

WPR Series

Flow Monitor with Flow Rate Transmitter

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 provides proportional analogue outputs of 4 - 20 mA, 0 - 5 V d.c. and 1 - 5 V d.c., 20 - 2000 Hz square-wave pulse. These outputs will drive popular data acquisition devices, meters and analogue input cards.

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

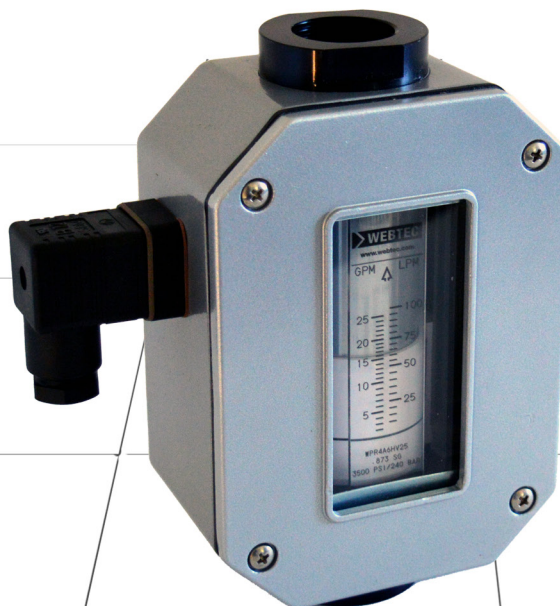
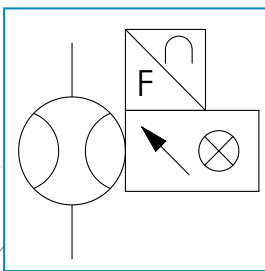
Due to the sharp edge orifice technology the units have excellent viscosity stability which means it is suitable for a wide operating temperature range.

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.

Specifications

Maximum Rated Pressure:	Up to 420 bar, 6000 psi
Maximum Rated Flow: Liquids:	Up to 550 L/min, 150 US gpm
Air/Gas:	Up to 600 SLPS, 1300 SCFM
Maximum Rated Temperature:	85 °C, 185 °F
Accuracy:	± 2.0% of full scale
Porting:	BSPP, NPTF, SAE
Material:	
Body Materials:	Aluminium, Brass or Stainless Steel
Internal Materials:	Stainless Steel
Seals:	NBR (Other seals consult sales office)

ISO Symbol:



Make it **BLUE**®

Features

- Simply install into your system and apply power. No straight plumbing required at inlet or outlet.
- Direct reading from laser engraved scale.
- Unrestricted mounting in any orientation.
- Transmitters have industry standard outputs that provides proportional analogue or pulse outputs.
- Pre-wired with cable disconnect using standard 4 pin square DIN connection.
- Other series available: WPB Hydraulic Flow Monitor, WPC Hydraulic Case Drain Monitor, WPM Flow Monitor with Flow Rate Alarm

Sales Order Code

Please contact our technical sales team to discuss any special order requirements.

TYPICAL CODE	DESCRIPTION	SEE TABLE	YOUR CODE
WPR	Basic valve - Monitor series	-	WPR
3	Port / Line Size	Table 1	
A	Material	Table 2	
6	Pressure Rating Maximum	Table 3	
H	Fluid Media	Table 4	
T	Thread Porting	Table 5	
02	Flow Ranges	Table 6	
	Optional Flow Directions	Table 7	

Table 1:

PORT / LINE SIZE	CODE
1/4" - 1/2"	3
3/4" - 1"	4
1 1/4" - 2"	5

Table 2:

MATERIAL	CODE
Aluminium	A
Brass	B
Stainless Steel	S

Table 3:

PRESSURE RATING MAXIMUM	CODE
42 bar, 600 psi (Air and gas / Aluminium and brass)	4
69 bar, 1000 psi (Air and gas / Stainless Steel)	5
240 bar, 3500 psi (Liquids / Aluminium and Brass)	6
420 bar, 6000 psi (Liquids / Stainless Steel)	7

Table 5:

THREAD PORTING	CODE
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
1/4" BSPP	8
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

Table 4:

FLUID MEDIA	CODE
Air & Gas	A
Oil and 0.873 specific gravity	H
Water and 1.0 specific gravity	W

Table 6:

