RPFS-LS ROTA PULSE FLOW SENSOR - LONG STEM

Insertion Paddlewheel for pipes diameters

> 110 to 2000 mm

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, or Inductive coil pulse version for battery powered low current apps.**
- **To 120°C temperature**
- **Simple installation and maintenance.**
- **Large range of pipe adapter fittings in sizes 150mm>.**
- **Special Long stem design brass housing**
- **Stainless Steel 17-4PH paddlewheel rotor without magnets.**

RPFS-H-LS

DESCRIPTION

The new LONG STEM Rota Pulse Flow Sensor (RPFS-LS) paddlewheel slip insertion type flowmeter has been introduced into the ManuFlo range to cater for the more difficult to adapt to larger pipe diameters greater than 150mm.

The flow meter comes in two model variants:

- **RPFS-H-LS** NPN pulse output.
- **RPFS-L-LS** low current inductive pulse for battery powered devices.

The flowsensors insert directly into a brass 1" diameter long stem special pipe adaptor fitting. This fitting can be used to insert into 1" BSP (female) entries. It can also be adapted to our large range of pipe adapter fittings available in PVC and Polypropelene saddle clamps, covering pipe sizes 150 to 315mm (standard sizes) and larger as required (or your own irrigation saddles and tapping bands). This makes the RPFS-LS long stem sensor suitable for a wide range of liquid flow measurement, monitoring and batching applications where larger pipe diameters are used.

With only one moving part and limited intrusion into the pipe, and combined with its flow-through design, RPFS-LS flowsensors allow accurate measurement of liquid flows with virtually no headloss. Each of the 4 blades of the rotor (paddlewheel) extends at least one centimetre past the internal curvature of the pipe into the flowing liquid. The RPFS-H-LS sensor generates a square wave pulse with the output frequency proportional to flow velocity and pipe diameter. The RPFS-L-LS produces a sine wave coil output, ideal for low power application with battery powered devices such as the **FRT303-B** indicator.

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-H-LS	**RPFS-L-LS**
Supply voltage	5-30 VDC	Inductive coil 260 ohms
Output signal	NPN open collector 50% duty cycle pulse	Inductive sine wave pulse 50% duty cycle pulse 0.1v to 2v peak-to-peak generated
Current draw @ 5 VDC / 24 VDC	2.5 mA / 10 mA	negligible
Max. switching current @ 24 VDC	200 mA	not applicable
Cable length	5 metres cable 2-core shielded (3 wire) *(or extend to 100 metres)*	5 metres cable 2-core shielded (3 wire) *(or extend to 100 metres)*
Fluid temperature	120 °C max.	120 °C max.
Weather rating	IP65	IP65
Pressure rating	2750 kPa (400 psi)	2750 kPa (400 psi)
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	> 110mm	

INSTALLATION GUIDE

Adapter nipple keyway fittings are available for:

- Copper/Brass/Metal/Steel pipes

For tapping into existing or larger pipe works, use either:

- BSPB-LS brass pipe screwed adapter fitting keyway nipple with locknut, which has 1" OD BSP thread for screwed insertion into 1" (female) sockets and threaded entries.
  BSP adapters can be welded directly to pipe (see Fig. 1);

or

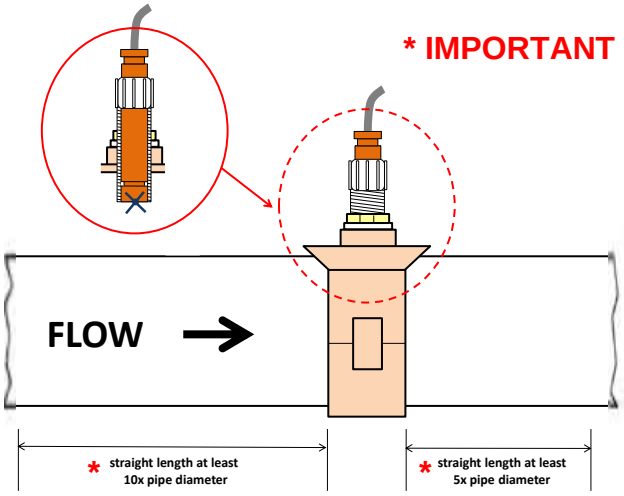
- PVC and Polypipe saddleclamps in pipe sizes 150-315mm.

or

- adapt to your own saddles or tapping bands of choice.

Installation Conditions

1. **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.
2. The RPFS-LS sensor must measure in a section of pipe that is full of liquid at all times.
3. Can be installed in a horizontal, inclined or vertical pipe position. (Note: If mounted in horizontal or inclined pipe, make sure the insertion position of the sensor is at top or 45° from the top, and not on the underside).



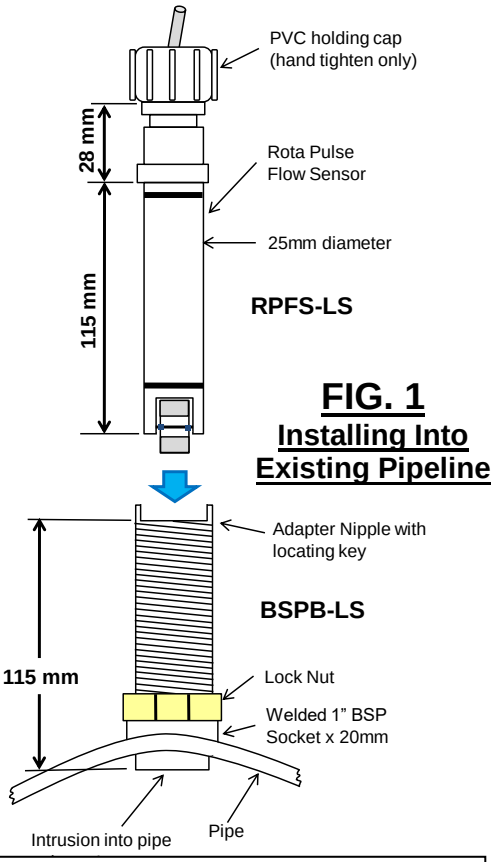


FIG. 1
Installing Into Existing Pipeline

Insertion of the adaptor pipe nipple should intrude at least 10mm past the ID curvature of the pipe (to obtain optimum results).

