RPFS - ROTA PULSE FLOW SENSOR (Insertion Paddlewheel)

FEATURES

- **± 2.5% accuracy @ velocity range 0.5 to 8.5 m/sec.**
- **± 1 % accuracy over linear range 0.7 to 7.0 m/sec.**
- **Repeatability of ±0.6%.**
- **NPN inductive pulse with internal amplification.**
- **Square wave output with short circuit protection.**
- **Inductive coil pulse option.**
- **50°C or 120°C temperature models.**
- **Simple installation and maintenance.**
- **Large range of pipe adapter fittings in sizes 15 to 150mm.**
- **New lighter-weight rotor design for improved response at lower flowrates (from 0.25 m/sec for RPFS-P model).**
- **Marine-grade alloy rotor without magnets.**
- **Australian made since 1984.**

RPFS-P

DESCRIPTION

The Rota Pulse Flow Sensor (RPFS) paddlewheel insertion type flowmeter uses a proven principle of flow measurement, which is used worldwide. The RPFS comes in three model variants:

- **RPFS-P** for liquids up to 50°C (plug-in cable)
- **RPFS-H** for liquids up to 120°C
- **RPFS-L** for liquids up to 120°C (special low current inductive pulse)

All three models insert directly into a large range of pipe adapter fittings available in PVC, Galvanized Iron, Brass, Stainless Steel or Polypipe materials, covering pipe sizes 15 to 150mm (standard sizes). This makes the RPFS suitable for a wide range of liquid flow measurement, monitoring and batching applications.

With only one moving part and limited intrusion into the pipe, and combined with its flow-through design, the RPFS allows accurate measurement of liquid flows with virtually no headloss.

Each of the 4 blades of the rotor (paddlewheel) extends approximately one centimeter into the flowing liquid. The RPFS-P sensor generates a square wave pulse with the frequency output proportional to flow velocity and proportional to pipe diameter. The RPFS-P incorporates internal amplification, allowing pulse transmission up to 1000 metres to the receiver device. The RPFS-P's specially constructed metal shielding jacket makes that unit immune to electrical interference.

Magnets are not used in the RPFS models, thereby eliminating iron particles jamming the rotor. The alloy rotor used also makes the RPFS less susceptible to interference from turbulence and particles hitting the rotor, thereby giving superior flow results.

SPECIFICATIONS

	Model		
	RPFS-P	**RPFS-H**	**RPFS-L**
Supply Voltage	5-30VDC	5-30VDC	Inductive coil 260ohms.
Output signal	NPN open collector 50% duty cycle pulse	NPN open collector 50% duty cycle pulse	Inductive sine wave pulse 50% duty cycle pulse 0.1v to 2v p/p generated
Cable length	5 metres, plug-in cable 3-core (3 wire)	2 metres cable 2-core shielded (3 wire)	2 metres cable 2-core shielded (3 wire)
Fluid Temperature	50 °C max.	120 °C max.	120 °C max.
Weather rating	IP68	IP65	IP65
Pressure rating	200psi	400psi	150psi
Accuracy	± 2.5% for 0.5 to 8.5 m/s, ±1% for 0.7 to 7.0 m/s, Repeatability ± 0.6%		
For Pipe Sizes	15 to 150mm standard, larger pipes via BSPB special adaptor or saddleclamps.		

INSTALLATION GUIDE

Adapter tee keyway fittings are available in:

1. PVC Class 18 Cat. 19 (glue-ends) pressure pipe sizes
   20, 25, 32, 40, 50, 65, 80 & 100 mm.
   PVC high pressure saddleclamps: 50, 80, 100 & 150 mm.
2. Galvanized Iron threaded connections:
   - BSP female: pipe sizes 25, 32, 40 and 50 mm;
   - BSP male: pipe sizes 80 and 100mm.
3. Copper/Brass BSP (male) threaded connection end
   process pipe tube tees 15 & 20 mm.
4. Polypipe saddleclamps in pipe sizes 50, 63, 75, 90, 110 mm,
   up to 315mm. PVC saddles 80, 100 and 150mm.

For tapping into existing or larger pipe works:

- Use BSPB brass or BSPSS Stainless Steel pipe adapter keyway nipple - with locknut, has 1" OD BSP thread for screwed insertion into 1"(female) half-sockets.
- BSP adapters can be welded directly to pipe (see Fig. 1).

Installation Conditions

- **IMPORTANT**: A minimum of 10x pipe diameter before (upstream of) the sensor and at least 5x pipe diameter after sensor of straight pipe section must be fitted, with no bends, reductions, enlargements, restrictions, valves etc within this section. This will help eliminate flow turbulence to ensure optimum accuracy performance.
- The RPFS sensor must measure in a full pipe flow section.
- Can be installed in a horizontal, inclined or vertical pipe position. (Note: If mounted in horizontal or inclined pipe, make sure insertion position of sensor is at top or 45° from top, not on the underside).

