

Technical Manual

Instructions for installation,
operation and maintenance

136 MIDFLOW[®]

Series 'J' Vane meters
with pulse transmitter (reed switch) and temperature transmitter (PT100)
Model J5025PT (1"), J5040PT (1,5"), J5050PT (2")



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1. PREFACE

1.1 GENERAL

This manual contains installation, operation and maintenance instructions for VAF liquid flowmeters model J5025PT (1"), J504PT (1,5") and J5050PT (2").

The flow meter with standard pulse transmitter has an optional temperature transmitter. In this manual both options (pulse transmitter, pulse and temperature transmitter) are shown. Please check your order to see which one you have.

This manual contains important information for the installer, the operator and for your maintenance department.



To ensure safe and correct installation and operation of your VAF flowmeter study this manual carefully before starting operations.

For associated equipment supplied by VAF Instruments B.V. separate instruction manuals are included with those products.

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Or your local authorized VAF dealer.

Their addresses can be found on www.vaf.nl

1.2 SYMBOLS

The symbols below are used to call attention to specific types of information.



A warning to use caution! In some instances, personal injury or damage to the flowmeter or control system may result if these instructions are not followed properly.



An explanation or information of interest.

1.3 COPYRIGHT

This manual is copyrighted with all rights reserved. No part of this book may be copied or reproduced by any means without written permission from VAF Instruments B.V.

While every precaution has been taken in the preparation of this manual, no responsibility for errors or omissions is assumed. Neither is any liability assumed for damages resulting from the use of the information contained herein. Specifications can be changed without notice.

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2. PRODUCT DESCRIPTION

The PT flow meter is used to measure the flow of a fluid. The output of the flow meter is a reed contact that is activated by a magnet that is located in one or more vane(s) of the flow meter. Normally there are two magnets, located on opposite sides of each other (see 9.2.7)
Options are: 1, 2 or 4 magnets

The flow meter can be equipped with an optional PT100 to measure the temperature of the fluid.

2.1 PRINCIPLE OF OPERATION

These meters operate on the sliding vane principle. The meters consist of a specially shaped housing in which a rotor can rotate freely. Two pairs of vanes are fitted into four slots in the rotor. Each pair is positioned by a rod and can move in and out of the rotor. The radial vane movement is guided by the special inner shape of the housing. This patented construction provides a dynamic seal between the inlet and the outlet of the flowmeter. The incoming liquid forces the rotor to rotate. The rotor rotations are directly measured by a pulse transmitter. The pulse transmitter allows remote flow monitoring or process control.



Note:

These flow meters are subject to P.E.D, cat 3.3.

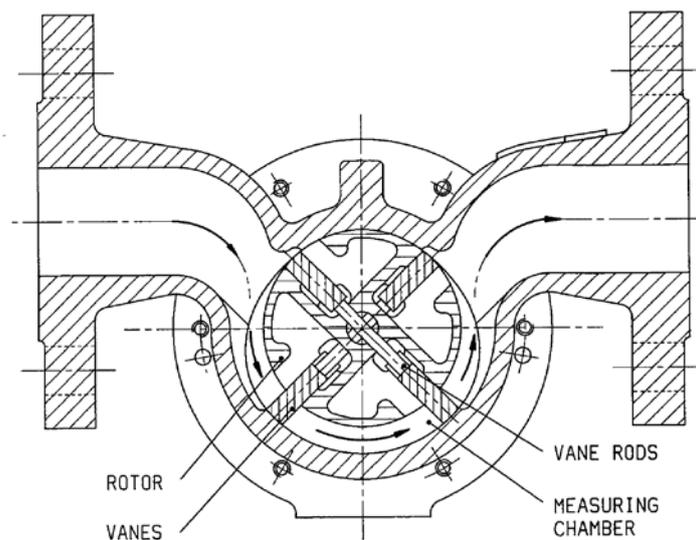
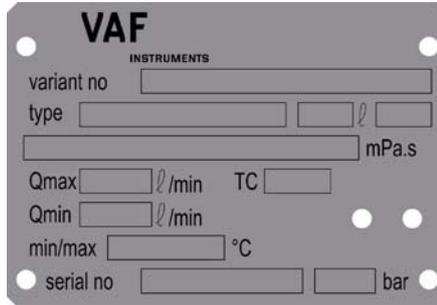


Figure 1 Sectional view of VAF vane meter

3. TECHNICAL SPECIFICATIONS

3.1 FLOWMETER

The technical specification of the flow meter can be found on the instrument text plate.



3.2 PULSE TRANSMITTER

The flowmeter is equipped with a pulse transmitter for remote flow indication and totalising. The number of generated output pulses is stamped on a text plate.

The parameters in the remote indicators have to be set according the output pulses on the text plate.

3.2.1 Technical specification of pulse transmitter

Type	Reed Switch
Contact	Normally open
Max. switched volts	30 V
Max. switched current	0,01 A
Max. switched power	0,25 VA
Contact resistance	500 mOhm
Breakdown volts	150 V
Pulse output	as indicated on the instrument text plate
Wire colour	red

3.2.2 Pulses per litre

J5025PT and J5040PT		J5050PT	
Vanes with Magnets	P/L	Vanes with Magnets	P/L
1	6	1	2.5
2	12	2	5
4	24	4	10

3.3 TEMPERATURE TRANSMITTER (OPTIONAL)

The flowmeter is equipped with a temperature transmitter for remote temperature indication.

3.3.1 Technical specification of the temperature transmitter

Type	PT100
Temperature range	as indicated on the instrument text plate
Wire colour	green

3.4 WEIGHT OF FLOWMETERS

Flowmeters without counter Approx. net weight (kg)

DN 25 mm	11
DN 40 mm	14
DN 50 mm	18

4. SAFETY INSTRUCTIONS

- Some calibration fluid can be left in the flow meter. This is Shellsol-T. See chapter 6 for more information.
- Be careful, the flow meter can be heavy, and difficult to handle with one person.

5. UNPACKING

The flow meter is a precision instrument and should be treated with care.

The two yellow protection caps on the in and outlet of the meter should be left in place as long as possible

Be careful not to put any force on the electrical connection box.

6. INSTALLATION AND FIRST USE

6.1 BEFORE INSTALLING FLOWMETER

1. Identify your flowmeter by comparing the type number on the instrument text plate with the description on the packing list.



Always quote type and serial numbers when contacting the factory.

2. Record data on text plate of flowmeter in the space below.
3. Ensure that the flowmeter is suitable for your process conditions.



Never exceed the capacity, temperature and pressure limits specified on the nameplate of the flowmeter. Consult the factory if the flowmeter must be used for a different process liquid than originally ordered.

4. Store the flowmeter in a safe place. Do not remove dust caps until just before installation.

VAF
INSTRUMENTS

variant no

type l

mPa.s

Qmax l/min TC

Qmin l/min

min/max °C

serial no bar

Please fill in the details of your flowmeter here.

Figure 2 Text plate on flowmeter body.

6.2 GENERAL



Read this section carefully before starting the installation work.

1. A VAF flowmeter is a precision instrument. Handle it with care.
2. No special tools are required to install the flowmeter. Ensure that your standard tools are fit for the job.
3. Use the lifting eye, when present, when moving the flowmeter.
4. Make sure the working environment is clean. Ensure that no dirt can enter the flowmeter.
5. Always use personal protective means when working with hot, aggressive and toxic process liquids.
6. Ensure that local safety regulations are met when installing and operating the flowmeter.
7. The sound level of a working flowmeter will always be lower than 70 dB(A).

6.3 SYSTEM LAYOUT RECOMMENDATIONS



WARNING

The flowmeter body will maintain the same temperature as the process liquid. Take measures to avoid personal injury from touching a hot or cold flowmeter. When applying insulation, do not apply this onto the read out counter, but only onto the flowmeter body.

Vibrations and pulsations must be avoided at the position of the flowmeter to ensure trouble free operation of the instrument.

6.3.1 Liquid filter

The liquid to be measured must be clean and free from air, gas or dirt. Solid particles may cause excessive wear. It is recommended to install a VAF liquid filter with a mesh width of ... 0,05 mm (280 mesh) at the inlet of the flowmeter / system.

6.3.2 Bypass

A bypass should be installed, in case the filter or meter need maintenance while the flow of liquid can not be stopped.

The valve that is installed in the bypass should be a pressure relieve valve. This will prevent a sudden stop of the liquid in case the filter or the flow meter becomes blocked.

6.3.3 To prevent measuring air

Accurate measurement is only possible if it is not influenced by the presence of gas or air. When the process liquid contains gas or air a deaerator should be fitted upstream of the flowmeter.

