

WPR Series

Flow Monitor with Flow Rate Transmitters

The WPR series in-line flow rate transmitters are ideal for batch, industrial process control, mobile hydraulic equipment and PC / PLC controlled hydraulic system monitoring applications.

The transmitter provide proportional analogue outputs of 4 - 20 mA, 0 - 5 Vdc and 1 - 5 Vdc*, 20 - 2000 Hz square-wave pulse. These outputs will drive popular data acquisition devices, meters and analogue input cards.

The flow rate is easily read in either US GPM or LPM from the laser engraved scale.

A varied choice of materials and seals can make it suitable for a wide range of fluids.

Due to the sharp edge orifice technology the units have excellent viscosity stability which means it is suitable for a wide operating temperature range.

Installation is made easy with a choice of threaded ports, no need for straight lengths of pipe on inlet or outlet and no restriction to orientation. This combined with the unit being sealed means that it can nearly be installed anywhere.

* The 1 - 5 Vdc output requires an external 249 ohm resistor (not included with transmitter) to be wired at the receiving device.

Symbol



Hydraulic measurement and control



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Features

- **ECONOMIC** early warning solution
- **FACTORY** calibrated for 4 - 20 mA, 0 - 5 Vdc, 1 - 5 Vdc and square wave pulse outputs
- **AVAILABLE** for fluids or air
- **WIDE** variety of flow ranges
- **DIRECT** reading
- **ACCURATE** within 2.0% FSD
- **ADVANCED** stainless steel sharp edge orifice
- **UNRESTRICTED** mounting in any orientation



Specifications

Measuring accuracy	± 2.0 % of full scale
Repeatability	± 1% of full scale
Flow measuring range:	Hydraulic: 0.2 - 560 lpm (0.05 - 150 US gpm), Pneumatic: 1.5 - 1300 SCFM
Maximum operating pressure:	Hydraulic: Aluminium & brass monitors 240 bar (3000 psi), stainless steel 410 bar (5900 psi) Pneumatic: Aluminium & brass monitors 40 bar (580 psi), stainless steel 70 bar (1000 psi)
Maximum operating temperature:	85°C (185°F)
Pressure differential:	See graphs below
Oil Meters:	Water Meters: Tap Water @ 21°C (1cSt), 1.0 sg: DTE 25 @ 43°C (40 cSt), 0.873 sg Pneumatic: Air @ 21°C, 1.0 sg and 6.9 bar (100 psi)
Degree of protection*:	NEMA type 4x *With cable connected
Calibration	Oil monitors: DTE 25 @ 43°C (40 cSt), 0.873 sg Water monitors: Tap water @ 21°C (1 cSt), 1.0 sg Flow calibration certificates are available on request, this is a chargeable option. Note: Must be requested at time of order & cannot be retrospectively requested.

Electronic Transmitter Performance

Power Requirements: 12 - 35 Vdc

Load Driving capacity: 4 - 20 mA: Load resistance is dependant on power supply voltage. Use the following equation to calculate maximum load resistance: Max loop Load () = 50 (Power supply volts - 12)

0 - 5 Vdc: Minimum load resistance 1000.

1 - 5 Vdc: Minimum load resistance 25k

Square Wave Pulse: Minimum load resistance 1000

Transmission distance: 4 - 20 mA and 1 - 5 Vdc are limited only by wire resistance and power supply voltage.

< 200 feet recommended for 0 - 5 Vdc and square wave pulse

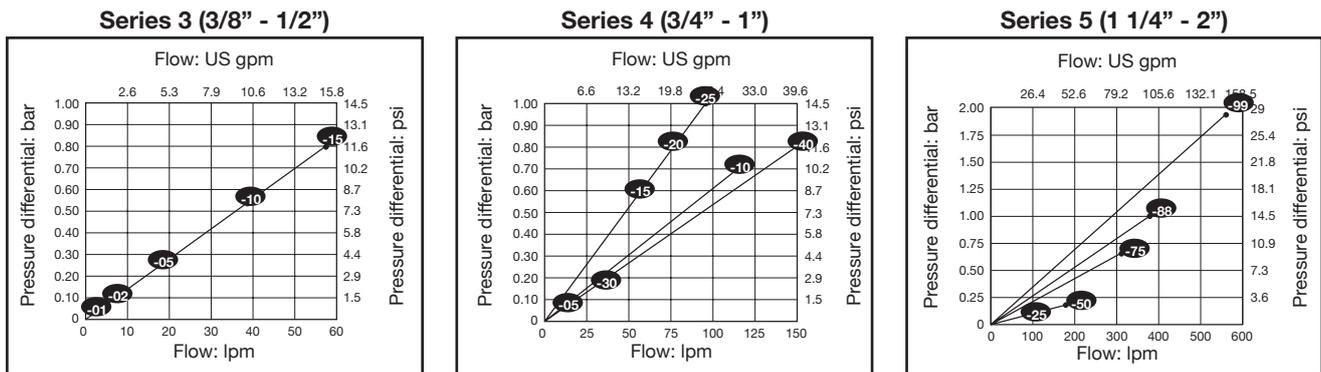
Over-current protection: Self limiting at 35 mA

Resolution: 10 bit (0.1 %)

Isolation: Inherently isolated from the process

Response time: < 100 milliseconds

Pressure differential graphs categorised by size code



15 = Flow size (see Product Selector)

14.5 psi = 1 bar, 1 US gpm = 3.785 lpm

Construction

Wetted components:

High pressure casing, end ports and tapered shafts: 2014 Aluminium, CA360 Brass and 304 Stainless Steel

Seals: Buna-N (STD), EPR, Viton® or Kalrez®

Transfer magnet: Teflon® coated Alnico

Floating Orifice disc: Stainless Steel

All other internal parts: Stainless Steel

(Teflon® is a registered trademark of DuPont) (Viton® & Kalrez® are registered trademarks of Dow DuPont Elastomers)

Non-wetted components:

Window tube: Polycarbonate (STD), Pyrex

Window seals: Buna-N (STD), Teflon®

Enclosure + Cover: Aluminium

DIN Connector: Polyamide

Operation

The flow monitor consists of tapered center shaft, encircled by a sharp edged floating orifice disk, transfer magnet and return spring.

