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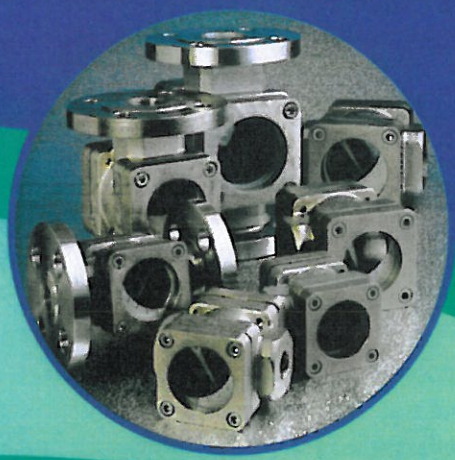
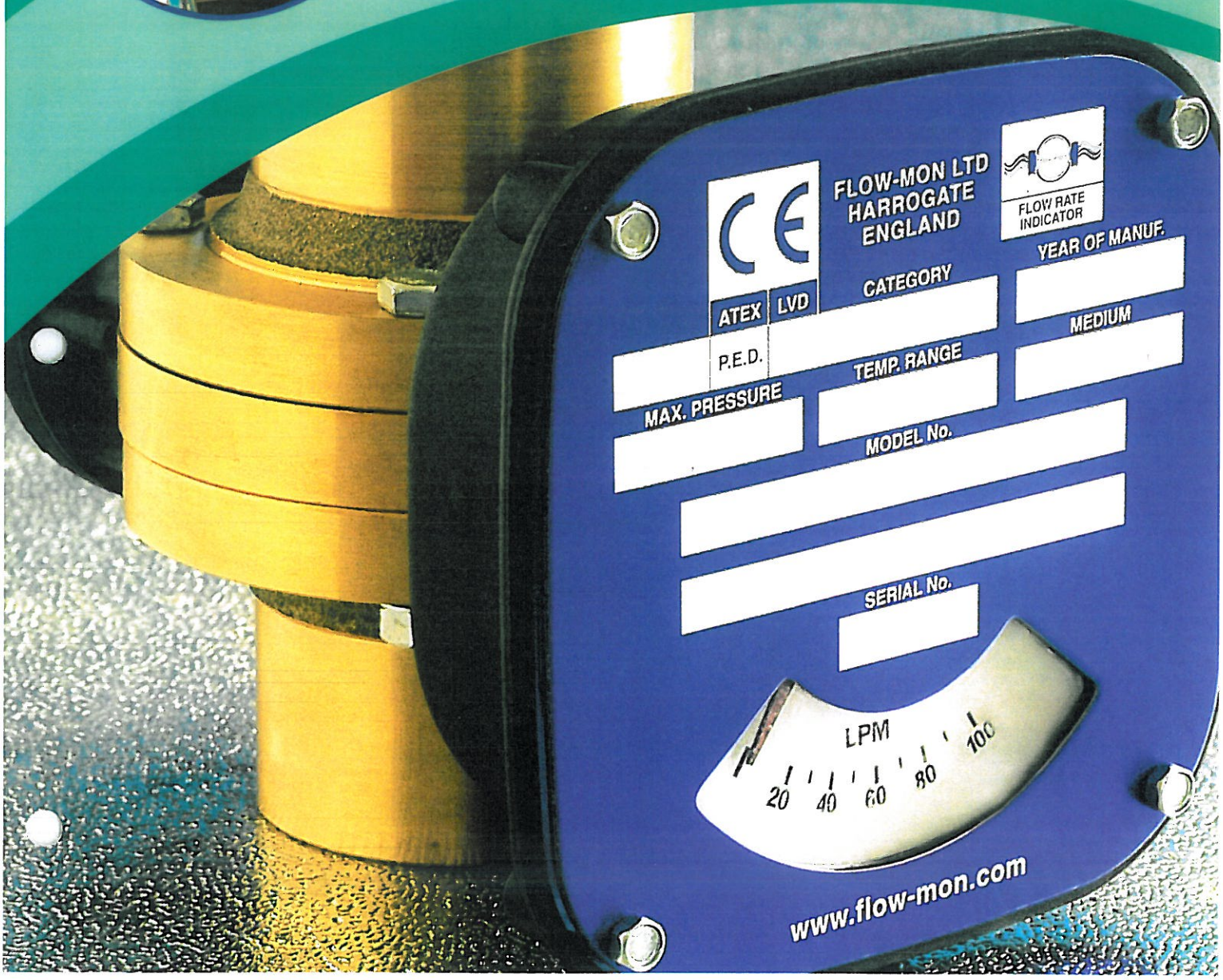
LØWENER
www.loewener.dk

