

MRPU5 - LCD RESETABLE COUNTER FLOWMETERS

****SERVICE GUIDE ONLY****

(Screwed Insertion Paddlewheel)

FEATURES

- 5 digit LCD resetable display Totaliser with pulse output option.
- Ideal in pipe diameters from 20 to 315 mm with simple installation pipe fitting/adapters.
- Suitable for measurement of liquids up to 50°C, with velocity range 0.6 to 8.0 metres/sec.
- $\pm 1\%$ accuracy (0.7- 7m/s), $\pm 2.5\%$ accuracy (0.6-8m/s).
- Robust housing for harsh environments with durable marine grade alloy paddlewheel rotor.
- Sealed glass IP65 digital display compartment and lid protects LCD from sunlight. Easy access for re-calibration.
- Used in Irrigation, Transit mixers, Slumpstands and many other applications.



The MRPU5 resetable counter flowmeter is designed and manufactured in Australia by ManuFlo. The MRPU5's round display head has a 1" BSP male threaded stem section which allows the display head to be fitted to most 1" BSP female entries. Usually, the MRPU5s are pre-fitted with a ManuFlo pipe adapter fitting. Adapters are available for a range of pipe sizes from 20 to 315 mm diameters, and the adapter range includes Galvanized Iron tees, Class18 Cat19 PVC high pressure tees, and saddle-clamp agricultural poly-pipe fittings.

(For concrete truck agitators, the similar MRP20 flowmeter range is available with cast Gunmetal 20mm flowtubes).

The MRPU5 is suitable for a wide range of medium to high flow range liquid flow measurement applications. Being internally battery powered, the unit is ideal in situations where no external power supply is accessible, making them totally portable resetable totaliser flowmeters.

The flowmeter's only moving part (a virtually indestructible alloy rotor which turns as liquid flows past it) allows registration in Litres, KiloLitres or MegaLitres up to 1 decimal place on the 5 digit Liquid Crystal resetable display counter. The main body component, consisting of the electronic counter board, is housed in a robust Gunmetal housing. The LCD display is visible through the glass window and sealed by a metal locking ring. The MRPU5 is rugged for harsh environments. The impact resistant ABS lid protects the LCD and glass from prolonged sun exposure, contaminants and breakage.

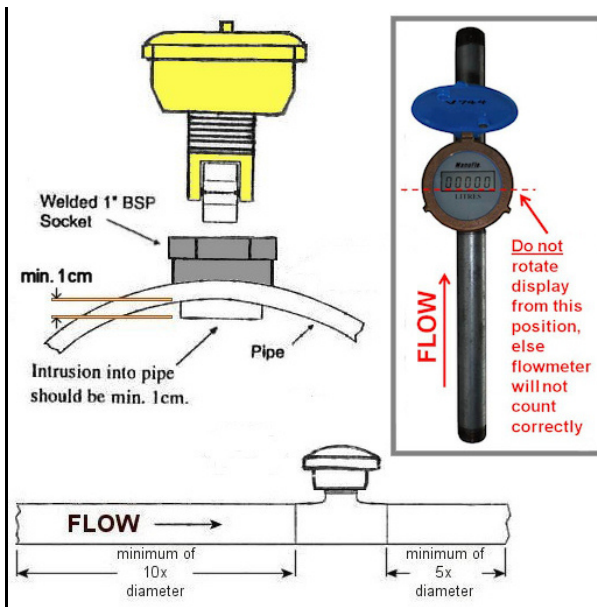
To operate, lift the hinged lid. This action automatically turns on power, and the Liquid Crystal display is zeroed ready for measurement. Liquid flow causes counting on the display. Closing the lid resets the digits, and turns off battery power. The internal lithium battery has a typical life of 5-10 years. NOTE: A sleep mode function turns the display off after 9 minutes of no use. The display is re-awakened either by flow occurring or by closing and re-opening the lid.

