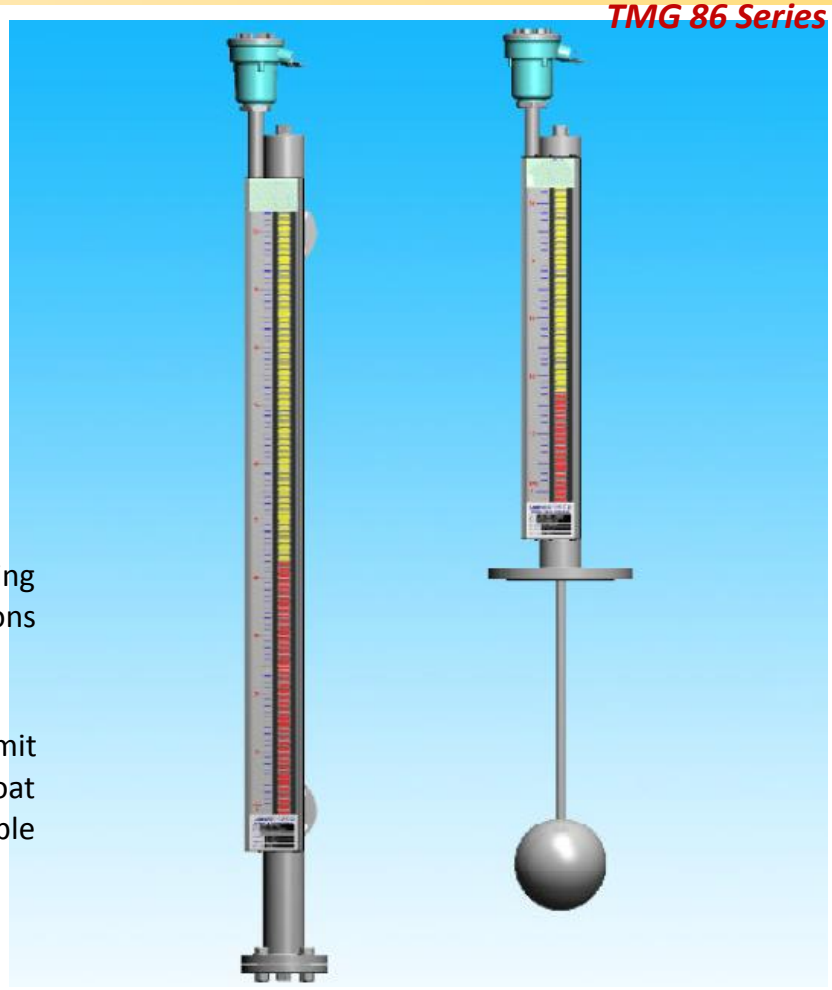
Tosilon Automation

Magnetic Level Gauge

TMG 86 Series



TMG86 level Gauge is used for measuring liquid levels in open or pressurized tanks. Due to its special design, it is particularly suitable for use in connection with aggressive, noxious or flammable substances and tough service conditions.

No power is required for local liquid-level indication. Optionally, the unit can be equipped or retrofitted with an electrical analogue level transducer system and/or limit switches.

Measuring Principle

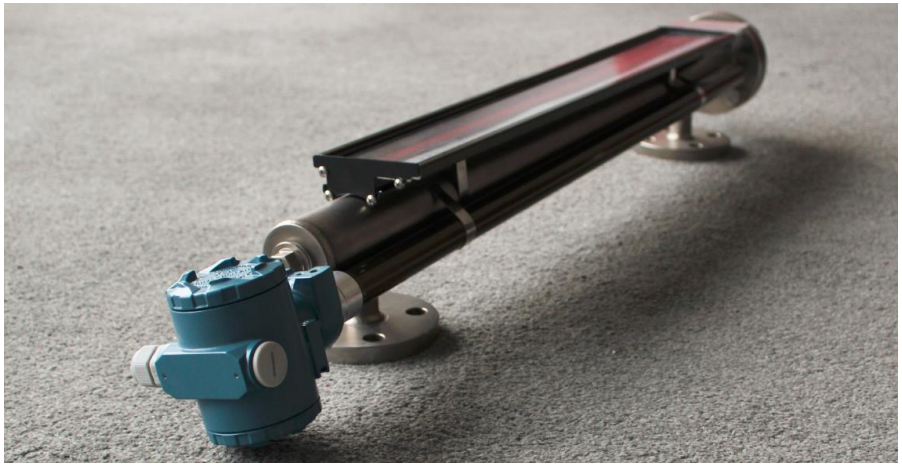
The unit operates on the principle of communicating tubes. The measuring tube is connected as a side vessel to the tank such that the same conditions are obtained in the tube as those in the tank.

