EN

FLOMEC®

OPERATING INSTRUCTIONS



OVAL GEAR SERIES FLOW METER

4-20mA ANALOGUE OUTPUT

Wichita · Sydney
GREAT PLAINS INDUSTRIES GPI®

General Information

This manual provides the necessary information for installation and operation of your Oval Gear Flow Meters; for detailed information on any integral electronics or accessories fitted to your flow meter please consult the relevant electronic or accessory operating instructions. This flow meter should only be installed and maintained by persons familiar with local regulations, particularly those for workplace Health and Safety.

For best results, please make yourself familiar with the contents of all relevant operating instructions prior to installation and commissioning. If further assistance is required please consult the distributor from whom you purchased your device.

Additional Translations Can Be Found Here

DISPOSAL WITHIN THE EUROPEAN UNION - WEEE



- The WEEE Directive requires that this product be recycled when disposed of within the European Union.
- The crossed out wheelie bin symbol shown in this manual signifies that this product should not be disposed of in general waste or landfill.
- Please contact the local dealer or national distributor from whom this product was purchased for information on recycling electronic equipment within your region.

Please contact Great Plains Industries, Inc. before returning any product. If you are missing parts, or experience problems with your installation, contact our Customer Support Department. We will be happy to assist you.

UNITED STATES

Contact Us:
888-996-3837 or 316-686-7361
FLOMECtech@gplains.com

AUSTRALIA

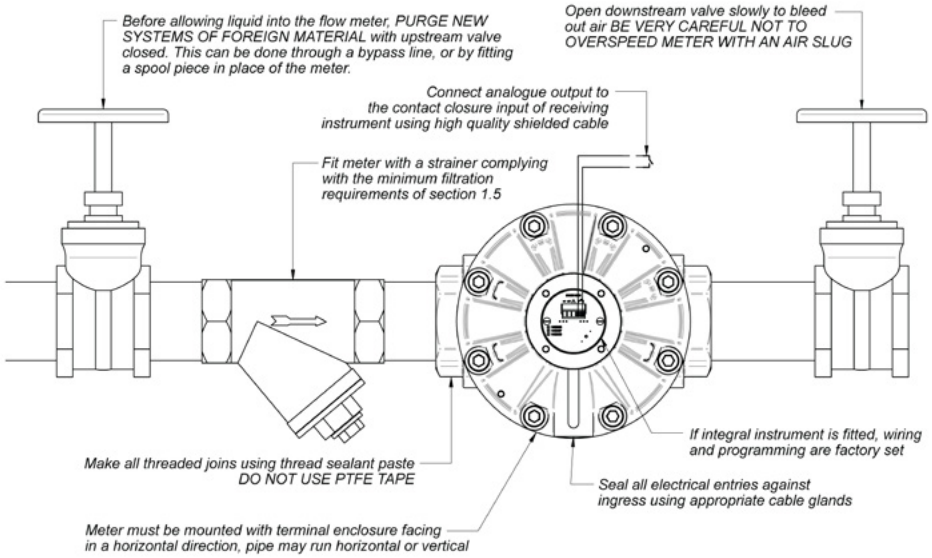
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info@FLOMECintl.com

The 'quick start' instructions shown below are intended for users who are experienced in the use of flow meters and who want to quickly set up their new meter with limited functionality, and start using their product right away. The 'quick start' instructions will allow the user to set up their meter without the risk of damage, allowing the use of the product while the complete instructions are read in detail at a later date.

⚠ CAUTION

Users installing product in Hazardous Areas must read this entire manual before installing their product.

Damage caused to flow meters by users who have only read the 'Quick Start Guide' will not be accepted as a justification for a warranty claim; if you are unsure, read the whole manual before installing your meter.



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Across all OM Series installations, adherence to manufacturer installation guidance is the single most important factor influencing accuracy, reliability, and service life. Most operational issues traced during fault finding are not due to flow meter defects but to preventable installation errors made during piping, wiring, or commissioning.

Correct installation protects the flow meter, the process, and the people operating it — ensuring the OM Series flow meters deliver the performance it was designed to provide.

Check out our:

Common Installation Mistakes Guide

We have also created checklists to assist with install:

Pre-Commissioning Checklist

Post-Commissioning Checklist

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1) Introduction

1.1 Before You Begin

For best results, take the time to fully acquaint yourself with all information about all components of your FLOMEC® flow meter prior to installation and use. If you need assistance, contact the distributor from whom you purchased.

1.2 Unpacking

All flow meters are inspected and calibrated prior to shipment and are sent out in perfect condition. Should damage be present on receipt of the product please inspect the delivery packaging for visible mishandling and contact the parcel service / freight forwarder. Maintain any protective plugs/caps until installation.

⚠ *CAUTION*

Please note that all flow-meters are calibrated with either ***Castrol ISO4113*** or ***Exxsol D130*** immediately prior to shipment, residual oil may be present; please take the appropriate precautions for health and safety. An SDS is available from the manufacturer or via an internet search.

1.3 General Safety Instructions

For your safety, review the major warnings and cautions below before operating your equipment.

1. Use only fluids that are compatible with the housing material and wetted components of the flow meter.
2. When measuring flammable liquids, observe precautions against fire or explosion.
3. When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. Always dispose of used cleaning solvents in a safe manner according to the solvent manufacturer's instructions.
6. During flow meter removal, liquid may spill. Follow the liquid manufacturer's safety precautions for cleanup of minor spills.
7. Do not blow compressed air through the flow meter.
8. Do not allow liquids to dry inside the flow meter.
9. When tightening pipe fittings, only grip the flow meter with a tool using the provided flats or hexagons on the flow meter ports.
10. For best results, always verify accuracy before use.

1.4 Product Overview

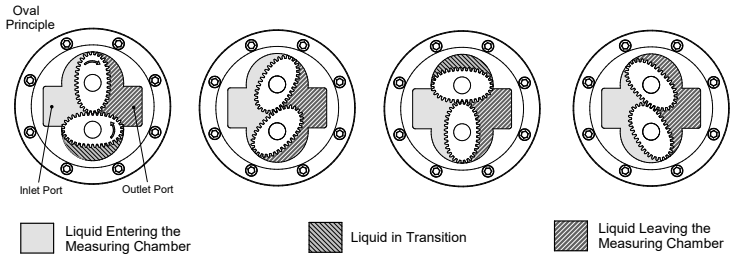
The Oval gear meter is a precise positive displacement flow meter incorporating a pair of oval geared rotors. These meters are capable of measuring the flow of a broad range of clean liquids.

Stainless Steel flow meters are suited to most liquid products and chemicals; including many water based liquids, acids, bases and salt solutions, and Aluminium meters are suitable for fuels, oils & most non-aggressive lubricating liquids.

This instruction manual covers Oval Gear flow meters with an integral 4-20mA analogue output. However, meters are also available with a pulse signal output capable of interfacing to most monitoring and control instrumentation, or the meter can be fitted with instruments such as totalisers, rate totalisers or batch controllers.

1.4.1 Operating Functions Principles

Oval Gear Flow Meters are positive displacement devices where the passage of liquid causes two oval geared rotors to rotate within a precision measuring chamber. Each rotation of the Oval rotors will transmit 4 identical volumes of liquid from the meter inlet to outlet (as shown in the diagram below). The rotation of the rotors is detected by magnetic sensors and converted to an analogue 4-20mA signal proportional to the flow rate through the flow meter.



1.5 Electrical / Mechanical Specifications

1.5.1 Small Capacity Models

Model Prefix	004	006	008
Nominal Size	⅛" (4 mm)	¼" (6 mm)	⅜" (8 mm)[1]
Accuracy (liquids ≥ 3cP)	± 1% of reading		
Repeatability (liquids ≥ 3cP)	Typically ± 0.03%		
Temperature Range	See Table 1.5.5		
Pressure Ratings – PSI (Bar)			
Aluminium	220 (15)		
Stainless Steel	495 (34)		
Intermediate Pressure SS	1450 (100)		
High Pressure Models	5800 (400)		
Minimum Filtration	200 mesh (75 micron)[2]		
Viscosity (cP)	***Flow range (Litres / Hour)***		
1	3 ~ 24	5 ~ 80	18 ~ 440
3	1 ~ 36	2 ~ 100	15 ~ 550
7	1 ~ 36	2 ~ 100	15 ~ 550
200	0.5 ~ 36	1 ~ 100	8 ~ 550
500	0.4 ~ 27	0.8 ~ 75	6 ~ 550
1000	0.25 ~ 16	0.5 ~ 45	4 ~ 360
Viscosity (cP)	***Flow range (US Gallons / Hour)***		
1	0.79 ~ 6.34	1.32 ~ 21.1	4.76 ~ 116.2
3	0.26 ~ 9.51	0.53 ~ 26.4	3.96 ~ 145.3
7	0.26 ~ 9.51	0.53 ~ 26.4	3.69 ~ 145.3
200	0.13 ~ 9.51	0.26 ~ 26.4	2.11 ~ 145.3
500	0.11 ~ 7.13	0.21 ~ 19.8	1.59 ~ 145.3
1000	0.07 ~ 4.23	0.13 ~ 11.9	1.06 ~ 95.1
For viscosities above 1000cP please contact FLOMEC customer service			

For K-factors please see section 6

Notes:

1. OM008H meter have a nominal port size of ¼" (6 mm)
2. Filtration requirements are for soft particles only; hard particles of any size are not acceptable.

