











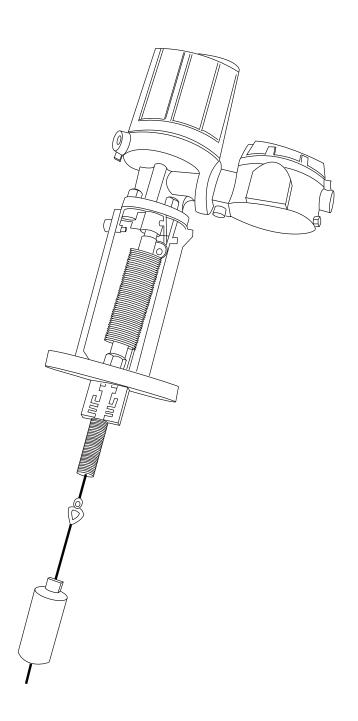






Operating Instructions

Level Switch MPC2000 MPC2





Basic device layout of the Magnet Level Switch MPC2

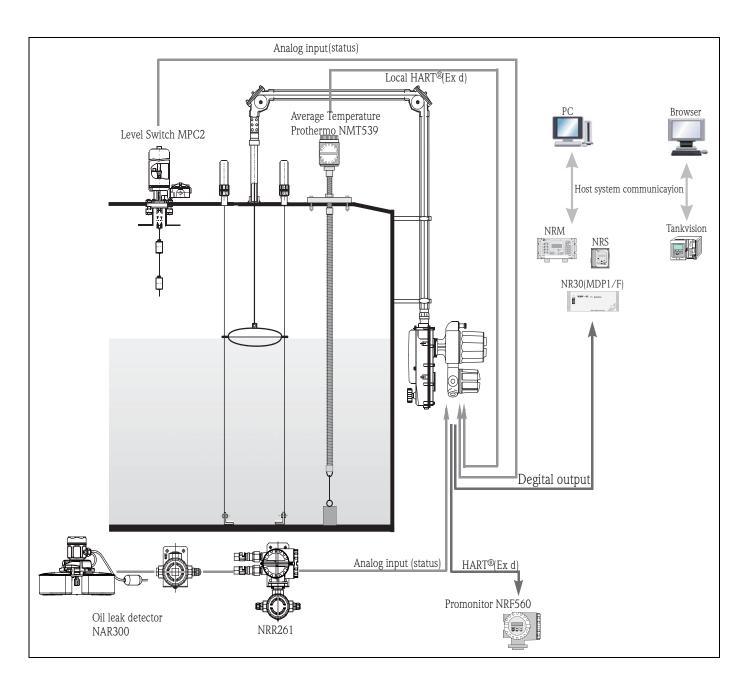


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Level Switch MPC2 1 Safety instructions

1 Safety instructions

1.1 Designated use

The MPC series level controllers are displacement type instruments for installation on tanks. It provides control outputs from 1 to 4 contacts while activating microswitches

with a magnet. Switching mechanism is designed to operate these contacts independent of one another. The instruments could therefore emit high and low alarm signals. It also performs pump control by utilizing the independent operations of the contacts

1.2 Installation, commissioning and operation

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried
 out by trained personnel authorized by the operator of the facility.
- Personnel must absolutely and without fail read and understand this Operating Manual before carrying out its instructions.
- The instrument may only be operated by personnel who are authorized and trained by the operator
 of the facility. All instructions in this manual are to be observed without fail.
- The installer must make sure that the measuring system is correctly wired according to the wiring diagrams. The measuring system is to be grounded.

1.3 Product Requirements

Connection to the peripheral equipment

It is possible to connect to the peripheral equipment explained in this installation Instrumants. Please refer to each installation Instrumants when connecting.

1.4 Safety of operation

Hazardous areas

Measuring systems for use in hazardous environments are accompanied by separate "Ex documentation", which is an integral part of this Operating Manual. Strict compliance with the installation instructions and ratings as stated in this supplementary documentation is mandatory.

- Ensure that all personnel are suitably qualified.
- Observe the specifications in the certificate as pipe as national and local regulations.

FCC approval

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution!



Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1 Safety instructions Level Switch MPC2

1.5 Notes on safety conventions and symbols

In order to highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding symbol in the margin.

