Technical Manual

VAF INSTRUMENTS

Instructions for installation,
operation and maintenance

145

PROFLOW

Series “J” Vane meter

Valid for Flowmeters with serial numbers 708851 and higher

Publication nr. TIB-145-GB-0317
Supersedes TIB-145-GB-0916

CONTENTS

1 PREFACE

1.1 GENERAL

This manual contains instructions for installation, operation and maintenance (IOM) of the VAF Instruments model series “J” ProFlow liquid flowmeters, with connection sizes DN15(½”) to DN50(2”).
For IOM information of associated equipment supplied by VAF Instruments, refer to the separate manual supplied with those products.
This manual contains important information for the installer, the operator and for your maintenance department.

Never use the equipment outside its specifications or beyond common engineering practice nor use the equipment for other applications or make connections to other equipment than explicitly described in the order acknowledgement and/or technical manuals of VAF Instruments.

CAUTION:
TO ENSURE SAFE AND CORRECT INSTALLATION AND HANDLING, OPERATION AND MAINTAINING, READ THIS MANUAL COMPLETELY BEFORE INSTALLING THE EQUIPMENT AND STARTING OPERATIONS.

For any additional information contact:

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

Or your local authorized VAF Instruments dealer.
Their addresses can be found on www.vaf.nl

1.2 SYMBOLS

The following symbols 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, E-COUNTER OR PULSE BOX MAY RESULT IF THESE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.

AN EXPLANATION OR INFORMATION OF INTEREST

1.3 COPYRIGHT

2 PRODUCT DESCRIPTION

VAF Instruments ProFlow positive displacement sliding vane type liquid flowmeters are used in continuous metering applications of oil-like liquids, especially for accurate measurement of fuel oil consumption.
The read out of the flowmeter can be with an E-counter ór with a pulse box.
The 7-digit E-counter can display a resettable total, a non-resettable accumulated total and flowrate.
The E-counter can be equipped with an optional pulse output.
The pulse box can be inductive type ór incremental type and has no local readout.

2.1 PRINCIPLE OF OPERATION

The ProFlow series flowmeters operate on the sliding vane principle. The flowmeter consists of a specially shaped housing in which a rotor can rotate freely. Two pairs of vanes are placed 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 constant seal between the inlet and the outlet of the flowmeter.
The incoming liquid forces the rotor to rotate. A magnet transmits the rotor rotations from the measuring chamber to a built-on E-counter ór pulse box.
An electric pulse output can be installed on the E-counter as option for remote totalising or flow data processing.

NOTE:
The ProFlow series flowmeters are subject to P.E.D.
(Pressure Equipment Directive) cat 3.3.

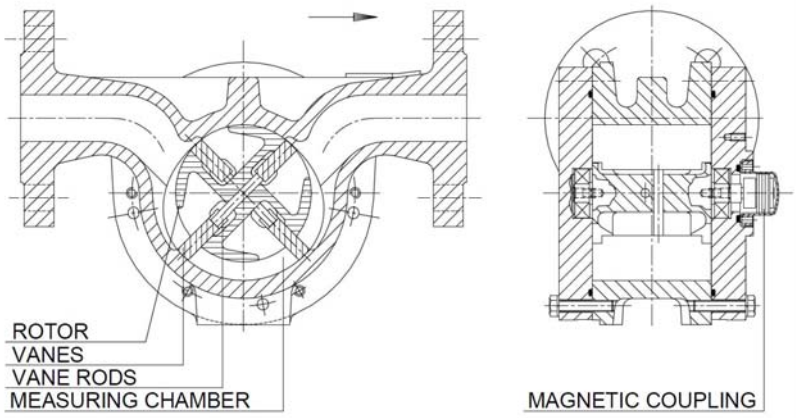


Figure 1 – Sectional view of a VAF Instruments ProFlow sliding vane type liquid flowmeter

2.2 LIQUID FILTER

The liquid to be measured must be clean and free from air, gas or dirt or solid particles.
Since solid particles may cause excessive wear of the flowmeter and its components it is highly recommended to install a VAF Instruments liquid filter with a mesh width of 0.05 mm (280 mesh) at the inlet of the flowmeter.
If necessary also install a suitable deaerator. Refer to product bulletin 302 for more information.

NOTE:
VAF Instruments cannot be held responsible for any damage to flowmeters and accessories caused by dirt or foreign particles in the process liquid.

3 TECHNICAL SPECIFICATION

3.1 GENERAL FLOWMETER SPECIFICATIONS

Basic model number	**J5015E**	**J5023E**	**J5025E**	**J5040E**	**J5050E**
Connection size, DN [mm]	15 mm (½ “)	25 mm (1”)	25 mm (1”)	40 mm (1½”)	50 mm (2”)
Capacity [l/min]	See graphs				
Maximum, 8 hrs/day discontinuous	50	50	160	250	500
Maximum, continuous	37.5	37.5	120	187.5	375
Displaced volume per revolution [litre]	0.025	0.025	0.167	0.167	0.4
Measuring accuracy					
Range 1 : 10 [1]	0.2%				
Range 1 : 20 [2]	0.3%				
Repeatability	Better than ± 0.05%				
Required starting pressure [kPa (bar)]	3 (0.03)				
Materials					
body, flanges, covers and rotor	ductile iron				
Vanes	carbon				
O-rings	viton A				
Body pressure rating [kPa (bar)]	4000 (40)		2500 (25)		
Available flanges					
DIN PN (bar) raised face or with groove acc. DIN 2512N	6, 10, 16, 25, 40		6, 10, 16, 25		
ANSI RF	150, 300				
JIS K	5, 10, 16, 20				
Liquid temperature range standard	-10ºC to 125ºC				-10ºC to 125ºC
On application	-10ºC to 180ºC				-10ºC to 160ºC
E-counter [3]	7 digit resettable totalizer				
Smallest readout unit	0,001 litre				
Optional pulse transmitter for E-counter	1 scalable pulse output – open collector NPN				
Pulse transmitter box [3]	Inductive type or Incremental type				
Inductive pulse transmitter	Transmitter for low frequency pulse generation. Pulse output 1 or 2 NAMUR (DIN19234) transmitters.				
Incremental pulse encoder	Encoder for high frequency pulse generation, with pulse discriminator. Open collector NPN or active pulse output.				
Weigtht without counter [kg]	5	7	12	14	22
Notes: [1] Standard factory calibration. [2] Calibration on request. [3] E-counter ór Pulse transmitter box.					

Table 1 – General flowmeter specifications

3.1.1 Flowrate – pressure drop viscosity relation

To approximate the pressure drop in relation to flowrate and viscosity of the liquids, the graphs as shown in Figure 66, Figure 67 and Figure 68 must be used.

NOTE:
The data in these graphs only refer to standard flowmeters used on Newtonian liquids. When viscosities higher than shown in the graphs are applicable VAF Instruments should be consulted.

3.1.2 Specific Flowmeter specifications

The technical specification of a specific flowmeter can be found on the instrument text plate which is fitted to the back cover of the flowmeter.

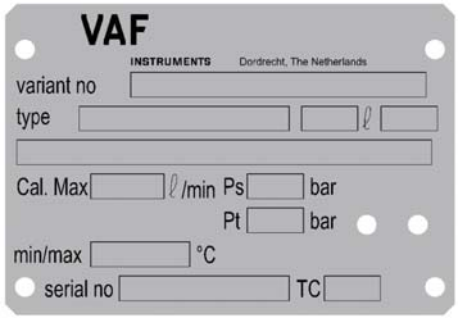


Figure 2 – Text plate

3.2 FLOWMETER WITH E-COUNTER

The flow meter can be equipped with only an E-counter ór with a puls transmitter box.

Operation	
Display	7 digit LCD display
Operator keypad	2 keys
Physical	
Size	85 x 85 x 60 mm
Weight	0.17 kg approx. (unpacked)
Cover material	Polycarbonate
Case material	Polysulfone
Electrical	
Power supply	Lithium Thionyl Chloride battery, 3.6 V, Size AA, 85°C
Battery lifetime	Up to 5 years
Enviromental	
Operating ambient temperature range	0 to 60 °C
Operating humidity range	5 to 95 %RH (non-condensing)
Enclosure sealing	IP65
EMC **Emissions & immunity**	Meets requirements of: • EN 55016-2-3 (2010) + A1 (2010) + C1 (2013) • EN 61000-4-2 (2009) • EN 61000-4-4 (2012) • EN 61000-4-6 (2009)
Vibration	Meets requirements of: EN 61000-4-4 (2012)IEC 60945:2002 Maritime navigation and radio communication equipment and system – General requirements – Method of vibration testing according to § 8.7.2
Pulse output (optional)	
Number of outputs	1
Type	Open collector NPN
Maximum load	U_{max} 25 V DC, I_{max} 100 mA
Range	1 to 9.999 pulse per unit
Maximum frequency pulse output	100 Hz
Pulse width	5, 10, 20, 50, 100, 200, 500 or 1000 ms
Cable gland	1x M12 x 1.5 mm, Ø3.5-7 mm
Maximum cable length	100m / AWG-24 and 100KOhm pull up resistor

Table 2 – E-counter specifications

3.2.1 Optional pulse output E-Counter

The E-counter can be equipped with an pulse output. For the pulse output specifications see Table 2. For electrical connections please refer to section 6.4.1.
The number of generated output pulses per unit is marked on the text plate of the flowmeter.

NOTE:
Use of the pulse output may reduce battery lifetime.

3.3 FLOWMETER WITH PULSE TRANSMITTER BOX

The flow meter can be equipped with only an E-counter ór with a puls transmitter box.

The pulse transmitter box can be of inductive type or incremental type.

3.3.1 Inductive pulse transmitter

- Installed in the pulse transmitter box to the flowmeter
- Transmitter for low frequency pulse generation
- 1 or 2 passive proximity switches according DIN 19234 (NAMUR)

Supply voltage	8.2 VDC
Max. operating temperature	75ºC
Protection class	IP55
Intrinsically safe	In accordance with PTB No. 99 ATEX 2219X and CENELEC Ex ia IIC T6...T4, if used with suitable zener-barrier

Table 3 – Inductive pulse transmitter

3.3.2 Incremental pulse encoder

- Installed in the pulse transmitter box to the flowmeter
- Encoder for high frequency pulse generation
- Includes a pulse discriminator for optimal accuracy

Supply voltage	12-35 VDC
Max frequency	5 kHz
Max. operating temperature	55ºC
Protection class	IP55

Table 4 – Incremental pulse encoder

3.3.3 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. See Figure 107.
Consult VAF Instruments if further information on zener-barriers is required.

3.4 PULSE DISCRIMINATOR

The pulse discriminator is housed in the pulse transmitter box of a non-indicating flowmeter. The discriminator is used in situations where, as a result of vibrations or pulsations in the liquid piping, it is possible for the flowmeter 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 flowmeter, 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.

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 PG13,5
Max. operating temperature	55ºC
Type output signal	Open collector NPN or active pulse
Max. load output signal	I_{max} 100mA, U_{max} 35 VDC
Protection class	IP55, DIN40050
Approved	CE

Table 5 – Technical specifications of the pulse discriminator

4 SAFETY INSTRUCTIONS

4.1 SAFETY PRECAUTIONS

All precautions have been taken to ensure, in so far as reasonable practical, that the equipment has been designed and constructed to be safe and without risk to health or the environment when properly used.
Provided that the recommendations contained in this manual are carefully adhered to, no circumstances are foreseen where the equipment will present a health or safety hazard.

To ensure the safety of personnel, equipment and the environment:

- Always follow the safety, installation, repair and maintenance recommendations in this manual.
- Always observe warning labels on containers and packages.
- All personnel who installs, operates, repairs or maintains the equipment should read this manual completely and make themselves acquainted with the equipment before installing, operating, repairing or maintaining the equipment.
- Make sure that all safety requirements are met before installing, operating, repairing or maintaining the equipment.
- Always use personal protective means when necessary especially when working with hot, aggressive and toxic process liquids.
- Always use the right tools for the job.
- If the flowmeter is fitted with a lifting eye, use it when moving the flowmeter.
- Make sure that all equipment is isolated from the electrical supplies and process lines before installing, repairing or maintaining the equipment.
- Never assemble or disassemble electrical equipment with power switched ON.
- Always handle printed circuit boards with CMOS components according to the correct procedures for such components, to prevent any damage due to electrostatic discharges.
- Only use cleaning solvents in a well ventilated area.
- Avoid breathing fumes.
- Keep away from open fire.
- Do not use solvents on plastic components or parts.

CAUTION:
THE BODY AND FLANGES OF THE FLOWMETER WILL BE THE SAME TEMPERATURE AS THE PROCESS LIQUID. TAKE PROPER MEASURES TO AVOID PERSONAL INJURY FROM TOUCHING A HOT OR COLD FLOWMETER.

CAUTION:
SOME CALIBRATION FLUID Q8 INDUCO 4 (Q8 PUCCINI 4P) MAY BE LEFT BEHIND IN THE FLOWMETER.
Q8 INDUCO 4 (Q8 PUCCINI 4P) IS A REFINED MINERAL OIL,
EG NO. 265-158-7,
CAS NO. 64742-55-8.

5 UNPACKING

- The flowmeter is a precision instrument and should be treated with care.
- Let the equipment acclimatize inside the closed box for at least one hour at the location where the flowmeter will be installed.
- When the flowmeter is taken out of the box, please leave the special protection supplied with the equipment as long as possible in place to avoid any damage.
- The two yellow protection caps on the in and outlet of the flowmeter should be left in place as long as possible to avoid dirt and foreign particles from entering the flowmeter.
- Be careful not to put any force on the E-counter or pulse box.
- Disposal of the packing material should be done according to local laws or regulations, or according to the rules that are applicable on the vessel.

Details of the flowmeter

Maximum weight (unpacked):

Model No	Approx. net weight [kg]
J5015E	5
J5023E	7
J5025E	12
J5040E	14
J5050E	22

Maximum dimensions:

Model No	W x H x D [mm]
J5015E	180 x 121 x 130
J5023E	220 x 137 x 130
J5025E	240 x 173 x 161
J5040E	240 x 173 x 161
J5050E	260 x 218 x 203

Weight and dimensions depending on flange rating

Figure 3 – Flowmeter with E-counter

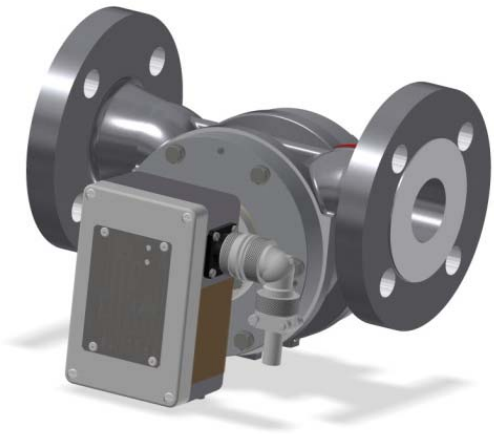


Figure 4 – Flowmeter with pulse box

6 INSTALLATION

6.1 BEFORE INSTALLING THE FLOWMETER

1. Identify the flowmeter by comparing the type number on the text plate with the description on the packing list.
2. Record the data of the text plate and document this information properly together with the installation location and drawings of the process piping.
3. Ensure that the flowmeter is suitable for your process conditions.

CAUTION:
NEVER EXCEED THE CAPACITY, TEMPERATURE AND PRESSURE LIMITS SPECIFIED ON THE TEXTPLATE OF THE FLOWMETER.
CONSULT VAF INSTRUMENTS IF THE FLOWMETER MUST BE USED FOR A DIFFERENT PROCESS LIQUID THAN ORIGINALLY ORDERED.

6.2 SYSTEM LAYOUT RECOMMENDATIONS

6.2.1 Flowmeter supports

The flowmeter must never be used to support the piping or other system components.
Suitable pipe brackets at each side of flowmeter, as shown in Figure 5 should be used.
Either the flowmeter must be supported by the process piping, or both the pipeline and the flowmeter must be supported.

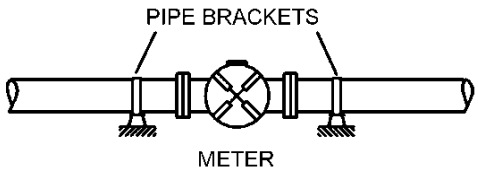


Figure 5 – Pipe brackets for supporting the flowmeter

NOTE:
The flowmeter should be accessible from all sides for easy inspection and servicing.

6.2.2 Liquid filter

The liquid to be measured must be clean and free from air, gas or dirt or solid particles.
Since solid particles may cause excessive wear of the flowmeter and its components, it is highly recommended to install a VAF Instruments liquid filter with a mesh width of 0.05 mm (280 mesh) at the inlet of the flowmeter.

6.2.3 Deaerator

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

6.2.4 Pulsation damper

To ensure trouble free operation of the instrument excessive pressure pulsations in the process liquid have to be avoided. When excessive pressure pulsations are present it is highly recommended to install a proper pulsation damper.

6.2.5 Vibrations

To ensure trouble free operation of the instrument, excessive vibrations have to be avoided. When excessive vibrations are present it is highly recommended to ensure decoupling from the source.

6.2.6 Preventing the flowmeter from emptying

To prevent the flowmeter from emptying or siphoning a back-pressure downstream of the flowmeter has to be maintained, so that it always remains full of liquid. This can be achieved by raising the pipeline downstream of the flowmeter, as shown in Figure 6 or by installing a back-pressure valve or by another suitable method.

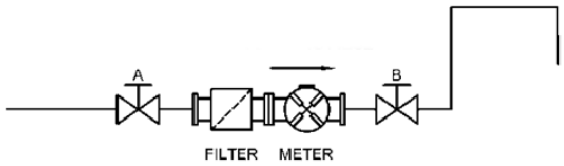


Figure 6 – Raising the pipeline to prevent emptying

6.2.7 Bypass piping arrangement

To insure that the flowmeter can be serviced without interrupting the flow in the system, it is highly recommended to install a bypass with manual block valves, as shown in Figure 7.

.

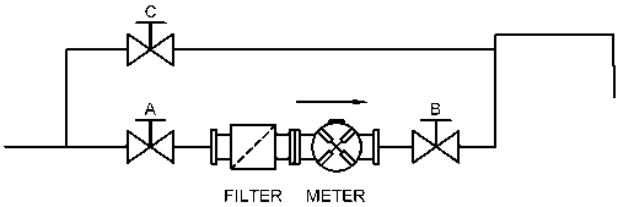


Figure 7 – Bypass piping arrangement

NOTE:
A bypass may not be allowed when the flowmeter is used for custody transfer purposes.

CAUTION:
DO NOT INSULATE OR TRACE THE HOLDER AND ELECTRONIC COUNTER

6.3 INSTALLING THE FLOWMETER

SAFETY PRECAUTIONS:
MAKE SURE THAT ALL SAFETY REQUIREMENTS AS DESCRIBED IN SECTION 4.1 ARE MET BEFORE ANY WORK IS COMMENCED.

NOTE:
A VAF flowmeter is a precision instrument. Handle it with care.

To correctly install the flowmeter follow the procedure below.

1. Remove the two yellow protection caps from the in and outlet of the flowmeter just before installation.

CAUTION:
SOME CALIBRATION FLUID Q8 INDUCO 4 (Q8 PUCCINI 4P) MAY BE LEFT BEHIND IN THE FLOWMETER.
Q8 INDUCO 4 (Q8 PUCCINI 4P) IS A REFINED MINERAL OIL,
EG NO. 265-158-7,
CAS NO. 64742-55-8.

2. Inspect the flanges on both the flowmeter and the process piping.
   Check for tool marks, dents, scratches or corrosion. Look for pitting and any other defects which would make sealing impossible. Any repairs must be made before bolting.

3. Inspect the gasket. Verify to be sure the gasket is of the proper material and style. Look for defects or damage.

4. Inspect and clean the bolts, nuts and washers. Verify to be sure they are of the specified material.

5. Lubricate the bolt threads and the nut contact surfaces.
   The use of an anti-seize compound should be considered to facilitate subsequent disassembly.

6. Centre the gasket on the flange. This is extremely vital when raised faced flanges are used.

7. Install the flowmeter in the process piping in accordance with the relevant position from Figure 8.

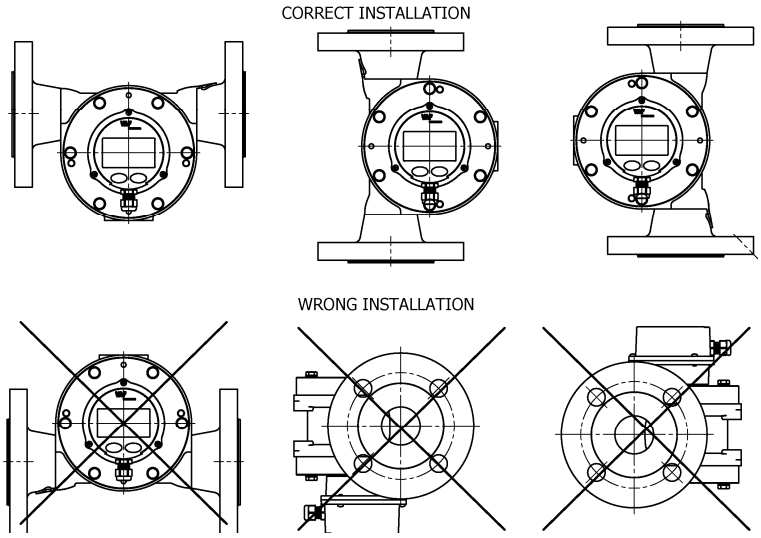


Figure 8 – Mounting position

NOTE:

- The back cover of the flowmeter must always be in vertical position.
- An arrow on the flowmeter body indicates the direction of the flow.
- The E-counter may be turned 90° to facilitate reading.
- Do not mount any object onto the flowmeter body.

8. Tighten the bolts approximately 30% to the final torque following the sequence shown in Figure 9 and Figure 10.
   If the correct tightening sequence is not followed, the flanges can be misaligned, making it impossible to have uniform seating of the gasket.

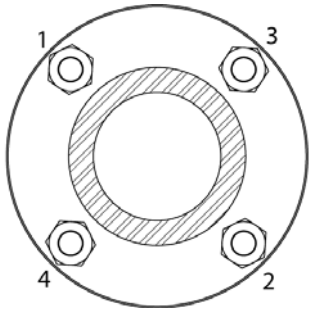


Figure 9 – Bolt tightening sequence for flanges using 4 bolts

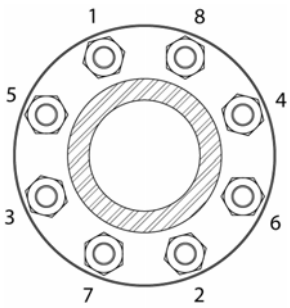


Figure 10 – Bolt tightening sequence for flanges using 8 bolts

9. Repeat step 8, elevating the torque to 50 to 60 percent of the final torque.

10. Continue tightening in the recommended sequence until the final torque value is reached. Each bolt normally has to be tightened more than once.

11. All gaskets relax after seating. Retightening is recommended 24 hours after installation to compensate for the relaxation. On high-pressure or high-temperature applications, it is recommended that the flanges be re-torqued to the required stress after 24 hours at operating pressure and temperatures to compensate for any relaxation.

6.4 ELECTRICAL CONNECTIONS

The flow meter can be equipped with only an E-counter ór with a puls transmitter box.

6.4.1 E-counter - pulse output connection

The electrical connection of the optional E-counter pulse output is shown in below Figure 11.
For led-counter and relay connections please refer to connection diagrams from Figure 101 through Figure 105.

For electrical connections between the E-counter and associated electronic processing instrumentation, reference is made to the separate technical manuals supplied with these electronic instruments.

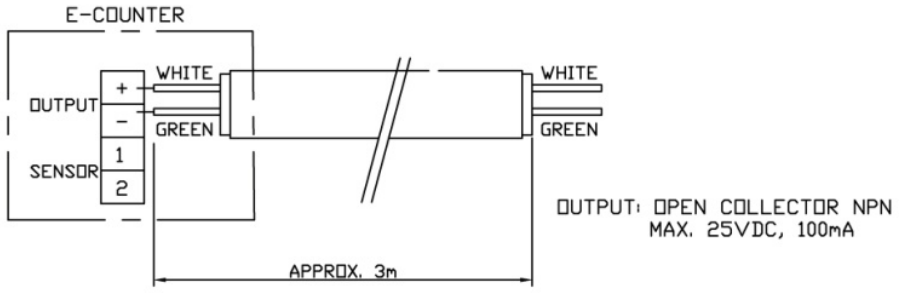


Figure 11 – Connection diagram E-counter (0830-2017)

6.4.2 E-counter - connection cable

The cable on the E-counter is screened to prevent false pulses being introduced by external electromagnetic interference.
On the inside of the E-counter this screening is properly finished.
On the inside of the connected instrument the screen must be connected to the IE (Instrument Earth) or PE (Protective Earth).
If no IE or PE terminal is available the screening must be connected to the ground terminal of the pulse input.
The maximum allowed cable length is 100m with a wire size of 0,5mm^2. With this length a 100kΩ pull up resistor at the connected device input is needed.

6.4.3 Pulse transmitter box - output connection

The electrical connections of the pulse transmitter are as shown in Figure 106 through Figure 109.

For electrical connections between the pulse transmitter box and associated electronic processing instrumentation, reference is made to the separate technical manuals supplied of these electronic instruments.

When using the pulse discriminator the output can be open collector NPN ór active pulse.
In case active pulse is required Rx and Zd need to be placed. Please refer to below Figure 12 and Table 6.

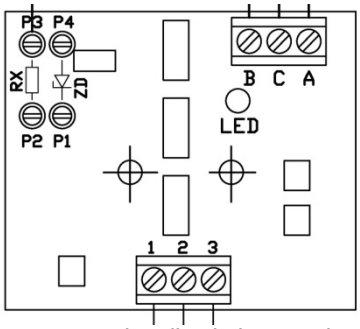


Figure 12 – Pulse discriminator print

Pulse output	**Resistor (Rx)**	**Zener diode (Zx)**
Open collector NPN	-	-
5 V pulse	2k4*	4V7 – 0,4W
12 V pulse	1k4*	12V – 0,4W
*supply voltage 24 VDC		
$Resistor\ Rx = \frac{supply\ voltage - desired\ pulse\ voltage}{0{,}008}$		

Table 6 – Calculation of the load resistor (Rx) and the zenerdiode (Zd)

6.4.4 Pulse transmitter box - connection cable

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 size 0,5mm^2. The screen must NOT come into contact with the flowmeter.
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.

7 OPERATING INSTRUCTIONS

7.1 STARTUP PROCEDURES

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

1. Remove the filter element of liquid filter installed on the inlet side of the flowmeter.
2. Remove the flowmeter from the piping system and replace it with a flushing pipe piece.
3. Flush the entire piping system to ensure that all dirt and other foreign matter, that could damage the flowmeter, has been removed.

CAUTION:

- DO NOT FLUSH DUCTILE IRON AND STEEL FLOWMETERS WITH WATER.
- NEVER EXCEED MAXIMUM FLOWRATE (CAL_{MAX}, ON THE TEXTPLATE OF THE FLOWMETER).
- WHEN RESTARTING 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 SERIOUSLY DAMAGING THE FLOWMETER.

7.1.1 Initial start up of a flowmeter system with bypass piping arrangement

1. Close valves A, B and C, as shown in Figure 13.
2. Remove the flushing pipe piece and reinstall the flowmeter and filter element.
3. Slowly open bypass valve C completely.
4. Start the pump and/or open the storage tank valve.
5. Open valve A slightly (5-10%).
6. Slowly open valve B. Depending on the internal resistance in the system, the flowmeter may start running. If it does, limit the flowrate to approximately 20% of its maximum capacity.
7. Slowly close bypass valve C until the 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.
8. Slowly open valve A, and if necessary also valve B, completely.
9. Slowly close valve C completely.

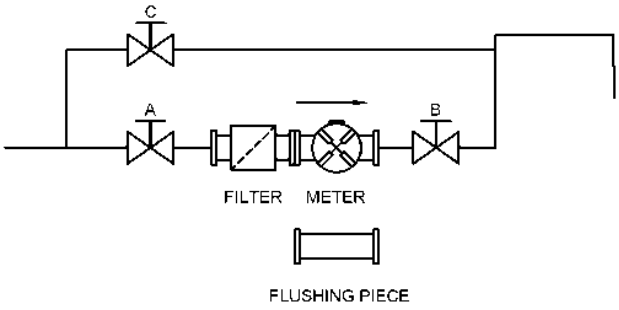


Figure 13 – Flowmeter setup with bypass piping arrangement and flushing piece

7.1.2 Initial start-up of a flowmeter system without bypass piping arrangement

1. Close valves A and B, as shown in Figure 14.
2. Remove the flushing pipe piece and reinstall the flowmeter and filter element.
3. Start the pump and/or open the storage tank valve.
4. Open valve A slightly (5-10%).
5. Slowly open valve B until the 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 B completely.
7. Slowly open valve A completely.

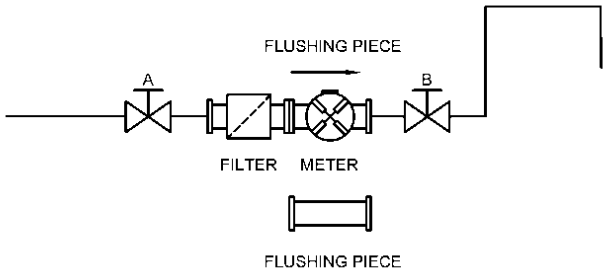


Figure 14 – Flowmeter setup without bypass piping arrangement and flushing piece.

7.2 OPERATION OF THE E-COUNTER

7.2.1 Layout of the E-counter

The E-counter mounted on the flowmeter displays all relevant information such as:

- Total Volume
- Accumulated Total Volume
- Flowrate

For operating the E-counter a select button and clear button are used.

NOTE:
To extend the lifetime of the battery, the display turns blank when no buttons are pushed for over 30 seconds.

Figure 15 – E-counter layout

7.2.2 Basic operation

When one of the buttons is pushed, the display of the E-counter turns on and displays *Total Volume* or *Accumulated Total Volume* (depending on the mode selected) and the current flowrate.

