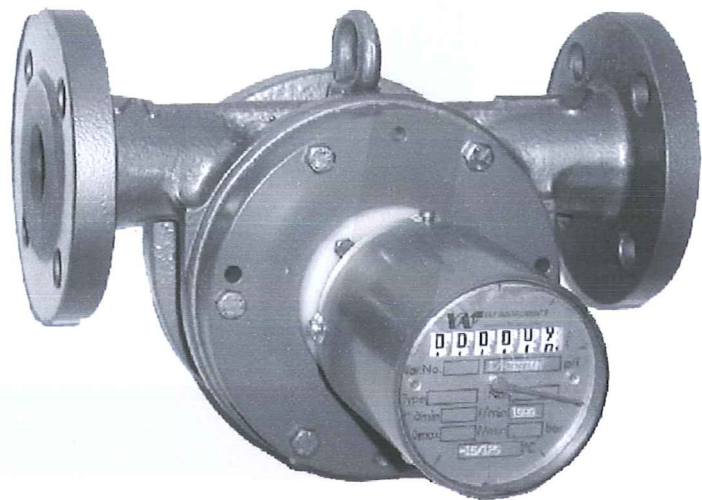


PROFLOW

Series 'B' Vane meters

Instructions
for
installation,
operation
and
maintenance



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TO BE REALLY SURE

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1. PREFACE

1.1 GENERAL

This manual contains installation, operation and maintenance instructions for VAF Series 'B' ProFlow liquid flow meters, model series "B" ProFlow with connection sizes DN15 (1/2") to DN 50 (2").

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 flow meter study this manual carefully before starting operations.

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

For any additional information contact:

VAF Instruments B.V.
Vierlinghstraat 24, NL-3316 EL Dordrecht
P.O. Box 40, NL-3300 AA Dordrecht
The Netherlands
Or your local authorized VAF dealer.
Their addresses can be found on www.vaf.nl

Tel. +31 78 618 3100
Fax +31 78 617 7068
E-mail: sales@vaf.nl
Internet: 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 flow meter 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 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.

2. PRODUCT DESCRIPTION

The ProFlow Flowmeter is used to measure the flow of a fluid. The read out of the flowmeter is a 6-digit and a pointer non-resettable counter.

The flowmeter can be equipped with optional pulse transmitter(s), LCD counter.

2.1 PRINCIPLE OF OPERATION

Series ProFlow meters operate on the sliding vane principle. The meter consists 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 flow meter. The incoming liquid forces the rotor to rotate. A magnetic coupling transmits the rotor rotations to a mechanical or LCD counter and/or to an optional pulse transmitter. The pulse transmitter allows remote flow monitoring or process control.



Note:

These flow meters are subject to P.E.D. (Pressure Equipment Directive) cat 3.3.

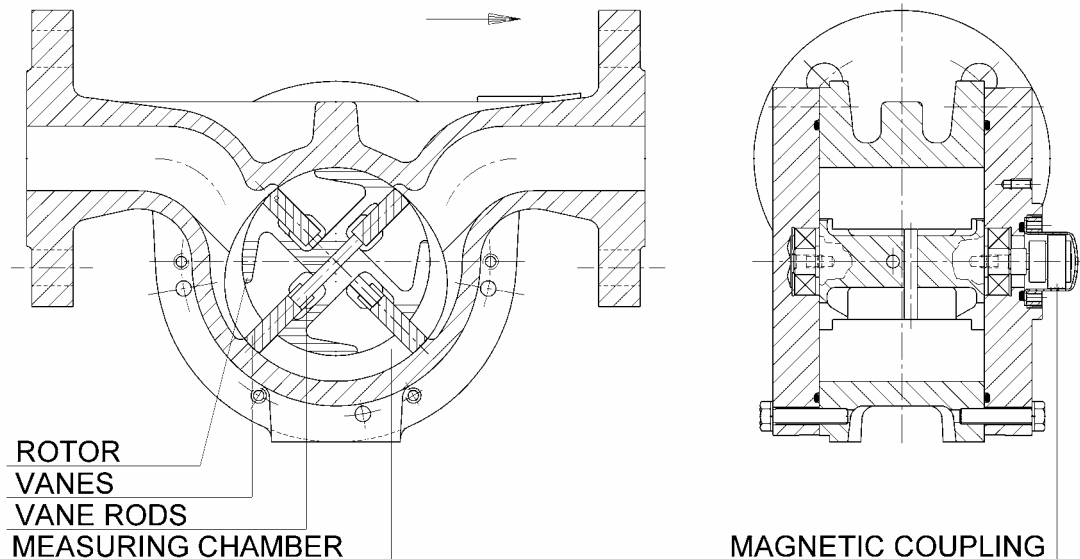


Figure 1 Sectional view of VAF vane meter

3. TECHNICAL SPECIFICATIONS

3.1 FLOWMETER

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

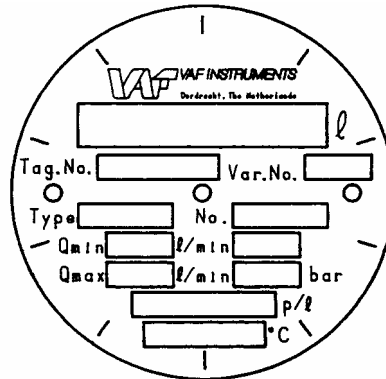


Figure 2 Text plate

3.2 OPTIONAL PULSE TRANSMITTER

If the flow meter is equipped with a totaliser, the internal connections of the cable connected to the flow meter are as shown in figure 8. The number of generated output pulses/litre is stamped on the text plate of the totaliser.

If the flow meter is equipped with a pulse transmitter box (instead of a totaliser), the number of generated output pulses is stamped on the text plate of the pulse transmitter box.

See figure 7 to 11 for connection diagrams.

3.2.1 Technical specification of pulse transmitters

Inductive type: 1 or 2 passive proximity switches according DIN 19234 (NAMUR). Protection class IP55, intrinsically safe acc. PTB No. 99 ATEX 2219X and Cenelec Eex ia IICT6..T4, if used with suitable zener-barrier. Max. operating temperature 75°C. Supply voltage 8.2 VDC.

Incremental type: Installed in a pulse box fitted to the flow meter. Includes pulse discriminator. Supply voltage 12-35 VDC. Max frequency 5 kHz. Protection class IP55. Max.operating temperature 55°C.

3.2.2 Intrinsic safe operation

To meet the standards for intrinsically safe operation according DIN 19234 (NAMUR), zener-barrier(s) (Stahl 9001/3-158-150/00, Pepperl & Fuchs EGT-101-0, or equivalent) must be installed between the flow meter and the associated data processing instrumentation. Consult VAF Instruments B.V. if further information on zener-barriers is required.

3.3 OPTIONAL PULSE DISCRIMINATOR

The pulse discriminator is housed in the pulse transmitter box of a non-indicating flow meter. The discriminator is used in situations where, as a result of vibrations or pulsations in the liquid piping, it is possible for the flow meter to rotate in the reverse direction. This may result in the generation of spurious pulses by the electric transmitter. By using a double pulse transmitter in the flow meter, generating two identical pulse signals with a phase shift of 90 degrees, these measurement errors will be eliminated by means of the pulse discriminator. The discriminator comprises a small printed circuit board which also contains a pulse amplifier. This makes the device suitable for direct connection to, for instance, an electromechanical counter or to a relay for further pulse processing.

3.3.1 Technical specifications of the pulse discriminator

Electric connections:	3-wire screw terminal
Supply voltage:	12-35 VDC
Power consumption:	2 VA at 35 VDC (no load)
Input signal:	2 NAMUR pulse transmitters or incremental encoders
Pulse memory:	up to 15 error pulses
Connections:	6-pin connector or cable gland PG 13.5
Max. working temp:	55°C
Output signal:	Open collector, current sink . I_{max} 100 mA, U_{max} 35 VDC
Protection class:	IP55, DIN 40050
Approved:	CE

3.4 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 flow meter. If necessary also install a suitable deaerator. Refer to product bulletin 302 for more information.



VAF Instruments B.V. will not be responsible for any damage to flow meters and accessories caused by foreign particles in the process liquid.

3.5 WEIGHT OF FLOWMETERS AND COUNTERS

Weight including counter

Model No	Approx. net weight (kg)
B5015	5
B5023	7
B5025	12
B5040	14
B5050	22

4. SAFETY INSTRUCTIONS

- Some calibration fluid can be left in the flow meter. This is Shellsol-T. See chapter 6.4 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.



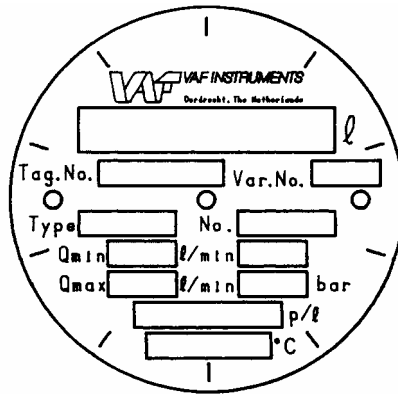
Always quote type and serial numbers when contacting the factory.

2. Record data on text plate of flowmeter in the space below, by filling in the text plate (figure 3).
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.



Please fill in the details of your flowmeter here.

Figure 3 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.

6.3.1 Supporting the flow meter

The flow meter must never be used to support the piping or other system components. The flow meter and its connecting flanges must be protected against strain or mechanical vibrations. Either the flow meter must be supported by the process piping, or both the pipeline and the flow meter must be supported.

1. Install suitable pipe brackets at each side of flow meter (Figure 4).



The flow meter should be accessible from all sides for easy inspection and servicing.

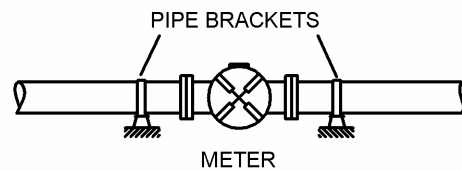


Figure 4 Supporting the flow meter

6.3.2 Bypass piping arrangement

A bypass with manual block valves is recommended so that the meter can be serviced without interrupting the flow in the system (Figure 5).



A bypass may not be allowed when the flow meter is used for custody transfer purposes.

