



## **Positive Displacement Flowmeters Overview**



# Design Excellence Leads To Better Performance

Among the many PD flowmeter design principals available today, the oval gear still holds a top place both in simplicity and field proven performance.

ETL boasts a robust positive displacement oval gear flowmeter range incorporating patented innovations & features that bring many benefits to market.



All metal rotors provide ultimate rotor stability.

## OVERVIEW

ETL stocks a range of oval gear flowmeters which provide high levels of accuracy & repeatability for a wide range of most clean liquids irrespective of viscosity & conductivity including fuels, oils, additives, chemicals, food bases, paints, viscous emulsions, insecticides, alcohols & solvents either pumped or gravity fed.



Hyperpulse high resolution & dual outputs ( standard )

## CHECKLIST

- modular process connections
- no requirement for flow conditioning
- high accuracy, repeatability & reliability
- wide turndown (min.~max. flow)
- ultimate rotor stability (all metal rotors)
- dual outputs (reed & hall effect) standard
- hyperpulse high resolution pulse output
- hazardous area versions
- bi-directional flow capability
- quadrature pulse output option



Modular Process Connections



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Registered in England No: 05888341 VAT No: 972 5859 68

# SMALL CAPACITY FLOWMETERS

Our small capacity flowmeters provide precise volumetric measurement of small quantities of liquids or low flows found in a broad range of industrial & commercial industries including automotive, aviation, mining, power, chemical, pharmaceutical, food, paint, medical engineering, petroleum & environmental.

Applications include additives for fuel, consumer products, water treatment, flotation cells & de-foaming plants, corrosion inhibitors, perfumes, catalysts, emulsifiers, oils, grease, glues, ink & insecticides.

## GENERAL SPECIFICATIONS\*

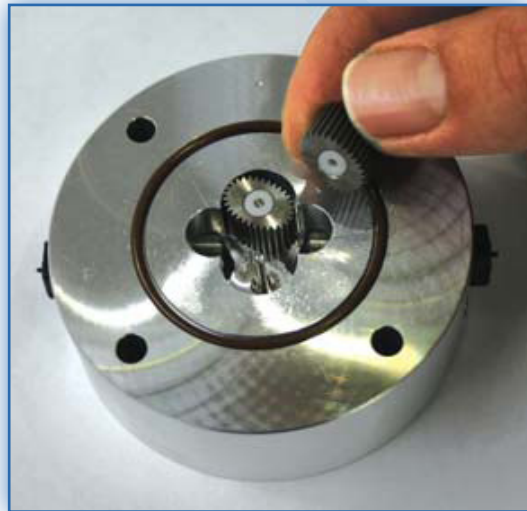
- flow range :** 0.5~550 litres/hr (0.16~145 USGPH)
  - nominal sizes :** 4~8mm ( 1/8"~3/8" )
  - linearity :** +/-1% of reading
  - repeatability :** +/-0.03% repeatability
  - temperature :** -20~+120°C (-4~250°F)
  - materials :** 316 stainless or aluminum
  - pulse outputs :** reed switch & NPN open collector (standard)
- (\* for full specifications see page 6)

## STANDARD OPTIONS :

- LCD totaliser
- LCD flow rate totaliser
- LCD two stage batch controller
- Intrinsically Safe (I.S.) instruments
- 4~20mA, scaled pulse & alarm outputs
- Quadrature pulse output

(see ancillaries for further details on integral & remote options)

- High resolution for precise measurement
- Simple to install & wire
- Dual outputs to suit most applications
- Stable stainless steel rotors
- Precision ceramic bearings



Two oval shaped gears (rotors) are the only moving parts within the measuring chamber



Pulse meter



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# MEDIUM CAPACITY FLOWMETERS

Our medium capacity flowmeters find widespread application in industry to monitor & control liquid flow streams & allow for precise dispensing of small to medium batch runs. They also have extensive application in the distribution of fuels, fuel oils, lubricant, alcohols, solvents & the blending of bio & ethanol fuels.