By pressing the select button it is possible to toggle between the amounts shown for *Total Volume* or *Accumulated Total Volume*.
In the left top corner is shown which mode is selected.

When the E-counter is in *Total Volume* mode and the clear button is pressed, the message "`Clear Total`" appears on the display.

To reset the *Total Volume* the clear button has to be pressed for confirmation.

If the select button is pressed the total is not reset.

It is not possible to reset the *Accumulated Total Volume*.

If the flowmeter detects actual flowrate, the flowrate icon in the left lower corner rotates.

7.2.3 Menu layout and setup

The E-counter has a setup menu layout as shown below.

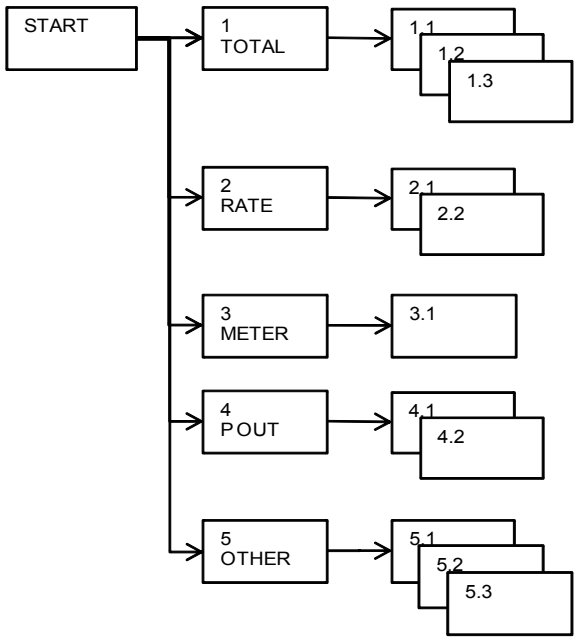


Figure 16 – Menu layout

To enter the setup menu the select button has to be pressed for approximately 7 seconds.

Once the setup menu is entered, it is possible to navigate the different menus by pressing the clear button.

With pressing the select button it is possible to navigate the sub menus.

When a submenu is entered, it is possible to change the settings by first entering the *program-mode*.

To enter the *program-mode*, press the select button and button clear simultaneously for very short period of time.

When the E-counter is in *program-mode*, the PROG icon will flash on the display.

By pressing the select button it is possible to scroll through the preset values and select one of them.

After selecting the appropriate setting, confim this selection by pressing the select button and clear button simultaneously for very short period of time.

The following settings can be made:

Menu	Description	Remark
1.1	Unit for totals and accumulated totals	Determines the measurement unit displayed for both total volume and accumulated total volume. The following units can be selected: l, m³, GAL
1.2	Number of decimals for totals	The decimal point determines the number of digits following the decimal point for total volume. The following can be selected: 0000000 - 111111.1 - 22222.22 - 3333.333
1.3	Number of decimals for accumulated totals	The decimal point determines the number of digits following the decimal point for accumulated total volume. The following can be selected: 0000000 - 111111.1 - 22222.22 - 3333.333

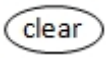
Table 7 – E-counter menu 1

Menu	Description	Remark
2.1	Unit for flowrate	Determines the measurement unit displayed for flowrate. The following units can be selected: l/min, l/h, m³/h, GPM
2.2	Number of decimals for flowrate	The decimal point determines the number of digits following the decimal point for flowrate. The following can be selected: 0000000 - 111111.1 - 22222.22 - 3333.333

Table 8 – E-counter menu 2

To change the K-factor the 

button can be pressed to change the value of a digit.

To select the next digit the 

button must be pressed.

Menu	Description	Remark
3.1	K-factor	With the K-factor, the magnetic pulses of the flowmeter are converted to a quantity. The K-factor is based on the number of magnetic poles generated by the flowmeter per selected measurement unit (SETUP 1.1). The K-factor can be found on the text plate on the back cover of the flowmeter. The following range can be selected: 0.001 - 9,999.999

Table 9 – E-counter menu 3

Menu	Description	Remark
4.1	Witdth	The period time determines the time that the pulse output will be switched; in other words the pulse length. The minimum time between the pulses is as long as the selected period time. The following can be selected: 5 - 10 - 20 - 50 - 100 - 200 - 500 - 1000 ms Note: If the frequency should go out of range e.g. when the flowrate increases, an internal buffer will be used to "store the missed pulses". As soon as the flowrate reduces again, the buffer will be "emptied". It can be that pulses will be missed due to a buffer-overflow, so it is advised to program this setting within its range.
4.2	Amount	According to the measurement unit settings for total volume, a X-number of pulses will be generated every unit. The following range can be selected: 1 - 9,999 pulse/unit

Table 10 – E-counter menu 4

The values in menu 5 are read-only and cannot be changed.

Menu	Description	Remark
5.1	Type	Displays the type of counter
5.2	Software version	Displays the software version
5.3	Serial number	Displays the serial number of the E-counter

Table 11 – E-counter menu 5

To exit *program-mode*, press the select button and clear button simultaneously again for very short period of time.
When no button is pushed for over 20 seconds, the E-counter will automatically exit the *program-mode*.

7.3 EXAMPLE, HOW TO SET THE NUMBER OF DECIMALS TO 1 FOR TOTALS

To change the number of decimals for Totals from 0 to 1, follow the steps below:

1. press the select button for 7 seconds to enter setup.(Total menu 1)
2. press the select button (Total submenu 1.1)
3. press the select button (Total submenu 1.2)
4. press the select button and clear button simultaneously for very short period of time, to enter *program-mode*.
5. press the select button (1 decimal)
6. press the select button and clear button simultaneously for very short period of time, to exit program mode.
7. Press the select button for 7 seconds to exit setup.

8 MAINTENANCE

8.1 GENERAL MAINTENANCE

Under normal operating conditions the flowmeter requires no maintenance other than the periodic accuracy check as described in Section 8.2.

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

8.2 ACCURACY CHECK

The interval for calibration of the flowmeter depends on the nature of the process liquid, the operating conditions, and user requirements due to internal procedures.

For industrial (non-marine) applications this will typically be once per year or once per two years, based on clean and non-abrasive liquids.

9 REPAIR

9.1 REMOVING THE FLOWMETER FROM THE PIPING SYSTEM

SAFETY PRECAUTIONS:
MAKE SURE THAT ALL SAFETY REQUIREMENTS AS DESCRIBED IN SECTION 4.1 ARE MET BEFORE ANY WORK IS COMMENCED.

9.1.1 General procedure

1. Shut off the flow through the flowmeter.
2. Remove any electrical connections from the flowmeter. Record any connections, if necessary.
3. Empty the piping system.
4. Drain the flowmeter, in accordance with Section 9.1.2.
5. Remove the flowmeter from the piping system, as described in Section 9.1.3.

CAUTIONS:
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 OVERSPEED THE FLOWMETER.

9.1.2 Draining the flowmeter

1. De-pressurise the pipe section with the flowmeter.
2. If the flowmeter is fitted with a drain plug, remove the plug to empty the flowmeter. When the flowmeter is not fitted with a drain plug, remove the flowmeter as described in Section 9.1.3.

9.1.3 Removing the flowmeter from the piping system

1. Ensure that flow through the flowmeter has been shut off and that all electric connections have been removed.
2. If the flowmeter is fitted with a lifting eye, use a lifting device to hold flowmeter in position.

CAUTIONS:
ALTHOUGH THE FLOW HAS BEEN SHUT OFF, THE FLOWMETER CAN STILL BE UNDER PRESSURE.
BE CAREFUL WHEN LOOSENING BOLTS ON INLET AND OUTLET FLANGES.

3. Loosen all bolts on both flanges of the flowmeter.
4. Remove half of all bolts and remove the gaskets, using an appropriate flange spreader.
5. Remove all remaining bolts.
6. Remove the flowmeter from the piping system.

CAUTIONS:
WHEN THE FLOWMETER HAS BEEN REMOVED FROM THE PIPING SYSTEM THERE WILL STILL BE SOME LIQUID LEFT IN THE MEASURING CHAMBER.

7. Hold the outlet of the flowmeter in a downward position and let the flowmeter leak out for approximately 10 minutes.
   High viscosity liquids will perhaps require more time. Rinsing the flowmeter with a suitable solvent may be of help.
8. Place the flowmeter on a dry and clean workbench.
9. If the flowmeter must be returned to VAF Instruments or a by VAF Instruments authorized local service agent, follow the instructions in Section 12.

9.2 DISASSEMBLING

The following procedures are recommended if the flowmeter must be disassembled for overhaul or repair.
Certain procedures require the use of special tools. If these tools are not available it is advisable to return the flowmeter to VAF Instruments or a by VAF Instruments authorized local service agent.

For disassembling and reassembling of the flowmeter, E-counter or pulse box the following tools are required:

- Philips head screwdriver PH1
- Slot screwdriver 0.4 x 2.5 mm
- Allen key 3 mm
- Magnet nut wrench, VAF part number 0379-0199
- Allen key 1.5mm (extra short)
- (Socket) spanner 10 mm
- Fine emery cloth, fine sand paper or whetstone
- Feeler gauge 0.02 - 0.12 mm
- Bearing puller
- Bearing mounting tool
- Arbor press
- Torque wrench 1 - 20 Nm, 10 mm

9.2.1 Removing the flowmeter from the piping system

Follow the instructions in Section 9.1.1 through Section 9.1.3.

9.2.2 Removing the E-counter from the flowmeter

1. Unscrew the 3 screws of the E-counter cover, as shown in Figure 17.

CAUTION:
THE COVER AND HOLDER OF THE E-COUNTER ARE CONNECTED WITH WIRING.
TAKE CARE NOT TO DAMAGE THE WIRING.

2. If the E-counter is fitted with the optional pulse output, there is no need to disconnect the cable. Leave the cable connected to the E-counter, as shown in Figure 18.

3. Unscrew the 4 Allen screws from the E-counter holder, as shown in Figure 19, and take off the E-counter holder and gasket.

Figure 17 – Unscrewing the screws of the E-counter cover

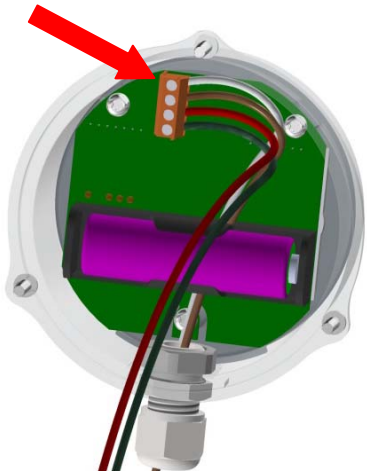


Figure 18 – In case of pulse output, do not disconnect the cable

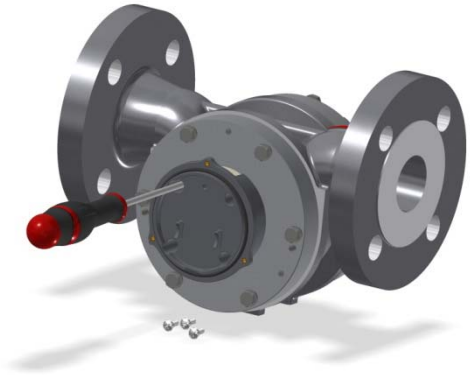


Figure 19 – Unscrewing the bolts of the holder

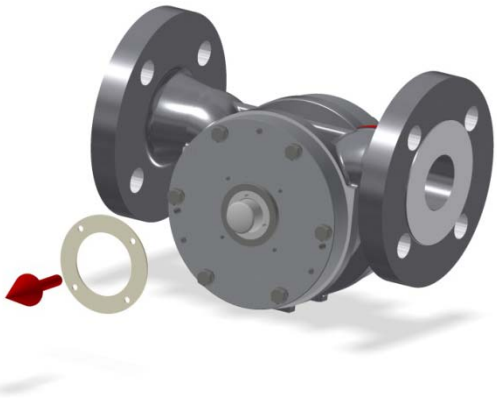


Figure 20 – Taking off the E-counter and gasket

9.2.3 Removing the pulse box from the flowmeter

The pulsebox can be removed by unscrewing the bolts of the holder to the flowmeter.

9.2.4 Removing the magnet cap and J5015E/J5023E magnet

1. Remove the magnet cap as shown in Figure 21, by loosening the nut using the magnet nut wrench (VAF part number 0379-0199).

2. Take of the magnet cap, as shown in Figure 22.

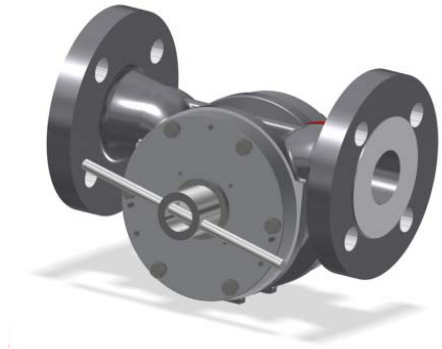


Figure 21 – Loosening the nut of the magnet cap

Figure 22 – Removing the magnet cap

3. Remove the O-ring, as shown in Figure 23.

4. For J5015E and J5023E the magnet needs to be removed first, before the front cover can be removed. Loosen the Allen screw using an appropriate Allen key (Allen key 1.5mm extra short). See Figure 24.

The magnet of the J5025E, J5040E and J5050E flowmeters can not be removed using an Allen screw.
For removing this magnet please refer to section 9.4.2.

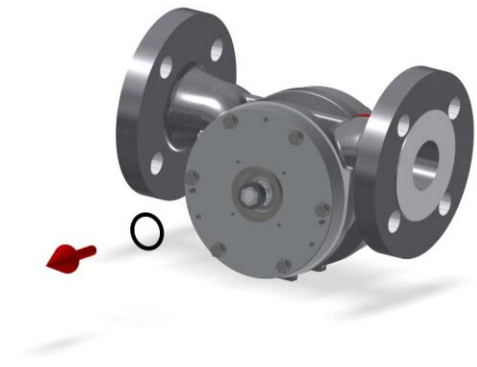


Figure 23 – Remove the O-ring

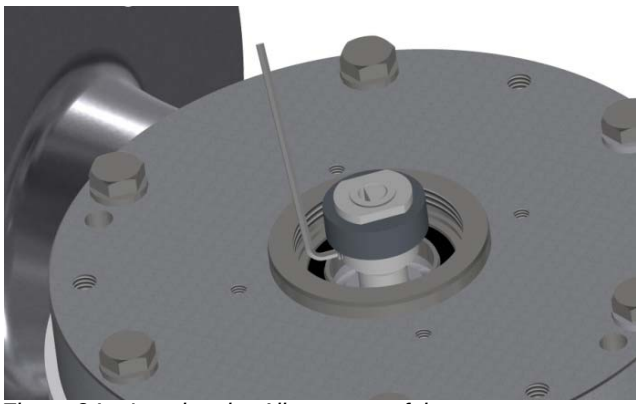


Figure 24 – Loosing the Allen screw of the magnet

9.2.5 Removing the front cover

1. Before disassembling the flowmeter, register the flow direction of the flowmeter. Look from the side where the E-counter was mounted on, for the arrow on the flowmeter indicating the flow direction, as shown in Figure 25 and Figure 26.

NOTE:
The standard flow direction is left to right.

*Figure 25 – Flow direction **left to right** (standard direction)*

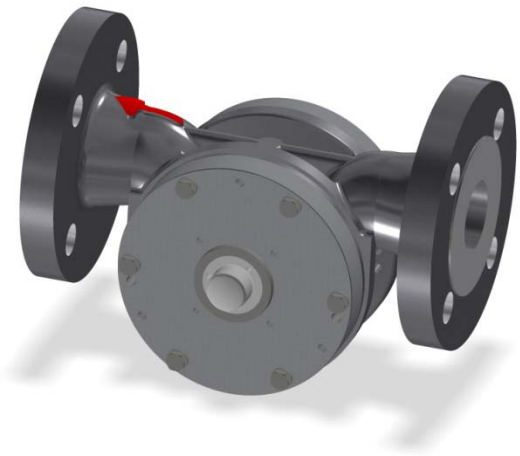


*Figure 26 – Flow direction **right to left***

CAUTION:
Flowmeters J5015E and J5023E the magnet needs to be removed first, before the cover can be removed. See section 9.2.4.
Flowmeters J5025E, J5040E and J5050E the magnet will be removed after removing the rotor. See section 9.4.2.

2. Remove the front cover mounting bolts and lock washers, as shown in Figure 27.

3. Install 2 bolts, which were removed earlier, in the jacking positions of the front cover, as shown in Figure 28.
   Tighten these bolts evenly and alternately until the cover comes free.

Figure 27 – Removing the bolts of the front cover

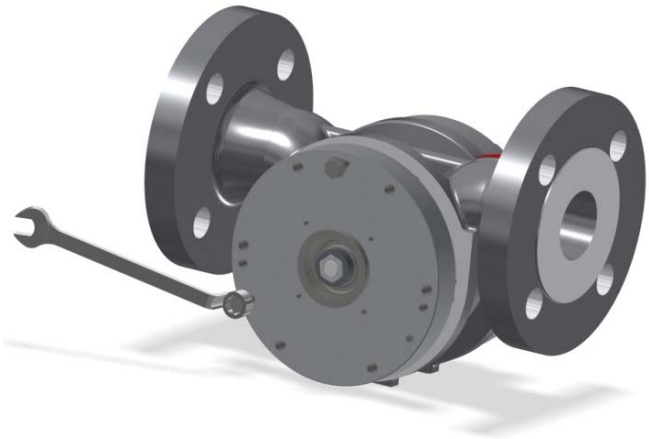


Figure 28 – Jacking up the front cover

4. Ensure that the cover is lifted evenly to prevent the location pins and the magnet from being damaged and take off the cover, as shown in Figure 29.

5. Remove the bolts and the O-ring, as shown in Figure 30.

Figure 29 – Lift off the cover by hand

Figure 30 – O-ring on the front cover

6. Visually inspect the side of the flowmeter housing for damage, caused by the bolts during the jacking of the cover, as shown in Figure 31.
   Remove any surface roughness with a fine emery cloth, fine sand paper or whetstone.

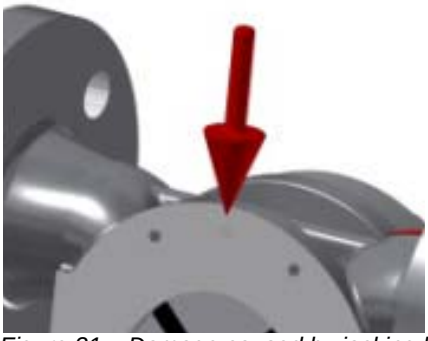


Figure 31 – Damage caused by jacking bolts

9.2.6 Removing the rotor/vanes assembly

1. Record how the vanes are installed in the rotor as indicated in Figure 32.

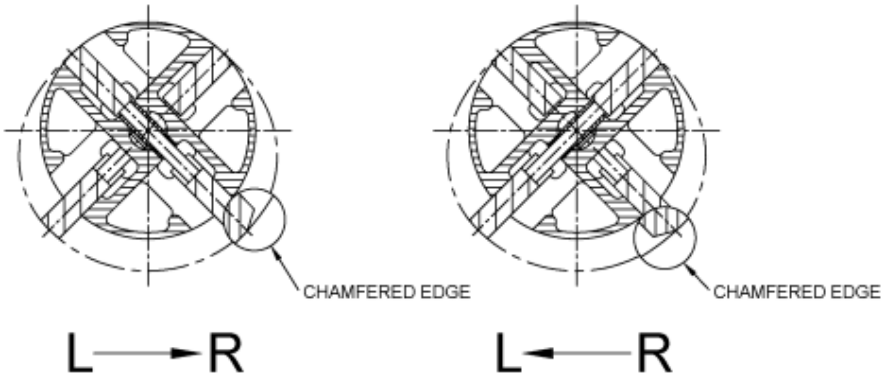


Figure 32 – Chamfered edge of the vanes in relation to the flow direction

2. Take out the vanes, as shown in Figure 33.
   If the vanes appear to be broken, ensure that the vane rods will not scratch the inside of the flowmeter housing, when the rotor is pulled out.

3. Remove the rotor from the housing by gently pulling on the magnet in the direction of the arrow, as shown in Figure 34.

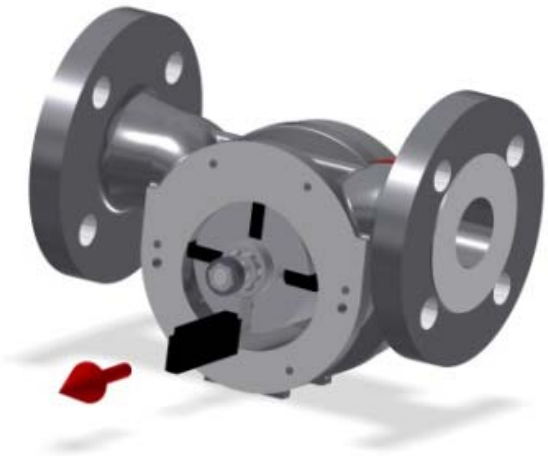


Figure 33 – Taking the vanes out of the housing

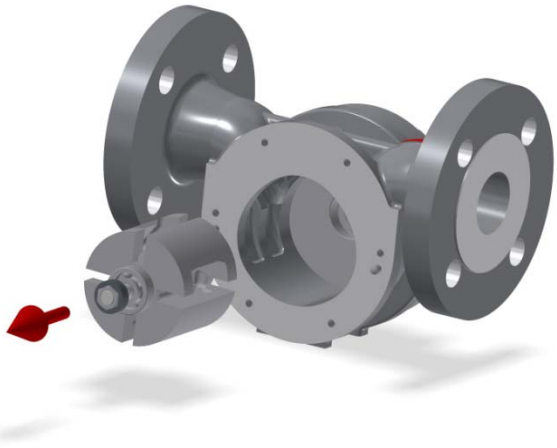


Figure 34 – Removing the rotor

CAUTIONS:
BE CAREFUL NOT TO DROP OR DAMAGE THE FOUR VANES AND THE TWO VANE RODS WHEN REMOVING THE ROTOR FROM THE FLOWMETER HOUSING.

KEEP THE PAIR OF VANES OPPOSITE OF EACH OTHER AND THE VANE ROD AS A SET TOGETHER.

BE CAREFULL NOT TO DAMAGE THE MAGNET BY APPLYING TOO MUCH FORCE WHEN PULLING THE ROTOR OUT OF THE HOUSING.

9.2.7 Removing the back cover

1. Remove the back cover mounting bolts and lock washers, as shown in Figure 35.

2. Install 2 bolts, which were removed earlier, in the jacking positions of the front cover, as shown in Figure 36.
   Tighten these bolts evenly and alternately until the cover comes free.

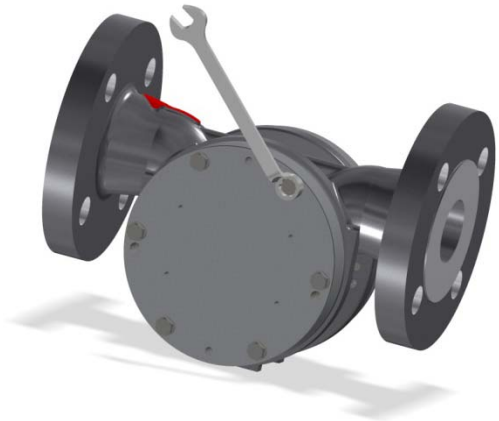


Figure 35 – Removing the bolts of the back cover

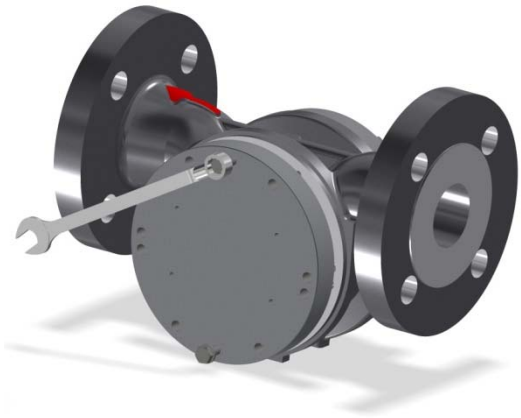


Figure 36 – Jacking up the back cover

3. Ensure that the cover is lifted evenly to prevent the location pins from being damaged.

4. Remove the bolts and the O-ring, as shown in Figure 37.

Figure 37 – O-ring on the back cover

5. Visually inspect the side of the flowmeter housing for damage, caused by the bolts during the jacking of the cover, as shown in Figure 38.
   Remove any surface roughness with a fine emery cloth, fine sand paper or whetstone.

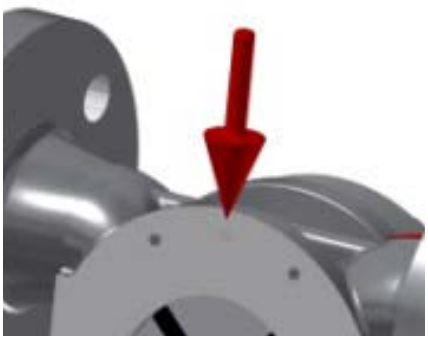


Figure 38 – Damage caused by jacking bolts

9.3 INSPECTION

The following procedures are recommended for inspection of the flowmeter.
Certain procedures require the use of accurate measuring tools. If these tools are not available it is advisable to return the flowmeter to VAF Instruments or a by VAF Instruments authorized local service agent.

NOTE:
Before any visual inspection all parts must be cleaned thoroughly using a suitable cleaning solution.

NOTE:
All parts that do not pass inspection must be replaced.

9.3.1 Inspecting the inside of the magnet cap and the magnet

1. Visually inspect the inner surface of the magnet cap and the outer surface of the magnet for grooves.
2. If any grooves are found, the magnet shaft is probably bent or the bearings are worn out and must be replaced.
3. Also replace the magnet and magnet cap if it is too heavily grooved.

9.3.2 Inspecting the inside surface of the covers

1. Visually inspect the inside surface of both the covers and the bearing cavities for grooves and other signs of wear.
2. If any grooves or signs of wear are found, the bearings or vanes are probably damaged and must be replaced.
3. Replace the cover if it is too heavily grooved or the bearing cavity is worn.

9.3.3 Inspecting the inside of the flowmeter housing

1. Visually inspect the inner surface of the flowmeter housing 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.
2. Grooving caused by coarse particles in the process liquid, or by a vane rod when a vane is broken, will push the material up. Such obstructions may result in uneven running of the flowmeter and/or premature vane wear and effect the performance of the flowmeter.
3. Remove any surface roughness with a fine emery cloth or fine sand paper.

NOTE:
If the inside of the flowmeter was severely scored, no guarantee can be given that after polishing, the flowmeter will still be able to operate within its specified limits of accuracy.

9.3.4 Inspecting the rotor and vanes

1. Visually inspect the vanes for chipped edges and grooves, replace the vanes if necessary.
2. Place the vane in the vane slot and measure the height of the vane in relation to the outside diameter of the rotor. If height of the vane(s) is less than the height of the rotor, the vane(s) need to be replaced.
3. Measure the clearance between the vane and the vane slot using a feeler gauge, as shown in Figure 39 or Figure 40.
   For correct measurements the gauge must be bottomed out in the slot. If the tolerance shown in Table 12 is exceeded, the vane(s) must be replaced.

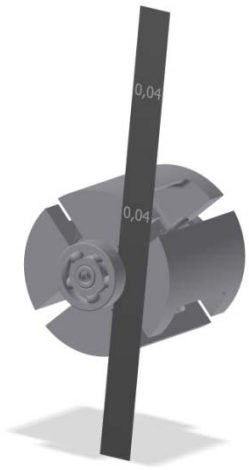


Figure 39 – Measuring the clearance between the vane and the vane slot. (J5015E and J5023E)

Figure 40 – Measuring the clearance between the vane and the vane slot. (J5025E, J5040E and J5050E)

Meter model	Standard vane - slot clearance [mm]
J5015E	0.040 - 0.050
J5023E	0.040 - 0.050
J5025E	0.040 - 0.070
J5040E	0.040 - 0.070
J5050E	0.045 - 0.080

Table 12 – Standard vane - slot clearance

4. Visually inspect the vanes for damage at the side of the rod. Any damage to the vane can cause too much clearance between the vanes and flowmeter housing.
5. Check that the vane rods can slide freely in and out of the rotor. If the rods cannot move freely this may be caused by dirt, worn out bores, bent rods or scored vanes. Any defective parts must be replaced.

9.3.5 Inspecting the rotor shaft and the bearings

1. Visually inspect the bearing cavities in the covers and the rotor shaft for excessive wear or other damage.
2. To examine the condition of a bearing, hold the bearing by the inner ring horizontally in one hand and rotate the outer ring to confirm that it turns smoothly.
3. Examine the condition of following:
    a. the bearing raceways.
    b. external surfaces of the bearing.
    c. the amount of cage wear.
    d. the increase in internal clearance.
4. If a bearing has any of the following defects, the bearing must be replaced:
    a. cracks in the inner or outer rings, rolling elements, or cage.
    b. flaking of the raceway or rolling elements.
    c. significant smearing of the raceway surfaces, ribs, or rolling elements.
    d. significant wear of the cage.
    e. rust or scoring on the raceway surfaces or rolling elements.
    f. significant impact or brinell traces on the raceway surfaces or rolling elements.
    g. significant evidence of creep on the bore or the periphery of the outer ring.
    h. when discoloration by heat is evident.
5. Replace defective bearings in accordance with Section 9.4.2.

9.4 REASSEMBLING THE FLOWMETER

9.4.1 General

- If there is any doubt about the condition of a particular flowmeter part, it should be replaced while the flowmeter is still disassembled. This is more economical than having to disassemble the flowmeter again after a short period of time.
- Once the flowmeter has been disassembled it is recommended that the O-rings for the covers and the O-ring for the magnet cap are replaced.
- Metal and carbon parts must be degreased before reassembly. O-rings should only be wiped dry with a clean cloth.

