OVAL GEAR FLOW METER

OGM

INTRODUCTION

Oval gear flow meters are the instruments, invented based on the positive displacement principle considering accuracy & precision as the core of their performance. These volumetric flow meters are best used in industries like oil & petroleum, chemicals, pharmaceuticals, general manufacturing industries where high level of accuracy & repeatability are required.

APPLICATION

For all viscous, non- abrasive clean liquids like

- Petroleum Products
- Oil Products
- Chemicals
- Grease
- Fuels
- Pastes

Stainless steel flow meters are suitable for most products & chemicals.
Aluminum meters are suitable fuel, oils & lubricating liquids.

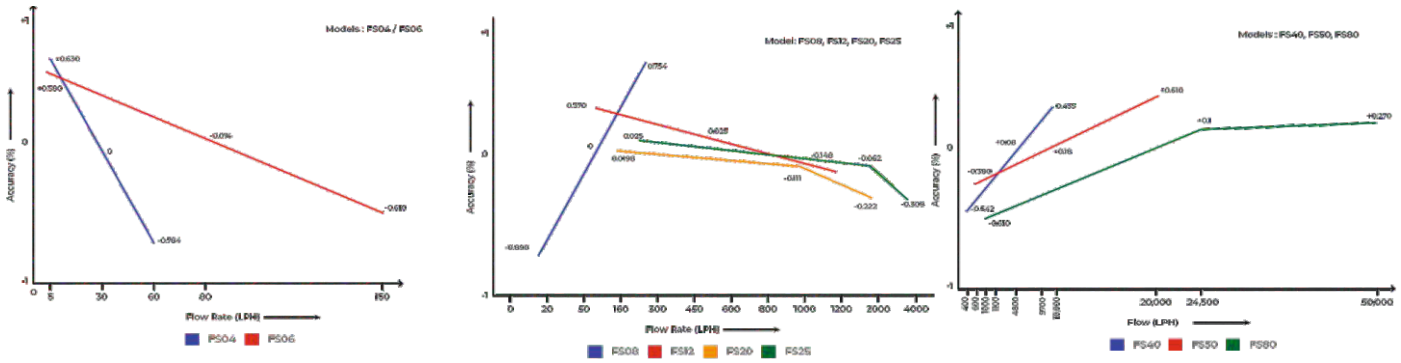
BENEFITS

- High resolution digital output
- Wide range ability
- Less slippage
- Smoother & quieter
- Bi - directional flow capability
- Low mass oval gears facilitate fast response time to step changes in flow rate

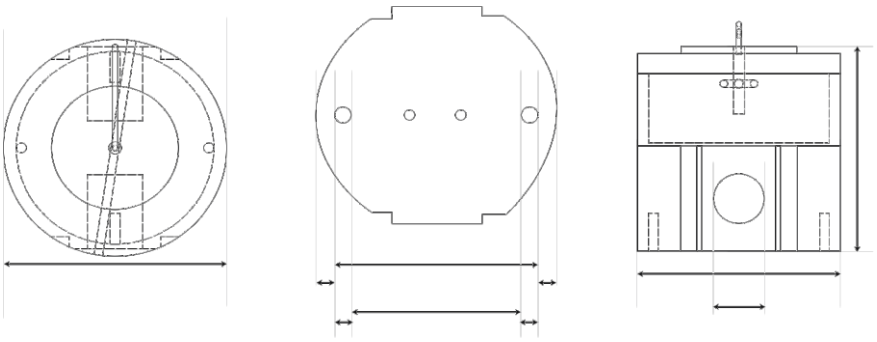
TECHNICAL SPECIFICATIONS

Capacity Group	: Low I Medium I High
Nominal Size (inch)	: 1/4" I 1/4" I 3/8" I 1/2" I 3/4" I 1" I 1.5" I 2" I 3"
Flow range (LPH)	: 0.6 to 60 I 5 to 150 I 20 to 300 I 50 to 1200 I 150 to 2000 I 200 to 4000 I 500 to 10000 I 600 to 20000 I 1000 to 50000
Accuracy	: ± 0.5% of reading (10.1 turndown)
Repeatability	: Typically 0.03% of reading
Temperature range	: 20^0C to 85^0C (for Aluminum body) -20^0C to 120^0C (for S.S body) refer factory for lower & higher temperature ranges.
Maximum Pressure in bar	: Aluminum meters - 25Bar I SS 316 meters - 25Bar
High Pressure Model	: Refer Factory
Output	: Hall effect NPN/ PNP Pulse
Pulse / Litter	: 5635 I 6000 I 1700 I 860 I 260 I 95 I 35 I 12 I 6
Optional Outputs	: 4-20mA, 485 Modbus communication
Physical - Protection Class	: IP 66 / 67
Noise generation	: 75 db
Dimensions	: refer datasheet

