

INSTALLATION INSTRUCTION & TECHNICAL MANUAL FLOWMETER

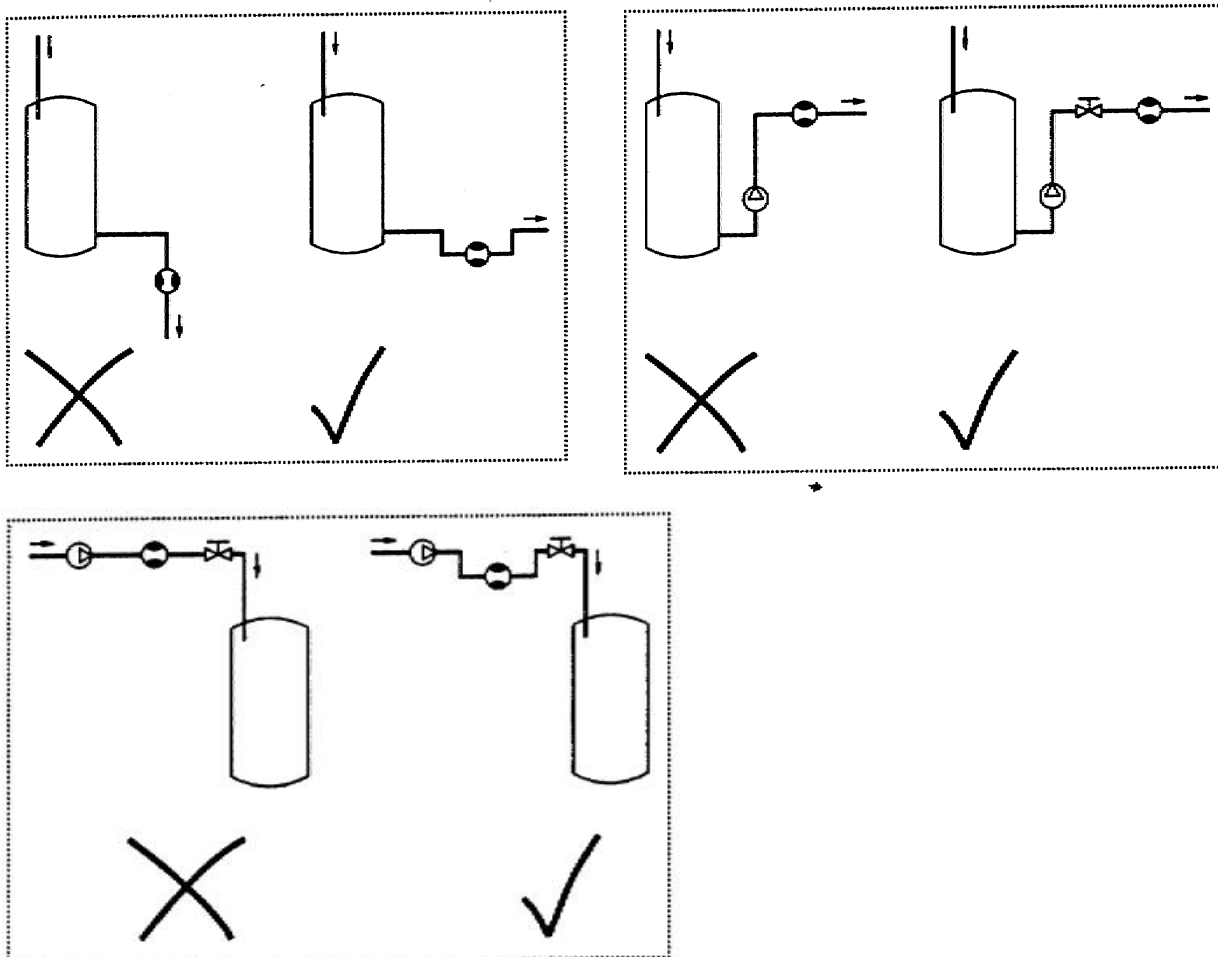


Type: MICA

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1 INSTALLATION CONCEPT

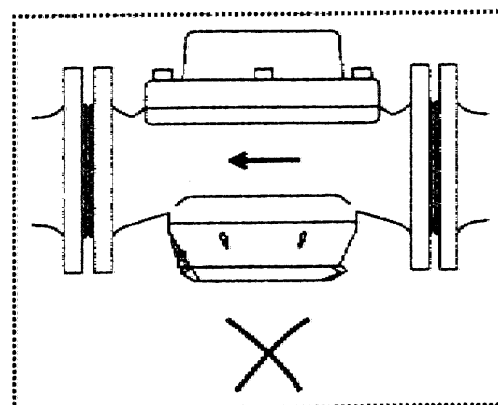
The installation concept must ensure that the meters are always filled with fluid, and that no air inclusions can arise.



2 MOUNTING POSITION OF THE METER

2.1 General remarks

- Ensure that the meter can always be clearly read. The register units can be rotated so as to get the most comfortable reading position.
- The meter must not be installed with the reading head facing downwards.



2.2 With accessory units

- Ring piston meters MIC Series with steam heating must always be mounted exactly horizontal to prevent the possibility of steam blowback (Figure 5) .

2.3 Without accessory units

- Ring piston meters can be mounted in any position without a straight steadying zone (Figure 5 and 6).