1.5.2 Medium Capacity Models

Model Prefix	**015**	**025**	**040**	**050**
Nominal Size	½" (15 mm)	1" (25 mm)	1.5" (40 mm)	2" (50 mm)
Accuracy (liquids≥3cP)	± 0.5% of reading			
Repeatability (liquids≥3cP)	Typically ± 0.03%			
Temperature Range	See Table 1.5.5			
Pressure Ratings – PSI *(Bar)* – *threaded meters only* [1]				
Aluminium	990 (68)	990 (68)	435 (30)	285 (20)
Intermediate Pressure Al	-	2000 (138)	-	-
Stainless Steel	990 (68)	990 (68)	435 (30)	550 (38)
PPS (Ryton®)	-	174 (12)	-	-
Intermediate Pressure SS	1450 (100)	1450 (100)	725 (50)	725 (50)
High Pressure SS	5800 (400)	5800 (400)	5800 (400)	4350 (300)
Minimum Filtration	100 mesh (150 micron)[2]			
Viscosity (cP)	***Flow range (Litres / Min)***			
1	2 ~ 32	12 ~ 120	25 ~ 200	50 ~ 385
3	1 ~ 40	10 ~ 150	15 ~ 250	30 ~ 450
7	1 ~ 40	6 ~ 150	15 ~ 250	30 ~ 450
200	0.5 ~ 40	5 ~ 150	8 ~ 250	15 ~ 450
500	0.4 ~ 40	3 ~ 150	6 ~ 250	12 ~ 450
1000	0.25 ~ 40	2 ~ 120	4 ~ 200	8 ~ 385
Viscosity (cP)	***Flow range (US Gallons / Min)***			
1	0.53 ~ 8.45	3.17 ~ 31.7	6.60 ~ 52.8	13.2 ~ 101.7
3	0.26 ~ 10.6	2.64 ~ 39.6	3.96 ~ 66.0	7.93 ~ 118.9
7	0.26 ~ 10.6	1.59 ~ 39.6	3.96 ~ 66.0	7.93 ~ 118.9
200	0.13 ~ 10.6	1.32 ~ 39.6	2.11 ~ 66.0	3.96 ~ 118.9
500	0.11 ~ 10.6	0.79 ~ 39.6	1.59 ~ 66.0	3.17 ~ 118.9
1000	0.07 ~ 8.45	0.53 ~ 31.7	1.06 ~ 52.8	2.11 ~ 101.7
For viscosities above 1000cP please contact FLOMEC customer service				

For K-factors please see section 7

Notes:

1. Flanged meter pressure rating is in accordance with applicable flange standard, or with threaded meter rating, whichever is lower.

2. Filtration requirements are for soft particles only; hard particles of any size are not acceptable.

1.5.3 Large Capacity Models

Model Prefix	**080**	**080E**	**100**	**100E**
Nominal Size	3" (80 mm)	3" (80 mm)	4" (100 mm)	4" (100 mm)
Accuracy (liquids≥3cP)	± 0.5% of reading			
Repeatability (liquids≥3cP)	Typically ± 0.03%			
Temperature Range	See Table 1.5.5			
Pressure Ratings – PSI *(Bar) – threaded meters only* [1]				
Aluminium	175 (12)	175 (12)	145 (10)	145 (10)
Stainless Steel	175 (12)	-	-	-
Minimum Filtration	40 mesh (350 micron)[2]			
Viscosity (cP)	***Flow range (Litres / Min)***			
1	58 ~ 640	82 ~ 850	124 ~ 1275	248 ~ 2125
3	35 ~ 750	50 ~ 1000	75 ~ 1500	150 ~ 2500
7	35 ~ 750	50 ~ 1000	75 ~ 1500	150 ~ 2500
200	18 ~ 750	25 ~ 1000	38 ~ 1500	75 ~ 2500
500	14 ~ 750	20 ~ 1000	30 ~ 1500	60 ~ 2500
1000	9 ~ 640	13 ~ 850	19 ~ 1275	38 ~ 2125
Viscosity (cP)	***Flow range (US Gallons / Min)***			
1	15.3 ~ 169.1	21.7 ~ 224.6	32.8 ~ 336.8	65.5 ~ 561.4
3	9.25 ~ 198.1	13.2 ~ 264.2	19.8 ~ 396.3	39.6 ~ 660.4
7	9.25 ~ 198.1	13.2 ~ 264.2	19.8 ~ 396.3	39.6 ~ 660.4
200	4.76 ~ 198.1	6.60 ~ 264.2	10.0 ~ 396.3	19.8 ~ 660.4
500	3.70 ~ 198.1	5.28 ~ 264.2	7.93 ~ 396.3	15.9 ~ 660.4
1000	2.38 ~ 169.1	3.43 ~ 224.6	5.02 ~ 336.8	10.0 ~ 561.4
For viscosities above 1000cP please contact FLOMEC customer service				

For K-factors please see section 7

Notes:

1. Flanged meter pressure rating is in accordance with applicable flange standard, or with threaded meter rating, whichever is lower.

2. Filtration requirements are for soft particles only; hard particles of any size are not acceptable.

1.5.4 Electrical Specifications

Analogue Output Board	
Output	Analogue 4-20mA
Type	Passive, loop powered
Resolution	16 bit
Step Size	0.24uA
Temperature Error	0.2uA per degree Celsius
Loop Voltage Range	12 ~ 28V (dc)
Maximum Loop Load at 12V	350 ohms
Maximum Loop Load at 24V	800 ohms
Normal current range	4mA – 20mA
Normal Under Range	3.8mA
Normal Over Range	20.5mA
Maximum Fault Current	22mA

1.5.5 Temperature Specifications

Variant	**Degrees Celsius**	**Degrees Fahrenheit**
Maximum Process Temperature		
All Variants	80	176
Minimum Process Temperature		
Meters w/ Viton seals	-15	5
Meters w/ Teflon seals	-15	5
Meters w/ Nitrile seals	-20	-4
Liquid must always stay above freezing temperature		
Minimum Ambient Temperature		
Meters w/ Viton seals	-15	5
Meters w/ Teflon seals	-15	5
Meters w/ Nitrile seals	-40	-40

Note for Hazardous Locations:

Flow meter maximum and minimum ratings are overruled by any ambient temperature limits imposed by the specific hazardous location zone rating and temperature class. See section 5.4 for more information.

2) Approvals

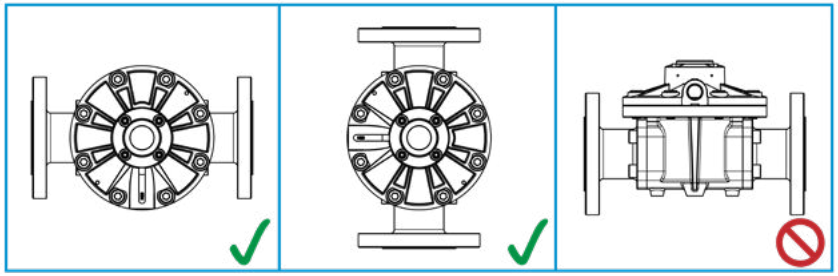
IECEx	IECEx approved for hazardous locations ***Specific models only***
Ex	ATEX approved for hazardous locations ***Specific models only***
CE	In compliance with applicable European directives for: Restriction of Hazardous Substances (RoHS) *Electromagnetic Compatibility (EMC)* *Pressure Equipment (PED)*

3) Mechanical Installation

Before installing your flow meter, it is recommended that you confirm the meter is suitable for your application conditions such as; fluid compatibility with meter materials, flow rate, pressure, and temperature. Fluid entering the meter must remain a liquid at all times; avoid solidification or gelling of the metered medium. If hydraulic shock or pressure surges of any kind are possible, the system upstream of the meter must be fitted with a surge suppressor or pressure relief valve to protect the meter from damage.

3.1 Installation Orientation

The flow meter MUST be mounted with the rotor shafts in a horizontal plane. Failure to mount your Oval Gear flow meter in the correct orientation (as shown in the diagrams below) will cause the weight of the rotors to bear down on the thrust bearings. The short term effects of incorrect mounting orientation will be a loss in accuracy, with long term effects ranging from reduced lifespan to fairly rapid catastrophic damage.