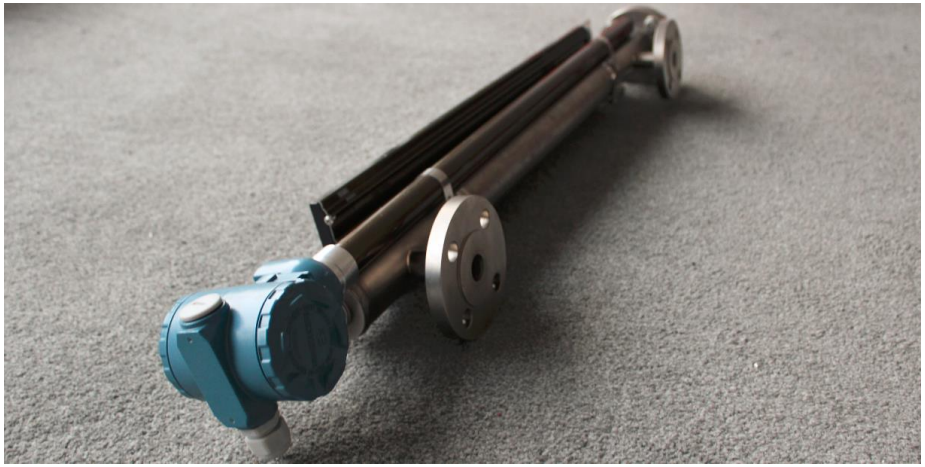
The float is equipped with a system of permanent magnets to transmit measured values to the local indicator. The magnet system of the float activates the magnetic flaps according to the liquid level, or a movable follower magnet in the indicating section of the indicator.

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

Performance

- Simple, Rugged, Advanced technology, Fashionable design
- Withstanding pressure, indicating part and measuring part is insulated by sealing
- Suitable for tough operating and environment conditions
- Reliable for liquid/gasoil, at density≥ 0.5kg/l
- Big bar scale, easily read
- Various versions, with inner PTFE or hard plastics and so on
- Pressure: standard ≥ 4.0MPa, middle pressure: 6.4MPa, high pressure: 10.0MPa, 16.0MPa
- Temperature: standard ≤ 150 ^{o}C, middle temperature ≤ 200 ^{o}C, high temperature ≤ 450 ^{o}C
- Measure interface, at density difference ≥ 0.1kg/l
- Changeable indicator, optional limit switches and remote transducer system remote current output: 4~20mA





Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

General Technical Parameters		
Measuring Range		
Standard	TMG86/C(D,E,F)/R1	0.3 ~ 6m
	TMG86/P/R1	0.3 ~ 2.5m
Option	TMG86/C/R1	0.3 ~9m (not for Ex)
Accuracy		± 5mm F.S.
Min Medium Density		
Standard	TMG86/C(D,E,F)/R1	0.5~3.0kg/l
	TMG86/P/R1	0.8~3.0kg/l
Others	Refer to the ”Floats Versions Sheet”	
Viscosity		≤ 5000mPa.s
Operating (Depend on material, Flange pressure rating and float pressure resistance)	Pressure Standard: 4.0MPa, Middle :6.4MPa, High :10.0MPa,16.0MPa	
Indicator Scale		
Standard	cm/m Linear	
Option	inch/feet, % (or as required)	
Indicator Protection	IP65	
Process Temperature		

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi’an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