SPECIFICATIONS

Flowrange and Accuracy	$\pm 2.5\%$ (0.6 - 8.0 m/sec velocity) $\pm 1.5\%$ (0.7 - 7.0 m/sec velocity, 10:1 flow curve)
Display readout	• 5 digit LCD (12mm high) in Litres, KiloLitres or MegaLitres • up to 1 decimal place
Calibration	via 3 internal pushbuttons
Power Source	3.6v Lithium battery (typically 5-10 year battery life)
Display Capsule Rating	IP65
Max. Operating Temperature	50 °C
Max. Pressure	2000 kPa, with Galvanised Iron and Gunmetal pipe fittings
Pulse Output (optional)	• via optional IP67 plug set. Open Collector transistor, 5-25VDC. • $\leq 100\text{mm}$: 1 pulse / Litre; $> 100\text{mm}$: 1 pulse / 10 Litres • 100 Hz maximum, 5 ms pulsewidth.
Weight (head only, unpacked)	0.8 kg

INSTALLATION GUIDE

- To maintain the stated accuracy curve, lengths of **straight pipe section** (i.e. without any bends, taps or valves), of the same diameter as the pipe adapter fitting, must be in place for a minimum 10x pipe diameters on the incoming (upstream) side, and 5x diameters on the exit (downstream) side, of the flowmeter.
- MRPU5 flowmeters are factory **calibrated to either vertical up, vertical down, or horizontal pipe-run/flow positions (must specify when ordering)**.
- A range of pipe adapters 20-315mm are available. Optionally, if mounting into your own fittings, make sure MRPU5 rotor is inline with flow direction. MRPU5s can also be mounted onto pipes by tapping a 1" BSP (female) thread into the pipe, then simply screw the MRPU5 into position and calibrate accordingly. The MRPU5 paddlewheel must protrude at least one centimeter past the Internal Diameter of the pipe. Usually MRPU5s are factory fitted to, and calibrated with, the chosen pipe adapter fitting.
- The flowmeter must measure in a **full pipe flow of liquid**.
- **Close lid after use**, to prevent LCD fading from prolonged exposure to direct sunlight, and to maximize battery life.



PRODUCT ORDERING CODE FORMAT

(* ** must specify Horizontal or Vertical pipe run)

MRPU5- pipe adapter - No. of decimal places (0 or 1) - units* - HV - options (if any)**

e.g. MRPU5-GAL50M-0-L-H = MRPU5, Gal. 50mm pipe adapter, no decimal place, Litres display, Horizontal run

PIPESIZE vs FLOW RANGE GUIDE

Pipe Size (mm)	Flowrange (Litres/minute)	
	Min @ ± 2.5%	Max @ ± 2.5%
20	13	160
25	23	235
32	32	385
40	50	600
50	90	940
63	130	1300
65	140	1400
75	160	1600
80	200	2410
90	265	2670
100	300	3760
110	395	3990
125	515	5150
140	645	6460
150	660	7780
160	845	8820
200	1350	15070
225	1670	16700
250	2060	20600
280	2580	25860
300	3260	30770
315	3270	32730
500	8700	81900

* units:	L = Litres,
	KL = KiloLitres,
	M = Megalitres)

FUNCTION OPTIONS

Code	Description
-DR	disable reset
-P	IP67-rated pulse output plug-set ≤ 100mm : 1 pulse / Litre; > 100mm : 1 pulse / 10 Litres
-LSB	Long stem body

SPARE PARTS

Code	Description
LM	Lid with magnet and pin
PW-N	Paddlewheel (rotor) and bushes
PWAH	Axle, Tungsten Carbide
LB	3.6v Lithium battery
SCP	Plug 1" sealer








MATERIAL SPECIFICATIONS

MRP housing and sealing ring	Cast gunmetal
Window	Tempered glass
Gasket	PVC
O-Ring	Neoprene
Rotor	Marine Alloy saf2205 and Delron bushes
Axle	Tungsten Carbide
Lid	ABS, ferrite magnet