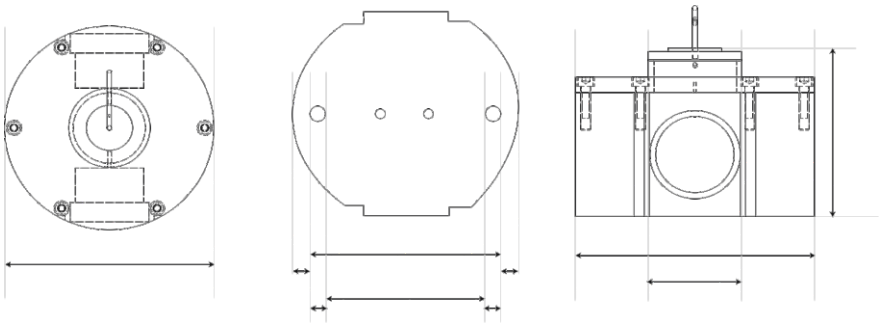
PRODUCT DIMENSION



PRODUCT DIMENSION



MODEL	A	B	C	D	E	F	G	H	I
F S04	75	70.88	11.72	54.19	10.25	10.25	45.7	4.25	4.25
F S06	75	70.88	11.72	64	5.5	5.5	55.75	4.2	4.2
F S08	75	79	15.2	64.2	5.5	5.5	55.75	4.25	4.25
F S12	75	79	18.9	64.4	5.3	5.3	55.68	4.25	4.25
F S20	88	91	24.4	78	4.7	4.7	70	4.25	4.25
F S25	99.5	98	30.5	94	3	3	85.37	4.25	4.25

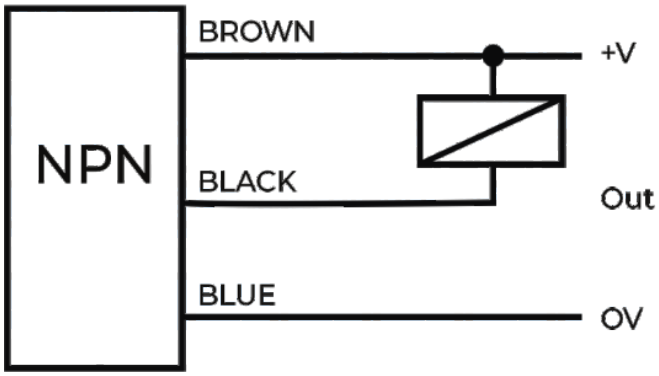


MODEL	A	B	C	D	E	F	G	H	I
F S40	145	119	45	118.8	13	13	105.15	6.9	6.9
F S50	203	150.9	56	166	18	18	153	6.9	6.9
F S80	225	161	85	201.3	12.35	12.35	188	6.9	6.9

ELECTRICAL CONNECTION & CHARACTERISTICS

It is recommended that all “signal” cables are screened and run separately to power lines & switched inductive loads and are located well away from inverter and other “noisy” apparatus. Always use sound wiring practice. Both hall effect and optical detectors (NPN) require a 10K Ohm external pull-up resistor connected between the output and a suitable power supply to attain a pulse. Typically the flow meter PSU may be used but sometimes a DC pulse, which is of different voltage, may be required e.g: using a PLC with a 24V PSU and an internal 5V rail for the pull-up.

Half effect sensor	
Supply Voltage	5-30 VCD
Temp. Range	0-85 C
Draw current (Max)	20mA



ORDERING CODES

1. MODEL WITH FLOW RANGE — FS 04

FS 04 1/4" + 0.6 to 60
FS 06 1/4" + 5 to 150
FS 08 3/8" + 20 to 300
FS 12 1/2" + 50 to 1200
FS 20 3/4" + 150 to 2000
FS 25 1" + 200 to 4000
FS 40 1.5" + 500 to 10000
FS 50 2" + 600 to 20000
FS 80 3" + 1000 to 50000

2. MOC BODY — A

A Alu
S S.S.