6.4 TO INSTALL FLOWMETER

1. Remove dust caps from inlet and outlet connections of flowmeter.



Note that some Shellsol-T calibration liquid may be left in the flowmeter. Shellsol-T is a flammable liquid (hydrocarbons, liquid, N.O. S (solvent naphtha)); EG No. 265-067-2, MITI No. 9-1699, CAS No. 64741-65-7

2. Install flowmeter to process piping in accordance with the flow direction.



Note that:

- the back cover of the flowmeter must always be in vertical position.
- an arrow on the flowmeter body indicates the direction of the flow.
- do not mount any object onto the flowmeter body

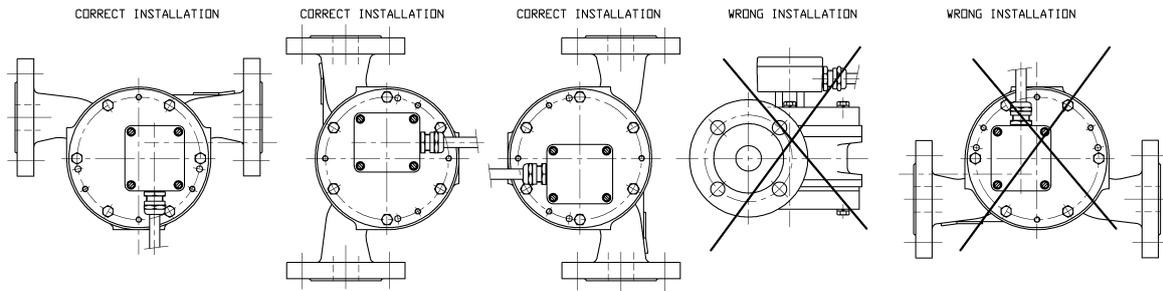


Figure 3 Installation flowmeter

6.5 ELECTRICAL CONNECTIONS

The electrical connections of the pulse transmitter are as shown in figure 4.

For electrical connections between flowmeter and associated electronic control panel reference is made to the separate technical manuals of these electronic instruments.

Cable specifications:

2 x 3 x 0,5 mm² individual screened.

Shield connected at flowmeter side only (please see connection diagram)

Overall cable diameter 5-10 mm

6.5.1 Connection cables

The leads from the pulse transmitter and the temperature transmitter need to be screened separately, as otherwise the electronic signals from the pulse transmitter or temperature transmitter might be disturbed by external electromagnetic fields.

The cables that need to be used are described in the technical manual from the signal processing instrumentation manual, for which this meter is used.

The screens of the cable must only be connected on the meter side, and should not be connected at the signal processing instrumentation.

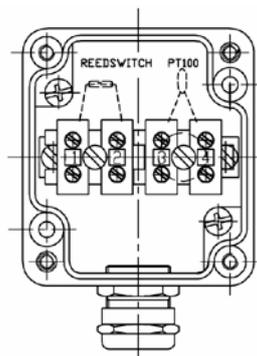


Figure 4 Electrical connection of pulse transmitter.

7. OPERATING INSTRUCTIONS

7.1 START-UP PROCEDURES

Before initial start-up of a flowmeter system, or when taking the installation into use again, after a major repair or revision of the piping system, the following procedures are recommended.

1. Remove filter element of liquid filter installed ahead of flowmeter.
2. Remove flowmeter from liquid system and replace it by a pipe piece.
3. Flush entire liquid system to ensure that all dirt and other foreign matter that could damage the flowmeter have been removed.
4. Close valves A, B and C (Fig. 5).
5. Remove flushing pipe piece. Re-install flowmeter and filter element.



CAUTION

Do not flush ductile iron and steel flowmeters with water.

- NEVER exceed maximum flowrate (Q_{max} , see textplate of flowmeter).
- When re-starting the flowmeter measures must be taken to avoid the presence of solidified or cured liquids inside the flowmeter. Failure to do so may result in breaking of the magnet or magnet shaft.

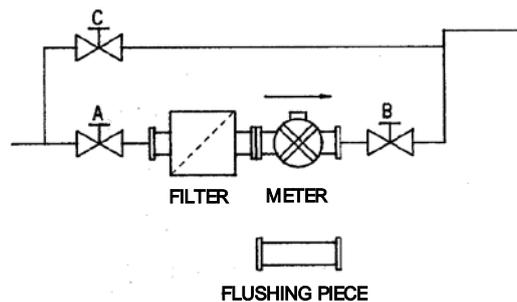


Figure 5 Flowmeter system with bypass

7.1.1 Initial start-up of a flowmeter system with bypass

1. Open bypass valve C completely.
2. Start pump and/or open storage tank valve.
3. Open valve A slightly (5-10%).
4. Slowly open valve B. Dependent on the internal resistance in the system, the flowmeter may start running. If it does, limit the flow to approx. 20% of its capacity.
5. Slowly close bypass valve C until flowmeter just starts running. Let the flowmeter run on this limited flow for a couple of minutes, to ensure that no air or gas will be left in the flowmeter.
6. Slowly open valve A, and if necessary also valve B, completely.
7. Slowly close valve C completely.

7.1.2 Initial start-up of a flowmeter system without bypass

1. Start pump and/or open storage tank valve.
2. Open valve A completely.
3. Slowly open valve B 5 - 10%, until flowmeter just starts running. Let the meter run on this limited flow for a couple of minutes, to ensure that no air or gas will be left in the flowmeter.
4. Slowly open valve B completely.

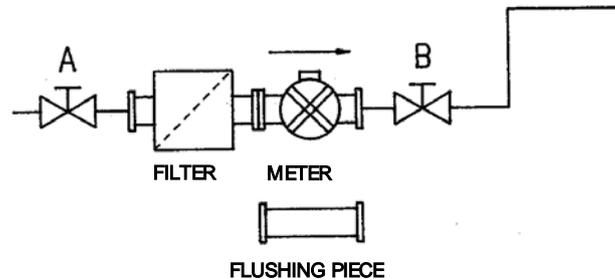


Figure 6 Flowmeter system without bypass

8. MAINTENANCE

8.1 GENERAL

Under normal operating conditions the flowmeter requires no maintenance other than: Periodic accuracy check. Refer to chapter 8.2.



For flowmeters that are running continuously, we recommend to inspect bearings every year as a preventive measure to keep the flowmeter in the best possible condition. In case of damage or wear, they should be replaced.

8.2 ACCURACY CHECK

The calibration interval will depend on the nature of the process liquid and the operating conditions. The table below applies if:-

- * the process liquid is clean and non-abrasive;
- * a liquid filter with correct mesh width has been installed at the flowmeter inlet.

Meter type	Conn. size	Calibration interval (litres)
J5025PT	DN 25 (1")	35×10^6
J5040PT	DN 40 (1.5")	55×10^6
J5050PT	DN 50 (2")	110×10^6

9. SERVICE AND REPAIR INSTRUCTIONS

9.1 GENERAL

This chapter describes the procedures to be followed when a flowmeter must be removed from the process line for service or repair.

9.2 TO REMOVE FLOWMETERS FROM PIPING SYSTEM



When removing a flowmeter from the piping system precautions must be taken to prevent personal injuries and damage to the flowmeter and process control installation.

- * Always wear protective clothing when the flowmeter contains a toxic or aggressive fluid.
- * Use a hoist or other lifting device and the lifting eye on top of the flowmeter to support the flowmeter when removing from the process piping.



Do not use steam or air to empty the pipe system. This will most likely cause an over speeding of the flow meter and cause damage to the vanes and or the house.

9.2.1 To remove flowmeter from piping system

1. Ensure that flow through the flowmeter has stopped.



Although the flow has stopped, the flowmeter can still be under pressure. Be careful when loosening bolts on inlet and outlet flanges.

1. Ensure the signal processing instrumentation has been switched off and no power is present on the wires connected to the meter.
2. Ensure all electrical wiring is marked with the correct number and removed from the flowmeter. (See chapter 9.2.2)
3. Use a lifting device and the lifting eye on top of the flowmeter to hold flowmeter in position.
4. Remove flowmeter from piping system.



When the flowmeter has been removed from the piping system there will still be some liquid left in its measuring chamber.

1. Hold meter outlet in downward position and let flowmeter leak out for approximately ten minutes. High viscosity liquids will perhaps require more time.
2. Place flowmeter on a dry and clean workbench.

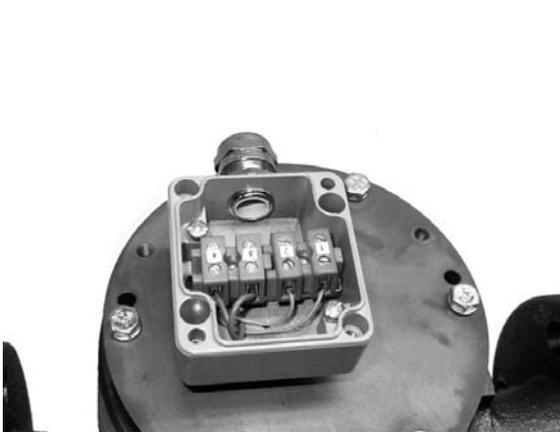
9.2.2 Instructions to exchange pulse transmitter in cover.



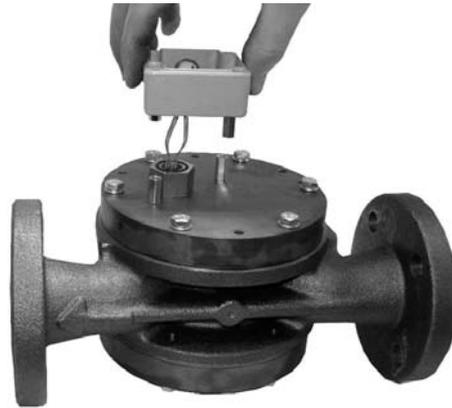
Never remove the pulse transmitter while the flowmeter is still in the system.