9.4.2 Replacing a bearing

1. For flowmeters J5015E and J5023E the magnet was already removed before removing the rotor, see section 9.2.4.

2. For flowmeters J5025E, J5040E and J5050E remove the shaft magnet assy by holding the rotor in one hand and using a suitable wrench in the other hand. See Figure 41.
   After removal carefully clean the thread of the shaft magnet assy.

DO NOT CLAMP THE ROTOR IN A WORKBENCH OR PLIERS. ONLY HOLD BY HAND. THIS BECAUSE OF THE POSIBILITY OF DAMAGING THE ROTOR.

THE THREAD OF THE SHAFT MAGNET ASSY CAN BE LEFT OF RIGHT THREADED:
FLOW DIRECTION LEFT-TO-RIGHT → RIGHT THREAD
FLOW DIRECTION RIGHT-TO-LEFT → LEFT THREAD

MAKE A CLEAR NOTE ON WHICH SIDE OF THE ROTOR THE SHAFT MAGNET ASSY IS FITTED.

3. Remove the old bearing from the rotor shaft using a suitable bearing puller, as shown in Figure 42.

NOTE:
Because the distance between the side of the bearing and rotor is rather small (approximately 2 mm), this operation requires a puller with thin blades.

Figure 41 – Removing shaft magnet assy.

Figure 42 – Bearing puller

4. Before mounting the bearing, apply some oil to inside of the inner ring of the bearing and the rotor shaft surface for smooth insertion.

5. Place a mounting tool on the inner ring, as shown in Figure 43.
   The mounting tool must not be placed on the outer ring, since the bearing may be damaged.

Figure 43 – Mounting tool

Figure 44 – Arbor press

6. Slowly press the new bearing vertically onto the rotor shaft using an arbor press, as shown in Figure 44.
   Press until the side of the inner ring rests against the shoulder of the shaft.

7. After mounting the two new bearings, place back the shaft magnet assy for flowmeters J5025E, J5040E and J5050E.
   For securing the shaft use Loctite 648 or other equivalent locking fluid, Figure 41.

DO NOT CLAMP THE ROTOR IN A WORKBENCH OR PLIERS. ONLY HOLD BY HAND. THIS BECAUSE OF THE POSIBILITY OF DAMAGING THE ROTOR.

THE THREAD OF THE SHAFT MAGNET ASSY CAN BE LEFT OF RIGHT THREADED:
FLOW DIRECTION LEFT-TO-RIGHT → RIGHT THREAD
FLOW DIRECTION RIGHT-TO-LEFT → LEFT THREAD

PLACE BACK THE SHAFT MAGNET ASSY ON THE SAME SIDE OF THE ROTOR AS WHEN REMOVED.

9.4.3 Installing the back cover

1. Inspect and clean the bolts and washers.
2. Lubricate the bolt threads and the contact surfaces with an anti seize compound. The use of an anti-seize compound should be considered to facilitate subsequent disassembly.
3. Clean the O-ring groove and install a new O-ring, as shown in Figure 45.
4. Position the back cover over the locating pins on the flowmeter housing.

Figure 45 – O-ring on the back cover

CAUTIONS:
TAKE UTMOST CARE NOT TO DAMAGE THE LOCATING PINS.
ENSURE THAT THE O-RING REMAINS IN PLACE AND IS NOT DAMAGED WHILE TAPPING DOWN THE COVER.

5. Install the cover onto the flowmeter using the bolts and lock washers.
6. Tighten the bolts alternately and evenly to the torque value specified in Table 13.

Meter model	Number of bolts	Torque values [Nm]
J5015E	6x M6	9
J5023E	6x M6	9
J5025E	6x M6	9
J5040E	6x M6	9
J5050E	6x M8	17

Table 13 – Torque for bolts flowmeter cover

9.4.4 Installing the rotor and vanes

CAUTIONS:
WHEN USED VANES ARE REFITTED, MAKE SURE THAT THE PAIR OF VANES OPPOSITE OF EACH OTHER AND THE VANE ROD ARE KEPT TOGETHER AS A SET.

1. To install the rotor, place the two vane rods through the holes in the rotor, as shown in Figure 46.

2. Place the rotor with the vane rods into flowmeter body, with the magnet shaft facing up, as shown in Figure 47.

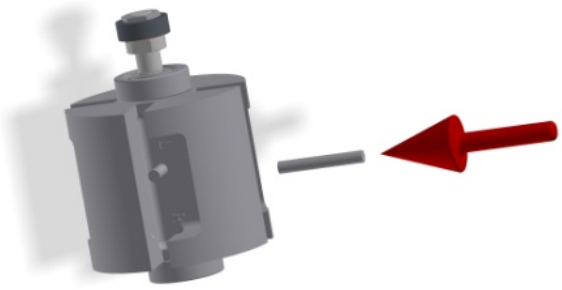


Figure 46 – Installing the vane rods

Figure 47 – Installing the rotor

CAUTIONS:
TAKE UTMOST CARE NOT TO DAMAGE THE BEARING IN THE BACK COVER.

3. Rotate the rotor so that two opposite slots in the rotor are in line with the inlet and outlet of the flowmeter. See Figure 48.

4. Insert the four vanes one by one into the slots of the rotor, starting with the vane nearest to the inlet connection and continue with the opposite vane.
   Next, rotate the rotor ¼ turn and insert the other two vanes in the same order, as shown in Figure 48 and Figure 49.

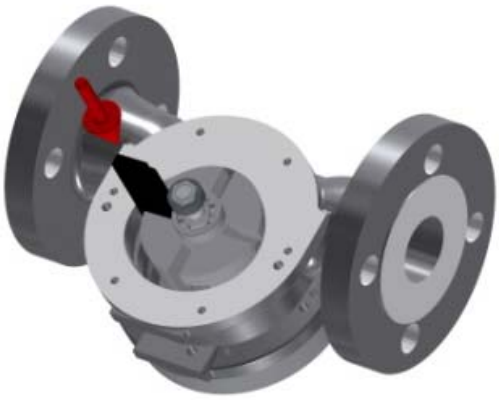


Figure 48 – Installing the first vanes

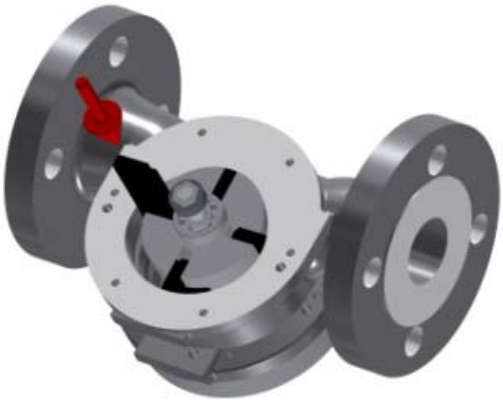


Figure 49 – Installing the last vanes

5. The chamfered edge of each vane must be in the rotating direction of the rotor, as shown in Figure 50.
   The top of the vanes must be flush with the upper surface of the rotor.

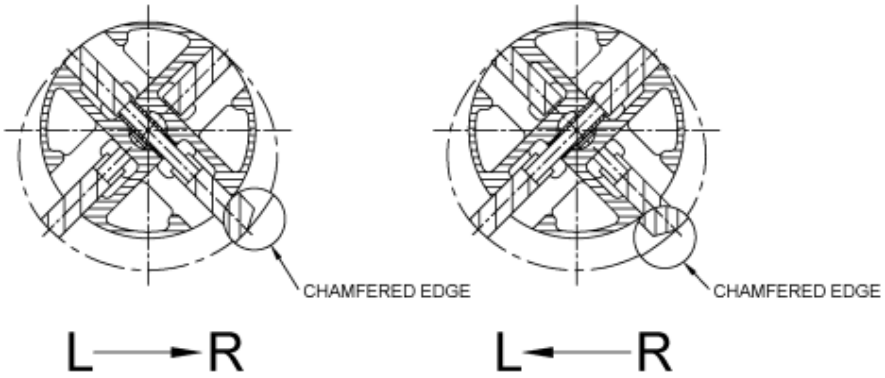


Figure 50 – Chamfered edge of the vanes in relation to the flow direction

CAUTIONS:
TAKE UTMOST CARE NOT TO DAMAGE THE VANES AND THE MAGNET.

6. Measure the radial vane clearance with a feeler gauge. The measurement should be taken, as shown in Figure 51.
   To measure correctly, the gauge must be bottomed out in the slot. If the tolerance is in excess of the value mentioned in Table 14, replace the vanes.

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

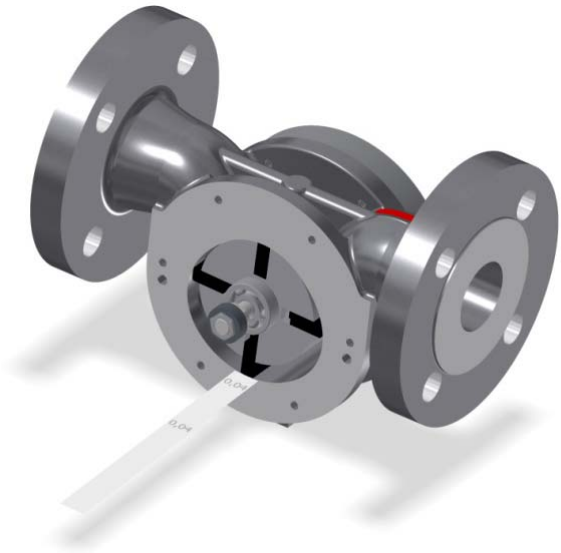


Figure 51 – Measuring the clearance between vanes and housing

Meter model	Tolerance [mm]
J5015E	0.025 - 0.060
J5023E	0.025 - 0.060
J5025E	0.040 - 0.090
J5040E	0.040 - 0.090
J5050E	0.050 - 0.100

Table 14 – Vane - housing clearance

9.4.5 Installing the front cover

1. Inspect and clean the bolts and washers.
2. Lubricate the bolt threads and the contact surfaces with an anti seize compound. The use of an anti-seize compound should be considered to facilitate subsequent disassembly.
3. Clean the O-ring groove and install a new O-ring, as shown in Figure 52.

Figure 52 – O-ring

Figure 53 – Positioning the front cover and installing it

4. Tilt the flowmeter housing, so that the rotor shaft is in a horizontal position.
5. Position the front cover over the locating pins on the flowmeter housing, as shown in Figure 53.

CAUTIONS:
TAKE UTMOST CARE NOT TO DAMAGE THE LOCATING PINS AND THE MAGNET. ENSURE THAT THE O-RING REMAINS IN PLACE AND IS NOT DAMAGED WHILE TAPPING DOWN THE COVER.

7. Install the cover onto the flowmeter using the bolts and lock washers, as shown in Figure 54.

Figure 54 – Installing the front cover

Meter model	Number of bolts	Torque values [Nm]
J5015E	6x M6	9
J5023E	6x M6	9
J5025E	6x M6	9
J5040E	6x M6	9
J5050E	6x M8	17

Table 15 – Torque for bolts flowmeter cover

8. Tighten the bolts alternately and evenly to the torque value specified in Table 15.

9. With the rotor shaft in horizontal position, rotate the rotor shaft by hand using the magnet, to check that the rotor runs smoothly. The rotor must rotate freely. If the rotor does not run smoothly, disassemble the flowmeter and repeat the assembly procedures.

9.4.6 Installing the inner magnet for flowmeter J5015E and J5023E

1. Place the inner magnet on the magnet shaft.
2. The top of the magnet must be flush with the magnet shaft, as shown in Figure 55

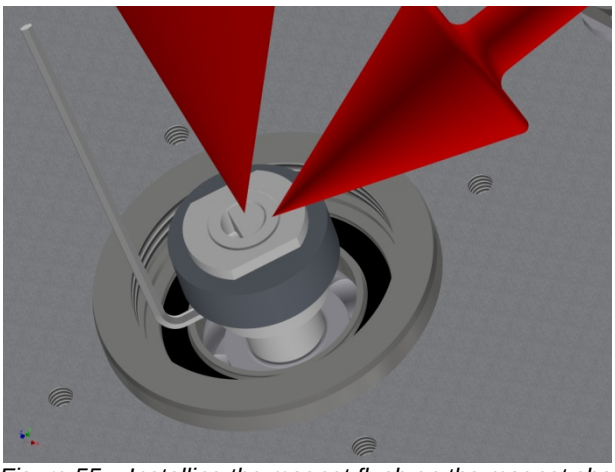


Figure 55 – Installing the magnet flush on the magnet shafft

3. Tighten the Allen screw in the fixed magnet, as shown in Figure 56
   Make sure to use an appropriate Allen key (Allenkey 1,5mm, extra short)

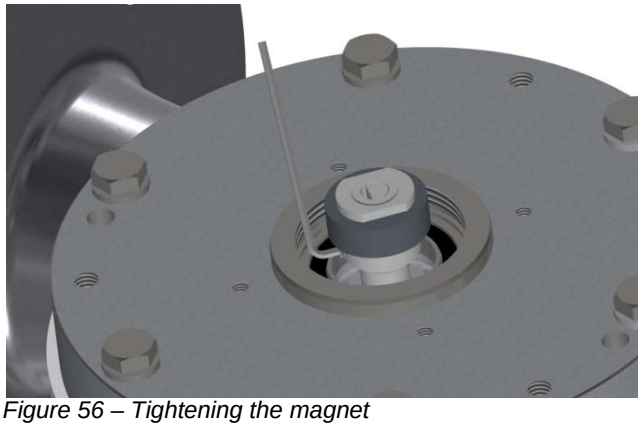


Figure 56 – Tightening the magnet

4. With the rotor shaft in horizontal position, rotate the rotor shaft by hand using the magnet, to check that the rotor runs smoothly.
   The rotor must rotate freely. If the rotor does not run smoothly, disassemble the flowmeter and repeat the assembly procedures.

9.4.7 Installing the magnet cap

1. Clean the O-ring groove and install a new O-ring, as shown in Figure 57.
2. Place the magnet cap, as shown in Figure 58.

Figure 57 – O-ring

Figure 58 – Installing the magnet cap

5. Place the nut and tighten the nut, as shown in Figure 59 and Figure 60, using the appropriate tools.

Figure 59 – Placing the nut on the magnet cap

Figure 60 – Tightening the nut of the magnet cap

9.4.8 Installing the E-counter

1. Put the gasket on the cover and install the holder using the 4 screws M4X12, as shown in Figure 61 and Figure 62.

2. Mount the E-counter cover with the 3 screws, Figure 63.

Figure 61 – Put the gasket on the cover

Figure 62 – Install the holder using the 4 bolds

Figure 63 – Mount the E-coutner cover

CAUTION:
THE COVER AND HOLDER OF THE E-COUNTER ARE CONNECTED TROUGH DELICATED WIRING.
TAKE CARE THAT THE WIRING DOES NOT GET PINCHED BETWEEN THE COVER AND HOLDER.

9.4.9 Installing the pulse box

The pulsebox can be installed by screwing the bolts of the holder to the flowmeter.

9.5 CHANGING THE FLOW DIRECTION

Unless otherwise specified the VAF Instruments model series “J” ProFlow liquid flowmeters 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 E-counter and rotate it 90° clockwise or counter clockwise, as shown in Figure 64 and Figure 65.

NOTE:

- In all cases the flow direction of the flowmeter, pointed out by the marked arrow on the meter body, must be in the right direction.
- If a change in flow direction must be made from left to right or right to left, additional parts are required.
  Please consult VAF Instruments or your local VAF Instruments agent.
- If a change in flow direction must be made during the warranty period, contact the VAF Instruments or your local VAF Instruments agent, 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 flowmeter is no longer valid. Therefore please keep record of the changes to avoid difficulties when ordering replacement parts.

Figure 64 – Flow direction top to bottom

Figure 65 – Flow direction bottom to top

10 TAKE OUT OF SERVICE

If the flowmeter has to be taken out of service follow the instructions in Section 9.1 to remove the flowmeter from the system.

- Flush the flowmeter with a clean non-corrosive fluid, like light diesel oil or kerosene.
- Empty the flowmeter as much as possible.
- Closed off the inlet and outlet of the flowmeter to prevent dirt or other particles entering the flowmeter as they may damage the flowmeter.

11 REMOVAL AND STORAGE OF EQUIPMENT

To remove the flowmeter from the system follow the instructions in Section 9.1.

- The flowmeter must be cleaned internally and externally and the inside of the flowmeter must been preserved adequately to protect against corrosion.
- The flowmeter must be emptied as much as possible.
- The inlet and outlet connections of the flowmeter must be plugged so that no dirt or other particles can enter the flowmeter.
- The flowmeter must be stored in a secure and save area.
- If the flowmeter is stored for a longer period of time, the inside of the flowmeter should be treated with a corrosion prevention liquid.

12 MALFUNCTION AND SEND FOR REPAIR

In case of a malfunction, follow the guidelines as described in Section 9.
If the flowmeter cannot be repaired on site, it should be send back for repair.
To take the flowmeter out of service, follow the instructions as described in Section 10.

The shipment must be accompanied by a fault report, as shown in Table 16, giving full information about the reason for return, all other relevant information and further instructions.

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		
Operating pressure:		Operating temperature:	
Specific gravity:		Viscosity:	
Flow rate [l/min]			
minimal:			
nominal:			
maximum:			
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:			
Name & Title:			
Date & Signature			

Table 16 – Example of a fault report to accompany a return shipment to the VAF Instruments factory or a by VAF Instruments authorized local service agent.

The fault report should be filled out in the English language.

12.1 CONDITIONS FOR RETURN OF GOODS

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

- The shipment must be accompanied by a fault report, as shown in
- Table 16, giving full information about the reason for return, all other relevant information and further instructions.
- The flowmeter must be cleaned internally and externally and the inside of the flowmeter must adequately been preserved to protect against corrosion.
- The flowmeter must be emptied as much as possible.
- The flowmeter must be free from risks of fire, explosion and toxic matters which may cause hazardous situations or personal injury.
- The inlet and outlet connections of the flowmeter must be plugged so that no dirt or other particles can enter the flowmeter and to prevent liquids leaking out of the instrument.
- The shipping container must be strong enough to protect the flowmeter during transport and should be packed with soft material to protect against shocks.
- Goods must be sent C.I.F. destination.

In the event a flowmeter has to be sent back for repair, send it directly to:

VAF
INSTRUMENTS

VAF Instruments B.V.
Vierlinghstraat 24
3316 EL Dordrecht
P.O. Box 40
3300 AA Dordrecht
The Netherlands

Tel.: +31 (0)78 6183100
Fax: +31 (0)78 6177068

Website: www.vaf.nl
E-mail: service@vaf.nl

13 ENVIRONMENT

- The flowmeter has no negative influence on the environment during normal operation.
- The noise level produced by the flowmeter is less than 70 dB(A).

14 DISPOSAL

The flowmeter consists of metal, plastics and electronic parts. It should be disposed according to local laws or regulations.
If in doubt or not able to dispose of the equipment it can be returned to VAF Instruments.
VAF Instruments will dispose of the equipment in a correct way.
A green passport can be supplied on request.

Main materials:

- Body Ductile iron
- Covers Ductile iron
- Rotor Ductile iron
- Vanes Carbon
- E-counter Plastics
  Electronic parts
  Lithium Thionyl Chloride battery

15 TROUBLE SHOOTING AND FAULT FINDING

15.1 THE E-COUNTER DOES NOT DISPLAY ANYTHING

Possible cause (perform the checks in sequential order)	**Solution**
1. The E-counter is in battery savings mode.	Press a button to activate the E-counter.
2. The battery of the E-counter is empty. At the end of the battery life time an Icon will be shown on the display. See Figure 68.	Replace the E-counter 3.6 V battery with a spare. During empty battery and replacing battery the Settings and Data will be kept.

Figure 68 – Battery Icon on display

3. The E-counter is malfunctioning.	Replace the E-counter.

15.2 NO FLOW INDICATION ALTHOUGH LIQUID IS PASSING

The flowmeter does not indicate any flow although liquid is passing through the flowmeter

Possible cause (perform the checks in sequential order)	**Solution**
1. The valve in the bypass line is still open.	Close bypass valve.
2. The E-counter or pulse box is malfunctioning.	Replace the E-counter or pulse box.
3. Inner parts of the flowmeter may be stuck or broken.	Return the flowmeter to the VAF Instruments factory or a by VAF Instruments authorized local service agent.

15.3 NO FLOW INDICATION AND NO LIQUID IS PASSING

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

Possible cause (perform the checks in sequential order)	**Solution**
1. Obstructions in the process line blocking the flow.	Check for obstructions, e.g. closed valves.
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 the dust cap(s) and check the flowmeter for damage.
3. Dirt is blocking the inner parts of the flowmeter.	Flush the flowmeter with a suitable solvent. If this does not solve the problem, return the flowmeter to the VAF Instruments factory or a by VAF Instruments authorized local service agent.
4. Inner parts of flowmeter may be stuck or broken.	Return the flowmeter to the VAF Instruments factory or a by VAF Instruments authorized local service agent.

16 CERTIFICATES

Certificates are delivered separately.

17 DRAWINGS

Figure Drawing number Description

Figure 66 – Drawing 0801-1746 – Flowrate - pressure drop - viscosity relation J5015E/J5023E
Figure 67 – Drawing 0801-1758 – Flowrate - pressure drop - viscosity relation J5025E/J5040E
Figure 68 – Drawing 0801-1759 – Flowrate - pressure drop - viscosity relation J5050E
Figure 69 – Drawing 0801-1800 – Mounting position J5015E-23E-25E-040E-050E
Figure 70 – Drawing 0801-1389 – Meter J5015E PN25
Figure 71 – Drawing 0801-2297 – Partslist J5015E DN15 PN25
Figure 72 – Drawing 0801-1390 – Meter J5023E PN25
Figure 73 – Drawing 0801-2298 – Partslist J5023E DN25 PN25
Figure 74 – Drawing 0801-1378 – Meter J5025E PN25
Figure 75 – Drawing 0801-2294 – Partslist J5025E DN25 PN25
Figure 76 – Drawing 0801-1383 – Meter J5040E PN25
Figure 77 – Drawing 0801-2295 – Partslist J5040E DN40 PN25
Figure 78 – Drawing 0801-1384 – Meter J5050E PN25
Figure 79 – Drawing 0801-2296 – Partslist J5050E DN50 PN25
Figure 80 – Drawing 0801-3301 – Dimensional drawing J5015E E-counter
Figure 81 – Drawing 0801-3302 – Dimensional drawing J5015E E-counter wih pulse output
Figure 82 – Drawing 0801-3313 – Dimensional drawing J5015E Pulse transmitter box
Figure 83 – Drawing 0801-3303 – Dimensional drawing J5023E E-counter
Figure 84 – Drawing 0801-3304 – Dimensional drawing J5023E E-counter with pulse output
Figure 85 – Drawing 0801-3314 – Dimensional drawing J5023E Pulse transmitter box
Figure 86 – Drawing 0801-3305 – Dimensional drawing J5025E E-counter
Figure 87 – Drawing 0801-3306 – Dimensional drawing J5025E E-counter with pulse output
Figure 88 – Drawing 0801-3315 – Dimensional drawing J5025E Pulse transmitter box
Figure 89 – Drawing 0801-3307 – Dimensional drawing J5040E E-counter
Figure 90 – Drawing 0801-3308 – Dimensional drawing J5040E E-counter with pulse output
Figure 91 – Drawing 0801-3316 – Dimensional drawing J5040E Pulse transmitter box
Figure 92 – Drawing 0801-3309 – Dimensional drawing J5050E E-counter
Figure 93 – Drawing 0801-3310 – Dimensional drawing J5050E E-counter with pulse output
Figure 94 – Drawing 0801-3317 – Dimensional drawing J5050E Pulse transmitter box
Figure 95 – Drawing 0830-1236 – E-counter dimensional drawing and partslist
Figure 96 – Drawing 0879-1215 – Pulse transmitter box assembly drawing
Figure 97 – Drawing 0879-2215 – Pulse transmitter box partslist
Figure 98 – Drawing 0879-1223 – Incremental encoder box assembly drawing
Figure 99 – Drawing 0879-2220 – Incremental encoder box partslist
Figure 100 – Drawing 0830-2017 – Connection diagram E-counter
Figure 101 – Drawing 0830-2018 – Connection diagram E-counter to LED counter
Figure 102 – Drawing 0830-2019 – Connection diagram E-counter to LED counter and relay
Figure 103 – Drawing 0830-2020 – Connection diagram E-counter to LED counter and 2xrelay
Figure 104 – Drawing 0830-2021 – Connection diagram E-counter to relay
Figure 105 – Drawing 0830-2022 – Connection diagram E-counter to 2x relay
Figure 106 – Drawing 0830-2007 – Connection diagram pulse transmitter
Figure 107 – Drawing 0803-2004 – Connection diagram pulse transmitter with safety barrier
Figure 108 – Drawing 0830-2008 – Connection diagram incremental encoder
Figure 109 – Drawing 0801-2008 – Connection diagram incr.encoder internal pulse discr.

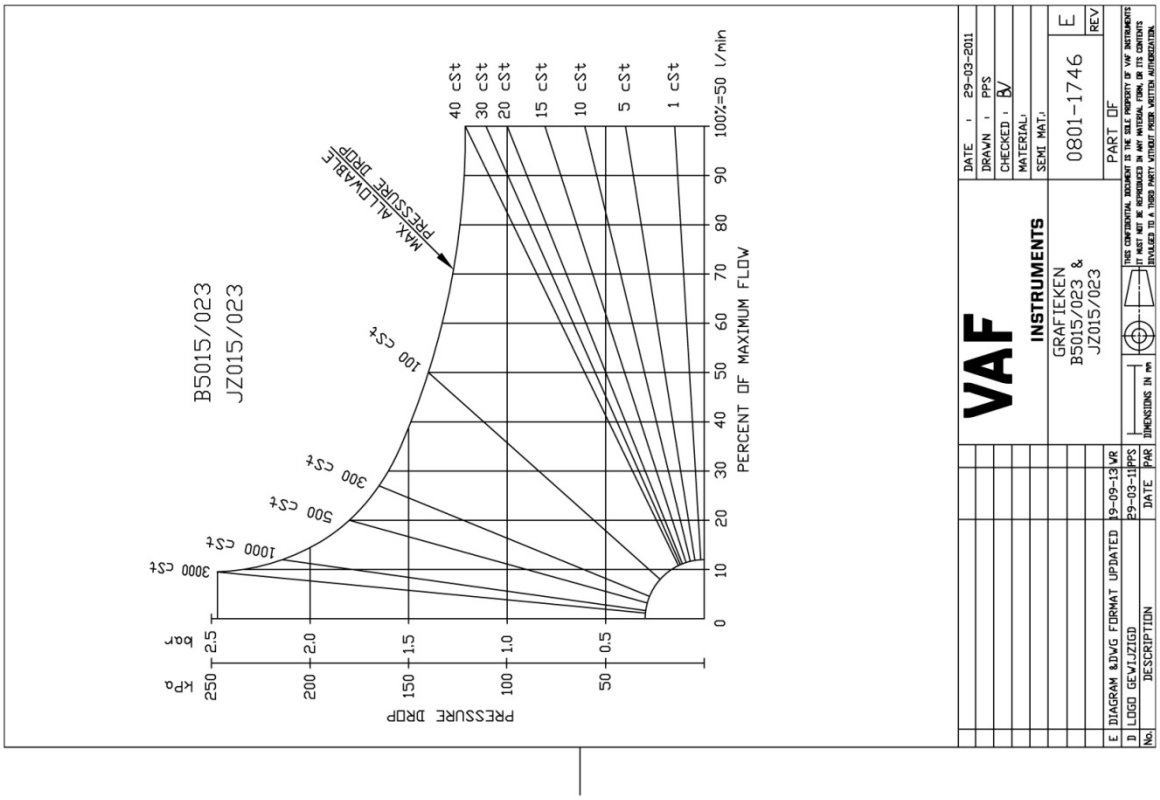


Figure 66 – Drawing 0801-1746 – Flowrate - pressure drop - viscosity relation J5015E/J5023E

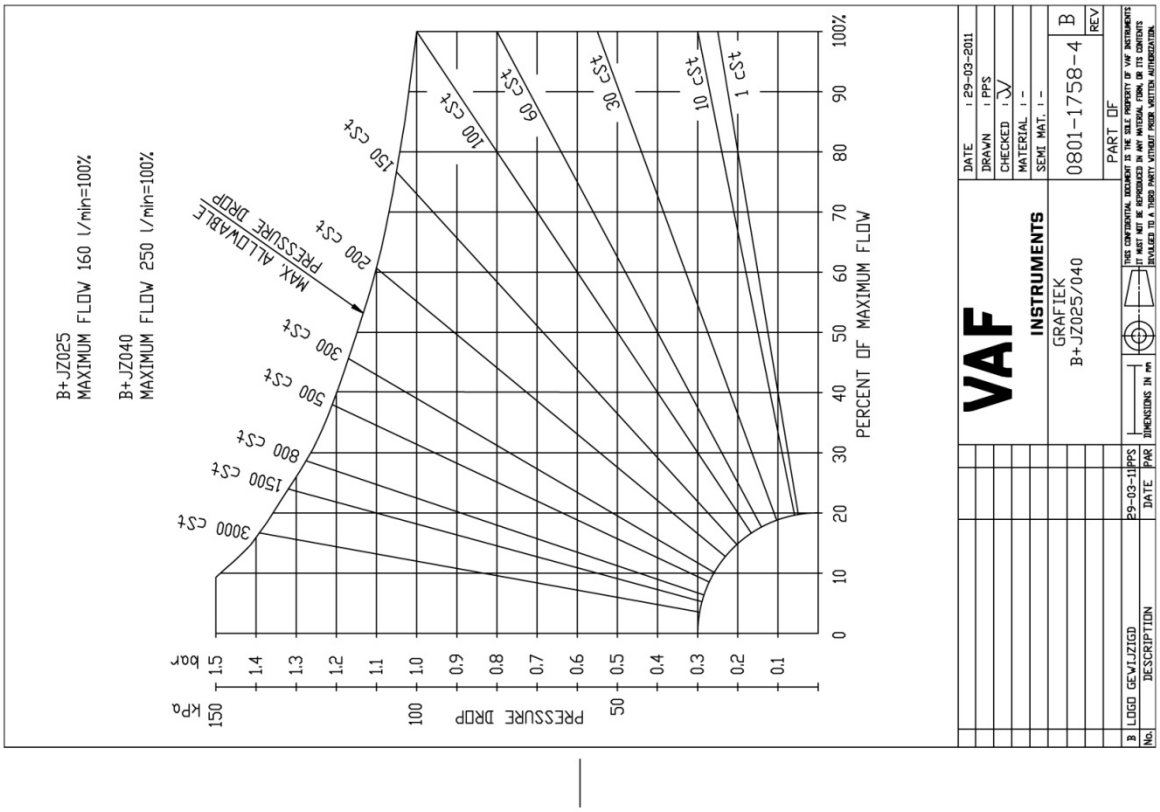


Figure 67 – Drawing 0801-1758 – Flowrate - pressure drop - viscosity relation J5025E/J5040E