3. ROTOR — D

D Alu
S S.S.
P PPS

4. O RING — 1

1 NBR
2 EPDM
3 VITON

5. THREAD — RE

RE BSP
FE NPT
GE FLANGE

6. OUTPUT — L

L PULSE
M BATTERY OPERATED DISPLAY
N ANALOG PULSE
O DISPLAY WITH ANALOG
P DISPLAY WITH COMMUNICATION

7. ELECTRICAL CONNECTION — C

C CABLE
M M12 CONNECTOR
D DIN

ORDERING EXAMPLE : NI-OGM-FS 04-A-D-1-RE-L-C

TRI-GEAR FLOW METER

TFM

INTRODUCTION

Trigear flow meters are designed to facilitate dual output standard with high resolution digital output and smoother operations. Based on the principle of positive displacement, these flow meters are meticulously designed and manufactured to measure fluid with accuracy and precision. They facilitate fast response time to step change in flow rate.

OPERATION PRINCIPLE

Liquid passes into the single case measuring chamber and displaces two trigears. Each rotation of a Tri-gear is proportional to a discrete unit of volume, in turn, the speed at which the gears rotate is directly proportional to flow rate. Reed and Hall effect sensors mounted outside the pressure boundary detect the movement of the Tri-gears, thus allowing local or remote instruments to display flow total, rate of flow or facilitate batching applications. Meter can be fitted with additional sensors to provide in phase or out of phase signals for applications such as bidirectional flow.

BENEFITS

- High resolution digital output
- Wide range ability
- Bi - directional flow capability
- Digital or Analogue Outputs available
- Hart Output Option
- Less slippage than oval gear meters
- Smoother and quieter than oval gear meters
- Dual Output standard (reed and hall effect)
- Low mass Tri-gears facilitate fast response time to
- step changes in flow rate.

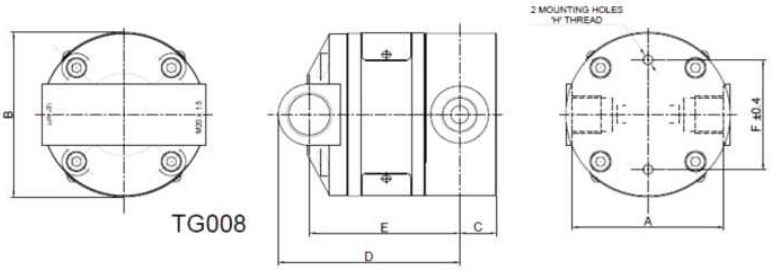
TECHNICAL SPECIFICATIONS

Capacity Group	: Small I Medium
Nominal Size (inch)	: 3/8" I 1/2" I 3/4" I 1" I 1.5" I 2"
Flow range (LPH)	: 0.25~9.2 (0.07 to 2.4) I 1~40 (0.3 to 10.5) I 2~50 (0.6 to 13) 5~150 (1.3 to 40) I 10~250 (2.6 to 66) I 20~500 (5 to 132)
Accuracy	: ± 0.25% of reading (15:1 turndown) ± 0.5% of reading (25:1 turndown)
Repeatability	: Typically 0.03% of reading
Temperature range	: 20^{0}C to +120^{0}C (-4F~+250F) refer factory for lower & higher temperature ranges.
Maximum Pressure in bar	: Aluminum meters - 30(440)
High Pressure Model	: Refer Factory
Output Pulse resolution	: Pulse/Liter (Pulses/US Gallon) - nominal
Reed switch and hall effect	: 670 (2546) I 77 (292.6) I 77 (292.6) I 33.5 (125.4) I 11.5 (43.7) I 6.5 (24.7)
High resolution hall/ quadrature	: 1340 (5092) I 154 (585.2) I 154 (585.2) I 67 (254.6) I 23 (87.4) I 13 (49.4)
Reed switch output	: 30VDC* 200mA max. (maximum thermal shock 10C (50F)/ 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
Model	: TG 800 I TG 015 I TG 020 I TG 025 I TG 040 I TG 050
Protection Class	: IP 66 / 67 (NEMA4X), integral ancillaries can be supplied intrinsically safe
Noise generation@ maximum flow	: 75DB
Dimensions	: Refer data sheet
Pressure drop chart	: Refer data sheet
Min. filtration- microns (mesh)	: 75 microns(200mesh) I 150 microns(100mesh)
Stainless steel	: 2.2 I 3.0 I 3.0 I 4.0 I 9.0 I 12.0
Aluminium	: 1.0 I 1.5 I 1.5 I 2.0 I 4.0 I 6.0