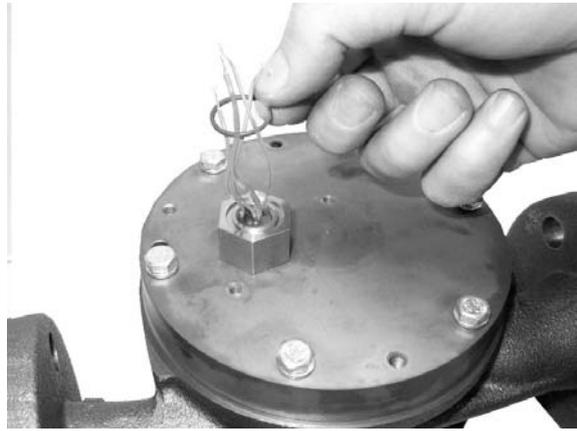
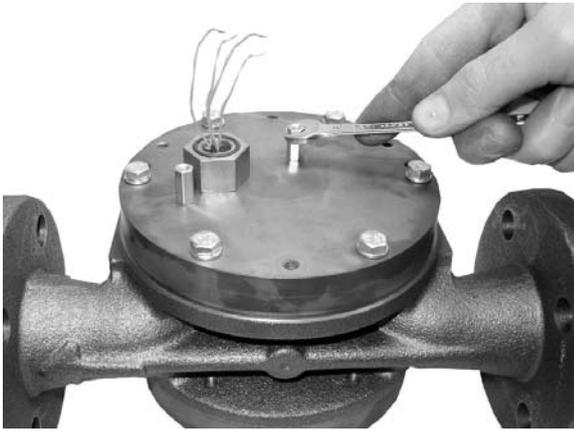
Remove the cover of the connection box



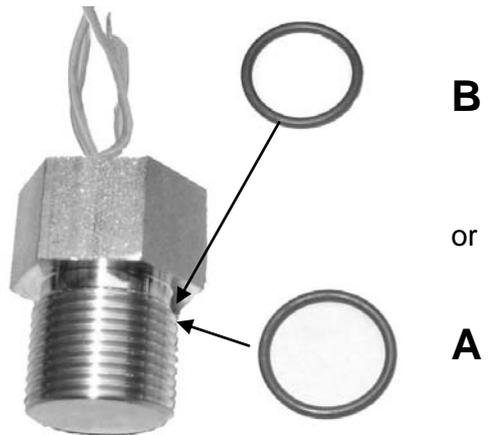
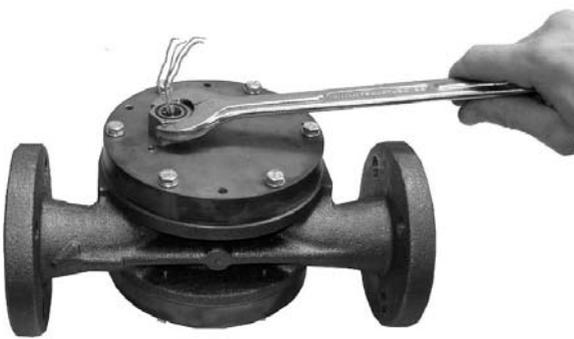
Disconnect the wiring (external and internal connections), pulse - red, temperature - green. Please make sure to write down how the connections are made.



Remove the two screws in the mounting holes of the box, and remove the box. Two spacers will remain attached to the flow meter.



Remove the two spacers and the O-ring that is on the top of the pulse transmitter assembly.



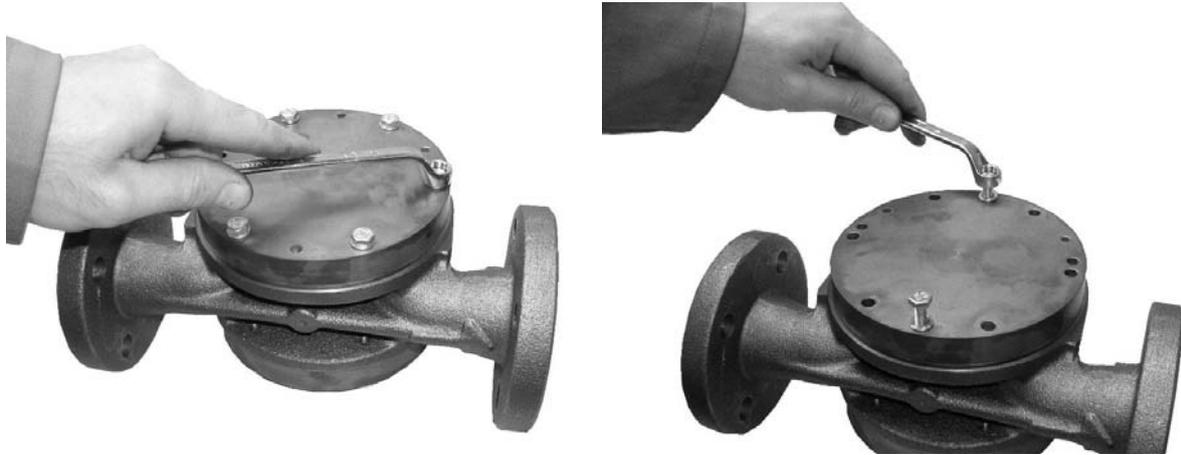
Remove the pulse transmitter assembly carefully, making sure not to damage the O-ring. Replace the O-rings if damaged.

Check the cover if you find the marking **(L)** on the cover use O-ring 17,86 x 2,62 mm A (VAF no.: 0630 - 6025).
 If there is no marking on the cover use O-ring 15,60 x 1,78 mm B (VAF no.: 0630-3017).

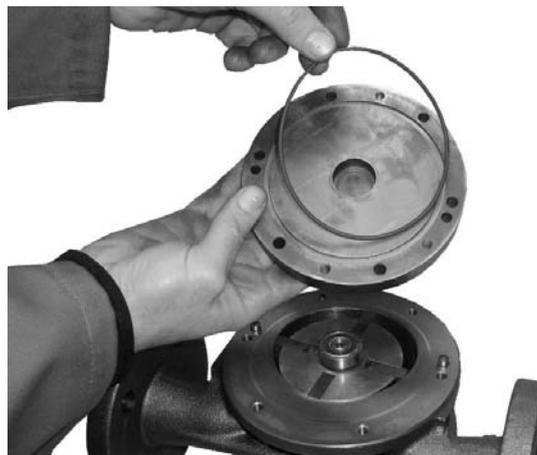


9.2.3 To remove the back or front cover

If the flow meter needs to be disassembled, it should preferably done by removing the back cover. In this way there is less change of damaging the connection box and wiring of the pulse transmitter.



1. Remove the cover mounting bolts and lock washers.
2. Install the bolts that were removed in step 1, in the jacking position of the back cover. Tighten these bolts evenly turn by turn, until the cover frees. Ensure the cover is lifted equally to avoid the locating pins from being damaged.



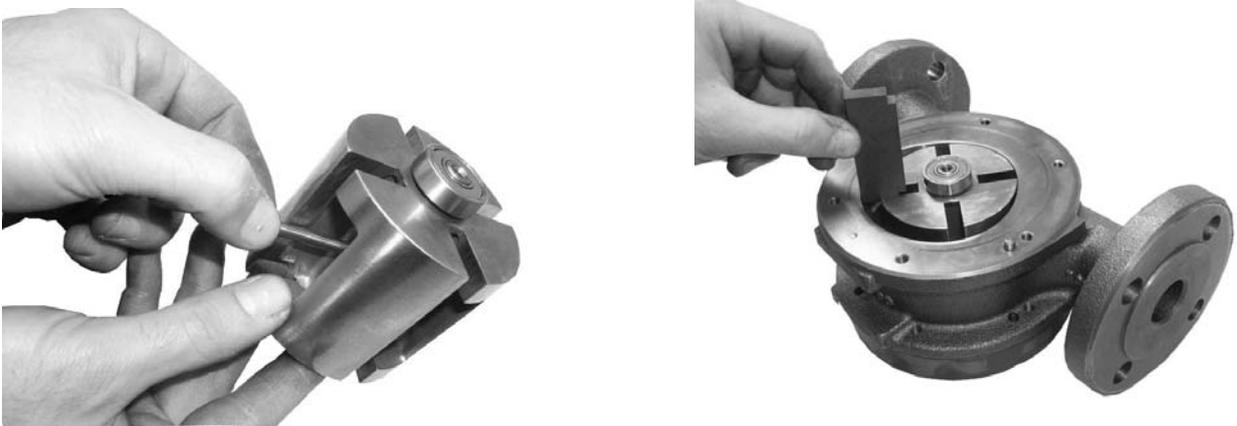
3. Lift the cover and remove the bolts and the O-ring.

9.2.4 Instructions to exchange the vanes from the flowmeter

1. Remove the back or front cover of the flowmeter. Preferably the back cover. (See chapter 9.2.3)
2. Before taking the rotor out of the meter body, visually inspect the inside of the body to find possible cause of damage. If vanes appear to be broken, ensure that the vane push rods will not scratch against the inner wall of the meter body, when the rotor is pulled out.
3. Record how the vanes are installed in the rotor.
4. Put the meter on horizontally, as shown on the picture, on a table or workbench.



