

# MR Flow Transmitters

## For Liquids / Air and Other Compressed Gases

- Full line of multi-functional remote flow indicators and transmitters
- Operate as part of a totally integrated electronic process control/data acquisition system
- Non-contact sensor electronics
- Electronic signal conditioning circuit
- Digital flow rate and total flow indication
- Proportional analog output
- In-field compensation for-
  - Specific gravity of all fluids
  - Viscosity of petroleum-based fluids
  - Specific gravity, pressure, and temperature of pneumatic systems
- CE compliant- exceeds US and meets European standards for EMI/EMC
- US Patent 7,130,750



### SPECIFICATIONS:

#### MATERIALS:

2024 - T351 Anodized aluminum body, piston and cone

C360 Brass body, piston and cone

T303 Stainless body, 2024 - T351 Anodized aluminum piston and cone  
(Oil, PE, WBF, & Air meters)

T303 Stainless body, C360 Brass piston and cone (Water meters)

T316 Stainless body, piston and cone

#### PETROLEUM (Oil) COMMON PARTS:

**Spider Plate:** T316 SS

**Spring:** T302 SS

**Fasteners:** T303 SS

**Pressure Seals:** Viton®

**Lens:** Polycarbonate

**Retaining Ring:** SAE 1070/1090 Carbon Steel

**Retaining Spring:** SAE 1070/1090 Carbon Steel

**Internal Magnet:** Teflon® Coated Alnico 8

**Enclosure Seal:** Silicone gasket

#### PHOSPHATE ESTER (PE) COMMON PARTS:

**Spider Plate:** T316 SS

**Spring:** T302 SS

**Fasteners:** T303 SS

**Pressure Seals:** EPR

**Lens:** Polycarbonate

**Retaining Ring:** SAE 1070/1090 Carbon Steel

**Retaining Spring:** SAE 1070/1090 Carbon Steel

**Internal Magnet:** Teflon® Coated Alnico 8

**Enclosure Seal:** Silicone gasket

#### WATER-BASED (WBF), WATER, AIR COMMON PARTS:

**Spider Plate:** T316 SS

**Spring:** T302 SS

**Fasteners:** T303 SS

**Pressure Seals:** Viton®

**Lens:** Polycarbonate

**Retaining Ring:** T316 SS

**Retaining Spring:** T316 SS

**Internal Magnet:** Teflon® Coated Alnico 8

**Enclosure Seal:** Silicone gasket

#### API OIL / AIR / CAUSTIC and CORROSIVE LIQUIDS and GASES:

**Spider Plate:** T316 SS

**Spring:** T316 SS

**Fasteners:** T316 SS

**Pressure Seals:** Viton®

**Lens:** Polycarbonate

**Retaining Ring:** T316 SS

**Retaining Spring:** T316 SS

**Internal Magnet:** Teflon® Coated Alnico 8

**Enclosure Seal:** Silicone gasket

**THREADS:** SAE J1926/1, NPTF ANSI B2.2, BSPP ISO1179

**TEMPERATURE RANGE:** -20 to +240 °F (-29 to +116 °C)

#### PRESSURE RATING:

##### Aluminum / Brass Operating:

**Liquids** - 3,500 psi/241 bar maximum with a 3:1 safety factor.

**Gases** - 1,000 psi/69 bar maximum with a 10:1 safety factor.

**For High Cycle Applications:** See page 7

##### Stainless Steel Operating:

**Liquids** - (1/4" to 1/2") - 6,000 psi/414 bar maximum with a 3:1 safety factor

**Liquids** - (3/4" to 1-1/2") - 5,000 psi/345 bar maximum with a 3:1 safety factor

**Gases** - 1,500 psi/103 bar maximum with a 10:1 safety factor.

**For High Cycle Applications:** See page 7

**ACCURACY:** ±2% of full scale

**REPEATABILITY:** ±1%

#### PRESSURE DROP REFERENCE TABLE:

	FLUID TYPE							
	Oil	PE	WBF	Water	API Oil	Caustic & Corrosive Liquids	Air/Caustic & Corrosive Gases	Air
50% / 100% Pressure Drop	p. 10	p. 16	p. 22	p. 28	p. 32	p. 32	p. 34	p. 36
Pressure Drop Chart	p. 55	p. 56	p. 57	p. 58	p. 59	p. 58	p. 59	p. 60

Viton is a registered trademark of DuPont Dow Elastomers  
Teflon is a registered trademark of E.I. DuPont de Nemours & Co.