Liquid can flow in a horizontal direction, or a vertical direction, but in each case the rotor shafts must be in a horizontal plane. This is achieved by mounting the meter so that the terminal cover, or integral instrument display, is facing in a horizontal direction. For pulse output flow meters the direction of flow is not important, as the output is non-directional.

3.2 Piping Construction

It is preferred to install the flow meter upstream of a flow control or shut-off valve, as the back pressure provided by the valve will be beneficial to system accuracy; do not operate a flow meter directly discharging to atmosphere. Piping should be designed so that the flow

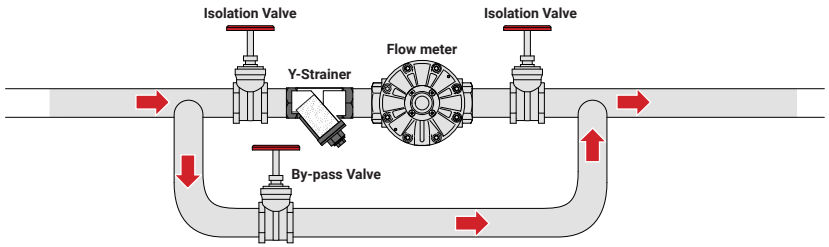
meter is full of liquid at all times; this is achieved by designing the inlet and outlet piping for the flow meter to be lower than all surrounding piping.

For vertical installations the liquid should travel from bottom to top, i.e. it should rise vertically through the flow meter. This will ensure that the flow meter remains full of liquid and will stop air entrapment in the meter.

All piping surrounding your flow meter should be well supported on secure footings, preferably at the point where the piping joins to the flow meter; unsupported piping will cause severe pipe stress on the flow meter.

3.2.1 Service Loop Plumbing

The best piping designs provide a bypass line, as shown in the following diagram, which allows isolation of the flow meter and strainer from the main process line. The benefits of installing a bypass line are that your system can be purged before start-up, and any maintenance on the flow meter or strainer can be carried out quickly and economically without interrupting critical processes.



3.3 Mechanical Support

All flow meters of nominal size 3” and 4” must have adequate mechanical support. Failure to adequately support the flow meter and the connected piping may result in structural damage to the flow meter housing. It is recommended that a solid structural support be provided at the first flange connection, on both sides of the flow meter. If possible, the housing of the flow meter can be directly supported, however piping should still be supported as close as possible to the

flow meter. It is never acceptable to support the flow meter and use the housing of the flow meter to support the weight of your piping.

3.4 Filtration / Straining

It is recommended to fit the inlet side of your flow meter directly to a strainer of appropriate pipe size and mesh size. The minimum mesh size as shown in the specifications section of this manual should be adhered to where ever possible. When metering medium or high viscosity fluids it may be necessary to use a strainer one pipe size larger than the flow meter nominal size, in order to limit the pressure drop across the strainer basket and maintain strainer efficiency *(i.e. a 1.5” strainer on a 1” meter)*.

In systems where there is potential for hard particles of any size, the filtration levels of the system should be improved so as to eliminate the flow of hard particles through the meter. While soft particles may pass through the rotating meter components without damage (if they are small enough) hard particles are abrasive and will always cause rotor and bearing damage regardless of size.

3.5 Pipe Connections

When installing a flow meter, it is important that no upstream pipe join between the flow meter and the strainer are sealed using PTFE sealing tape. Lose pieces of PTFE tape are common causes of failure in new meter installations due to the tendency to wrap around the rotating components inside the meter. It is recommended that the sealing of pipe joins should be done with a sealing paste or liquid *(such as Loctite® 565 thread sealant paste)*.

Flanged connections should be made using gaskets and bolting suitable for the metered liquid and the system pressure; flow meters fitted with stainless steel flanges may be installed using metallic gaskets and high strength bolting if required. For meters fitted with Aluminium flanges it is only suitable to make pipe connections in accordance with the relevant flange standard requirements for cast iron flanges; gaskets according to ASME B16.5 Annex C gasket group 1a are recommended, and only low strength or intermediate strength bolting may be used.

For all flanged pipe connections to flow meters it is essential that flange faces are well aligned and closely fitting.

⚠ CAUTION

Flange bolts in Aluminium flanges should never be tightened to torque values greater than 110ft. lb (150 Nm)

3.5.1 Plastic Pipe Threads

When installing pipe fittings on a plastic flow meter it is very easy to over tighten the threads and cause damage to the flow meter housing. Over-tightened pipe fittings will create high levels of stress on the internal pipe thread of the plastic housing, which can lead to cracking of the housing. Cracked housings are not repairable, and not covered under warranty. Stress on the internal pipe thread of the flow meter housing is made worse when excessive amounts of PTFE thread tape are used.

When installing pipe fittings on a plastic flow meter it is recommended to always use a pipe sealant paste that is compatible with plastic pipe fittings and with the liquid being measured. Install the pipe fittings to finger tight, and then tighten by a further 1-2 turns.

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4) Electrical Installation

4.1 Wiring

All wiring of electrical outputs should use high quality instrument cable; twisted pair low capacitance shielded instrument cable (20AWG [0.5mm2] minimum) is recommended. Always use cable with an appropriate temperature rating for the liquid temperature inside the flow meter. The cable drain or screen should be terminated on a DC common or a specifically assigned shield terminal at the readout instrument end only; to protect the signal from mutual inductive interference. ***The cable shield at the meter end of the cable must be isolated with tape or similar, do not connect the cable shield to ground at the meter.***

The cable should not be run in a common conduit, or parallel with, power cables or high inductive load carrying cables; as interference may affect the transmitted signal. Run all instrument cables in their own separate conduit. Where instrument cables must cross high power cables be sure that the cables intersect at 90 degrees to limit induced interference.

Do not combine any inductive loads on the same voltage supply as your flow meter wiring, as these components are commonly sources of high frequency interference that may affect the quality of the output signals. Inductive loads on a common voltage source also have the potential for voltage spikes well in excess of the 28Vdc limit of the flow meter electronics.

The maximum wire cross section that can be connected to the terminals of the flow meter is 16AWG (1.5 mm^2).

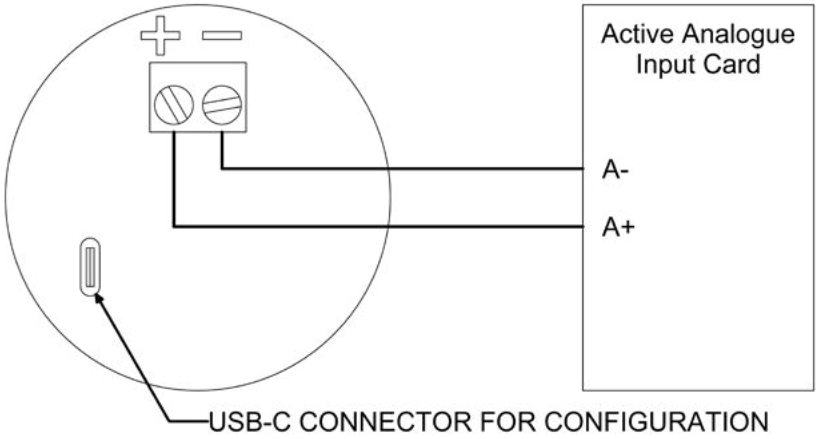
4.2 Making Electrical Connections

To gain access to the electrical connections on a meter, you must first remove the terminal cover by removing the four cover screws with a ***4 mm Hex Key (Allen Key)***. When removing the terminal cover, take care not to damage or lose the O-Ring. The analogue output board uses a pluggable terminal block which can be removed for fitment of wires. **All wiring requires a 0.1 in. (2.5 mm) wide Flat Blade Screw Driver (or smaller).**

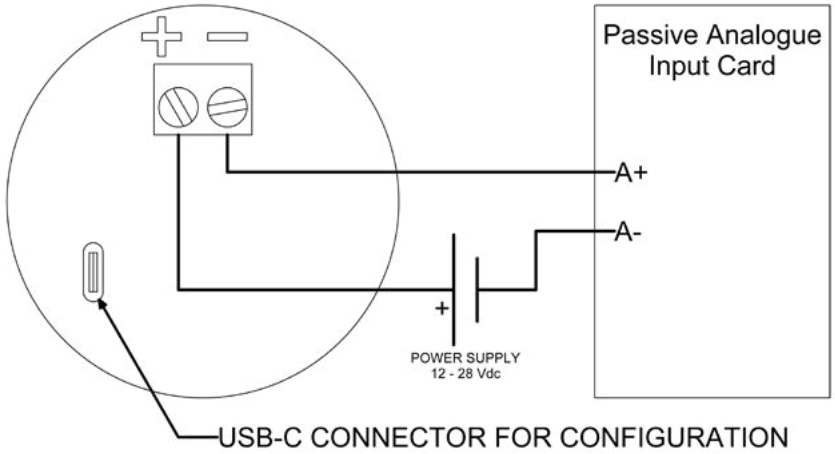
When refitting a terminal cover for a Flameproof (Ex d) flow meter the terminal cover screws must be tightened to a torque of 2.95ft lb (4Nm). See section 5.5 for more details.