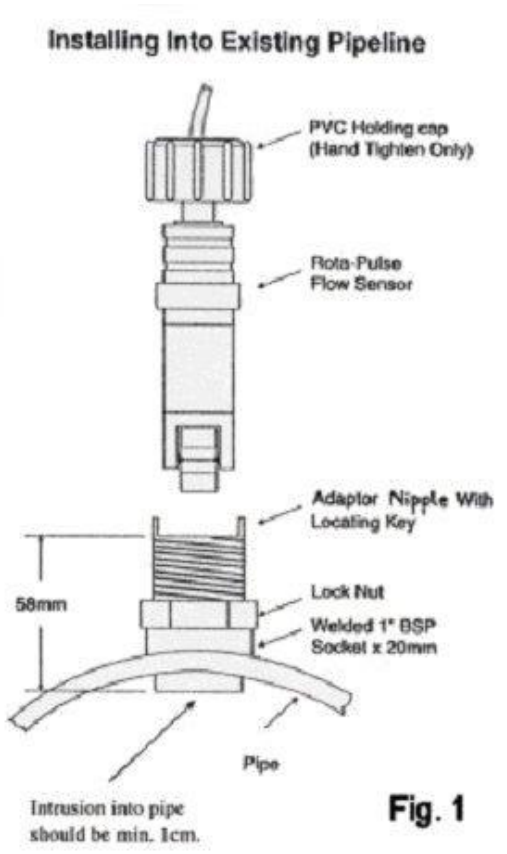
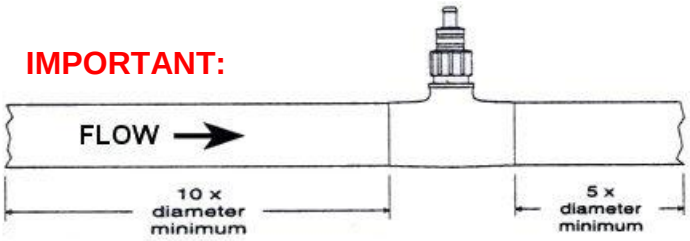


Fig. 1



Selection of pipe diameter

For best operating results, use the table below:

Pipe size (mm)	Flowrange (Litres/min)		Pulses/Litre (approx.) *
	Min	Max	
15	5.5	90	207
20	9.5	160	116
25	15	250	75
32	25	410	46
40	38	640	30
50	60	1000	20
65	100	1690	12
80	151	2560	7.3
100	236	4005	4.6
150	535	9010	2.1

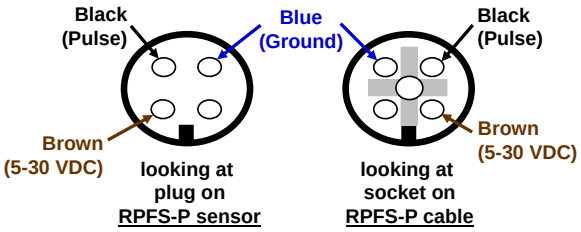
For >150mm diameter pipes:
Pulses per Litre = 46512/(Pipe diameter in mm)^2

* NOTE: Due to gravitational forces, the pulse output value can differ up to 6% between a vertical flow that is upwards or downwards. Where possible, perform a calbration check to determine pulserate given the pipe diameter and flow conditions. Once calibrated, meter will give linear and repeatable results within the flowrange.

ELECTRICAL INSTALLATION/DATA

Cable connection:

RPFS-P# Black = Pulse
Brown = + 5-30 VDC
Blue = O.V. ground/shield



RPFS-H# White = Pulse
Red = + 5-30 VDC
Shield = O.V. ground/shield

RPFS-L White = Signal
Red = Signal
Shield = connect to signal/ground

If connecting to non-ManuFlo equipment, a 2K2 pull-up resistor may be required between (+) and Pulse.

For extra cable length, use shielded cable only!

WARNING: To avoid electrical interference the RPFS-H and RPFS-L should not be installed within 30cm of any AC fields, otherwise 50Hz could be detected and create oscillations.

Sensor Construction

Model	RPFS-P	RPFS-H	RPFS-L
Body	Delron (Acetal)	Brass	Delron
O-rings x2	Neoprene	Viton	Neoprene
Rotor	Marine grade stainless steel		
Bushes	Delron	Delron	Delron
Axle	Tungsten Carbide		
Lockcap	PVDF	Brass	PVDF
Dimensions Overall (approx.)	130L x 30W mm	150L x 30W mm	135L x 30W mm

RPFS-H

MAINTENANCE

With clean liquids, a check is required once every year. In applications with reclaimed or contaminated fluids, regular monthly (at worst quarterly) maintenance checks are recommended.