Selection of pipe diameter

For best operating results, use the table below:

Pipe size (mm)	Flowrange (Litres/min)		Pulses/Litre (approx.) (1)(2)
	Min	Max	
150	600	9 010	2 .1
160	650	10 200	1 .8
195	900	15 200	1 .22
200	950	16 000	1 .16
250	1 480	25 000	0 .7
280	1 850	31 400	0 .6
315	2 300	39 720	0 .46
400	3 740	64 000	0 .291
500	5 900	100 100	0 .1860
800	14 900	256 300	0 .07268
1000	23 200	400 600	0 .04651
1500	51 800	901 500	0 .02067
2000	91 800	1 602 800	0 .01163

ELECTRICAL INSTALLATION/DATA

Cable connection:

RPFS-H-LS#	White = Pulse Red = + 5-30 VDC Shield = 0V ground/shield
RPFS-L-LS	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-LS and RPFS-L-LS should not be installed within 30cm of any AC fields, otherwise 50Hz could be detected and create oscillations.

(1) For pipes >315mm diameter:
Pulses per Litre = 46512 / [(Pipe diameter in mm) ^{2}]

(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

Sensor Construction

Model	RPFS-H-LS	RPFS-L-LS
Body	Brass	Brass
O-rings x2	Neoprene	Neoprene
Rotor	Stainless Steel 17-4PH	
Bush	Delron	Delron
Axle	Tungsten Carbide	
Lockcap	PVDF or Brass	PVDF or Brass
Dimensions Overall (approx.)	150L x 30W mm	150L x 30W mm

RPFS-H-LS

MAINTENANCE

With clean liquids, a check is a good idea once every year. In applications with reclaimed or contaminated fluids, 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 cleaning solvent. ▪ 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 wheel as required.

APPLICATIONS

RPFS-LS Long Stem Flow Sensors can be used in a large variety of applications where water and water-based products need to be measured, batched or monitored with ManuFlo's range of indicators e.g. FRT303, ME5, ME3000, UIC/D pulse scaler cards and others.

The RPFS-H-LS can be connected direct to PLCs, ManuFlo ME995 series preset Batch Controllers or FRT303 Flowrate/Totalisers, or just about any other process controller/indicator device (up to 1000 metres 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.

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

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

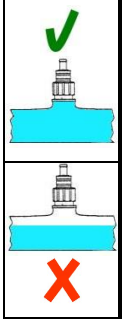
Item	Description
RPFS-H-LS	NPN transistor 5-25VDC sinking pulse, liquid temperature to 120°C
RPFS-L-LS	Inductive coil pulse signal for amplified inputs, liquid temperature to 120°C

(See page 4, for pipe installation adapter fittings)

SPARE PARTS

Order Code	Description	Order Code	Description
BLN	25mm Brass Lock Nut for BSPSS and BSPB adapters	PW	Paddlewheel, with bushes
BS020	Neoprene O-ring	PWAH	Axle for paddlewheel
LC-B	Locking Cap -Brass	SLC	Sealer locking cap
BSPB-LS	Long stem adapter nipple with locating key and locknut		

ORDER CODES FOR PIPE ADAPTER FITTINGS

Material	PVC	Polypropylene	Polypropylene	BSPB-LS	BRASS
Type	**Saddle Clamp**	**SaddleClamp**	**SaddleClamp**		**Socket**
For	**Pressure pipe**	**PVC Irrigation pipe**	**Poly Pipe Black**		
150 mm	PVC150SC-LS	SCPxxx: Polypipe Tapping Saddles available for PVC irrigation pipes 150 - 315mm	SC150-LS	1" insertion screwed adaptor nipple 100- 2000 mm	BSOC: 1" BSP Brass pipe socket adaptor for 110-2000 mm pipes
160 mm			SC160-LS		
180mm			SC180-LS		
195 mm	PVC195SC-LS				
200 mm	PVC200SC-LS		SC200-LS		
225 mm			SC225-LS		
250 mm			SC250-LS		
280 mm			SC280-LS		
300mm	PVC300SC-LS				
315 mm			SC315-LS		
500 mm					
Pipe must be full at all times					
	PVC 1500 kPa	PVC ≤ 150mm: 1600 kPa > 150mm: 1000 kPa	Poly-pipe agricultural Saddle Clamps. ≤ 150mm: 1600 kPa > 150mm: 1000 kPa	1" Brass screwed adapter nipple with locating key and locknut	1" BSP Brass pipe socket adaptor **(see installation diagram Fig. 1 on Page 2)**

Note: For some pipe entries a 50x25 reducer bush may be required.

E.G. Connect to the FRT303-B battery powered indicator for LCD rate/reset/total and pulse output for datalogging

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

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