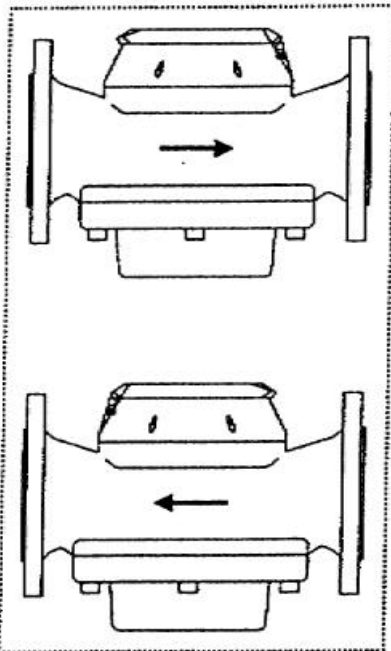


Figure 5

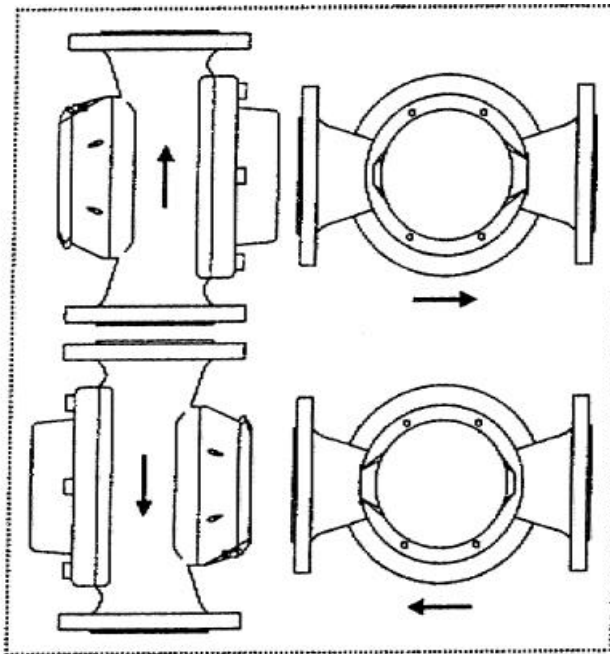


Figure 6

3 METERS WITH REMOTE EVALUATION

Reversed flow must be prevented in meters with pulse transmitters for remote evaluation. A non-return valve should be fitted if this cannot be achieved by a corresponding installation concept.

4 FILLING / DOSING

The valve must be fitted between meter and discharge for filling and dosing. Highest accuracy is achieved with short pipes from meter to discharge. Very fast valve opening and closing should be avoided to prevent pressure shocks.

5 IMPURITIES IN THE INSTALLATION OR IN THE FLUID

A dirt trap or a filter should be fitted in front of (upstream) the meter if impurities can be expected in the installation pipes or in the fluid.

5.1 Mesh width for Flow meters MICA series

The mesh width of the filter element should not exceed:

15; 20 and 25	Mesh width	100 μ m
40 and 50	Mesh width	250 μ m

The filter incorporated in the meter's connection piece is only a safety filter. This makes it too small to function as a dirt trap. This filter can only become clogged if the installation was not made properly or if the mesh of the preceding filter is too large.

6 INSTALLATION

6.1 Preparatory work prior to installing

- The pipe network must be thoroughly flushed out **before** the meter is installed to remove all shavings, welding splatter and pieces of gasket material.
- Conduct a pressure test in the installation.
- Clean the dirt trap/preceding filter.
- Remove the distance piece from the line.
- Remove the protective sleeves or covering plates on the meter connections.

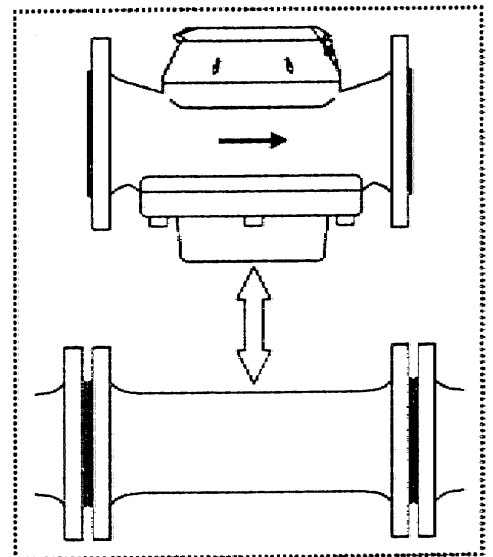


Figure 7:
Flush pipes before
installing flowmeter

6.2 Installation in the pipeline

- Install the meter **tension free** with the arrow pointing in the flow direction.
- The gasket must be chemically resistant to the metered substance.
- Masking flange and meter flange must be fitted parallel and without pre-tension.
- Tighten the screws crosswise.

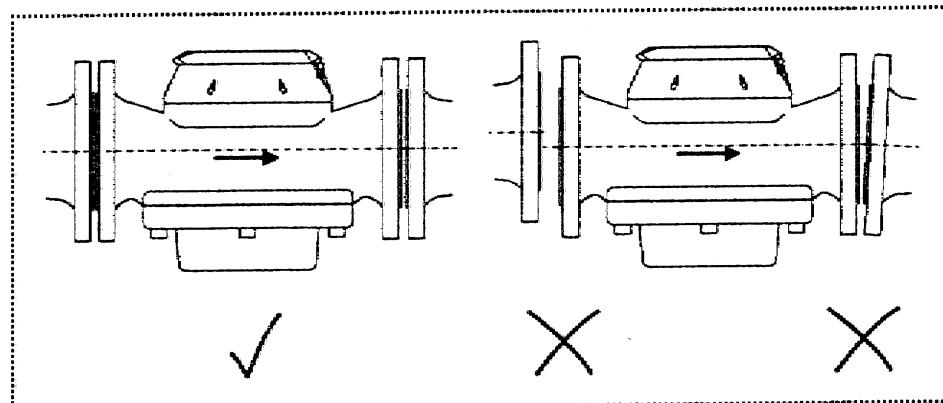


Figure 8: Flanges must be parallel and without pre-tension.