Safety conventions					
<u>^</u> !\	Warning! A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument				
d	Caution! Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instrument				
	Note! A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned				
Explosion protection					
⟨Ex⟩	Device certified for use in explosion hazardous area If the device has this symbol embossed on its name plate, it can be installed in an explosion hazardous area				
EX	Explosion hazardous areas Symbol used in drawings to indicate explosion hazardous areas. Devices located in and wiring entering areas with the designation "explosion hazardous areas" must conform with the stated type of protection				
×	Safe area (non-explosion hazardous area) Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. Devices located in safe areas still require a certificate if their outputs run into explosion hazardous areas				
Explosion protection					
	Direct voltage A terminal to which or from which a direct current or voltage may be applied or supplied				
\sim	Alternating voltage A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied				
_	Grounded terminal A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system				
	Protective grounding (earth) terminal A terminal which must be connected to earth ground prior to making any other connection to the equipment				
*	Equipotential connection (earth bonding) A connection made to the plant grounding system which may be of type e.g. neutral star or equipotential line according to national or company practice				

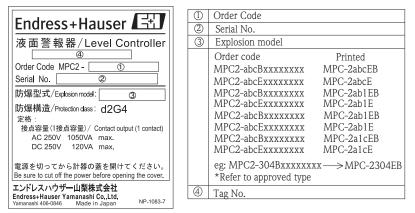
Level Switch MPC2 2 Identification

2 Identification

2.1 Device designation

2.1.1 Nameplate

The following technical data are given on the instrument nameplate:



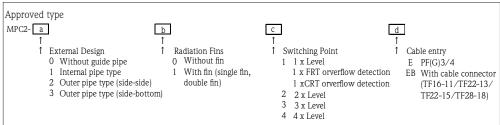


Fig. 1: Name plate

2 Identification Level Switch MPC2

Ordering Information 2.2

010	Т	ype:							
310	0	7	ot sel	ecte	ed				
	1	In	terna	ıl pip	эе				
	2			_		le-side inst. 25A/1")			
	3	E	tern	al pi	pe (sic	le-bottom inst. 25A/1")			
020					ation:				
		0			,	x. 100°C			
		1 2				ax. 250°C			
030			Switch count:						
			1 1 x Level						
		2 2 x Level 3 3 x Level							
			4	4	x Lev	el			
			5			Overflow detection			
			6	1	x CR	Coverflow detection			
040				Ap	prova	ıl:			
				В		ne proof d2G4, TIIS + cable gland			
				E W		ne proof d2G4, TIIS ather proof IP65			
				X		ather proof IP65 + cable connector			
				9		cial version, TSP-no. to be spec			
050	ı.	1		' 	Eun	cion:			
030						Basic version			
						Special version, TSP-no. to be spec			
060		ı	i		1	Process Connection, Top Mounted Flange:			
000						3 10K 65A RF, SUS304, JIS flange B2220			
					2	1 10K 65A RF, SUS316, JIS flange B2220			
						, , , , ,			
						2 10K 80A RF, SUS316, JIS flange B2220			
						10K 100A RF, SUS304, JIS flange B2220 10K 100A RF, SUS316, JIS flange B2220			
						, , , , , ,			
					8	3 20K 65A RF, SUS316, JIS flange B2220			
						5 20K 80A RF, SUS304, JIS flange B2220			
						5 20K 80A RF, SUS316, JIS flange B2220 C 2-1/2"150lbs RF, SUS304, ANSI flange B16.5			
						C 2-1/2"150lbs RF, SUS304, ANSI flange B16.5 D 2-1/2"150lbs RF, SUS316, ANSI flange B16.5			
						G 2-1/2"300lbs RF, SUS304, ANSI flange B16.5			
]	H 2-1/2"300lbs RF, SUS316, ANSI flange B16.5			
						A 3" 150lbs RF, SUS304, ANSI flange B16.5			
						3" 150lbs RF, SUS316, ANSI flange B16.5 3" 300lbs RF, SUS304, ANSI flange B16.5			
						3" 300lbs RF, SUS316, ANSI flange B16.5			
						J 4" 150lbs RF, SUS304, ANSI flange B16.5			
						7 4" 150lbs RF, SUS316, ANSI flange B16.5			
						65A 150lbs RF, SUS304, JPI flange 7S-15			
						M 65A 150lbs RF, SUS316, JPI flange 7S-15 Q 65A 300lbs RF, SUS304, JPI flange 7S-15			
						8 (65A 300lbs RF, SUS316, JPI flange 7S-15			
					J				
						80A 150lbs RF, SUS316, JPI flange 7S-15			
						N 80A 300lbs RF, SUS304, JPI flange 7S-15 P 80A 300lbs RF, SUS316, JPI flange 7S-15			
						W 100A 150lbs RF, SUS304, JPI flange 7S-15			
						100A 150lbs RF, SUS316, JPI flange 7S-15			
					Ġ	Special version, TSP-no. to be spec.			
ı	1	1	ı	ı	1 1				
MPC2-		T	1			Product designation (part 1)			