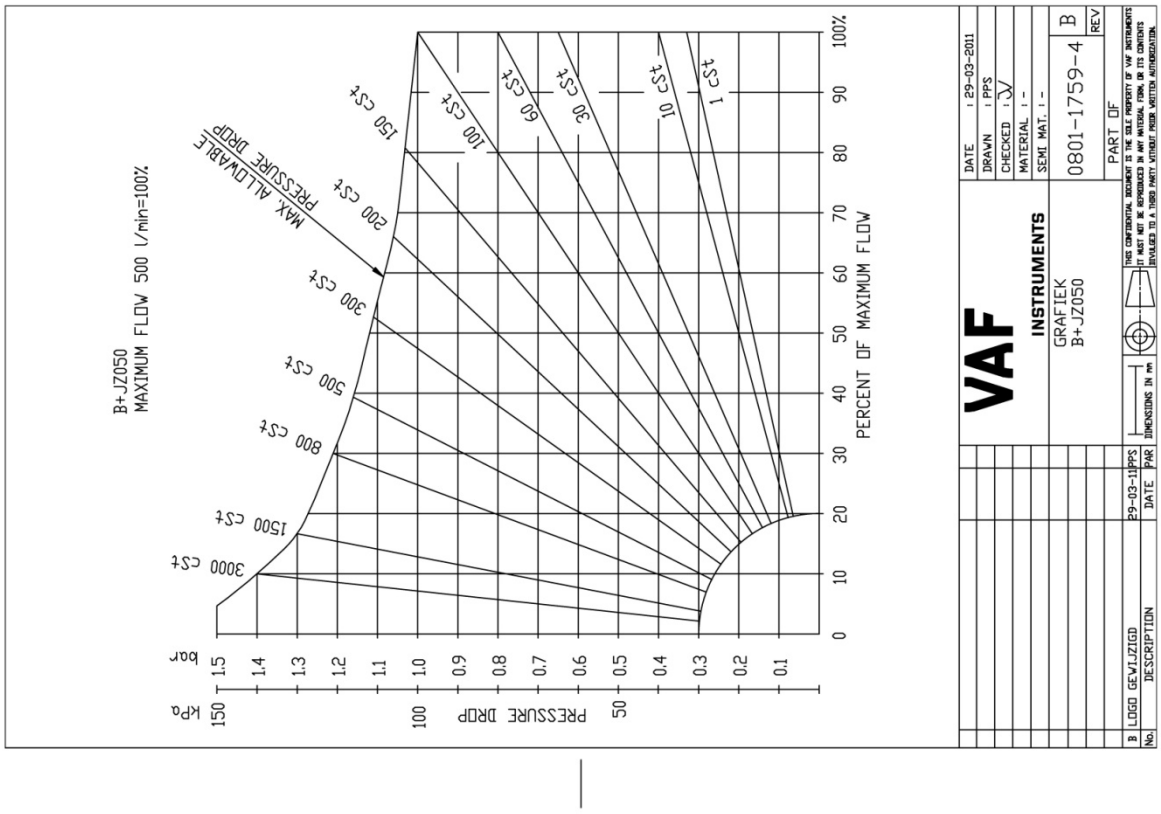


Figure 68 – Drawing 0801-1759 – Flowrate - pressure drop - viscosity relation J5050E

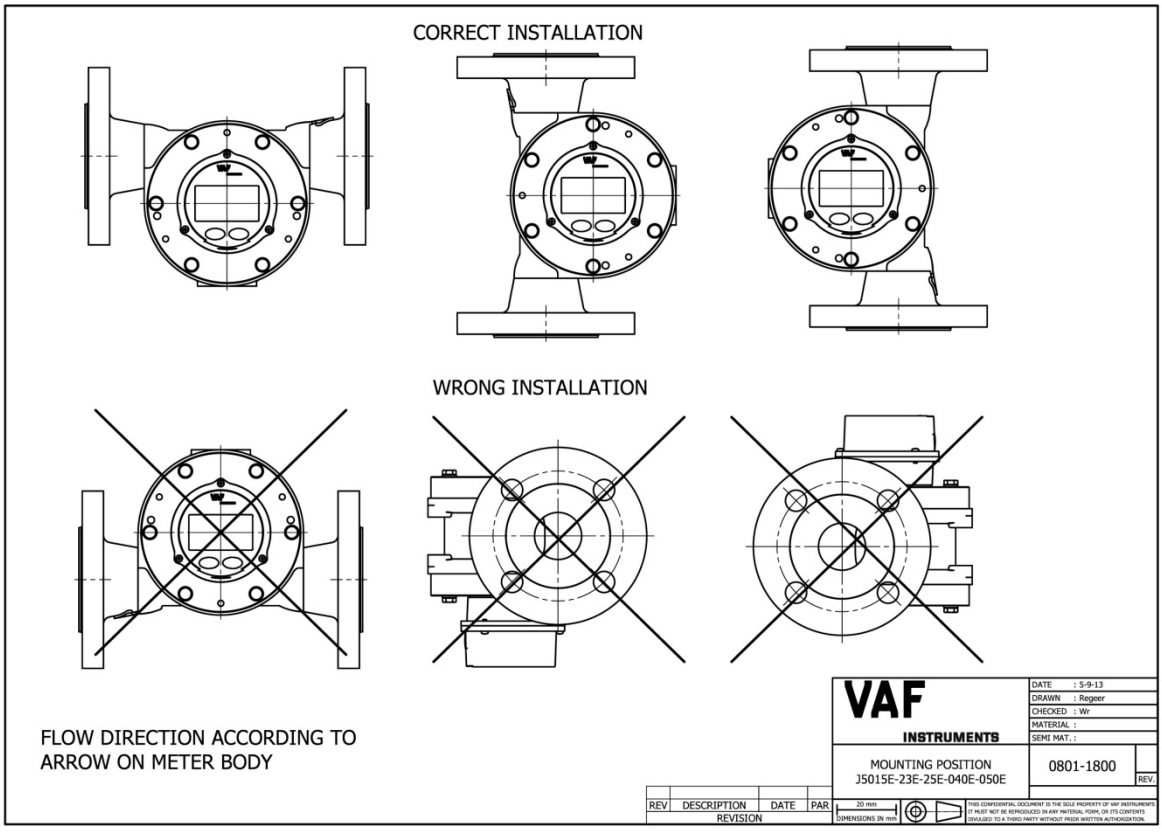


Figure 69 – Drawing 0801-1800 – Mounting position J5015E-23E-25E-040E-050E

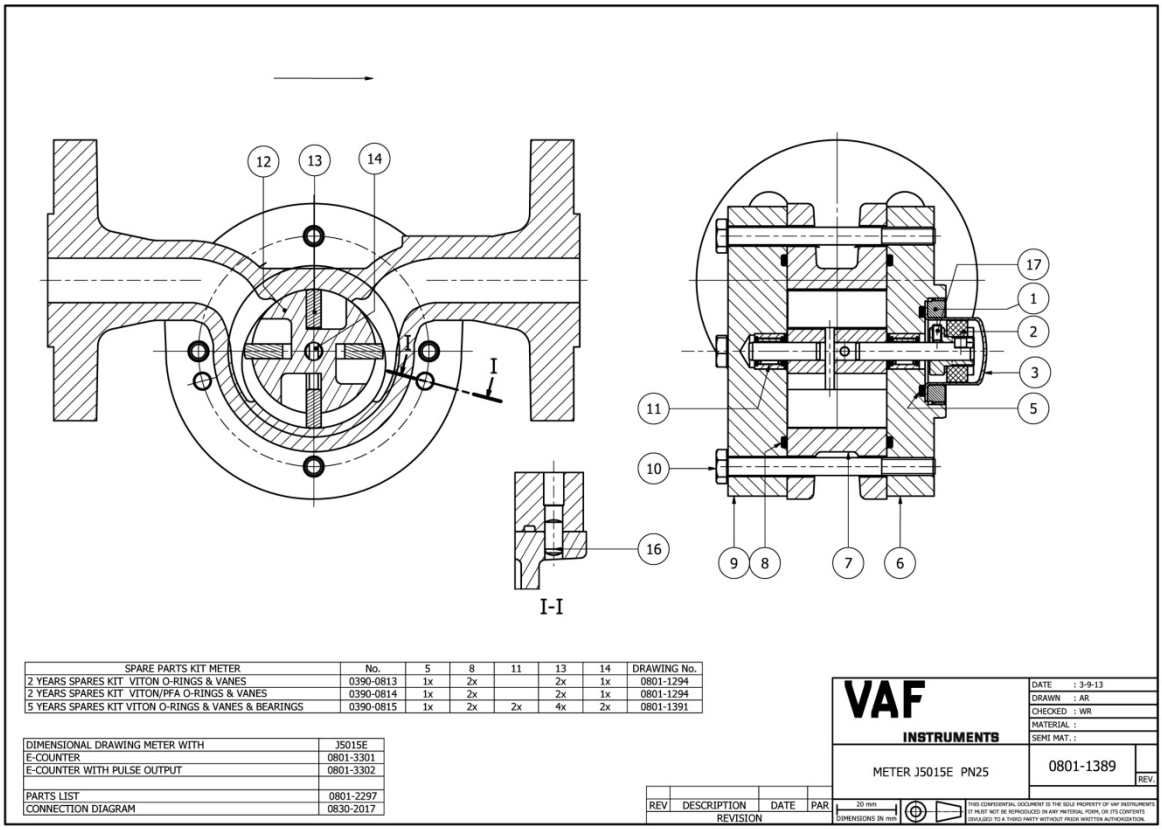


Figure 70 – Drawing 0801-1389 – Meter J5015E PN25

Figure 71 – Drawing 0801-2297 – Partslist J5015E DN15 PN25

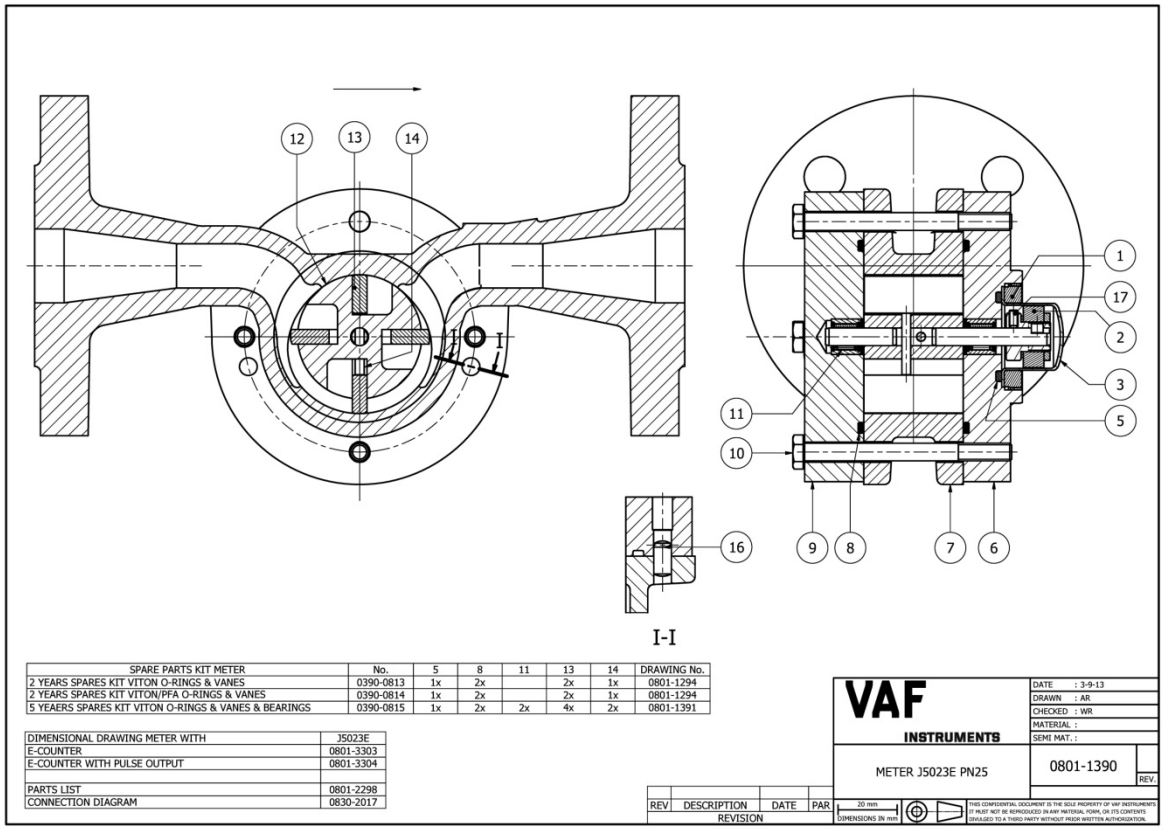
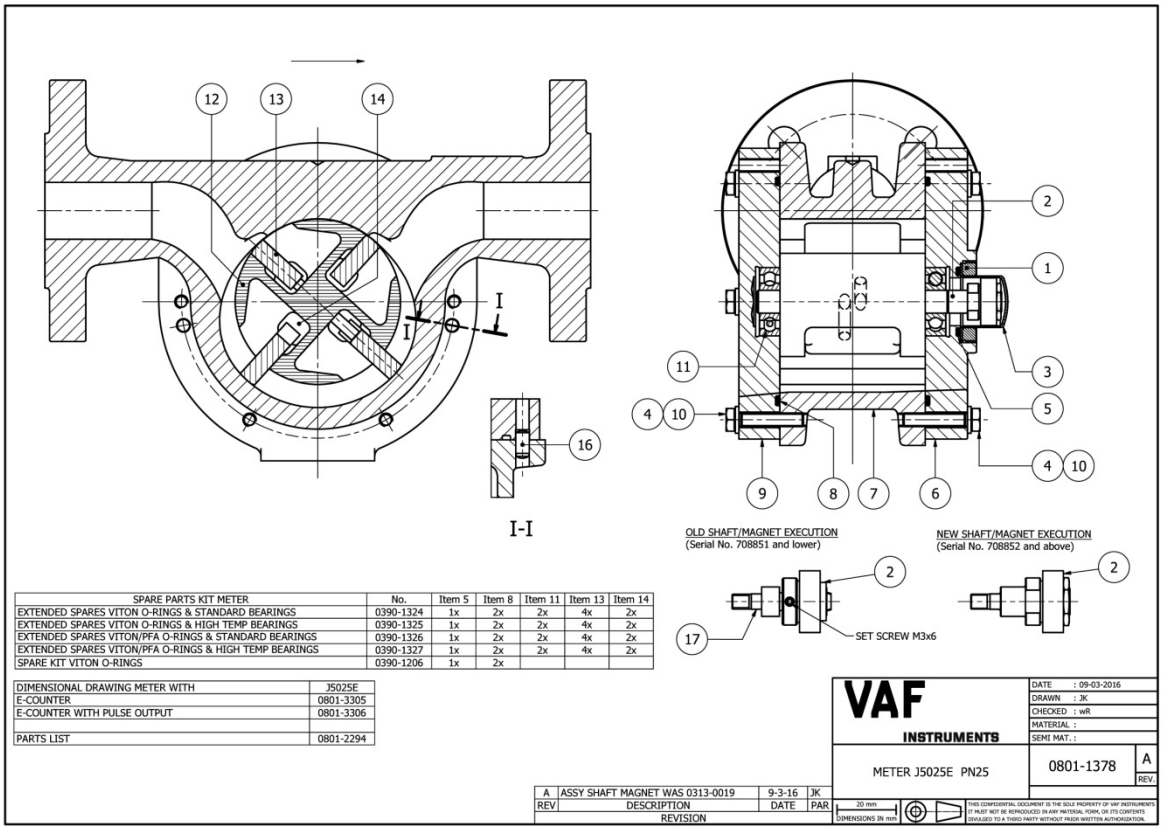


Figure 72 – Drawing 0801-1390 – Meter J5023E PN25

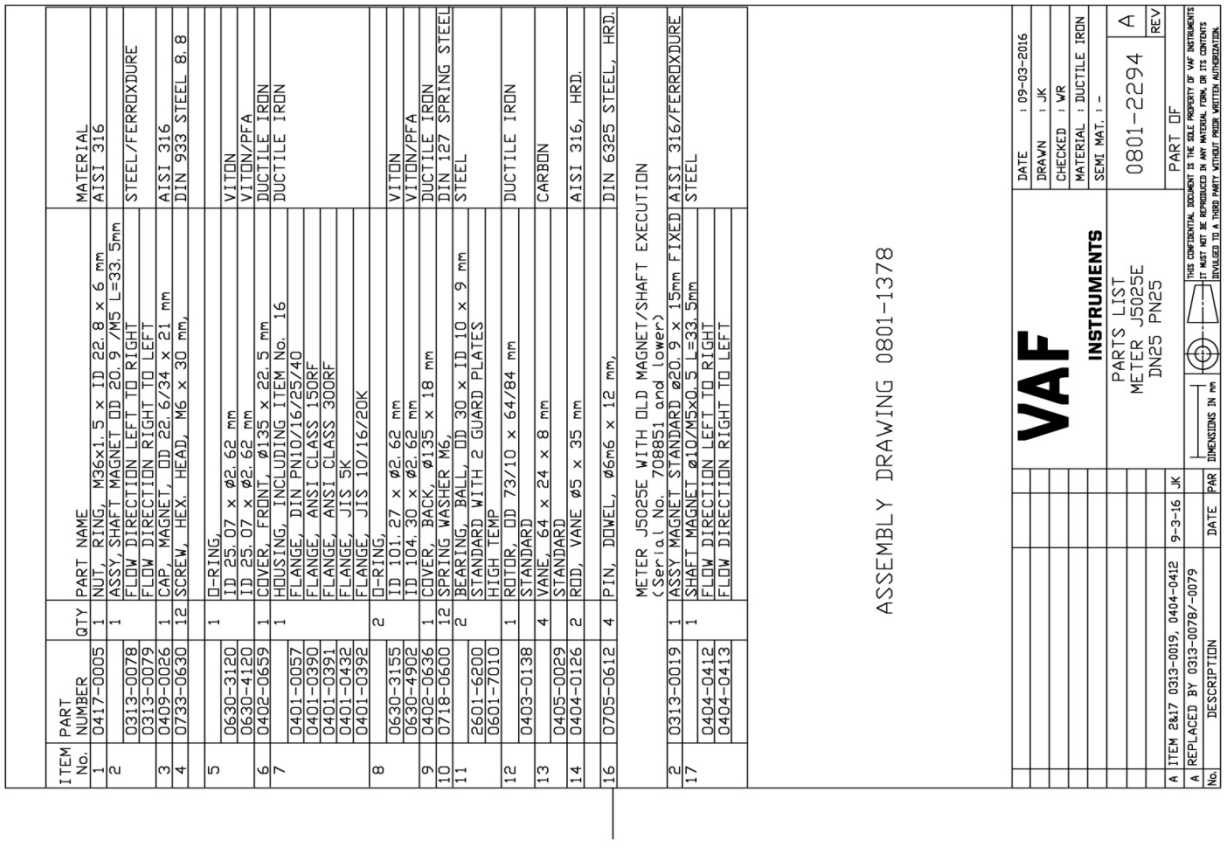
Figure 73 – Drawing 0801-2298 – Partslist J5023E DN25 PN25



SPARE PARTS KIT METER	No.	Item 5	Item 8	Item 11	Item 13	Item 14
EXTENDED SPARES VITON O-RINGS & STANDARD BEARINGS	0390-1324	1x	2x	2x	4x	2x
EXTENDED SPARES VITON O-RINGS & HIGH TEMP BEARINGS	0390-1325	1x	2x	2x	4x	2x
EXTENDED SPARES VITON/PFA O-RINGS & STANDARD BEARINGS	0390-1326	1x	2x	2x	4x	2x
EXTENDED SPARES VITON/PFA O-RINGS & HIGH TEMP BEARINGS	0390-1327	1x	2x	2x	4x	2x
SPARE KIT VITON O-RINGS	0390-1206	1x	2x			

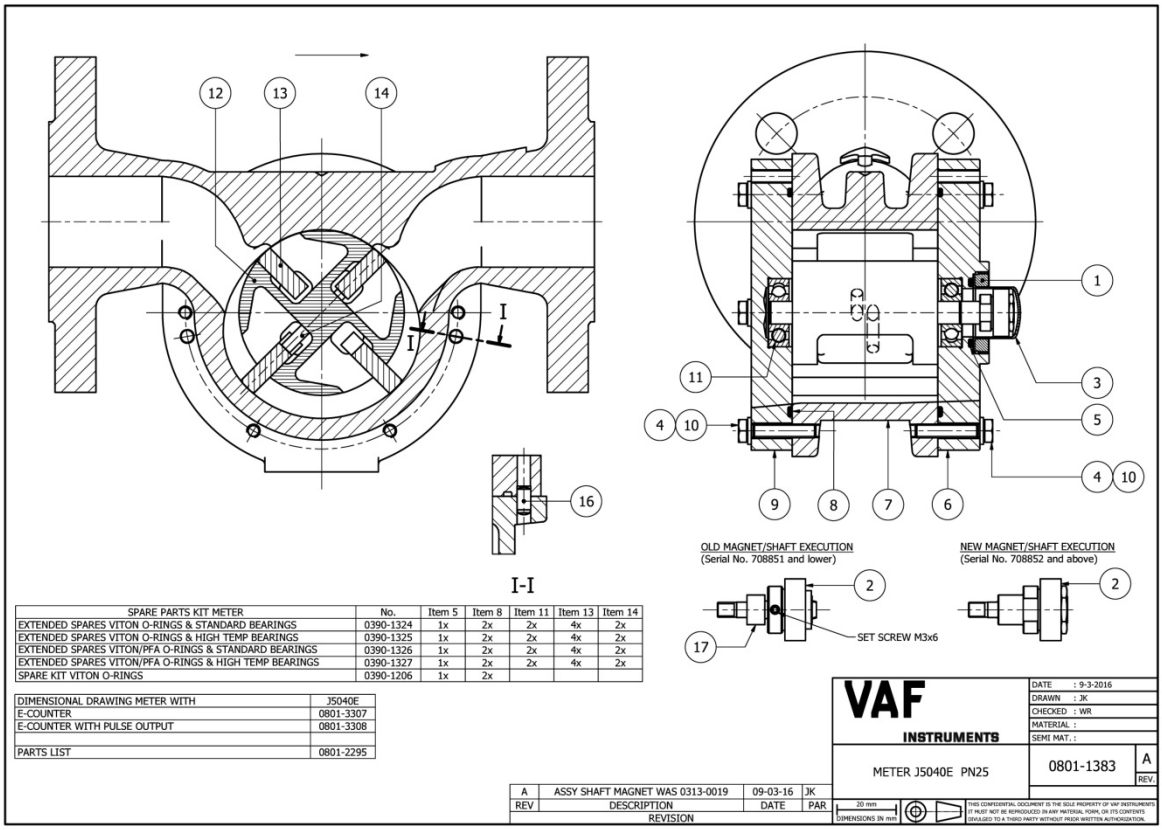
DIMENSIONAL DRAWING METER WITH	J5025E
E-COUNTER	0801-3305
E-COUNTER WITH PULSE OUTPUT	0801-3306
PARTS LIST	0801-2294

Figure 74 – Drawing 0801-1378 – Meter J5025E PN25



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		1	ASSY, SHAFT MAGNET OD 20.9 /M5 L=33.5mm	
	0313-0078		FLOW DIRECTION LEFT TO RIGHT	STEEL/FERROXDURE
	0313-0079		FLOW DIRECTION RIGHT TO LEFT	
3	0409-0026	1	CAP MAGNET, OD 22.6/34 x 21 mm	AISI 316
4	0733-0630	12	SCREW, HEX. HEAD, M6 x 30 mm,	DIN 933 STEEL 8.8
5		1	O-RING,	
	0630-3120		ID 25.07 x Ø2.62 mm	VITON
	0630-4120		ID 25.07 x Ø2.62 mm	VITON/PFA
6	0402-0659	1	COVER, FRONT, Ø135 x 22.5 mm	DUCTILE IRON
7		1	HOUSING, INCLUDING ITEM No. 16	DUCTILE IRON
	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
9	0402-0636	1	COVER, BACK, Ø135 x 18 mm	DUCTILE IRON
10	0718-0600	12	SPRING WASHER M6,	DIN 127 SPRING STEEL
11		2	BEARING, BALL, OD 30 x ID 10 x 9 mm	STEEL
	2601-6200		STANDARD WITH 2 GUARD PLATES	
	0601-7010		HIGH TEMP	
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	
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.
2	0313-0019	1	ASSY MAGNET STANDARD ø20.9 x 15mm FIXED	AISI 316/FERROXDURE
17		1	SHAFT MAGNET ø10/M5x0.5 L=33.5mm	STEEL
	0404-0412		FLOW DIRECTION LEFT TO RIGHT	
	0404-0413		FLOW DIRECTION RIGHT TO LEFT	

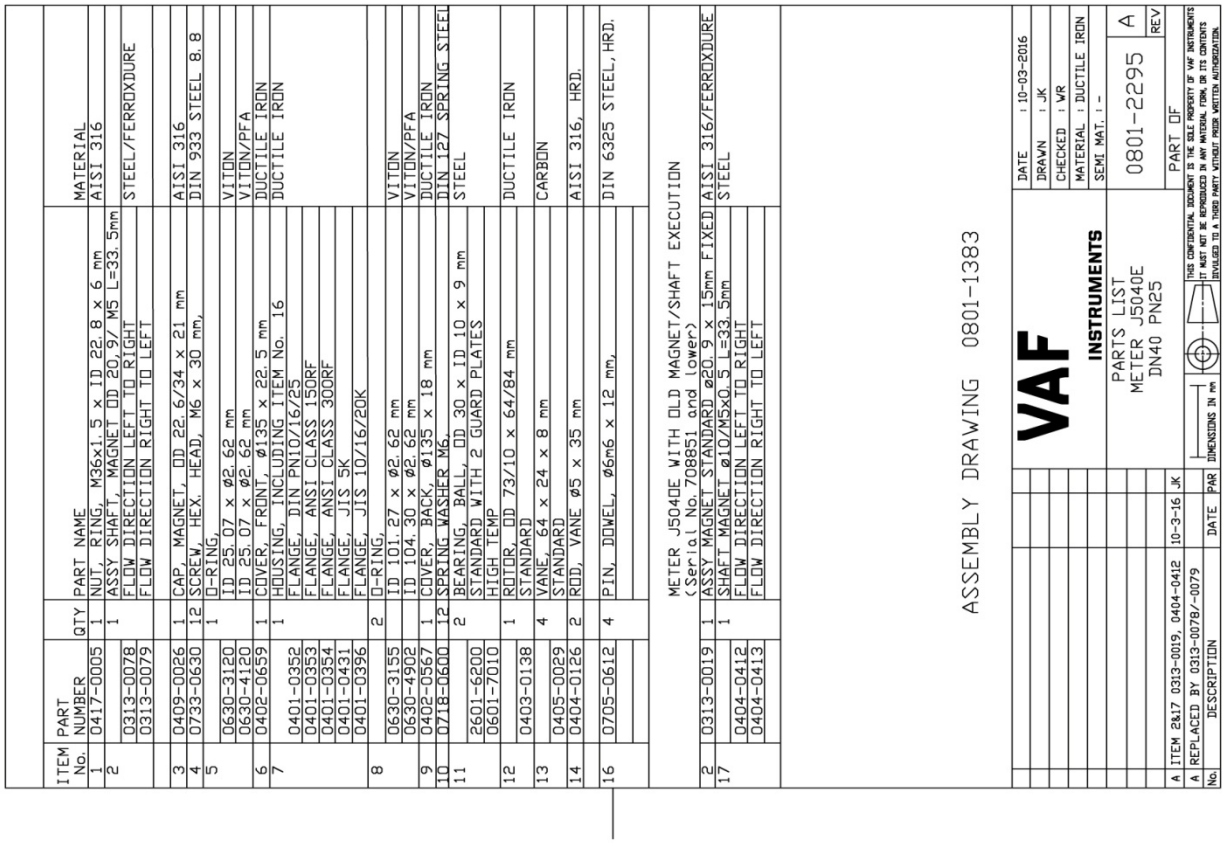
Figure 75 – Drawing 0801-2294 – Partslist J5025E DN25 PN25



SPARE PARTS KIT METER	No.	Item 5	Item 8	Item 11	Item 13	Item 14
EXTENDED SPARES VITON O-RINGS & STANDARD BEARINGS	0390-1324	1x	2x	2x	4x	2x
EXTENDED SPARES VITON O-RINGS & HIGH TEMP BEARINGS	0390-1325	1x	2x	2x	4x	2x
EXTENDED SPARES VITON/PFA O-RINGS & STANDARD BEARINGS	0390-1326	1x	2x	2x	4x	2x
EXTENDED SPARES VITON/PFA O-RINGS & HIGH TEMP BEARINGS	0390-1327	1x	2x	2x	4x	2x
SPARE KIT VITON O-RINGS	0390-1206	1x	2x			