4.3 Wiring Diagram

4.3.1 Active Analogue Inputs



4.3.2 Passive Analogue Inputs



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5) Installations in Hazardous Areas

Installations in Hazardous Areas are applications where the utmost care is necessary in correctly selecting your flow meter. If your flow meter is to be used in a hazardous area it is important that it has been correctly selected for the specific explosive atmosphere in which it is to be used, and that installation be carried out by a ***competent*** person.

An Oval Gear flow meter may be suitable for use in a hazardous area if it has been purchased as Flameproof (Ex d). ***Before installation ensure your meter is suitable for the specific explosive gas or vapour present and the zone rating, gas group, and temperature classification of your installation.***

For any installations measuring non-conductive liquids there may be a risk of electrostatic build-up in the liquid. It is recommended that the guidance in IEC TS 60079-32-1 is followed.

5.1 ATEX/IECEx Flameproof Flow meters (Ex db)

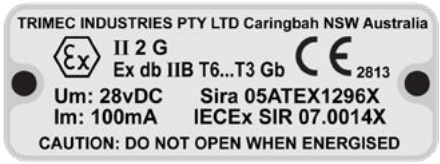
ATEX/IECEx flameproof (Ex db) Oval Gear flow meters are designed and certified for use in either Zone 1 or Zone 2 hazardous areas.

Flameproof flow meters must be installed in accordance with hazardous area standards, which require the use of certified cable glands, sealed conduit connections, and armoured cable according to the international standards IEC/EN 60079:1 and IEC/EN 60079:14. The extent of special wiring installation is dependent on the zone and gas group.

ATEX/IECEx flameproof flow meters are available with either of the following equipment ratings:

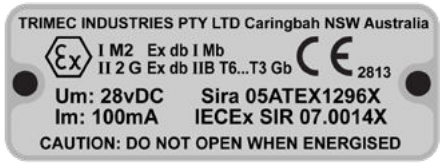
Group IIB – Aluminium or Stainless Steel meters suitable for hazardous gas atmospheres in group IIB.

II 2 G
EX d IIB T6...T3 Gb



Group I/IIB – Stainless Steel meters suitable for mines subject to firedamp and gas atmospheres in group IIB.

I M2 Ex d I Mb
II 2 G EX d IIB T6...T3 Gb



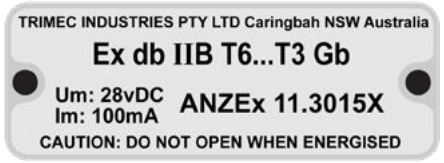
5.2 ANZEx Flameproof Flow Meters (Ex db)

ANZEx flameproof (Ex db) Oval Gear flow meters are designed and certified for use in either Zone 1 or Zone 2 hazardous areas in Australia and New Zealand, in locations where IECEx is not accepted.

ANZEx flameproof flow meters are available with either of the following equipment ratings:

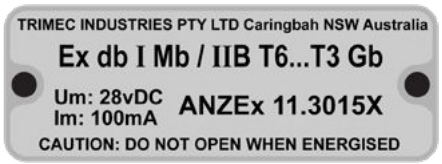
Group IIB – Aluminium or Stainless Steel meters suitable for hazardous gas atmospheres in group IIB.

EX d IIB T6...T3 Gb



Group I/IIB – Stainless Steel meters suitable for mines subject to firedamp and gas atmospheres in group IIB.

Ex d I Mb
EX d IIB T6...T3 Gb



FLOMEC®

5.3 Conforming Standards

Flameproof flow meters carrying ATEX/IECEx labels are certified in accordance with the following standards. Prior to installation or use, review the approval markings on the product and in this manual, as well as the conforming standards below, to confirm it is appropriate for your country/region and site classification.

ATEX Directive	***IECEx Scheme***
ATEX directive 2014/34/EU	IEC 60079-0:2011 Edition 6.0
EN 60079-0:2012 + A11: 2013	IEC 60079-1:2014-06 Edition 7.0
EN 60079-1:2014	

5.4 Temperature Limits for Flameproof Flow meters

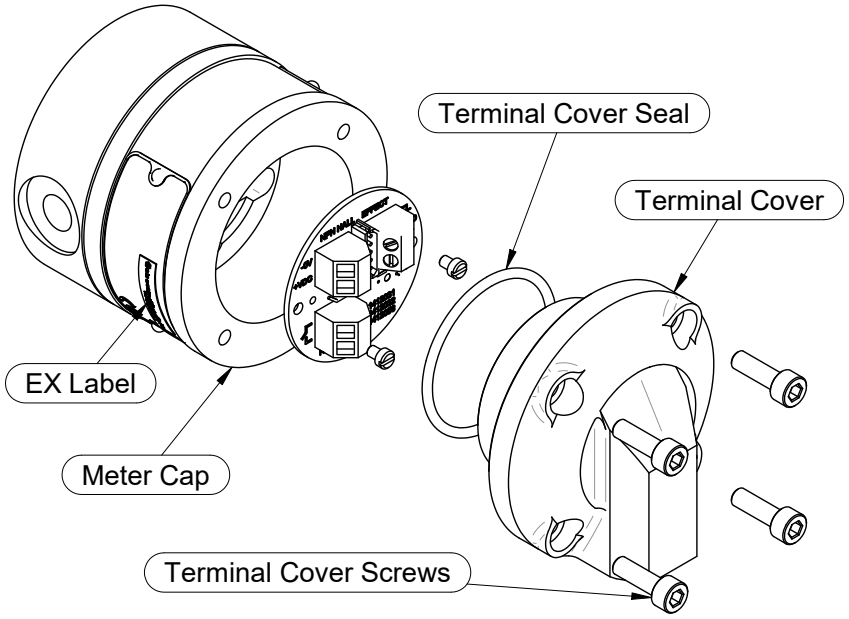
When operating a Flameproof meter, the process (liquid) temperature must be kept below the maximum limit which is allowed for the temperature class of the installation. This is a critical requirement for explosion safety. For ATEX/IECEx rated equipment refer to the table below to determine the temperature limits for a specific temperature class ***(e.g. T6 installations must be kept below 158°F [70°C])***

Process (Liquid) and Ambient Temperature Limits	
Marking	**Allowable Temperature Range**
EX d Mb	+14°F ≤ T ≤ +176°F (-10°C ≤ T ≤ +80°C)
EX d IIB T6 Gb	-40°F ≤ T ≤ +158°F (-40°C ≤ T ≤ +70°C)
EX d IIB T5 Gb	-40°F ≤ T ≤ +176°F (-40°C ≤ T ≤ +80°C)

5.5 Special Conditions of Use

The following conditions must be adhered to for use, service or maintenance of a Flameproof (EXd) flow meter.

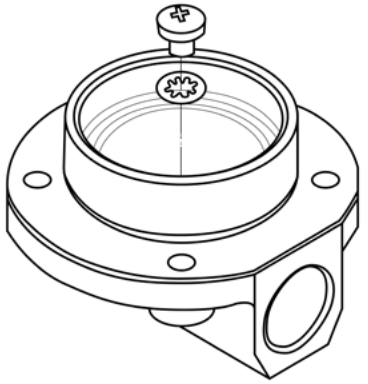
- ***Flame paths are not intended to be repaired, contact manufacturer.***
- The maximum allowable diametric clearance of the cylindrical joint between the terminal cover and the meter cap must not exceed 0.0059 inches (0.15mm).
- The property class of the hexagon socket head cap screws retaining the terminal cover must be A2-70 or higher; e.g. A4-80.
- Terminal covers screws must be torqued to a value of 2.95ft-lb (4Nm).



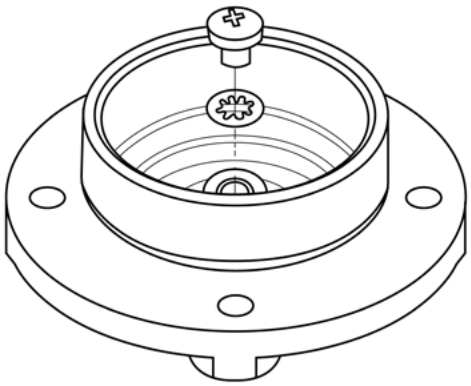
5.6 Earthing of Flameproof Flow meters

A facility for the connection of an earthing conductor is provided inside the terminal cover of all flameproof (EXd) flow meters, as per below diagrams. The earthing connection is fitted with a 5 mm Phillips head screw with a locking washer and allows for the fitment of a 5 mm ring terminal.