flow~mon

...simple flow solutions in a complicated world

www.flow-mon.com





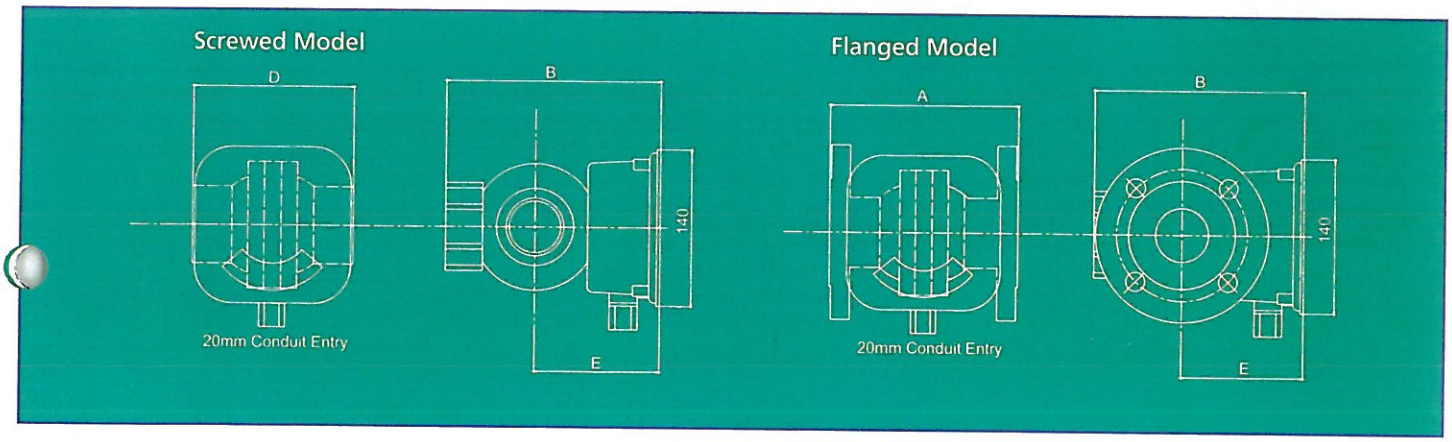
Flow rate indicators

These units are manufactured in a wide range of sizes and specification options but all have the same basic function.

A dial and mechanical indicator continuously monitor the flow rate at any given time whilst electrical switches can be specified to signal when a particular level has been reached during increasing or decreasing flow rates.

Switches are field adjustable over the full range. Where batching, trending, totalising or recording is required, all Flow-Mon units can be supplied with a 0-10V or 4-20mA output. All sizes are manufactured to the same simple design concept, the main characteristic of which ensures that the pressure drops are confined to an absolute minimum (see 'pressure drop' charts) across the vane orifice at full flow, with viscosities as high as 600cS.

Sizes are defined by pipe size and / or maximum flow capacity, and every flow switch is individually calibrated so that full scale deflection is used in each application i.e. the maximum scale reading coincides with the maximum requirement of system as specified by the customer. Calibration may be in any units with single or dual scale to specification.



			Overall Dimensions (mm)					Approximate Weight (kg)				
Min Full Scale Flow LPM	Max Full Scale Flow LPM	Pipe Size	a	b	c	d	e	AL	B	CI	S-SS	PVC
0.2 (low flow unit)	5 (low flow unit)	1/4 - 1"	n/a	155	100	188	110	3	8	-	8	3
4	70	1/4 - 1"	160	150	80	130	110	1	2	2	2	1
40	500	3/4 - 2"	180	200	120	150	115	3	7	7	7	3
50	800	2 1/2"	180	200	120	230*	115	5	10	10	10	4
250	1500	3"	255	320	250	305*	160	20	54	50	54	15
300	2000	4"	255	320	250	305*	160	23	60	56	60	17
800	3500	6"	460	500	370	510*	280	60	200	175	200	n/a
1000	5000	8"	485	500	370	535*	280	68	225	200	225	n/a