WARNING

BEFORE TAKING THE FLOWMETER IN COMMISSIONING MAKE SURE THAT:

- a) The fuel system is properly vented and there must be no air in the fuel lines.
- b) The fuel flow must be opened gradually. Sudden opening of the shut-off valve will damage the flow meter.

By not observing the above mentioned, the flow meter could be easily damaged.

6.3 Preparatory work prior to installing

For flow meter's with pulse transmitter according NAMUR only.

Use the enclosed two plug pins and the intermediate part for mounting the cable. Respect the polarity + and – while mounting.

Don't tighten the cable coupling if the pulse transmitter is inserted!

- Dismantle the coupling and pass it over the end of the cable (B, C, D).
- Remove the cable sheets on circa. 17 mm and strip the insulation on circa. 4 mm (A).

Normal cable:	light blue	= minus (-)
	brown	= plus (+)

Ex-cable	white	= minus (-)
	orange	= plus (+)

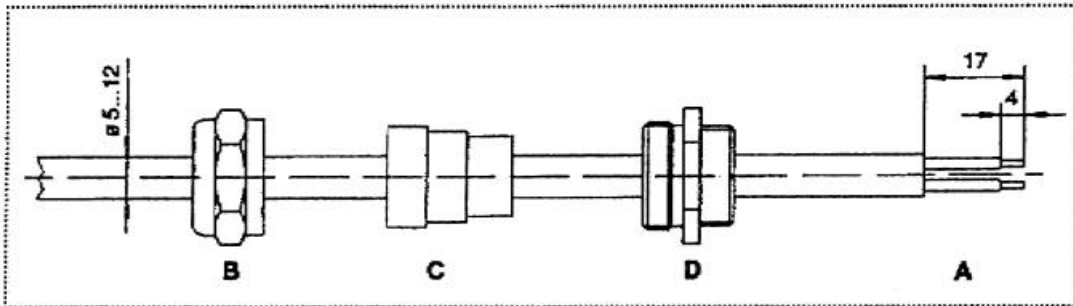


Figure 9: Mount the coupling and strip the cable.

- Put the plug pins on the end of the cable and tighten them (E).
- Pass the plug pins through the side of the intermediate part indicating the polarity until they are the same level on the opposite side.

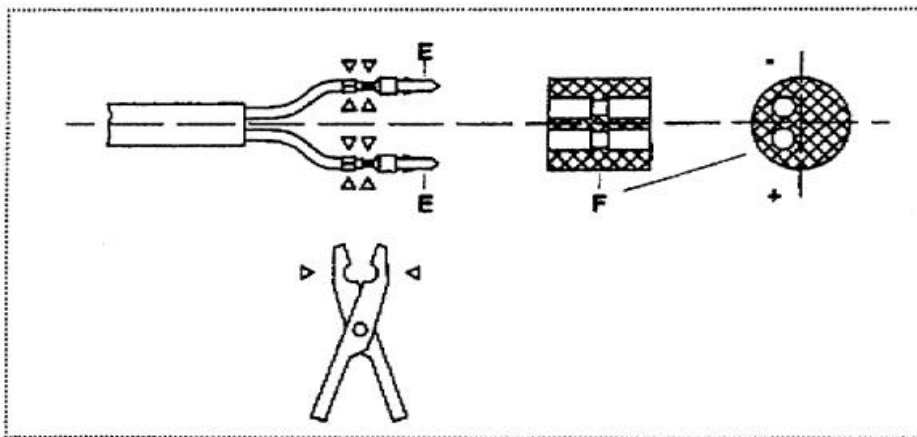


Figure 10: Mount the plug pins on the cable.

- Insert the intermediate part (F) in the socket of the pulse transmitter (G).
- Insert and tighten part D of the cable coupling into the socket of the pulse transmitter.
- Assemble and tighten part C and B of the cable coupling.
The socket of the pulse transmitter may not be inserted in the meter.

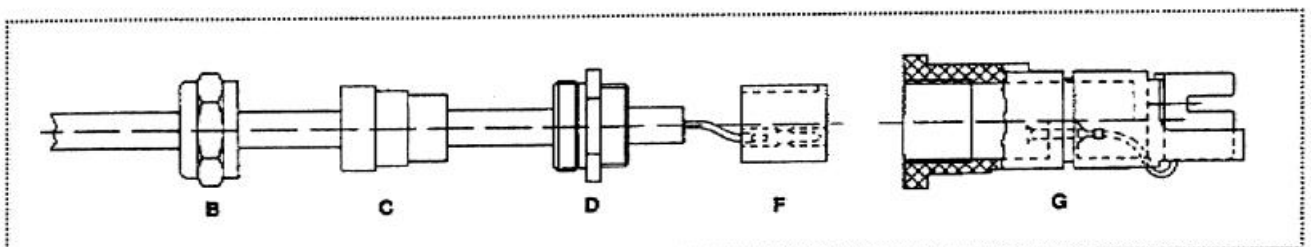


Figure 11: Mount the complete cable coupling.