Standard	≤ 150 ^{O}C
Option	Middle Temp ≤ 200OC, High Temp.≤ 450OC,
TMG86/R1/Exi (Exd) (indicator in field with electrical remote unit)	(-20 ~ 60) ^{O}C
TMG86/R1/ (indicating in field fox hazardous area) indicator with magnetic flaps	(-20 ~ 200) ^{O}C
Flange Connection *(According to DIN 2501 (please contact manufacture for high Pressure, and middle pressure)*	
Standard	
TMG86/C(D,E,F)/R1	DN25, PN4.0
TMG86/P/R1	DN150,PN1.6
TMG86/C/RP	DN25, PN.16
PP, PV, PD	DN25, PN0.6
Option	
TMG86/C(D,E,F)/R1	DN15~DN50, PN1.6 or PN4.0
TMG86/P/R1	DN200,PN1.6
TMG86/P/R1 may be chosen if the unit has manhole	DN40 ~ DN125, PN1.6
TMG86/C/RP	DN15~DN50, PN.16
PP, PV, PD	DN15~DN50, PN0.6 or PN1.0
Flange Connection with Heating Jacket	DN15, DN4.0, PN0.6 or PN1.0
Remark	Information on other standards and pressure ratings supplied on request
Remote Output	4~20mA
allowable expansion coefficient for PVC and PP=0.12-0.15mm/m^{O}C	

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

General Technical Parameters

Select Floats

Select float as a function of the pressure, temperature, and density of the liquid. In addition, the required degree of corrosion resistance and use of the correct magnet system must be considered when selecting materials

Standard										
TMG86/C(D,E,F) Magnetic Float										
Float No.	Shape	Dimension Diameter mm	Material	med. min. DEN kg/l	Max. Operating Pressure				Process Temp.	
					20 °C MPa	100 °C MPa	200 °C MPa	300 °C MPa	Min. low °C	Max. high °C
1	Cylinder	Φ 64 × 200 × 1.0	1Cr18Ni9Ti	0.82	5.0	4.5	3.7	3.2	-200	400
2	Cylinder	Φ 64 × 200 × 0.5	1Cr18Ni9Ti	0.55	1.6	1.2	1.0	0.9	-200	400
3	Cylinder	Φ 64 × 208 × 0.6	Ti	0.5	2.0	1.6	1.0	0.6	-200	300
4	Cylinder	Φ 64 × 208 × 1.0	Ti	0.6	6.0	4.0	2.5	1.6	-200	300
5	Cylinder	Φ 64 × 120 × 2.0	PVC	0.85	2.5	-	-	-	10	40
6	Cylinder	Φ 64 × 200 × 2.0	PP	0.8	3.2	-	-	-	10	80
7	Cylinder	Φ 64 × 145 × 2.5	PVDF	0.9	0.9	-	-	-	-40	100
TMG86/C(D,E,F)/Exi (Local Indicator with Electrical Remote)										
1	Cylinder	Φ 64 × 200 × 1.0	1Cr18Ni9Ti	0.82	4.0	4.0	-	-	-20	100
2	Cylinder	Φ 64 × 200 × 0.5	1Cr18Ni9Ti	0.55	1.6	1.2	-	-	-20	100
3	Cylinder	Φ 64 × 208 × 0.6	Ti	0.5	2.0	1.6	-	-	-20	100
4	Cylinder	Φ 64 × 208 × 1.0	Ti	0.6	4.0	4.0	-	-	-20	100
TMG86/C(D,E,F) Local Indicator										
1	Cylinder	Φ 64 × 200 × 1.0	1Cr18Ni9Ti	0.82	4.0	4.0	3.7	-	-20	200
2	Cylinder	Φ 64 × 200 × 0.5	1Cr18Ni9Ti	0.55	1.6	1.2	1.0	-	-20	200
3	Cylinder	Φ 64 × 208 × 0.6	Ti	0.5	2.0	1.6	1.0	-	-20	200

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

4	Cylinder	Φ 64 × 208 × 1.0	Ti	0.6	4.0	4.0	3.0	-	-20	200
TMG86/P/R1 Magnetic Float										
1	Sphere	Φ 150	1Cr18Ni9Ti	1.0	1.6	1.0			-20	200
2	Sphere	Φ 150	1Cr18Ni9Ti	1.0	1.6	1.0			-20	200

Attention: Testing Pressure of Float=Max. Allowable Operating Pressure multiply by 1.5
Please contact manufacture for Middle Pres., High Pres., Middle Temp. High temp.