ORDER CODES FOR PIPE ADAPTER FITTINGS

Material Type For	GAL T-Piece For Gal pipe	PVC slip T-piece Pressure pipe	PVC Saddle Clamp Pressure pipe	Polypropylene SaddleClamp PVC Irrigation pipe	Polypropylene SaddleClamp Poly Pipe Black	STAINLESS T-Piece S/Steel pipe	BRASS T-piece Brass pipe	BRASS Socket
20 mm							BRA20M	
25 mm	GAL25M	PVC25M	PVC40SCM			SS25M	BRA25M	
32 mm	GAL32M	PVC32M						
40 mm	GAL40M	PVC40M		SCP40M	SC40M			
50 mm	GAL50M	PVC50M	PVC50SCM	SCP50M	SC50M			
63 mm					SC63M			
65 mm				SCP65M				
75 mm					SC75M			
80 mm	GAL80M		PVC80SCM	SCP80M				
80 mm	GAL80M-F (Table D flanged)							
90 mm					SC90M			
100 mm	GAL100M		PVC100SCM	SCP100M				
100 mm	GAL100M-F (Table D flanged)							
110 mm					SC110M			
125 mm				SCP125M	SC120M			
140 mm					SC140M			
150 mm			PVC150SCM	SCP150M				
160 mm					SC160M			
200 mm			PVC200SCM	SCP200M	SC200M			
225 mm				SCP225M	SC225M			
250 mm				SCP250M	SC250M			
280 mm					SC280M			
300 mm			PVC300SCM	SCP300M				
315 mm					SC315M			
500 mm								

BSOC: 1" BSP Brass pipe socket adaptor for 32-500 mm pipes

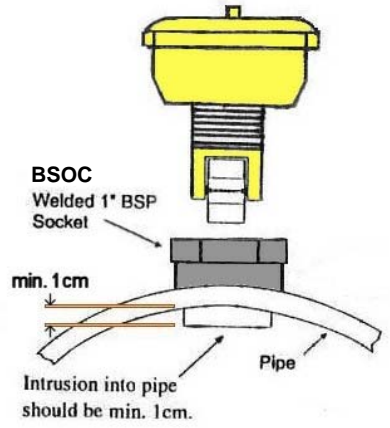
							
Galvanised Iron, threaded entries BSP(female). 2000 kPa NOTE: 25mm is supplied with straight pipe sections already fitted:	PVC T-piece Class 18, Cat 19 Glue-in (female) 1100 kPa	PVC 1400 kPa	PVC ≤ 150mm: 1600 kPa > 150mm: 1000 kPa	Poly-pipe agricultural Saddle Clamps. ≤ 150mm: 1600 kPa > 150mm: 1000 kPa	Stainless Steel 316 T-piece. BSP (female) threaded entry 2000 kPa	Brass T-piece BSP (female) threaded entry 2000 kPa	1" BSP Brass pipe socket adaptor (see installation diagram below)



GAL80M - 80mm Galvanized Iron pipe adapter (80mm φ x 600mm long)

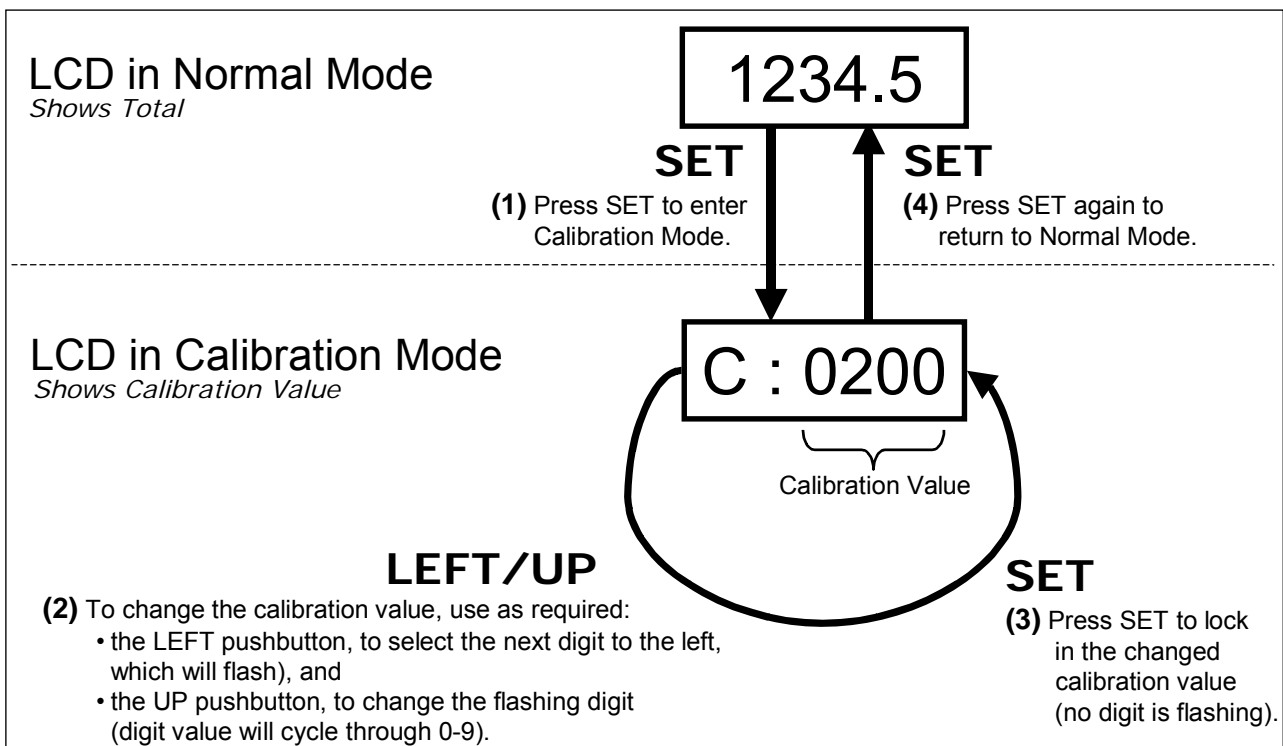
IMPORTANT:

The display head is factory programmed according to the pipesize, and the display head and it's pipe adapter are calibrated together to operate as one unit. **DO NOT** remove the display head and place it on a different sized pipe adapter, because the display will then not read correctly for the new pipesize.

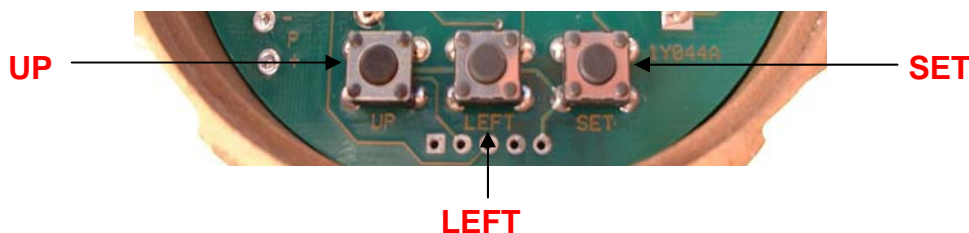


RE-CALIBRATION

- Note: The calibration (K-factor) characteristics can vary up to 6% between horizontal or vertical runs.
- **Recalibration of an MRP5 is performed via three internal pushbuttons** (marked SET, LEFT and UP) mounted on the PCB. **To access the PCB**, open the hinged lid cover, and with a pair of multi-grips, grasp the metal locking ring and turn it anti-clock wise until the four lock tabs align with the four matching slots on the metal PCB housing. Remove the locking ring, and then remove the glass window.
- Now run liquid through the MRP5 into a calibrated vessel or load cell, until at least 50 Litres is displayed on the MRP5. For accuracy, keep flowrate continuous and above minimum flowrange for the pipesize.
- Compare the actual amount collected against what is displayed on the MRP5. If the amount collected matches the amount displayed within 2%, then no adjustment to calibration is necessary.
- If the amount collected is say only 45 Litres, yet the display shows 50 litres, this is 5 litres under or 10% (i.e. $5/50 \times 100\%$). So, increase the set calibration value by 10%
e.g. if set to 100, new value is $100 + 10\% = 100 + 10 = 110$.
- If the amount collected is more than that displayed, then the inverse applies e.g. if the amount collected is say 55 Litres, yet the display shows 50 litres, this is 5 litres over or 10% (i.e. $5/50 \times 100\%$). So, decrease the set calibration value by 10% e.g. if set to 100, new value is $100 - 10\% = 100 - 10 = 90$.
- To change the calibration value, follow the sequence shown in the diagram below.
 - Calibration Mode is entered by pressing the SET pushbutton and the Calibration Value is then shown.
 - Write down the displayed Calibration Value to remember it.
 - As required, use the LEFT button to select a digit to be changed (selected digit will flash), and use the UP button to change the value of the selected (flashing) digit.
 - When all required digits have been changed, pressing SET will lock in the new Calibration Value.
 - Pressing SET again will exit Calibration Mode.



Adjusting the Calibration Value using the internal Calibration pushbuttons SET, LEFT and UP.