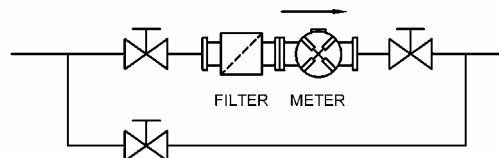


Figure 5 Bypass piping arrangement

6.3.3 To prevent the flow meter from emptying

To prevent the flow meter from emptying or siphoning, maintain a back-pressure downstream of the meter so that it always remains full of liquid. This can be done by raising the pipe line downstream of the flow meter, by installing a back-pressure valve or by other suitable method.

6.3.4 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 flow meter.

6.4 TO INSTALL FLOWMETER

1. Remove dust caps from inlet and outlet connections of flow meter.



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

2. Install flow meter to process piping in accordance with the relevant figure 6.

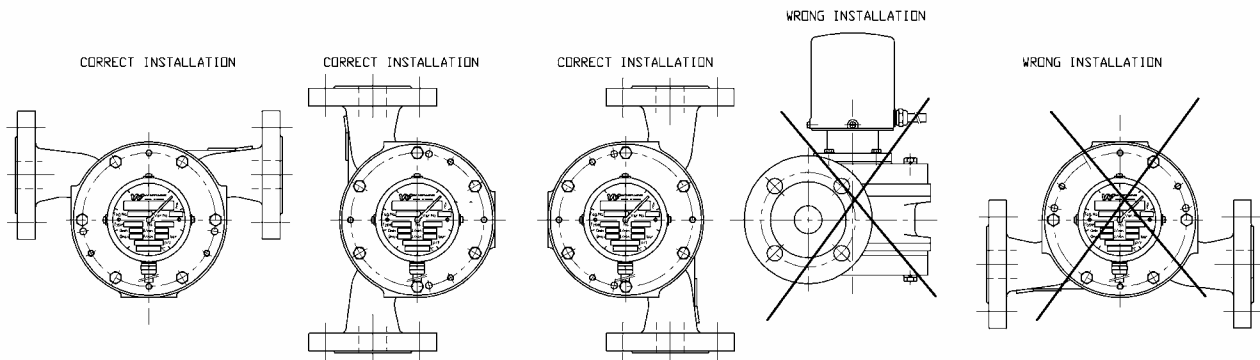


Figure 6



Note that:

- the back cover of the flow meter must always be in vertical position.
- an arrow on the flow meter body indicates the direction of the flow.
- the counter may be turned in 90° increments to facilitate reading.

6.5 ELECTRIC CONNECTION DIAGRAMS

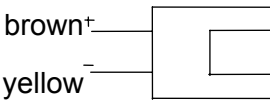
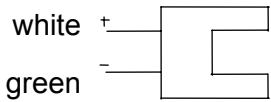
The electrical connections of the pulse transmitter are as shown in figures 7 through 11. For electrical connections between flow meter and associated electronic processing instrumentation, reference is made to the separate technical manuals supplied of these electronic instruments.

6.5.1 Connection cables

Each pair of leads between the pulse transmitter and the connected signal processing instrumentation must be screened separately, as otherwise false pulses might be induced by external electromagnetic fields.

Use shielded cable with a diameter of 6 to 8 mm and a wire diameter of max. 0.8 mm. The screen must NOT come into contact with the flow meter. In the connected instrument the screen must be connected to the system earth or, in absence of the latter, to the zero connection of the pulse input terminals.

6.5.2 Connections at totaliser

Wiring of pulse generators:		
Connections of pulse transmitter:		
1 low frequency pulse transmitter *	low: ●	
1 high frequency pulse transmitter		high: ●
1 low + high frequency pulse transmitter	low: ●	high: ●
2 low frequency pulse transmitters *	low: ●	low: ●
2 high frequency pulse transmitters	high: ●	high: ●

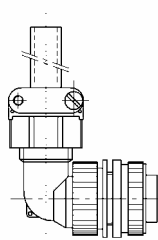
* Low frequency includes 1 & 5 & 10 pulses/litre (meter models B5015, B5023, B5025, B5040) and 0.1 & 0,5 & 1 pulse/litre (meter model B5050). Other pulse rates are high frequency type.

Figure 7 Wiring of pulse generators inside totaliser

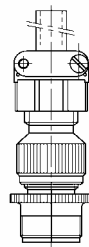
6.5.3 Connections at 6-pole connector

When the pulse output cable from the totaliser is provided with a 6-pole connector, the internal wiring is as shown in figure 8.

	6-pole connector	Cable
High 1 + -	A	White
	B	Green
High 2 + -	C	Brown
	D	Yellow
Low 1 + -	E	Brown
	F	Yellow
Low 2 + -	C	White
	D	Green



RIGHT-ANGLED
6-PINS PLUG



STRAIGHT 6-PINS
PLUG

Figure 8 Internal wiring of connector plug

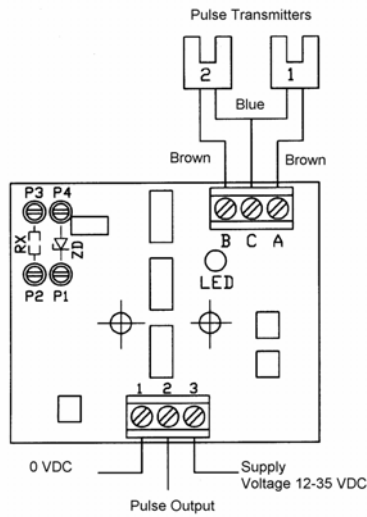
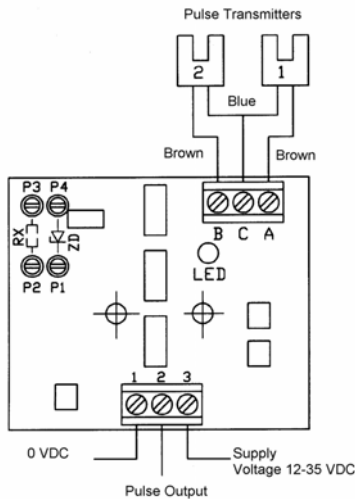


Figure 9 External connections of flow meter with pulse discriminator or incremental pulse encoder in pulse box with Pg 13.5 cable gland

6.5.4 External connections at pulse transmitter box



Pulse output	Resistor (Rx)	Zener diode (Zd)
Open-Collector	-	-
5 V pulse	* 2k4	4V7 - 0,4 W
12 v pulse	* 1k4	12 V - 0,4 W

* supply voltage 24 VDC

$$\text{Calculation: } R_x = \frac{\text{supply voltage} - \text{desired pulse voltage}}{0,008}$$

Figure 10 Non-indicating flow meter with inductive pulse transmitters and pulse discriminator

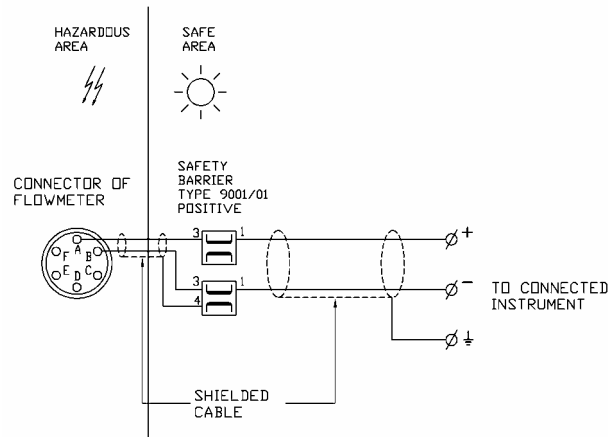


Figure 11 External connections to safety barrier

7. OPERATING INSTRUCTIONS

7.1 START-UP PROCEDURES

Before initial start-up of a flowmeter system, or when taking the installation again into use 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.



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.

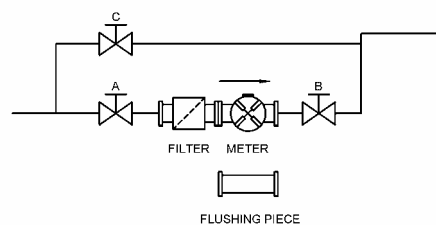


Figure 12 Flowmeter system with bypass

7.1.1 Initial start-up of a flow meter system with bypass

1. Close valves A, B and C (Figure 12).
2. Remove flushing pipe piece. Re-install flow meter and filter element.
3. Slowly open bypass valve C completely.
4. Start pump and/or open storage tank valve.
5. Open valve A slightly (5-10%).
6. Slowly open valve B. Dependent on the internal resistance in the system, the flow meter may start running. If it does, limit the flow to approx. 20% of its capacity.
7. Slowly close bypass valve C until flow meter just starts running. Let the flow meter run on this limited flow for a couple of minutes, to ensure that no air or gas will be left in the flow meter.
8. Slowly open valve A, and if necessary also valve B, completely.
9. Slowly close valve C completely.

7.1.2 Initial start-up of a flow meter system without bypass

1. Close valves A and B (Figure 13).
2. Remove flushing pipe piece. Re-install flow meter and filter element.
3. Start pump and/or open storage tank valve.
4. Open valve A slightly (5-10%).
5. Slowly open valve B until flow meter 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 flow meter.
6. Slowly open valve B completely.
7. Slowly open valve A completely.

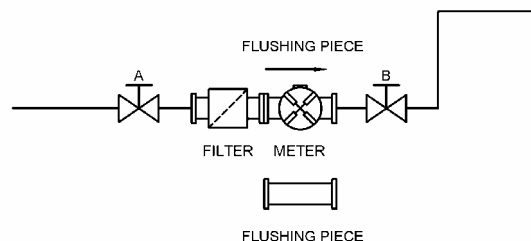


Figure 13 Flowmeter system without bypass

7.2 OPERATION OF COUNTERS

This section only contains concise operating procedures. For additional functional description of counters separate technical manuals can be ordered from the Literature Department of VAF Instruments B.V.

7.2.1 Totaliser

The totaliser requires no operation.



Figure 14 Totaliser

7.2.2 FlowCount Rate-Totaliser



Figure 15 FlowCount Rate Totaliser

The Model E200 FlowCount Rate Totaliser is fully programmed in the factory, in accordance with the flow data supplied by the customer. The instrument will display rate, resetable total and accumulated total.

FlowCount is an indicating instrument and may optionally be equipped with a 4-20 mA output, or a DC power input and flow alarm.

1. The accumulated total is displayed by pressing the [ACCUM TOTAL] key.
2. The resetable total can be reset at any time by pressing the [RESET] key.
3. The flow rate is continuously displayed.

The instrument also has a display test mode which can be entered by simultaneously pressing all three front panel keys, followed by pressing the [PROGRAM] key. All segments of the display will then show.