Special version
Low Temperature AG, TR, IC-TR
Version TMG86/AG: up to -40 ^{O}C
Version TMG86/TR: up to -200 ^{O}C
Version TMG86/IC-TR: up to -200 ^{O}C

All components are made of 1Cr18Ni9Ti except for indicator

The measuring tube in the TMG86/IC-TR has fiber-glass insulation and aluminium cladding. The float magnets are made of a special material.

The scale indication is magnified by plexitherm glass for easier reading. The ambient temperature and product temperature will have been specified by the customer to ensure insulation is appropriate. The socket length to the connecting flange will have been specified by the customer if insulation is supplied by the customer.

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

General Technical Parameters

Version AG (fig.2)

1. Plexitherm Glass
2. Indicator Scale
3. Glass Tube with Indicator
4. Measuring Tube

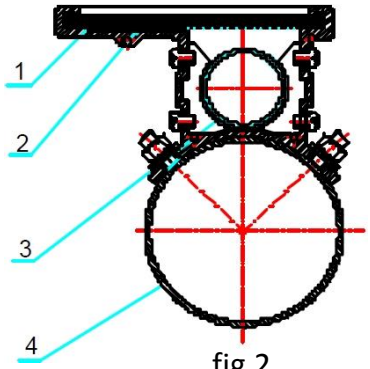


fig.2

Version TR (fig.3)

1. Measuring Tube
2. Glass tube with Indicator
3. Plexitherm Glass
4. Indicator Scale

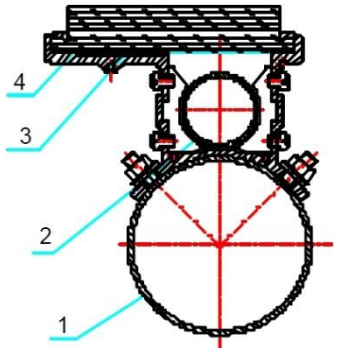


fig.3

Version IC-TR (fig.4)

1. Measuring Tube
2. Insulation
3. Glass tube with Indicator
4. Plexitherm Glass

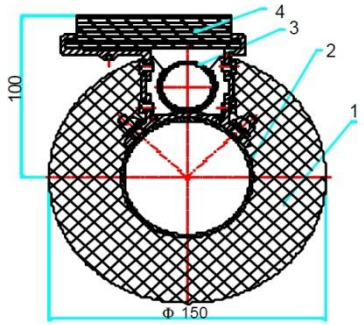


fig.4

High Temp. Version: HR, IC-HR (fig.5)

The TMG86/HR and TMG86/IC-HR versions are suitable for applications in the range from 200 °C to 400 °C .

All components are made of solid stainless 1Cr18Ni9Ti. The measuring tube in the TMG86/IC-HR version has glass wool insulation and aluminium cladding.

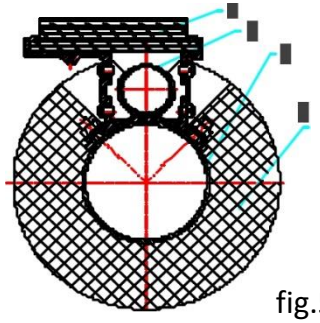


fig.5

1. Measuring Tube
2. Insulation
3. Glass tube with Indicator
4. Plexitherm Glass

Tosilon

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

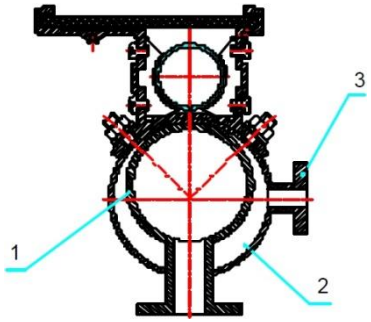
General Technical Parameters

Heating system for measuring tube B (fig.6)

For extreme operating conditions, the measuring tube is fitted with a heating jacket with flange connection.

