



ADDITIVE INJECTION MANIFOLD



AIM Block

INSTRUCTION MANUAL

Models: AIM004, AIM006, AIM008



Note:

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfill the EWG-machine guidelines.

As per PED 97/23/EG

In acc. with Article 3 Paragraph (3), "Sound Engineering Practice", of the PED 97/23/EC no CE mark.
Diagram 8, Pipe, Group 1 dangerous fluids

| | | |
|-----------------------------------|--|-------------|
| 1.0 General | | Page |
| 1.1 | Overview | 2 |
| 1.2 | Flowmeter operating principal | 2 |
| 1.3 | Model number information | 3 |
| 1.4 | Specifications | 4 |
| | | |
| 2.0 Installation | | |
| 2.1 | Mechanical installation | 5 |
| 2.1.1 | Orientation | 5 |
| 2.1.2 | Flow conditioning & locations | 6 |
| 2.2 | Electrical installation | 6 |
| 2.2.1 | Instrument cable | 6 |
| 2.2.2 | Hazardous area wiring | 6 |
| 2.3 | Pulse output selection for pulse meters | 7 |
| 2.3.1 | Hall sensor pulse output | 7 |
| 2.3.2 | Quadrature pulse output | 8 |
| 2.3.3 | Signal integrity verification | 8 |
| | | |
| 3.0 Commissioning | | 9 |
| 3.1 | Meter calibration factor (<i>K-factor or scale factor</i>) | 9 |
| 3.2 | AIM block hydraulics | 9 |
| 3.3 | In-situ calibration | 10 |
| | | |
| 4.0 Maintenance | AIM block description | 11 |
| 4.1 | AIM block components | 12 |
| 4.2 | AIM block exploded view | 13 |
| 4.3 | AIM block part numbers | 14 |
| 4.4 | Disassembly of pulse meter | 15 |
| 4.5 | Inspection & exploded view | 15 |
| 4.6 | Re-assembly of meter | 15 |
| 4.7 | Meter spare parts | 15 |
| | | |
| 5.0 Fault Finding | | 16 |
| 5.0 | Meter fault finding | 16 |
| 5.1 | Trouble shooting | 17 |
| | | |
| 6.0 Explosion proof option | | 18 |

General

1.1 Overview

The AIM block is a compact all stainless steel manifold assembly with isolating, flow regulating & check valves, a fine mesh strainer, solenoid valve & a precision oval gear flow meter. Inlet & outlet elbows can be arranged in three orientations providing installation flexibility. All assemblies shown are modular to the manifold & may be quickly changed in-situ.

The AIM block will work with any controller or TAS system, serving as a composite slave assembly for the accurate blending of fuel additives to fuels at loading facilities, stationary & mobile transfer units within the petroleum industry worldwide.

Central to the AIM block is a precision oval gear positive displacement flowmeter having a solid state style NPN Hall Effect pulse output, with the option of an Exd explosion proof terminal housing.

The second most crucial element is the solenoid valve, having a fast direct acting valve with an FFKM (Kalrez) seat, which allows for high velocity flows through a small 3mm or 5mm orifice providing minute proportion control even at high injection pressures.

AIM accurately injects small amounts of modifying additives to base product. Additives include lead replacements, Dyes & Markers, Denaturants, Detergents, Odorizing, Antifreeze, Anti-corrosion, Anti-detonating, Anti-static, Anti-icing, Anti-foaming, Emulsifiers and performance enhancing agents.

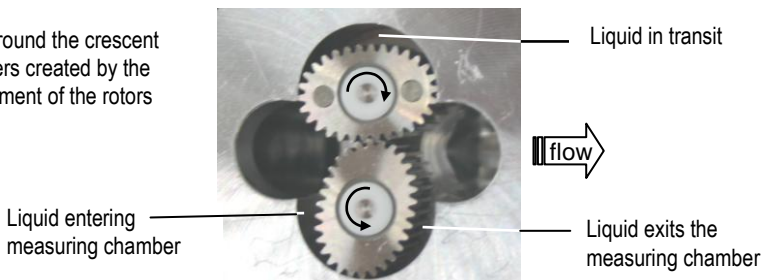
1.2 Flowmeter Operating Principle

The Oval Gear meters are positive displacement flowmeters where the passage of liquid causes two oval geared rotors to rotate within a precision measuring chamber and with each rotation a fixed volume of liquid is displaced passing through the meter. Magnets embedded within the rotors initiate a high resolution pulse train output. The pulse output can be wired directly to process control and monitoring equipment or can be used as an input to instruments supplied with or fitted directly to the meter.

The benefits of this technology allow precise flow measurement and dispensing of most clean liquids irrespective of their conductivity, with other liquid characteristics having nil or minimal effect on meter performance. This metering technology does not require flow profile conditioning as required with alternative flow technologies making the installation relatively compact and low cost.

OPERATION:

Liquid travels around the crescent shaped chambers created by the rotational movement of the rotors



Additive Injection Manifold block

| | |
|--------|---|
| AIM004 | AIM block 0.01~1 L/min, 2800 PPL (10,600 PPG) - 11,200PPL optional (HR) |
| AIM006 | AIM block 0.03~1.66 L/min 1050 PPL (4000 PPG) - 4,200 PPL optional (HR) |
| AIM008 | AIM block 0.25~9.16 L/min 710 PPL (2690 PPG) REFER AIM PRESSURE DROP GRAPH FOR ORIFACE SIZE |

Manifold, meter & valve material

| | |
|---|---|
| S | Stainless Steel (AIM temp. range -20~+65°C for Ex version, -20~+100°C non Ex version) |
|---|---|

Seal materials

| | |
|---|---|
| 1 | Viton (standard) |
| 2 | EPR (Ethylene Propylene Rubber) |
| 3 | # Chem-Kit, comprises Teflon & Perfluoroelastomer (Kalrez-Kemraz) O-rings |
| 4 | Buna-N (Nitrile) |