*Obtained by mating flanges

FML300 B LP 3EE 1cS 16F10 S3 D1

Series and Flow Rate

FMC*	= Low Flow
FML*	= Litres / Min
FMB*	= Imp. Gallons / Min
FMG*	= U.S. Gallons / Min
FMM*	= M3/ Hour

*Add Full Flow Rate in Units

Material of Manufacture

AL	= Aluminum
B	= Bronze
CI	= Cast Iron
CIK	= Cast Iron Nickel Plated
S	= Carbon Steel
SS	= Stainless Steel
PTFE*	= PTFE
PVC*	= PVC

*Only available up to 4" Port Connections and 100 psi / 7 bar maximum pressure. Note: For materials and pressures not specified, please consult factory.

Pressure Rating

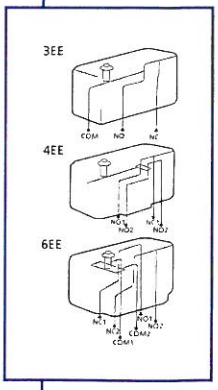
LP	= 300 psi / 20 bar maximum
MP	= 750 psi / 50 bar maximum
HP	= 3000 psi / 200 bar maximum*

*CI, CIK, S & SS only

Indicator Read Out

ME	= Mechanical Pointer only
3EE	= SPDT 3 Wire Switch
3EEG	= SPDT 3 Wire Switch with Gold Contacts
4EE	= single-pole, double throw, double-break.
6EE	= DPDT 6 wire switch
3EE(ATEX2)	= SPDT Explosion Proof Micro Switch to ATEX zone 2
3EE(ATEX1)	= SPDT Explosion Proof Switch to ATEX zone 1
6EE(ATEX1)	= DPDT Explosion Proof Switch to ATEX zone 1
AIR	= Pneumatic Switch
POT	= Potentiometer (Specify Rating)
OUT	= 4-20 mAmp Output
OUTX	= 4-20 mAmp Output (ATEX)
TOT	= Digital Rate Totaliser
TOTX	= Digital Rate Totaliser (ATEX)

Note 1: All electrical boxes (apart from TOT & TOTX) also carry a Mechanical Pointer
Note 2: For 4 & 6 Wire Switches replace 3EE by 4EE or 6EE
Note 3: Manufactured to IP65 (NEMA 4) as standard (up to 2 1/2")



Electrical Options

Code: 3EE
Basic single pole, double throw, 3 wire switch.
15 Amp - 125, 250 or 480V.AC
0.5 Amp - 125V.DC / 0.25 Amp - 250V.DC

Code: 4EE
Contact arrangements is single-pole, double throw, double-break.
10 Amp - 125 or 250V.AC
0.3 Amp - 125V.DC / 0.15 Amp - 250V.DC

Code: 6EE
Double-pole, double throw switches simultaneously make and break two independent circuits.
10 Amp - 125 or 250V.AC
0.3 Amp - 125V.DC / 0.15 Amp - 250V.DC

Code: AIR
This system offers an alternative safety arrangement for operation in explosive atmospheres. Compressed air can be used to transmit an on / off signal from the danger area, or to operate a klaxon inside the danger area.

Code: POT
Remote read-out option (0-10V). Rating to customer's specification, e.g. 1K, 2K etc.

Code: OUT
A non contact position encoder gives a continuous required 4-20 mAmp readout. Data Loggers or Recorders can be added to the system.

The 3 and 6 wire switches described above are available in ATEX approved explosion proof versions, with the appropriate enclosure box. When two or more switches are assembled in one unit, they remain independently adjustable. Re-adjustments may be carried out in the field.

Flow Directions

D1 = → D2 = ←
D3 = ↑ D4 = ↓

O Ring Seal Material

S1 = Buna	(-40°C	+110°C)
S2 = EPDM	(-40°C	+150°C)
S3 = Viton	(-20°C	+200°C)
S4 = PTFE	(-100°C	+250°C)
S5 = Perlast	(-15°C	+330°C)

Port Connections

2 = 1/4"
4 = 1/2"
6 = 3/4"
8 = 1"
10 = 1 1/4"
12 = 1 1/2"
16 = 2"

Sizes 1/4" - 2" are Screwed or Flanged. For Flanged Bodies, add relevant code letters (shown below).