Maximum allowable operating pressure of the heating medium is 0.6MPa.

Insulation of the measuring tube is recommended.



1. Measuring Tube
2. Heating System
3. Heating Medium Inlet

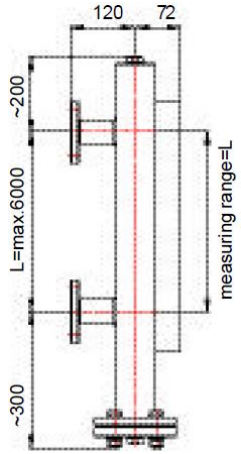
fig.6

Liquid/liquid interface measurement TMG86/T

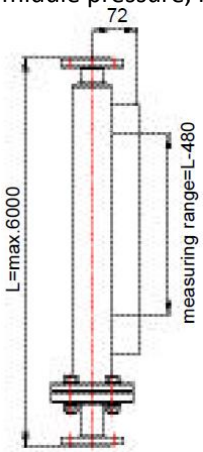
If a tank contains two liquids with different densities, the level of the interface can be measured by means of an adapted float loaded with ballast. The floats buoyancy properties permit it to float on the surface of the heavier liquid and ignore the lighter liquid. The difference in liquid densities must be at least 0.1kg/l, with the float being fully submerged in the lighter liquid.

Measuring tube type (fig.7)

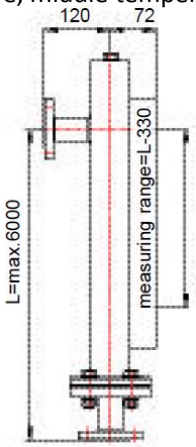
Please contact manufacture for middle pressure, high pressure, middle temperature, high temperature