To exit the test mode, press the [ACCUM TOTAL] key and while still holding, simultaneously press the [RESET] and [PROGRAM] keys.



A technical manual with more details is supplied with each instrument.

8. MAINTENANCE

8.1 GENERAL

Under normal operating conditions the flowmeter requires no maintenance other than:

* Periodic accuracy check. Refer to section 8.2;



For flowmeters that are running continuously, we recommend to replace bearings every two years as a preventive measure to keep the flowmeter in the best possible condition.

* Check of totaliser (if this option is supplied). Refer to section 8.3.

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 flow meter inlet.

Meter type	Calibration interval (litres)
B5015	11×10^6
B5023	11×10^6
B5025	35×10^6
B5040	55×10^6
B5050	110×10^6

8.3 CHECK OF TOTALISERS

The totaliser should be inspected:

* Every two years.

* Every year when the flow meter is installed in a hot, humid or dusty environment.

To check counter:

1. Remove three cross head screws and lift off cap.
2. Inspect gear train for wear.



Take care not to damage any pulse generators. Do not lubricate plastic parts.

9. SERVICE AND REPAIR INSTRUCTIONS

9.1 GENERAL

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

9.2 TO REMOVE FLOWMETER 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.

9.2.1 General procedure

1. Shut off flow through flowmeter.
2. Remove any electrical connections from flowmeter. Record connections, if necessary.
3. Empty piping system, in accordance with chapter 9.2.2.
4. Drain flowmeter, in accordance with chapter 9.2.3.
5. Remove flowmeter from piping system, as described in chapter 9.2.4.

9.2.2 To empty piping system



Emptying a piping system is often done by blowing through with steam or air. This practise is not recommended when a vane type flowmeter is installed, because it will be overspeeded.

9.2.3 To drain flowmeter

1. If the flowmeter is fitted with a drain plug, remove plug to empty flowmeter.
2. When the flowmeter is not fitted with a drain plug, remove flowmeter as described under chapter 9.2.4.

9.2.4 To remove flowmeter from piping system

1. Ensure that flow through flowmeter has been shut off. Ensure that electric connections have been removed.



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

2. Use a lifting device and the lifting eye on top of the flowmeter to hold flowmeter in position.
3. 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.

4. Hold meter outlet in downward position and let flowmeter leak out for approximately ten minutes. High viscosity liquids will perhaps require more time. Rinsing with a suitable solvent may be of help.
5. Place flowmeter on a dry and clean workbench.
6. If flowmeter must be returned to VAF Instruments or local service representative, follow instructions under chapter 12

9.3 DISMANTLING

The following procedures are recommended if the flow meter must be dismantled for overhaul or repair. Certain procedures require the use of accurate measuring tools. If these tools are not available it is advisable to return the flow meter to VAF or local service representative.

9.3.1 To remove flow meter from liquid piping

Follow instructions on paragraphs 9.2.1 through 9.2.4.

9.3.2 To remove counter from flowmeter

Remove pulse box (figure 16), or counter (figure 17) from meter body according the following procedure:

1. Loosen 4 bolts M4 x 12
2. Rotate outer magnet with finger (Figure 18) and check shafts, calibration gears and bearings for wear and excessive slackness of the counter drive.
3. Ensure that the outer magnet is clean and that none of the magnets are missing or damaged. Check centering of outer magnet.

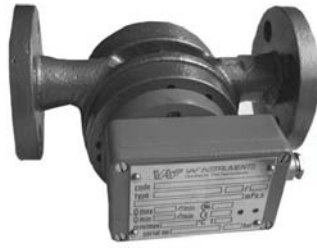


Figure 16



Figure 17



Figure 18A N-counter



Figure 18B Pulse box

9.3.3 To remove magnet cap and magnet

1. Remove magnet cap holder by loosening the nut (figure 19)
2. Remove magnet cap, inner magnet and sealing ring, as shown in figures 20, 21 and 22
3. Check inside of magnet cap and outside of inner magnet for grooves. If any grooves are found, the magnet shaft is probably bent and must be replaced. Replace the magnet cap if too heavily grooved.



Figure 19

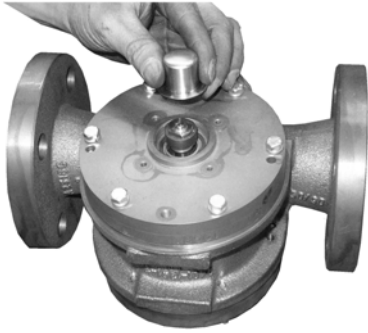


Figure 20

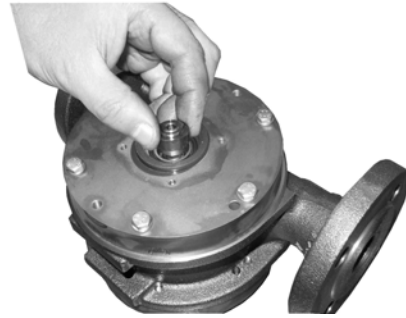


Figure 21

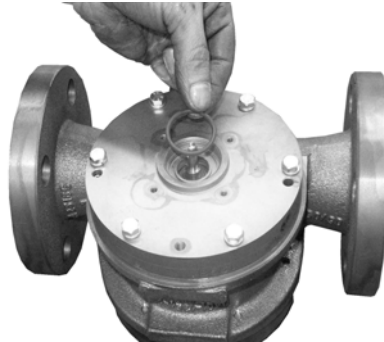


Figure 22

9.3.4 To remove front cover

Register the flowdirection before dismantling the flowmeter. Look from counter side to arrow marked at the flowmeter for flow direction. Note: standard flow direction is left to right.



Figure 23 Flowdirection left to right

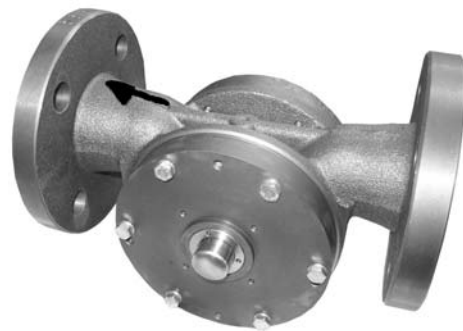


Figure 24 Flowdirection right to left

Check for any signs of bearing wear by 'wiggling' flow meter shaft carefully.

1. Remove the front cover mounting bolts and lock washers (figure 25)
2. Install the bolts, which were removed in step 1 above, in the jacking positions of the front cover (figure 26). Tighten these bolts evenly and alternately until the cover frees. Ensure cover is lifted equally to protect the location pins from being damaged.
3. Lift off cover equally to protect the location pins from being damaged and remove bolts and O-ring (fig 27) Visually inspect inside surface and bearing cavity for grooves and other signs of wear, indicating that bearing(s) or vanes are damaged.



Do not remove the pin glued in the cover while it is used for centering the cover, refer to figure 27.



Figure 25



Figure 26



Figure 27 Center pin location

9.3.5 To remove rotor/vanes assembly

1. Before taking the rotor out of the meter body, visually inspect the inside of the body to locate possible cause of damage. If the 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 (fig 28).
2. Record how vanes are installed in the rotor (figure 29). Remove rotor from body by gently pulling at the rotor shaft and supporting the rotor/vane assembly with the other hand (figure 30)



Figure 28

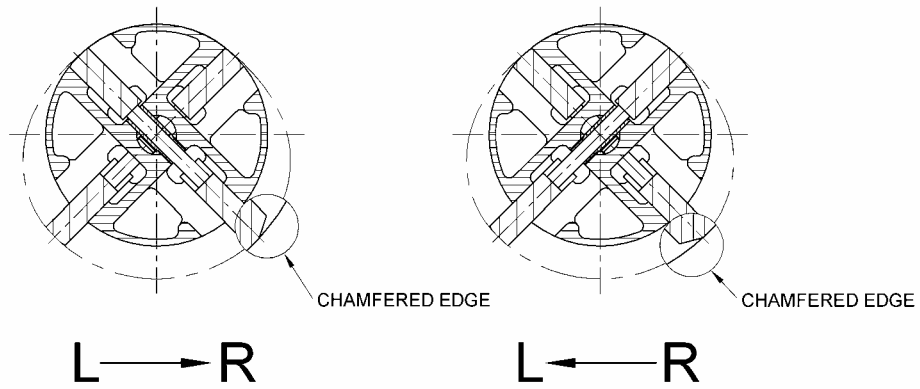


Figure 29

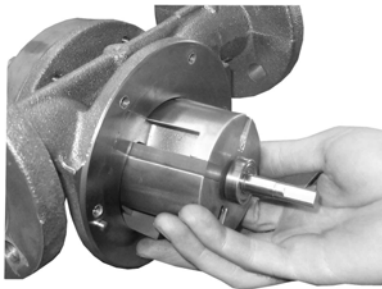


Figure 30



Caution:

Be careful not to drop or damage the four loose vanes and the two loose vane push rods when removing the rotor from the meter body. Keep both pairs of vanes together.

9.3.6 To remove back cover

1. Remove the back cover mounting bolts and lock washers (figure 31)
2. Install the bolts, which were removed in step 1 above, in the jacking positions of the back cover (figure 32). Tighten these bolts evenly and alternately until the cover frees. Ensure cover is lifted equally to protect the location pins from being damaged.
3. Lift off cover and remove bolts and O-ring (figure 33). Visually inspect inside surface and bearing cavity for grooves and other signs of wear, indicating that bearing(s) or vanes are damaged.

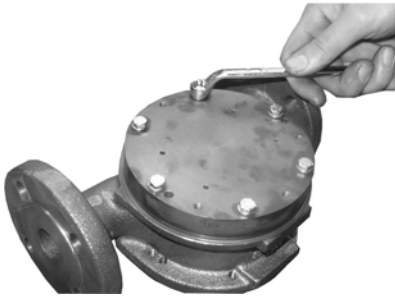


Figure 31



Figure 32



Figure 33

9.3.7 To inspect inside of meter body

1. Visually inspect inner surface of meter body for grooves. Minimal grooving due to small impurities in the process liquid requires no further action, provided that the original shape of the metering chamber is not disturbed. Grooving caused by coarse particles in the process liquid, or by a vane push rod when a vane is broken, will upset material. Such obstructions may result in uneven running of the flow meter and/or premature vane wear affecting the performance of the flow meter.
2. Remove any surface roughness with fine emery cloth.



If the meter wall was heavily scored no guarantee can be given that after polishing action the flowmeter will still be able to operate within its specified limits of accuracy.