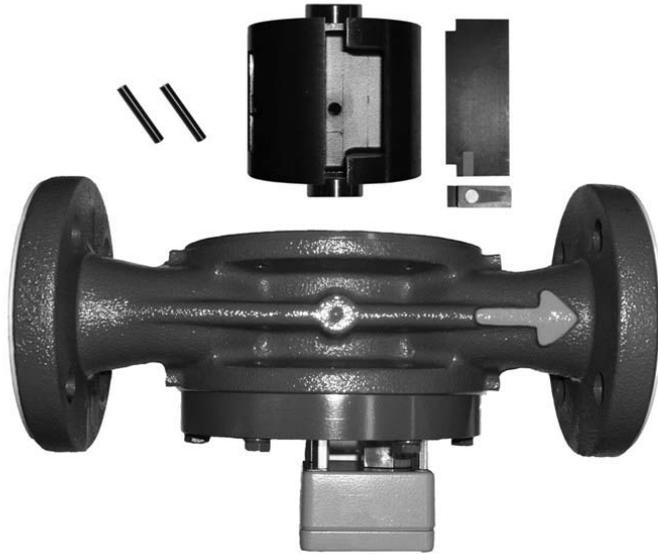
5. First remove the vanes
6. Carefully remove the rotor making sure the vane push rods do not touch the inside of the house. Note: the bearings are connected to the rotor



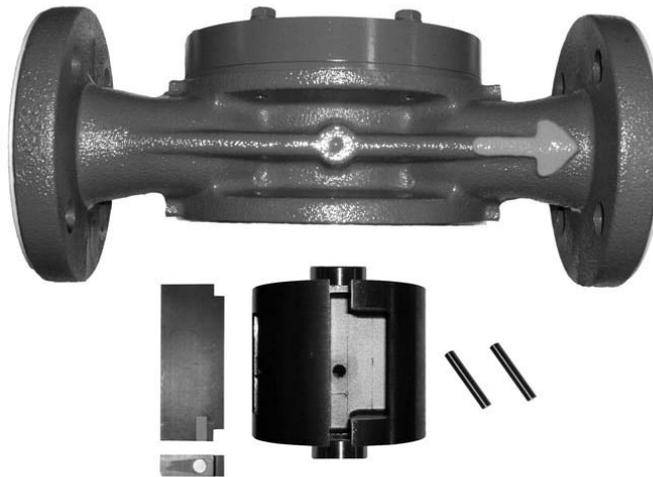
Clean rotor vanes and push rods with diesel oil.

7. After the rotor, bearings and push rods are inspected; they can be placed back in the flow meter house.

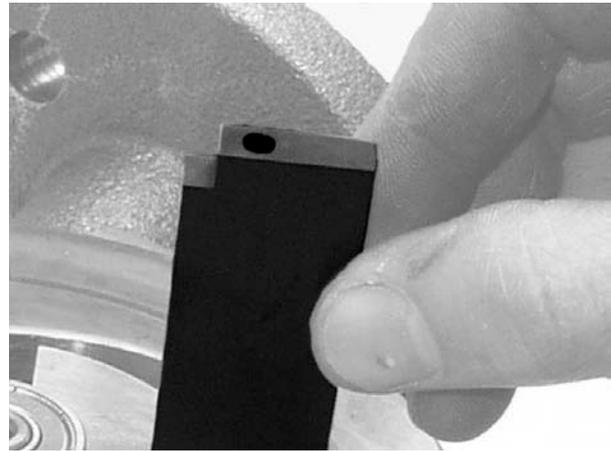
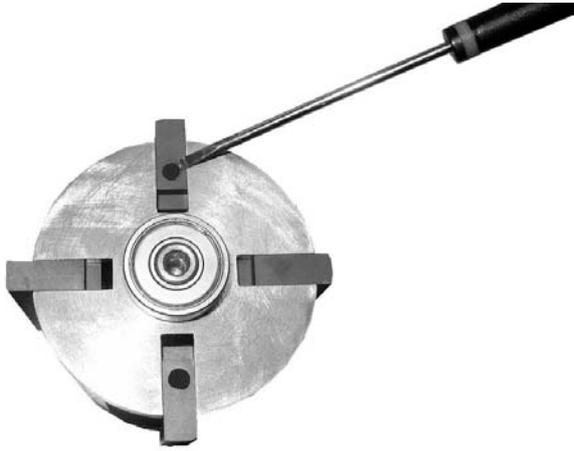
8. Place the push rods inside the rotor and put the rotor back in the Flowmeter house.
8a. If the back cover was removed the rotor and vanes should be installed as follows:



- 8b. If the front cover was removed install the rotor and vanes as follows:



9. Install the vanes. Make sure the magnets are on the same side where the pulse transmitter is. If the flow meter has two magnets, install the vanes with the magnets on opposite side of each other.



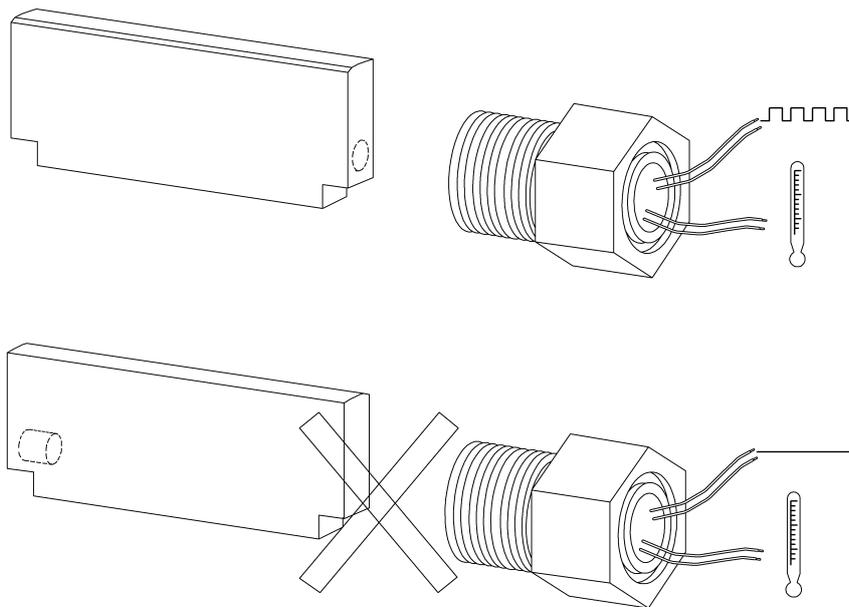
Vanes with small magnets

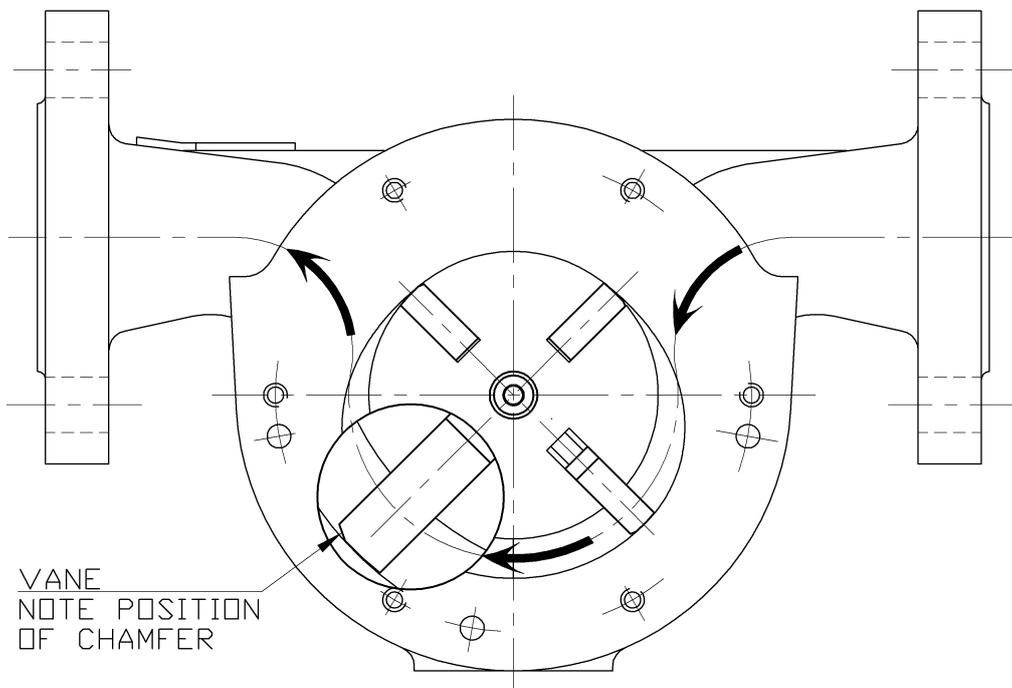


WARNING:

The vanes have small magnets installed on one side only. If the (new) vanes are re-installed in the wrong way, there will be no activation of the reed-switch and therefore the flow indicator connected to the meter will show zero.