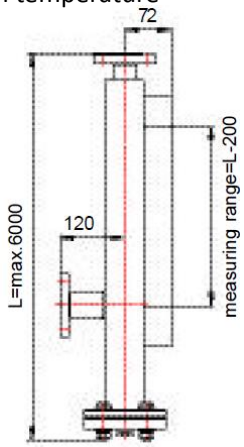
TMG86/C/R1



TMG86/D/R1



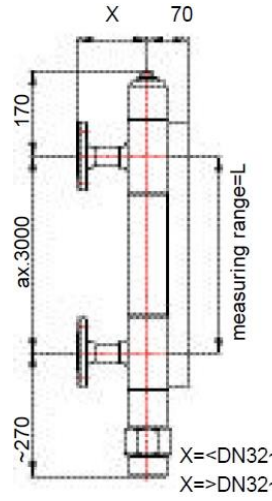
TMG86/E/R1



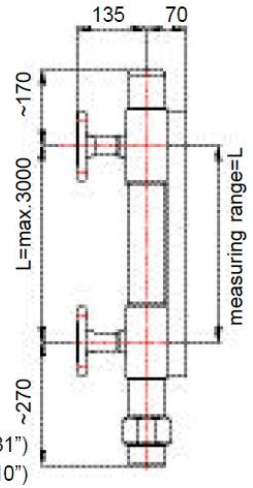
TMG86/F/R1

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

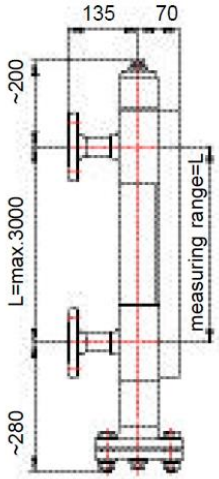
General Technical Parameters



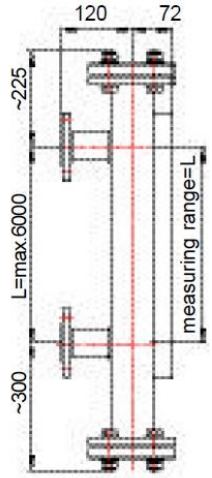
TMG86/C/PV



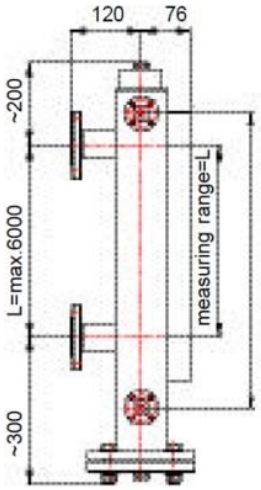
TMG86/C/PP



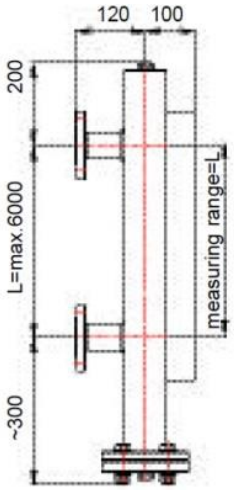
TMG86/C/PD



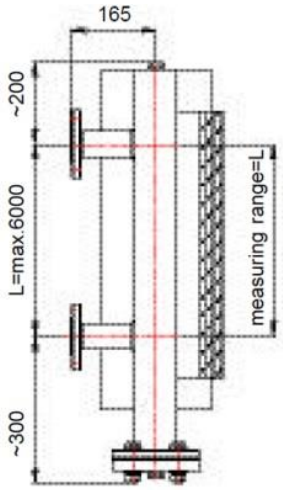
TMG86/C/Rp



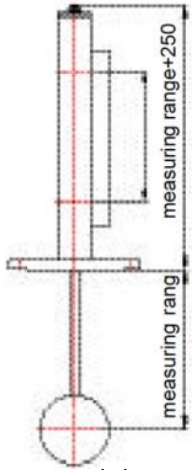
TMG86/C/R1/B



TMG86/C/R1/AG



TMG86/C/R1/IC-TR

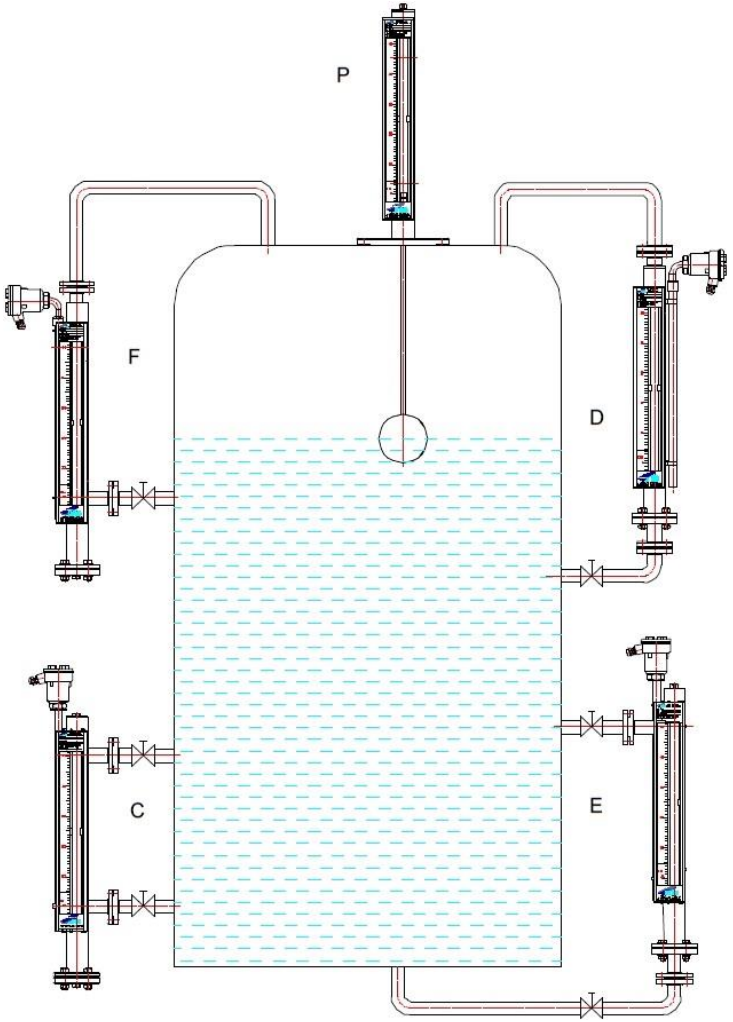


TMG86/P/R1

Tosilon

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

Installation Classes for Measuring Tube



Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

Remote Data Transducer System

In addition to the local scale indicator, the TMG86 can be fitted with an electrical remote system. For types, see mode codes.