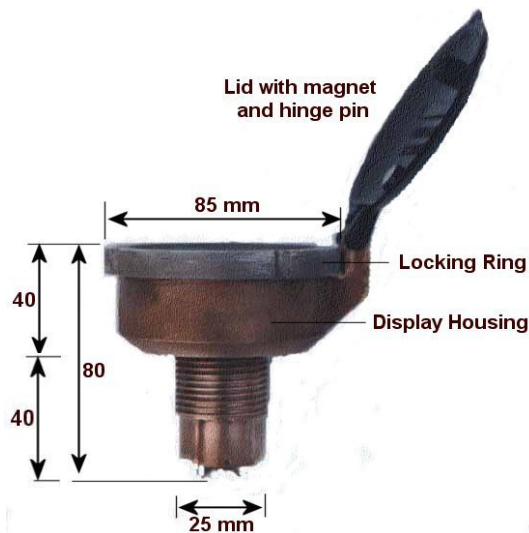


MAINTENANCE

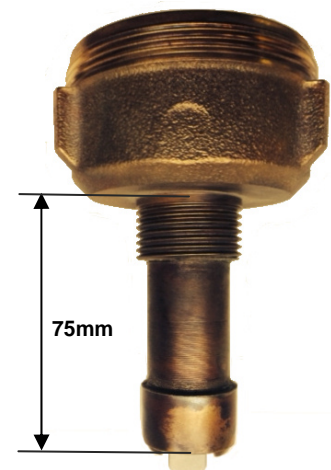
- If the LCD display is blank, the MRPU5 may be in dormant mode because it is not receiving input pulses from its attached flowmeter. The LCD is reawakened once flow restarts, or by closing and re-opening the lid.
- If the flowmeter ceases to count, the paddlewheel may be blocked:
 - Grasp the readout head and turn it anti-clockwise, until it clears the threaded section.
 - Examine and, if required, clear debris from rotor.
 - If used with reclaimed water, then over time a calcium buildup may deposit on the rotor, so immerse the rotor in diluted acid to clear.
 - Re-insert the readout head and screw-in clockwise to its original position.
- If the MRPU5 counts when there is no flow, a nearby 50Hz AC field is probably causing false counts. Move the flowmeter away from the 50Hz field, or move the source of the field if practical.
- **To access the internal electronic display board to replace the Lithium battery:**
 - refer to "Re-calibration" section for instructions to open the MRPU5 to access the PCB.
 - Two screws secure the PCB - unscrew them and remove the PCB to access the battery on underside.
 - Replace battery with an equivalent unit (3.6v 1/2AA lithium with radial mount leads) .
 - Re-insert the PCB and glass.
 - secure the lock ring, and seal under lock ring with silicon, as a precaution against liquid ingress.
- When not in use, keep the lid closed. If prolonged direct exposure to sunlight causes the LCD to become faint or discoloured, return the MRPU5 to ManuFlo for servicing.



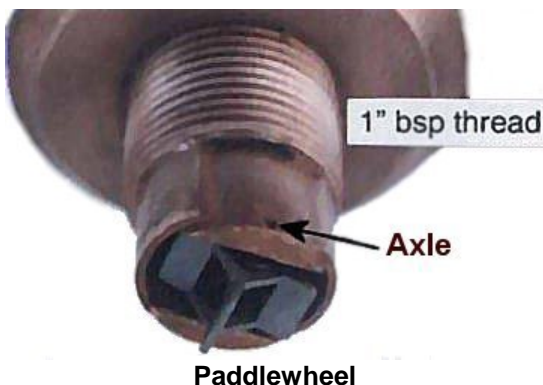
Internal view - PCB and 3 calibration pushbuttons



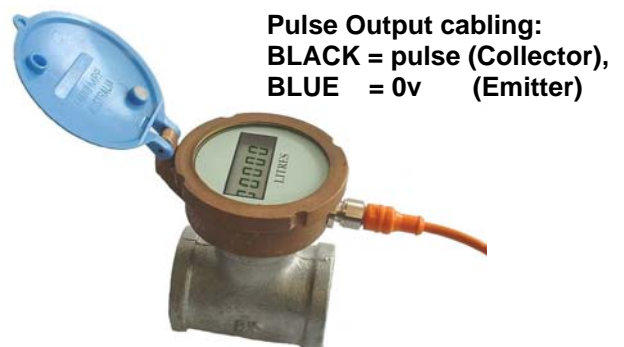
Side view, with dimensions



Long Stem body version for pipesizes > 150mm (other dimensions as at left)