3. Degrease meter body in a suitable solvent.

9.3.8 To inspect rotor and vanes

1. Visually inspect for chipped vanes, replace vanes if necessary.
2. Measure the height of vanes. Replace vanes if height is less than height of rotor.
3. Measure the vane/slot clearance using a feeler gauge (fig 34). For correct measurement the gauge must be bottomed out in the slot. If the tolerance shown below is exceeded, the vane(s) must be replaced.

Meter model	Standard vane - slot clearance [mm]
B5015 (1/2")	0.040 - 0.050
B5025 (1")	0.040 - 0.070
B5040 (1,5")	0.040 - 0.070
B5050 (2")	0.045 - 0.080

4. Check that the vane at vane rod side is not damaged causing too much space between vanes and meter body.
5. Check that the vane rods can slide freely in and out of the rotor. If the rods can not move freely this may be caused by dirt, worn out bores, bent push rods ore scored vanes. Any defective parts must be replaced.



Figure 34

9.3.9 To inspect bearings and rotor shaft

1. Visually inspect bearings, bearing cages, bearing cavities in covers and rotor shaft for excessive wear or other damage. The maximum run out tolerance for rotor shafts is 0.01 mm dial gauge reading.
2. Replace defective bearings in accordance with section 9.4.12.

9.3.10 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.



Figure35

9.4 TO RE-ASSEMBLE A FLOWMETER

9.4.1 General

1. If there is any doubt about the condition of a particular flow meter component, replace it when the meter is still dismantled. This is more economical than having to strip the flow meter down again after a short period of time.
2. Once the flow meter has been dismantled it is recommended that the O-rings for the covers and the O-ring for the magnet cap are replaced.
3. Metal and carbon parts must be degreased before assembly. O-rings should only be wiped dry with a clean cloth.

9.4.2 To install back cover

1. Clean O-ring groove and install new O-ring (Figure 36).
2. Position back cover over locating pins of meter body.



Take utmost care not to damage the locating pins. Ensure that the O-ring remains in place and is not damaged while tapping down cover.



Figure 36

3. Install cover to meter body using bolts (and lock washers if originally provided). Lubricate bolt threads with 'Never Seez'. Tighten bolts alternately and evenly to the torque value specified on next page.

Torque values (Nm) – Covers

Meter Model	No. Of bolts	Stainless Steel	Steel	Ductile iron
B5015	6x M6	-	-	8.5 - 9
B5025/B5040	6x M6	-	-	8.5 - 9
B5050	6x M8	-	-	16 - 17

To install rotor and vanes

1. Place the two vane push rods through the drilled and reamed holes in the rotor (Figure 37).
2. Place rotor with installed vane push rods into flow meter body, with magnet shaft facing up (Figure 38).



Take care not to damage the bearing in the back cover.

3. Place two opposite slots in rotor in line with inlet and outlet flange connections of flow meter.



Figure 37

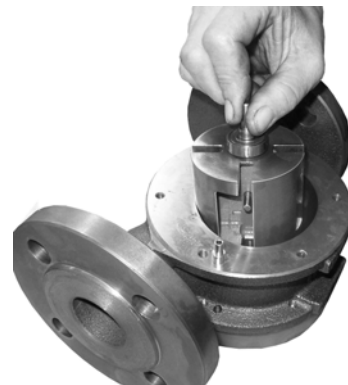


Figure 38

4. Insert the four (4) vanes one by one into the slots of the rotor, starting with the vane nearest to the inlet connection. Continue with the opposite vane. Then rotate the rotor 1/4 turn and insert the other vanes in the same order (Figure 39). The chamfered edge of each vane must be in the rotating direction of the rotor, as shown in Figure 40 for flow meters with flow direction from left to right and from right to left. The top of the vanes must be flush with the upper surface of the rotor.



Take care not to damage the vanes.

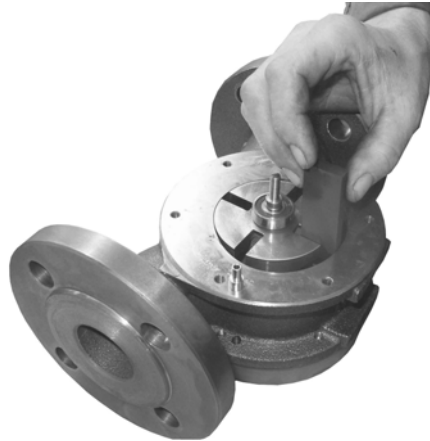


Figure 39

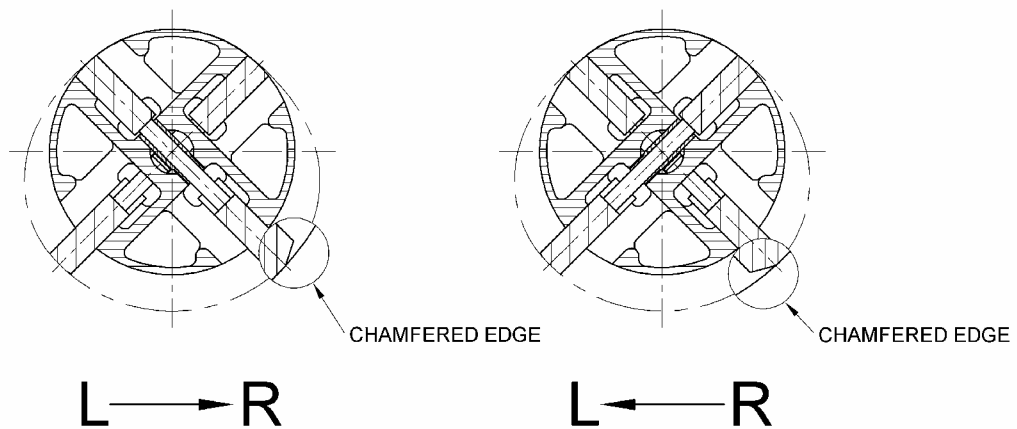


Figure 40

5. Measure the radial vane clearance with a feeler gauge. Measurement should be taken as shown in Figure 41. For correct measurement the gauge must be bottomed out in the slot. If the tolerance is in excess of the value mentioned in the table on next page, replace vane(s) or grind to size with fine emery cloth.

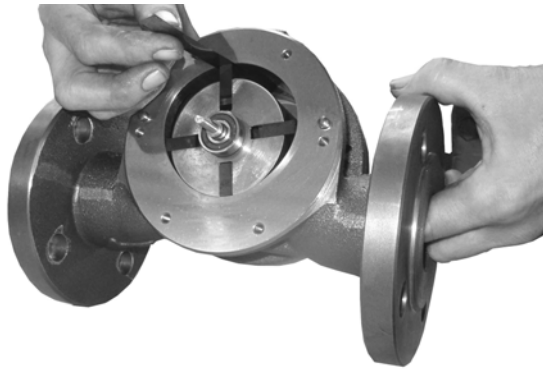


Figure 41

Vane-to-meter body clearance

Model No.	Tolerance (mm)
B5015 (1/2")	0.025 - 0.060
B5025 (1")	0.040 - 0.090
B5040 (1.5")	0.040 - 0.090
B5050 (2")	0.050 - 0.100

6. Rotate the rotor with finger to ensure that it will run smoothly.

9.4.3 To install front cover to meter body

1. Clean O-ring groove and install new O-ring.
2. Tilt meter body, so that the rotor shaft is in horizontal position.
3. Position front cover over locating pins on meter body.



When installing front cover to meter body take utmost care not to damage bearing and locating pins. Ensure that the O-ring remains in place and is not damaged.

4. Lubricate threads of cover mounting bolts with 'Never Seez'. Install bolts (and lock washers if originally provided). Tighten bolts equally and in turn (Figure 42), in accordance with the torque value table of section 9.4.2.

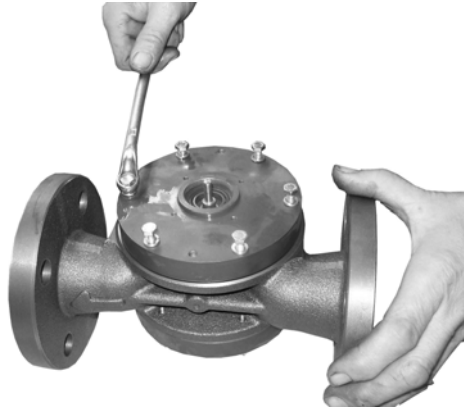


Figure 42

9.4.4 To install inner magnet

1. Place inner magnet on rotor shaft (Figure 43). The magnet should be placed as shown in figure 44. The magnet must be flush with the shaft.
2. With the rotor shaft in horizontal position, rotate the rotor shaft by hand using the magnet, to check that the rotor runs smoothly.



Figure 43

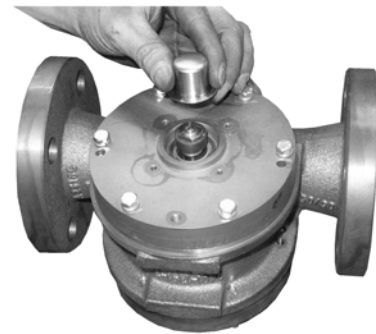


Figure 44

9.4.5 To install magnet cap

1. Clean O-ring groove in front cover and install new O-ring (Figure 45).
2. Clean inner magnet with compressed air.
3. Place magnet cap over magnet (Figure 46)

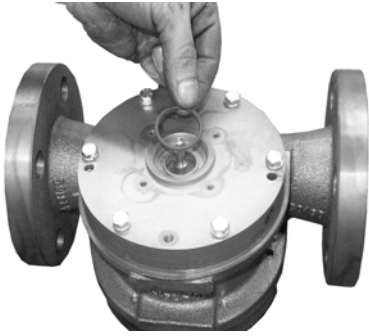


Figure 45

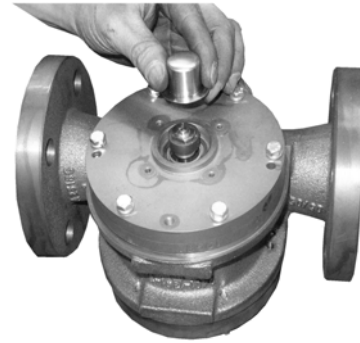


Figure 46

5. For a final check that the rotor runs smoothly after assembling covers and magnet cap, the flow meter may be blown through with compressed air at **low** pressure. The rotor must then be able to make a few obstructionless rotations. If the rotor does not run smoothly, disassemble the flow meter and repeat the assembly procedures.