20 = 2 1/2"
24 = 3"
32 = 4"
48 = 6"
64 = 8"

Sizes 2 1/2" - 8". Standard units have Flanged Bodies - add relevant code letters (shown below) Cast Iron and Steel mating flanges are available. For Screwed, add - S For Socket Weld, add - SW

Standard Threads are BSP, for NPT add - N. For Wafer connections add W then Flange type. For Flanged Connections add one of the following codes:

F10
F16
F25
F40

Alternative Pressure Ratings in BSEN1092 / DIN2632-5

F150
F300
F600

Alternative Pressure Ratings in BS1560 / ANSI B16.5

FAD
FE
FF

Alternative Pressure Ratings in BS10

For special flange connections, please enquire at factory

For model part number 16W10 see page 10

Viscosity at Operating Temperature

State units and scale eg. Water is 1 Centistoke (cS) Maximum rating should not exceed 600cS

Air & Gas Applications

Flow-Mon flow switches can be used to measure gas flows in exactly the same way as liquid flows. When enquiring for such an application the following information will be required:

- Specify gravity of the gas
- Maximum flow volume
- Operating temperature
- Operating pressure

Small, Medium, Large

The flow switch body houses a spring-loaded valve plate (vane) which pivots off-centre in a hemispherical cavity. Thus the vane and cavity have a variable area orifice relationship. This gives both a high flow range and a linear relationship between flow rate and vane displacement. The vane indirectly operates both the indicating needle and an adjustable cam, which in turn triggers the micro-switch at any chosen setting of flow rate. Two switches can be supplied to provide high and low (or 'low-low') flow switching.

Features & Benefits

- All metal construction - no tubes of glass or plastic to break
- Spring loaded mechanical design - requires no straight pipe run and not affected by orientation
- Limited movement on internal parts - minimal wear and down time
- Modular design - reduces maintenance costs, down time, and production loss
- Direct indication & field adjustable switch(es) - monitors critical flows and provides alarm(s)
- 1% of rate repeatable switch set point - accurate & reliable through all operation cycles
- Weatherproof enclosure box to IP65 (Nema 4)
- Flow through design - minimal pressure loss
- Individually calibrated to customer specification - ensures accuracy
- Adjustable under operating conditions
- Scale is in units (e.g litres/minute)
- Large range of body materials available
- Size range from 8mm (1/4") to 200mm (8")
- May be installed in any position
- Orientation of enclosure box easily changed
- High switch rating - 10 to 15 Amps
- ATEX approved Explosion-proof models available
- Will pass twice the maximum indicated flow
- Acts as non-return value

Function

A scaled plate and mechanical indicator continuously monitor the flow rate at any given time whilst electrical switches can be specified to signal when a particular level has been reached during increasing or decreasing flow rates.

Low	0-0.5 LPM min 0-4 LPM max	
Small	0-6 LPM min 0-70 LPM (pipe size 1/4" - 1") max	
Medium	(3/4" to 2 1/2") 0-40 LPM min (3/4" to 1 1/4") 0-400 LPM max (1 1/2" to 2") 0-500 LPM max (2 1/2") 0-800 LPM max	
rge	3"	0-1500 LPM
	4"	0-2000 LPM
	6"	0-3500 LPM
	8"	0-5000 LPM

Style

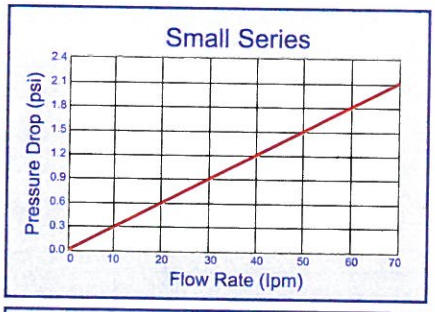
Through its unique modular design it allows for easy field installation and service. It does not require any straight pipe runs before or after the monitor thus minimizing the installation footprint. The versatile design of the vane monitor allows for orientation to be mounted in any position. Vane style monitor operates when flow is introduced through the inlet connection making direct contact with the vane that is mechanically linked to the indicator shaft. The fluid forces the vane to move through a contoured opening creating a variable orifice, the greater the flow the larger the orifice becomes for flow to pass. The vane style monitor is spring loaded and allows the vane to return on decreasing flows.