Applicable Models: 004, 006, 008, all High Pressure models



Applicable Models: 015, 025, 040, 050, 080, 080E, 100, 100E



The use of the internal earth connection as the only earthing connection may be acceptable with wiring systems using steel wire armoured cable or metallic conduit. For all other installations an external earthing connection must be used which may be connected to the external threaded mounting holes on the flow meter body or using metallic cable glands with earthing tags.

6) CDS Software

6.1 Preparation

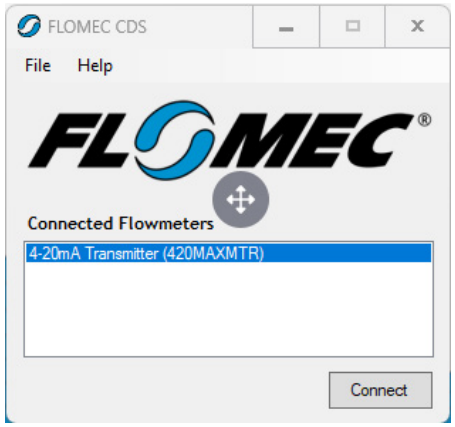
Ensure that a windows computer with USB ports is available, and that a current version of Windows is loaded. It is recommended that the computer not have any common DC grounds with any device in the current loop (e.g. PLC, SCADA system). A battery powered laptop computer is preferred.

Navigate to flomec-cds.com and download the latest version of the FLOMEC CDS software. It is also possible to view instructional videos of the CDS software at this website link.

6.2 Connection

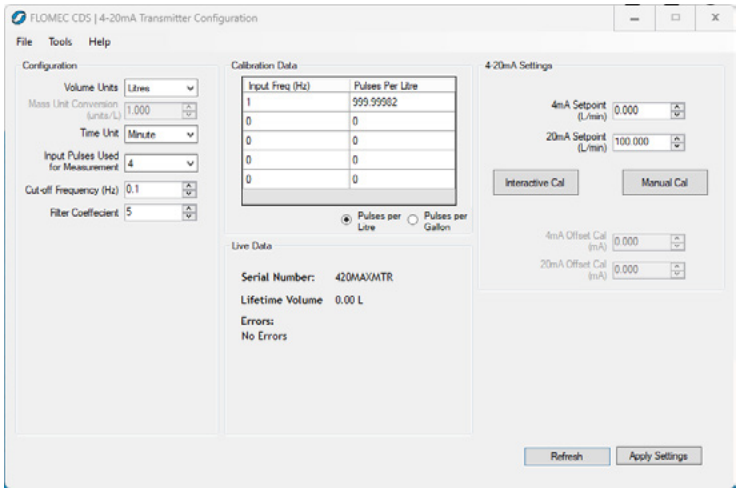
Select a USB-C cable of appropriate length and connect to both your Windows computer and the analogue output board in the flow meter. See Section 4.3 for the location of the USB-C connector on the flow meter. The analogue output board should not need to be removed from the flow meter housing to do this.

Open the FLOMEC CDS software, wait for the 4-20mA transmitter to be detected, and then connect to the device using the 'Connect' button on the CDS interface.



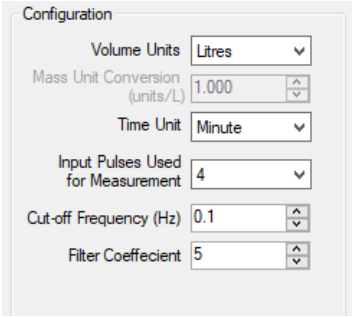
6.3 Configuration

Once the flow meter is connected to the CDS software, the configuration window will appear. Inside the configuration window various parameters can be adjusted by the user, such as units of measure, filtering, flow meter calibration data, and 4-20mA current set points.



6.3.1 Engineering Units

Engineering units are user selectable from a list of many common volume or mass units, such as; litres, US gallons, cubic metres, pounds, kilograms, imperial gallons, cubic centimetres, and others. The factory configuration will be in either litres or US gallons. If units of mass are selected, the user will then need to enter a value for the mass conversion. This must be entered in either kilograms per litre, or pounds per litre.



Changes in this parameter are reflected in the 4-20mA set points, and the lifetime volume value. The user can also change the time unit for the flow rate calculation. By default, the flow rate is calculated per minute (e.g. L/min, or Gal/min). This parameter can be changed to /seconds, /minute, /hour, or /day. Changes in this parameter are reflected in the 4-20mA setpoints.

6.3.2 Flow Rate Filtering

The analogue output board has two different parameters that control how the raw flow signal is averaged and filtered before calculating the mA current output. These parameters are important to ensure an output signal that meets the user's requirements for both stability and responsiveness.

The purpose of the 'Input Pulses Used for Measurement' parameter is to determine the number of input pulses which are used in calculation of the flow rate; the more pulses which are used the more accurately the Rate Display will represent the average flow rate of the system. The parameter is adjustable from 1 to 99 pulses per calculation, and a value of 4 is the default.

For systems using pumps with a non-uniform rate of delivery (piston pumps, diaphragm pumps, or similar) it is important to have a high value for this parameter as it will produce a stable rate display which is representative of the average flow through the pipe. If this parameter is set too low when using a piston or diaphragm pump then the current output signal will follow the flow spikes from the pump which can cause unstable responses from the control system.

For systems with a steady and uniform flow through the pipe, lower values can be used for this parameter to achieve a more responsive analogue current output. A minimum value of 4 is recommended.

The Filter Coefficient parameter is used to smooth out fluctuating flow input signals in order to provide a stable flow rate display. Most input signals are reasonably stable and need only the default setting, however for systems with large flow fluctuations the Filter setting may need to be increased.

If the user requires quick visual indication of changes to a system's flow rate, this can be accomplished by entering a lower number. To remove all filtering from the flow rate calculation this parameter can be set to zero.

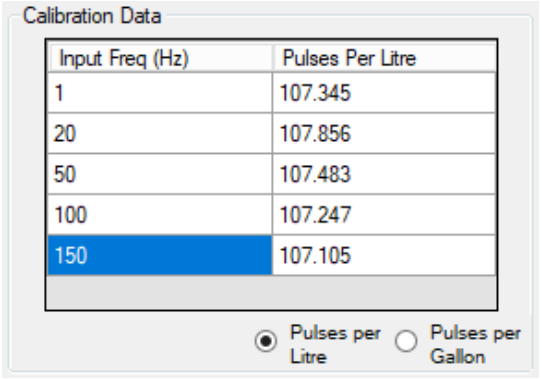
6.3.3 Cut-off Frequency

The Cut-off Frequency parameter is used to adjust the minimum frequency required for the flow meter to calculate a flow rate. This setting is useful to avoid spikes in the analogue output from "apparent flow" when the system is intended to be at zero flow. This can be caused by movement of liquid in the pipes of a mobile installation (on a truck etc.), or pulsations from a dead-headed pump.

The default value for the low frequency cut-off is 0.1Hz, and the parameter is adjustable from 0.1Hz up to 9.9Hz.

6.3.4 Calibration Data

The Calibration Data table allows the user to enter up to 5 points of calibration for the flow meter. The default values in this table will match the factory calibration that was ordered with the flow meter. Typically, only a single point of calibration will be loaded unless a 3-point or 5-point calibration was purchased at additional cost.



Each point of calibration in the table requires a frequency value and a K-factor. Frequency values are to be entered in Hertz (pulses/second) and can be entered with up to 8 significant figures. K-factor values are to be entered in Pulses/Litre or Pulses/Gallon with up to 7 significant figures. ***Before entering calibration data in Pulses/Gallon ensure this option is selected underneath the calibration data table.***

If a single point of calibration is to be entered, the frequency value is not important and any non-zero value can be entered here. After entering a non-zero value for frequency the K-factor for the flow meter may be entered. ***Please note, if there are no non-zero frequency values entered the flow meter will operate as if the K-factor has been set to 1 Pulses/Litre.***

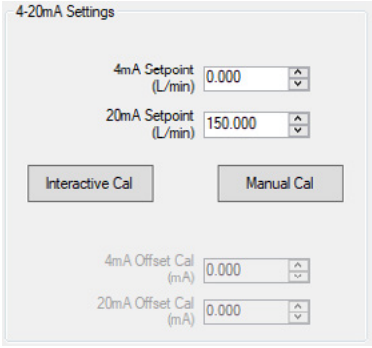
When entering multiple points of calibration the user must calculate the frequency for each calibration point, which can be done as follows:

$$Flow\ rate\left(\frac{Litres}{Minute}\right) x\ K.Factor\left(\frac{Pulses}{Litre}\right) \div 60 = Frequency(Hz)$$

Example: for a calibration point at 50 L/min with a K-factor of 107 Pulses/Litre the user would enter a frequency value of 89.2Hz and a K-factor of 107 Pulses/Litre

Calibration points may be entered in any order; it is not necessary to enter them in ascending frequency order. However, if any point is entered with a frequency value of zero then any k-factor entered on this line of the table will be deleted once the user clicks the 'Apply Settings' button on the CDS interface.