The electrical remote system is consisted of remote component in measuring tube. The remote component is made up of circuit, installing tube and housing. The circuit mainly contains reed contact and resistance. The magnetic system in float will active reed contact according to the liquid level, therefore, the value of whole resistive chain is in proportion to the liquid level.

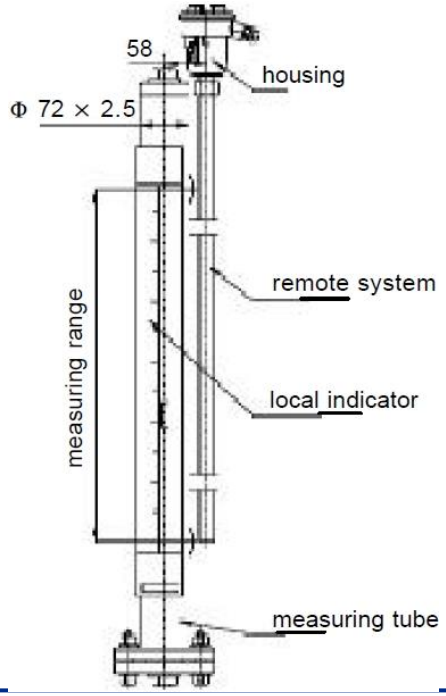
The remote system reading is converted into a current output of 4 to 20 mA by the transmitter that is potted into the transducer housing. The TMG86/Exi and TMG86/Exd can connect resistance in series if the transmitter directly connect to 14-36VDC in two-wire way. The version TMG86/Exi must be used with guard grating.

If the TMG86/Exi is connected to digital instrument, it displays the liquid level value on 4-digit LED.

Technical Data

Name	Remote systemEs, Exi, Exd
Measuring Length	
Standard	≤ 4000mm
Option	≤ 6000mm
Measuring Error	Measuring Value ± 1.0%FS
Resolution	10mm
Ambient Temperature	20 °C ~ +70 °C
Current Output	4-20mA
Power Supply	
Es	14~36VDC with Rev. Conn. Protection
Exi	14~30VDC
Max. Load	12V/12mA(max.500ohms)
for Exi system	
Self-Inductance (Li)	Neglect
Self-Capacitance (Ci)	Neglect

Remote output Construction



Tosilon

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

Limit switches

To signal specific liquid levels, the LM86 level indicator can be equipped with different types of limit switch that are clamped to the measuring tube and are adjustable over the whole measuring range. They are actuated by a magnet incorporated into the float. The operating conditions define which limit switches may be used.

KD, KS, KSa-Exd

This two limit switches consist of a reed contact that is actuated directly by the magnet system in the float. Due to their bi-stable switching characteristic, the switching state is maintained until the float magnet system again activates the limit switch in the opposite direction. The Exd features a explosion resistant housing, the Ex class is ExdIIC T6.

MC

This limit switch is Micro-Motion Switch; it is actuated by the magnet system in the float. The magnet system will activate when the float reach to alarm level.