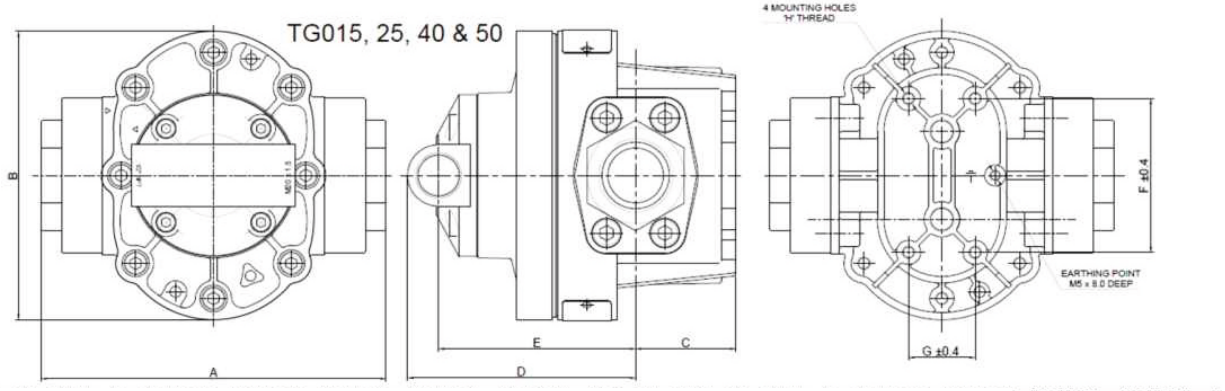
* Maximum flow is to be reduced as viscosity increases, see flow de-rating guide.
max. allowable pressure drop is 140Kpg (20psi).

DIMENSION

STAINLESS STEEL THREADED METERS

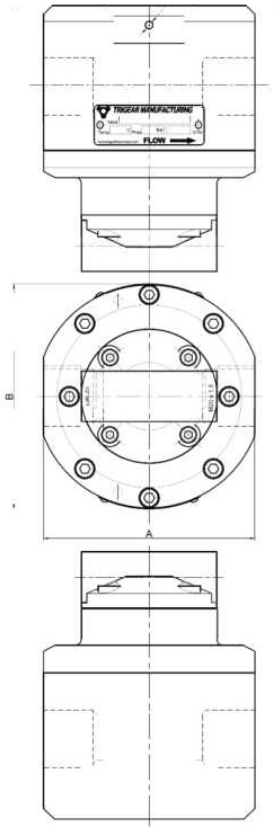


TG008

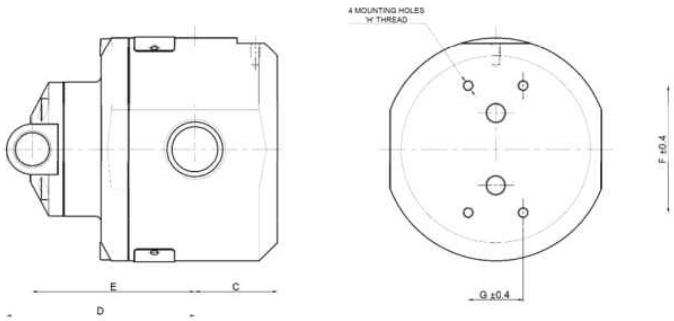


METER SIZE	DIMENSION							
	A	B	C	D	E	F	G	H THREAD
TG008	68	75	16.5	81.5	67.5	50	-	M5 X 12 DEEP
TG015	130	108	35	95.5	81.5	55	25	M5 X 10 DEEP
TG025	155	130	45	102.5	88.5	70	30	M5 X 10 DEEP
TG040	215	166	56	118.5	104.5	105	35	M8 X 13 DEEP
TG050	242	209	87	121.5	107.5	120	50	M8 X 16 DEEP

ALUMINIUM THREADED METERS



METER SIZE	DIMENSION							
	A	B	C	D	E	F	G	H THREAD
TG008	68	75	16.5	81.5	67.5	50	-	M5 x 15 DEEP
TG015	100	107	35	95.5	81.5	55	25	M5 x 10 DEEP
TG025	115	124	45	102.5	88.5	70	30	M5 x 10 DEEP
TG040	150	163	56	118.5	104.5	105	35	M8 x 13 DEEP
TG050	180	202	87	121.5	107.5	120	50	M8 x 16 DEEP