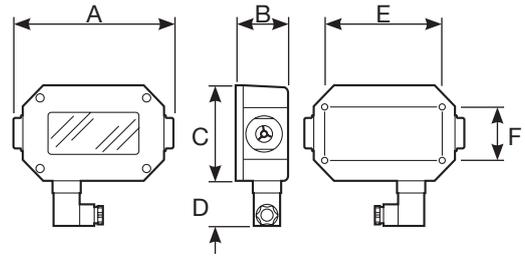
As flow moves through the monitor, a pressure differential occurs across the floating orifice disk, forcing the disk & transfer magnet against the return spring. As flow increases, the pressure differential increases, forcing the disk transfer magnet along the tapered shaft. As flow decreases, the biased spring forces the disk & transfer magnet down the tapered shaft, returning to the "no flow" position.

In metal casing monitors, where the disk & transfer magnet are sealed in the body casing, there is a magnetically coupled magnet follower which displays the reading on the outside scale.

The flow monitor has a linear relationship between flow rate, pressure differential and piston displacement which is displayed on the calibrated scale.

Dimensions

Size code	3	4	5	5 (2" Ports)
Dim. A mm (inches)	167 (6.6)	182 (7.2)	258 (10.2)	322 (12.7)
Dim. B mm (inches)	56 (2.2)	75 (3)	97 (3.8)	97 (3.8)
Dim. C mm (inches)	101 (4)	114 (4.5)	135 (5.3)	135 (5.3)
Dim. D mm (inches)	47 (1.9)	47 (1.9)	47 (1.9)	47 (1.9)
Dim. E mm (inches)	128 (5)	127 (5)	172 (6.8)	172 (6.8)
Dim. F mm (inches)	57 (2.2)	73 (2.9)	95 (3.7)	95 (3.7)



Product Selector

Standard Flow Meter Part Number

(For custom units, consult the Sales Office)

Series # WPR - - Webtec Part Number

Port / Line Size

1/4" - 1/2"	= 3
3/4" - 1"	= 4
1 1/4" - 2"	= 5

Material

Aluminium	= A
Brass	= B
Stainless Steel	= S

Pressure rating maximum

42 bar (600 psi)	= 4
(Air and gas / Aluminium and brass)	
69 bar (1000 psi)	= 5
(Air and gas / Stainless steel)	
240 bar (3500 psi)	= 6
(Liquids / Aluminium and brass)	
420 bar (6000 psi)	= 7
(Liquids / Stainless steel)	

Fluid Media:

Air and Gases	= A
Oil and 0.873 specific gravity	= H
Water and 1.0 specific gravity	= W

Thread porting

Size 3 available threads

1/4" NPTF	= S
3/8" NPTF	= A
1/2" NPTF	= B
9/16" -18UN #6 SAE ORB	= E
3/4" -16UN #8 SAE ORB	= F
7/8" -14UN #10 SAE ORB	= G
3/8" BSPP	= R
1/2" BSPP	= T

Size 4 available threads

3/4" NPTF	= C
1" NPTF	= D
1-1/16" -12UN #12 SAE ORB	= H
1-5/16" -12UN #16 SAE ORB	= J
3/4" BSPP	= U
1" BSPP	= V

Size 5 available threads

1-1/4" NPTF	= K
1-1/2" NPTF	= L
2" NPTF	= M
1-5/8" -12UN #20 SAE ORB	= N
1-7/8" -12UN #24 SAE ORB	= P
2" -12UN #32 SAE ORB	= Q
1-1/4" BSPP	= W
1-1/2" BSPP	= Y
2" BSPP	= X

Please note - SAE porting not available in brass

Flow ranges

Oil and Water LPM (USgpm)	@100 PSIG		Size
	SCFM		
0.5-4 (0.05 - 1)	1.5 -12	= 01	3 only
0.5-4 (0.1 - 1) water			
1-8 (0.2-2)	4-23	= 02	3 & 4
2-19 (0.5-5)	5-50	= 05	3 & 4
4-38 (1-10)	10-100	= 10	3 & 4
4-56 (1-15)	25-150	= 15	3 & 4
10-75 (2-20)	20-215	= 20	4 only
10-95 (2-25)	20-250	= 25	4 & 5
10-115 (3-30)	30-330	= 30	4 only
15-150 (4-40)	30-400	= 40	4 only
20-190 (6 - 50)	40-500	= 50	4 only
20-190 (6 - 50)	30-470	= 50	5 only
30-280 (8-75)	30-750	= 75	5 only
40-375 (10-100)	150-900	= 88	5 only
75-550 (20-150)	150-1300	= 99	5 only

Optional flow directions

Uni-directional	=
Reverse flow	= RF

Other Series available

WPB Series Hydraulic Flow Monitor
 WPH Series High Temperature Flow Monitor
 WPP Series Phosphate Ester Flow Monitor

WPM Series Flow Monitor with Flow Rate Alarm
 WPC Series Hydraulic Case Drain Monitor
 WPG Series Pneumatic Flow Monitor