 $Endress\!+\!Hauser$

Level Switch MPC2 2 Identification

070	Switch P	Switch Position:						
	0 Lower	Lower						
		Lower + upper						
	2 Upper	Upper						
080	Pipe:	Pipe:						
		ot selected						
		mm T, internal pipe, SGP/SS						
		mm T, internal pipe, SUS304						
		mm T, internal pipe, SUS316						
		mm S, external pipe, STPG/SS, S25C						
		mm S, external pipe, SUS304 mm S, external pipe, SUS316						
		pecial version, TSP-no. to be spec.						
090		et Point:						
	A	, 6 (
	В							
	C	, ,						
		L2=SW2-SW3, L3= SW3-SW4						
	Y							
100		Cable Entry:						
		0 Thread PF(G)3/4						
		1 Thread PF(G)3/4, TF16-11						
		2 Thread PF(G)1, TF22-13						
		3 Thread PF(G)1, TF22-15						
		4 Thread PF(G)1-1/4, TF28-18						
		5 Thread NPT3/4						
		9 Special version, TSP-no. to be spec.						
110		Density Range:						
		0 Not selected, no displacer						
		$3 0.65 - 1.2 \text{g/cm}^3$, see additional spec.						
		9 Special version, TSP-no. to be spec.						
120		Colour:						
		0 Silver						
		9 Special version, TSP-no. to be spec.						
MPC2-		Complete product designation						

Note!

Order Info. 070 "Switch position"

When alarm point is 3 or 4 points and select "1: lower +upper", if you do not specify, we set the following specification.

- 3 points : 2 upper limit, 1 lower limit
- 4 points : 2 upper limit, 2 lower limit

Order Info. 090 "Set point"

- Without internal pipe/external pipe, overflow alarm
 - $\,-\,$ Please specify a setting length from top mounted flange bottom.
- with internal pipe
 - with length of internal pipe plate + attached gasket + mounting gasket (6+2+2mm) in mind, please specify
 a setting length from top mounted flange bottom.
- with external pipe
 - with length of mounting gasket (2mm) in mind, please specify a setting length from top mounted flange bottom.
- minimum setting length
 - 1 point length (H) is more than 300mm. Please specify alarm interval with more than 150mm.

2.3 Scope of delivery

Caution!

It is essential to follow the instructions concerning the unpacking, transport and storage of measuring

2 Identification Level Switch MPC2

instruments given in the chapter "Incoming acceotance, transport, storage" .

The scope of delivery consists of:

■ Assembled instrument

Accompanying documentation:

■ Operating Instruction (this manual)

Level Switch MPC2 3 Installation

3 Installation

3.1 3.1 Incoming acceptance, transport, storage

3.1.1 Incoming acceptance

Check the packing and contents for any signs of damage.

Check the shipment, make sure nothing is missing and that the scope of supply matches your order.

3.1.2 Transport

Caution!

Follow the safety instructions and transport conditions for instruments of more than 18 kg.

3.1.3 Storage

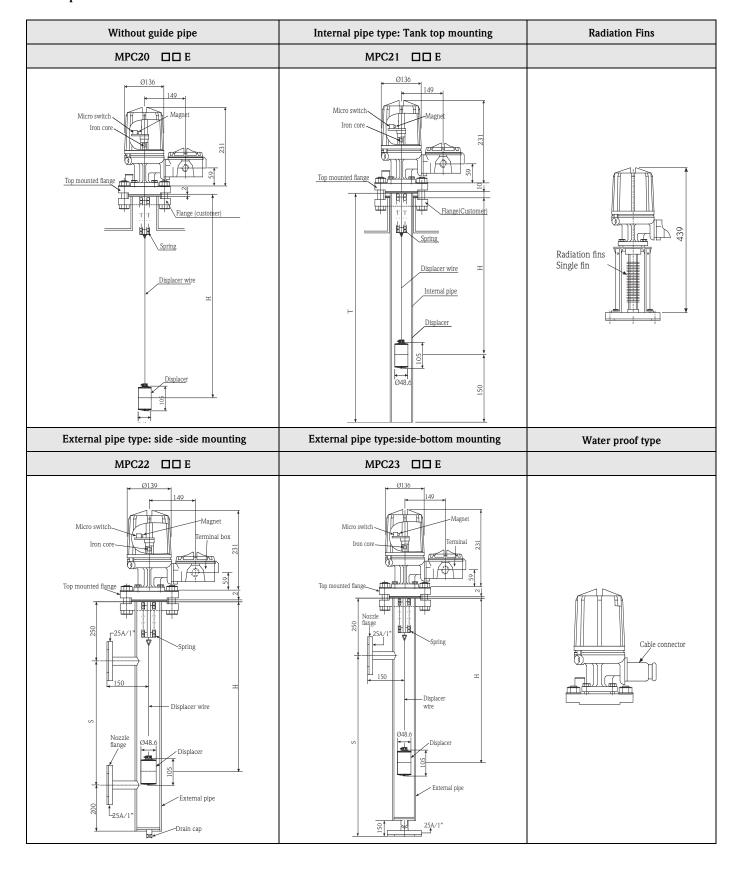
Pack the measuring instrument so that is protected against impacts for storage and transport. The original packing material provides the optimum protection for this.