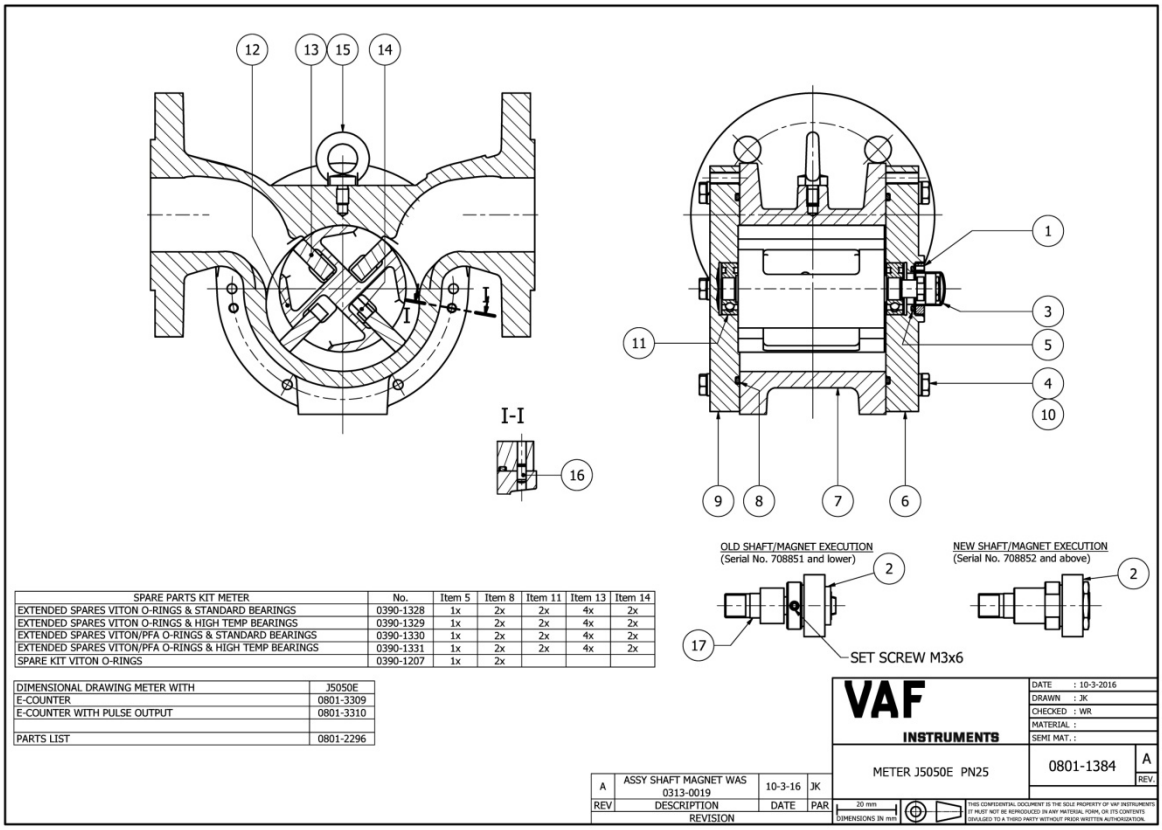
DIMENSIONAL DRAWING METER WITH	J5040E
E-COUNTER	0801-3307
E-COUNTER WITH PULSE OUTPUT	0801-3308
PARTS LIST	0801-2295

Figure 76 – Drawing 0801-1383 – Meter J5040E PN25



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		1	ASSY SHAFT, MAGNET OD 20,9/ M5 L=33.5mm	
	0313-0078		FLOW DIRECTION LEFT TO RIGHT	STEEL/FERROXDURE
	0313-0079		FLOW DIRECTION RIGHT TO LEFT	
3	0409-0026	1	CAP, MAGNET, OD 22.6/34 x 21 mm	AISI 316
4	0733-0630	12	SCREW, HEX. HEAD, M6 x 30 mm,	DIN 933 STEEL 8.8
5		1	O-RING,	
	0630-3120		ID 25.07 x Ø2.62 mm	VITON
	0630-4120		ID 25.07 x Ø2.62 mm	VITON/PFA
6	0402-0659	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	
	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
9	0402-0567	1	COVER, BACK, Ø135 x 18 mm	DUCTILE IRON
10	0718-0600	12	SPRING WASHER M6	DIN 127 SPRING STEEL
11		2	BEARING, BALL, OD 30 x ID 10 x 9 mm	STEEL
	2601-6200		STANDARD WITH 2 GUARD PLATES	
	0601-7010		HIGH TEMP	
12	0403-0138	1	ROTOR, OD 73/10 x 64/84 mm	DUCTILE IRON
			STANDARD	
13		4	VANE, 64 x 24 x 8 mm	CARBON
	0405-0029		STANDARD	
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.
			METER J5040E WITH OLD MAGNET/SHAFT EXECUTION (Serial No. 708851 and lower)	
2	0313-0019	1	ASSY MAGNET STANDARD ø20.9 x 15mm FIXED	AISI 316/FERROXDURE
17		1	SHAFT MAGNET ø10/M5x0.5 L=33.5mm	STEEL
	0404-0412		FLOW DIRECTION LEFT TO RIGHT	
	0404-0413		FLOW DIRECTION RIGHT TO LEFT	

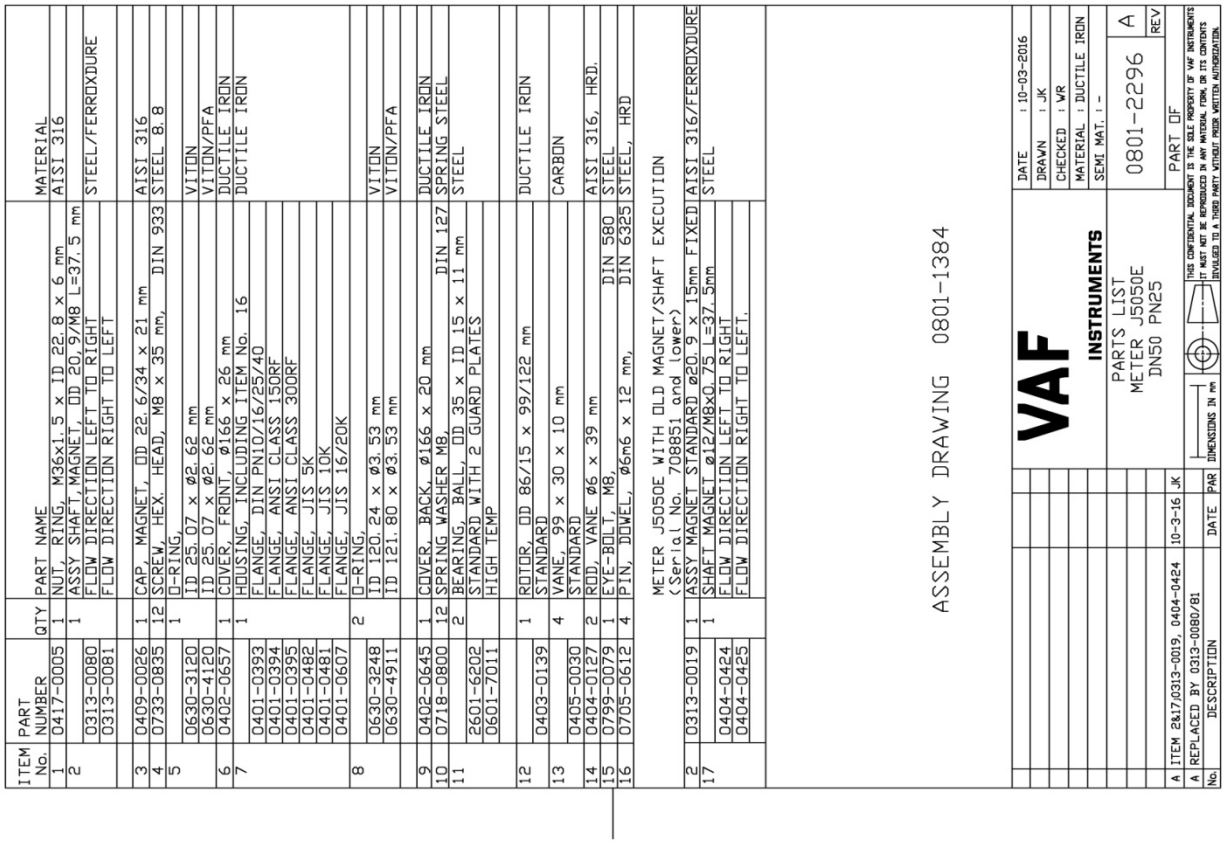
Figure 77 – Drawing 0801-2295 – Partslist J5040E DN40 PN25



SPARE PARTS KIT METER	No.	Item 5	Item 8	Item 11	Item 13	Item 14
EXTENDED SPARES VITON O-RINGS & STANDARD BEARINGS	0390-1328	1x	2x	2x	4x	2x
EXTENDED SPARES VITON O-RINGS & HIGH TEMP BEARINGS	0390-1329	1x	2x	2x	4x	2x
EXTENDED SPARES VITON/PFA O-RINGS & STANDARD BEARINGS	0390-1330	1x	2x	2x	4x	2x
EXTENDED SPARES VITON/PFA O-RINGS & HIGH TEMP BEARINGS	0390-1331	1x	2x	2x	4x	2x
SPARE KIT VITON O-RINGS	0390-1207	1x	2x			

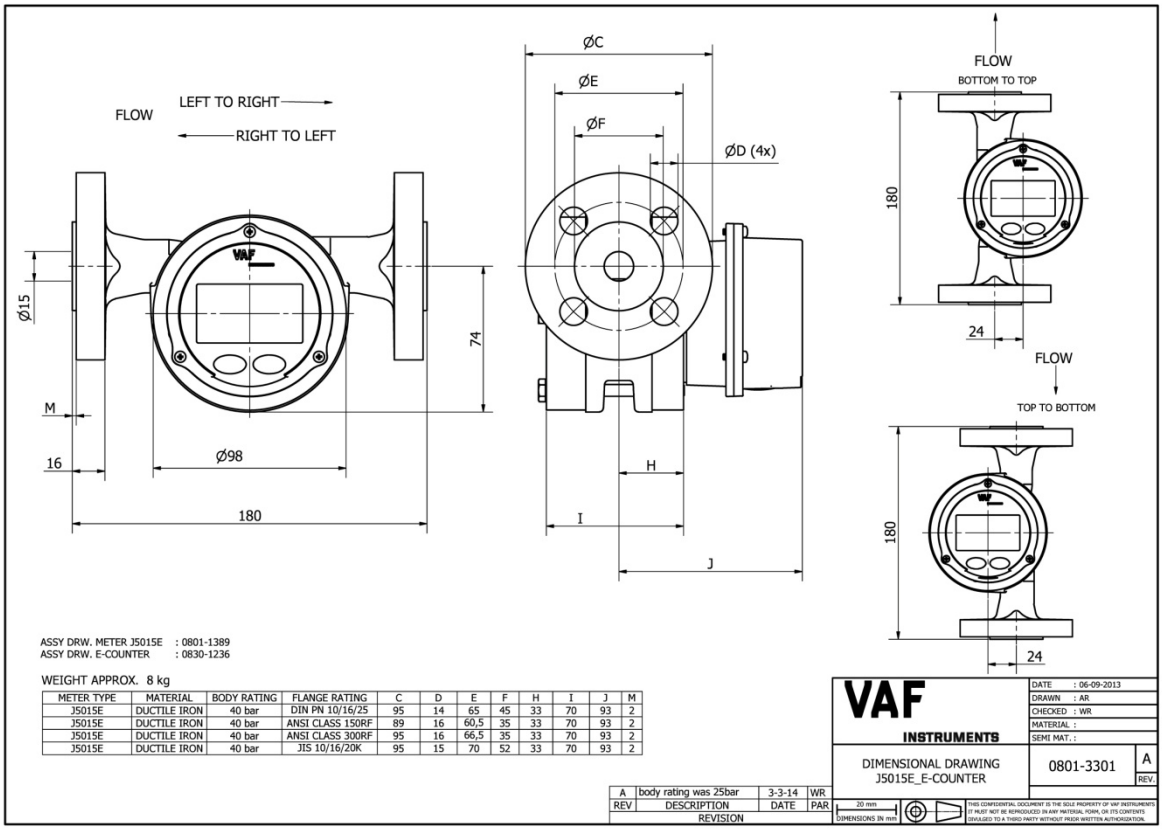
DIMENSIONAL DRAWING METER WITH	J5050E
E-COUNTER	0801-3309
E-COUNTER WITH PULSE OUTPUT	0801-3310
PARTS LIST	0801-2296

Figure 78 – Drawing 0801-1384 – Meter J5050E PN25



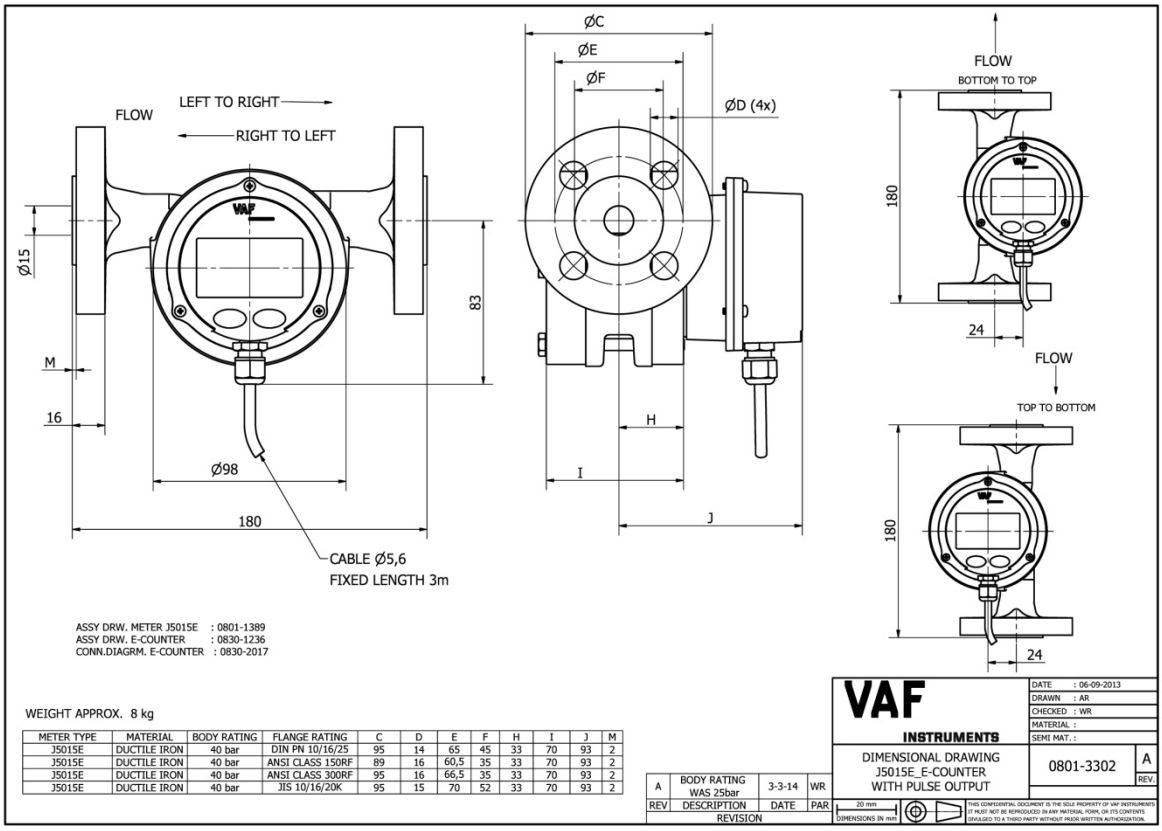
ITEM No.	PART NUMBER	QTY	PART NAME	MATERIAL
1	0417-0005	1	NUT, RING, M36x1.5 x ID 22.8 x 6 mm	AISI 316
2		1	ASSY SHAFT, MAGNET, OD 20,9/M8 L=37.5 mm	
	0313-0080		FLOW DIRECTION LEFT TO RIGHT	STEEL/FERRODURE
	0313-0081		FLOW DIRECTION RIGHT TO LEFT	
3	0409-0026	1	CAP, MAGNET, OD 22.6/34 x 21 mm	AISI 316
4	0733-0835	12	SCREW, HEX. HEAD, M8 x 35 mm, DIN 933	STEEL 8.8
5		1	O-RING,	
	0630-3120		ID 25.07 x Ø2.62 mm	VITON
	0630-4120		ID 25.07 x Ø2.62 mm	VITON/PFA
6	0402-0657	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
9	0402-0645	1	COVER, BACK, ø166 x 20 mm	DUCTILE IRON
10	0718-0800	12	SPRING WASHER M8, DIN 127	SPRING STEEL
11		2	BEARING, BALL, OD 35 x ID 15 x 11 mm	STEEL
	2601-6202		STANDARD WITH 2 GUARD PLATES	
	0601-7011		HIGH TEMP	
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	
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, Ø6m6 x 12 mm, DIN 6325	STEEL, HRD
2	0313-0019	1	ASSY MAGNET STANDARD ø20.9 x 15mm FIXED	AISI 316/FERRODURE
17		1	SHAFT MAGNET ø12/M8x0.75 L=37.5mm	STEEL
	0404-0424		FLOW DIRECTION LEFT TO RIGHT	
	0404-0425		FLOW DIRECTION RIGHT TO LEFT	

Figure 79 – Drawing 0801-2296 – Partslist J5050E DN50 PN25



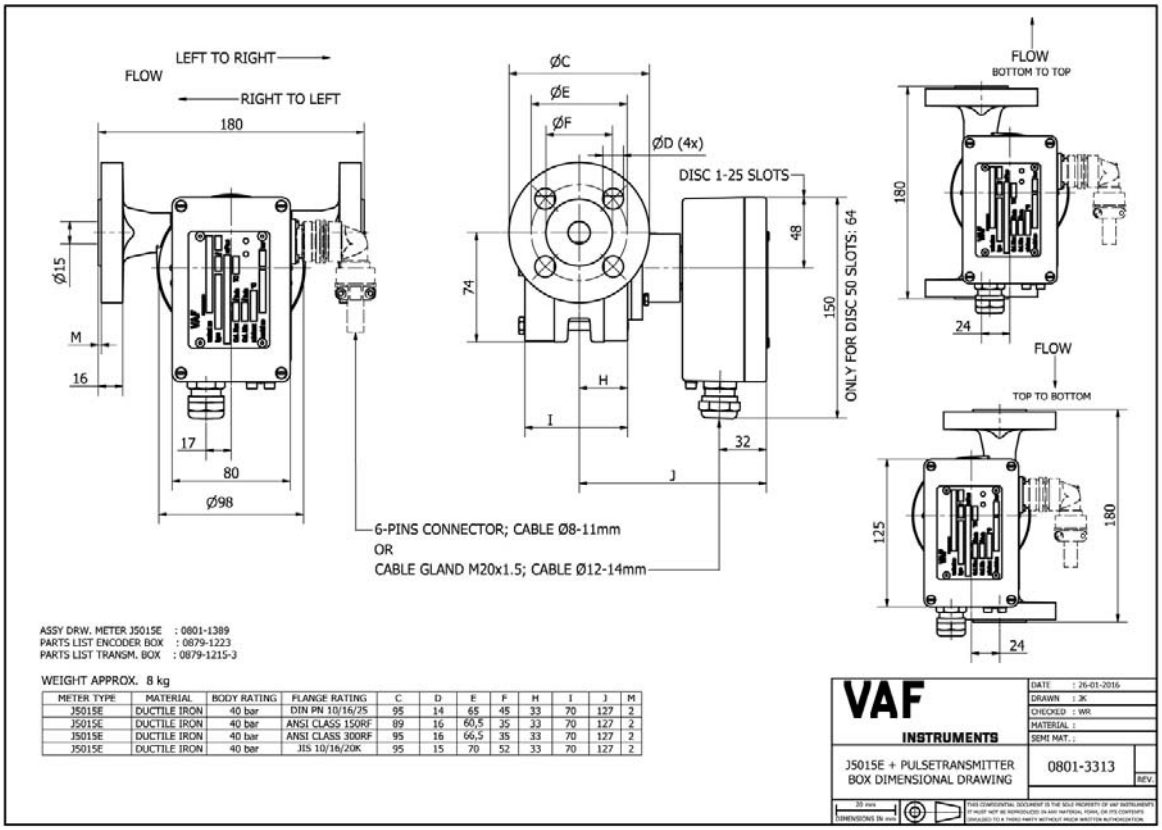
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5015E	DUCTILE IRON	40 bar	DIN PN 10/16/25	95	14	65	45	33	70	93	2
J5015E	DUCTILE IRON	40 bar	ANSI CLASS 150RF	89	16	60,5	35	33	70	93	2
J5015E	DUCTILE IRON	40 bar	ANSI CLASS 300RF	95	16	66,5	35	33	70	93	2
J5015E	DUCTILE IRON	40 bar	JIS 10/16/20K	95	15	70	52	33	70	93	2

Figure 80 – Drawing 0801-3301 – Dimensional drawing J5015E E-counter



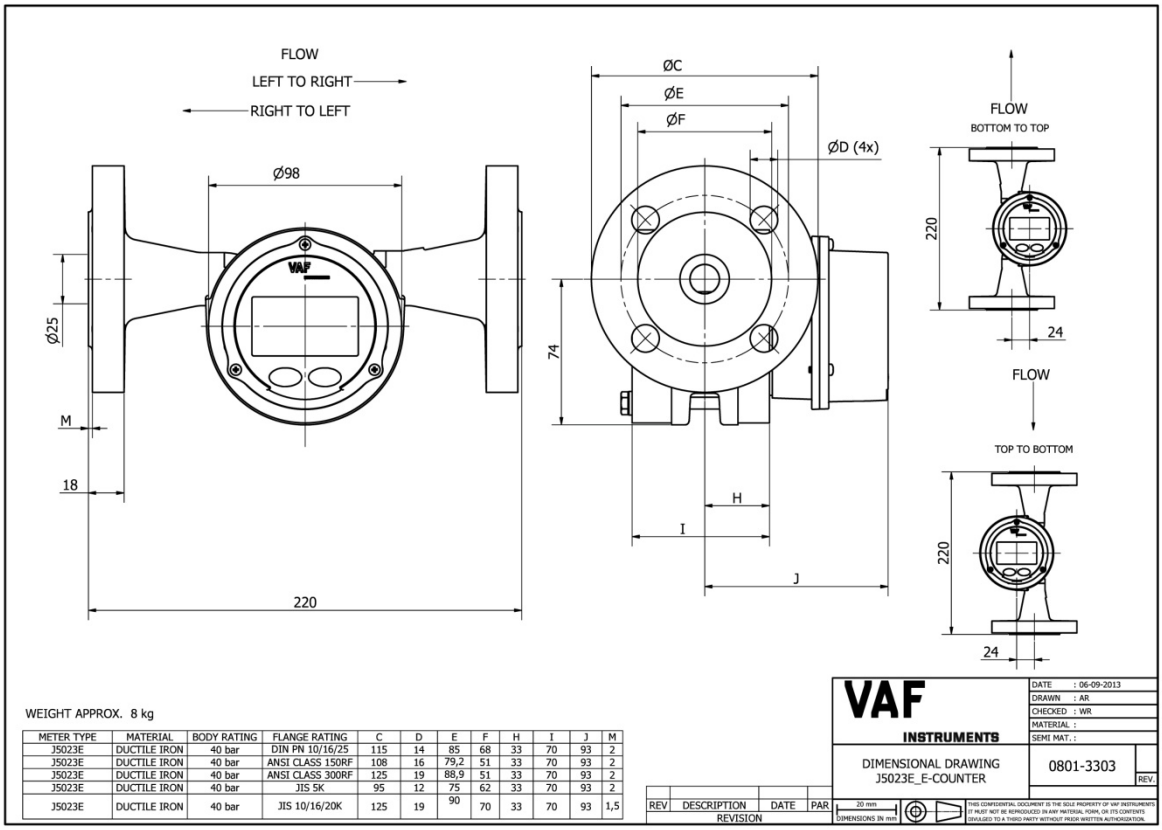
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5015E	DUCTILE IRON	40 bar	DIN PN 10/16/25	95	14	65	45	33	70	93	2
J5015E	DUCTILE IRON	40 bar	ANSI CLASS 150RF	89	16	60,5	35	33	70	93	2
J5015E	DUCTILE IRON	40 bar	ANSI CLASS 300RF	95	16	66,5	35	33	70	93	2
J5015E	DUCTILE IRON	40 bar	JIS 10/16/20K	95	15	70	52	33	70	93	2

Figure 81 – Drawing 0801-3302 – Dimensional drawing J5015E E-counter wih pulse output



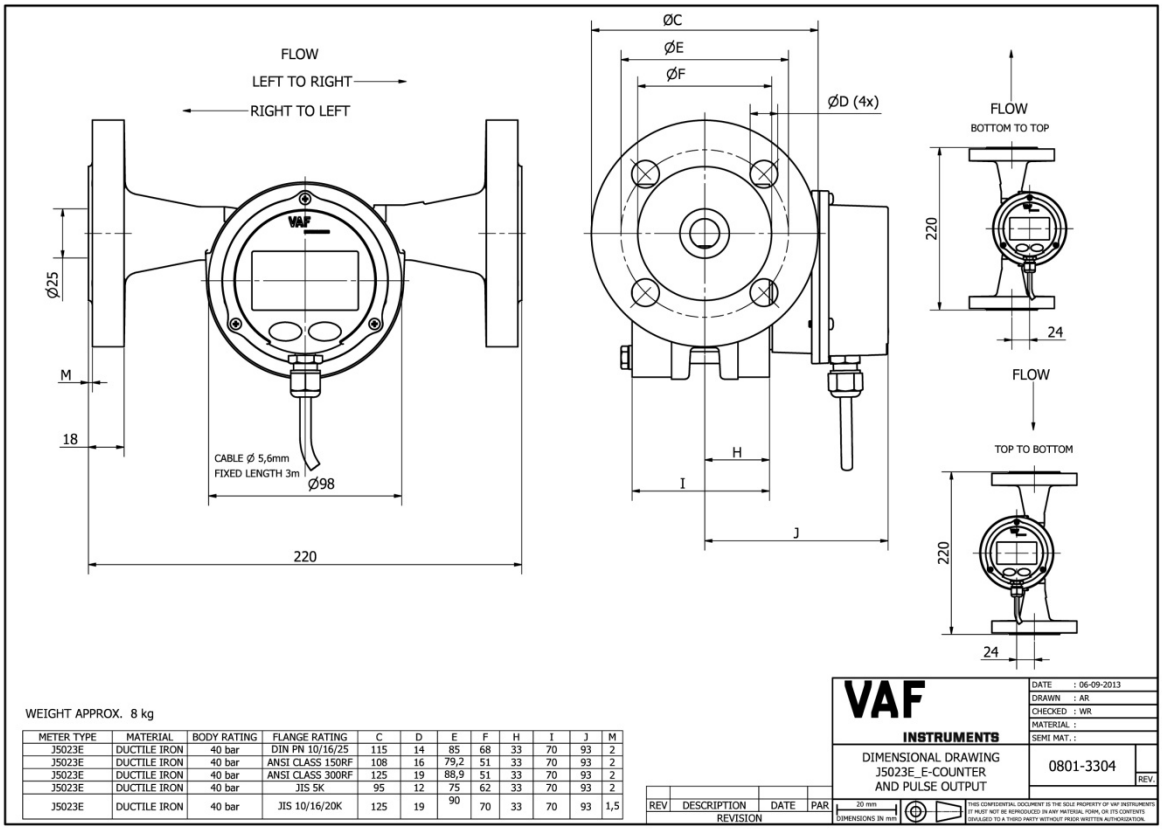
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5015E	DUCTILE IRON	40 bar	DIN PN 10/16/25	95	14	65	45	33	70	127	2
J5015E	DUCTILE IRON	40 bar	ANSI CLASS 150RF	89	16	60,5	35	33	70	127	2
J5015E	DUCTILE IRON	40 bar	ANSI CLASS 300RF	95	16	66,5	35	33	70	127	2
J5015E	DUCTILE IRON	40 bar	JIS 10/16/20K	95	15	70	52	33	70	127	2

Figure 82 – Drawing 0801-3313 – Dimensional drawing J5015E Pulse transmitter box



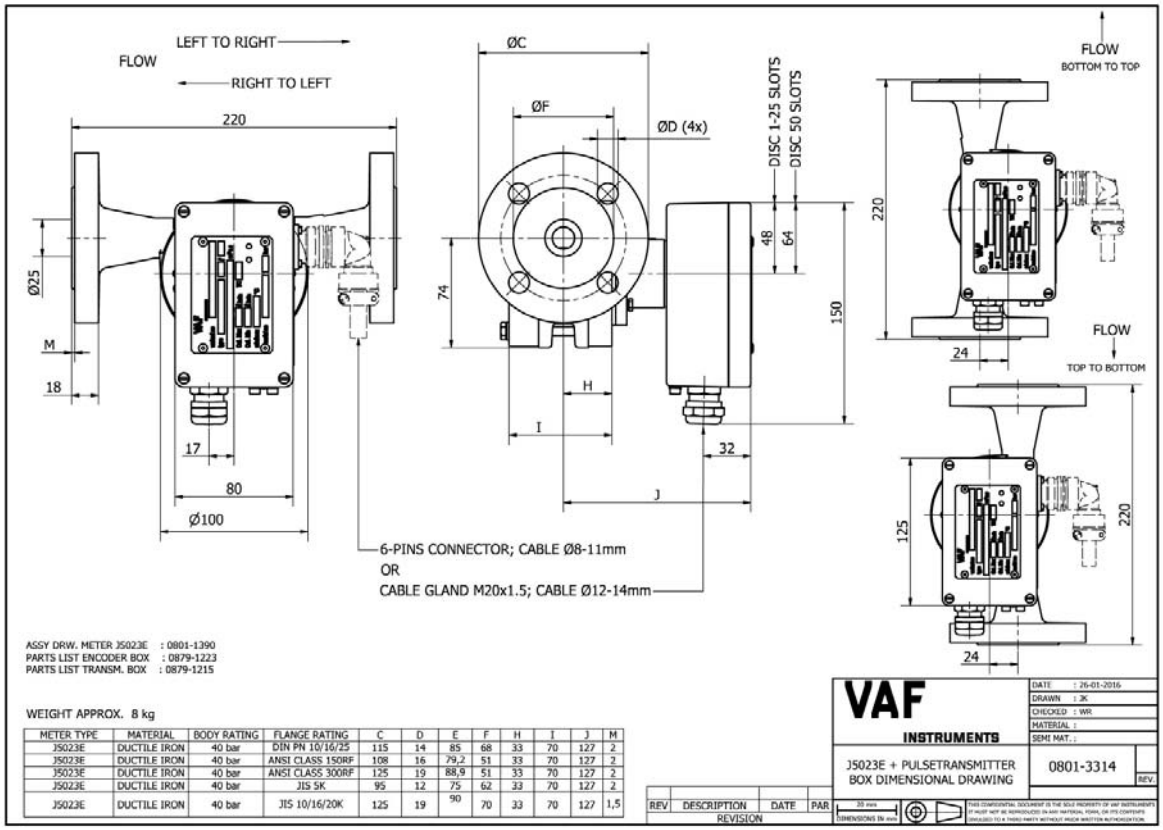
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5023E	DUCTILE IRON	40 bar	DIN PN 10/16/25	115	14	85	68	33	70	93	2
J5023E	DUCTILE IRON	40 bar	ANSI CLASS 150RF	108	16	79,2	51	33	70	93	2
J5023E	DUCTILE IRON	40 bar	ANSI CLASS 300RF	125	19	88,9	51	33	70	93	2
J5023E	DUCTILE IRON	40 bar	JIS 5K	95	12	75	62	33	70	93	2
J5023E	DUCTILE IRON	40 bar	JIS 10/16/20K	125	19	90	70	33	70	93	1,5