ORDERING CODES

1. SIZE

TG 008	3/8" (8mm)	aluminum or stainless steel	**TG 008**
TG 015	1/2" (15mm)	aluminum or stainless steel	
TG 020	3/4" (20mm)	aluminum or stainless steel	
TG 025	1" (25mm)	aluminum or stainless steel	
TG 040	1-1/2" (40mm)	aluminum or stainless steel	
TG 050	2" (50mm)	aluminum or stainless steel	

2. BODY MATERIAL

S	316 Stainless steel	**S**
A	Aluminium	

3. TRI-GEAR MATERIAL

1	PPS (Ryton)	**1**
2	PEEK (FDA Approved Material)	
6	PPS (Ryton) for high viscocity liquids	
8	PEEK for high viscocity liquids	

4. BEARING TYPE

E	PPS (Ryton)	**E**
G	PEEK (FDA Approved Material)	

5. O RING MATERIAL

5G	VITON (Standard)	**5G**
6H	EPR (Ethylene Propylene Rubber)	
7J	TEFLON (Encapsulated viton)	
8K	BUNA-N (Nitrile) 100^{0}C (212^0 F) Max.	

6. TEMPERATURE LIMITS

1	80^{0}C (180^{0}F) No Heat Insulation	**1**
2	120^{0}C (250^{0}F) Use Heat Insulator	
3	120^{0}C (250^{0}F) Heat Insulator	

7. PROCESS CONNECTIONS

A	BSP Female threaded	**A**
B	NPT Female threaded	
C	ANSI - 150 RF Flanges	
D	ANSI - 300 RF Flanges	
E	PN 16 DIN Flanges	
F	Customer Nominated	

8. CABLE ENTRIES

0	M16 X 15mm (Exclusive to FRT Rate Totaliser)	**0**
1	M20 X 15mm	
2	1/2" NPT	

9. INTEGRAL OPTIONS

HR	High resolution hall effect output	**HR**
420	Analog output - 4 wire, 4~20mA output option	
EXH	Explosion proof ~Exd I/IIB T4/T6 (Hall effect)	
ISH	Intrinsically Safe (I. S.) Hall effect output	
RS	Reed Switch only	
F1	FRT - 00 Flow rate totaliser - No output - display only	
F2	FRT - AP Flow rate totaliser	
F3	FRT - ALP Flow rate totaliser	
F4	FRT - BC Flow rate totaliser	
102	Contrec 102 Rate totaliser	
202	Contrec 202D A Tex I. S. Flowrate totaliser	
SB	Specific build requirement	

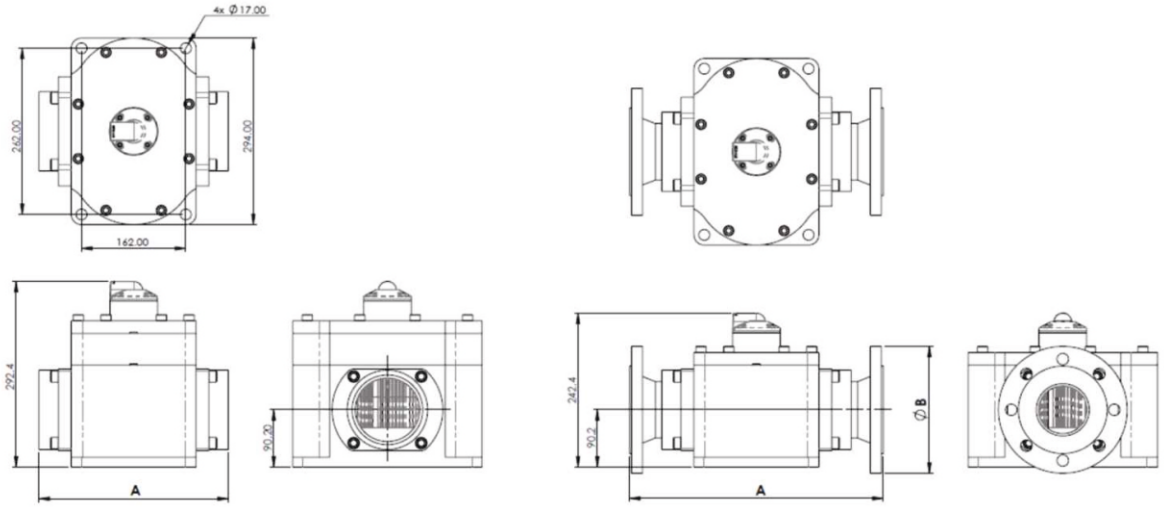
ORDERING EXAMPLE : NI-TFM-TG 008- S-1-E-5G-1-A-0-HR