Paddlewheel



Pulse Output cabling:
BLACK = pulse (Collector),
BLUE = 0v (Emitter)

With optional IP67-rated Pulse Output plug set.
≤ 100mm : 1 pulse / Litre; > 100mm : 1 pulse / 10 Litres

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1.1.2 MRPU5 - LCD RESETABLE COUNTER FLOWMETER

Order Code **Description**

MRPU5 Multi-pipe-size adaptable **5 digit** LCD resetable counter flowmeter to 50°C.


MRPU5-F Multi-pipe-size adaptable **5 digit** LCD **FLOWRATE** flowmeter (upto 315mm Φ)


OPTIONS

-P • Pulse output option, with M12 IP67 plug set and 5-metre lead.
 • ≤ 100mm : 1 pulse / Litre; > 100mm : 1 pulse / 10 Litres
 • 100 Hz maximum, 5 ms pulsewidth.
 • (note: for MRPU5-F, pulse output only indicates that there is flow)

-T Teflon-coated body for suitability for seawater and corrosive liquids

-DR Disable Reset

-LSB  Long stem flowmeter head for larger pipe sizes (>150mm)

-RB  IP65 pushbutton. Push to wake total, push again to reset (instead of reset by lid)

ORDERING CODE FORMAT

MRPU5- pipe adapter - No. of decimal places (0 or 1) - units* - H/V - options (if any)**
 e.g. MRPU5-GAL50M-0-L-H = MRPU5, Gal. 50mm pipe adapter, no decimal place, Litres display, Horizontal run

* units: **L** = Litres,
 KL = KiloLitres,
 M = Megalitres
 ** pipe run: **H**orizontal or
 Vertical

1.1.3 MRPU Pipe Adapters and Tee Pieces

Pipe Adaptor fittings to suit MRPUs range of reset counter flowmeters. MRPUs meters have a 1" BSP (male) thread, screw-in entry, that can screw into any 1" BSP (female) threaded entry. The flowmeter head is prefitted with, and calibrated with, the pipe adapter.

Galvanised Iron

Order Code Description

GAL25M	25mm Galvanised pipe tee fitting BSP(female) with Galvanised Iron pipe section lengths (1" BSP male threaded ends for slumpstands)
GAL32M	32 mm Galvanised pipe tee fitting, BSP(female) threaded ends
GAL40M	40 mm Galvanised pipe tee fitting, BSP(female) threaded ends
GAL50M	50 mm Galvanised pipe tee fitting, BSP(female) threaded ends
GAL80M	80 mm (3") BSP (male) threaded ends. Socket welded into 600mm long Gal. pipe.
GAL80M-F	80 mm (3") Table D flanges. Socket welded into 600mm long Gal. pipe.
GAL100M	100 mm (4") BSP (male) threaded ends. Socket welded into 600mm long Gal. pipe.
GAL100M-F	100 mm (4") Table D flanges. Socket welded into 600mm long Gal. pipe.

Stainless Steel

SS25M	25 mm Stainless-316 pipe tee fitting BSP(female) threaded entry
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Brass

BRA20M	20mm (3/4") Brass adapter Tee fitting (BSP male threaded ends), 2000 kPa
BRA25M	25 mm Brass pipe tee fitting BSP (female) threaded entry
BSOC	1" BSP Brass pipe socket adaptor (for 32 - 500 mm pipes)

Tee Pieces for PVC Pressure Pipe

The flowmeter head is prefitted with, and calibrated with, the pipe adapter.

Order

<u>Code</u>	<u>Description</u>
PVC25M	25 mm Class18 PVC pressure pipe slip tee fitting (1100 kPa)
PVC32M	32 mm Class 18 PVC pressure pipe slip tee fitting (1100 kPa)
PVC40M	40 mm Class 18 PVC pressure pipe slip tee fitting (1100 kPa)
PVC50M	50 mm Class 18 PVC pressure pipe slip tee fitting (1100 kPa)

1.1.4 MRPU Irrigation Pipe Adapter Fittings - Saddle Clamps

Saddle Clamp Tapping Bands for PVC Pressure Pipe (Series 1) AS/NZ 4793

High grade glass-reinforced plastic pipe adaptor fittings to suit MRPUs range of reset counter flowmeters.