# MR Flow Transmitters

## For Liquids / Air and Other Compressed Gases

### ENCLOSURE:

- Material:** Anodized and epoxy powder-coated aluminum with polycarbonate lens
- Seals:** Silicone gaskets between enclosure and lens  
Viton® O-rings between enclosure and flow meter body
- Connection:** 4-pin (Protection Class IP65) standard, see Figure 2  
Other connections available - consult factory for details
- Fasteners:** T303 SS
- Rating:** NEMA 12 & 13 (IP 52/54)

### ELECTRICAL SPECIFICATIONS:

#### Power

- Requirement:** 0-5 VDC Output: 10-30 VDC @ 0.75W maximum  
0-10 VDC Output: 12-30 VDC @ 0.75W maximum  
4-20 mA Output: loop-powered, 30 VDC maximum

#### Power

- Consumption:** 25 mA maximum

#### Analog

- Outputs:** 0-5 VDC and 0-10 VDC into 10,000 Ohms minimum  
4-20 mA into 1000 Ohms maximum, see Figure 1

#### Circuit

- Protection:** Reverse polarity and current limiting

#### Transmission

- Distance:** 4-20 mA limited by cable resistance  
0-5 VDC and 0-10 VDC 1000 feet (300 m) maximum  
**Isolation:** Inherently isolated from the piping system

#### Display:

- Fixed or toggle modes of operation for rate and totalizer display  
8 digit, 0.70" high numeric display for rate and total  
8 digit, 0.35" high alphanumeric display for units and setup

#### Temperature

- Drift:** 50 ppm / °C (max)

- Analog Output:** Resolution - 1:4000

#### Transient

- Over-Voltages:** Category 3, in accordance with IEC 664

#### Pollution

- Degree:** Category 2, in accordance with IEC 664

#### Approvals:

- CE compliant

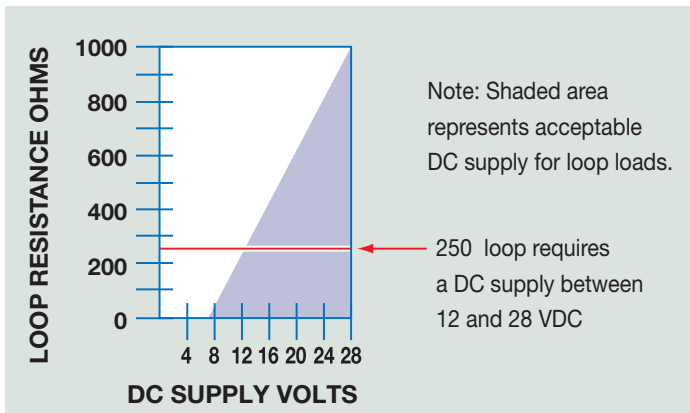
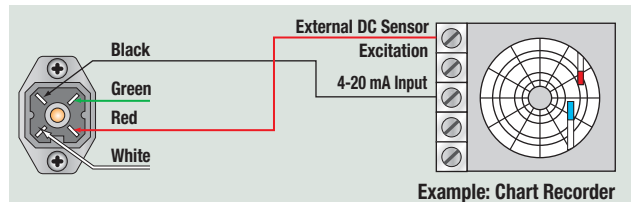


Figure 1. Load Limitations (4-20 mA Output Only)

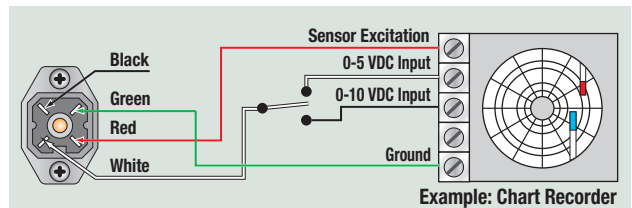
### SCHEMATICS:

The transmitter can be wired in various configurations to allow interface with many different types of data collection and control instrumentation.

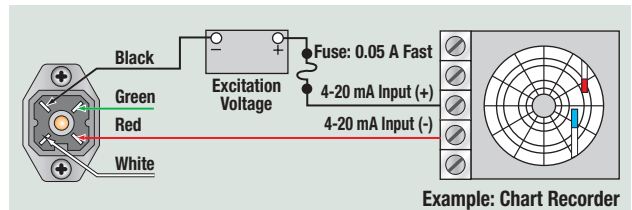
Schematics 1 & 2 represent typical wiring for a target powered by either AC power or DC supply. Schematics 3 & 4 will be utilized when the flow transmitter is operated with loop-powered process indicators or data loggers that do not have external sensor excitation available.