In a flowmeter with two vanes with magnets, the vanes with the magnets are placed opposite of each other.





FLOWMETER WITH BACKCOVER REMOVED

9.3 TO REPLACE BEARINGS

1. Remove old bearing from rotor shaft using a suitable bearing puller (Figure 35).



Because the space between bearings and rotor is approximately 2 mm, this operation requires a puller with thin blades.

2. Press new bearing vertically on rotor shaft using an arbor press.



10. TAKE OUT OF SERVICE

If the flowmeter has to be taken out of service follow the instructions in chapter 9 (repair) to remove the flow meter from the system. Flush the flow meter with a clean non corrosive fluid, like light diesel oil, or kerosene. The flow meter should than be emptied as much as possible. The inlet and outlet must be closed off to prevent dirt or other particals entering the flow meter. This can damage the flow meter.

11. REMOVAL AND STORAGE OF EQUIPMENT

Follow the instruction in chapter 9 (repair) to remove the flow meter from the system. Flush the flow meter with a clean non corrosive fluid, like light diesel oil, or kerosene. The flow meter should than be emptied as much as possible. The inlet and outlet must be closed off to prevent dirt or other particals entering the flow meter. This can damage the flow meter. It should be stored and secured in a save place. If the flow meter is stored for a longer period of time, it should be treated inside with a corrosion prevention liquid.

12. MALFUNCTION AND SEND FOR REPAIR

In case the flow meter stops working and can not be repaired on site, it should be send back for repair.

Follow the instructions in Chapter 11 (Removal and storage of equipment).

The shipping container or wooden box must be strong enough to protect the flow meter during transport.

The flow meter should be packed with soft material to protect it against shock's.

A fault report should accompany the flow meter, stating the fault, which fluid the meter was used for and all other information that is important to speed up the repair.

13. ENVIRONMENT

The flow meter has no negative influence for the environment it is placed in.

The noise the meter is producing in normal circumstances is below 70 dB (A).

14. DISPOSAL

Laws and restrictions for disposal of equipment will be different in most counties. If in doubt or unable to dispose the equipment it can be send back to VAF Instruments.

VAF Instruments will dispose the equipment in a correct way.

Main materials:

Body	Ductile iron
Rotor	Ductile iron
Vanes	Carbon

15. TROUBLE SHOOTING

15.1 TROUBLE SHOOTING CHART

Problem:

The flowmeter does not indicate any flow, although the liquid is flowing.

Possible cause	Solution
(Perform a check in the following order)	
1. The valve in the bypass line is still open.	Close bypass valve.
2. Inner parts of flowmeter may be stuck or broken.	Refer to chapter 9.
3. The electrical connection between the flowmeter and the flow indicator is broken	Check wires and connections
4. The reed switch is mal functioning	Replace pulse/temperature transmitter.
5. Vanes with magnets are inserted wrong	Refer to chapter 9.

Problem:

The flowmeter does not indicate any flow and no liquid is passing through the flowmeter.

Possible cause	Solution
(Perform a check in the following order)	
1. Obstructions in the liquid piping, blocking the flow.	Check for obstructions, e.g. closed valves. If this does not solve the problem, proceed with next step.
2. The dust cap in the inlet and/or outlet connection of the flowmeter was not removed when the flowmeter was installed in the process line.	Remove dust cap(s) and check the flowmeter for damage. If there are no visible signs of damage, proceed with next step.
3. Dirt is blocking the vanes and/or the rotor of the flowmeter.	Flush the flowmeter with a suitable solvent. If this does not solve the problem, return flowmeter to factory or nearest authorized VAF Instruments service representative.
4. Inner parts of flowmeter may be stuck or broken.	Refer to chapter 9.

16. CERTIFICATES

Certificates are delivered separately.

17. DRAWINGS

Except where noted all dimensions are in millimetres.