- Remove the covering plug (H) on the meter.
- Insert the pulse transmitter and tighten lightly the locking screw (J).

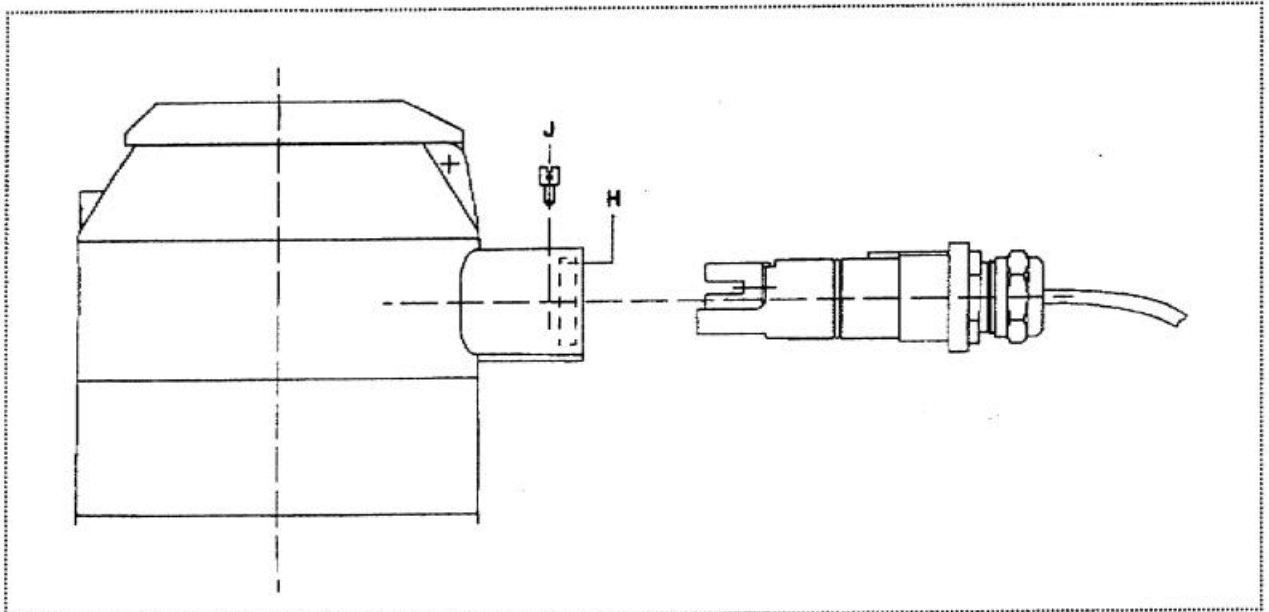


Figure 12: Insert the pulse transmitter in the flowmeter.

- Connect the cable on the opposite side to the desired apparatus (impulse amplifier, impulse indicator or impulse counter) with NAMUR input.
Pay attention to the polarity of the NAMUR proximity switch.
The pulse transmitter requires an excitation voltage V_{exc} of 5 to 15 Volt (typical 8 V).
The typical input resistance R_{in} is 1k .

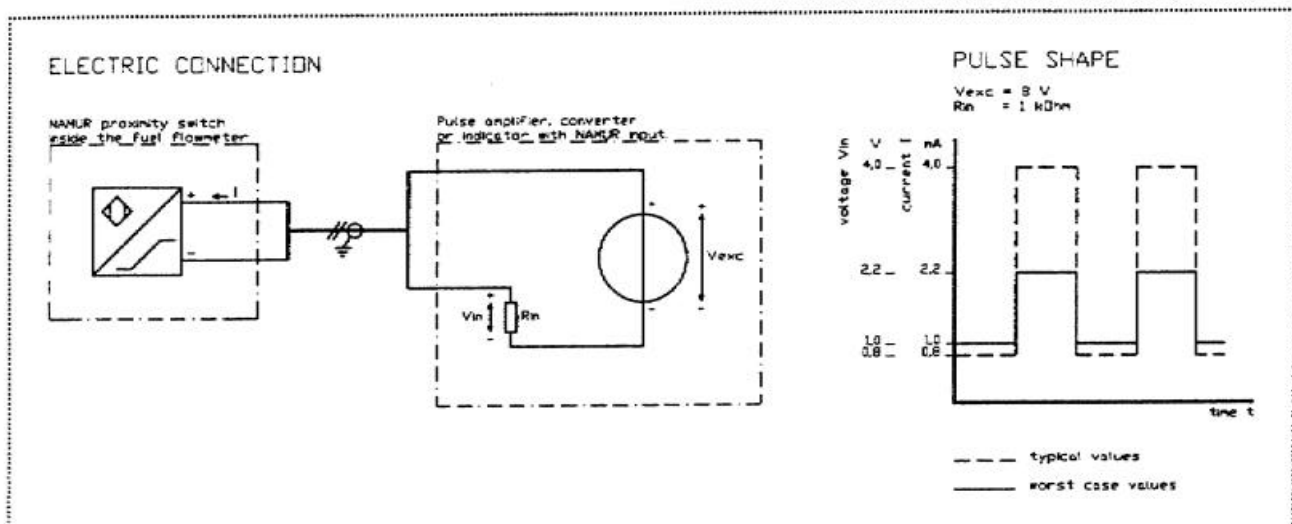


Figure 13: Electric connection of the pulse transmitter.