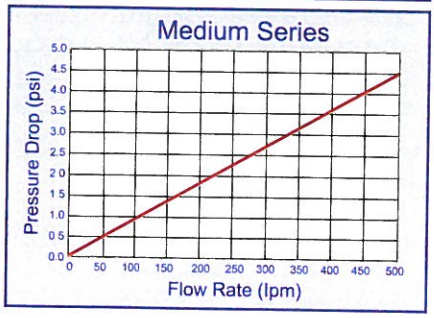
Switches

Are field adjustable, suitable for batching, trending, totalising or recording where required. All Flow-Mon units can be supplied with a 0-10v or 4-20mA output.

Sizes

All sizes are manufactured to the same simple design concept, the main characteristic of which ensures that the pressure drops are confined to an absolute minimum (see "pressure drop" charts) across the vane orifice at full flow, with viscosities as high as 600cS. Sizes are defined by pipe size and/or maximum flow capacity, and every flow switch is individually calibrated so that full scale deflection is used in each application i.e. the maximum scale reading coincides with the maximum requirements of system as specified by the customer. Calibration may be in any units with Single or Dual scale to specification.





Applications

Water, De-Ionised Water, Soluble Oils (Glycols), Petroleum Based Fluids, Synthetic Based Fluids, Coolants, Corrosive Fluids, Paints, Solvents, Air & Gases

Comparison

Comparable to similar style devices in the industry, Flow-Mon's "flow through" design offers a low pressure loss. To ensure accuracy they are individually calibrated in any unit of measure to customer operating specifications.

Wafer

Function

A scaled plate and mechanical indicator continuously monitor the flow rate at any given time whilst electrical switches can be specified to signal when a particular level has been reached during increasing or decreasing flow rates.

Features

- Direct reading Flow Rate Indication
- Optional (field adjustable) switch(es)
- Optional Non-Contact 4-20mA Output
- High Pressure available
- Mounts easily between Ansi, Jis or Din flanges
- Mounts in any orientation
- No straight Pipe Run required
- Connection sizes from 3" to 12"

Minimum Scale 0-40 LPM
Maximum Scale on request

Style

Through its unique modular design it allows for easy field installation and service. It does not require any straight pipe runs before or after the monitor thus minimizing the installation footprint. The versatile design of the vane monitor allows for orientation to be mounted in any position. Vane style monitor operates when flow is introduced through the inlet connection making direct contact with the vane that is mechanically linked to the indicator shaft, the fluid forces the vane to open. The vane style monitor is spring loaded and allows the vane to return on decreasing flows.

Switches

Are field adjustable, suitable for batching, trending, totalising or recording where required. All Flow-Mon units can be supplied with a 0-10v or 4-20mA output.

Sizes

All sizes are manufactured to the same simple design concept, the main characteristic of which ensures that the pressure drops are confined to an absolute minimum across the vane orifice at full flow, with viscosities as high as 600cS. Sizes are defined by pipe size and/or maximum flow capacity, and every flow switch is individually calibrated so that full scale deflection is used in each application i.e. the maximum scale reading coincides with the maximum requirements of system as specified by the customer. Calibration may be in any units with Single or Dual scale to specification.

Applications

Water, De-Ionised Water, Soluble Oils (Glycols), Petroleum Based Fluids, Synthetic Based Fluids, Coolants, Corrosive Fluids, Paints, Solvents, Air & Gases

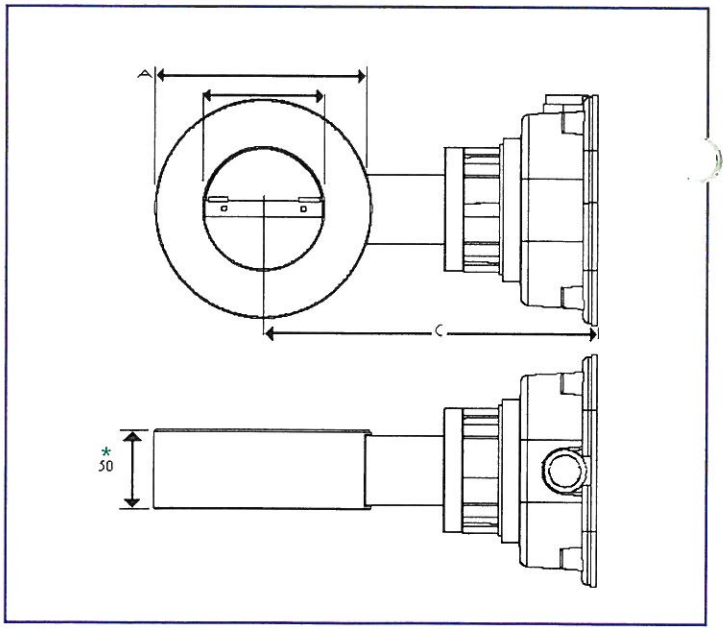
Please find part code info on page 8.