- High flow rangeability
- Modular construction aids installation
- Precise batching via “Hyperpulse” technology
- Easy to read LCD or mechanical displays
- Choice of output suits most applications
- All metal rotors

## GENERAL SPECIFICATIONS\*

**flow range :** 1~450 litres/min (0.26~120 USGPM)

**nominal sizes :** 15~50mm (1/2”~2”)

**linearity :** +/-0.5% of reading

**repeatability :** +/-0.03% repeatability

**temperature :** -20~+120°C (-4~250°F)

**materials :** 316 stainless or aluminum

**pulse outputs :** reed switch & NPN open collector (standard)

(\* for full specifications see page 6)

## STANDARD OPTIONS

- modular process connections
- LCD totaliser
- LCD flow rate totaliser
- LCD two stage batch controller
- Intrinsically Safe (I.S.) instruments
- 4~20mA, scaled pulse & alarm outputs
- integral mechanical totaliser / batch register
- quadrature pulse output

(see ancillaries for further details on integral & remote options)



Pulse meter



with LCD register



with 3 or 4 digit mechanical register



# LARGE CAPACITY FLOWMETERS

Our 3" and 4" large capacity flowmeters are highly competitive meters suited for receipt verification, loading, un-loading & distribution management at petroleum depots, mine sites, marine & aviation facilities. Common transfer applications involve fuels, oils, solvents, alcohols along with the blending of bio & ethanol fuels.

The meters are relatively compact & light weight in construction, important benefits when used in mobile installations or within confined spaces.

## GENERAL SPECIFICATIONS\*

**flow range :** 50~1500 litres/min (13~400 USGPM)

**nominal sizes :** 80 & 100mm ( 3" & 4" )

**linearity :** +/-0.2% 15:1 turndown

**repeatability :** +/-0.03% repeatability

**temperature :** - 20~+120°C (-4~250°F)

**materials :** aluminum or ductile iron

**pulse outputs :** reed switch & NPN open collector

(\* for full specifications see page 6)

## STANDARD OPTIONS :

- modular process connections
- LCD totaliser
- LCD flow rate totaliser
- LCD two stage batch controller
- Intrinsically Safe (I.S.) instruments
- 4~20mA, scaled pulse & alarm outputs
- integral mechanical totaliser / batch register
- quadrature pulse output

(see ancillaries for further details on integral & remote options)

- Compact & light weight
- High flow capacity
- Modular construction aids installation
- Easy to read LCD or mechanical displays
- High resolution or Quadrature pulse outputs
- All metal rotors



Pulse meter



with LCD register



with 3 or 4 digit mechanical register



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# ANCILLARIES

- Field programmable electronics
- Scrolling English prompts
- Remote or integral meter mounting
- Easy to read displays

## BATTERY POWERED TOTALISER

Simultaneously displays resettable (batch) total & cumulative total in engineering units as programmed by the user. When externally dc powered the instrument will produce an un-scaled or scaleable solid state output pulse which is NPN/PNP selectable.

Available with intrinsically safe (I.S.) certification.

Data sheet FSLBT000

## BATTERY POWERED FLOW RATE TOTALISER

Displays instantaneous flow rate, resettable (batch) total or a cumulative total in engineering units as programmed by the user. When externally powered this instrument will produce an un-scaled or scaleable solid state pulse, 4~20mA & flow alarm outputs & has nonlinearity correction & dual flow input functions.

Available with intrinsically safe (I.S.) certification.

Data sheet FSLRT000

## BATCH CONTROLLER

Provides automatic batch control with one or two stage outputs. The display provides batch quantity as well as status at each stage of the batch process. Batch limiting & no-flow detection are safety features & automatic overrun compensation & dual stage outputs provide for precise batch control. Other features include remote stop/start, system interlocks, totalised display & multiple batch controller networking.

Available with intrinsically safe (I.S.) certification.

Data sheet FSLEB000

## MECHANICAL REGISTERS

As an alternative to electronic totalisers, robust mechanical registers with metal housings offer 3 or 4 large resettable digits & 6 or 8 digit cumulative total clearly visible for loading & un-loading sites at petroleum depots, mining, construction & marine facilities.