7 COMMISSIONING

7.1 Fill the pipe

- Fill the pipe network **slowly** to prevent pressure shocks, and ensure that the pipes are always thoroughly vented. Air inclusions will cause faulty readings in all measuring systems, and they can damage the meter during operation.

7.2 Check the operating data

- Ensure that the prevailing flow volume, temperature and operating pressure do not exceed the values on the meter's rating plate.

Check the flow through the installation in the following manner:

- Measure the flow volume for exactly 1 minute by reading the roller counter.
- Calculate the hourly flow volume by multiplying the totalised flow in this minute by 60.

A flow restriction should be installed downstream the meter if the calculated value is above the meter specification, or a larger meter should be selected.

The following brief pressure test is permissible in the event that another pressure test has to be completed after the meter has been installed:

- Meter PN 16 max. test pressure 25 bar
- Meter PN 25 max. test pressure 40 bar
- Meter PN 40 max. test pressure 64 bar

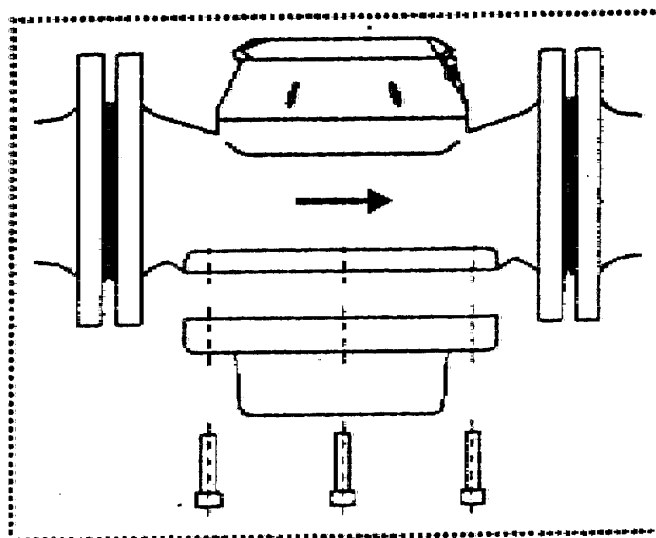
8 MAINTENANCE

8.1 Dirt trap

- Clean the dirt trap periodically, initially at relatively short intervals.

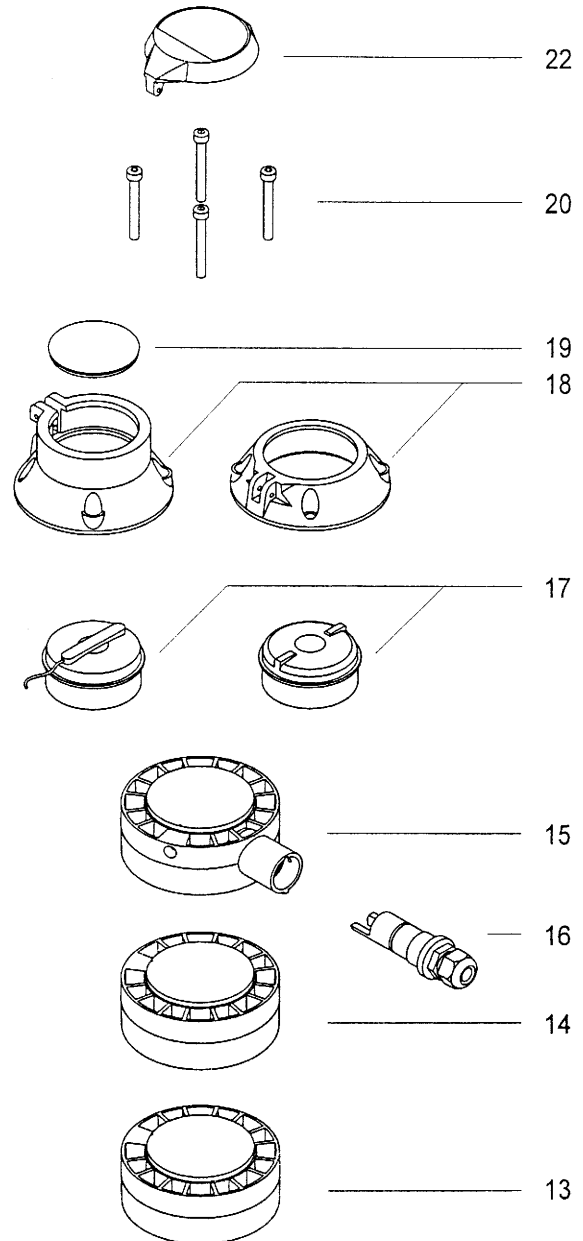
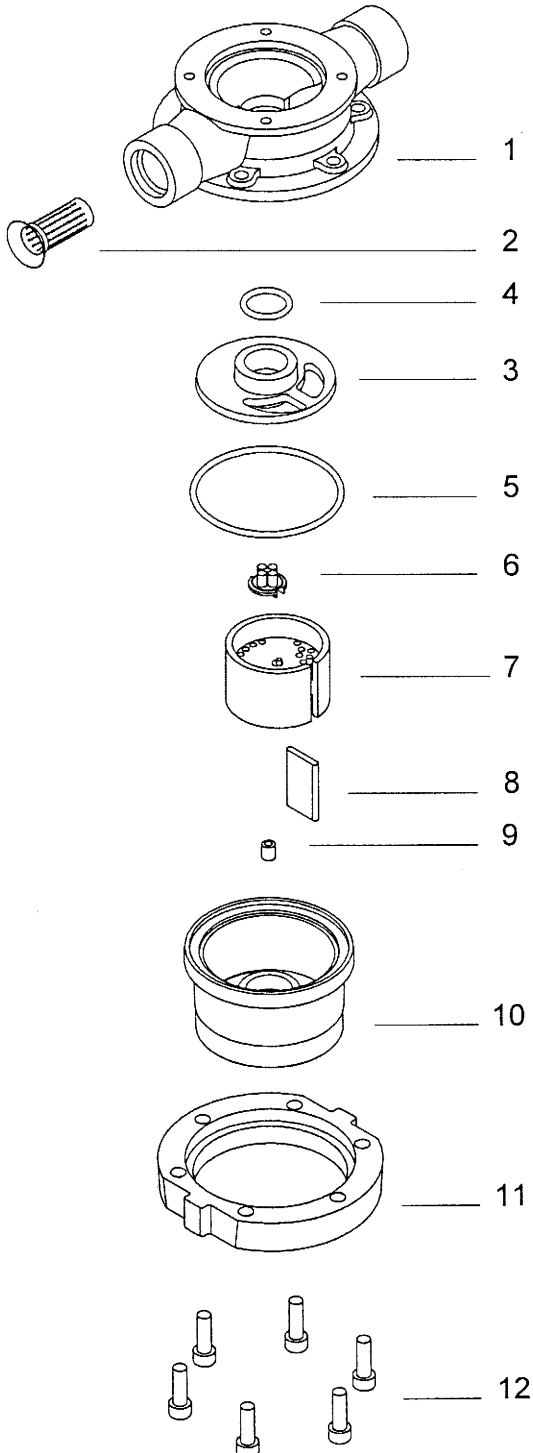
8.2 Meter