Figure 83 – Drawing 0801-3303 – Dimensional drawing J5023E E-counter



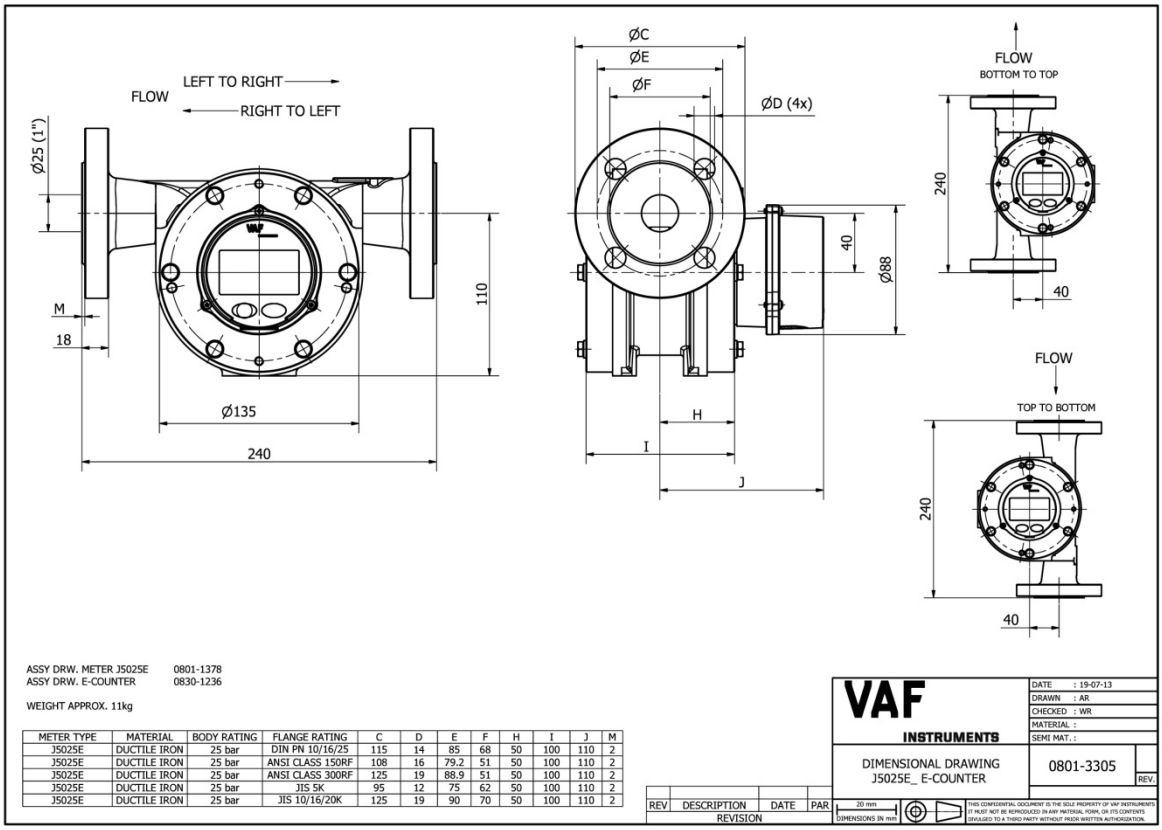
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5023E	DUCTILE IRON	40 bar	DIN PN 10/16/25	115	14	85	68	33	70	93	2
J5023E	DUCTILE IRON	40 bar	ANSI CLASS 150RF	108	16	79,2	51	33	70	93	2
J5023E	DUCTILE IRON	40 bar	ANSI CLASS 300RF	125	19	88,9	51	33	70	93	2
J5023E	DUCTILE IRON	40 bar	JIS 5K	95	12	75	62	33	70	93	2
J5023E	DUCTILE IRON	40 bar	JIS 10/16/20K	125	19	90	70	33	70	93	1,5

Figure 84 – Drawing 0801-3304 – Dimensional drawing J5023E E-counter with pulse output



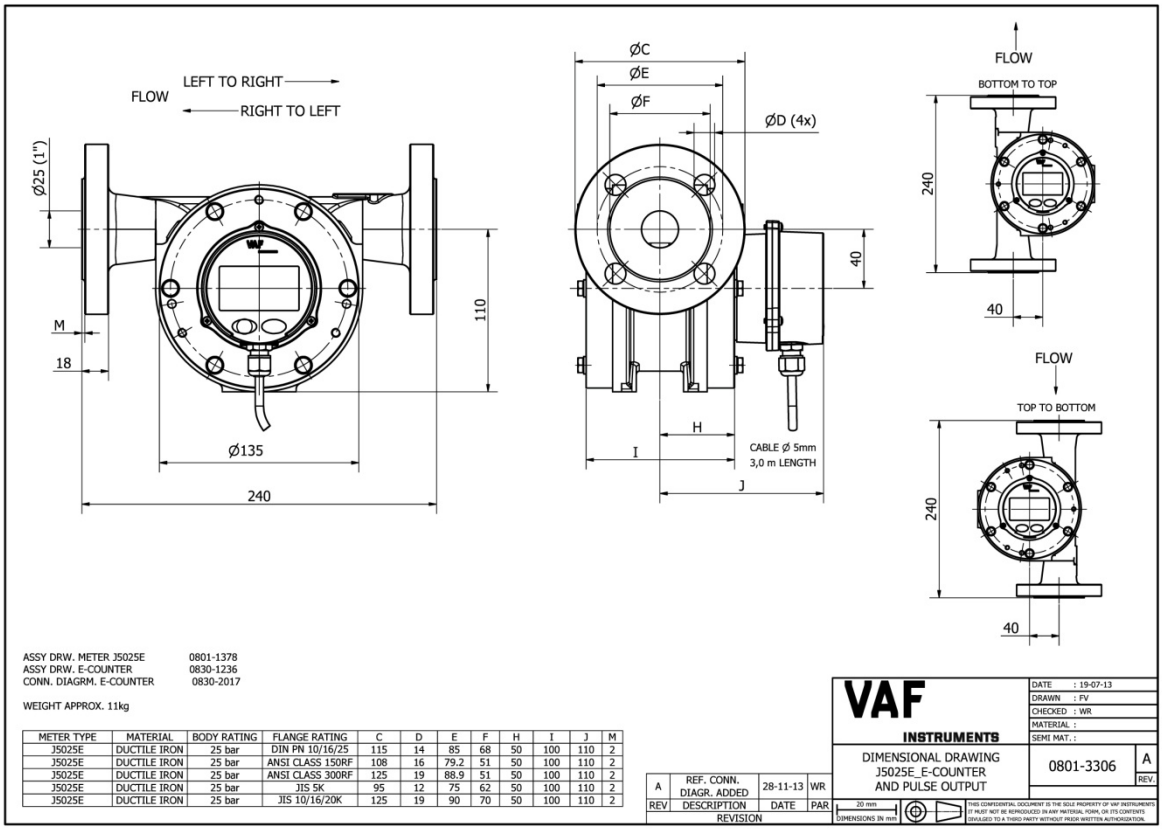
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5023E	DUCTILE IRON	40 bar	DIN PN 10/16/25	115	14	85	68	33	70	127	2
J5023E	DUCTILE IRON	40 bar	ANSI CLASS 150RF	108	16	79,2	51	33	70	127	2
J5023E	DUCTILE IRON	40 bar	ANSI CLASS 300RF	125	19	88,9	51	33	70	127	2
J5023E	DUCTILE IRON	40 bar	JIS 5K	95	12	75	62	33	70	127	2
J5023E	DUCTILE IRON	40 bar	JIS 10/16/20K	125	19	90	70	33	70	127	1,5

Figure 85 – Drawing 0801-3314 – Dimensional drawing J5023E Pulse transmitter box



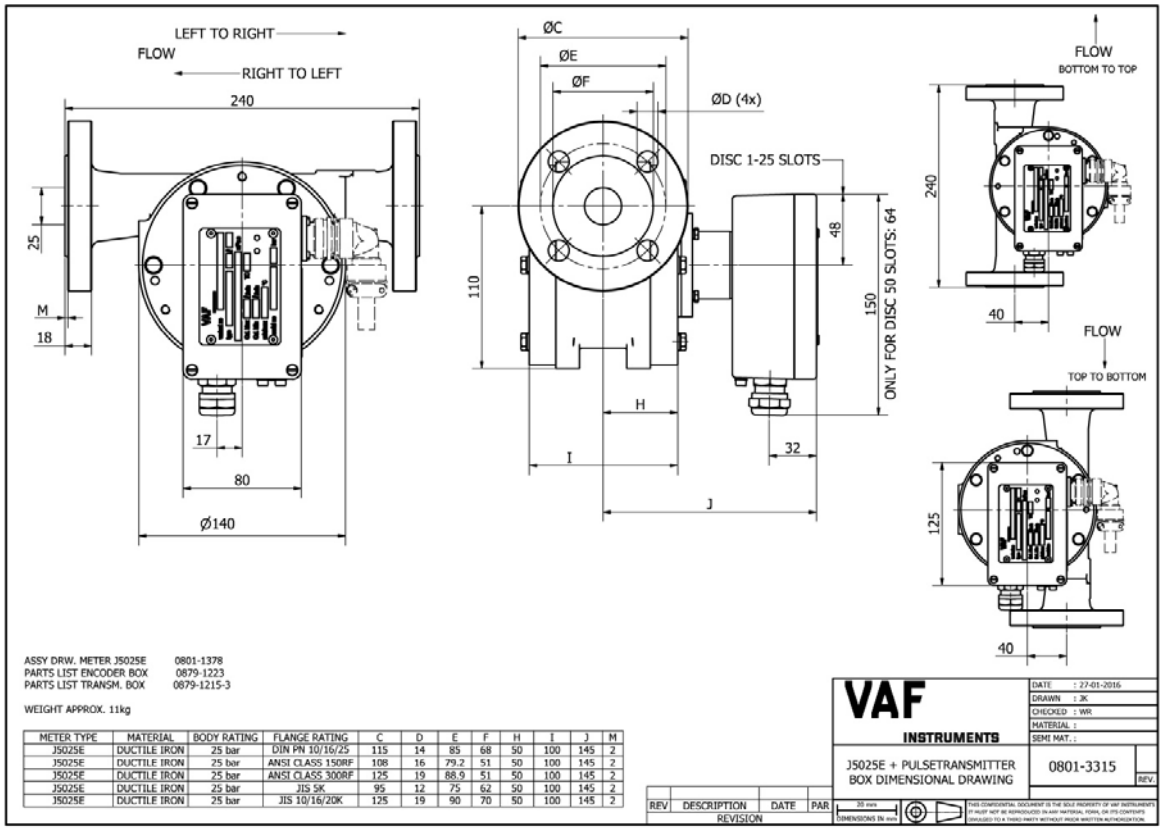
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5025E	DUCTILE IRON	25 bar	DIN PN 10/16/25	115	14	85	68	50	100	110	2
J5025E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	108	16	79.2	51	50	100	110	2
J5025E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	125	19	88.9	51	50	100	110	2
J5025E	DUCTILE IRON	25 bar	JIS 5K	95	12	75	62	50	100	110	2
J5025E	DUCTILE IRON	25 bar	JIS 10/16/20K	125	19	90	70	50	100	110	2

Figure 86 – Drawing 0801-3305 – Dimensional drawing J5025E E-counter



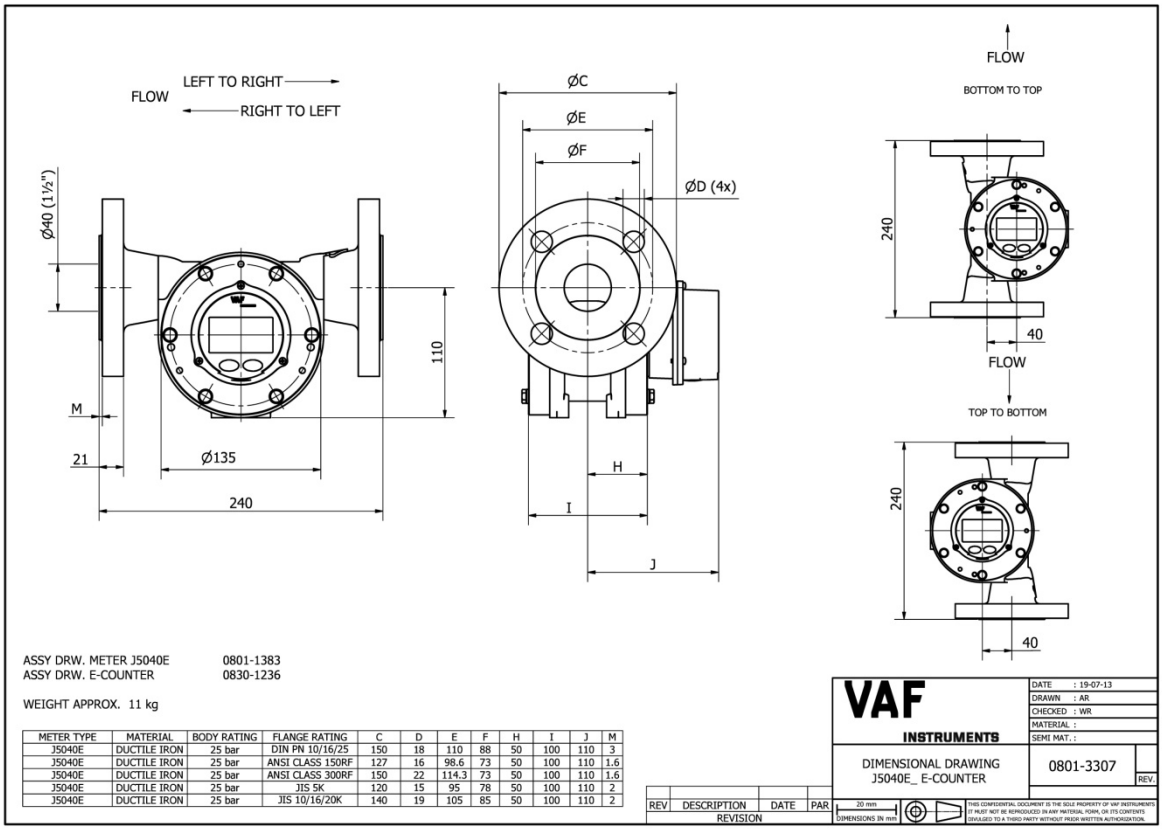
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5025E	DUCTILE IRON	25 bar	DIN PN 10/16/25	115	14	85	68	50	100	110	2
J5025E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	108	16	79.2	51	50	100	110	2
J5025E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	125	19	88.9	51	50	100	110	2
J5025E	DUCTILE IRON	25 bar	JIS 5K	95	12	75	62	50	100	110	2
J5025E	DUCTILE IRON	25 bar	JIS 10/16/20K	125	19	90	70	50	100	110	2

Figure 87 – Drawing 0801-3306 – Dimensional drawing J5025E E-counter with pulse output



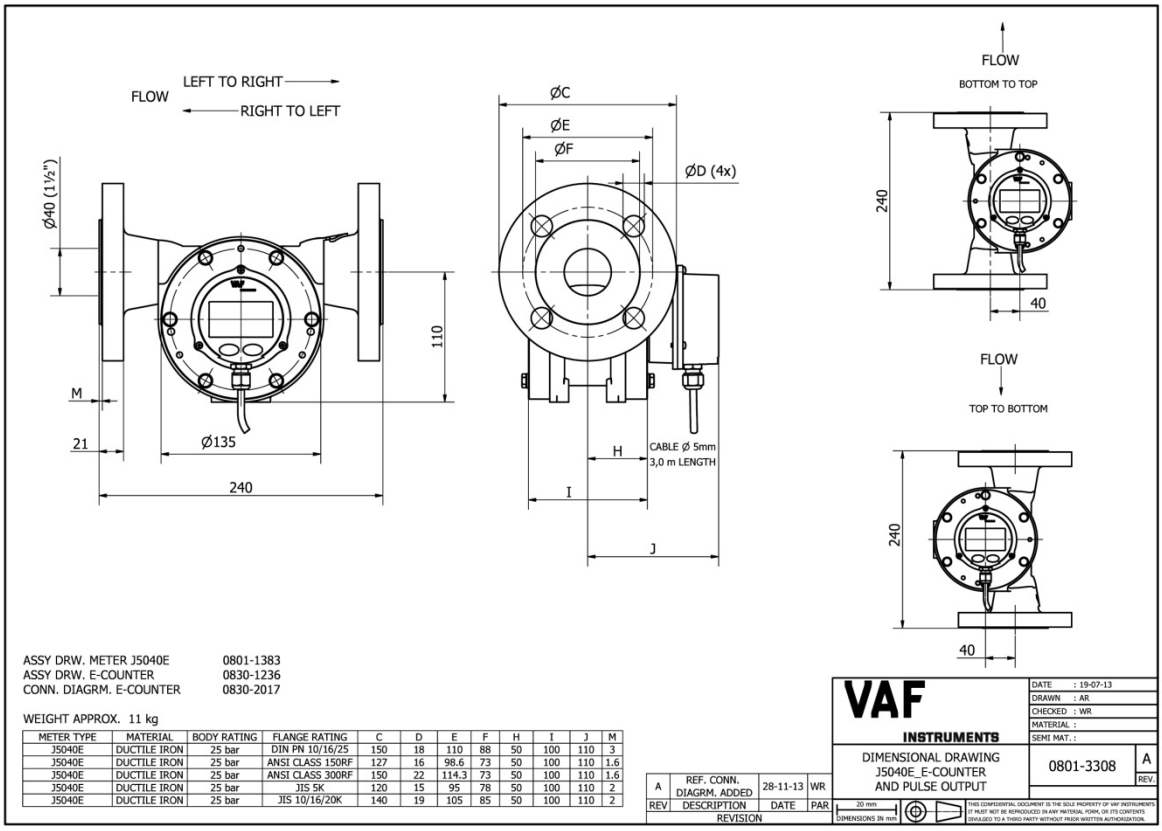
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5025E	DUCTILE IRON	25 bar	DIN PN 10/16/25	115	14	85	68	50	100	145	2
J5025E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	108	16	79.2	51	50	100	145	2
J5025E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	125	19	88.9	51	50	100	145	2
J5025E	DUCTILE IRON	25 bar	JIS 5K	95	12	75	62	50	100	145	2
J5025E	DUCTILE IRON	25 bar	JIS 10/16/20K	125	19	90	70	50	100	145	2

Figure 88 – Drawing 0801-3315 – Dimensional drawing J5025E Pulse transmitter box



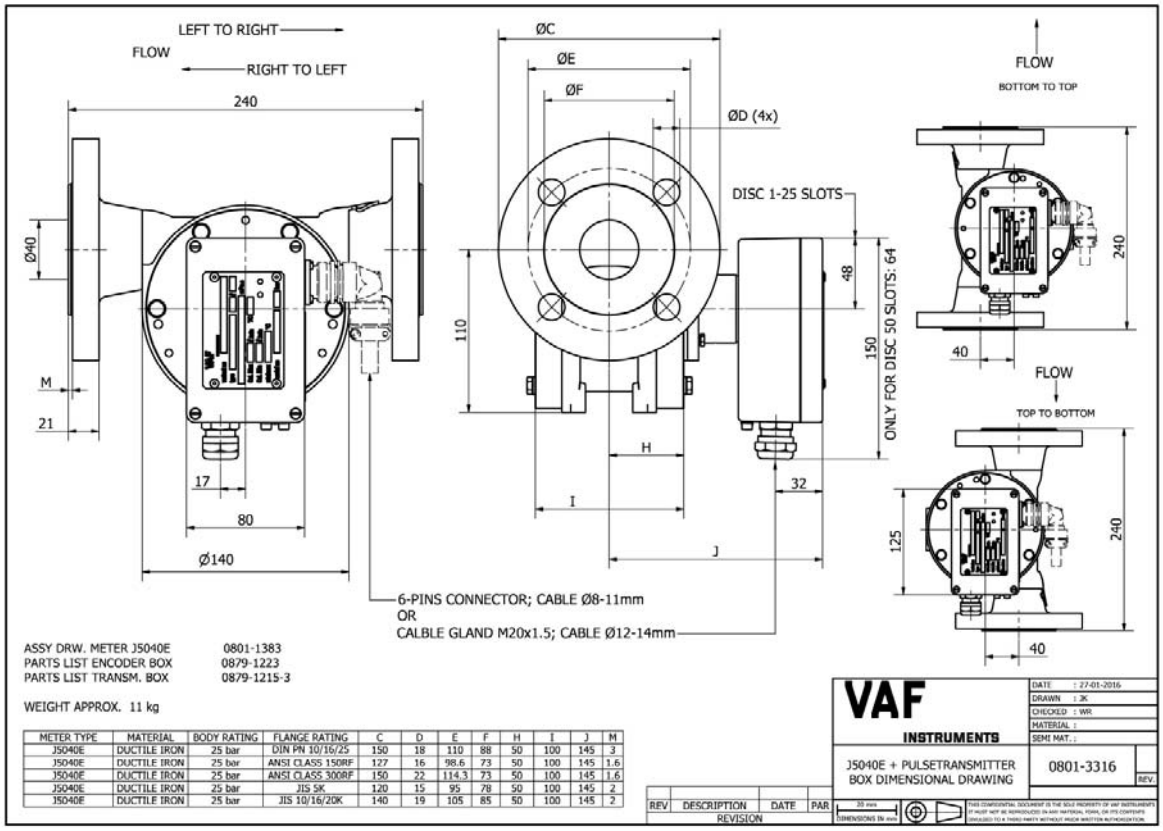
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5040E	DUCTILE IRON	25 bar	DIN PN 10/16/25	150	18	110	88	50	100	110	3
J5040E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	127	16	98.6	73	50	100	110	1.6
J5040E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	150	22	114.3	73	50	100	110	1.6
J5040E	DUCTILE IRON	25 bar	JIS 5K	120	15	95	78	50	100	110	2
J5040E	DUCTILE IRON	25 bar	JIS 10/16/20K	140	19	105	85	50	100	110	2

Figure 89 – Drawing 0801-3307 – Dimensional drawing J5040E E-counter



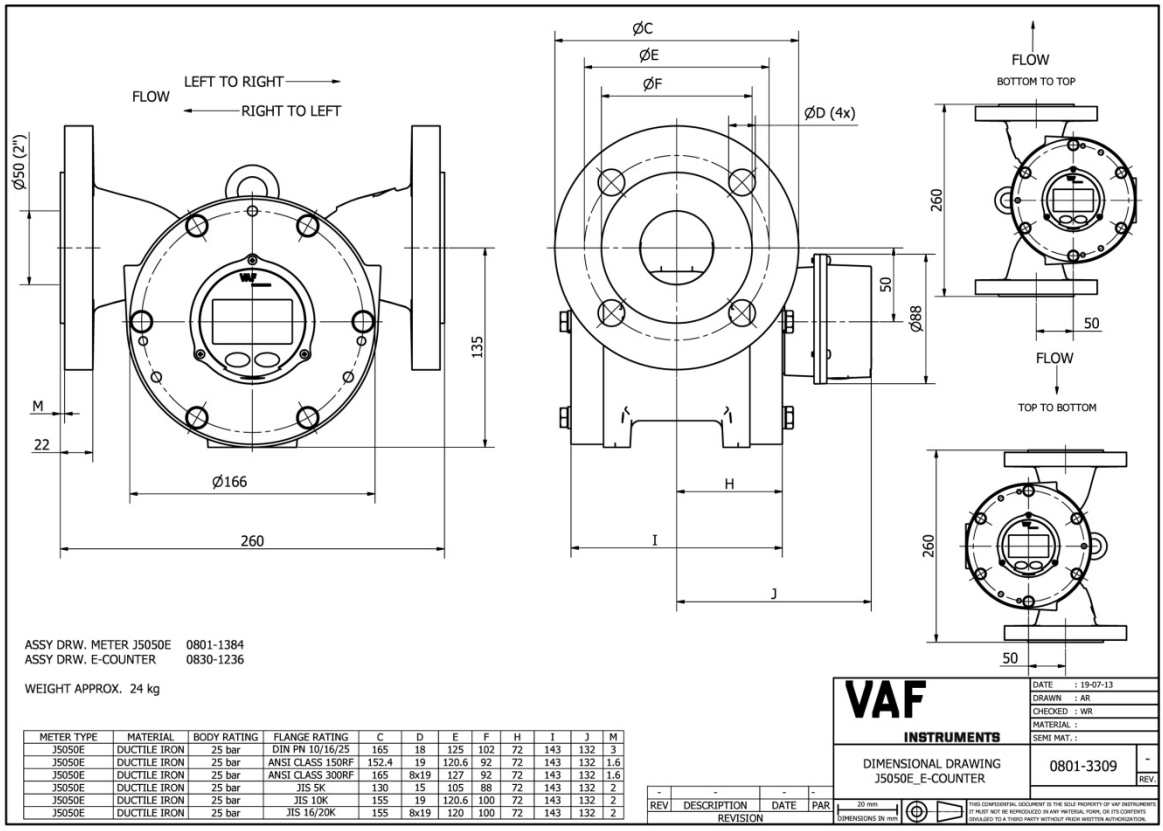
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5040E	DUCTILE IRON	25 bar	DIN PN 10/16/25	150	18	110	88	50	100	110	3
J5040E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	127	16	98.6	73	50	100	110	1.6
J5040E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	150	22	114.3	73	50	100	110	1.6
J5040E	DUCTILE IRON	25 bar	JIS 5K	120	15	95	78	50	100	110	2
J5040E	DUCTILE IRON	25 bar	JIS 10/16/20K	140	19	105	85	50	100	110	2

Figure 90 – Drawing 0801-3308 – Dimensional drawing J5040E E-counter with pulse output



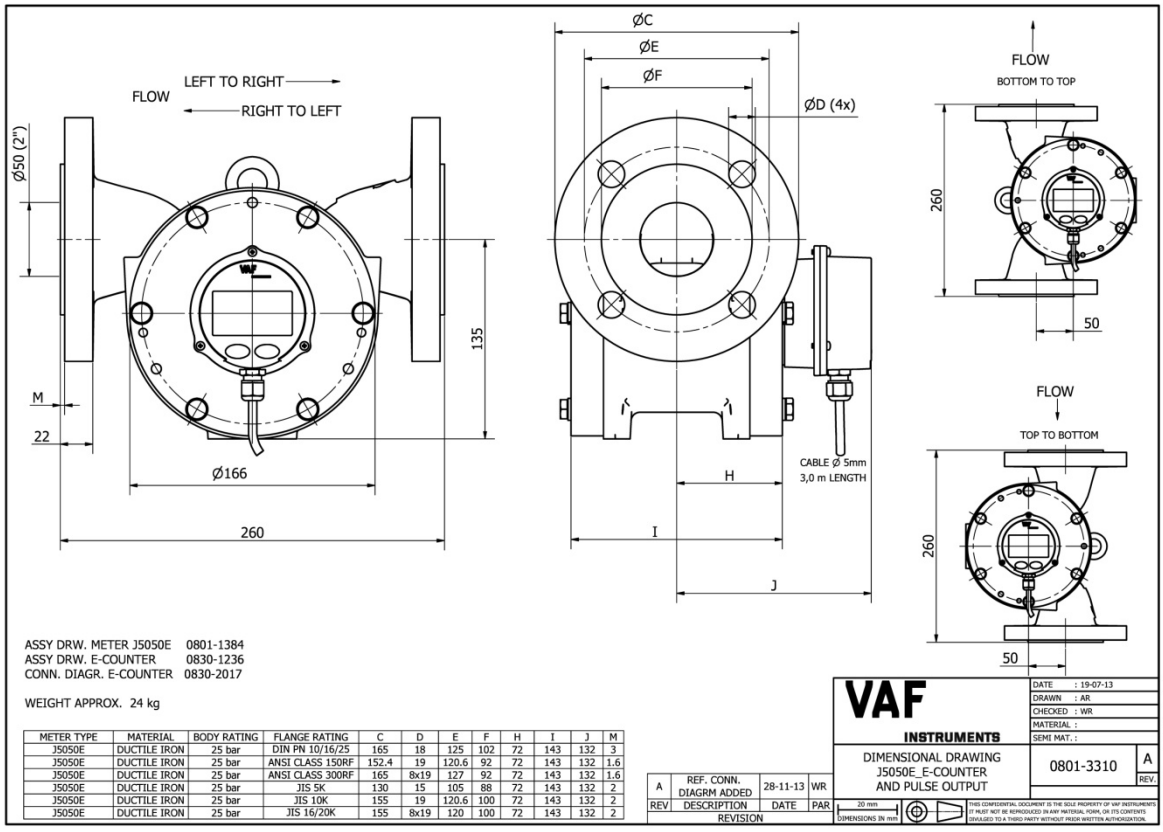
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5040E	DUCTILE IRON	25 bar	DIN PN 10/16/25	150	18	110	88	50	100	145	3
J5040E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	127	16	98.6	73	50	100	145	1.6
J5040E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	150	22	114.3	73	50	100	145	1.6
J5040E	DUCTILE IRON	25 bar	JIS 5K	120	15	95	78	50	100	145	2
J5040E	DUCTILE IRON	25 bar	JIS 10/16/20K	140	19	105	85	50	100	145	2