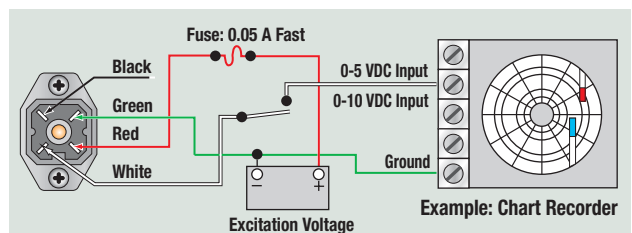
Schematic 1: 4-20 mA connection using target power supply



Schematic 2: 0-5 Vdc or 0-10 Vdc connection using target power supply



Schematic 3: 4-20 mA connection using target external power supply



Schematic 4: 0-5 Vdc or 0-10 Vdc connection using target external power supply

	DC Output Connection	Loop Power Connection
2 Black:	No Connection	(-) 4-20 mA Out
3 Green:	0 VDC	No Connection
1 Red:	(+) DC Power	(+) 4-20 mA In
4 White:	0-5 VDC or 0-10 VDC Output	No Connection

Figure 2. Electrical 4-Pin Connection

# MR Flow Transmitters

## For Liquids / Air and Other Compressed Gases

### Dimensions:

A	B	C	D	E	F	G	H	I	J	K
Nominal Port Size	Length In. (mm)	Length In. (mm)	Length In. (mm)	Width In. (mm)	Width In. (mm)	Width In. (mm)	Width In. (mm)	Depth In. (mm)	Offset In. (mm)	Hole Dia. In. (mm)
1/4 (SAE 6)	6.60 (168)	5.27 (134)	6.41 (163)	6.00 (152)	3.23 (82)	3.00 (76)	4.20 (107)	2.94 (75)	1.51 (38)	.31 (8)
1/2 (SAE 10)	6.60 (168)	5.27 (134)	6.41 (163)	6.00 (152)	3.23 (82)	3.00 (76)	4.20 (107)	2.94 (75)	1.51 (38)	.31 (8)
3/4 (SAE 12)	7.20 (183)	5.27 (134)	7.04 (179)	6.00 (152)	3.60 (91)	3.00 (76)	4.20 (107)	2.94 (75)	1.27 (32)	.31 (8)
1 (SAE 16)	7.20 (183)	5.27 (134)	7.04 (179)	6.00 (152)	3.60 (91)	3.00 (76)	4.20 (107)	2.94 (75)	1.27 (32)	.31 (8)
1-1/4 (SAE 20)	12.20 (310)	10.68 (271)	11.65 (296)	7.63 (194)	4.84 (123)	3.82 (97)	5.02 (128)	4.50 (114)	2.20 (56)	.31 (8)
1-1/2 (SAE 24)	12.20 (310)	10.68 (271)	11.65 (296)	7.63 (194)	4.84 (123)	3.82 (97)	5.02 (128)	4.50 (114)	2.20 (56)	.31 (8)



### Optional Remote Display and Signal Processor:

Hedland also offers the F6700/F6750 Series Digital Display with integrated signal processor capabilities to further enhance the utility of the MR Flow Transmitters. In addition to remote flow monitoring, these units can be configured to provide alarm processing and communication options including RS232, RS485, Modbus, Profibus and DeviceNet. For complete product specifications, refer to page 53.



	<b>FLOW TRANSMITTER OIL</b> Ordering Info <b>46</b>		<b>FLOW TRANSMITTER PE</b> Ordering Info <b>47</b>		<b>FLOW TRANSMITTER WBF</b> Ordering Info <b>48</b>		<b>FLOW TRANSMITTER WATER</b> Ordering Info <b>49</b>
	<b>FLOW TRANSMITTER API OIL and Caustic and Corrosive Liquids</b> Ordering Info <b>50</b>		<b>FLOW TRANSMITTER AIR and Caustic and Corrosive Gases</b> Ordering Info <b>51</b>		<b>FLOW TRANSMITTER AIR</b> Ordering Info <b>52</b>		