- Check that the connections are tight; tighten if necessary .
- Measuring chamber and piston can be dismantled for cleaning and inspection, the meter itself remaining in the pipe.
- We recommend to replace gaskets whenever meter is opened.
- The cleaning and overhaul cycle depends greatly upon the operating conditions. 5 to 10 years are sufficient under favourable conditions.
- Observe the mounting instructions for accessory units.



9 SPARE PARTS MICA Flow sensors

**Ancillaries
RW..., RV..., IR..., IN., IP., GTAS INA...**



Pos. 12: Screw Torque		
Flow meter	Screws	Torque
DN 15, 20	M 6	6 Nm
DN 25	M 8	16 Nm
DN 40	M 12	47 Nm
DN 50	M 16	100 Nm

item 17...22 on request

MICA				Flow sensors				
Pos	Description	Qty	DN 15	DN 20	DN 25	DN 40	DN 50	
1	Housing (as MICV&VA)	1	On request					
2	Inlet filter (as MICV&VA)	1	12968	19021	12969	12970	12971	
3	Cover measuring chamber (as MICV&VA)							
	for A ../xxx1, A ../xxx2, A ../xxx3	Brass	1	12856	19008	12861	12859	---
	for A ../xxx1, A ../xxx2, A ../xxx3	Bronze	1					12860
	for A ../xxx4, A ../xxx5	St. St.	1	12857	19389	12862	12864	12866
4,5	Gasket							
4	for A ../xxxx-x2 (as MICV&VA)	FPM	1	13002	13002	12985	12985	12985
5	for A ../xxxx-x2 (as MICV&VA)	FPM	1	13003	19020	16028	12994	13004
4	for A ../xxxx-x6	PTFE	1	13017	13017	13018	13018	13018
5	for A ../xxxx-x6	PTFE	1	13019	19435	13020	13021	13022
4	Special trims							
4	for A ../xxxx-x3	EDPM	1	13011	--	13012	13012	13012
5	for A ../xxxx-x3	EDPM	1	13013	--	13014	13015	13016
4	for A ../xxxx-x7	FEP	1	13040	13040	13041	13041	13041
5	for A ../xxxx-x7	FEP	1	13042	13046	13043	13044	13045
6	Driver (as MICV&VA)							
	for A ../xxx1, A ../xxx4, A ../xxx8 PPA max. 130°C		1	19154	19155	19156	19157	19383
	for A ../xxx2, A ../xxx3, A ../xxx5 PTFE max. 180°C		1	19095	19045	13160	13161	13162
7	Rotary piston							
	for A ../xxxx-A (as MICV&VA) Anti-corrode (Al)		1	12790	19022	12881	12882	12883
	for A ../xxxx-H	Ebonite	1	19062	12806	19078	19079	--
	for A ../xxxx-G	Graphite	1	12792	12805	12795	12798	12801
	for A ../xxxx-S	Stainless steel	1	12793	19385	12796	12799	12802
	for A ../xxxx-P	Synthetic material PTFE	1	12884	19386	12885	12886	12887
8	Separating plate							
	for A ../xxx1, A ../xxx8 (as MICV&VA)							
	Synthetic material PPS max. 130°C		1	13024	19848	12963	12965	12967
	for A ../xxx2, A ../xxx3 (as MICV&VA)							
	Stainless steel St. St. max. 180°C		1	13025	19390	13026	13027	13028
	for A ../xxx4 (as MICV&VA) Synthetic material PPS		1	13024	19848	12963	12965	12967
	for A ../xxx5 (as MICV&VA) St. St.		1	13025	19390	13026	13027	13028
9	Guide roller							
	for A ../xxx1	PPS max. 130°C	1	12972	19850	12973	12974	12975
	for A ../xxx2, A ../xxx5	St. St. max. 180°C	1	13146	19391	13147	13148	13149
	for A ../xxx3	St. St. max. 180°C	1	19163	19763	19164	19165	19166
	for A ../xxx4	PPS max. 130°C	1	12972	19850	12973	12974	12975
	for A ../xxx8	PPS max. 130°C	1	19167	19851	19168	19169	19170
10	Measuring chamber							
	for A ../xxx1, A ../xxx2, A ../xxx3, A ../xxx8							
		Brass	1	12841	--	12851	19551	--
		Brass PN 16 1)	1	--	19007	--	--	--
		Brass PN 25 2)	1	--	19032	--	--	--
		Bronze	1	--	--	--	--	19506
	for A ../xxx4, A ../xxx5	St. St. PN 40	1	12842	19387	12844	19550	19507
	1) A 20/111x 2) A 20/122x							
	If a measuring chamber in DN 40 or 50, consisting of one part, has to be replaced by a new one (consisting of two parts), pos. 11 and 12 (flange and screws) are needed additionally. See remark on page x.							
11	Flange of measuring chamber							
		PN 16	1	12874	--	--	--	--
		PN 25 / 40	1	12877	--	--	--	--
		PN 16...40	1	12874	--	12978	19547	19508
12	Screw							
		M 6 x 16 (PN 16)	4	12958				
		M 6 x 16 (PN 25)	6	12958				
	¹⁾ only ARD 20/111x	M 6 x 12 (PN 16) ¹⁾	4		19035 ¹⁾			
		M 6 x 16 (PN 25)	6		12958			
		M 8 x 25	6			13101		
		M12 x 40	8				19548	
		M16 x 50	10					19549