Figure 91 – Drawing 0801-3316 – Dimensional drawing J5040E Pulse transmitter box



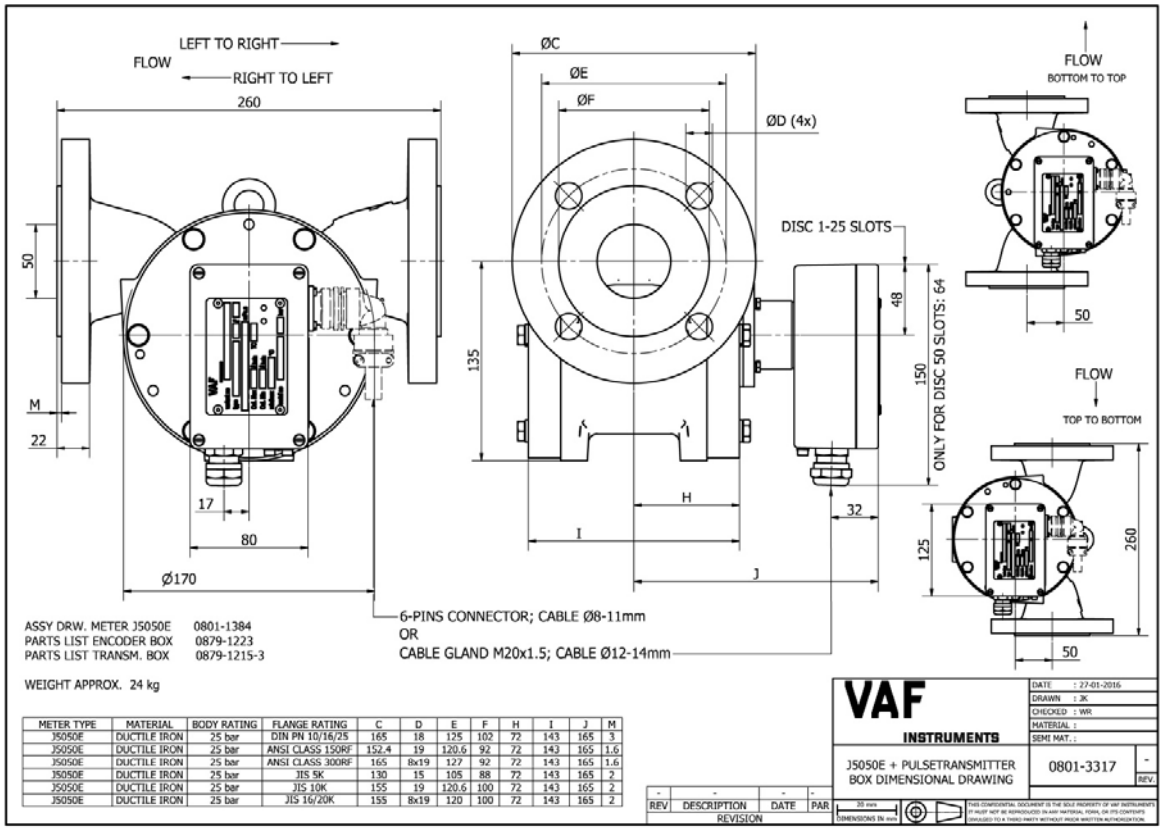
METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5050E	DUCTILE IRON	25 bar	DIN PN 10/16/25	165	18	125	102	72	143	132	3
J5050E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	152.4	19	120.6	92	72	143	132	1.6
J5050E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	165	8x19	127	92	72	143	132	1.6
J5050E	DUCTILE IRON	25 bar	JIS 5K	130	15	105	88	72	143	132	2
J5050E	DUCTILE IRON	25 bar	JIS 10K	155	19	120.6	100	72	143	132	2
J5050E	DUCTILE IRON	25 bar	JIS 16/20K	155	8x19	120	100	72	143	132	2

Figure 92 – Drawing 0801-3309 – Dimensional drawing J5050E E-counter



METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5050E	DUCTILE IRON	25 bar	DIN PN 10/16/25	165	18	125	102	72	143	132	3
J5050E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	152.4	19	120.6	92	72	143	132	1.6
J5050E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	165	8x19	127	92	72	143	132	1.6
J5050E	DUCTILE IRON	25 bar	JIS 5K	130	15	105	88	72	143	132	2
J5050E	DUCTILE IRON	25 bar	JIS 10K	155	19	120.6	100	72	143	132	2
J5050E	DUCTILE IRON	25 bar	JIS 16/20K	155	8x19	120	100	72	143	132	2

Figure 93 – Drawing 0801-3310 – Dimensional drawing J5050E E-counter with pulse output



METER TYPE	MATERIAL	BODY RATING	FLANGE RATING	C	D	E	F	H	I	J	M
J5050E	DUCTILE IRON	25 bar	DIN PN 10/16/25	165	18	125	102	72	143	165	3
J5050E	DUCTILE IRON	25 bar	ANSI CLASS 150RF	152.4	19	120.6	92	72	143	165	1.6
J5050E	DUCTILE IRON	25 bar	ANSI CLASS 300RF	165	8x19	127	92	72	143	165	1.6
J5050E	DUCTILE IRON	25 bar	JIS 5K	130	15	105	88	72	143	165	2
J5050E	DUCTILE IRON	25 bar	JIS 10K	155	19	120.6	100	72	143	165	2
J5050E	DUCTILE IRON	25 bar	JIS 16/20K	155	8x19	120	100	72	143	165	2

Figure 94 – Drawing 0801-3317 – Dimensional drawing J5050E Pulse transmitter box

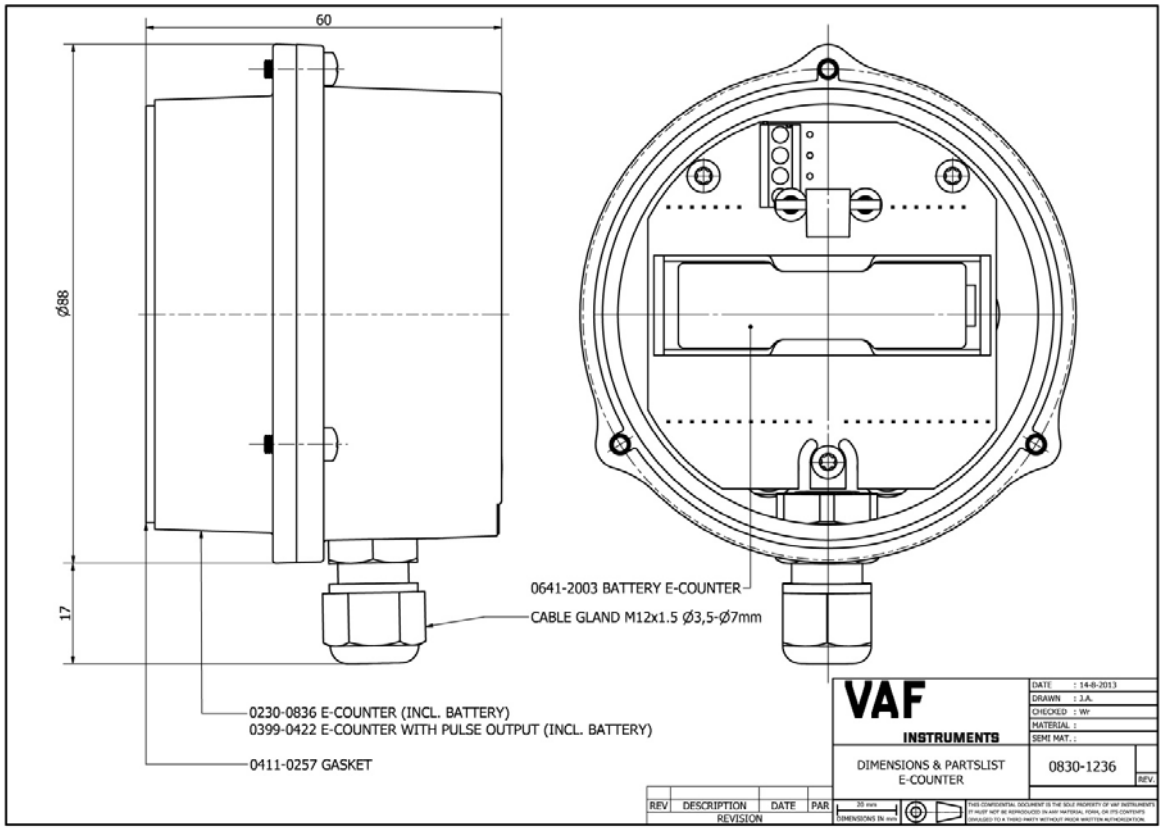


Figure 95 – Drawing 0830-1236 – E-counter dimensional drawing and partslist

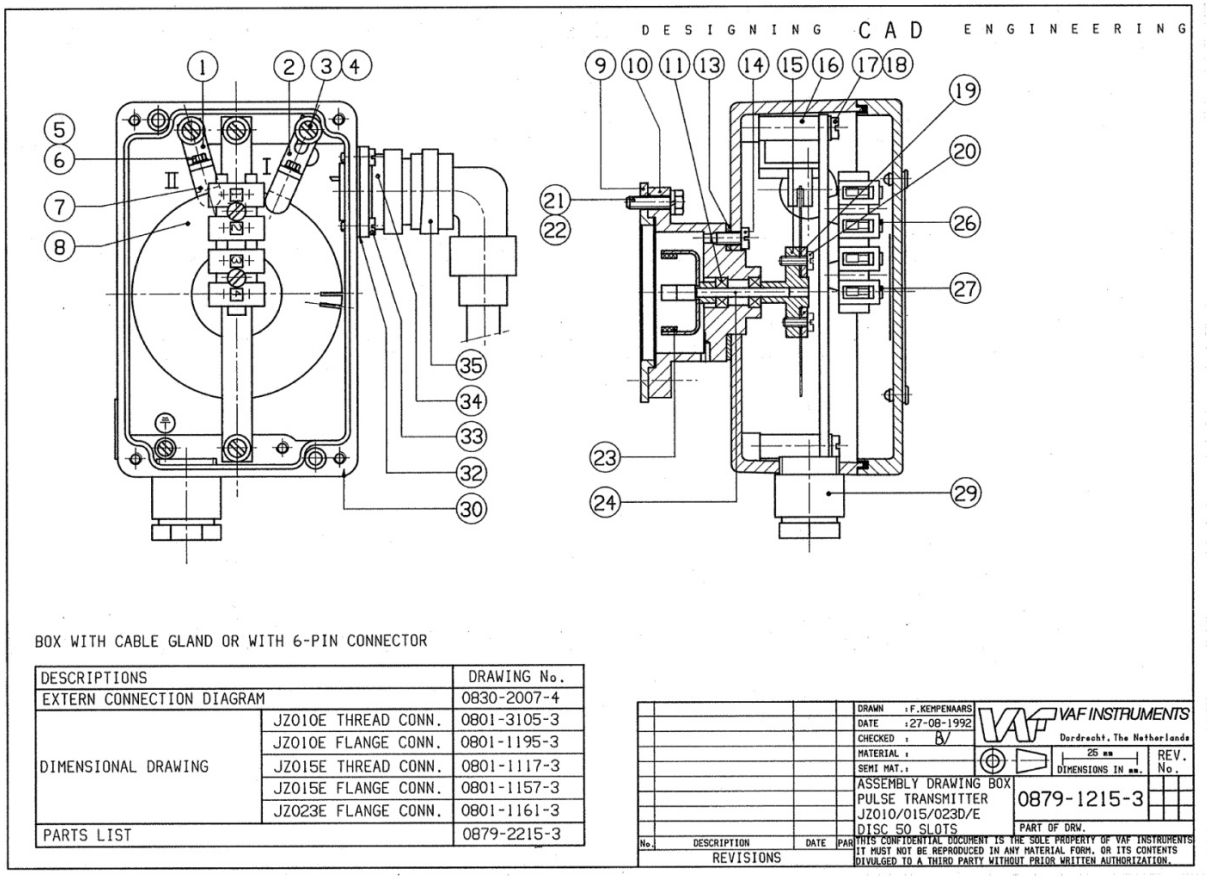
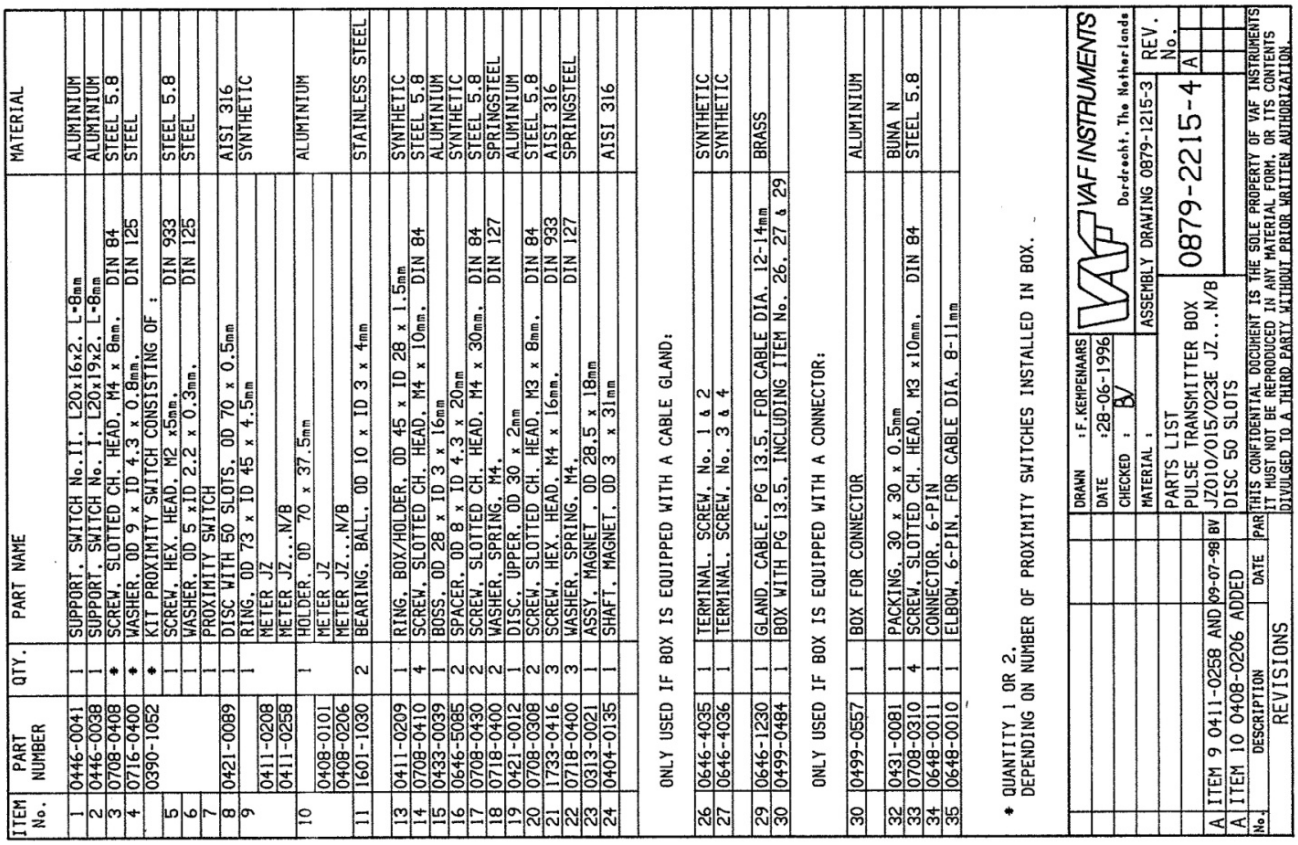


Figure 96 – Drawing 0879-1215 – Pulse transmitter box assembly drawing



ITEM No.	PART NUMBER	QTY.	PART NAME	MATERIAL
1	0446-0041	1	SUPPORT, SWITCH No.II, L20x16x2, L-8mm	ALUMINIUM
2	0446-0038	1	SUPPORT, SWITCH No. I, L20x19x2, L-8mm	ALUMINIUM
3	0708-0408	*	SCREW, SLOTTED CH. HEAD, M4 x 8mm, DIN 84	STEEL 5.8
4	0716-0400	*	WASHER, OD 9 x ID 4.3 x 0.8mm, DIN 125	STEEL
	0390-1052	*	KIT PROXIMITY SWITCH CONSISTING OF :	
5		1	SCREW, HEX. HEAD, M2 x5mm, DIN 933	STEEL 5.8
6		1	WASHER, OD 5 xID 2.2 x 0.3mm, DIN 125	STEEL
7		1	PROXIMITY SWITCH	
8	0421-0089	1	DISC WITH 50 SLOTS, OD 70 x 0.5mm	AISI 316
9		1	RING, OD 73 x ID 45 x 4.5mm	SYNTHETIC
	0411-0208		METER JZ	
	0411-0258		METER JZ...N/B	
10		1	HOLDER, OD 70 x 37.5mm	ALUMINIUM
	0408-0101		METER JZ	
	0408-0206		METER JZ...N/B	
11	1601-1030	2	BEARING, BALL, OD 10 x ID 3 x 4mm	STAINLESS STEEL
13	0411-0209	1	RING, BOX/HOLDER, OD 45 x ID 28 x 1.5mm	SYNTHETIC
14	0708-0410	4	SCREW, SLOTTED CH. HEAD, M4 x 10mm, DIN 84	STEEL 5.8
15	0433-0039	1	BOSS, OD 28 x ID 3 x 16mm	ALUMINIUM
16	0646-5085	2	SPACER, OD 8 x ID 4.3 x 20mm	SYNTHETIC
17	0708-0430	2	SCREW, SLOTTED CH. HEAD, M4 x 30mm, DIN 84	STEEL 5.8
18	0718-0400	2	WASHER, SPRING, M4, DIN 127	SPRINGSTEEL
19	0421-0012	1	DISC, UPPER, OD 30 x 2mm	ALUMINIUM
20	0709-0308	2	SCREW, SLOTTED CH. HEAD, M3 x 8mm, DIN 84	STEEL 5.8
21	1733-0416	3	SCREW, HEX. HEAD, M4 x 16mm, DIN 933	AISI 316
22	0718-0400	3	WASHER, SPRING, M4, DIN 127	SPRINGSTEEL
23	0313-0021	1	ASSY, MAGNET, OD 28.5 x 18mm	
24	0404-0135	1	SHAFT, MAGNET, OD 3 x 31mm	AISI 316
			ONLY USED IF BOX IS EQUIPPED WITH A CABLE GLAND:	
26	0646-4035	1	TERMINAL, SCREW, No. 1 & 2	SYNTHETIC
27	0646-4036	1	TERMINAL, SCREW, No. 3 & 4	SYNTHETIC
29	0646-1230	1	GLAND, CABLE, PG 13.5, FOR CABLE DIA. 12-14mm	BRASS
30	0499-0484	1	BOX WITH PG 13.5, INCLUDING ITEM No. 26, 27 & 29	
			ONLY USED IF BOX IS EQUIPPED WITH A CONNECTOR:	
30	0499-0557	1	BOX FOR CONNECTOR	ALUMINIUM
32	0431-0081	1	PACKING, 30 x 30 x 0.5mm	BUNA N
33	0708-0310	4	SCREW, SLOTTED CH. HEAD, M3 x10mm, DIN 84	STEEL 5.8
34	0648-0011	1	CONNECTOR, 6-PIN	
35	0648-0010	1	ELBOW, 6-PIN, FOR CABLE DIA. 8-11mm	

* QUANTITY 1 OR 2, DEPENDING ON NUMBER OF PROXIMITY SWITCHES INSTALLED IN BOX.

DRAWN :F.KEMPENAARS
DATE :28-06-1996
CHECKED : BV
MATERIAL :
VAF INSTRUMENTS
Dordrecht, The Netherlands
ASSEMBLY DRAWING 0879-1215-3
REV. No.
PARTS LIST
PULSE TRANSMITTER BOX
JZ010/015/023E JZ...N/B
DISC 50 SLOTS
0879-2215-4
A

A ITEM 9 0411-0258 AND 09-07-98 BV
A ITEM 10 0408-0206 ADDED
No. DESCRIPTION DATE PAR
REVISIONS

Figure 97 – Drawing 0879-2215 – Pulse transmitter box partslist

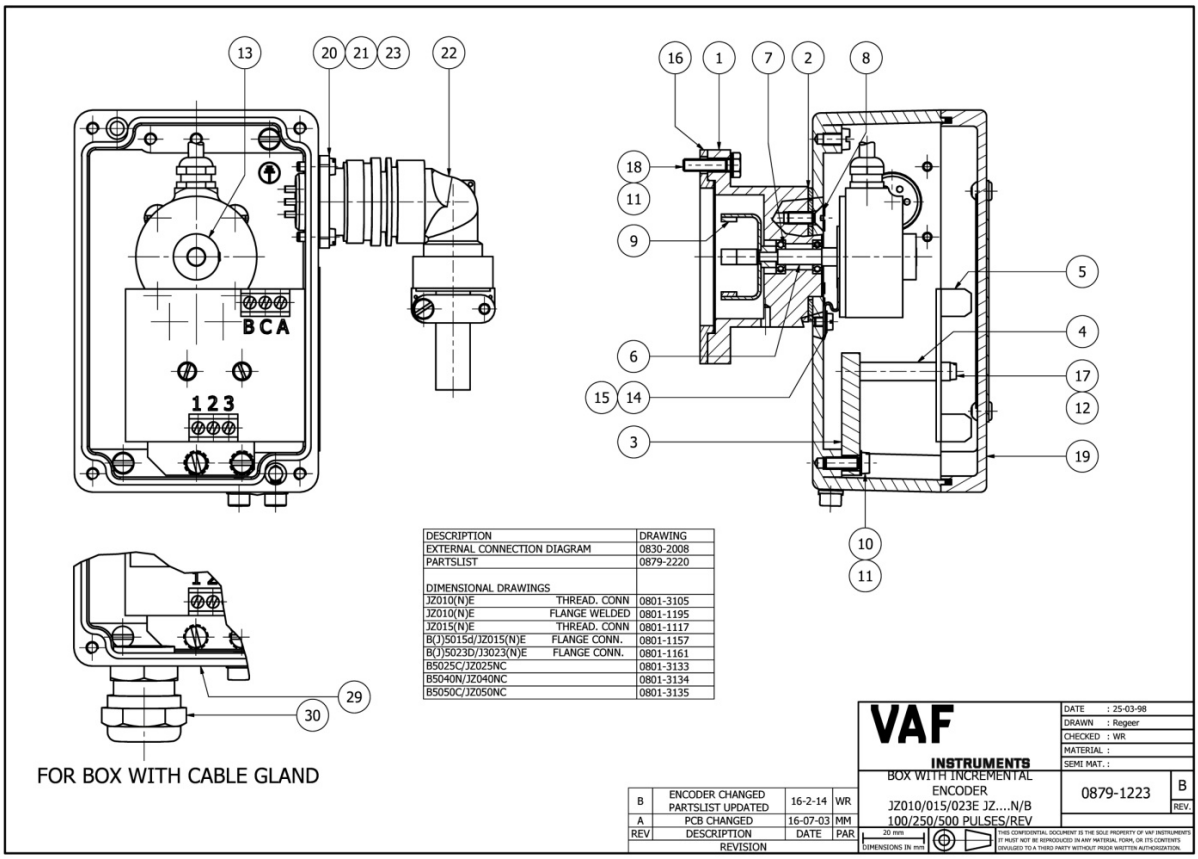


Figure 98 – Drawing 0879-1223 – Incremental encoder box assembly drawing

PARTS LIST

ITEM	PART NUMBER	QTY	DESCRIPTION	MATERIAL
1		1	HOLDER MAGNET OD 70 x 37.5mm	ALUMINIUM
	0408-0209		FOR METERS JZ	
	0408-0211		FOR METERS JZ...N AND B...	
2	0411-0209	1	RING , BOX/HOLDER OD 45 xID 28 x1.5mm	SYNTHETIC
3	0410-0090	1	PLATE 40 x35 x6mm	ALUMINIUM
4	0646-5087	2	SPACER Ø6xØ3.2 L=25	Nylon-6/6
5	0397-2203	1	PCB PULSE DISCRIMINATOR	
6	0404-0450	1	SHAFT ENCODER J010_015D, OD 6 x 57mm	AISI 316
7	0499-0621PH	2	BEARING BALL OD 11 x ID 5 x3mm	AISI 440
8	0736-0412	4	CSK HD SCREW, M4 x12 DIN 963	STEEL 4.8
9	0313-0021	1	ASSY MAGNET OUTSIDE OD 28.5 x18mm	
10	0708-0412	2	CH HD SCREW M4 x12 DIN84	SSTEEL4.8
11	0799-0044	5	SERRATED LOCK WASHER A4.3	STEEL
12	0646-5078	2	SPACER Ø6xØ3.2 L=3	Nylon-6/6
13		1	INCREMENTAL ENCODER	
	0680-0040		100 PULSES/REV	
	0680-0041		250 PULSES/REV	
	0680-0042		500 PULSES/REV	
14	0716-0300	2	WASHER - A 3,2 DIN 125	STEEL
15	0708-0304	2	CH HD SCREW- M3 x 4 DIN 84	STEEL 4.8
16		1	RING METER/HOLDER OD73 xID45 x2.5/4.5mm	SYNTHETIC
	0411-0208		FOR METERS JZ	
	0411-0258		FOR METERS JZ....N AND B....	
17	0708-0335	2	CH HD SCREW M3x35, DIN84	STEEL 4.8
18	1733-0416	3	HEX HD BOLT M4x16	AISI 316
			ONLY USE FOR BOX WITH CONNECTOR	
19	0499-0757	1	BOX FOR CONNECTOR	ALUMINIUM
20	0648-0011	1	CONNECTOR, RECEPTACLE PLUG 6 PINS	
21	0431-0081	1	PAKKING CONNECTOR 30x30x0.5mm	BUNA N
22	0648-0010	1	CONNECTOR,ELBOW 6 PINS , CABLE DIA 8-11mm	
23	0708-0310	4	CH HD SCREW M3x10 , DIN 84	STEEL 4.8
			ONLY USE FOR BOX WITH CABLE GLAND	
29	0499-0756	1	BOX FOR CABLE GLAND	ALUMINIUM
30	0646-1305	1	CABLE GLAND M20X1.5, CABLE DIAM 10-14mm	BRASS

B ENCODER CHANGED PARTSLIST UPDATED 16-2-14 WR
A PCB CHANGED 16-07-03 MM
REV DESCRIPTION DATE PAR
REVISION

VAF INSTRUMENTS

ENCR. ENCODER BOX
JZ010....023(N)E
JZ025...50N/B5015...050
100/250/500 PULSES/REV

0879-2220 B REV.