The permissible storage temperature is -10... + 60 °C

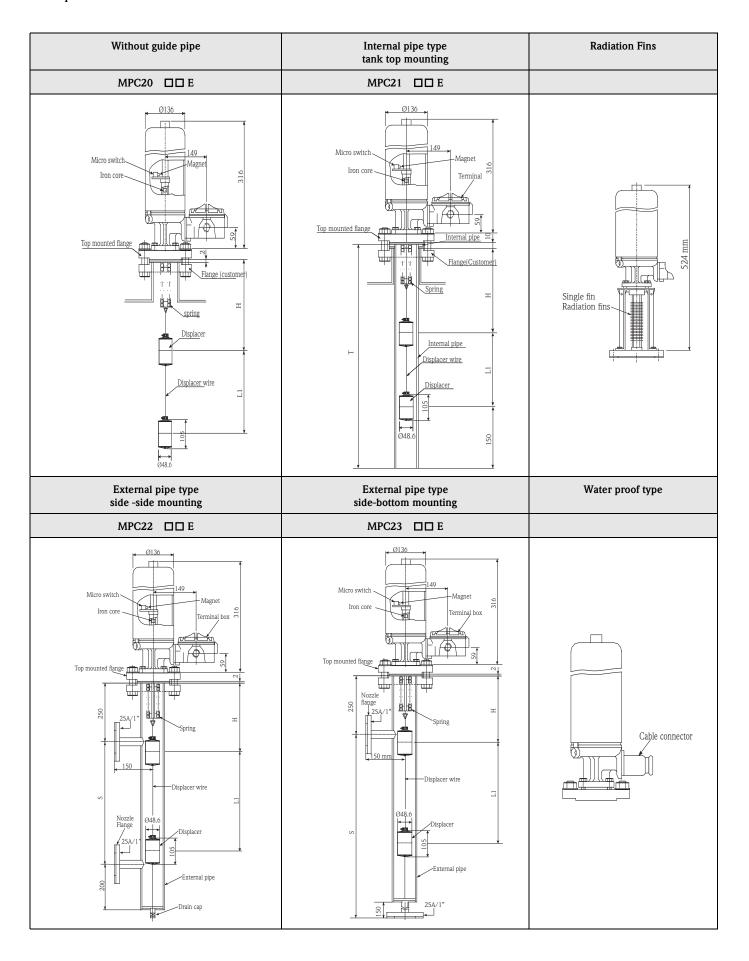
4 Assembly and Installation

4.1 Dimensions

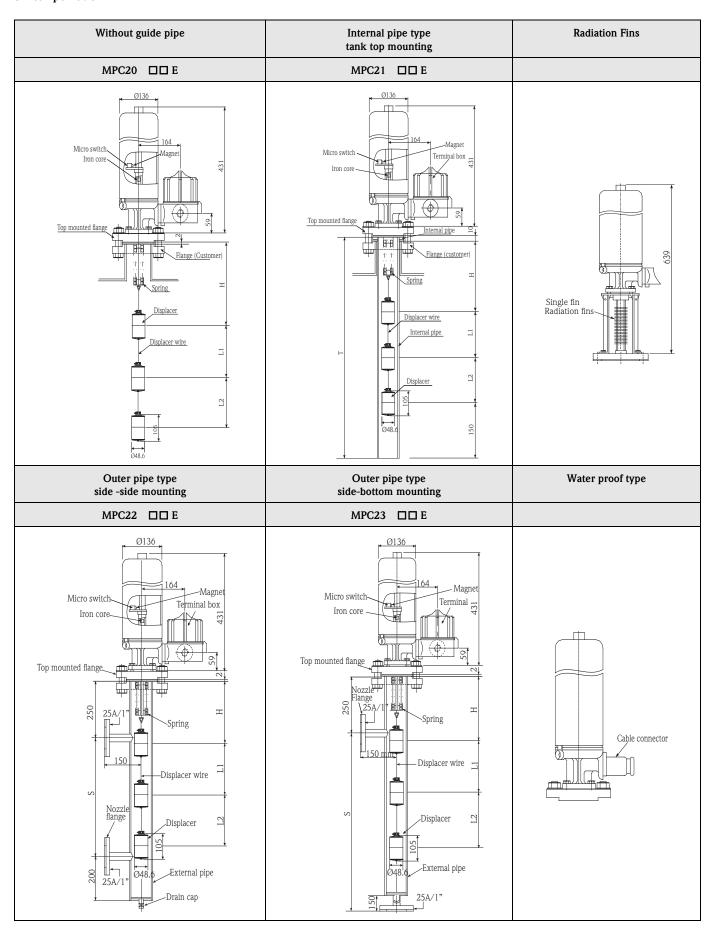
Switch point:1



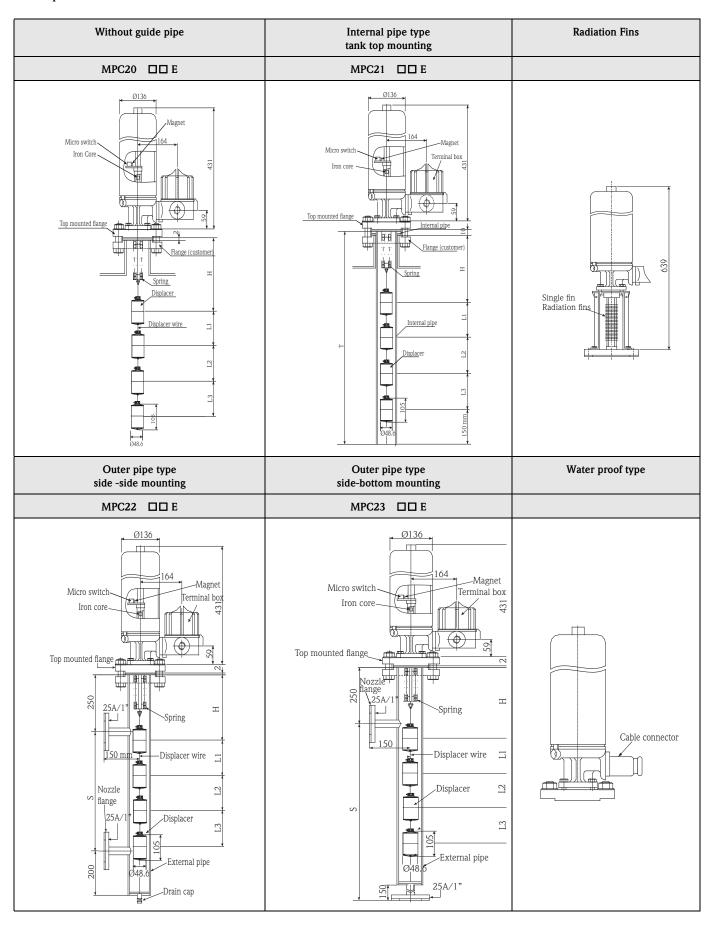
Swich point: 2



Switch point: 3



Switch point: 4



4.2 Overflow alarm

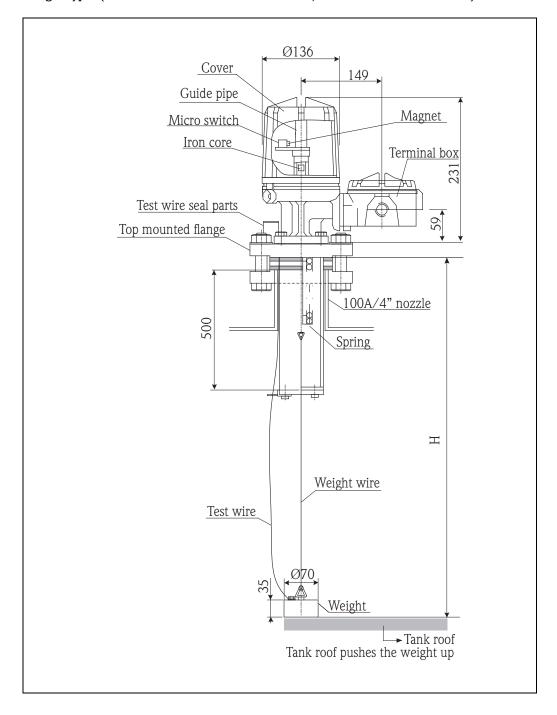
There are two specifications: displacer for CRT and weight type for FRT.

When displacer or weight reached set position, alarm signal is output to warn of overflow.

The operation and performance are same as 1 switch point type MPC. When liquid reaches the upper limit point, displacer rises and triggers alarm. MPC2 also has a checking function. By pulling the test wire and raising the displacer manually to the high limit point, an alarm can be simulated.