MICA		RW..., RV..., IR..., IN..., IP..., GTAS			Modules		
Pos	Description	Qty	DN 15	DN 20	DN 25	DN 40	DN 50
13	Adjustment gear, (litres)	1	12889	12944	12942	12943	12888
14	Isolating piece (pos. 20 and 21 included)	1	13172	13172	13172	13172	13172
15	Pulse module without detector	1	13261	13261			
	IN 0,1 l	1	13260	13260	13261	13261	
	IN 1 l	1			13260	13260	13261
	IN 10 l	1					13260
16	Plug-in detector IN, INA	1	13240	13240	13240	13240	13240
	Option with cable fixed, additionally	1	80019	80019	80019	80019	80019
	or Plug-in detector IR	1	13239	13239	13239	13239	13239
	or Plug-in detector IP	1	13199	13199	13199	13199	13199
	IR, IN, INA: Included in plastic bag:						
Contact pin	4	5560	5560	5560	5560	5560	
and							
Plug body	1	13243	13243	13243	13243	13243	
17	Roller counter RW, litres	1	12870	19028	12871	12871	12873
	or Roller counter, RV						
	0.1	1	13062				
	1 l	1	13063	19030	13064	13064	
	10 l	1		19031	13065	13065	13066
100 l	1					13067	
18	Head ring RW	1	12903	12903	12903	12903	12903
	or Head ring RV, without sight glass	1	13070	13070	13070	13070	13070
19	Sight glass	1	13558	13558	13558	13558	13558
20	Screws for:						
	RW, RV, INA	M 6 x 55	4	12959	12959	12959	12959
	IR.../RW, IN... /RW, IP... /RW	M 6 x 93	4	13167	13167	13167	13167
	IR.../RV, IN... /RV	M 6 x 93	4	13167	13167	13167	13167
	INA.../RW, INA.../RV	M 6 x 123	4	13195	13195	13195	13195
only for versions 180°C: IRH..., INH..., INAH...							
21	Extension	4	13166	13166	13166	13166	13166
22	Cover	1	13423	13423	13423	13423	13423

10 MICA Repair instructions

10.1 Figures

Figure 1

- Cleaning of housing



Figure 2

- Starting position of rotary piston



Figure 3

- Positioning of driver in cover of measuring chamber



Figure 4

- Positioning of cover on measuring chamber



Figure 5

- Gaskets



Figure 6

- Positioning of housing on measuring chamber



Figure 7

- Parts



10.2 Repair instructions and fault finding

This is a measuring instrument to be handled with care.

Note on safety

- When removing from piping, observe safety instructions in the operating manual.
- When using inflammable cleaning substances, inflammable objects and liquids are to be removed from the working area. Room to be well ventilated.
- Prior to disassembly, the measuring instrument must be free from residues that could represent a danger to persons or test equipment. Flush thoroughly with care.

10.2.1 Repair instructions for measuring sensors

10.2.1.1 Replacement of filter

When removing the filter, small splinters can be formed, and these must not be allowed to enter the measuring unit. It is therefore recommended to separate the housing from the measuring unit.

1. Remove measuring chamber screws (Item 12).
2. Remove housing (Item 1).
3. Extract filter (Item 2) with screwdriver and replace.
4. Remove deposits from housing surface and seating using fine emery-cloth of grade 320 (Fig. 1).
5. Clean housing connections with a cloth.
6. Fit new filter (Item 2) in housing connection. Press the metal ring into position using a round bar.
➔ *Do not press on the filter bottom!*
7. Wash housing and remove any splinters with cloth.
8. Locate the inlet and outlet space of the housing (Item 1) opposite the openings in the cover of the measuring chamber (Fig. 6) and place housing on measuring chamber (Item 3).
9. Insert measuring chamber screws (Item 12) and tighten. Correct torque see page 9.