Option 3 Chem-Kit comprises both Teflon & Perfluoro O-rings as appropriate

Meter protection approval

| | |
|---|----------------------|
| 0 | No approval |
| 1 | IEC / ATEX inclusive |

Cable entry for meter

| | |
|---|-----------------------------|
| 1 | M20 x 1.5mm female threaded |
| 2 | 1/2" NPT female threaded |

Solenoid valve voltage

| | |
|---|--|
| 0 | 12V dc x 9W coil (maximum operating pressure 7 bar) |
| 1 | 24V dc x 9W coil (maximum operating pressure 7 bar) |
| 2 | 108~132Vac/60hz x 8W AC coil (maximum operating pressure 20 bar) |
| 3 | 220~240Vac/50hz x 8W AC coil (maximum operating pressure 20 bar) |

Solenoid valve approval

| | |
|---|--------------|
| 0 | No approval |
| 1 | IECEX / ATEX |

Solenoid valve orifice (refer pressure drop graph below)

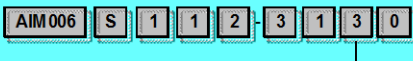
| | |
|---|---|
| 3 | 3mm Ø (DC coil = 7 bar, AC coil = 10 bar max. differential pressure) |
| 5 | 5mm Ø (DC coil = 3.5 bar, AC coil = 8.5 bar max. differential pressure) |

Options

| | |
|----|------------------------------------|
| 0 | No options |
| 2 | Quadrapulse pulse output |
| HR | High resolution Hall Effect output |

AIM004 = 11560 PPL, AIM006 = 4200 PPL

Model No. example



The AIM block is a compact all stainless steel manifold assembly with isolating, flow regulating & check valves, a fine mesh strainer, solenoid valve & a precision oval gear flow meter. Inlet & outlet elbows can be arranged in three orientations providing installation flexibility. All assemblies shown are modular to the manifold & may be quickly changed in-situ.

Technical details:

Flow Range: 0.01 ... 0.6 L/min ... 0.25 ... 9.16 L/min

Process Connections: 3/8" NPT elbows, 3 x 90° orientation positions

Accuracy: +/- 0.5% of reading (at 3 cP)

Repeatability: typically \pm 0.25%

Operating temperature: -20 ... +100 °C (standard); -20...+65°C (Exd approved model)

Viscosity Range: low to medium viscosity fluids (It will vary according to fluid type, flow rate and orifice size)

Solenoid Valve: Direct acting 2/2 way solenoid valve

Solenoid Coil: 8 W (108 – 132 VAC/ 220 - 240 VAC) or 9 W (12VDC/24 VDC) coil (see ordering information for supply voltage)

Flowmeter Protection Approval (optional): EX 2 G Exd IIB T6/T4

Solenoid Coil Protection Approval (optional): EX 2 G D EX d mb IIC T4

Protection Class: IP 65 (standard), IP67 (Exd approved model)

Mounting Position: Base vertical (see 2.1.1)

Flow Direction: In direction of arrow; inlet Port is marked on AIM block manifold, and Outlet Port has Flow arrow marked on the manifold.

Materials:

Manifold block: stainless steel 1.4305 (SS303)

Inlet and Outlet flow valves, strainer and hex plugs: stainless steel 1.4401 (SS316)

O-ring (see ordering table):
FPM (standard)
EPR (Ethylene Propylene Rubber) for Ketones only
PTFE/ FFKM (for aggressive chemicals)
NBR

Flowmeter body/ gear wheels/shafts: stainless steel 1.4401 (SS316)

Solenoid valve base: stainless steel 1.4401 (SS316)

Solenoid valve seat: FFKM (Kalrez)

Bearing: ceramic

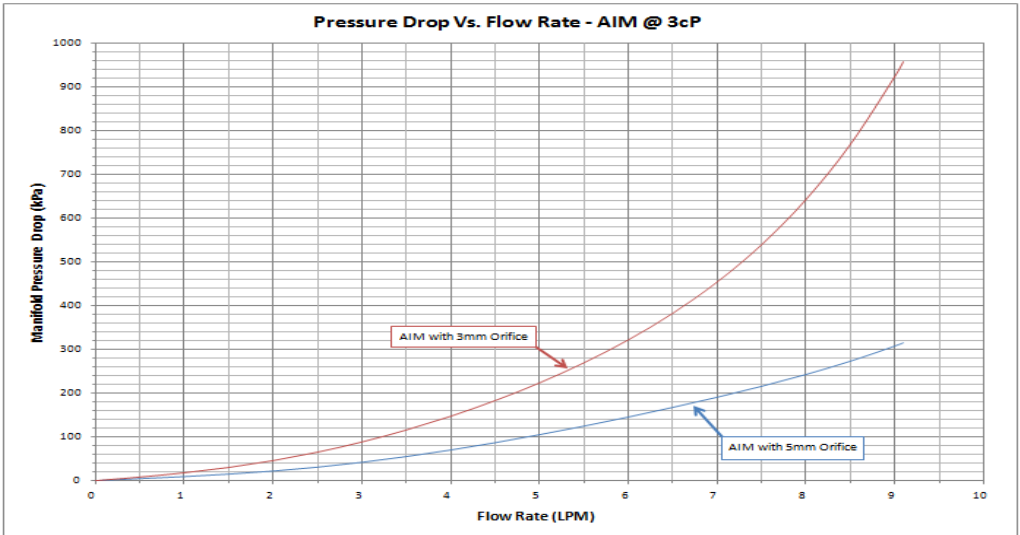
Cover: glass reinforced nylon (standard), stainless steel 1.4301 (SS304) (Optional / Exd. Meters)

2.0 Installation

2.1 Mechanical Installation *Prior to installing the block check:*

The fluid is compatible with the meter materials of construction using appropriate information such as fluid compatibility charts and site experience & that process temperature and pressure does not exceed block ratings.