6.3.5 4-20mA Setpoints



The 4-20mA set point parameters allow the user to configure the zero and span of the analogue output in flow rate units. If any changes have been made to the engineering units, per section 6.3.1 above, the selected volume units and time units will be reflected here.

It is common practice for the 4mA setpoint to be configured to zero flow, however the user may adjust this to suit their process. The 20mA setpoint will be factory configured to the maximum flowrate rating of the flow meter; however, the user can change this to a lower value to improve the measurement resolution of their system.

6.3.5.1 Default Setpoints

Each flow meter is factory configured in metric units, using the maximum flowrate specification for the flow meter expressed in Litres per minute, or Litres per hour. Users in North America may use the flow meter out of the box by referring to the below table of factory set point values. If the user prefers to have a 'round number' for their 20mA setpoint they may use FLOMEC CDS software to change their units of measure and then adjust their setpoints to their preference.

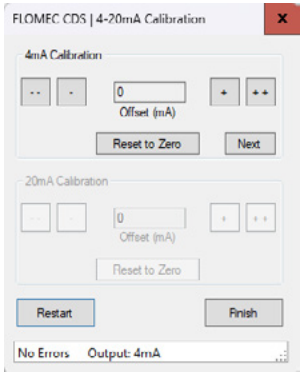
Flow Meter Size	4mA Setpoint	20mA Setpoint (Metric)	20mA Setpoint (US Customary)
004	Zero	36 L/hr	9.510 GPH
006	Zero	100 L/hr	26.417 GPH
008	Zero	550 L/hr	145.295 GPH
015	Zero	40 L/min	10.567 GPM
025	Zero	150 L/min	39.626 GPM
040	Zero	250 L/min	66.043 GPM
050	Zero	450 L/min	118.877 GPM
080	Zero	750 L/min	198.129 GPM
080E	Zero	1000 L/min	264.172 GPM
100	Zero	1500 L/min	396.258 GPM
100E	Zero	2500 L/min	660.430 GPM

6.3.6 Calibrating the Analogue Output

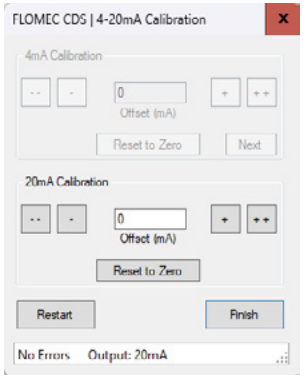
To calibrate the analogue output the user must first connect an accurate master such as a FLUKE 709 Precision Loop Calibrator, or a similar device from another manufacturer. This master device should ideally have a recent calibration report confirming its own measurement accuracy.

Once the loop calibrator is connected to the flow meter the user should connect via USB to the CDS software on their Windows PC, and then select the 'Interactive Cal' button on the CDS interface. A separate window will open with an interface for adjusting the current output values at 4mA and at 20mA. The calibration window contains various buttons for making small adjustments to the current output; they function according to the below table.

Button	Function
- -	Decrease current output by 0.01mA
-	Decrease current output by 0.001mA
+	Increase current output by 0.001mA
+ +	Increase current output by 0.01mA
Reset to Zero	Reset all adjustments to zero



Once the calibration window is open the analogue output board will drive an output of 4mA. If there is any inaccuracy in the current circuitry of the PCB this value may show a slight deviation from 4.000mA. E.g. 4.004mA or 3.997mA. By using the buttons on this interface the user can adjust their analogue output current in real time. Once the loop calibrator shows a perfect 4.000mA, click the 'Next' button to progress to calibration of the 20mA point.

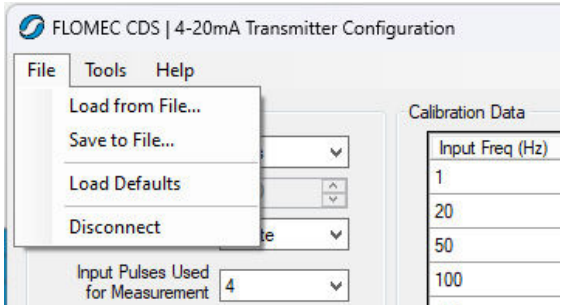


Once the user has clicked the 'Next' button the lower half of the interface screen is accessible, and the same process can be used to adjust the analogue current output at the 20mA point. Once all adjustments are completed click the 'Finish' button to return to the main configuration window.

There is also a 'Manual Cal' option which functions the same way, but without the ability to drive the current output to 4mA and 20mA while making the adjustments.

6.3.7 Saving Configuration Changes

Any configuration changes made using the CDS software can be saved using the 'Apply Settings' button on the lower right-hand side of the CDS configuration window. Or, if you wish to discard any changes you have made in the CDS software and reload all the existing configuration from the flow meter press the 'Refresh' button.



The configuration of the flow meter can also be saved to file as a precaution, or to provide a backup which can be loaded into a replacement analogue output board if required in future.

7) K-Factor Chart

Each flow meter is individually calibrated and supplied with a calibration report showing the number of pulses per unit volume (e.g. pulses/Litre) which is characteristic to the flow meter. The relevant K-factor for your flow meter is entered into the analogue output board in the factory.
Nominal K-factor values are shown in the below tables, actual values shown on calibration reports will differ from the nominal value by a small amount due to manufacturing tolerances.

Nominal K-Factors		
Flow Meter Size	Pulses/Litre	Pulses/US Gallon
004	5600	21200
006	2100	7950
008	710	2690
015	168	636
025	53.5	204
040	28	106
050	13	49
080	5.33	20
080E	3.0	11.4
100	2.2	8.3
100E	1.12	4.24

8) Commissioning

Once the meter has been mechanically and electrically installed in accordance with this instruction manual, the meter is ready for commissioning.

8.1 System Purging

The newly installed meter must NOT be run until the piping is completely flushed of foreign materials. The most common foreign matter that is present in new or modified piping is; welding slag, grinding dust, sealing tape/compound, and surface rust. If your piping has been designed with a bypass line it will be easy to isolate your meter from the remainder of the system to flush out the majority of the piping. If you have not installed a bypass line around the meter, the best solution is to replace the meter with a spool-piece for the duration of the flushing procedure.

The other critical concern when commissioning a meter is the presence of air slugs; this is also a concern for any systems that have been shut down for long periods of time.

> ⚠ ***CAUTION***
>
> ***Do not start up your system for the first time by opening all valves and turning on the pump, this will damage the flow meter.***

To safely start a meter for the first time, the best procedure is to eliminate the majority of the air volume in your piping system using the bypass line described earlier. After bleeding the majority of the air through the bypass line, the remainder of the air can be slowly passed through the meter by gently opening the flow control valve downstream of the meter. If a bypass line has not been incorporated into your system, and no alternative exists for bleeding air upstream of the meter, then the entire air volume of your piping will need to be bled very slowly through the valve downstream of the flow meter.

Following the start-up procedure, and during the period of initial operation, it is recommended that the inlet strainer on your meter be inspected regularly, and cleaned if necessary, as it is possible that not all foreign material will be completely removed from your system during the initial flushing.

8.2 Accuracy Verification

Before use, check the flow meter's accuracy to verify correct installation and commissioning procedures have been followed.

1. Ensure there is no air in the system
2. Select an accurate volume container that holds a minimum of 2 minutes of flow at the calibration flow rate
3. Measure an exact known volume into the container
4. Verify the volume against the readout on the flow meter, or the volume total in the connected recording equipment, such as a PLC or SCADA system.
5. If a volume total is not available in the recording equipment; record the 'Lifetime Volume' value from the CDS interface before and after the verification process. Then subtract the values and compare against the liquid volume in the test container.

Small errors in this reading may simply indicate that the container used for the accuracy verification does not contain an accurate volume, or that some liquid has been spilled in the process. Small errors are not cause for concern.

Large errors in the reading indicate larger issues which may have been caused by improper installation and commissioning, or errors when entering the K-factor into the display or recording equipment (PLC, etc.). If large errors are found in the accuracy verification, please follow these steps:

1. Confirm that the installation meets the requirements in section 3: Mechanical Installation
2. Confirm that the installation meets the requirements in section 4: Electrical Installation
3. Confirm that the correct commissioning process was completed
4. If all of the above steps have been completed correctly, please refer to the troubleshooting steps in sections 9 and 10.