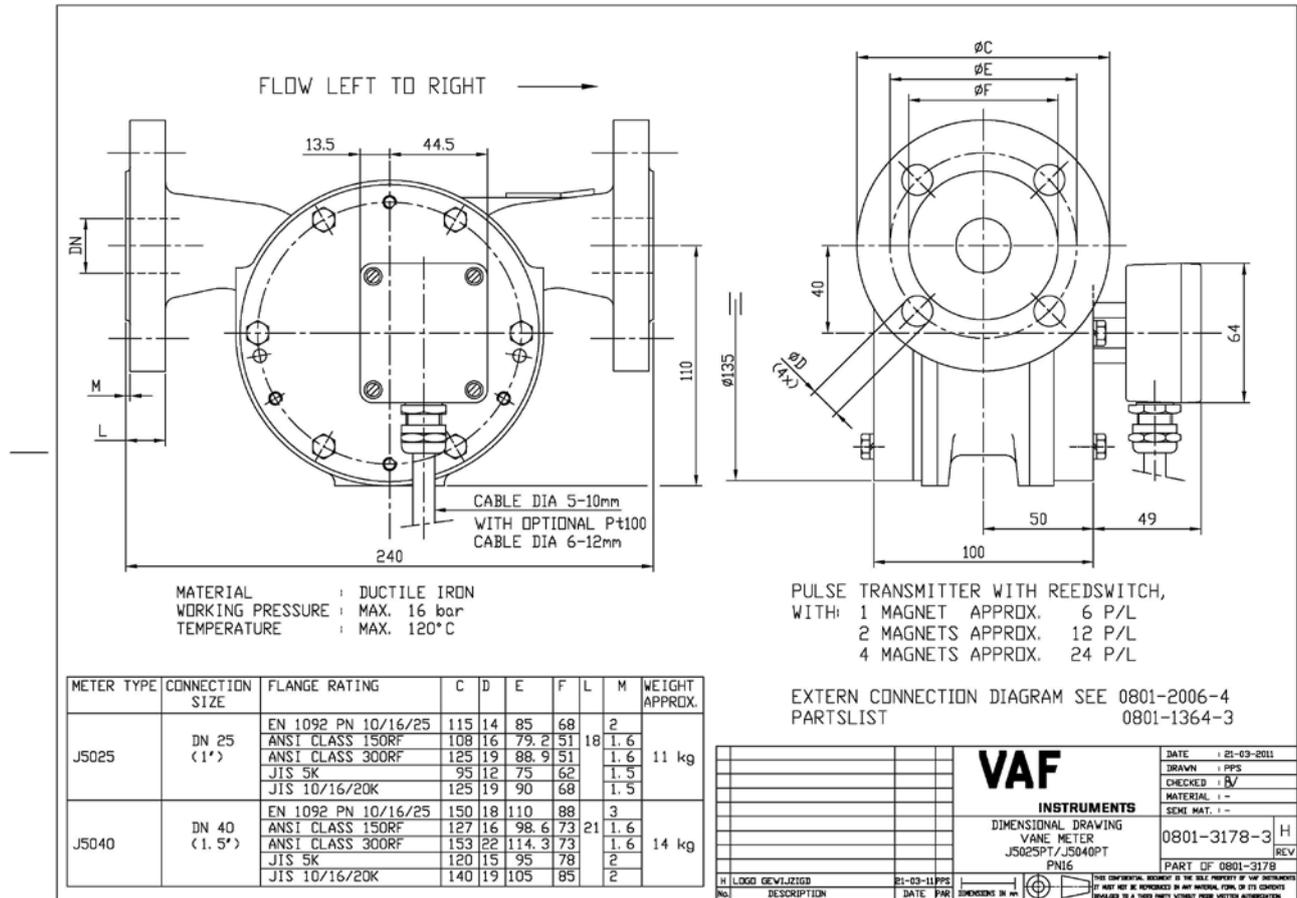


Figure 8 Flowmeter J5025PT and J5040PT

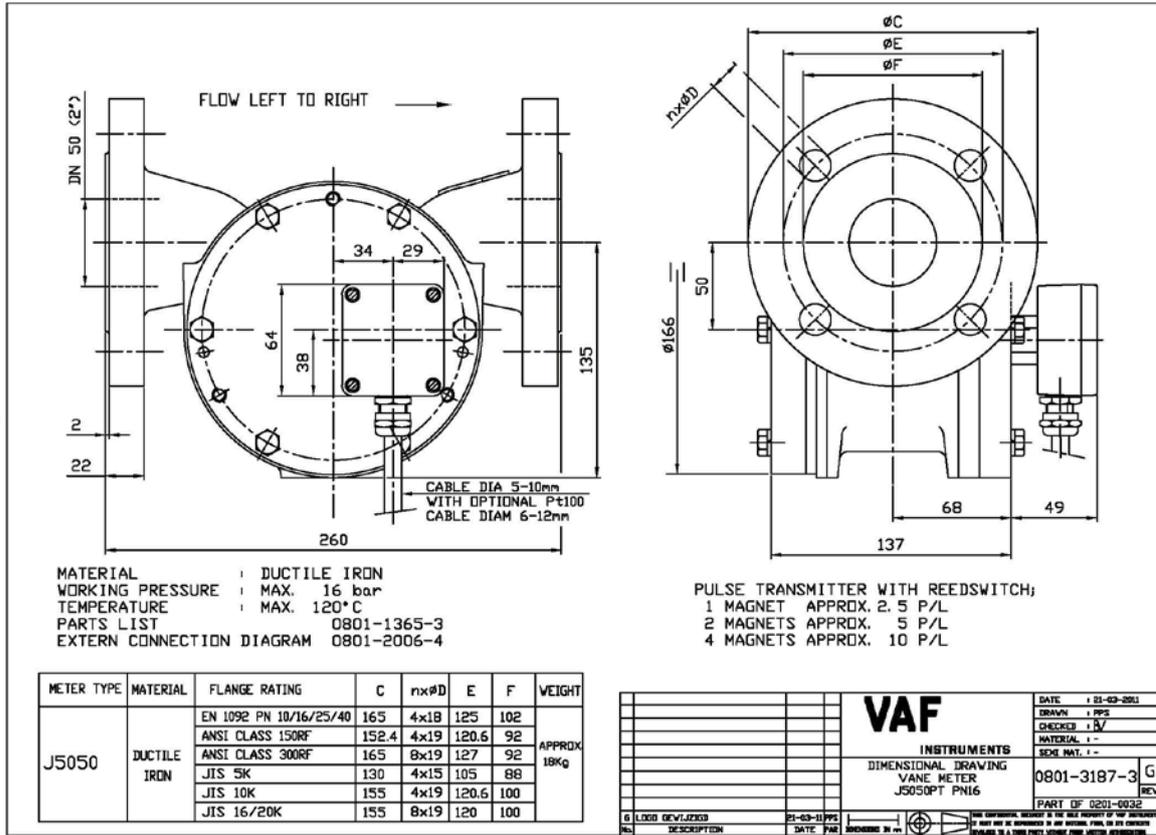


Figure 9 Flowmeter J5050PT

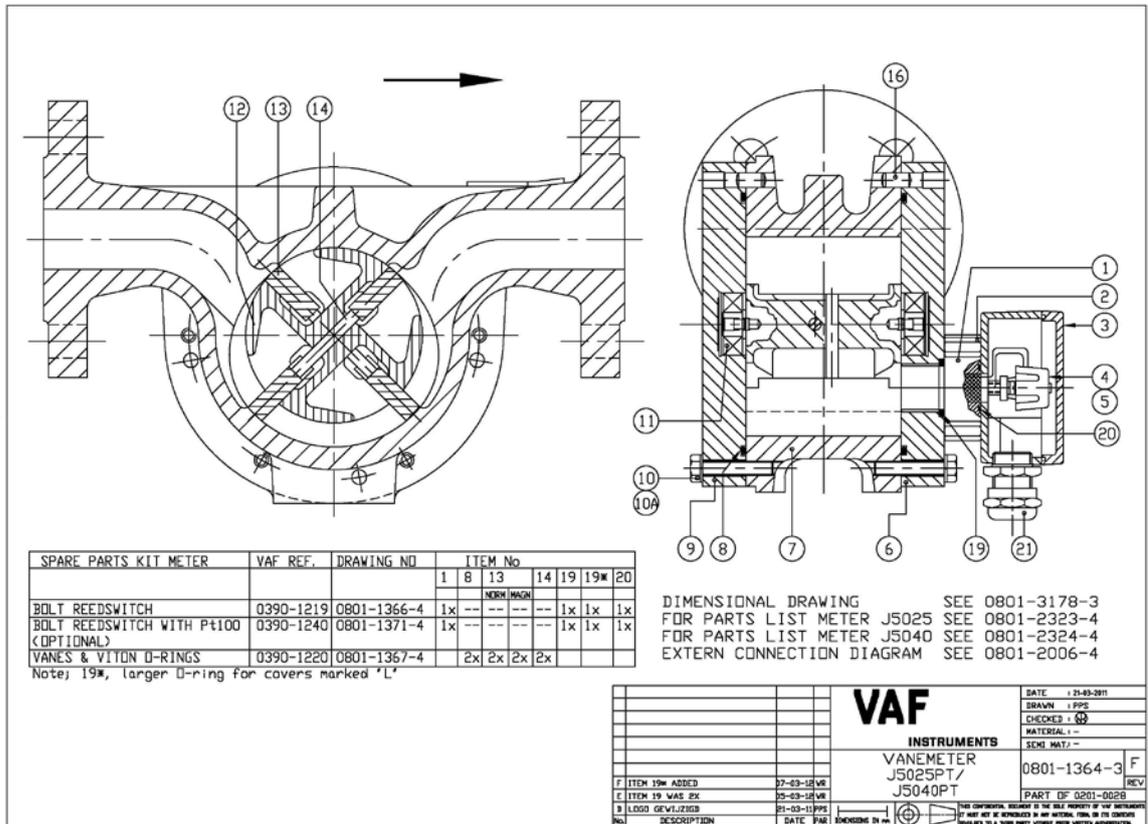


Figure 10 Flowmeter J5025PT and J5040PT

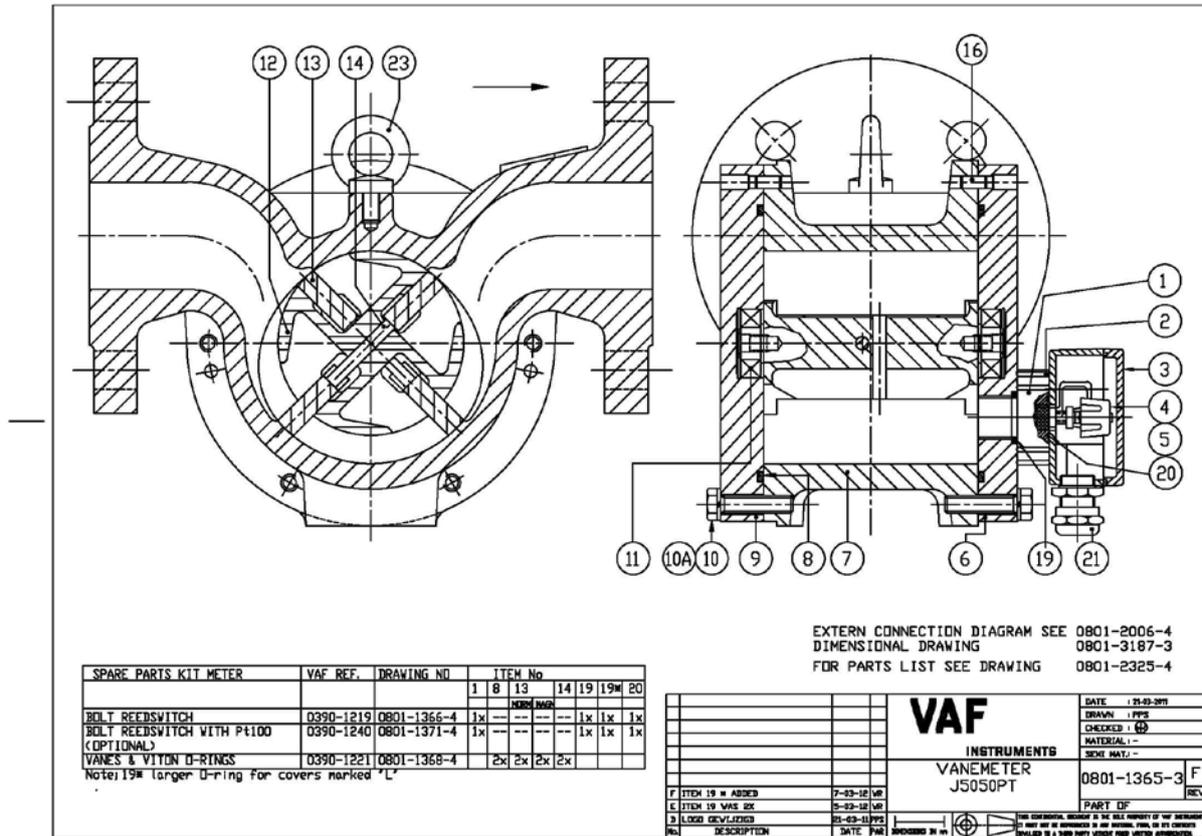


Figure 11 Flowmeter J5050PT

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL															
1		1	ASSY BOLT REEDSWITCH M20x1.5																
	0361-0002		WITH REEDSWITCH	SS 303															
	0361-0004		WITH REEDSWITCH AND Pt100 (OPTIONAL)	SS 303															
2	0646-5111	4	SPACER HEX. 7, M4, L=15mm	STEEL															
3	0499-0696	1	BDX, 64 x 58 x 34mm	ALUMINIUM															
4	0646-4035	2	TERMINAL CONNECTION 1 & 2 EEx1																
5	0708-0312	2	SCREW, M3 x 12mm, DIN 84	STEEL															
6	0402-0610	1	COVER, FRONT, Ø135x18mm	DUCTILE IRON															
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON															
	0401-0559		FLANGE, EN 1092 PN6																
	0401-0057		FLANGE, EN 1092 PN10/16/25/40																
	0401-0390		FLANGE, ANSI CLASS 150RF																
	0401-0391		FLANGE, ANSI CLASS 300RF																
	0401-0432		FLANGE, JIS 5K																
	0401-0392		FLANGE, JIS 10/16/20K																
8	0630-3155	2	O-RING, ID 101.27 x Ø2.62 mm	VITON															
9	0402-0116	1	COVER, BACK, Ø135 x 18 mm	DUCTILE IRON															
10	0733-0630	12	SCREW, HEX. HEAD, M6 x 30 mm, DIN 933	STEEL 8.8															
10A	0718-0600	12	SPRING WASHER M6, DIN 127	SPRING STEEL															
11		2	BEARING, BALL, OD 26 x ID 10 x 8 mm																
	2601-6000		STANDARD WITH 2 GUARD PLATES	STEEL															
12		1	ROTOR, OD 73/10 x 64/84 mm	DUCTILE IRON															
	0403-0138		STANDARD																
13		4	VANE, 64 x 24 x 8 mm	CARBON															
	0405-0029	*	STANDARD																
	0305-0004	*	ASSY VANE L-R WITH MAGNET																
14	0404-0126	2	ROD, VANE Ø5 x 35 mm	AISI 316, HRD.															
16	0705-0612	4	PIN, DOWEL, Ø6x6 x 12 mm, DIN 6325	STEEL, HRD.															
19	0630-3017	1	O-RING ID 17.17xØ1.78 mm	VITON															
	0630-6025		O-RING ID 17.86xØ2.62 mm																
20	0630-3016	2	O-RING ID 15.60xØ1.78mm	VITON															
21	0646-1303	1	GLAND, CABLE M16x1.5, CABLE Ø 5-10mm	BRASS															
			WITH OPTIONAL Pt100																
	0646-1304	1	GLAND, CABLE M20X1.5 CABLE Ø6-12mm	BRASS															
	0646-1348	1	RING ENLARGEMENT M16x1.5 TO M20X1.5	BRASS															
* QTY SEE THIS TABLE																			
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>VANE</td> <td>0405-0029</td> <td>3x</td> <td>2x</td> <td>0x</td> </tr> <tr> <td>ASSY VANE</td> <td>0305-0004</td> <td>1x</td> <td>2x</td> <td>4x</td> </tr> <tr> <td>P/L APPROX.</td> <td></td> <td>6</td> <td>12</td> <td>24</td> </tr> </table>					VANE	0405-0029	3x	2x	0x	ASSY VANE	0305-0004	1x	2x	4x	P/L APPROX.		6	12	24
VANE	0405-0029	3x	2x	0x															
ASSY VANE	0305-0004	1x	2x	4x															
P/L APPROX.		6	12	24															
METER ASSEMBLY SEE DRAWING 0801-1364-3																			
			VAF	DATE : 21-03-2011															
			INSTRUMENTS	DRAWN : PPS															
			PARTS LIST	CHECKED :															
			METER J5025PT	MATERIAL : -															
			PN16	SEMI MAT. : -															
				0801-2323-4 E															
				REV															
				PART OF															
E LOGO GEWIJZIG	21-03-11	PPS		THIS CONFIDENTIAL DOCUMENT IS THE SOLE PROPERTY OF VAF INSTRUMENTS IT MUST NOT BE REPRODUCED IN ANY MATERIAL FORM OR ITS CONTENTS DISCLOSED TO A THIRD PARTY WITHOUT PRIOR WRITTEN AUTHORIZATION															