LIQUID		AIR & GAS		SIZE	CODE
L/min	US gpm	SCFM	SLPS		
0.5-4	0.1-1.0	2-12	1-5.5	3 only	01
1-8	0.2-2.0	4-23	2-10	3 & 4	02
2-19	0.5-5.0	5-50	3-23	3 & 4	05
5-37.5	1-10	10-100	6-48	3 & 4	10
5-55	1-15	25-150	10-70	3 & 4	15
10-75	2-20	20-215	10-100	4 only	20
10-95	2-25	20-250	15-120	4 & 5	25
15-115	4-30	30-330	15-150	4 only	30
20-150	4-40	30-400	15-180	4 only	40
20-190	5-50	40-500	30-230	4 only	50
20-190	5-50	30-470	30-210	5 only	50
30-280	8-75	30-750	25-350	5 only	75
40-375	10-100	150-900	50-450	5 only	88
100-550	20-150	150-1300	100-600	5 only	99

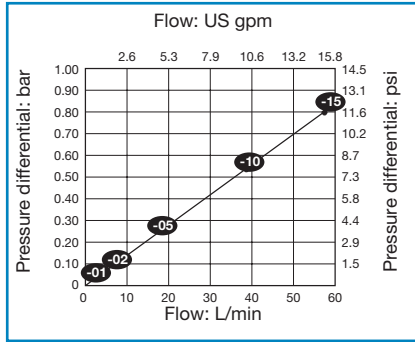
Table 7:

OPTIONAL FLOW DIRECTIONS	CODE
Uni- directional	
Reverse flow	-RF

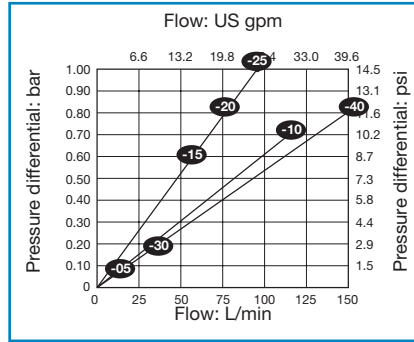
NPTF porting threads are dry seal to ANSI B1.20.3
For SAE porting in brass please contact technical sales team.

Pressure Differential Graphs Categorised by Sized Code

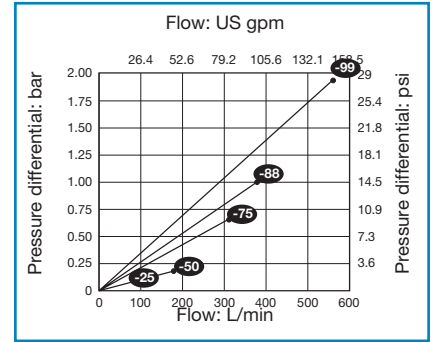
Series 3 (3/8" - 1/2")



Series 4 (3/4" - 1")



Series 5 (1 1/4" - 2")



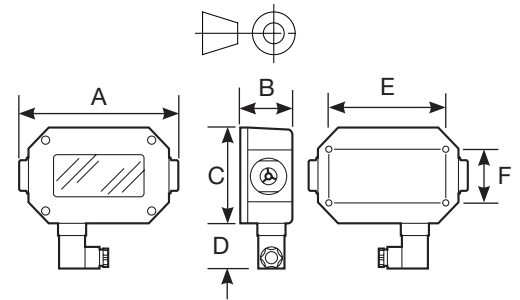
15 = Flow size (see Product Selector)

14.5 psi = 1 bar, 1 US gpm = 3.785 L/min

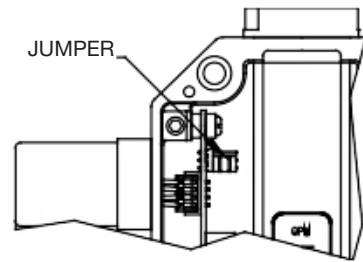
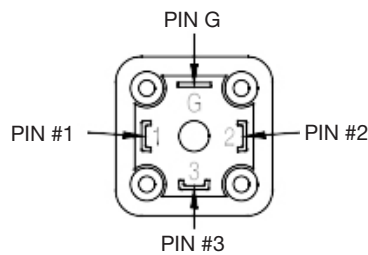
Installation Details