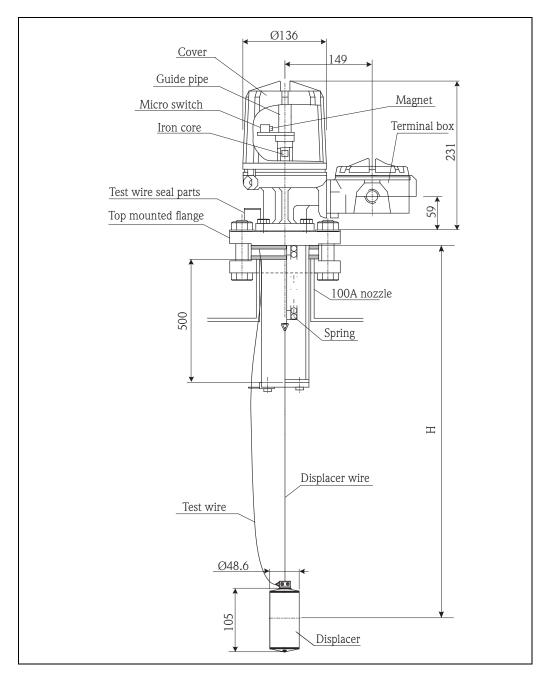
4.2.1 Floating roof tank (FRT)

Weight type: (order code: 030 "Switch Count"...5; 1xFRT overflow detection)

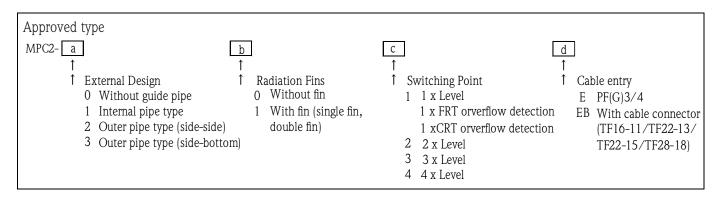


4.2.2 Cone-roof tank (CRT)

Displacer type (order info. 030 "Switch Count"....6; 1xCRT overflow detection



Approved type

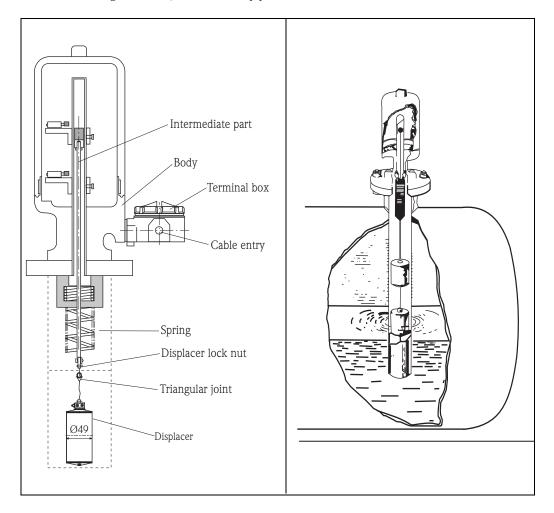


4.3 Mounting (Ex type)

The MPC are deliverd in four separate parts Body, Spring (include Iron), Displacer, Pipe (Internal, outer). Please mount them as following and install it on the tank.

Note!

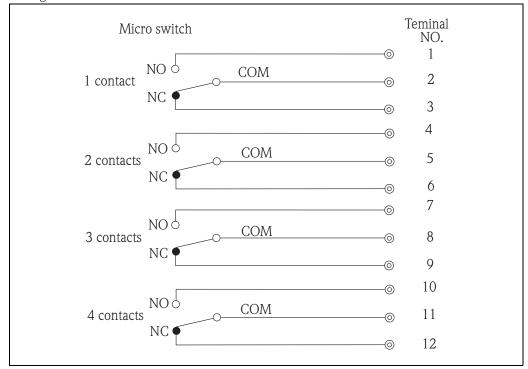
- Please handle the displacer wire with care, as the displacer is connected with wire. It may cause damage by kink.
- When connecting Displacer and Spring, use the fixed triangular joint with threaded displacer locknut. Be careful not to move the displacer position because it has already been adjusted at factory.
- Be careful not to bend intermediate shaft, when mounting spring and body.
- Mount locking screw of spring tight.
- After mounting as follows, connect with pipe.



Level Switch MPC2 5 Wiring

5 Wiring

The figure shows the each switch contact condition when level is normal.



6 Alarm contact changing Level Switch MPC2

6 Alarm contact changing

Alarm contact can change within the length range of wire on which is hanging a displacer. Please move the displacer position the length and direction that you wish to change. (ex. when going down 100mm upper alarm contact, go down 100mm the upper displace). Do not touch the switches in the body.