MRPU flowmeter heads all have a 1" BSP (male) thread that can screw into the 1" BSP (female) threaded entry of our specially modified Saddle Clamps or Tapping Saddles.

NBR-E lip seal with locating lug (low bolt torque).

<u>Order Code</u>	<u>Pipe OD</u>	<u>PVC actual OD mm</u>		<u>Description</u>	<u>PN</u>
		<u>min</u>	<u>max</u>		
PVC40SCM	40 mm	48.1	48.4	40 mm nominal tapping band for PVC Pressure pipe	16
PVC50SCM	50 mm	60.2	60.5	50 mm nominal tapping band for PVC Pressure pipe	16
PVC80SCM	80 mm	88.7	89.1	80 mm	16
PVC 100SCM	100 mm	114.1	114.5	100 mm	16
PVC 150SCM	150 mm	160.0	168.5	150 mm FOR USE LONG STEM ONLY	16
PVC 200SCM	200 mm	225.0	225.6	200 mm FOR USE LONG STEM ONLY	16
PVC 300SCM	300 mm	341.0	349.6	300 mm FOR USE LONG STEM ONLY	16

Saddle Clamps for PVC Irrigation Pipe (Series 1)

Used for cold water service in irrigation PVC pipes. O-ring with flat lip (NBR)









<u>Order Code</u>	<u>Pipe OD</u>	<u>Description</u>	<u>PN</u>
SCP40M	40 mm	40 mm Polypropylene Saddle Clamps for PVC Pressure Pipe (Series 1)	16
SCP50M	50 mm	50 mm	16
SCP65M	65 mm	65 mm	16
SCP80M	80 mm	80 mm	16
SCP100M	100 mm	100 mm	10
SCP125M	125 mm	125 mm	16
SCP150M	150 mm	150 mm FOR USE LONG STEM ONLY	16
SCP200M	200 mm	200 mm FOR USE LONG STEM ONLY	10
SCP225M	225 mm	225 mm FOR USE LONG STEM ONLY	10
SCP250M	250 mm	250 mm FOR USE LONG STEM ONLY	10
SCP300M	300 mm	300 mm FOR USE LONG STEM ONLY	10

Saddle Clamps for Metric Irrigation PE Polyethylene Pipe (Black)

<u>Order Code</u>	<u>Pipe OD</u>	<u>Description</u>	<u>PN</u>
SC40M	40 mm	40 mm saddle clamp for metric polyethylene pipe (blue line)	16
SC50M	50 mm	50 mm	16
SC63M	63 mm	63 mm	16
SC75M	75 mm	75 mm	16
SC90M	90 mm	90 mm	16
SC110M	110 mm	110 mm	16
SC125M	125 mm	125 mm	16
SC140M	140 mm	140 mm FOR USE LONG STEM ONLY	16
SC160M	160 mm	160 mm FOR USE LONG STEM ONLY	16
SC200M	200 mm	200 mm FOR USE LONG STEM ONLY	10
SC225M	225 mm	225 mm FOR USE LONG STEM ONLY	10
SC250M	250 mm	250 mm FOR USE LONG STEM ONLY	10
SC280M	280 mm	280 mm FOR USE LONG STEM ONLY	10
SC315M	315 mm	315 mm FOR USE LONG STEM ONLY	10

A PN 16 pipe is one that can withstand 160 MPa at 20 °C. Other tapping bands available for ductile, AC and copper pipe lines.

1.1.5 SPARE PARTS for MRP20 and MRPU5 Flowmeters

<u>Product Code</u>	<u>Description</u>	
LB	Lithium Battery 3.6v (6-10 year life) 1/2AA radial mount. 600milli-amp/hrs +	
LM	Lid with magnet and pin	
MRP-MAG	Magnet	
MRP-GLASS	Glass window (specify whether "Litres" or "Litres/min")	
MRPU5-PCB	MRPU5 circuit board	
PC-MRPUP	Spare M12 IP67 5-metre plug-in cable for MRPU5-P flowmeter.	
PW-N	Paddlewheel with bushes	
PWAH	Tungsten carbide axle	
SPC	Sealer plug cap, screwed 1" BSP(m)	