Application and process conditions are compatible with the block specifications. Minimum and maximum flows are within the meter specified range including any in-situ cleaning processes. When metering viscous liquids the maximum allowable flow may need to be reduced to ensure the pressure drop across the flowmeter rotors does not exceed 100 kPa (1 Barg, 15 PSIG). (Note: 1 Barg pressure drop limitation excludes pressure drop across solenoid valve orifice, pressure drop across flowmeter can be measured using 1/4" NPT auxiliary ports in sides of manifold)



Orientation

The flowmeter **MUST** be mounted so that the rotor shafts are in a horizontal plane; this can be achieved by mounting the block on a vertical surface or a vertically orientated backing plate as pictured (4 blocks shown).

Note the terminal cover can be rotated in 90 degree increments to provide access to the electrical entry from 4 angles; the solenoid valve coil can also be orientated in various positions to suit the installation.



2.1.1 Flow Conditioning and Location

Flow conditioning: The flowmeter does not require any flow conditioning, therefore straight pipe runs before or after the block are not required. If required, the pipe size about the block can be altered to suit the installation.

Fluid state: To protect the meter, fluid entering the block must remain a liquid at all times; avoid gassing, solidification or gelling of the metered medium. If meters are to be trace heated or jacketed in any way the maximum temperature rating of the meter must not be exceeded. Size the meter to avoid gasification of volatiles (*flashing*) within the liquid due to the pressure drop experienced within the system or within the meter.

Locations : The block is to be fitted downstream of the additive pump, there is a discharge check valve within the block outlet which prevents reverse flow through the block and minimizes the risk of drainage and air entrapment which can result in erroneous readings or damage the meter on start up.

If exposed to weather ensure a suitable watertight gland or plug is used to seal any open electrical entries. In humid environments take precautions to avoid condensation build up within the electrical chambers. It is good wiring practice for conduits to be connected from the bottom of an entry port, in this way any condensation will gravitate away from any terminal housing.

2.2 Electrical Installation

2.2.1 Instrument Cable Twisted pair low capacitance shielded instrument cable 7 x 0.3mm ($0.5mm^2$) should be used for electrical connection between the flowmeter and remote instrumentation, use Belden® number 9363 or similar. The cable drain or screen should be terminated on a DC COMMON or a specifically assigned shield termination at the readout instrument end only in order to protect the transmitted signal from mutual inductive interference. **IMPORTANT**, tape off & isolate the shield at the flowmeter end of the cable.

The cable should not be run in a common conduit or parallel with power and high inductive load carrying cables as power surges may induce erroneous noise transients onto the transmitted pulse signal or cause damage to the electronics. Run the cable in separate conduit or with other low energy instrument cables. The maximum transmission distance is typically 1000m (3300 Ft)



The terminal housing on the meter has a conduit entry of either ½" NPT conical or M20x1.5mm cylindrical, the internal volume is less than 45cc. The solenoid valve coil has an M20x1.5mm conduit entry, with internal volume of less than 10cc.


2.2.2 Hazardous Area Wiring When wiring to the Exd explosion proof option(Exd IIB T4/T6) appropriate wiring techniques must be undertaken in accordance with the rules, regulations and requirements applying to the territory in which the meter is being installed. The meters should only be connected by qualified staff; the qualified staff must have knowledge of protection classes, regulations & provisions for the apparatus in hazardous areas. Only Exd certified conduit and cable glands with appropriate temperature limits should be used.

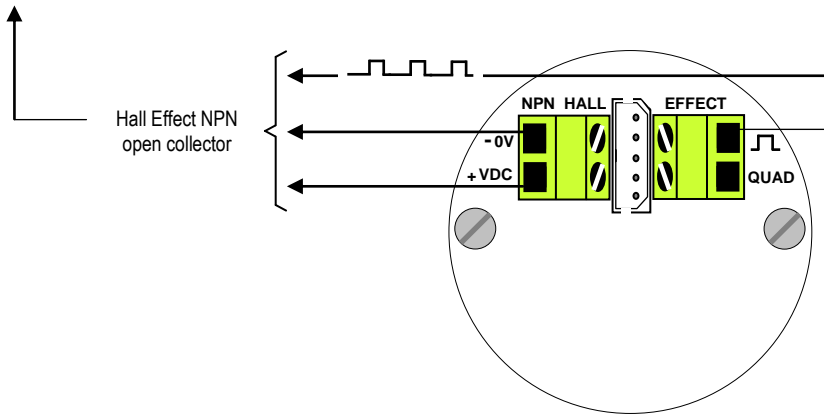
Earthing lugs are located within the terminal housing cover, use a separate earth within the cable making sure that the earth conductor does not come in contact with the cable shield / screen. Use only high temperature cable at the flowmeter when the process temperature exceeds 85°C.

2.3 Pulse Output selection for pulse meters: Type of output available is open collector from Hall Effect sensors. Output type is linearly proportional to volumetric flow and each pulse is representative of an equal volume of liquid.

2.3.1 Hall Effect Sensor Pulse Output: The Hall Effect Sensor is a high resolution solid state 3 wire device providing an un-sourced, open collector, NPN transistor output. The term “un-sourced” means that no voltage is applied to the output from within the flowmeter, it must be pulled to a ‘high’ or ‘on’ state by between 5–24Vdc supplied from an external source, typically the receiving instrument.

The pulse output between signal  and -0V is a voltage square wave with the high level being the dc voltage available at the open collector  and the low level being -0V.