# Flow-Alert™ Flow Switches and Flow Transmitters For Petroleum Fluids

## ORDERING INFORMATION:

NOMINAL PORT SIZE <sup>①</sup>	FLOW RANGE		MODEL NUMBER (see example below)			MATERIAL			OPTIONS		
	GPM	LPM	SAE	NPTF	BSPP	ALUMINUM 3500 PSI	BRASS 3500 PSI	STAINLESS	Flow-Alert 1 SWITCH / 2 SWITCH	Flow-Alert REED SWITCH	MULTIPLE OUTPUT SENSOR
1/4" SAE 6	.02 - 0.2	0.1 - 0.75	H200 * - 002 - †	H201 * - 002 - †	H202 * - 002 - †	A	B	6000 PSI S	Not Available		Not Available
	.05 - 0.5	0.2 - 1.9	H200 * - 005 - †	H201 * - 005 - †	H202 * - 005 - †						
1/4" SAE 6	0.1 - 1.0	0.5 - 3.75	H200 * - 010 - †	H201 * - 010 - †	H202 * - 010 - †	A	B	6000 PSI S	F1/F2	SEE	MR
	0.2 - 2.0	1 - 7.5	H200 * - 020 - †	H201 * - 020 - †	H202 * - 020 - †						
1/2" SAE 10	0.1 - 1.0	0.5 - 3.75	H600 * - 001 - †	H601 * - 001 - †	H602 * - 001 - †	A	B	6000 PSI S	F1/F2	SEE	MR
	0.2 - 2.0	1 - 7.5	H600 * - 002 - †	H601 * - 002 - †	H602 * - 002 - †						
	0.5 - 5.0	2 - 19	H600 * - 005 - †	H601 * - 005 - †	H602 * - 005 - †						
	1 - 10	5 - 38	H600 * - 010 - †	H601 * - 010 - †	H602 * - 010 - †						
	1 - 15	4 - 56	H600 * - 015 - †	H601 * - 015 - †	H602 * - 015 - †						
3/4" SAE 12	0.2 - 2.0	1 - 7.5	H700 * - 002 - †	H701 * - 002 - †	H702 * - 002 - †	A	B	5000 PSI S	F1/F2	OPTI	MR
	0.5 - 5.0	2 - 19	H700 * - 005 - †	H701 * - 005 - †	H702 * - 005 - †						
	1 - 10	5 - 38	H700 * - 010 - †	H701 * - 010 - †	H702 * - 010 - †						
	2 - 20	10 - 76	H700 * - 020 - †	H701 * - 020 - †	H702 * - 020 - †						
	3 - 30	10 - 115	H700 * - 030 - †	H701 * - 030 - †	H702 * - 030 - †						
1" SAE 16	0.2 - 2.0	1 - 7.5	H760 * - 002 - †	H761 * - 002 - †	H762 * - 002 - †	A	B	5000 PSI S	F1/F2	ONS	MR
	0.5 - 5.0	2 - 19	H760 * - 005 - †	H761 * - 005 - †	H762 * - 005 - †						
	1 - 10	5 - 38	H760 * - 010 - †	H761 * - 010 - †	H762 * - 010 - †						
	2 - 20	10 - 76	H760 * - 020 - †	H761 * - 020 - †	H762 * - 020 - †						
	3 - 30	10 - 115	H760 * - 030 - †	H761 * - 030 - †	H762 * - 030 - †						
	4 - 40	10 - 150	H760 * - 040 - †	H761 * - 040 - †	H762 * - 040 - †						
1-1/4" SAE 20	3 - 30	10 - 110	H800 * - 030 - †	H801 * - 030 - †	H802 * - 030 - †	A	B	5000 PSI S	F1/F2	BELL	MR
	5 - 50	20 - 190	H800 * - 050 - †	H801 * - 050 - †	H802 * - 050 - †						
	10 - 75	40 - 280	H800 * - 075 - †	H801 * - 075 - †	H802 * - 075 - †						
	10 - 100	50 - 380	H800 * - 100 - †	H801 * - 100 - †	H802 * - 100 - †						
	10 - 150	50 - 560	H800 * - 150 - †	H801 * - 150 - †	H802 * - 150 - †						
1-1/2" SAE 24	3 - 30	10 - 110	H860 * - 030 - †	H861 * - 030 - †	H862 * - 030 - †	A	B	5000 PSI S	F1/F2	LOW	MR
	5 - 50	20 - 190	H860 * - 050 - †	H861 * - 050 - †	H862 * - 050 - †						
	10 - 75	40 - 280	H860 * - 075 - †	H861 * - 075 - †	H862 * - 075 - †						
	10 - 100	50 - 380	H860 * - 100 - †	H861 * - 100 - †	H862 * - 100 - †						
	10 - 150	50 - 560	H860 * - 150 - †	H861 * - 150 - †	H862 * - 150 - †						

① Fractional sizes apply to NPTF and BSPP.

(example) H 701 A - 030 - F1 or F2



### Flow-Alert Flow Switches

F1 = Single Switch  
F2 = Double Switch

(example) H 701 A - 030 - RS1NO



### Flow-Alert Reed Switches

#### Options:

- RS1NO (reed switch one (1) normally open)
- RS2NO (reed switch two (2) normally open)
- RS1NC (reed switch one (1) normally closed)
- RS2NC (reed switch two (2) normally closed)

(example) H 701 A - 030 - MR



### Multiple Output Flow Sensor

3 Standard field selectable outputs

0-5 VDC } Flow Transmitter is factory-calibrated to provide 4 mA (0 VDC) at zero flow  
0-10 VDC } and 20 mA (5/10 VDC) at full flow. Optional 5-point calibration certificate available  
4-20 mA } (see Price and Availability Digest for details).

NOTE: 1/4" liquid meters for .02-0.2 and .05-0.5 GPM ranges available in strap-on design for RS1NO and RS1NC only.

NOTE: For 50% and 100% flow/pressure drop information, see page 10.  
For detailed flow/pressure drop charts, see page 55.