▪ To remove the sensor, first unscrew the PVC locking cap. ▪ Remove the sensor by pulling up, do not twist until clearing keyway. Do not pull by cable. ▪ If the paddlewheel (rotor) is dirty, then clean with diluted hydrochloric acid. ▪ For ease of removal or refitting, lubricate the body O-rings. ▪ If the paddlewheel requires servicing, push out the axle, remove the wheel, and service or replace the bushes as required.

APPLICATIONS

Since the RPFS Flow Sensor was first manufactured in 1984, over 8000 units are now in use worldwide. They are used in a large variety of applications, including measurement of fresh and recycled water in concrete batch plants, measurement of petrol/diesel, water irrigation, salt water, chlorinated water and countless other low viscosity liquid measurement processes (Note: is not suitable for pulsating flows).

RPFS-P and RPFS-H sensors can be connected direct to PLCs, ManuFlo ME995 preset batch controllers or FRT303 Flowrate/Totalisers, or just about any other process controller/indicator device (up to 1000m away).

The ManuFlo UIC universal pulse scaler card allows conversion of the output pulse to individual requirements – ideal for PLC inputs of DC NPN/PNP or AC triac types.
Pulses can be scaled down or factored to a desired engineering unit, to cater for slow counting PLCs.

The RPFS-L inductive coil sensors are energy misers suitable for low current requirements and are ideal for battery powered applications using FRT303 or ME5 Indicators (up to 150m away).

RPFS-type flow sensors are designed to operate with ManuFlo equipment (our equipment has internal pull-up resistors at the inputs). If using an RPFS with non-ManuFlo equipment and pulses are not being detected, then fit a resistor of value 1.5K - 3.3K across the Pulse and (+) positive input to act as pull-up resistor (the exact resistor value should be determined by the current draw to suit your equipment).

ORDERING CODES

Item	Description		
RPFS-P	NPN transistor 5-25VDC sinking pulse,	liquid temperature to 50°C	
RPFS-H	NPN transistor 5-25VDC sinking pulse,	liquid temperature to 120°C	
RPFS-L	Inductive coil pulse signal for amplified inputs,	liquid temperature to 120°C	

NOTE: All RPFS sensors are supplied with a screw-down locking cap.

LC
Locking cap

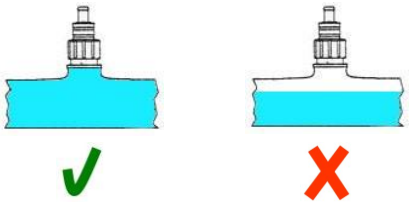
(See page 4 Fig. 2, for pipe installation adapter fittings)

RPFS - PIPE ADAPTER FITTINGS

Material	Size mm	Order Code	Adapter Type
PVC with PVC Keyway	20	PVC20	Class18, Cat.19, glue-in (female) socket connections for PVC pipe sections.
	25	PVC25	
	32	PVC32	
	40	PVC40	
	50	PVC50	
	65	PVC65	
	80	PVC80	
	100	PVC100	
PVC Saddle-clamp	80	PVC80SC	Saddleclamps to 1500 kPa to suit PVC pipe sections
	100	PVC100SC	
	150	PVC150SC	
GALVANIZED with brass Keyway	25	GAL25	Threaded BSP (female) entries for galvanised metal, copper or other pipe materials.
	32	GAL32	
	40	GAL40	
	50	GAL50	
All Brass	20	GAL20	As above, but all brass.
All Stainless	25	SS25	As above, but all Stainless 316.
POLY with brass Keyway	50	SC50	Saddle-clamped on black poly irrigation pipes up to 315mm. To fit, a 25-30mm hole must be drilled into pipe.
	63	SC63	
	75	SC75	
	90	SC90	
	110	SC110	
BRASS	25-250	BSPB	Adaptor with Keyway for existing metal, copper or stainless steel pipe runs.
STAINLESS	25-250	BSPSS	
Keyway			

SPARE PARTS

Order Code	Description
BLN	25mm Brass Lock Nut
BS020	Neoprene O-ring
BS020V	Viton O-ring
LC	Locking Cap
PW-N	Paddlewheel, with bushes
PWAH	Axle for paddlewheel
PC-RPFSP	Plug-in cable for RPFS-P
STC	Sealer locking cap



BSPB BSPSS

PVC fittings

GAL fittings

Various pipe adapter fittings and sizes.

Fig. 2

Due to continuous product improvement, specifications are subject to change without notice.