Extreme care should be taken not to overspeed the rotor to avoid damage to the internal meter parts. Just apply enough air that the rotor starts running.

9.4.6 To install pulse transmitter box or counter

Clean out magnet of pulse transmitter box/counter.

Install the pulse transmitter box/counter by placement of the four bolts M4x12 (Figure 47).



The pulse transmitter box must be installed in such a way that, when the flow meter is installed in the liquid piping, the cable gland will point downwards or side wards, but never upwards.

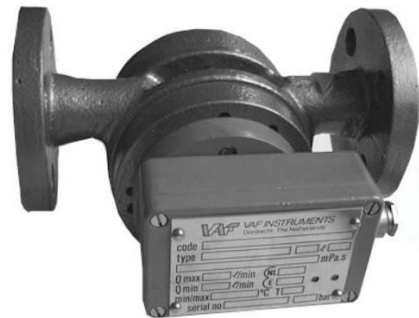


Figure 47

9.5 FINAL PERFORMANCE CHECK

If the flow meter is recalibrated during a maintenance check or after replacement of major parts, the highest measuring accuracy should be within the operating flow range of the flow meter.

9.6 CHANGING THE FLOW DIRECTION

Unless otherwise specified VAF Series ProFlow meters are delivered for a flow direction from left to right.

When the flow direction must be changed from left-to-right into bottom-to-top or top-to-bottom, this can easily be done by removing the mounting bolts of the counter or pulse transmitter box and rotate it 90 degrees clockwise or counter clockwise (Figure 48). Note that in all cases the flowdirection of the flowmeter, pointed out by the marked arrow on the meter body, is in the right direction.

If for some reason the direction of flow must be reversed from left-to-right into right-to-left please contact VAF Instruments or local service agent.



If the change in flow direction must be made during the warranty periods contact the factory or your local VAF distributor, because unauthorized servicing will void the warranty.



If a change in flow direction is made, the code number as stamped on the identification plate of the flow meter is no longer valid. Therefore please keep record of the changes to avoid difficulties when ordering replacement parts.



Figure 48 Flowdirection top to bottom



Figure 49 Flowdirection bottom to top flowmeter

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.

Example of sheet to accompany a return shipment to factory or service agent.

Sheet to be filled out in English language

Sender	
Company Name _____	Contact Person _____
Street _____	Department _____
Postal Code _____	Telephone _____
City _____	Fax _____
Country _____	E-mail _____

Shipping address for return of goods to user (if different from above mentioned)

Reason for return
 Repair Warranty Claim Calibration
 Other _____

Type of flow meter (see nameplate on instrument)
Code / Type: _____
Serial Number: _____

Liquid Data
Process Liquid (trade name or chemical composition): _____
Liquid properties:
 harmless toxic explosion dangerous inflammable
Flow rate [l/min] minimal _____ nominal _____ maximum _____
Operating pressure: _____ Operating temperature: _____
Specific gravity: _____ Viscosity: _____

Description of Complaint / Work to be performed

Safety Precautions
 The flow meter has been emptied
 The flow meter has been internally cleaned and preserved using _____
 Inlet- and outlet ports have been plugged

Recommended cleaning fluid: _____
Recommended safety precautions before opening of flow meter: _____

Installation date: _____	Failure date: _____
Date & Signature _____	Name & Title: _____
_____	_____

13. ENVIRONMENT

The flowmeter has no negative influence on 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 countries. 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 flow meter 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. The totaliser or FlowCount Rate-Totaliser is malfunctioning.	Totaliser: Remove counter drive shaft with finger to see if counter runs smoothly. FlowCount: Is battery empty? Refer to trouble shooting section of manual supplied with instrument. Continue with next step if this does not solve the problem.
3. Inner parts of flow meter may be stuck or broken.	Return flow meter to factory or authorized local VAF Instruments service representative.

Problem:

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

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 flow meter was not removed when the flow meter was installed in the process line. | Remove dust cap(s) and check the flow meter for damage. If there are no visible signs of damage, proceed with next step. |
| 3. Dirt is blocking the inner parts of the flowmeter. | Flush the flow meter with a suitable solvent. If this does not solve the problem, return flow meter to factory or nearest authorized VAF Instruments service representative. |
| 4. Inner parts of flow meter may be stuck or broken. | Return flow meter to factory or nearest authorized VAF service representative. |

15.2 CONDITIONS FOR RETURN OF GOODS

Return shipments of goods to VAF Instruments or local service agent must meet the following conditions:

1. The shipment must be accompanied by a check list giving full information about the reason for return and further instructions. See example on next page.
2. The flow meter must be internally and externally cleaned and adequately preserved. It must be free from risks of fire, explosion and toxic matters which may cause a hazardous situation or personal injury.
3. Flow meter inlet and outlet connections must be plugged so that no liquid can leak out of the instrument.
4. Goods must be sent c.i.f. destination.

16. CERTIFICATES

Certificates are delivered separately.

17. DRAWINGS

DESIGNING CAD ENGINEERING

LOCKED IN COVERS
WITH LOCTITE TYPE 648

CROSS SECTION I-I CROSS SECTION II-II

SPARE PARTS KIT METER		No.	DRAWING No.	ITEM No.				
				5	8	11	13	14
2 YEARS WITH VITON	D-RINGS AND STANDARD VANES	0390-0813	0801-1294-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA	D-RINGS AND STANDARD VANES	0390-0814	0801-1294-4	1x	2x	--	2x	1x
2 YEARS WITH KALREZ	D-RINGS AND STANDARD VANES	0390-0905	0801-1294-4	1x	2x	--	2x	1x
5 YEARS WITH VITON	D-RINGS AND STANDARD VANES	0390-0815	-----	1x	2x	2x	4x	2x

FOR PARTS LIST METER SEE DRAWING 0801-2310-4

METER WITH	DIMENSIONAL DRAWING	PARTS LIST	EXT. CONN. DIAGRAM
N-COUNTER	0801-3125-3	-----	-----
PULSE TRANSMITTER IN N-COUNTER	0801-3125-3	-----	0830-2013/4-4
FLOWCOUNT E200	0801-1069-3	0830-1231-3	0830-2011-4
PULSE TRANSMITTER BOX N=1 ... 25		0879-1202-3	0830-2007-4
PULSE TRANSMITTER BOX N=50		0879-1215-3	0830-2007-4
PULSE DISCRIMINATOR BOX N=1 ... 25	0801-1157-3	0879-1204-3	0830-2008-4
PULSE DISCRIMINATOR BOX N=50		0879-1219-3	0830-2008-4
INCREMENTAL PULSE TRANSM. BOX(OLD) N=100/250/500		0879-1211-3	0830-2008-4
INCREMENTAL PULSE TRANSM. BOX(NEW) N=100/250/500		0897-1223-3	0830-2008-4
MAGNETIC PULSE TRANSMITTER BDX	0801-1147-3	0850-1207-3	0801-8052-4

No.	DESCRIPTION	DATE	PAR

METER B5015D DN15 PN40 WITH FLANGES		0801-1344-3	
PART OF			

DATE 19-09-1997
DRAWN B.T.
CHECKED B.V.
MATERIAL INCLITE IRON
SEMI MAT.
Bardrecht, The Netherlands
25 mm
DIMENSIONS IN mm
REV. No. A B


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DESIGNING CAD ENGINEERING

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL
1	0417-0005	1	NUT, MAGNET CAP M36x1.5, ID 22.8x6mm	AISI 316
2		1	ASSY, MAGNET	
	0313-0004		STANDARD, $\varnothing 20.9 \times 15$ mm	FERROXDURE/
	0313-0019		FIXED, INCL. ITEM 17, $\varnothing 20.9 \times 15$ mm	AISI 316
	0313-0031		CLOSED, $\varnothing 20.9 \times 14$ mm	AISI 316
	0313-0045		CLOSED + FIXED, INCL. ITEM 17, $\varnothing 20.9 \times 14$ mm	AISI 316
3	0409-0026	1	CAP, MAGNET, $\varnothing 22.6/\varnothing 34 \times 21$ mm	AISI 316
5		1	O-RING, ID 25.07 x $\varnothing 2.62$ mm	
	0630-3120		STANDARD	VITON
	0630-4120		OPTIONAL	VITON/PFA
	0630-9120		OPTIONAL	KALREZ
6	0302-0228	1	COVER, FRONT, INCLUDING 1xITEM 11, $\varnothing 98 \times 20$ mm	DUCTILE IRON
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON
	0401-0439		FLANGE, DIN PN10/16/25/40	
	0401-0440		FLANGE, ANSI CLASS 150RF	
	0401-0441		FLANGE, ANSI CLASS 300RF	
	0401-0583		FLANGE, JIS 5K	
	0401-0442		FLANGE, JIS 10/16/20K	
8		2	O-RING, ID 59.99 x $\varnothing 2.62$ mm	
	0630-3142		STANDARD	VITON
	0630-4142		OPTIONAL	VITON/PFA
	0630-9142		OPTIONAL	KALREZ
9	0302-0229	1	COVER, BACK, INCLUDING 1xITEM 11, $\varnothing 98 \times 20$ mm	DUCTILE IRON
10	0732-0670	4	BOLT, HEX. HEAD. M6 x 70 mm, DIN 931	STEEL 8.8
11	0604-0017	2	BEARING, NEEDLE, $\varnothing 12 \times$ ID 6 x 10 mm	STEEL
12		1	ROTOR, ASSY, $\varnothing 42/6 \times 76$ mm	DUCTILE IRON/
	0303-0132		STANDARD, FLOW DIRECTION LEFT TO RIGHT	STEEL, HRD.
	0303-0134		STANDARD, FLOW DIRECTION RIGHT TO LEFT	
	0303-0022		OVERSIZED, FLOW DIRECTION LEFT TO RIGHT	
	0303-0023		OVERSIZED, FLOW DIRECTION RIGHT TO LEFT	
13		4	VANE, 33.6 x 13 x 5 mm	CARBON
	0405-0031		STANDARD	
	0405-0050		OVERSIZED	
	0405-0179		BI-DIRECTIONAL	
14	0404-0136	2	ROD, VANE, $\varnothing 3 \times 21$ mm	AISI 316, HRD.
16	0705-0612	4	PIN, DOWEL, D=6m6, L=12 mm, DIN 6325	STEEL, HRD.
17	1731-0306	1	SCREW, HEX. SOCKET SET, M3 x 6 mm, DIN 916, ONLY FOR FIXED MAGNET ASSY	AISI 316
19	0436-0112	2	PIN, ECCENTRIC, $\varnothing 8 \times 5.3 \times 15$ mm	AISI 316