7 Operating and Maintenance

There are no special notes about operating and Maintenance, but if the liquid is adhesive, please clean sealpipe, displacer, internal pipe.

8 Precaution for high temperature

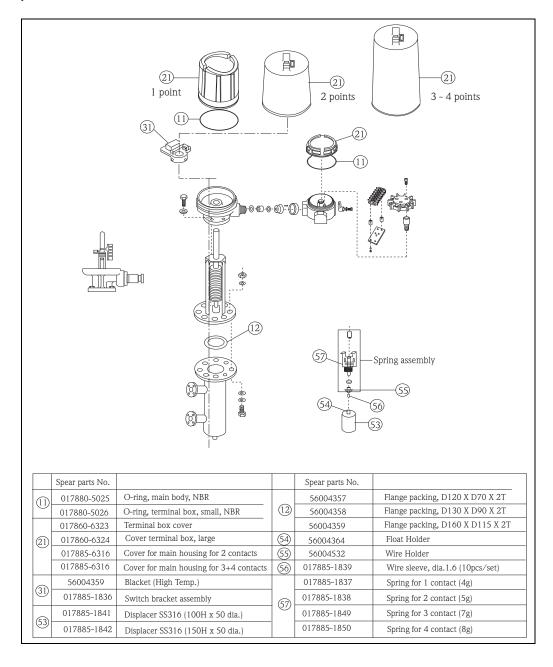
Please refer to MPC2 series Technical Informantion "Instruction for use in high temperature".

Level Switch MPC2 9 Troubleshooting

9 Troubleshooting

9.1 Spare Parts

You can order spare parts directly from your Endress+Hauser service organization by the corresponding spare parts.



9 Troubleshooting Level Switch MPC2

9.2 Failure and Remedy

Failure	Possible reason	Remedy
Sigunal is not generated	 Iron core does not move because intermediate shaft is bent. Micro switch failure. Spring breaks down by sticky substance. Displacer does not work because device mount flange is bent. Displacer sinks. 	 Remove device and fix the bent intermediate shaft. Replace micro-switch. Remove device and clean up or remove spring. Repair the mounting Replace displacer
Signal is generated or is not generated	 Wiring is bad connection Lead-in conductor is bad connection Micro switch is bad connection(internal terminal of switch is bad connection and switch inside is contact fault) 	 Repair contact faults Correct the connection Replace Microswitch
Upper/Lower setting position mis- alignment	 Liquid density changed Displacer and Iron core movement lack smoothness because device mounting is bent. Displacer weight increase because it has sticky substance. 	 Make a readjustment Repair mounting Replace device, pull displacer up and remove sticky substance.

9.3 Return

The following procedures must be carried out before the instruments is sent to Endress+Hauser for repair:

- Always enclose a duly completed "Declaration of Contamination" form. Only then can Endress +Hauser transport, examine and repair a returned device.
- Enclose special handling instructions if necessary, for example, safety data sheet as per EN 91/155/EEC.
- Remove all residue which may be present. Pay special attention to the gasket grooves and crevices where fluid may be present. This is especially important if the fluid is dangerous to health, e.g. corrosive, poisonous, carcinogenic, radioactive, etc.

Note:

A copy of the "Declaration of Contamination" is included at the end of this operating manual.

Caution!

No instrument should be sent back for repair without all dangerous material being completely removed first, e.g. in scratches or diffused through plastic. Incomplete cleaning of the instrument may result in waste disposal or cause harm to personnel

(burns, etc.). Any costs arising from this will be charged to the operator of the instrument.

9.4 Disposal

In case of disposal, please separate the different components according to their material consistency.

9.5 Contact addresses of Endress+Hauser

The addresses of Endress+Hauser are given on the back cover of this operating manual. If you have any questions, please do not he sitate to contact your E+H representative.