Comparison

Comparable to similar style devices in the industry, Flow-Mon's "flow through" design offers a low pressure loss. To ensure accuracy they are individually calibrated in any unit of measure to customer operating specifications.

Dimensions

DN	A	C	Ansi	A	C
80	138	216	3	127	210
100	158	226	4	157	217
150	218	264	6	216	263
200	278	291	8	270	287
250	335	318	10	324	313
300	395	348	12	381	338



* for 3" and 4", 70mm for 6-12"

i-Mon

4-20mA Transducer

Programmable 4-20mA current loop transducer designed to be built into Flow-Mon's flow indicators.

- Based on the sophisticated Zettlex ST technology for inductive displacement sensing
- Non-contact (no wear problems, no loading and no added hysteresis on the system to effect measurement at low flow)
- Absolute measurement (no problems if power is disconnected and reconnected)
- Robust construction (long life without problems)
- Smart (one time factory calibration stored in in electronic memory)
- Accurate (more than 1000 measurement points over full-scale deflection)
- High resolution measurement (sensor can indicate changes in flow before the eye can)
- Programmable output filter for stable output (damping of the pointer vibration)
- Consists of two parts: electronics board and target (pointer replacement)
- 3 wire or 2 wire version

Technical specifications

Mechanical specification

Measurement range	100°
Angle resolution	0.03°
Linearity	±1%
Gap range (electronics to target)	4.3mm... 5.8mm[a,b]
Max concentricity	±1.5mm
Repeatability	<0.2%

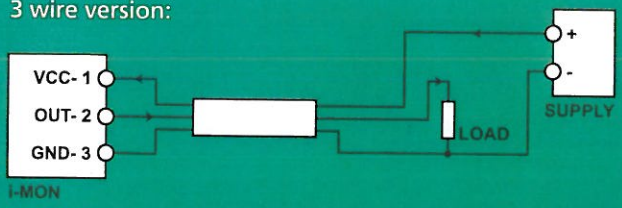
Electrical specification

Operating voltage	8... 28V DC
Supply current	50mA max[d], 4... 20mA[e]
Reverse polarity protection	Yes
Overvoltage protection	up to 30V
Output signal	4... 20mA[c]
Load impedance	R<(Usupply - 3)/0.02[d] R<(Usupply - 8)/0.02[e]
Resolution of the output signal	>10 bit
Programmable output filter	0... 5s (0.5s steps)
Temperature stability	<80ppm
Standard connections	3[d]/2[e] way terminal block, wires<1.0mm²
Operating temperature	-40°C... +85°C
Storage temperature	-40°C... +85°C

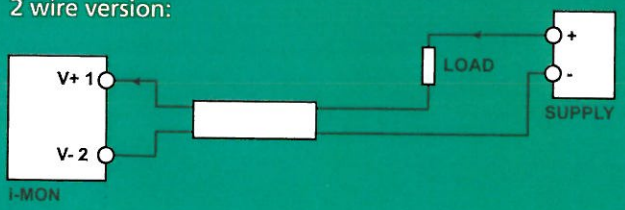
[a] Specified performance is only within this range of the gap
[b] Gap is measured between top of the pointer and top of the electronics board
[c] Guaranteed only within the full scale ±5% on both ends
[d] 3 wire version only
[e] 2 wire version only

Installation instructions

3 wire version:



2 wire version:



Wires must be kept away from the underneath of the electronics board area otherwise they could affect the accuracy of the output.

(3 pins board are for calibration only)

ATEX approved i-Mon
Certificate number FTZU09ATEX0221X
Product marking II 1G Ex ia IIC T4/T6
Ambient temperature for T4 -40°C<Ta<+85°C
Ambient temperature for T6 -40°C<Ta<+60°C
Applicable in zones 0, 1, 2
Ex data
Ui = 28V Ii = 120mA Pi = 0.82W Ci = 0nF Li = 5µH