when float is falling)
		1 float	2 floats	
E8	80 mm	80 mm	100 mm	55 mm
E2	70 mm		80 mm	65 mm
E7	80 mm		120 mm	70 mm
E5 (TSR/FED/E5)	90 mm		125 mm	60 mm
E5 (TSR/FEW/E5)				65 mm

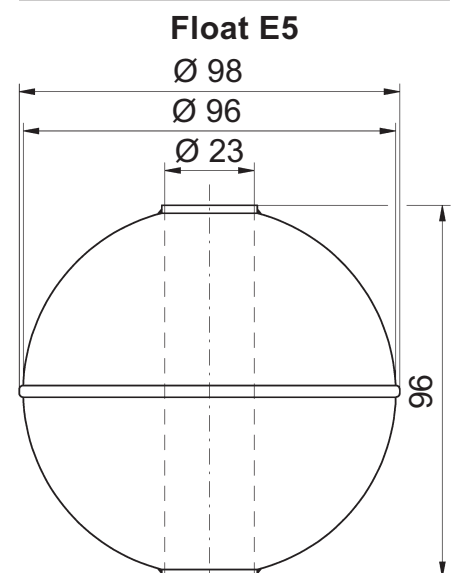
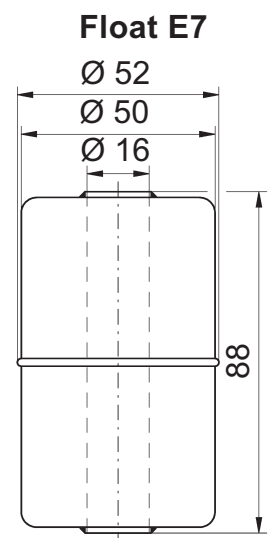
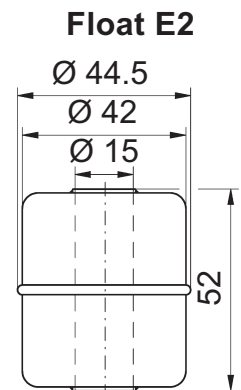
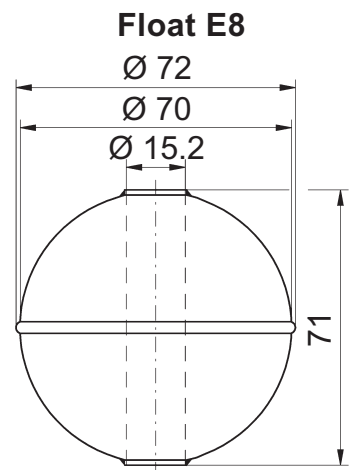
The above equipment will be manufactured in accordance with your specifications.



**TSR/FED/E8/
Ex d/Ex-1G Ex II 2 G
Ex d IIB T6 Gb
with
supplementary collar**



**TSR/FEW/E5/
Ex d/Ex-1G Ex II 2 G
Ex d IIB T6 Gb
with
supplementary collar**



**For inquiries or orders, please complete
the questionnaire on page 3-2-17.**

Dimensions in mm



TSR/FHED/E4/Ex d/Ex-1G and TSR/FHEW/E4/Ex d/Ex-1G

II 2 G Ex d IIB T4 or T3 Gb
immersion probes

with
connecting cable

Technical data	TSR/FHED/E4/Ex d/Ex-1G II 2 G Ex d IIB T. Gb	TSR/FHEW/E4/Ex d/Ex-1G II 2 G Ex d IIB T. Gb
Application	in potentially explosive atmospheres zone 1 or 2 EC type examination certificate INERIS 03ATEX0163X between AC/DC 24 V and 250 V between AC 100 mA and 2 A (0.4 A) max. 100 VA	
Switching voltage Switching current Switching capacity		
Probe tube: • material • diameter • length	stainless steel 316 Ti, on request hastelloy B or C 14 mm 20 mm according to customer's specification, however max. 1,500 mm max. 3,000 mm	
Screw-in nipple	G ³ / ₄ , on request G1, G1½ or G2	G1, on request G1½ or G2
Float • E4	stainless steel 316 Ti, on request hastelloy B or C Ø 97 mm x 80 mm for liquids with a density ≥ 0.70 g/cm ³	
Electrical connection	connecting cable based on a polyolefin copolymer, length 1.5 m, other length on request, cable entry made of nickel-plated brass, on request stainless steel, protection class IP65	
Mounting orientation	vertical	
Temperature range: • T4 • T3	- 20°C to + 110°C - 20°C to + 125°C	
Pressure resistance	use only under atmospheric pressures (between 0.8 bar and 1.1 bar), on request pressure resistant version up to max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressure in line with the Pressure Equipment Directive 2014/68/EU	
Contacts: • type • max. number: NO or NC OC	reed contacts: NO, NC or OC 2 2	3 2

Float	Min. distances to be observed (based on liquids with a density of 1 g/cm ³):			
	from the nipple sealing surface to the upper contact	between contacts when using		from the lower contact to the end of the probe tube (when float is falling)
E4	90 mm	1 float 80 mm	2 floats 110 mm	60 mm

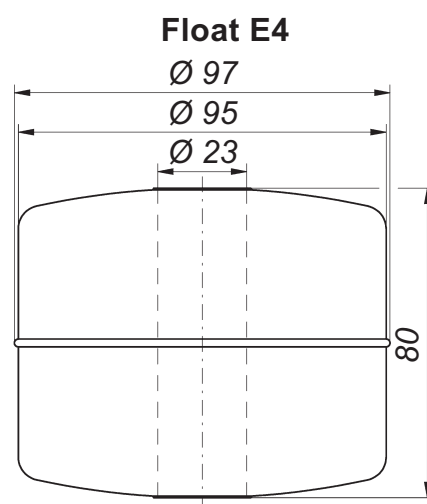
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**TSR/FHED/E4/
Ex d/Ex-1G  II 2 G
Ex d IIB T4 or T3 Gb
with
supplementary collar**