BT battery Totaliser



RT rate Totaliser or  
EB batch controller

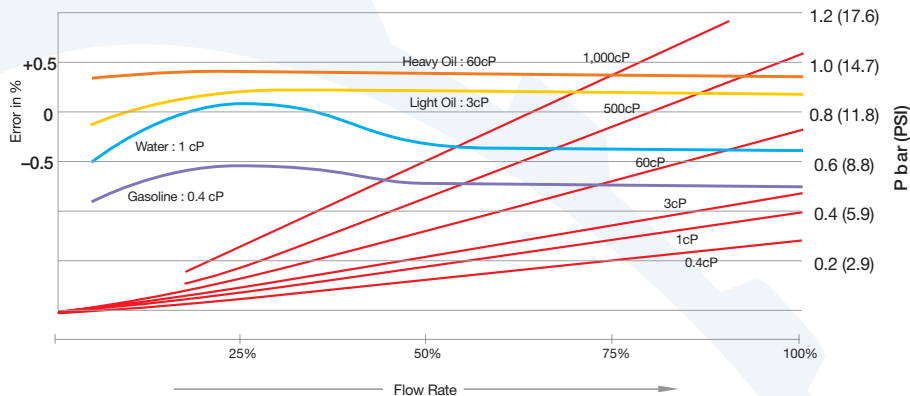


Mechanical registers



# PERFORMANCE SPECIFICATIONS

Viscosities (cp)	Max. flow multiplier
up to 1200	1.0
1200~4000	0.6
up to 6000	0.5
up to 10000	0.4
up to 20000	0.3
40000 max.	0.16
60000 max.	0.12
100000 max.	0.08
200000 max.	0.06
400000 max.	0.05
600000 max.	0.04
up to 1000000	0.03



Model prefix :	OM004	OM006	OM008	OM015	OM025	OM040	OM050	OM080	OM80H	OM100
Capacity group :	small capacity			medium capacity				large capacity		
Nominal size ( inches )	4mm (1/8")	6mm (1/4")	8mm (3/8")	15mm (1/2")	25mm (1")	40mm (1.5")	50mm (2")	80mm (3")	80mm (3")	100mm (4")
*Flow range - (LPH) litres/min	(0.5 ~ 36)	(2 ~ 100)	(15 ~ 550)	1 ~ 40	10 ~ 150	15 ~ 250	30 ~ 450	35 ~ 750	50 ~ 1000	75 ~ 1500
- (GPH) US gall/min	(0.13~9.5)	(0.5~27)	(4~145)	0.26 ~ 10.6	2.6 ~ 40	2.6 ~ 66	8 ~ 120	10 ~ 200	13 ~ 260	20 ~ 400
**Accuracy @ 3cp	± 1% of reading			± 0.5% of reading				± 0.2% of reading (15:1 turndown)		
Repeatability	typically ± 0.03% of reading ( accuracy is ± 0.2% of reading with optional RT12 with non-linearity correction )									
Temperature range	-20°C ~ +120°C ( -4°F ~ +250°F ), refer factory for lower temperature									
Maximum pressure ( threaded meters )	bar ( PSI )									
aluminium meters	15 ( 220 )			68 ( 1000 )	68 ( 1000 )	30 ( 440 )	20 ( 300 )	12 ( 180 )	12 ( 180 )	10 ( 150 )
316 stainless steel	34 ( 500 )			100 ( 1500 )	100 ( 1500 )	100 ( 1500 )	38 ( 560 )	-	-	-
ductile iron	-	-	-	-	-	-	-	12 ( 180 )	12 ( 180 )	10 ( 150 )
high pressure models	refer factory									
<b>Electrical</b> - for pulse meters ( see below for optional outputs )										
Output pulse resolution	pulses / litre ( pulses / US gallon ) - nominal									
Reed switch	2890 (10940)	2100 (7950)	355 (1345)	83 (314)	27 (102)	13 (50)	6.5 (24.7)	2.32 (8.8)	1.55 (5.87)	1.1 (4.15)
Hall effect	2890 (10940)	2100 (7950)	710 (2690)	166 (628)	107 (405)	52.6 (200)	26.1 (99)	9.3 (35.2)	6.2 (23.5)	4.4 (16.6)
Quadrature Hall option	2890 (10940)	2100 (7950)	710 (2690)	166 (628)	54 (204)	26.3 (100)	13 (49)	4.65 (17.6)	3.1 (11.8)	2.2 (8.3)
Reed switch output	30Vdc x 200mA max. ( maximum thermal shock 10°C (50°F) / minute )									
Hall effect output (NPN)	3 wire open collector, 5~24Vdc max., 20mA max.									
Optional outputs	4~20mA, scaled pulse, quadrature pulse, flow alarms or two stage batch control									
<b>Physical</b>										
Protection class	IP66/67 (NEMA4X), optional Exd IIB T6, integral ancillaries can be supplied I.S. ( intrinsically safe )									
Overall dimensions	refer data sheet									
Recommended filtration	75 microns (200 mesh)			150 microns (100 mesh)				350 microns (40 mesh)		
* Maximum flow is to be reduced as viscosity increases, see flow de-rating guide. Max. allowable pressure drop is 100Kpa. (15 psi).										
* Maximum flow may be increased by 10% for intermittent refuelling periods.										
** Accuracy ± 1% of reading with mechanical registers										