SPARE PARTS METER WITH STANDARD VANES	VAF No.	DRAWING No.	ITEM No.				
			5	8	11	13	14
2 YEARS WITH VITON O-RINGS	0390-0813	0801-1294-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA O-RINGS	0390-0814	0801-1294-4	1x	2x	--	2x	1x
2 YEARS WITH KALREZ O-RINGS	0390-0905	0801-1294-4	1x	2x	--	2x	1x
5 YEARS WITH VITON O-RINGS	0390-0815	-----	1x	2x	2x	4x	2x

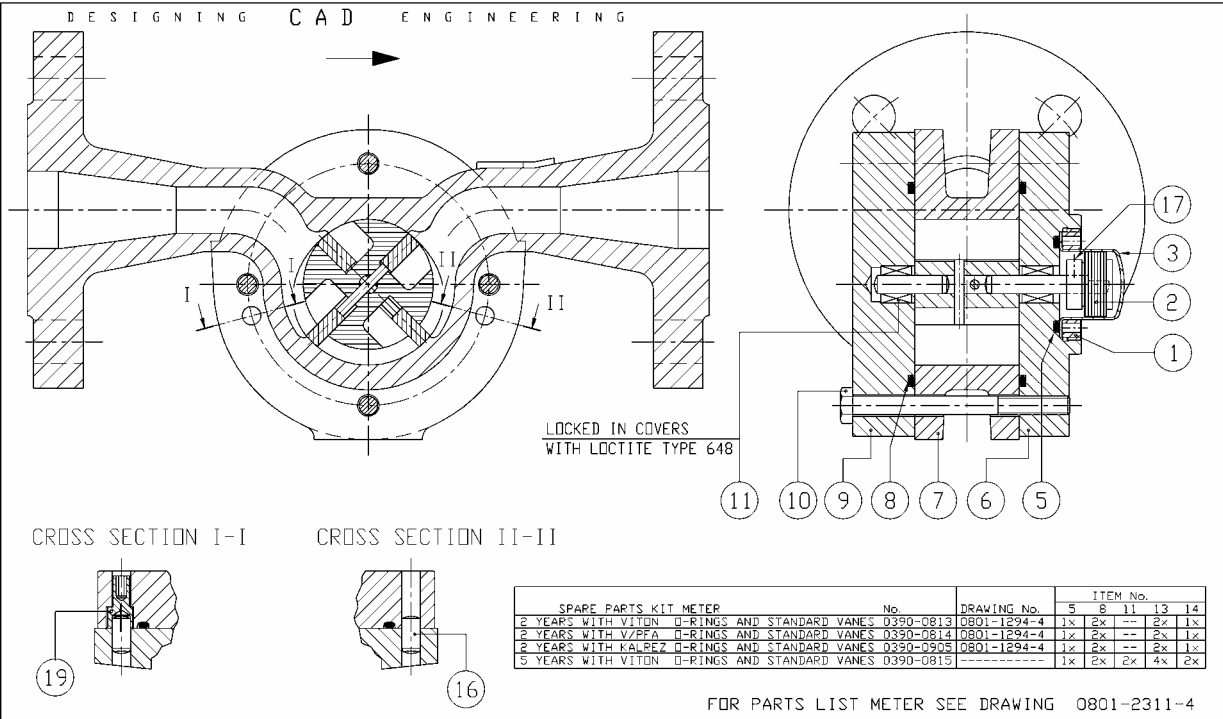
ASSEMBLY METER SEE DRAWING 0801-1344-3

DATE	:19-09-1997	 VAF INSTRUMENTS Dordrecht, The Netherlands
DRAWN	:J.Vollebregt	
CHECKED	: BV	
MATERIAL	:DUCTILE IRON	

PARTS LIST		0801-2310-4	REV. No.
B	ITEM 17 AND 23-10-03 BV		A
B	0313-0019/0045 ADDED		
A	REDRAWN IN AUTOCAD 07-01-02 JV		

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REVISIONS



SPARE PARTS KIT METER		No.	DRAWING No.	ITEM No.				
				5	6	11	13	14
2 YEARS WITH VITON O-RINGS AND STANDARD VANES	D390-0813	0801-1294-4	1x	2x	--	2x	1x	1x
2 YEARS WITH V/PEA O-RINGS AND STANDARD VANES	D390-0814	0801-1294-4	1x	2x	--	2x	1x	1x
2 YEARS WITH KALPEZ O-RINGS AND STANDARD VANES	D390-0905	0801-1294-4	1x	2x	--	2x	1x	1x
5 YEARS WITH VITON O-RINGS AND STANDARD VANES	D390-0815	-----	1x	2x	2x	4x	2x	

FOR PARTS LIST METER SEE DRAWING 0801-2311-4

METER WITH	DIMENSIONAL DRAWING	PARTS LIST	EXT. CONN. DIAGRAM
N-COUNTER	0801-3126-3	-----	-----
PULSE TRANSMITTER IN N-COUNTER	0801-3126-3	-----	0830-2013/4-4
FLOWCOUNT E200	0801-1081-3	0830-1231-3	0830-2011-4
PULSE TRANSMITTER BOX N=1 ... 25		0879-1202-3	0830-2007-4
PULSE TRANSMITTER BOX N=50		0879-1215-3	0830-2007-4
PULSE DISCRIMINATOR BOX N=1 ... 25	0801-1161-3	0879-1204-3	0830-2008-4
PULSE DISCRIMINATOR BOX N=50		0879-1219-3	0830-2008-4
INCREMENTAL PULSE TRANSM. BOX(OLD) N=100/250/500		0879-1211-3	0830-2008-4
INCREMENTAL PULSE TRANSM. BOX(NEW) N=100/250/500		0897-1223-3	0830-2008-4
MAGNETIC PULSE TRANSMITTER BOX	0801-1160-3	0890-1207-3	0801-8052-4


DATE	19-09-1997	 VAF INSTRUMENTS Hardrecht, The Netherlands	REVISIONS
DRAWN	B. T.		CHECKED
MATERIAL	INCLITE IRON	SEMI MAT.	NO.
B TABLE AND ITEM 17 ADDED 23-10-03 BV A N-COUNTER WAS B-COUNTER 17-12-97 CS		DIMENSIONS IN mm 25 mm A B	No. A B
METER B5023D DN15 PN40 WITH FLANGES		0801-1345-3 PART OF	
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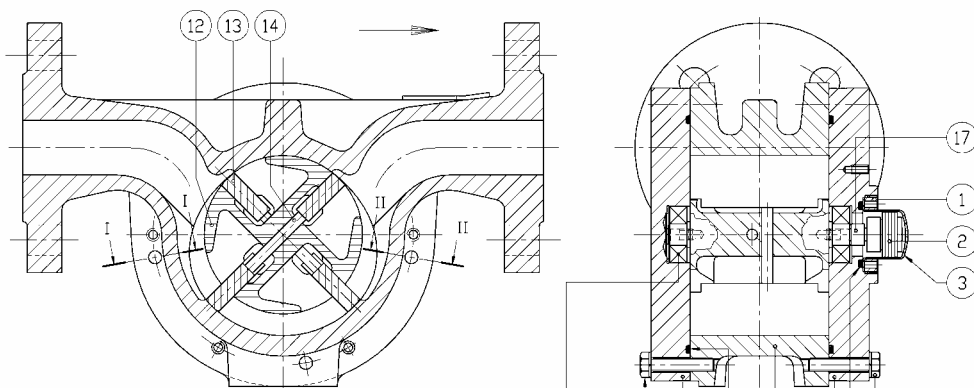
DESIGNING CAD ENGINEERING

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL
1	0417-0005	1	NUT, MAGNET CAP M36x1.5, ID 22.8x6mm	AISI 316
2		1	ASSY, MAGNET	
	0313-0004		STANDARD, $\varnothing 20.9 \times 15$ mm	FERROXDURE/
	0313-0019		FIXED, INCL. ITEM 17, $\varnothing 20.9 \times 15$ mm	AISI 316
	0313-0031		CLOSED, $\varnothing 20.9 \times 14$ mm	AISI 316
	0313-0045		CLOSED + FIXED, INCL. ITEM 17, $\varnothing 20.9 \times 14$ mm	AISI 316
3	0409-0026	1	CAP, MAGNET, $\varnothing 22.6/\varnothing 34 \times 21$ mm	AISI 316
5		1	O-RING, ID 25.07 x $\varnothing 2.62$ mm	
	0630-3120		STANDARD	VITON
	0630-4120		OPTIONAL	VITON/PFA
	0630-9120		OPTIONAL	KALREZ
6	0302-0228	1	COVER, FRONT, INCLUDING 1xITEM 11, $\varnothing 98 \times 20$ mm	DUCTILE IRON
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON
	0401-0544		FLANGE, DIN PN10/16/25/40	
	0401-0545		FLANGE, ANSI CLASS 150RF	
	0401-0546		FLANGE, ANSI CLASS 300RF	
	0401-0584		FLANGE, JIS 5K	
	0401-0547		FLANGE, JIS 10/16/20K	
	0401-0633		FLANGE, DIN PN10/16/25/40 DIN 2512	
8		2	O-RING, ID 59.99 x $\varnothing 2.62$ mm	
	0630-3142		STANDARD	VITON
	0630-4142		OPTIONAL	VITON/PFA
	0630-9142		OPTIONAL	KALREZ
9	0302-0229	1	COVER, BACK, INCLUDING 1xITEM 11, $\varnothing 98 \times 20$ mm	DUCTILE IRON
10	0732-0670	4	BOLT, HEX, HEAD. M6 x 70 mm, DIN 931	STEEL 8.8
11	0604-0017	2	BEARING, NEEDLE, OD 12 x ID 6 x 10 mm	STEEL
12		1	ROTOR, ASSY, OD 42/6 x 76 mm	DUCTILE IRON/
	0303-0132		STANDARD, FLOW DIRECTION LEFT TO RIGHT	STEEL, HRD.
	0303-0134		STANDARD, FLOW DIRECTION RIGHT TO LEFT	
	0303-0022		OVERSIZED, FLOW DIRECTION LEFT TO RIGHT	
	0303-0023		OVERSIZED, FLOW DIRECTION RIGHT TO LEFT	
13		4	VANE, 33.6 x 13 x 5 mm	CARBON
	0405-0031		STANDARD	
	0405-0050		OVERSIZED	
	0405-0179		BI-DIRECTIONAL	
14	0404-0136	2	ROD, VANE, $\varnothing 3 \times 21$ mm	AISI 316, HRD.
16	0705-0612	4	PIN, DOWEL, D=6m6, L=12 mm, DIN 6325	STEEL, HRD.
17	1731-0306	1	SCREW, HEX. SOCKET SET, M3 x 6 mm, DIN 916, ONLY FOR FIXED MAGNET ASSY	AISI 316
19	0436-0112	2	PIN, ECCENTRIC, $\varnothing 8 \times 5.3 \times 15$ mm	AISI 316