**TSR/FHEW/E4/
Ex d/Ex-1G  II 2 G
Ex d IIB T4 or T3 Gb
with
supplementary collar**

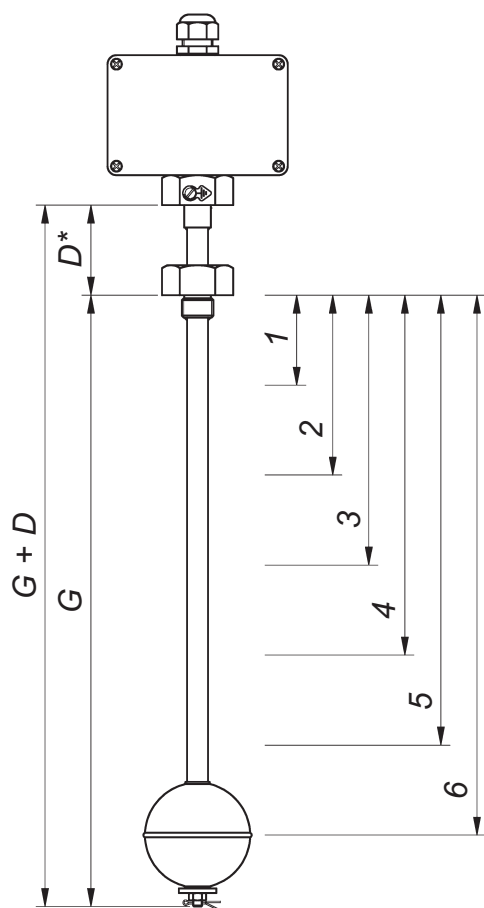


Dimensions in mm

For inquiries or orders, please complete the questionnaire on page 3-2-17.

For inquiries or orders, please complete the following questionnaire

Tank dimensions and installation conditions (attach sketch if necessary)			
Type of liquid			
Density		Temperature	
Hydraulic pressure, not suitable for pressure in line with the Pressure Equipment Directive 2014/68/UE			



Desired type	TSR/ ⊕ G Ex
Desired probe tube length (dimension G)	
Please mark desired floats and collars on the probe tube. * = 20 mm, optional: other value, but only for the Ex ia versions (to be inscribed in the drawing)	
Desired options	

	Contact type (NO, NC or OC)	Distance from the sealing surface of the screw-in nipple, in mm	Switching function (e.g. high alarm, pump ON, pump OFF, run-dry or overflow protection)	Float working direction: rising ↑ or falling ↓
1				
2				
3				
4				
5				
6				

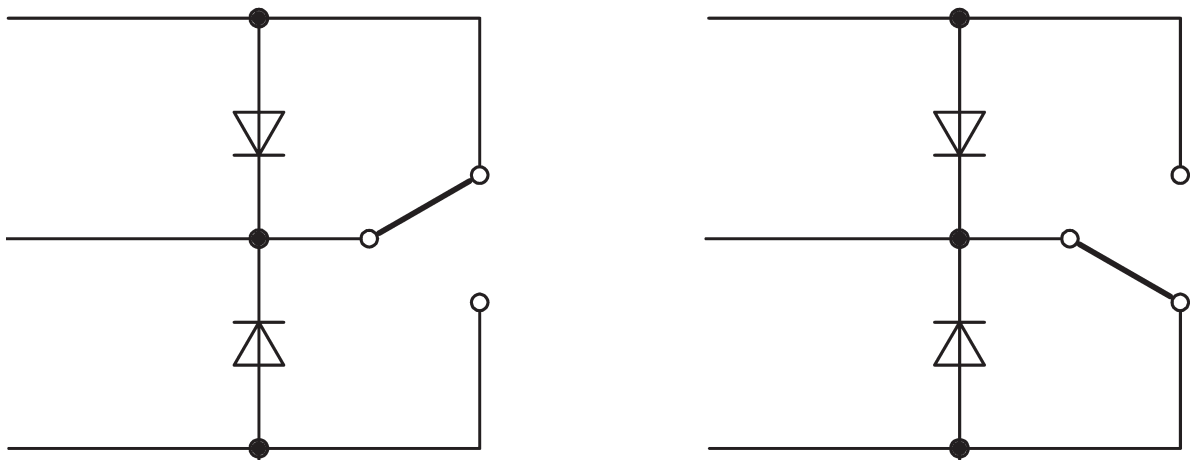
**Immersion probes will be manufactured according to customer's specifications.
It is therefore not possible to return these special designs.**

Options for safety applications for immersion probes TSR/.../Variant./Ex-.G Ex ia IIC T6 G.: incorporation of electronic components for a reed contact for cable break and short-circuit monitoring

Variant 0:
without electronic components

Variant 1:
with diodes for half-wave monitoring

Two (2) diodes of the type 1N4004 or equivalent



Variant 2:
with resistors for NAMUR monitoring

Two (2) metal film resistors or carbon film resistors R 1, R 2,
each greater than or equal to 2 k Ω ,
each P greater than or equal to 1/4 W

and

one (1) metal film resistor or carbon film resistor R 3
greater than or equal to 330 Ω ,
P greater than or equal to 1 W