TECHNICAL SPECIFICATIONS

Nominal Size (inch)	: TG 080 (3") I TG 100 (4")
Flow range (LPM / GPM)	: 25 - 750 I 50 - 1500 I 6.5 - 200 I 13 - 400
Accuracy	: ± 0.25% of reading (15:1 turndown) ± 0.5% of reading over (6:1 turndown)
Repeatability	: Typically 0.03% of reading
Temperature range	: - 30^{0}C to +120^{0}C (-22^{0}F + 250^{0}F) refer factory for lower & higher temperature ranges.
Maximum Pressure in bar	: 15(220) I 15(220) Stainless Steel - 20(290) I 20(290)
Electrical for pulse meters	: See below for optional outputs
Output Pulse resolution	: Pulse/Liter (Pulses/US Gallon) - nominal
Reed switch & Hall effect	: 2.8(10.6) I 1.4(5.3) I 11.2(42.5) I 5.6(21.5)
High resolution hall/ quadrature	: 5.6(21.2) I 2.3(10.6)
Reed switch output	: 30VDC* 200mA max. (maximum thermal shock 10^{0}C (18^{0}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
Protection Class	: IP 66 / 67 (NEMA4XI, optional Ex II 2G Ex Ex d IIC T6 to T4, Ex II 1G Ex ia IIC T2 or T4 Ga. Integral readouts can be supplied to either classification
Overall dimensions	: Refer Below
Recommended filtration	: 350 microns (40mesh)

DIMENSION

	CONNECTION TYPE					
DIMENSION	3"BSP	4"BSP	PN16 DN80	PN16 DN100	DN80 ANSI150	DN80 ANSI300
A	294	294	394	398	433.8	465.4
B	125	125	200	220	190	254



ORDERING CODES

1. SIZE — **TG 080**

TG 080 3" (40mm) aluminum or stainless steel
TG 100 4" (50mm) aluminum or stainless steel

2. BODY MATERIAL — **G**

G 316 Stainless steel
A Aluminium

3. TRI-GEAR MATERIAL — **D**

D PPS (Ryton)
E PEEK (FDA Approved Material)
F PPS (Ryton) for high viscocity liquids
G PEEK for high viscocity liquids

4. BEARING TYPE — **JK**

JK PPS (Ryton)
RJ PEEK (FDA Approved Material)

5. O RING MATERIAL — **900**

900 VITON (Standard)
100 EPR (Ethylene Propylene Rubber)
500 TEFLON (Encapsulated viton)
700 BUNA-N (Nitrile) 100°C (212° F) Max.

6. TEMPERATURE LIMITS — **2**

2 120°C (250°F) See note 1
3 120°C (250°F) See note 2

7. PROCESS CONNECTIONS — **A**

A BSP Female threaded
B NPT Female threaded
C ANSI - 150 RF Flanges
D ANSI - 300 RF Flanges
E PN 16 DIN Flanges
F Customer Nominated

8. CABLE ENTRIES — **8**

8 M16 X 15mm (Exclusive to FRT Rate Totaliser)
0 M20 X 15mm
9 1/2" NPT

9. INTEGRAL OPTIONS — **EXH**

EXH High resolution hall effect output
420 Analog output - 4 wire, 4~20mA output option
HR Explosion proof ~Exd I/IIB T4/T6 (Hall effect)
ISH Intrinsically Safe (I. S.) Hall effect output
RS Reed Switch only
F1 FRT - 00 Flow rate totaliser - No output - display only
F2 FRT - AP Flow rate totaliser
F3 FRT - ALP Flow rate totaliser
F4 FRT - BC Flow rate totaliser
102 Contrec 102 Rate totaliser
202 Contrec 202D A Tex I. S. Flowrate totaliser
SB Specific build requirement

ORDERING EXAMPLE : NI-TLFM-TG 080- G-D-JK-900-2-A-8-EXH

Notes: 1) 120ºC (250ºF) rating for the pulse meter, 80ºC (180ºF) rating with PPS Rotor and/or totalisers.