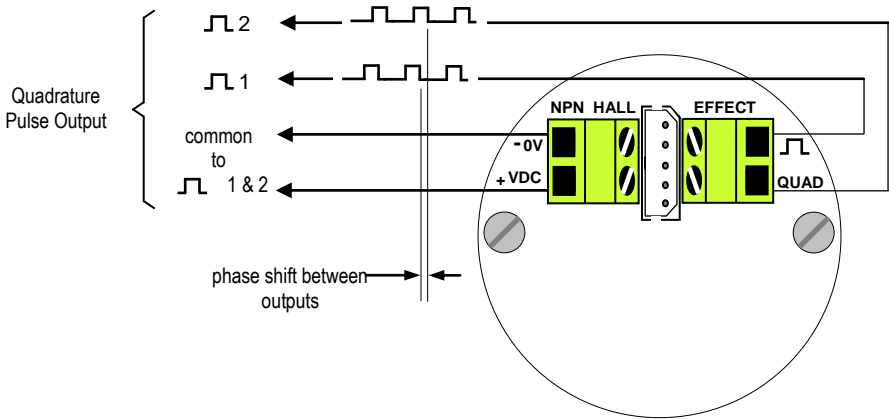
The receiving instrument must incorporate a pull up resistor (*typically greater than 10K ohms in most instruments*) which ties the open collector to the available dc voltage level when the Hall sensor is not energized. When energized the open collector output  is pulled to ground through the emitter (-0V).



2.3.2 Quadrature (QUAD) Pulse Output The diagrams below apply when the meter is fitted with the Quadrature pulse output option (*two Hall Effect sensors arranged to give separate outputs out of phase with one another*).

The Quadrature output is typically suited to custody transfer applications where signal integrity verification is required; it is also used for metering bi-directional flow.

2.3.3 Signal integrity verification Many fiscal transactions require the primary measuring device (*flowmeter*) to have Quadrature outputs in order to detect any difference in the number of pulses from each input (from \square 1 & \square 2) during delivery.



3.0 Commissioning Once the block has been mechanically and electrically installed in accordance with this and any other relevant instrument manual(s) the meter is ready for commissioning.

The block must NOT be run until the pipework is flushed of foreign matter, more often than not foreign matter is present after pipework fabrication or modification, weld slag, grinding dust, sealing tape & compound &/or surface rust are most common offenders and can lead to severe damage to precision components.

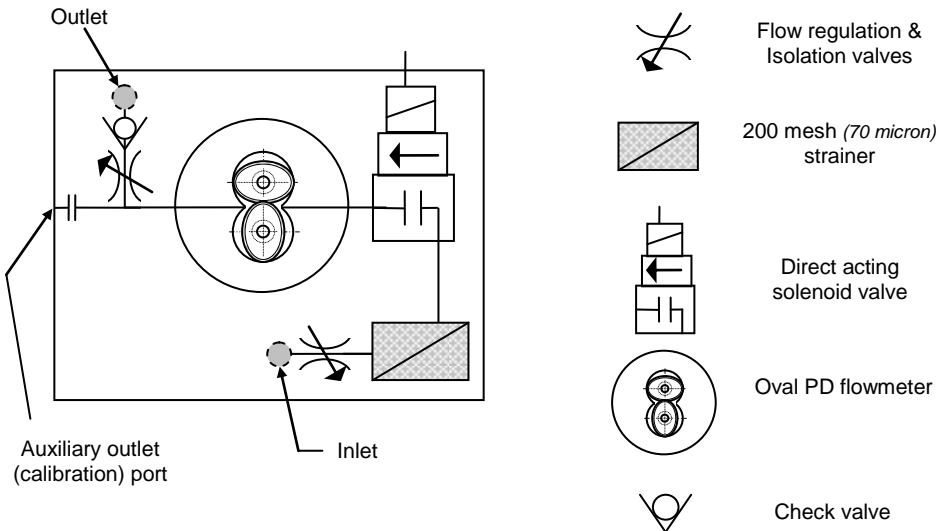
Flushing can be undertaken by utilizing a by-pass or removing the meter from the pipework.

After flushing or following long periods of shutdown the meter must be purged of air/vapour. This can be achieved by allowing the liquid to flow through the meter at a slow rate until all air/vapour is displaced. Never run the meter above its maximum flow or exceed 100kpa (1 bar, 15psi) pressure drop across the meter. Now the meter is ready for its operation to be confirmed by ensuring correct indication or operation at the receiving instrument(s). Refer if necessary to fault finding section of this manual.

3.1 Meter Calibration Factor (K or scale Factor) Each flowmeter is individually calibrated and supplied with a calibration certificate showing the number of pulses per unit volume (eg pulses per litre or pulses per USgallon). Initial calibration is done using Castrol diesel injector calibration fluid 4113, nominal calibration figures are shown in the specification section of this manual.

Due to operational variations such as additive batch cycle rates and batch cycle values it may be necessary to individually calibrate each block in situ using the actual additive of the process, this is commonly done as a matter of course at time of commissioning and periodically as required by any traceability standards within the industry (see in-situ calibration on following page).