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# MODEL DESIGNATION

## Meter size

<b>OM004</b>	4mm ( 1/8" )	aluminum or stainless steel
<b>OM006</b>	6mm ( 1/4" )	aluminum or stainless steel
<b>OM008</b>	8mm ( 3/8" )	aluminum or stainless steel
<b>OM015</b>	15mm ( 1/2" )	aluminum or stainless steel
<b>OM025</b>	25mm ( 1" )	aluminum or stainless steel
<b>OM040</b>	40mm ( 1 1/2" )	aluminum or stainless steel
<b>OM050</b>	50mm ( 2" )	aluminum or stainless steel
<b>OM080</b>	80mm ( 3" )	aluminum or ductile iron
<b>OM80H</b>	80mm ( 3" high flow )	aluminum or ductile iron
<b>OM100</b>	100mm ( 4" )	aluminum or ductile iron

## Body material

<b>A</b>	Aluminum
<b>S</b>	316 stainless steel
<b>H</b>	High pressure 316 stainless steel
<b>D</b>	Ductile iron

## Rotor material

<b>4</b>	Aluminum
<b>5</b>	316 stainless steel
<b>9</b>	Application specific

## Bearing type

<b>1</b>	Ceramic
<b>4</b>	Hardened steel roller bearings ( aluminum rotors )

## O-ring material

<b>1</b>	Viton ( standard ) -15~+200°C ( -5~+400°F )
<b>2</b>	Ethylene Propylene Rubber ( EPR )
<b>3</b>	Teflon encapsulated viton
<b>4</b>	Buna-N ( Nitrile ) -65~+100°C ( -53~+212°F )

## Temperature limits

- <b>2</b>	120°C ( 250°F ) - see note 1
- <b>5</b>	120°C ( 250°F ) - see note 2

## Process connections

<b>1</b>	BSP female threaded
<b>2</b>	NPT female threaded
<b>4</b>	ANSI-150 RF flanges
<b>5</b>	ANSI-300 RF flanges
<b>6</b>	PN16 DIN flanges
<b>9</b>	Customer nominated

## Cable entries

<i>with B2/B3 options</i>	<b>0</b>	3~6mm cable gland
	<b>1</b>	M20 x 1.5mm
	<b>2</b>	1/2" NPT

## Model No. Example

**OM025** **A** **4** **4** **1** - **5** **1** **1** **R2** ( refer factory for model availability )

## Integral options

2 NPN open collector phased outputs	<b>QP</b>	Quadrature pulse output
IECEX & ATEX approved	<b>E1</b>	Explosion proof ~ Exd
IECEX & ATEX approved	<b>Q1</b>	Exd with Quadrature pulse
accum. & reset totals, pulse output	<b>B2</b>	BT11 dual totaliser
IECEX & ATEX approved	<b>B3</b>	Intrinsically safe BT11 ( I.S. )
flow rate, totals & all outputs	<b>R2</b>	RT12 Flow Rate Totaliser
IECEX & ATEX approved	<b>R3</b>	Intrinsically safe RT12 ( I.S. )
dc Ecobatch two stage control	<b>E0</b>	EB10 batch controller
<b>M*</b> = <b>M1</b> litres, <b>M2</b> gallons	<b>M*</b>	3 digit mechanical reset totaliser
<b>M*</b> = <b>M3</b> litres, <b>M4</b> gallons	<b>M*</b>	4 digit mechanical reset totaliser

(1) 120°C (250°F) rating of the pulse meter, 80°C (180°F) rating with BT, RT & EB options.

See temperature code 5 for higher temperature with BT, RT, & EB

(2) Cooling fin is fitted with LCD instruments for operation between 80~120°C (180~250°F)



**PED**

Proudly the flomec facility is ISO9001 quality certified for design & manufacture.

Innovative engineering & features can be attributed to 150 combined years of flow metering experience coming from the Flomec design team.



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