Level Switch MPC2 10 Technical data

10 Technical data

Accuracy	Without fin: (MPC2-+0+++++++++) 1 and 2 points: better than ± 3 mm (MPC2-+0++++++++++) 3 and 4 points: better than ± 5 mm, *at 25°C With Fin: Single fin (MPC2-+2++++++++++) 1 and 2 points: ± 7 mm, 3 and 4 points: ± 10 mm Double fin (MPC2-+1++++++++++) 1 and 2 points: ± 7 mm, 3 and 4 points: ± 10 mm						
Maximum allow- able working pressure	$2.94 \text{ Mpa} (30 \text{kgf/cm}^2)$						
Allowable temperature	Ambient temperature: -2060°C (not freezing or dewfall condition) Liquid temperature: 0100°C (Radiation Fine: max. 250°C) Refer to "Instruction for use in high temperature"						
Wetted material	Refer to Order info.: 060: Process connection, Top mounted flange, 080: Pipe						
Alarm contacts	1~4						
Contact capacity	TIIS: max. AC250V, 1050VA max. DC250V, 120VA Allowable contact capacity: max. AC250V, 4.2mA (1~2 points) max. AC250V, 2.8mA (3~4 points) Please contact Endress+Hauser about specifications						
Hysteresis	Standard: 1,2: better than 7~25mm (in case of density = 1g/cm ³) 3,4: better than 7~45mm (in case of density = 1g/cm ³) High temperature: 1,2: better than 7~40mm (in case of density = 1g/cm ³) 3,4: better than 7~40mm (in case of density = 1g/cm ³) Upper limit switch Lower limit switch over level upper limit Upper alarm point Lower alarm point under level upper limit						

10 Technical data Level Switch MPC2

Mounting connection, Top mounted flange	without internal pipe/Internal pipe: 10K 80A RF, SUS304, JIS flange B2220 10K 80A RF, SUS316, JIS flange B2220 20K 80A RF, SUS304, JIS flange B2220 20K 80A RF, SUS316, JIS flange B2220 3" 150lbs RF,SUS304, ANSI flange B16.5 3" 150lbs RF,SUS316, ANSI flange B16.5 3" 300lbs RF,SUS304, ANSI flange B16.5 3" 300lbs RF,SUS304, ANSI flange B16.5 80A 150lbs RF,SUS316, ANSI flange B16.5 80A 150lbs RF,SUS316, JPI flange 7S-15 80A 300lbs RF,SUS316, JPI flange 7S-15 80A 300lbs RF,SUS316, JPI flange 7S-15 80A 300lbs RF,SUS316, JPI flange 7S-15 80A 303 300lbs RF,SUS316, JPI flange B2220 10K 65A RF, SUS304, JIS flange B2220 20K 65A RF, SUS304, JIS flange B2220 20K 65A RF, SUS304, JIS flange B2220 20K 65A RF, SUS316, JIS flange B2220 2-1/2" 150lbs RF,SUS304, ANSI flange B16.5
	2-1/2" 150Ibs RF,SUS316, ANSI flange B16.5 2-1/2" 300Ibs RF,SUS304, ANSI flange B16.5 2-1/2" 300Ibs RF,SUS316, ANSI flange B16.5 65A 150Ibs RF,SUS304, JPI flange 7S-15 65A 150Ibs RF,SUS316, JPI flange 7S-15 65A 300Ibs RF,SUS304, JPI flange 7S-15 65A 300Ibs RF,SUS316, JPI flange 7S-15
	Overflow detection 10K 100A RF, SUS304, JIS flange B2220 10K 100A RF, SUS316, JIS flange B2220 4" 150Ibs RF,SUS304, ANSI flange B16.5 4" 150Ibs RF,SUS316, ANSI flange B16.5 100A 150Ibs RF,SUS304, JPI flange 7S-15 100A 150Ibs RF,SUS304, JPI flange 7S-15
Approval	Flame proof TIIS d2G4
Protection Class	IP65
Construcyion	Explosion proof (d2G4)type (E): PF(G) $3/4$, PF(G)1, PF(G) $1-1/4$ TF16-11, TF22-13, TF22-15, TF28-18 NPT3/4 Weather proof type (W): 20 a.b.c (cable connector)
Color	Metallic silver (internal type is not painted)
Dimendion	Internal pipe type: Internal pipe length max. 4000mm External pipe type: mounting nozzle interval (specified) Caution! Side and bottom flange are 25A/1" equivalent.

Declaration of contamination

Dear customer,

Because of legal determinations and for the safety of our employees and operating equipment, we need this "Declaration of contamination" with your signature before your order can be handled. Please, include the completely filled in declaration with the device and the shipping documents in any case. Add also safety sheets and / or specific handling instructions if necessary.

Type of device / sensor: Medium / concentration: Cleaned with:				Serial no.:				
				nperature:]	Pressure: Viscosity:		
				nductivity:	,			
Warning hints	for medium us	ed (mark the ap	opropriate hints)					
radioactive	explosive	caustic	poisonous	harmful to health	biologically hazardous	inflammable	SAFE	
Reason for ret	urn 							
Company data	L							
Company:			Co	ontact person:				
				epartment:				
Address:			Ph	none:				
			Fa	x / e-mail:				
			Yo	our order no.:				
hereby certify the compliance with						ndustrial practice ion.	s and is in	
(Place, date)				(Company stamp and legally binding signature)				



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People for Process Automation