Table Dimensions

SIZE CODE	3		4		5		5 (2"PORTS)	
	mm	inch	mm	inch	mm	inch	mm	inch
A	167	6-9/16	182	7-5/32	258	10-1/8	322	12-5/8
B	56	2-3/16	75	2-15/16	97	3-13/16	97	3-13/16
C	101	4	114	4-1/2	135	5-5/16	135	5-5/16
D	47	1-7/8	47	1-7/8	47	1-7/8	47	1-7/8
E	128	4-7/8	127	5	172	6-3/4	172	6-3/4
F	57	2-1/4	73	2-7/8	95	3-3/4	95	3-3/4



Connecting Details



4-20 mA ELECTRICAL CONNECTIONS	
NO CONNECTION	PIN G
+12-35 V d.c.	PIN #1
4-20 mA OUT	PIN #2
NO CONNECTION	PIN #3
4 - 20 mA	JUMPER*

* Programmable jumper in position closest to meter outlet.

0 - 2000 Hz ELECTRICAL CONNECTIONS	
0 - 2000 Hz OUTPUT	PIN G
+12-35 V d.c.	PIN #1
DC GROUND	PIN #2
NO CONNECTION	PIN #3
0 - 2000 HZ	JUMPER***

*** Jumper in position closest to meter inlet.

0 - 5 VDC ELECTRICAL CONNECTIONS	
NO CONNECTION	PIN G
+12-35 V d.c.	PIN #1
DC GROUND	PIN #2
0 - 5 V d.c. OUTPUT	PIN #3
0 - 5 V d.c.	JUMPER**

** Jumper in position closest to meter inlet.

ELECTRONIC TRANSMITTER PERFORMANCE

Power requirements:	12-24 V d.c., Regulated
Load driving capacity:	4-20 mA: Load resistance is dependent on power supply voltage. Use the following equation to calculate maximum load resistance: Max Loop Load (Ω) = 50 (Power supply volts – 12). 0-5 V d.c. (regulated): Minimum load resistance 1000 Ω 1-5 V d.c. (regulated): Minimum load resistance 25 k Ω , requires an external 249 ohm resistor (not included with transmitter) to be wired at the receiving device. Square Wave Pulse: Minimum load resistance 1000 Ω
Transmission Distance:	4-20 mA and 1-5 V d.c. (regulated) are limited only by wire resistance and power supply voltage. <200 feet recommended for 0-5 V d.c. (regulated) and square wave pulse.
Over-Current Protection:	Self limiting at 35 mA
Resolution:	10-bit (0.1%)
Response Time:	<100 milliseconds

Product Information

Accuracy:	$\pm 2.0\%$ of full scale for oil and water $\pm 2.5\%$ of full scale in centre third of measuring range; $\pm 4\%$ in upper & lower thirds for air and gas
Repeatability:	$\pm 1\%$ of full scale
Max. operating pressure:	
Liquids:	Aluminium and Brass 240 bar, 3500 psi. Stainless Steel 420 bar, 6000 psi.
Air/Gas:	Aluminium and Brass 40 bar, 600 psi. Stainless Steel 69 bar, 1000 psi.
Max. operating temperature:	85 °C, 185 °F
Calibration:	Oil monitors: DTE 25 @ 43 °C, 110 °F (40 cSt), 0.873 sg (DTE 25 is a registered trademark of Exxon Mobil). Water monitors: Tap water @21 °C, 70 °F (1 cSt), 1.0 sg Air meters: air @21 °C, 70 °F, 1.0 sg and 6.8 bar, 100 psig Flow calibration certificates are available on request - this is a chargeable option. Note: Must be requested at time of order & cannot be retrospectively requested.
Degree of protection:	Nema 4X type - with cable connected
Viscosity:	Standard viscosities up to 110 cSt - viscosities between 110 to 430 cSt consult sales office.
Filtration requirements:	74 micron filter or 200 mesh screen minimum

Construction

Wetted Components:

Casting and End Ports:	Anodised Aluminium, Brass, Stainless Steel
Seals: Aluminium & Brass:	NBR (as standard); Optional EPR, FKM or FFKM - consult sales office
Stainless Steel:	FKM with PTFE backup (as standard); Optional NBR, EPR or FFKM - consult sales office
Transfer Magnet:	PTFE coated Alnico
All other Internal Parts:	Stainless Steel

Non-wetted Components:

Enclosure and Cover:	Painted Aluminium
Window Tube:	Polycarbonate
Window Seal:	NBR (as standard)
Din Connector:	Polyamide

Operation

The flow monitor consists of tapered centre 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.