For best results it is recommended that the flow meter be regularly calibrated or verified for continued measurement accuracy.

Annual calibration is a common industry standard; however the calibration frequency may need to be adjusted to suit the operating conditions of the flow meter. Applications with high pressures, high temperatures, constant operation, or corrosive liquids may need more regular recalibrations to ensure optimum accuracy.

Calibration of flow meters is essential for quality assurance, as it ensures that measurements remain accurate and reliable over time. By verifying the meter against known standards, calibration confirms that readings taken since the last calibration can be trusted within acceptable tolerances. The importance of regular calibration is directly linked to the critical role the flow meter plays in operations. For example:

- **Process Control:** In systems where flow meters regulate or control processes, inaccurate readings can lead to inefficiencies, product defects, or even safety risks.
- **Billing and Accounting:** When flow meters are used for charging customers or as a measurement for financial accounting, accuracy is crucial. Even small measurement errors can result in significant financial discrepancies.

Therefore, routine calibration not only maintains measurement integrity but also supports operational efficiency, regulatory compliance, and fair commercial transactions.

9) Troubleshooting Summary

Symptom	Possible Cause	Solution
Meter Readings are High	Output Signal Interference	- confirm shielded cable has been used - ground cable shield at recording equipment (PLC) end only - isolate cable shield at flow meter end - re-route cabling from high electrical energy sources, or power carrying cables such as valves and pumps/motors.
	Entrained air or gas	- Remove source of air or gas entrapment - Install an upstream air-eliminator
	Pulsating Flow from reciprocating style pump	- Increase back pressure on pump - Install a fast response one-way (check) valve, or a surge arrestor between pump and meter - Change pump style to a smooth delivery pump
	Incorrectly configured zero/span	- Zero and span settings in flow meter do not match settings in the recording equipment (PLC, SCADA, etc.) - Use CDS software to check and adjust zero/ span settings
Meter Readings are Low	Damaged/ worn rotors or measuring chamber	- Inspect rotors and measuring chamber for damage or fouling. - Clean, remove any fouling or foreign particles - If damage is found, consult manufacturer for advice.
	Incorrectly configured zero/span	- Zero and span settings in flow meter do not match settings in the recording equipment (PLC, SCADA, etc.) - Use CDS software to check and adjust zero/span settings
No Reading on Recording Equipment (PLC, etc.)	No analogue signal from flow meter	- Check wiring connections are not loose - Ensure correct DC voltage (12-28Vdc) is available at the terminals of the PCB - Use CDS software to check flow meter zero and span settings - Disconnect wiring at flow meter and use a loop calibrator (FLUKE 709 or similar) and calibration function on CDS software to check current output from flow meter
	Faulty recording equipment	- Use a loop calibrator to drive current signal into recording equipment to check for possible fault in PLC hardware - Repair or replace any faulty hardware in recording equipment
	Rotors jammed	- If meter has been recently field serviced, check that rotors are not installed upside-down or incorrectly meshed - Check for obstruction due to foreign particles - Clean, repair, or replace rotors

10) Troubleshooting Steps

Flow meters have two distinct sections: the mechanical wetted section housing the rotors, and the electrical section housing the analogue 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.***

Step 1 - Check application, installation and set up; refer to installation sections for installation and application factors that may affect the meter operation including incorrect wiring. Check meter specifications for incorrect flow rate, temperature, pressure, or materials compatibility.

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 flow meter, a malfunctioning pump, closed valves or low liquid level in feeder tank.

Step 4 - Connect the flow meter PCB to a windows computer using a USB cable, and check configuration settings; Confirm the Calibration Data table contains frequency and k-factor data, confirm the 4mA and 20mA setpoints are appropriate for the operating flowrate range of the flow meter. If the flow meter is expected to operate at 100L/min and the 20mA set point is configured to 10,000L/min the analogue output will not function as expected.

Step 5 - Use CDS software to troubleshoot the current loop; The CDS software will show if the flow meter has recorded any volume, or if any loop errors are preventing function. First resolve any identified loop errors, click the 'Reconnect Loop' button, and confirm that the recording equipment or loop calibrator is receiving a 4mA signal.

Step 6 – Use the Interactive Calibration function in the CDS software to test output current; Click the 'Interactive Cal' button on the CDS interface. Confirm the recording equipment or loop calibrator is receiving a 4mA current signal. Click the 'Next' button on the CDS interface and then confirm that the recording equipment or loop calibrator is receiving a 20mA current signal. If 20mA is not reached, confirm the loop load values meets the specification before contacting FLOMEC customer service.

Step 7 – Test the function and accuracy of the recording equipment (PLC, SCADA, etc.) using a loop calibrator; Using a loop calibrator (FLUKE 709 or similar) test the analogue current input on the recording equipment to ensure it is functioning correctly and the readings are accurate.

10.1 Loop Errors

Loop errors are dealt with according to NAMUR NE43 and American standard API 551. Error levels are according to the below table.

Condition	Transmitter Output Signal
Normal	4 to 20 mA
Normal under range	3.8 to 4.0 mA
Normal over range	20.0 to 20.5 mA
Loop fault	Less than 3.6 mA
Open circuit on loop wire	Less than 3.6 mA
Transmitter fault	20.5 to 22.0 mA
Probable short on loop wire	Greater than 22.0 mA

More information on loop errors and possible solutions may be found by connecting your flow meter to the FLOMEC CDS software.

11) Maintenance and Repairs

Adhering to the installation instructions is the most important requirement to ensure that your Oval Gear meter provides the maximum level of operational performance. Oval Gear meters are a mechanical device, and so will be subject to some wear and tear over their operational life except under ideal circumstances. The amount of normal wear that the meter will experience will be dependent on the operational conditions such as; flow rate, temperature, cleanliness of the liquid, lubricity of the liquid, and the amount of continuous duty required of the meter.

To maximise the operational availability of your meter, and reduce system downtime, a periodic maintenance and inspection regime should be used. Frequency of maintenance depends on the operational conditions of the meter and the criticality of the system; it is the user's responsibility to determine inspection frequency however the manufacturer can provide guidance.

For any installations that require in-situ cleaning (CIP); it is important that the cleaning or flushing procedures do not produce operating conditions that are outside of the acceptable flow rate, pressure, or temperature ratings of the meter. High temperature cleaning procedures that increase system temperature at a rate greater than 18°F (10°C) per minute may damage the reed switch output. Chemical compatibility of cleaning solutions should be checked against the materials of construction of the meter.

Before undertaking meter maintenance ensure the following:

Associated alarm(s) or control output(s) are isolated so not to affect the process

Voltage supply is isolated from the meter

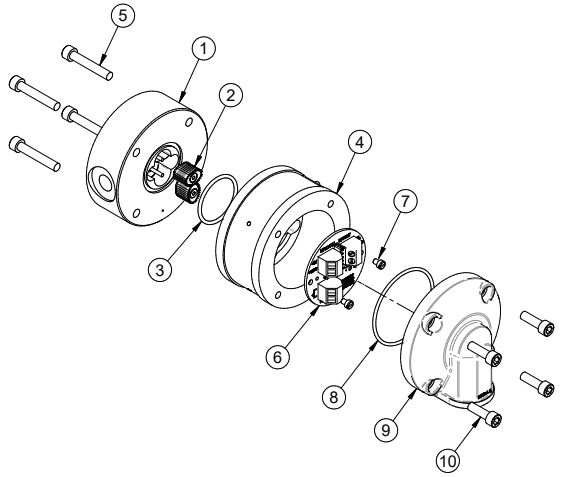
Liquid supply to the meter is closed off

The meter is depressurised and liquid drained from the meter / pipeline

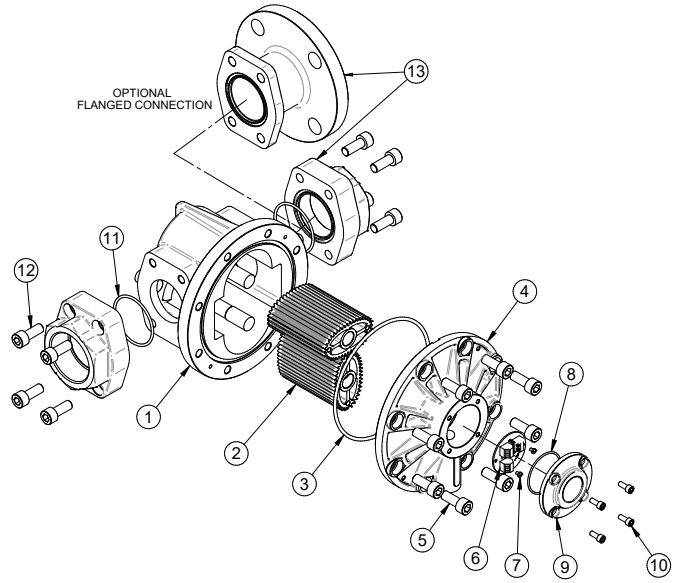
11.1 Parts Identification

For identification of the parts within your Oval Gear Meter refer to the following images and tables.