10.2.1.2 Cleaning or repair of measuring unit

1. Remove measuring chamber screws (Item 12).
2. Remove housing (Item 1).
3. Remove cover of measuring chamber (Item 3).
4. Remove driver (Item 6), rotary piston (Item 7), separating plate (Item 8), and guide roller (Item 9).
5. Replace worn parts and clean all remaining parts.
➔ *For cleaning purposes it is recommended to use non-fraying cloths and kerosene or solvents.*
6. Remove deposits from housing surface and seating using fine emery-cloth of grade 320 (Fig. 1).
7. Replace guide roller (Item 9) on pin at bottom of measuring chamber (Item 10).
8. Insert separating plate (Item 8).
9. Insert rotary piston (Item 7) with guide pin facing downwards.
➔ *The guide pin has a larger diameter than the driver pin and is located at the centre of the rotary piston.*
10. The rotary piston (Item 7) has very little clearance but can easily be rotated.
11. Rotate the rotary piston (Item 7) to the starting position (Fig. 2).
➔ *The driver pin of the rotary piston lies on the axis of the separating plate.*
12. Place the driver (Item 6) on the pin of the cover of measuring chamber (Item 3).
➔ *Locate the long, deep, groove of the driver opposite the groove for the separating plate (fig. 3).*
13. Place cover of measuring chamber (Item 3) with driver (Item 6) on the measuring chamber and press down firmly avoiding tilting (Fig. 4).
➔ *The cover of the measuring chamber and the measuring chamber now form a continuous surface. When the measuring chamber is shaken in a circle, the rotary piston can move freely.*
14. Treat new gaskets (Items 4 and 5) with lubricant (silicon grease) and mount on cover of measuring chamber (Item 3) (Fig. 5).
15. Locate the inlet and outlet space of the housing (Item 1) opposite the openings in the cover of the measuring chamber (Fig. 6) and join.

16. Align boring mark or cast mark on the measuring chamber base (Item 10) in a right angle to the housing axle.
17. Insert measuring chamber screws (Item 12) and tighten. Correct torque see page 9.

Flow meters with rotary pistons in metal must only be tested and operated using fluids having a lubricating effect!

10.2.2 Repair instructions for modules

→ *The individual modules are not screwed together. Be careful to ensure that these do not fall apart when removing from meter housing.*

1. Note the position of the cover opening and the pulse connection in relation to the housing axle.
2. Remove Allen screws (Item 20).
3. Remove head ring (Item 18) with cover (Item 22).
4. Remove roller counter with clamping ring.
5. Replace worn or damaged modules.
6. Reassemble in reverse order.

10.3 Fault finding

Fault Identification	Possible cause	Procedure	1)
<ul style="list-style-type: none"> • Meter not working • No reading on roller counter • No or very little flow • Quantity shown is too small 	<ul style="list-style-type: none"> • Flow rate below Q-min or above Q-max of meter 	<ul style="list-style-type: none"> • Check flow rate • If flow rate too high, reduce flow or fit larger meter • If flow rate too low, increase flow or fit smaller meter 	
	<ul style="list-style-type: none"> • Dirt trap filter heavily soiled 	<ul style="list-style-type: none"> • Clean dirt trap or replace filter 	
	<ul style="list-style-type: none"> • Safety filter in meter inlet clogged 	<ul style="list-style-type: none"> • Fit correct filter mesh in dirt trap • Replace safety filter in meter 	
<ul style="list-style-type: none"> • Quantity shown is too large 	<ul style="list-style-type: none"> • Measuring unit jammed 	<ul style="list-style-type: none"> • Remove and clean measurement chamber, replace damaged parts and assemble 	
	<ul style="list-style-type: none"> • Gas or air bubbles at measurement position • Meter positioned at highest point of plant 	<ul style="list-style-type: none"> • Check operating conditions and meter positioning • Thoroughly and carefully de-aerate pipes. 	
<ul style="list-style-type: none"> • Pointers of roller counter do not rotate regularly 	<ul style="list-style-type: none"> • This is normal at high flow rates and has no effect on accuracy of measurement 	<ul style="list-style-type: none"> • No action necessary 	
<ul style="list-style-type: none"> • High pressure drop at meter exit 	<ul style="list-style-type: none"> • Dirt trap filter heavily soiled 	<ul style="list-style-type: none"> • Clean dirt trap or replace filter 	
<ul style="list-style-type: none"> • Meter runs backwards 	<ul style="list-style-type: none"> • Meter mounted in wrong direction 	<ul style="list-style-type: none"> • Mount meter with arrow in direction of flow 	
<ul style="list-style-type: none"> • No pulse output signal 	<ul style="list-style-type: none"> • No flow 	<ul style="list-style-type: none"> • Check flow using roller counter (if installed) 	
	<ul style="list-style-type: none"> • Pulse sensor defective 	<ul style="list-style-type: none"> • Replace sensor 	
	<ul style="list-style-type: none"> • Pulse module defective 	<ul style="list-style-type: none"> • Remove sensor and check whether pulse disk rotates under flow 	
<ul style="list-style-type: none"> • Pulse disk does not rotate 	<ul style="list-style-type: none"> • Remove pulse module, place remaining modules on first module and check flow using roller counter (if installed) • If the roller counter gives a reading, the pulse module must be replaced 		
	<ul style="list-style-type: none"> • Pressure shock due to air in pipe • Meter mounted in unsuitable position • Gas bubbles at measuring point 	<ul style="list-style-type: none"> • Check operating conditions and meter positioning • Thoroughly de-aerate pipes and then slowly refill 	

1) Consult operating instructions