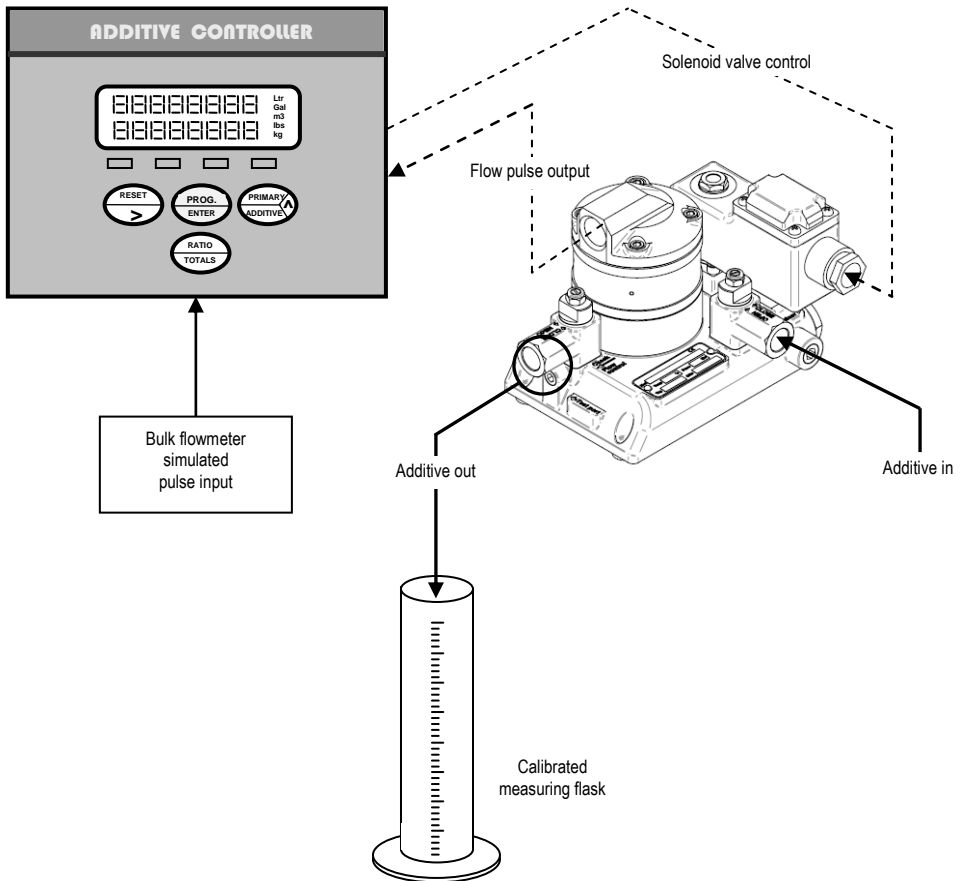
3.2 AIM Manifold Block hydraulics



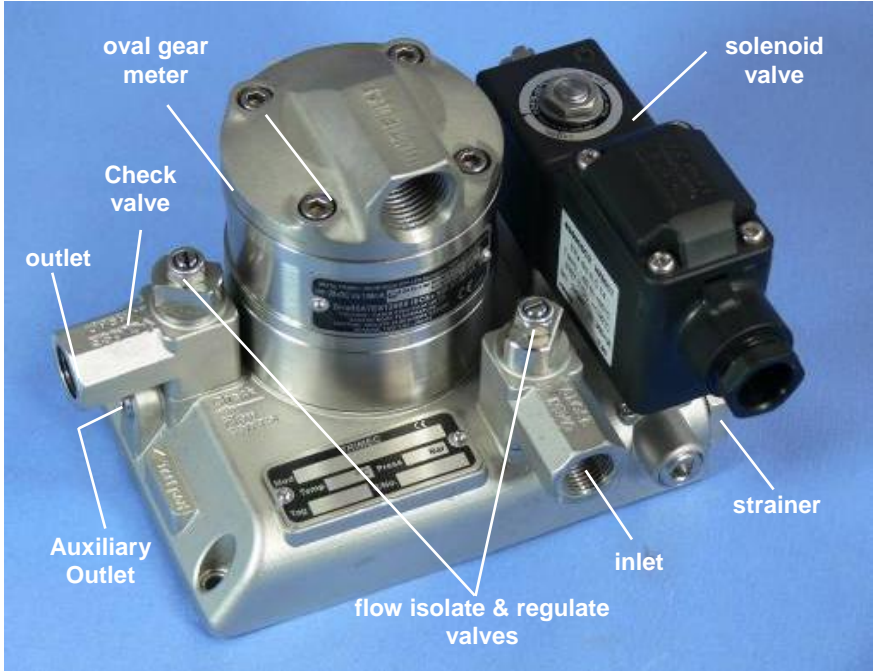
3.3 In-situ calibration

In-situ calibration can be taken from either the 3/8" outlet port via an appropriate "T" off connection or the 1/4" auxiliary port in the AIM manifold. A precision calibrated flask or beaker is used to receive the calibration sample, this is then compared with the readings displayed on the additive controller.

Calibration is generally initiated by a simulated pulse being directed to the input to the additive controller, this simulated signal represent a flow input from the bulk fuel flowmeter, accordingly the controller will cause the AIM block to deliver a proportionate volume of additive to the measuring flask for comparison.

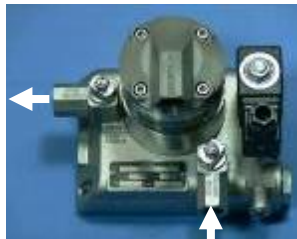
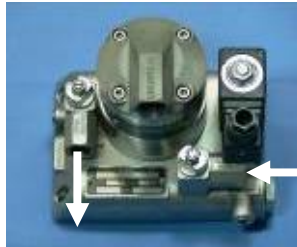
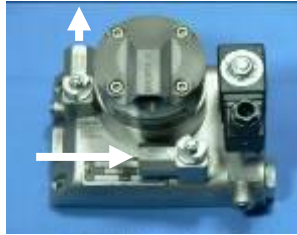


4.0 AIM block description



4.1 AIM block components

Isolation & flow regulation: The block incorporates two slotted stem isolation valves to enable the strainer, solenoid valve & meter to be isolated and serviced as required. The valves also serve as flow regulation valve as & when needed, typically under operation the upstream (inlet) valve would be opened fully then backed off by $\frac{1}{2}$ a turn and the downstream (outlet) valve only would be used as a flow regulating valve. Once positioned both valve stems are to be secured using the Nyloc nuts included.