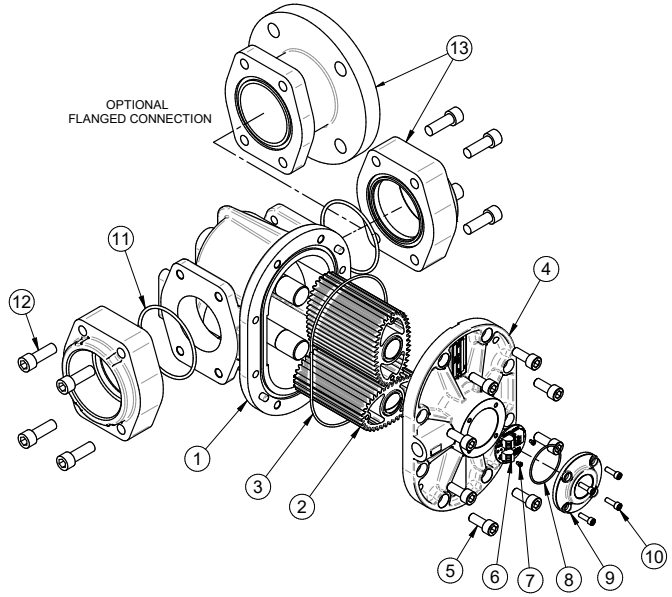
Applicable Models: 004, 006, 008, 015



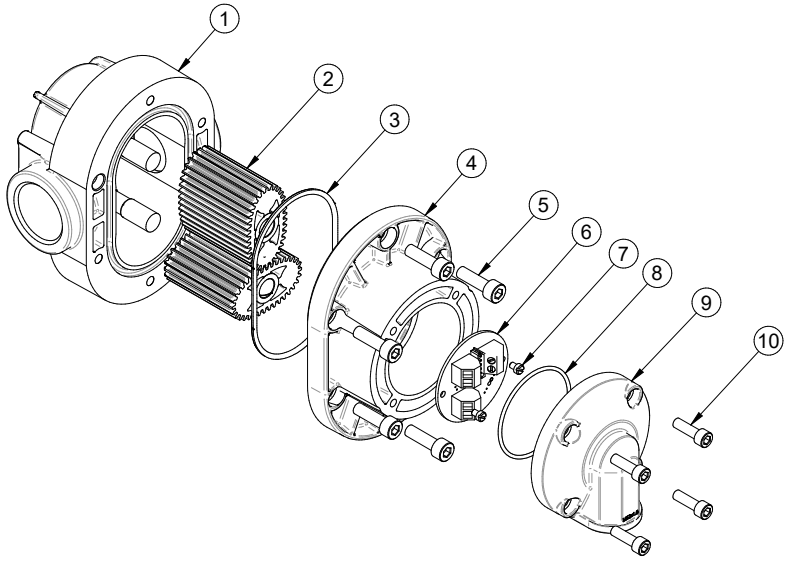
Applicable Models: 025, 040, 050, 050E



Applicable Models: 080, 080E, 100, 100E



Applicable Models: 025P



Parts Identification Table

Item No.	Description
1	Meter Body Assembly
2	Rotor Assembly
3	Meter Body O-Ring
4	Meter Cap
5	Meter Body Screw
6	Analogue Output Board
7	Pulse Output Board Screw
8	Terminal Cover O-Ring
9	Terminal Cover
10	Terminal Cover Screw
11	Flange Portion O-Ring
12	Flange Portion Screw
13	Flange Portion

11.2 Flow Meter Disassembly

If required to gain access to the meter terminals and analogue output board, undo the 4 cap screws (10), remove the terminal cover (9) carefully to avoid putting strain on the terminal connections. The analogue output board (6) can now be accessed and removed if necessary by removing the PCB screws (7).

To access the oval gear rotors, undo the meter body screws (5), and carefully pry the meter body apart avoiding misplacing or damaging the O-ring (3). The rotors (2) can now be removed and inspected.

11.3 Flow Meter Inspection

Inspect O-rings for damage, chemical attack, deformity or any form of deterioration. Remove, inspect and clean the rotors, and check the measuring chamber for damage or scoring, the rotor shafts should NOT be loose or able to be rotated. Rotors should turn freely, and should spin without scraping or catching on any part of the meter body.

11.4 Re-assembly of Flow Meter

When re-installing the rotors the magnets MUST be correctly positioned so that they are facing the sensors located in the meter cap, for meters ranging from 004 to 015 sizes the magnets are inserted from the underside of the rotor so will not be visible when the rotors are installed. Meters from 025 size and larger will have the magnets visible from the top; if you are unsure of magnet location it is easiest to test using a small steel object such as a steel ruler or small screw driver.

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. If you are able to rotate the engaged rotors through a complete 360, then you have installed them at the correct 90 degree angle.

Fit the O-ring into the groove and assemble the meter cap onto the meter body; small meters are visibly aligned using a small dimple on the top face of the meter cap and the underside of the meter cap. Larger meters are aligned using a location pin or a pair of dowel pins.

Fit the body cap screws (5) and tighten in a star sequence, then carryout a final tighten in the same sequence to a firm torque. This sequence and procedure ensures the meter bodies are assembled correctly and evenly. Fit the analogue output board, terminal cover or instrument as appropriate.

FLOMEC®

12) EU Declaration of Conformity

Product Models: OM Series Oval Gear Flow Meters

Manufacturer: Trimec Industries Pty. Ltd.
12/7-11 Parraweena Road
Caringbah, NSW 2229
Australia

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Conformity is based on the application of the harmonised standards listed below, and where necessary through certification by a European Union Notified Body.

2014/30/EU EMC Directive
Harmonised standards: EN 61326-1:2013

2011/65/EU RoHS Directive
Harmonised standards: EN 50581:2012
EN IEC 63000:2018

2014/68/EU Pressure Equipment Directive
Compliance is declared according to Article 4, paragraph 3 – SEP
Annex II, table 3
Models OM050H, OM100A, and OM100E are PED compliant under SEP only for Group II liquids according to Annex II, table 4.

When purchased as EXd these products are additionally in conformance with:
2014/34/EU ATEX Directive
ATEX certificate: Sira05ATEX1296X
Harmonised standards: EN 60079-0:2012 (+A11:2013), EN 60079-1: 2014
Notified Body for ATEX Type Examination: CSA Group Netherlands B.V. (N.B. No. 2813)
Notified Body for ATEX QAN: CSA Group Netherlands B.V. (N.B. No. 2813)

Signed for and on behalf of the manufacturer:



Matthew Wyres,
General Manager
Trimec Industries Pty. Ltd.

Sydney, Australia
13th May 2026

FLOMEC® TWO-YEAR LIMITED WARRANTY (AUSTRALIA)

Great Plains Industries Australia hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries Australia (Trimec Industries Pty. Ltd.) and Great Plains Industries, Inc. This product includes a two (2) year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations herein after provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of purchase from the Manufacturer or from the Manufacturer's approved distributor/representative, with original proof of purchase (sales receipt/invoice). Or, if such proof is unavailable on the date of manufacture.

A. the product has been altered or modified outside the warrantor's duly appointed representative;

B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, or for technical assistance or repair, contact your FLOMEC distributor or contact Great Plains Industries Australia (Trimec Industries Pty. Ltd.)

Great Plains Industries Australia (Trimec Industries Pty. Ltd.)
12/7-11 Parraweena Road Caringbah NSW 2229 Australia
+61 02 9540 4433
FLOMECintl.com

The company will step you through a product troubleshooting process to determine appropriate corrective actions.

GREAT PLAINS INDUSTRIES AUSTRALIA, EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

Trimec Industries Pty. Ltd. T/A Great Plains Industries Australia also provides automatic guarantees of all goods according to Australian Consumer Law.

FLOMEC® TWO-YEAR LIMITED WARRANTY (USA)

Great Plains Industries, Inc. 5252 E. 36th Street North, Wichita, KS USA 67220-3205, hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This product includes a 2-year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

A. the product has been altered or modified outside the warrantor's duly appointed representative;

B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, or for technical assistance or repair, contact your FLOMEC distributor or contact Great Plains Industries USA:

Great Plains Industries, Inc.
5252 East 36th St. North Wichita, KS 67220-3205 USA
888-996-3837
FLOMECmeters.com

The company will step you through a product troubleshooting process to determine appropriate corrective actions.

GREAT PLAINS INDUSTRIES, INC., EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

NOTE: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).