SPARE PARTS METER WITH STANDARD VANES	VAF No.	DRAWING No.	ITEM No.				
			5	8	11	13	14
2 YEARS WITH VITON O-RINGS	0390-0813	0801-1294-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA O-RINGS	0390-0814	0801-1294-4	1x	2x	--	2x	1x
2 YEARS WITH KALREZ O-RINGS	0390-0905	0801-1294-4	1x	2x	--	2x	1x
5 YEARS WITH VITON O-RINGS	0390-0815	-----	1x	2x	2x	4x	2x

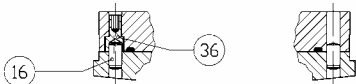
ASSEMBLY METER SEE DRAWING 0801-1345-3

			DATE : 19-09-1997	 Dordrecht, The Netherlands
			DRAWN : J.Vollebregt	
			CHECKED : BV	
			MATERIAL : DUCTILE IRON	
			PARTS LIST	
B	ITEM 17 AND	23-10-03	BV	0801-2311-4 REV. No. A B
B	0313-0019/0045 ADDED			
A	REDRAWN IN AUTOCAD	07-01-02	JV	
No.	DESCRIPTION	DATE	PAR	THIS CONFIDENTIAL DOCUMENT IS THE SOLE PROPERTY OF VAF INSTRUMENTS IT MUST NOT BE REPRODUCED IN ANY MATERIAL FORM, OR ITS CONTENTS DIVULGED TO A THIRD PARTY WITHOUT PRIOR WRITTEN AUTHORIZATION.
REVISIONS				



PARTS LIST METER B5025C DN25 PN25 DUCTILE IRON 0801-2237-4
 J1025NC DN25 PN25 STEEL 0801-2239-4
 B5040C DN40 PN25 DUCTILE IRON 0801-2247-4
 J1040NC DN40 PN25 STEEL 0801-2249-4

CROSS SECTION I-I CROSS SECTION II-II



SPARE PARTS KIT METER		No.	DRAWING No.	ITEM No.			
2 YEARS WITH VITON O-RINGS & STANDARD VANES	0390-1121	0801-1335-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA O-RINGS & STANDARD VANES	0390-1131	0801-1351-4	1x	2x	--	2x	1x
5 YEARS WITH VITON O-RINGS & STANDARD VANES + STANDARD BEARINGS	0390-1122	-----	1x	2x	2x	4x	2x
HIGH TEMP BEARINGS	0390-1250	-----	1x	2x	2x	4x	2x
ONLY VITON O-RINGS	0390-1206	0801-1361-4	1x	2x	--	--	--

DIMENSIONAL DRAWING METER WITH	B5025C J1025NC	B5040C J1040C
N-COUNTER	0801-3117-3	0801-3118-3
ELECTRONIC COUNTER TYPE FLOWCOUNT E200	0801-3130-3	0801-3131-3
INDUCTIVE/INCREMENTAL PULSE TRANSMITTER BOX	0801-3133-3	0801-3134-3

DATE	19-03-1997	 Dordrecht, The Netherlands 25 mm DIMENSIONS IN mm	REV. No. A B C
DRAWN	M.MEIJM		
CHECKED	BV	PART OF	
MATERIAL	SEMI MAT.	0801-1334-3	
C 0390-1250 ADDED	27-09-06 WR	ASSEMBLY DRAWING	
B 0390-1206 AND	03-10-03 MM	VANEMETER	
B 0801-1361-4 ADDED		B5025C / B5040C	
A B...C WAS B...B	25-05-98 PB	J1025NC / J1040NC	
A J1025NC / J1040NC ADDED		PART OF	
No.	DESCRIPTION	DATE	PAR
REVISIONS			


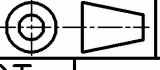
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D E S I G N I N G C A D E N G I N E E R I N G

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL
1	0417-0005	1	NUT, RING, M36x1.5 x ID 22.8 x 6 mm	AISI 316
2	0313-0004	1	ASSY, MAGNET	
	0313-0031		STANDARD, OD 20.9 x 15 mm CLOSED, OD 20.9 x 10 mm	AISI 316/FERROXDURE AISI 316
3	0409-0026	1	CAP, MAGNET, OD 22.6/34 x 21 mm	AISI 316
4	0733-0630	6	SCREW, HEX. HEAD, M6 x 30 mm, DIN 933	STEEL 8.8
4A	0718-0600	6	SPRING WASHER M6, DIN 127	SPRING STEEL
5		1	O-RING, ID 25.07 x Ø2.62 mm	
	0630-3120			VITON
	0630-4120			VITON/PFA
	0630-9120			KALREZ
6	0402-0566	1	COVER, FRONT, Ø135 x 22.5 mm	DUCTILE IRON
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON
	0401-0559		FLANGE, DIN PN6	
	0401-0057		FLANGE, DIN 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		2	O-RING,	
	0630-3155		ID 101.27 x Ø2.62 mm	VITON
	0630-4902		ID 104.30 x Ø2.62 mm	VITON/PFA
	0630-9155		ID 101.27 x Ø2.62 mm	KALREZ
9	0402-0567	1	COVER, BACK, Ø135 x 18 mm	DUCTILE IRON
10	0733-0630	6	SCREW, HEX. HEAD, M6 x 30 mm, DIN 933	STEEL 8.8
10A	0718-0600	6	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
	0601-6000		OVERSIZED	STEEL
	1601-6000		STAINLESS STEEL	STAINLESS STEEL
	4601-6000		SYNTHETIC CAGE	STEEL
12		1	ROTOR, OD 73/10 x 64/84 mm	DUCTILE IRON
	0403-0138		STANDARD	
	0403-0001		OVERSIZED	
13		4	VANE, 64 x 24 x 8 mm	CARBON
	0405-0029		STANDARD	
	0405-0041		OVERSIZED	
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.
17		1	SHAFT, MAGNET, OD 10 / M5x0.5 L=33.5 mm	STEEL
	0404-0412		FLOW DIRECTION LEFT TO RIGHT	
	0404-0413		FLOW DIRECTION RIGHT TO LEFT	
36	0436-0112	2	PIN, ECCENTRIC OD 8/5.3 x 17 mm	AISI 316

SPARE PARTS KIT METER		No.	DRAWING No.	ITEM No.				
				5	8	11	13	14
2 YEARS WITH VITON O-RINGS + STANDARD VANES		0390-1121	0801-1335-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA O-RINGS + STANDARD VANES		0390-1131	0801-1351-4	1x	2x	--	2x	1x
5 YEARS WITH V/PFA O-RINGS + STANDARD VANES + STANDARD BEARINGS		0390-1122	-----	1x	2x	2x	4x	2x
ONLY VITON O-RINGS		0390-1206	0801-1361-4	1x	2x	--	--	--

ASSEMBLY DRAWING 0801-1334-3



		DATE : 02-04-1997		 VAF INSTRUMENTS Dordrecht, The Netherlands			
		DRAWN : M.MOM					
		CHECKED : BV					
		MATERIAL : DUCTILE IRON				REV. No.	
		SEMI MAT. :					
A	0390-1131/1206 ADDED	19-11-03	MM	PARTS LIST METER B5025C DN25 PN25		0801-2237-4	
A	B5025C WAS B5025B						
A	PN25 WAS PN20						
A	ITEM 17 MATERIAL						
A	WAS AISI 316			PART OF			
No.	DESCRIPTION	DATE	PAR	THIS CONFIDENTIAL DOCUMENT IS THE SOLE PROPERTY OF VAF INSTRUMENTS IT MUST NOT BE REPRODUCED IN ANY MATERIAL FORM, OR ITS CONTENTS DIVULGED TO A THIRD PARTY WITHOUT PRIOR WRITTEN AUTHORIZATION.			
REVISIONS							

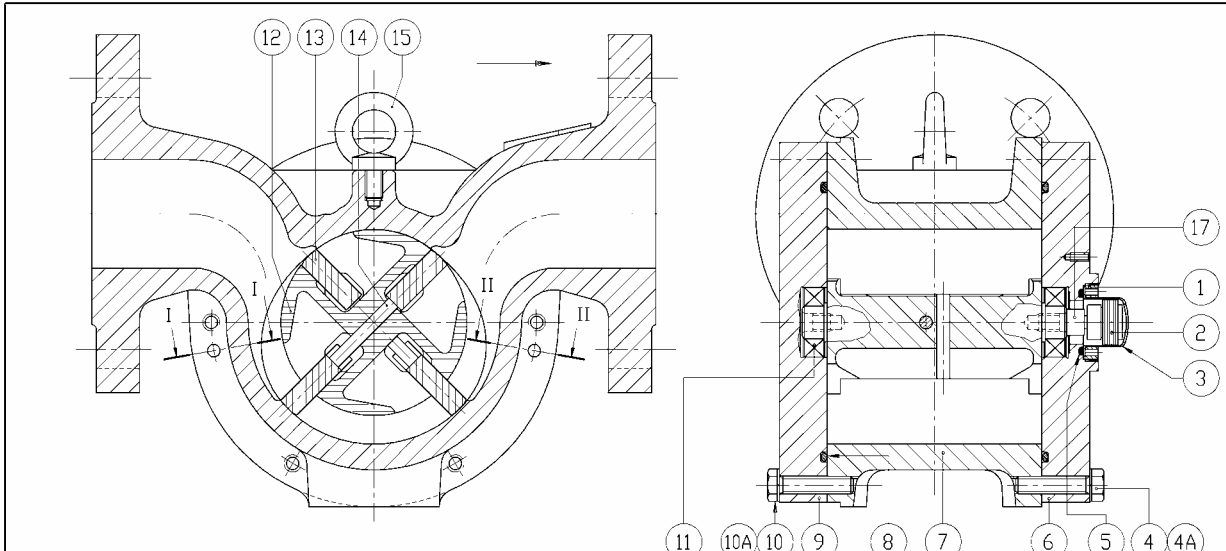
D E S I G N I N G C A D E N G I N E E R I N G