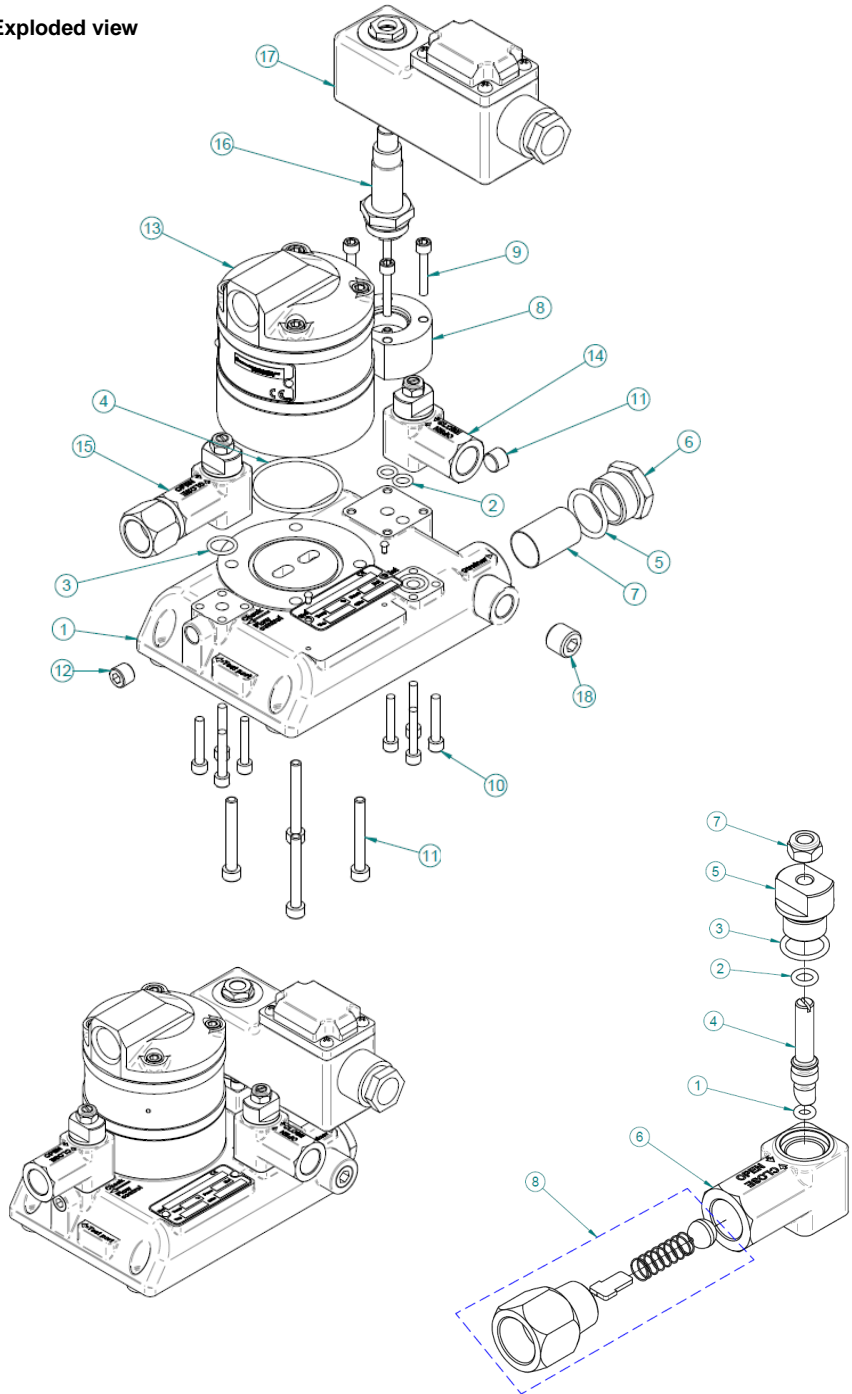


Shown above, each of the inlet & outlet valve assemblies may be repositioned in one of three 90 degree incremental positions by accessing the socket head screws on the underside of the manifold.

Strainer: The block has a 200mesh (75 micron) strainer immediately upstream of (prior to) the solenoid valve & flowmeter, this should be inspected regularly for cleanliness particularly if the flow rate slows and the block fails to keep pace with the mainline flow (master or wild stream).

In-situ calibration: A local calibration shunt can be taken off either the 3/8" NPT outlet port or the auxiliary 1/4" NPT "fixed" outlet port located adjacent the 3/8" NPT outlet port.

4.2 Exploded view



4.3 BLOCK SPARE PARTS *(refer to exploded views)*

AIM BLOCK

| Item | Description | Part No. |
|------|--------------------------------------|------------|
| 1 | Manifold | |
| | stainless steel manifold | 1301126 |
| 2 | Solenoid base O-ring | (BS010) |
| | R viton - std. | 13030101 |
| R | Chem-Kit option (<i>perfluoro</i>) | 13030105 |
| 3 | Process port O-rings | (BS013) |
| | R viton - std. | 13030131 |
| R | Chem-Kit option (<i>teflon</i>) | 13030133 |
| 4 | Meter base O-ring | (BS030) |
| | R viton - std. | 13030301 |
| R | Chem-Kit option (<i>teflon</i>) | 13030303 |
| 5 | Strainer cap O-ring | (BS117) |
| | R viton - std. | 13031171 |
| R | Chem-Kit option (<i>perfluoro</i>) | 13031175 |
| 6 | Strainer cap | |
| | stainless steel | 1307011 |
| 7 | Strainer element | |
| | R stainless steel, 75 µm (200 #) | 1307012 |
| 8 | Solenoid base | |
| | with 3.0mm orifice | 1422016 |
| | with 5.0mm orifice | 1422017 |
| 9 | Solenoid base screw | |
| | M4 x 20 | 130804106 |
| 10 | Process port screws | |
| | M4 x 25 | 130804112 |
| 11 | Meter base screw | |
| | M5 x 40 | 130805124 |
| | Hex plug | |
| 12 | stainless steel, 1/8" NPT | 130810200 |
| | Meter assy. (see page 3) | |
| 13 | Inlet flow valve assy. | |
| 14 | with flow isolation valve | 1407006 |
| | Outlet flow valve assy. | |
| 15 | flow regulation, isolation & check | 1407007 |
| | Solenoid armature assy. | |
| 16 | armature with 3mm operator | 121VS9305B |
| | armature with 5mm operator | 121VS9305C |
| | Solenoid coil | |
| 17 | refer factory | |
| | Hex plug | |
| 18 | stainless steel, 1/4" NPT | 130810200 |

R = recommended spare parts

AIM CONNECTION ELBOW PARTS BREAKDOWN.