No. DESCRIPTION	DATE	PAR	DIMENSIONS IN mm																

Figure 12 Flowmeter J5025PT

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL															
1		1	ASSY BOLT REEDSWITCH M20x1.5																
	0361-0002		WITH REEDSWITCH	SS 303															
	0361-0004		WITH REEDSWITCH AND Pt100 (OPTIONAL)	SS 303															
2	0646-5111	4	SPACER HEX. 7, M4, L=15mm	STEEL															
3	0499-0696	1	BOX, 64 x 58 x 34mm	ALUMINIUM															
4	0646-4035	2	TERMINAL CONNECTION 1 & 2 EEx1																
5	0708-0312	2	SCREW, M3 x 12mm, DIN 84	STEEL															
6	0402-0610	1	COVER, FRONT, Ø135x18mm	DUCTILE IRON															
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON															
	0401-0352		FLANGE, EN 1092 PN10/16/25/40																
	0401-0353		FLANGE, ANSI CLASS 150RF																
	0401-0354		FLANGE, ANSI CLASS 300RF																
	0401-0431		FLANGE, JIS 5K																
	0401-0396		FLANGE, JIS 10/16/20K																
8	0630-3155	2	O-RING, ID 101.27 x Ø2.62 mm	VITON															
9	0402-0116	1	COVER, BACK, Ø135 x 18 mm	DUCTILE IRON															
10	0733-0630	12	SCREW, HEX. HEAD, M6 x 30 mm, DIN 933	STEEL 8.8															
10A	0718-0600	12	SPRING WASHER M6, DIN 127	SPRING STEEL															
11		2	BEARING, BALL, OD 26 x ID 10 x 8 mm																
	2601-6000		STANDARD WITH 2 GUARD PLATES	STEEL															
12		1	ROTOR, OD 73/10 x 64/84 mm	DUCTILE IRON															
	0403-0138		STANDARD																
13		4	VANE, 64 x 24 x 8 mm	CARBON															
	0405-0029	*	STANDARD																
	0305-0004	*	ASSY VANE L-R WITH MAGNET																
14	0404-0126	2	ROD, VANE Ø5 x 35 mm	AISI 316, HRD.															
16	0705-0612	4	PIN, DOWEL, Ø6m6 x 12 mm, DIN 6325	STEEL, HRD.															
19	0630-3017	1	O-RING ID 17.17xØ1.78 mm	VITON															
	0630-6025		O-RING ID 17.86xØ2.62 mm																
20	0630-3016	2	O-RING ID 15.60xØ1.78mm	VITON															
21	0646-1303	1	GLAND, CABLE M16x1.5, CABLE Ø 5-10mm	BRASS															
			WITH OPTIONAL Pt100																
	0646-1304	1	GLAND, CABLE M20X1.5 CABLE Ø6-12mm	BRASS															
	0646-1348	1	RING ENLARGEMENT M16x1.5 TO M20X1.5	BRASS															
* QTY SEE THIS TABLE																			
<table border="1"> <tr> <td>VANE</td> <td>0405-0029</td> <td>3x</td> <td>2x</td> <td>0x</td> </tr> <tr> <td>ASSY VANE</td> <td>0305-0004</td> <td>1x</td> <td>2x</td> <td>4x</td> </tr> <tr> <td>P/L APPROX.</td> <td></td> <td>6</td> <td>12</td> <td>24</td> </tr> </table>					VANE	0405-0029	3x	2x	0x	ASSY VANE	0305-0004	1x	2x	4x	P/L APPROX.		6	12	24
VANE	0405-0029	3x	2x	0x															
ASSY VANE	0305-0004	1x	2x	4x															
P/L APPROX.		6	12	24															
METER ASSEMBLY SEE DRAWING 0801-1364-3																			
VAF				DATE : 21-03-2011															
INSTRUMENTS				DRAWN : PPS															
PARTS LIST				CHECKED : R															
METER J5040PT				MATERIAL : DUCTILE IRON															
PN16				SEMI MAT. : -															
				0801-2324-4 E															
				REV															
				PART OF															
E LOGO GEWIJZIGD	21-03-11	PPS	THIS CONFIDENTIAL DOCUMENT IS THE SOLE PROPERTY OF VAF INSTRUMENTS																
No. DESCRIPTION	DATE	PAR	IT MUST NOT BE REPRODUCED IN ANY MATERIAL FORM, OR ITS CONTENTS																
			DISCLOSED TO A THIRD PARTY WITHOUT PRIOR WRITTEN AUTHORIZATION.																