TRI-GEAR CHEMICAL FLOW METER

TCM

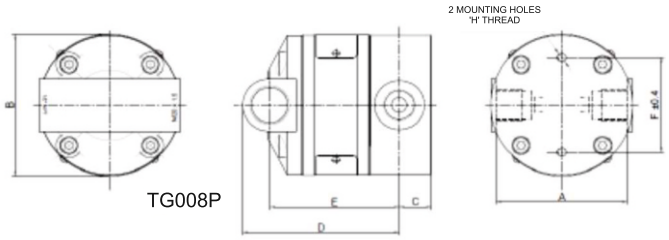
INTRODUCTION

Performance accuracy along with shelf life are on stake when it comes to operate for Acid and other strong chemicals that easily harm th equipment used. The Tri-gear chemical flow meters have been designed with highly durable alloys and PVDF body, supporting the flow-less and effort free operations and fluid measurement. The PEEK material gear supports sturdy operation and enhance the shelf life.

TECHNICAL SPECIFICATIONS

Model Prefix	: TG 008P
Nominal Size (inch)	: 8mm (3/8")
Flow range (LPM /USGPH)	: 0.25 - 9.2 I 0.07~2.4
Accuracy@ 3CP	: ± 1.0% of reading
Repeatability	: Typically ± 1.0% of reading
Temperature range	: - 30^{0}C to +80^{0}C (-22^{0}F + 175^{0}F)
Maximum Pressure	: 5 Bar. G. (75 PSIG)
Output Pulse resolution	: Pulse/Liter (Pulses/US Gallon) - nominal
Reed switch output & Hall effect	: 650(2460)
High resolution hall/ quadrature	: 1300(4920)
Reed switch output	: 30VDC* 200mA max. (maximum thermal shock 10^{0}C (50^{0}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
Protection Class	: IP 66 / 67 (NEMA4X) Integral readouts can be supplied to either classification
Min. filtration-microns (mesh)	: 75 microns (200 mesh)
Approximate shipping weights (PVDF threaded meter)	: 0.6 Kg

DIMENSION



	DIMENSION							
METER SIZE	A	B	C	D	E	F	G	H THREAD
TG008	68	75	16.5	81.5	67.5	50	-	M5 X 12 DEEP

ORDERING CODES

1. SIZE — **TG 008**

TG 080 3/8" (8mm) aluminum or stainless steel

2. BODY MATERIAL — **G**

P PVDF (Polyvinyidene Difluoride)

3. TRI-GEAR MATERIAL — **2E**

2E PEEK (Polyether Ether Ketone)

4. BEARING TYPE — **RJ**

RJ PEEK (Polyether Ether Ketone)

5. O RING MATERIAL — **R02**

R02 Teflon encapsulated viton

6. TEMPERATURE LIMITS — **1**

1 80°C (180°F) TG008P only

7. PROCESS CONNECTION — **W3**

W3 BSP Female threaded
W6 NPT Female threaded
W7 Customer Nominated

8. CABLE ENTRIES — **AB**

AB M20 X 15mm
GB 1/2" NPT

9. BODY BOLTING — **8**

SS A2 Stainless Steel
HC Hastelloy C276

9. INTEGRAL OPTIONS — **00**

00	GRN Terminal cover, hall effect & reed switch output
SS	Stainless steel terminal cover
HR	High resolution (Hall effect only)
ISH	Analog output
RS	Explosion proof ~ ATEX/ IEC Ex Exd I/IIB T4/T6 (Hall effect)
F1	Intrinsically safe ~ ATEX / IEC Ex I.S. Hall effect output
F2	Reed switch only
F3	Contrec 102 Rate totaliser
F4	Contrec 202D A Tex I. S. Flowrate totaliser
102	Fluidwell F112 ATEX / IEC Ex. I.S flowrate totaliser
202	Fluidwell F018 ATEX / IEC Ex. I.S flowrate totaliser
SB	Specific build requirement

ORDERING EXAMPLE : NI-TLFM-TG008- G-2E-RJ-R02-1-WE-AB-8-00

Notes: 1) 120ºC (250ºF) rating for the pulse meter, 80ºC (180ºF) rating with PPS Rotor and/or totalisers.