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL
1	0417-0005	1	NUT, RING, M36x1.5 x ID 22.8 x 6 mm	AISI 316
2	0313-0004	1	ASSY, MAGNET	
			STANDARD, OD 20.9 x 15 mm	AISI 316/FERROXDURE
	0313-0031		CLOSED, OD 20.9 x 10 mm	AISI 316
3	0409-0026	1	CAP, MAGNET, OD 22.6/34 x 21 mm	AISI 316
4	0733-0630	6	SCREW, HEX. HEAD, M6 x 30 mm, DIN 933	STEEL 8.8
4A	0718-0600	6	SPRING WASHER M6, DIN 127	SPRING STEEL
5		1	O-RING, ID 25.07 x Ø2.62 mm	
	0630-3120			VITON
	0630-4120			VITON/PFA
	0630-9120			KALREZ
6	0402-0566	1	COVER, FRONT, Ø135 x 22.5 mm	DUCTILE IRON
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON
	0401-0352		FLANGE, DIN 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		2	O-RING,	
	0630-3155		ID 101.27 x Ø2.62 mm	VITON
	0630-4902		ID 104.30 x Ø2.62 mm	VITON/PFA
	0630-9155		ID 101.27 x Ø2.62 mm	KALREZ
9	0402-0567	1	COVER, BACK, Ø135 x 18 mm	DUCTILE IRON
10	0733-0630	6	SCREW, HEX. HEAD, M6 x 30 mm, DIN 933	STEEL 8.8
10A	0718-0600	6	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
	0601-6000		OVERSIZED	STEEL
	1601-6000		STAINLESS STEEL	STAINLESS STEEL
	4601-6000		SYNTHETIC CAGE	STEEL
12		1	ROTOR, OD 73/10 x 64/84 mm	DUCTILE IRON
	0403-0138		STANDARD	
	0403-0001		OVERSIZED	
13		4	VANE, 64 x 24 x 8 mm	CARBON
	0405-0029		STANDARD	
	0405-0041		OVERSIZED	
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.
17		1	SHAFT, MAGNET, OD 10 / M5x0.5 L=33.5 mm	STEEL
	0404-0412		FLOW DIRECTION LEFT TO RIGHT	
	0404-0413		FLOW DIRECTION RIGHT TO LEFT	
36	0436-0112	2	PIN, ECCENTRIC OD 8/5.3 x 15 mm	AISI 316

SPARE PARTS KIT METER	No.	DRAWING No.	ITEM No.				
			5	8	11	13	14
2 YEARS WITH VITON O-RINGS + STANDARD VANES	0390-1121	0801-1335-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA O-RINGS + STANDARD VANES	0390-1131	0801-1351-4	1x	2x	--	2x	1x
5 YEARS WITH V/PFA O-RINGS + STANDARD VANES + STANDARD BEARINGS	0390-1122	-----	1x	2x	2x	4x	2x
ONLY VITON O-RINGS	0390-1206	0801-1361-4	1x	2x	--	--	--

ASSEMBLY DRAWING 0801-1334-3

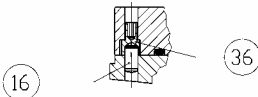
		DATE : 02-04-1997	 VAF INSTRUMENTS Dordrecht, The Netherlands			
		DRAWN : M.MOM				
		CHECKED : BV				
		MATERIAL : DUCTILE IRON			REV. No.	
B	0390-1131/1206 ADDED	19-11-03	MM			
B	B5040C WAS B5040B					
B	PN25 WAS PN20					
A	ITEM 17 MATERIAL	27-10-97	BV			
A	WAS AISI 316					
No.	DESCRIPTION	DATE	PAR			
REVISIONS						
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PARTS LIST METER B5050C DUCTILE IRON 0801-2258-4
 B1050C STEEL 0801-2260-4

CROSS SECTION I-I

CROSS SECTION II-II



DIMENSIONAL DRAWING METER WITH
 N-COUNTER 0801-3122-3
 ELECTRONIC COUNTER TYPE FLOWCOUNT E200 0801-3132-3
 INDUCTIVE/INCREMENTAL PULSE TRANSMITTER BOX 0801-3135-3

SPARE PARTS KIT METER		No.	DRAWING No.	ITEM No.			
2 YEARS WITH VITON O-RINGS & STANDARD VANES	0390-1129	0801-1341-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA O-RINGS & STANDARD VANES	0390-1133	0801-1353-4	1x	2x	--	2x	1x
5 YEARS WITH VITON O-RINGS & STANDARD VANES + STANDARD BEARINGS	0390-1130	-----	1x	2x	2x	4x	2x
HIGH TEMP BEARINGS	0390-1251	-----	1x	2x	2x	4x	2x
ONLY VITON O-RINGS	0390-1207	0801-1362-4	1x	2x	--	--	--


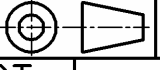
DATE	05-09-1997	 Dordrecht, The Netherlands 25 mm DIMENSIONS IN mm	REV.	No.
DRAWN	M.M.EJM		REV.	A B C
CHECKED	BV	0801-1339-3		
MATERIAL		PART OF		
SEMI MAT.		0801-1339-3		
C 0390-1251 ADDED	27-09-06 WR	ASSEMBLY DRAWING		
B 0390-1207 AND	03-10-03 MM	METER		
B 0801-1362-4 ADDED		B5050C/J1050NC		
A J1050NC ADDED	25-05-98 PB	DN50 PN25		
REVISIONS		THIS CONFIDENTIAL DOCUMENT IS THE SOLE PROPERTY OF WAF INSTRUMENTS IT MUST NOT BE REPRODUCED IN ANY MANNER, EVEN FOR ITS CONTENTS DIVULGED TO A THIRD PARTY WITHOUT PRIOR WRITTEN AUTHORIZATION.		

DESIGNING CAD ENGINEERING

ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL
1	0417-0005	1	NUT, RING, M36x1.5 x ID 22.8 x 6 mm	AISI 316
2	0313-0004	1	ASSY, MAGNET	
	0313-0031		STANDARD, OD 20.9 x 15 mm CLOSED, OD 20.9 x 10 mm	AISI 316/FERROXDURE AISI 316
3	0409-0026	1	CAP, MAGNET, OD 22.6/34 x 21 mm	AISI 316
4	0733-0835	6	SCREW, HEX. HEAD, M8 x 35 mm, DIN 933	STEEL 8.8
4A	0718-0800	6	SPRING WASHER M8, DIN 127	SPRING STEEL
5		1	O-RING, ID 25.07 x Ø2.62 mm	
	0630-3120			VITON
	0630-4120			VITON/PFA
	0630-9120			KALREZ
6	0402-0573	1	COVER, FRONT, Ø166 x 26 mm	DUCTILE IRON
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON
	0401-0393		FLANGE, DIN 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		2	O-RING,	
	0630-3248		ID 120.24 x Ø3.53 mm	VITON
	0630-4911		ID 121.80 x Ø3.53 mm	VITON/PFA
	0630-9248		ID 120.24 x Ø3.53 mm	KALREZ
9	0402-0574	1	COVER, BACK, Ø166 x 22 mm	DUCTILE IRON
10	0733-0835	6	SCREW, HEX. HEAD, M8 x 35 mm, DIN 933	STEEL 8.8
10A	0718-0800	6	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
	0601-6002		OVERSIZED	STEEL
	1601-6002		STAINLESS STEEL	STAINLESS STEEL
	4601-6002		SYNTHETIC CAGE	STEEL
12		1	ROTOR, OD 86/15 x 99/122 mm	DUCTILE IRON
	0403-0139		STANDARD	
	0403-0002		OVERSIZED	
13		4	VANE, 99 x 30 x 10 mm	CARBON
	0405-0030		STANDARD	
	0405-0042		OVERSIZED	
14	0404-0127	2	ROD, VANE Ø6 x 39 mm	AISI 316, HRD.
15	0799-0079	1	EYE-BOLT, M8, DIN 580	STEEL
16	0705-0612	4	PIN, DOWEL, Ø6x6 x 12 mm, DIN 6325	STEEL, HRD.
17		1	SHAFT, MAGNET, OD 12/M8x0.75 L=37.5 mm	STEEL
	0404-0424		FLOW DIRECTION LEFT TO RIGHT	
	0404-0425		FLOW DIRECTION RIGHT TO LEFT	
36	0436-0112	2	PIN, ECCENTRIC OD 8/5.3 x 15 mm	AISI 316

SPARE PARTS KIT METER			ITEM No.				
No.	DRAWING No.		5	8	11	13	14
2 YEARS WITH VITON O-RINGS + STANDARD VANES	0390-1129	0801-1341-4	1x	2x	--	2x	1x
2 YEARS WITH V/PFA O-RINGS + STANDARD VANES	0390-1133	0801-1353-4	1x	2x	--	2x	1x
5 YEARS WITH V/PFA O-RINGS + STANDARD VANES + STANDARD BEARINGS	0390-1130	-----	1x	2x	2x	4x	2x
ONLY VITON O-RINGS	0390-1207	0801-1362-4	1x	2x	--	--	--

ASSEMBLY DRAWING 0801-1339-3

DATE : 05-09-1997			VAF INSTRUMENTS	
DRAWN : M.MOM			Dordrecht, The Netherlands	
CHECKED : BV				
MATERIAL : DUCTILE IRON			REV. No.	
SEMI MAT. :				
PARTS LIST		0801-2258-4		A
METER B5050C		PART OF		
DN50 PN25				
A	0390-1133/1207 ADDED	19-11-03	MM	
No.	DESCRIPTION	DATE	PAR	
REVISIONS				
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18. ABBREVIATIONS

19. SPARE PARTS

Contact VAF Instruments or local agent for spare parts for flowmeter type ProFlow.

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 1106:

- Instruction dismantling/re-assembling added
- Dimensional drawings and parts lists added
- New photos added

Revision 1206:

Figure 18 corrected

Revision 0608:

Recommendation added in chapter 8.1.



VAF Instruments B.V.
Vierlinghstraat 24, NL-3316 EL Dordrecht
P.O.Box 40, NL-3300 AA Dordrecht
The Netherlands
Telephone: +31 78 618 3100
Fax: +31 78 617 7068
Internet: www.vaf.nl or www.vaf.eu
E-mail: sales@vaf.nl



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