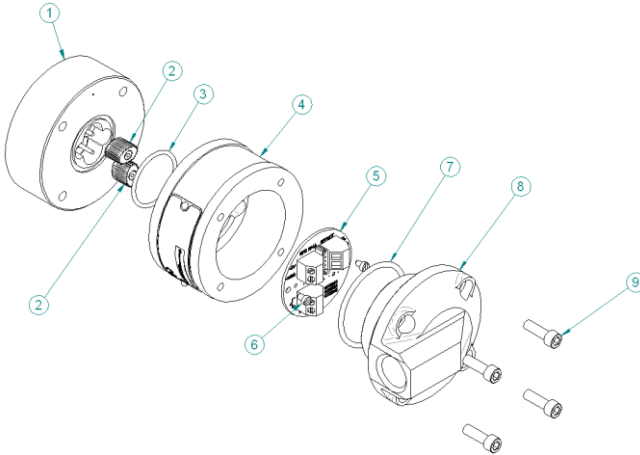
| Item | Description | Part No. |
|------|--|-----------|
| 1 | Isolate O-ring | (BS007) |
| | R viton - standard | 13030071 |
| | R Chem-Kit option (<i>perfluoro</i>) | 13030075 |
| 2 | Regulate O-ring | (BS009) |
| | R viton - standard | 13030091 |
| R | Chem-Kit option (<i>perfluoro</i>) | 13030095 |
| 3 | Static O-ring | (BS014) |
| | R viton - standard | 13030141 |
| R | Chem-Kit option (<i>perfluoro</i>) | 13030145 |
| 4 | Regulation valve screw | |
| | stainless steel | 1307015 |
| 5 | Flow control housing | |
| | stainless steel | 1307016 |
| 6 | Process port housing | |
| | stainless steel - 3/8" NPT | 1307018 |
| 7 | Lock nut | |
| | M6 | 130806115 |
| 8 | Check valve | |
| | Check valve housing assembly | 1407009 |

Solenoid armature parts breakdown.

| | | |
|-----|-------------------------------|----------|
| 16A | armature (common outer assy.) | 7491654 |
| 16B | 3mm operator (inner plunger) | 13030075 |
| 16C | 5mm operator (inner plunger) | 7492601 |
| 16D | 3mm operator spring | 7491594 |
| 16E | 5mm operator spring | 7491670 |

4.4 Disassembly of the meter (*Refer Exploded View*) First isolate any live electrical source and or liquid source to the block. To gain access to the meter terminals and pulse output board, undo the 4 cap screws (9), remove the cover (8) carefully to avoid putting strain on the terminal connections. The pulse output board (5) can now be accessed and removed if necessary (screws 6).

If required to gain access to the oval geared rotors, undo the 4 meter base screws attaching the meter assembly to the manifold, carefully separate the meter cap (4) from the meter body (1), avoiding misplacing or damaging the O-ring (3) and rotors (2). Note items 1 & 4 are marked with a dimple and both dimples must align when reassembling. In addition (*models AIM004 & AIM006*) the rotor shaft located closest to the dimple must take the primary rotor, which is the rotor fitted with magnet(s).



4.5 Inspection Remove, inspect and clean the rotors. Check the measuring chamber for damage or scoring & redress if necessary, the rotor shafts should NOT be loose or able to be rotated.

4.6 Re-assembly of meter When replacing the rotors be very sure to have the rounded tooth ends at the bottom of the measuring chamber otherwise the rotors will be severely damaged as the meter cap (4) is fastened into place.

Re-install rotors by locating the dimple mark on the meter section which contains the rotor shafts. The shaft located closest to the dimple mark must be fitted with the primary rotor, which is the rotor fitted with magnets (*this applies to model AIM004, AIM006 only*). REMEMBER the rounded edged rotor teeth MUST be at the bottom end of the measuring chamber. If the second rotor also contains magnets (*model AIM008 only*) make sure all magnet holes are NOT visible when installed. Both rotors will only engage correctly if fitted precisely at an orientation of 90 degrees to each other. Rotate the rotors slowly by hand to ensure they are correctly fitted at the same time check the rotor shafts & rotor bearings for wear.

Fit the O-ring into the groove and assemble the two parts of the meter ensuring the dimples on each section (1 & 4) are aligned. Fit the body cap screws (11) and tighten using a 1,3,2,4 sequence then torque in the same sequence to 3.5 Nm. This sequence and procedure ensures the meter bodies are assembled correctly and evenly. Fit the pulse output board, terminal cover or instrument as appropriate.

4.7 Meter spare parts Please consult factory.

5.0 Meter Fault Finding The flowmeter has two distinct sections: the mechanical wetted section housing the rotors and the electrical section housing the pulse output board.

The aim of fault finding is to trace the source of the fault to one of these sections.

Below are basic fault finding steps. Also refer to Trouble Shooting Guide on following page.

Step 1 - Check application, installation and set up.

Refer to Mechanical Installation section for installation and application factors that may affect the meter operation including pulsation and air entrainment or incorrect meter selection including incorrect flow rate, temperature and pressure or materials compatibility. Refer to Electrical Installation for correct wiring.

Step 2 - Check for blockages.

The most common cause of fault/unsatisfactory meter operation, particularly for new or altered installations, is due to blockage within the system or meter caused by foreign particles such as weld slag, sealing tape or compound, rust, etc.