Figure 13 Flowmeter J5040PT

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL															
1		1	ASSY BOLT REEDSWITCH M20x1.5																
	0361-0002		WITH REEDSWITCH	SS 303															
	0361-0004		WITH REEDSWITCH AND Pt100 (OPTIONAL)	SS 303															
2	0646-5111	4	SPACER HEX. 7, M4, L=15mm	STEEL															
3	0499-0696	1	BOX, 64 x 58 x 34mm	ALUMINIUM															
4	0646-4035	2	TERMINAL CONNECTION 1 & 2 EExI																
5	0708-0312	2	SCREW, M3 x 12mm, DIN 84	STEEL															
6	0402-0623	1	COVER, FRONT, Ø166 x 18 mm	DUCTILE IRON															
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON															
	0401-0393		FLANGE, EN 1092 PN10/16/25/40																
	0401-0394		FLANGE, ANSI CLASS 150RF																
	0401-0395		FLANGE, ANSI CLASS 300RF																
	0401-0482		FLANGE, JIS 5K																
	0401-0481		FLANGE, JIS 10K																
	0401-0607		FLANGE, JIS 16/20K																
8	0630-3248	2	O-RING, ID 120.24 x Ø3.53 mm	VITON															
9	0402-0106	1	COVER, BACK, Ø166 x 20 mm	DUCTILE IRON															
10	0733-0835	12	SCREW, HEX. HEAD, M8 x 35 mm, DIN 933	STEEL 8.8															
10A	0718-0800	12	SPRING WASHER M8, DIN 127	SPRING STEEL															
11		2	BEARING, BALL, OD 32 x ID 15 x 9 mm																
	2601-6002		STANDARD WITH 2 GUARD PLATES	STEEL															
12		1	ROTOR, OD 86/15 x 99/122 mm	DUCTILE IRON															
	0403-0139		STANDARD																
13		4	VANE, 99 x 30 x 10 mm	CARBON															
	0405-0030	*	STANDARD																
	0305-0005	*	ASSY VANE L-R WITH MAGNET																
14	0404-0127	2	ROD, VANE Ø6 x 39 mm	AISI 316, HRD.															
16	0705-0612	4	PIN, DOWEL, Ø6x6 x 12 mm, DIN 6325	STEEL, HRD.															
19	0630-3017	1	O-RING ID 17.17xØ1.78 mm	VITON															
	0630-6025		O-RING ID 17.86xØ2.62 mm																
20	0630-3016	2	O-RING ID 15.60xØ1.78 mm	VITON															
21	0646-1303	1	GLAND, CABLE M16x1.5, CABLE Ø 5-10mm	BRASS															
23	0799-0079	1	EYE BOLT, M8, DIN 580	STEEL, HRD.															
* QTY SEE THIS TABLE																			
<table border="1"> <tr> <td>VANE</td> <td>0405-0030</td> <td>3x</td> <td>2x</td> <td>0x</td> </tr> <tr> <td>ASSY VANE</td> <td>0305-0005</td> <td>1x</td> <td>2x</td> <td>4x</td> </tr> <tr> <td>P/L APPROX.</td> <td></td> <td>2.5</td> <td>5</td> <td>10</td> </tr> </table>					VANE	0405-0030	3x	2x	0x	ASSY VANE	0305-0005	1x	2x	4x	P/L APPROX.		2.5	5	10
VANE	0405-0030	3x	2x	0x															
ASSY VANE	0305-0005	1x	2x	4x															
P/L APPROX.		2.5	5	10															
ASSEMBLY METER SEE DRAWING 0801-1365-3																			
VAF				DATE : 21-03-2011															
INSTRUMENTS				DRAWN : PPS															
PARTS LIST				CHECKED : R															
METER J5050PT				MATERIAL : DUCTILE IRON															
PN16				SEMI MAT. : -															
				0801-2325-4 E															
				REV															
				PART OF															
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No. DESCRIPTION	DATE	PAR																	

Figure 14 Flowmeter J5050PT

18. ABBREVIATIONS

PT100	Temperature sensor
PED	Pressure Equipment Directive

19. SPARE PARTS

Model number	Spare kit for Flowmeter	Spare kit for Pulse Transmitter	Spare kit for Pulse and Temperature Transmitter
J5025PT	0390-1220	0390-1219	0390-1240
J5040PT	0390-1220	0390-1219	0390-1240
J5050PT	0390-1221	0390-1219	0390-1240

Notes:

Spare kit for Flowmeter consists of 4 vanes, 2 vane rods and 2 "O" rings.

Spare kit for Pulse transmitter consists of 1 reed switch assy and 2 "O" rings.

Spare kit for Pulse/Temperature transmitter consists of 1 reed/PT100 switch assy and 2 "O" rings.

20. WARRANTY CONDITIONS

1. Without prejudice to the restrictions stated hereinafter, the contractor guarantees both the soundness of the product delivered by him and the quality of the material used and/or delivered for it, insofar as this concerns faults in the product delivered which do not become apparent during inspection or transfer test, which the principal shall demonstrate to have arisen within 12 months from delivery in accordance with subarticle 1A exclusively or predominantly as a direct consequence of unsoundness of the construction used by the contractor or as a consequence of faulty finishing or the use of poor materials.
 - 1A. The product shall be deemed to have been delivered when it is ready for inspection (if inspection at the premises of the contractor has been agreed) and otherwise when it is ready for shipment.
2. Articles 1 and 1a shall equally apply to faults which do not become apparent during inspection or transfer test which are caused exclusively or predominantly by unsound assembly/installation by the contractor. If assembly/installation is carried out by the contractor, the guarantee period intended in article 1 shall last 12 months from the day on which assembly/installation is completed by the contractor, with the understanding that in this case the guarantee period shall end not later than 18 months after delivery in accordance with the terms of subarticle 1A.
3. Defects covered by the guarantee intended under articles 1, 1a and 2 shall be remedied by the contractor by repair or replacement of the faulty component either on or off the premises of the contractor, or by shipment of a replacement component, this remaining at the discretion of the contractor. Subarticle 3A shall equally apply if repair or replacement takes place at the site where the product has been assembled/installed. All costs accruing above the single obligation described in the first sentence, such as are not restricted to shipment costs, travelling and accommodation costs or disassembly or assembly costs insofar as they are not covered by the agreement, shall be paid by the principal.
 - 3A. If repair or replacement takes place at the site where the product has been assembled/installed, the principal shall ensure, at his own expense and risk, that:
 - a. the employees of the contractor shall be able to commence their work as soon as they have arrived at the erection site and continue to do so during normal working hours, and moreover, if the contractor deems it necessary, outside the normal working hours, with the proviso that the contractor informs the principal of this in good time;
 - b. suitable accommodation and/or all facilities required in accordance with government regulations, the agreement and common usage, shall be available for the employees of the contractor;
 - c. the access roads to the erection site shall be suitable for the transport required;
 - d. the allocated site shall be suitable for storage and assembly;
 - e. the necessary lockable storage sites for materials, tools and other goods shall be available;
 - f. the necessary and usual auxiliary workmen, auxiliary machines, auxiliary tools, materials and working materials (including process liquids, oils and greases, cleaning and other minor materials, gas, water, electricity, steam, compressed air, heating, lighting, etc.) and the measurement and testing equipment usual for in the business operations of the principal, shall be available at the correct place and at the disposal of the contractor at the correct time and without charge;

- g. all necessary safety and precautionary measures shall have been taken and adhered to, and all measures shall have been taken and adhered to necessary to observe the applicable government regulations in the context of assembly/installation;
 - h. the products shipped shall be available at the correct site at the commencement of and during assembly.
4. Defects not covered by the guarantee are those which occur partially or wholly as a result of:
 - A. non-observance of the operation and maintenance instructions or other than foreseeable normal usage;
 - B. normal wear and tear;
 - C. assembly/installation by third parties, including the principal;
 - D. the application of any government regulation regarding the nature or quality of the material used;
 - E. materials or goods used in consultation with the principal;
 - F. materials or goods provided by the principal to the contractor for processing;
 - G. materials, goods, working methods and constructions insofar as are applied at the express instruction of the principal, and materials or goods supplied by or on behalf of the principal.
 - H. components obtained from third parties by the contractor insofar as that party has given no guarantee to the contractor.
 5. If the principal fails to fulfil any obligation properly or on time ensuing from the agreement concluded between the principal and the contractor or any agreement connected to it, the contractor shall not be bound by any of these agreements to any guarantee regardless of how it is referred to. If, without previous written approval from the contractor, the principal commences disassembly, repair or other work on the product or allows it to be commenced, then every agreement with regard to guarantee shall be void
 6. Claims regarding defects must be submitted in writing as quickly as possible and not later than 14 days after the discovery of such. All claims against the contractor regarding faults shall be void if this term is exceeded. Claims pertaining to the guarantee must be submitted within one year of the valid complaint on penalty of invalidity.
 7. If the contractor replaces components/products under the terms of his guarantee obligations, the replaced components/products shall become the property of the contractor.
 8. Unless otherwise agreed, a guarantee on repair or overhaul work carried out by the contractor or other services shall only be given on the correctness of the manner in which the commissioned work is carried out, this for a period of 6 months. This guarantee only covers the single obligation of the contractor to carry out the work concerned once again in the event of unsound work. In this case, subarticle 3A shall apply equally.
 9. No guarantee shall be given regarded the inspection conducted, advice given and similar matters.
 10. Alleged failure to comply with his guarantee commitments on the part of the contractor shall not absolve the principal from his obligations ensuing from any agreement concluded with the contractor.
 11. No guarantee shall be given on products which form a part of, or on work and services on, goods older than 8 years.

Revision: 0107:

3.2.1 Technical specification of pulse transmitter corrected
17. Information added in figure 8 and figure 9.

Revision 1007:

Main description flowmeter changed (figure 8, 9, 10, 11, 12, 14 and 15).

Revision 0608:

Recommendation added in chapter 8.1.

Chapter 9.3 added

Revision 0809:

Chapter 6.5: Even designation / specification of wiring

Revision 1209:

Chapter 3.2.1: Technical specification of pulse transmitter corrected.

Revision 0310:

Chapter 9.2.2: O-ring pulse transmitter changed;

Chapter 17: Drawings changed accordingly.

Revision 0610:

Chapter 17: Spare parts drawings revised;

drawing numbers:

0801-3178, 0801-3187, 0801-2323, 0801-2324, 0801-2325

Revision 0711

1. House style change
2. Text altered due to new calibration fluid

Revision 0811

Installation requirements elucidated

Revision 0312

Chapter 17 Drawings 0801-1364 and 0801-1365 corrected

Revision 0513

Chapter 6.3.1 Text filter description updated