DATE : 30-8-2010
DRAWN : Regeer
CHECKED :
MATERIAL :
SEMI MAT. :

Figure 99 – Drawing 0879-2220 – Incremental encoder box partslist

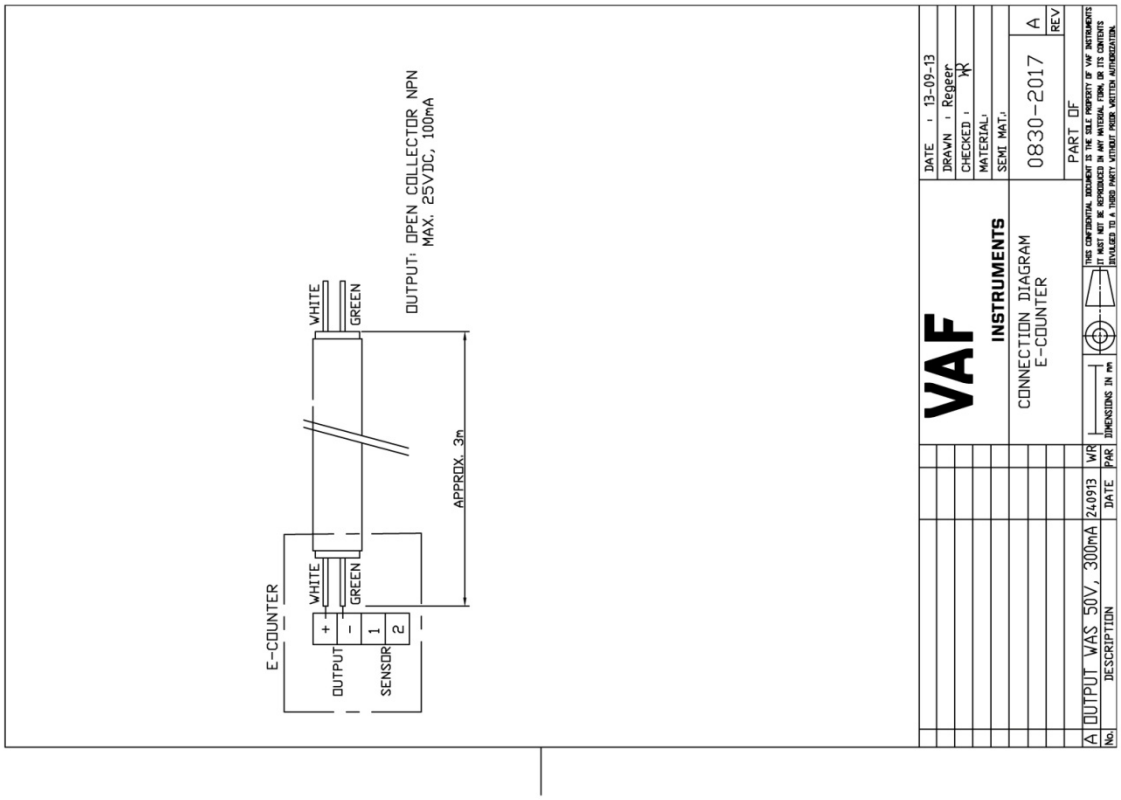


Figure 100 – Drawing 0830-2017 – Connection diagram E-counter

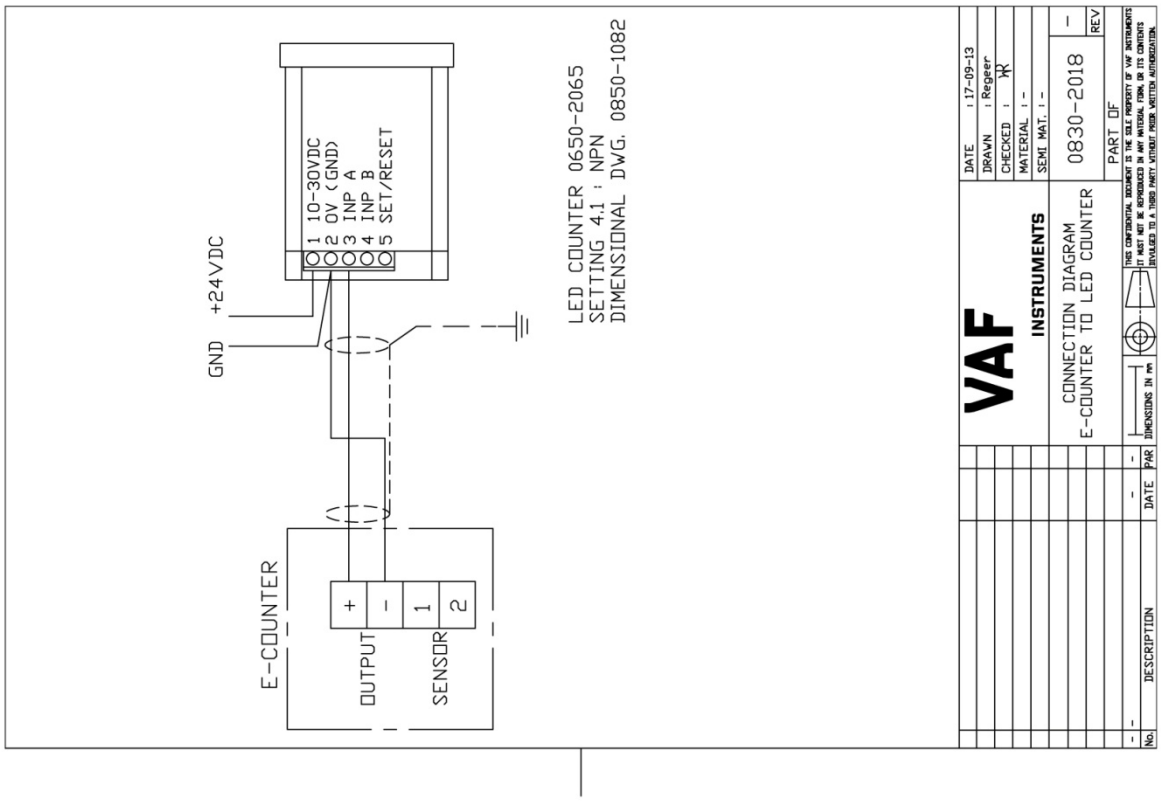


Figure 101 – Drawing 0830-2018 – Connection diagram E-counter to LED counter

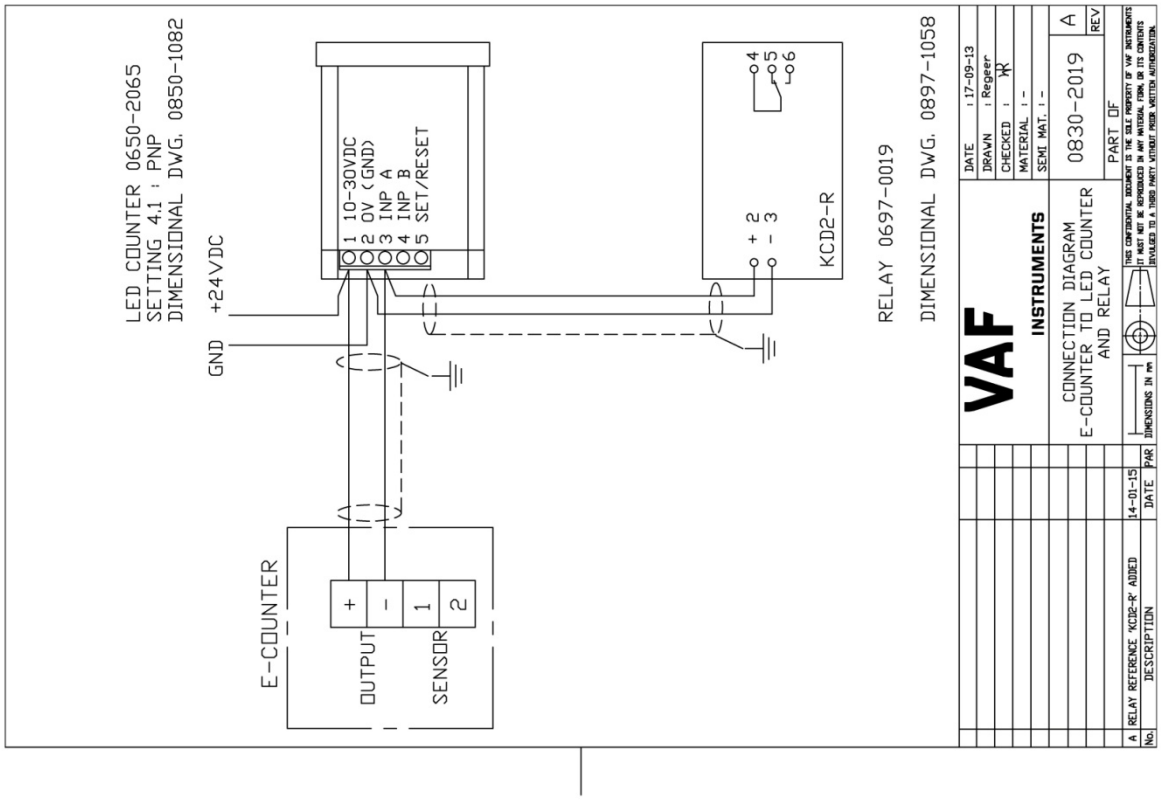


Figure 102 – Drawing 0830-2019 – Connection diagram E-counter to LED counter and relay

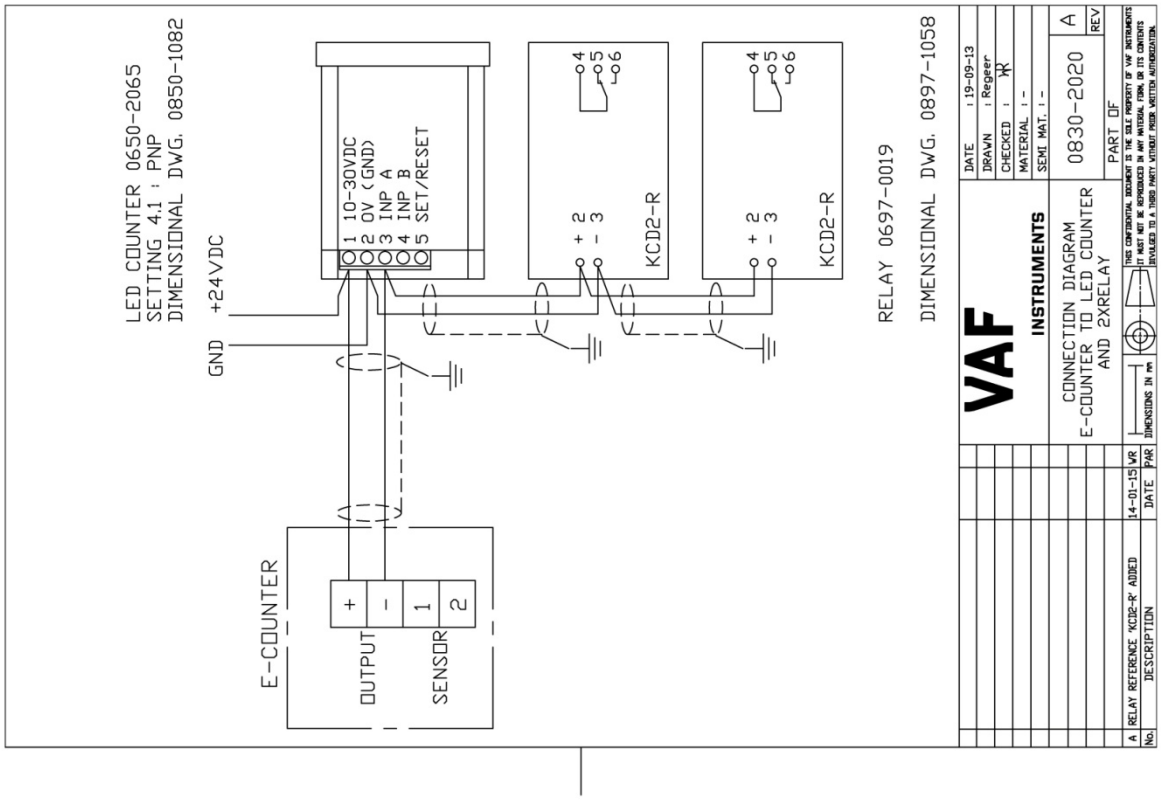


Figure 103 – Drawing 0830-2020 – Connection diagram E-counter to LED counter and 2xrelay

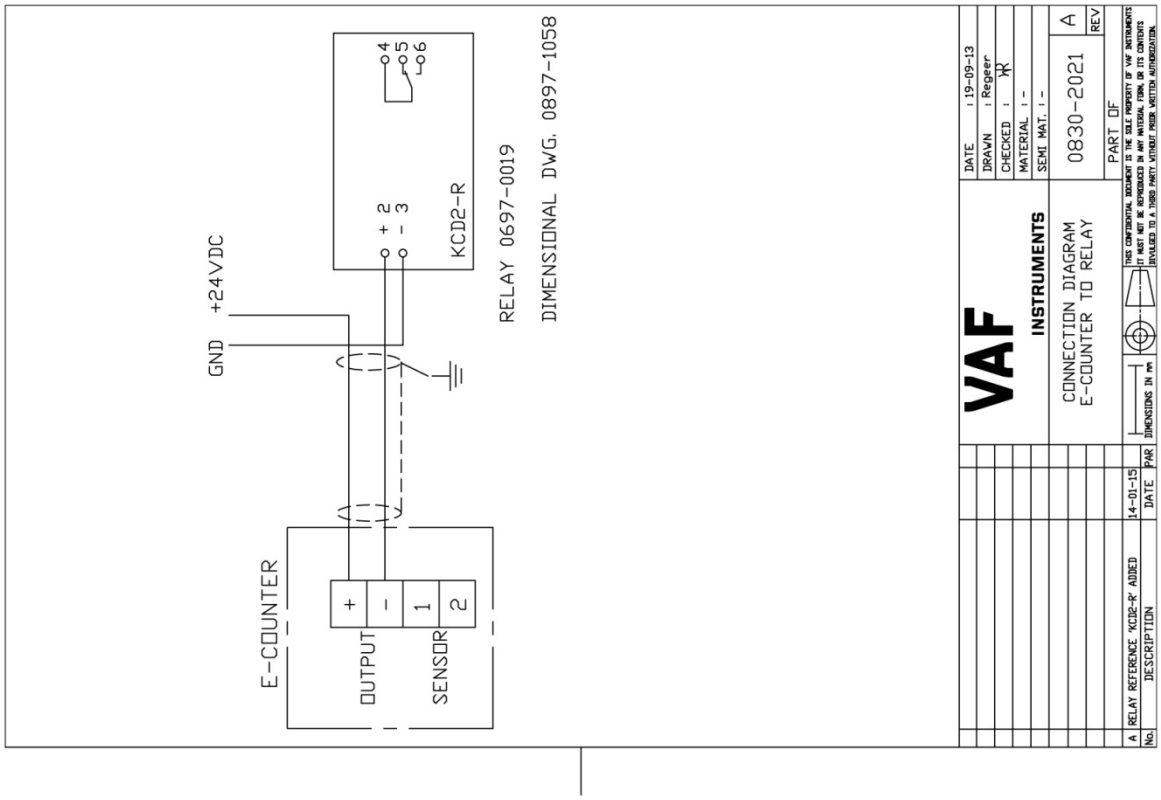


Figure 104 – Drawing 0830-2021 – Connection diagram E-counter to relay

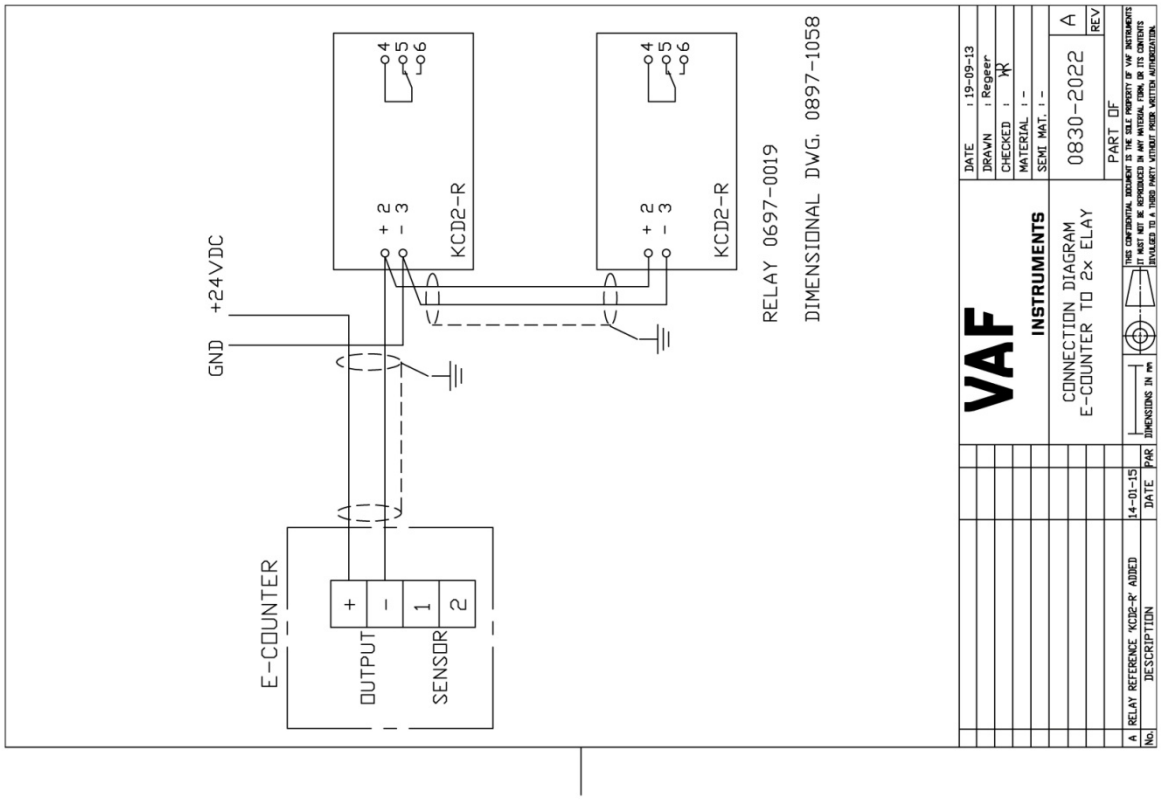


Figure 105 – Drawing 0830-2022 – Connection diagram E-counter to 2x relay

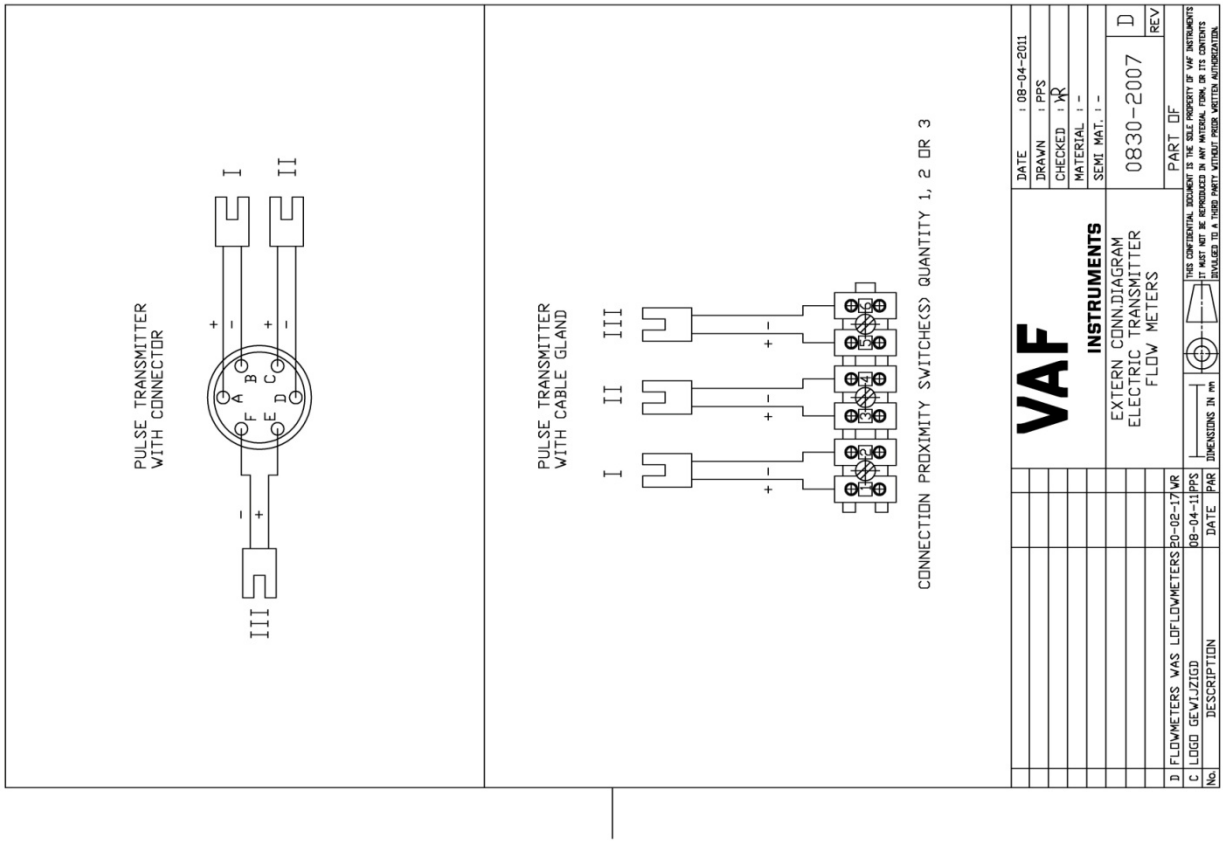


Figure 106 – Drawing 0830-2007 – Connection diagram pulse transmitter

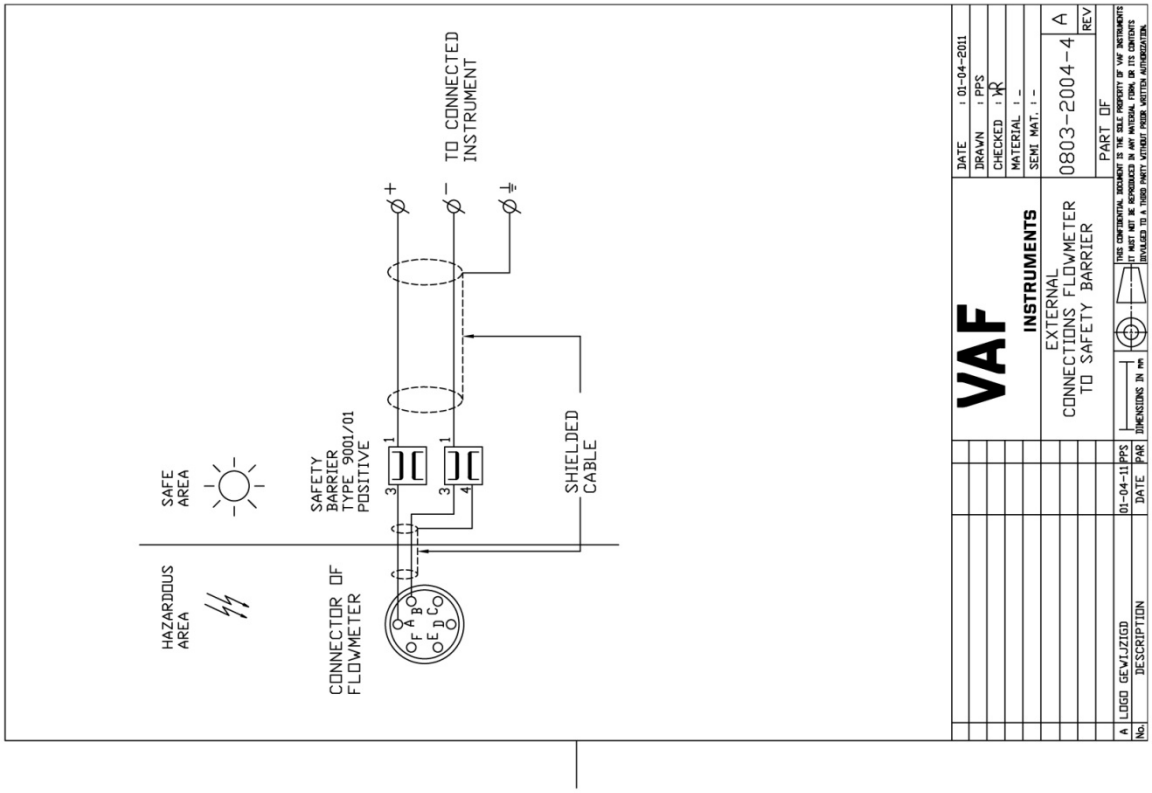


Figure 107 – Drawing 0803-2004 – Connection diagram pulse transmitter with safety barrier

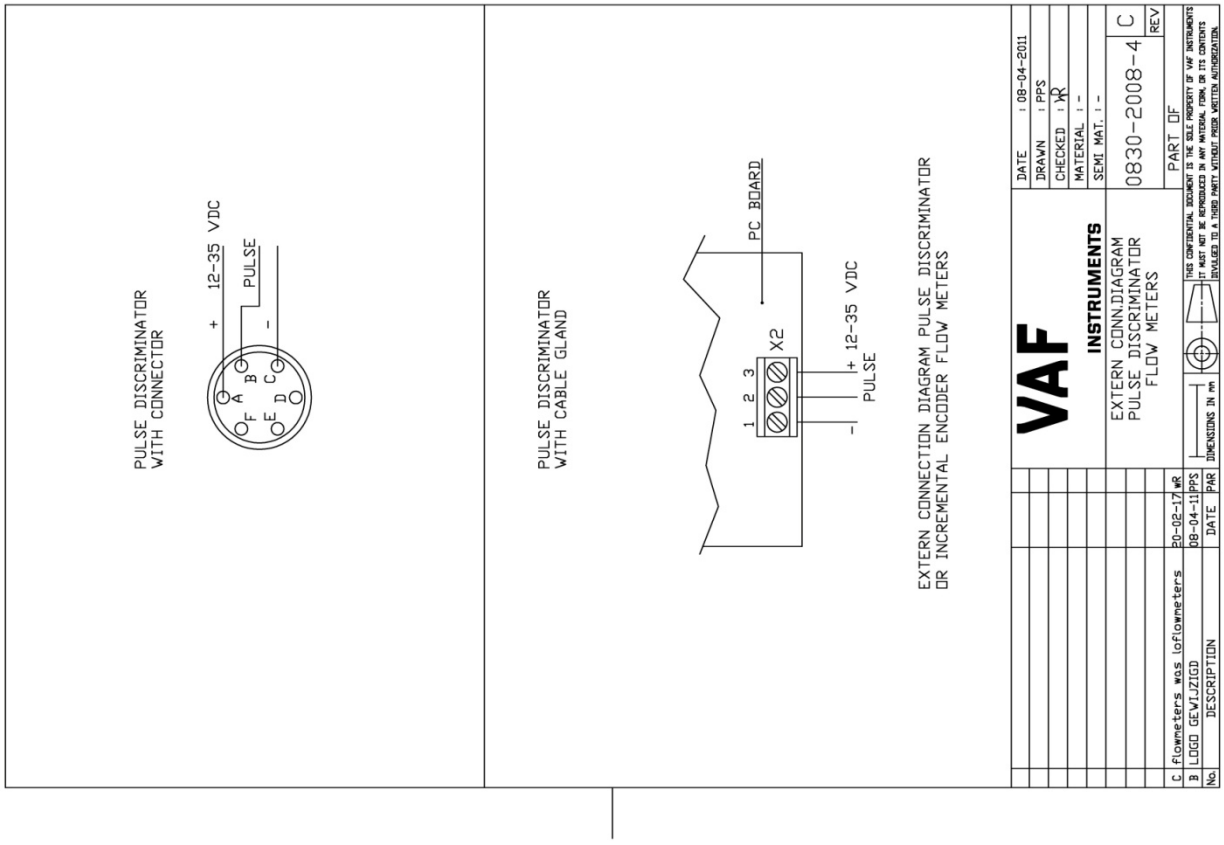


Figure 108 – Drawing 0830-2008 – Connection diagram incremental encoder

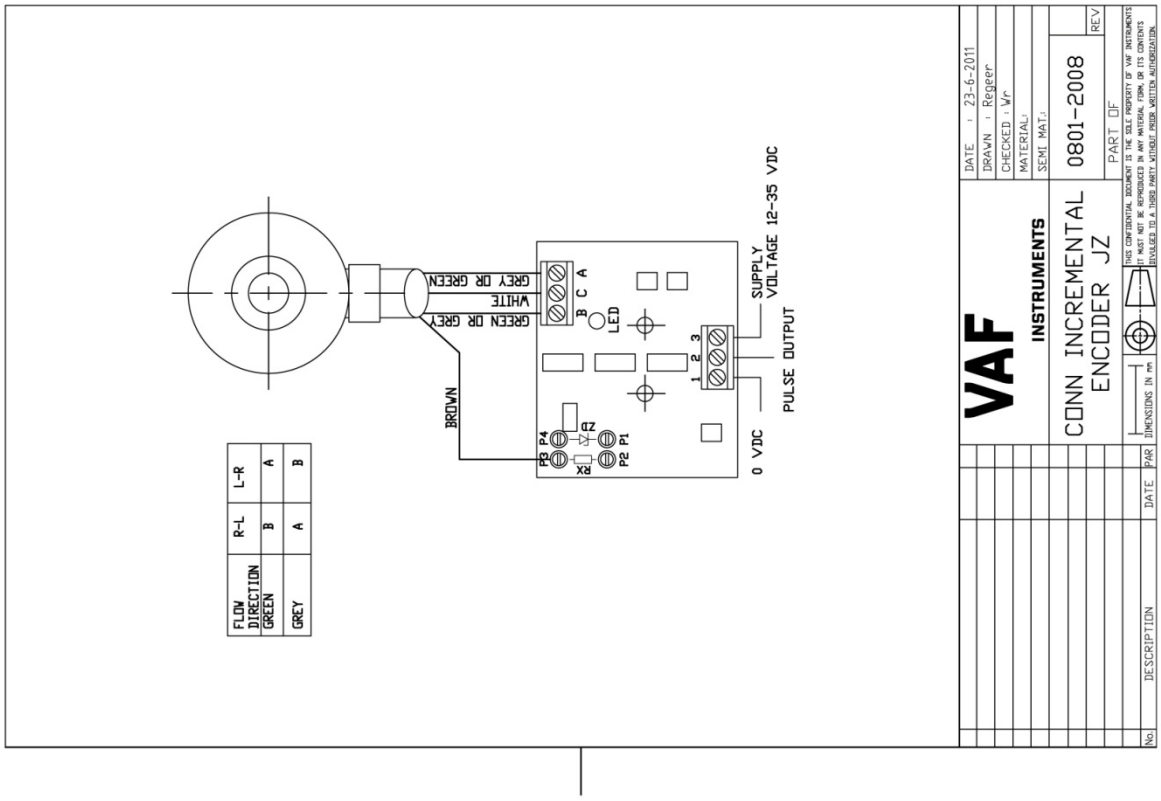


Figure 109 – Drawing 0801-2008 – Connection diagram incr.encoder internal pulse discr.

18 ABBREVIATIONS

PED	Pressure Equipment Directive
IE	Instrument Earth
PE	Protective Earth

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 sub article 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 sub article 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. Sub article 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; the necessary lockable storage sites for materials, tools and other goods shall be available;
   e. 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;
   f. 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;
   g. 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, sub article 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 0114
Section 3.2.3 Temperature added
Section 6.2.7 Warning added

Revision 0114(2)
Section 15.1 clarified

Revision 0314
Section3.2.7 added max. cable length
Section 6.4.1 added max. cable length
Section 6.4.2 added max. cable length and explanation text.

Revision 0715
Update fig.20

Revision 0216
Section 3.1 body pressure rating J5050E adjusted

Revision 0916
Section 1.1 warning added
Drawing updates and part nr tool updated

Revision 0317
Section 3,6 and 15 updated with pulse box
Section 8.2 adjusted.
Section 9 updated concerning new magnet assy and pulse box.
Section 17 drawings updated with latest version
Section 17 drawings added concerning J5025E, J5040E and J5050E with new magnet.
Section 17 drawings added concerning puls box dimensions, parts and connections
All instruction pictures updated digitally and complete document check.

VAF

INSTRUMENTS

Represented by

VAF Instruments B.V.

Vierlinghstraat 24, 3316 EL Dordrecht, The Netherlands

P.O. Box 40, 3300 AA Dordrecht, The Netherlands

T +31 (0) 78 618 3100, F +31 (0) 78 617 7068

sales@vaf.nl, www.vaf.nl