Step 3 - Ensure flow is present.

No flow or lower than normal minimum flow may be attributed to a blocked strainer, jammed or damaged rotors within the flowmeter, malfunctioning pump, closed valves or low liquid level in feeder tank.

Step 4 - Ensure oval gears within meter are rotating.

Rotation of the oval gears can be heard by holding a screw driver blade to the meter body and pressing the handle hard against the ear lobe. If necessary test the meter with the flow turned off and turned on to familiarize yourself with the audible rotation signature.

Step 5 - Ensure pulses are being generated during flowing conditions.

A multimeter is often not fast enough to distinguish the pulse train from the Hall Effect sensor. An oscilloscope will allow you to view the output pulse train. When viewing the Hall Effect sensor pulse ensure a pull up resistor is installed between the pulse output and the supply voltage (refer electrical installation).

Step 6 - Confirm Instrument Operation.

If an associated instrument is connected to the flowmeter confirm its operation by simulating a pulse input onto the flow input terminals. In most instances a contact closure on the flow input terminals is an adequate simulation.

5.1 TROUBLE SHOOTING

| Symptom | Possible cause | Solution |
|-----------------------------------|---|--|
| Meter readings are high | 1. Output signal interference | <ol style="list-style-type: none"> 1. Ground shield of signal cable 2. Re-route cable from high electrical energy sources |
| | 2. Entrained air or gas | <ol style="list-style-type: none"> 1. Remove source of air or gas entrapment 2. Install an upstream air eliminator |
| | 3. Pulsating flow from reciprocating style pump | <ol style="list-style-type: none"> 1. Increase back pressure on pump 2. Install a fast response one way check valve 3. Install a surge arrestor between pump & meter 4. Re-calibrate meter in situ to compensate for pulsations 5. Change pump style to smooth delivery type pump |
| Meter readings are low | 1. Damaged or worn rotors | <ol style="list-style-type: none"> 1. Inspect, repair, clean or replace rotors |
| | 2. Damaged or worn measuring chamber | <ol style="list-style-type: none"> 1. Inspect measuring chamber for damage - repair 2. Check concentricity of rotor shafts within chamber |
| | 3. Output signal interference | <ol style="list-style-type: none"> 1. Ground shield of signal cable 2. Re-route cable from high electrical energy sources 3. Check all electrical terminations & wires for continuity. |
| No output from meter | 1. Rotors fouled | <ol style="list-style-type: none"> 1. Check that rounded teeth are towards base of chamber 2. Check for obstruction due to foreign particles 3. Clean, repair or replace rotors |
| | 2. Meter incorrectly reassembled | <ol style="list-style-type: none"> 1. See instructions for reassembly of meter with particular emphasis on positioning of rotors & magnets |
| | 3. No output from output board | <ol style="list-style-type: none"> 1. Check terminal connections & solder joints 2. Ensure dc voltage is available at Vdc & 0V and receiving instrument is fitted with a pull up resistor 3. Replace output board |
| Not reading on readout instrument | 1. Faulty receiving instrument | <ol style="list-style-type: none"> 1. Check DIP switch settings & program data 2. Check terminal connections & electrical continuity 3. Repair / replace receiving instrument |

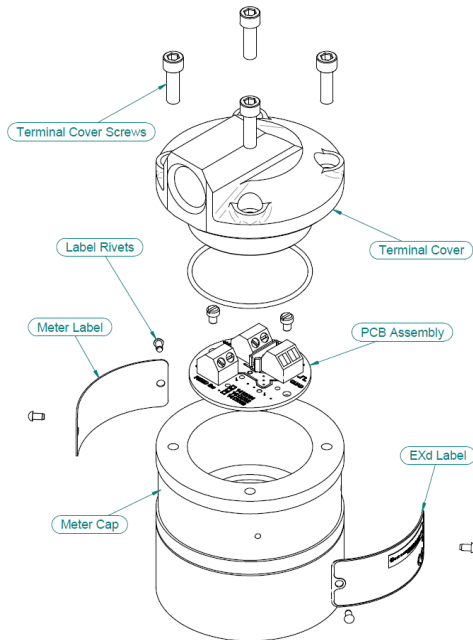
6.0 Exd option

Products ordered with the optional Exd Explosion proof Certification are supplied with an Exd certified flowmeter, and an Exd certified Solenoid Coil. Please refer to Hazardous Area Wiring instructions in section 2.2.2 of this manual, as well as the notes below, when installing or operating this product.

Products ordered with the optional Exd Explosion proof terminal enclosure are fitted with an Exd label plate (see *image below*) stating the relative apparatus grouping and temperature classification that applies to the flowmeter. The Exd label plate should be examined before installation or operation of this product.

Exd IIB T4/T6 When applied as a temperature class T6 enclosure the temperature of the process fluid passing through the flowmeter must be below 70°C, and for temperature class T4 the temperature of the process fluid passing through the flowmeter must be below 100°C.

Apparatus marked IIB are suitable for applications requiring Group IIB, or Group IIA apparatus. Exd certified apparatus should only be installed in hazardous areas according to the gas types to which they are certified.



Operational Notes:

ISOLATE EXD APPARATUS AWAY FROM EXPLOSIVE ATMOSPHERES BEFORE REMOVING TERMINAL COVERS

The maximum allowable diametric clearance of the cylindrical joint between the terminal cover and the Exd meter cap must not exceed 0.15mm. If, through corrosion or wear, diametric clearance is increased to above 0.15mm, corroded or worn parts must be replaced.

The product does not comply with EXd requirements unless terminal covers are fully engaged and fastened. Do not use terminal cover screws of different size or grade to those originally fitted.

Notes:

Notes:

**Each block has been calibrated on mineral oil
and will contain a small amount of oil residue.**

**The oil used is Castrol Diesel Calibration
Fluid 4113 (product code 055830).**



Wichita / Sydney / Mexico City

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