Technical Data for Limit Switches

Switches Version	MC	KD	KS	KSa	
Max. Operating Voltage	250V DC	400 V DC	500 V DC	500 V DC	
Max. Contact Power	15W	100W	30W	50W	
Max. Contact Current	3A	3A	0.5A	1.5A	
Ambient Temperature	-20 °C to 120 °C	-20 °C to 120 °C	-20 °C to 120 °C	-20 °C to 120 °C	KD = DRR-129
Process Temperature	<450 °C	<450 °C	<450 °C	<450 °C	KS = DRR-DTH
Ingress Protection	IP65	IP65	IP65	IP65	KSa= DRT-DTH
Entrance Cable	PG13.5-M20 × 1.5	PG13.5-M20 × 1.5	PG13.5-M20 × 1.5	PG13.5-M20 × 1.5	
Housing Material	PPO	PPO	PPO	PPO	
Hysteresis	± 5mm	± 5mm	± 5mm	± 5mm	
Flameproof		may apply to Exd	may apply to Exd	may apply to Exd	

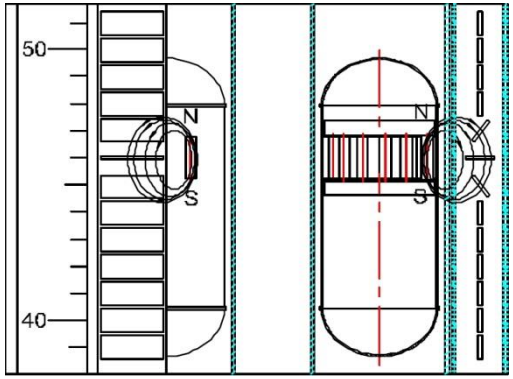
Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

ORDER GUIDE

TMG86 /..... /..... /..... /..... /..... /.....
1 2 3 4 5 6

1. CONNECTION VERSIONS

C= Two lateral Connections (side-side)
D= Two axial Connections
E= Bottom Side Connections (One top lateral entry and one bottom axial exit)
F= Top Side Connections (One bottom lateral entry and one top axial exit)
P= Top Connections



Operating Sketch for Magnetic Flaps

2. MATERIALS

Type	Mea. Tube Material	Mea. Tube Size	Flange Material	Max Operating Per.	Max. Process Tempt. (°C)
TMG86/R1	1Cr18Ni9Ti	Φ 72 × 2	1Cr18Ni9Ti	4.0MPa	200
TMG86/R0	0 Cr18Ni12Mo2Ti		0Cr18Ni12Mo2Ti		
TMG86/R10	0Cr18Ni9		0Cr18Ni9		
TMG86/R4	304		304		
TMG86/R4L	304L		304L		
TMG86/6	316		316		
TMG86/6L	316L		316L		
TMG86/RP*	316, PTFE Lining		316		
TMG86/PP*	PP	Φ 63 × 3	PP	0.6MPa	100
TMG86/PV*	PVC		PVC		40
TMG86/PD*	PVDF		PVDF		150

(For Floats Material, see Floats Versions)

Tosilon

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

ORDER GUIDE

3. Limit Switches Trigger Points and Types

MC, KD, KS, KSa (see page 6 for detail)

-Exd

-K1 =low limit

-K2 =high limit

-KK1 =high, low limit

-KK2 =high, high limit

-C =single-pole single-throw NC

-O =single-pole single-throw NO

--PC =Single-Pole Double-Throw NC

--PO =Single-Pole Double-Throw NO

4. Electrical Signal

Es = electrical remote system(two-wrie,4-20mA)

Exi = electrical remote system(ExiaIICT6,intrisic)

Exd=electrical remote system(ExdIICT5, flameproof)

5. Measuring versions

T = measure interface

6. Special Versions for Measuring Tube

B = Measuring Tube with Heating Jacket

AG = Low Temperature (-40 oC)

TR = Low Temperature (-200 oC)

HR = High Temperature

HP = High Pressure

C-TR = Ultralow Temperature, with insulated jacket

IC-HR= High temperature, with Heating Jacket

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com

Tosilon Automtion

Your Global Partner for Automation

China

Tosilon Automation CH

No.299,Daqing Rd, Lianhu District,

Xi'an Shaanxi,china

Tel:0086-29 8823 8550

Fax:0086-29-8133 9235

Email:info@tosilon.com

Overseas Dept:

globe@tosilon.com

www.tosilon.com

CH Inland

Tosilon

Tosilon Automation Co.,Ltd
Add: No. 229, Daqing Rd, Lianhu District, Xi'an Shaanxi, China
TEL: 0086-029-8823 8550
Email: globe@tosilon.com Website: www.tosilon.com