FEATURES:-

- 6 digit LCD resettable or non-reset totalizer (12mm high), and 5 digit flowrate
- Total in LITRES or optional KiloLitres
- Flowrate in LPM or optional LPS
- Easy reset of total via flip top lid.
- ± 2.5% accuracy, at 0.7 8.0 m/s flow velocity
- Repeatability: ± 1.0%
- 8+ year Battery life.
- Max. Process Temperature 80 °C
- Max. Operating Pressure: PVC Tee' options rated to 1100 kPa All Metal Tee options are rated 1600 kPa
- With simple installation pipe fittings/adapters.
- For pipe Tee adaptors sizes from 20 to 100 mm (short stem version) or 100 to 315mm via saddle clamp (long stem version)
- Optional pulse output, via M12 IP67 plugset
- Robust ASA-UV IP65 Display housing Dual Hinged robust lid protects LCD from sunlight.
- Slip insertion sensor design with locking cap allows simple removal from pipeline if cleaning rotor.
- Easier Access for re-calibration and user friendly smart 1 point re-calibration function -self calculation for a new K- factor.
- Optional External re-calibrate via Portable Device with RFID and EWM calibration software.
- Dual display: Rate + Reset Total 6-digit LCD (12mm high) counts in LITRES or KILOLITRES.
- Pulse Output is Live even when lid is closed or optionally Pulse Output is Disabled when lid is closed (code -PNL)
- Option for continuous Live LCD (code -NS)



New Improved ASA **Display Enclosure**



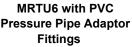
'Dual Display' 6 Digit Resettable **Running Total &** 5 Digit Flow Rate



MRTU6-GAL50 with 50mm (2") **GAL Pipe Fitting**

MRTU6: Ideal in Irrigation and many other general water measurement and monitoring applications. Incorporating the widely used RPFS sensor design.







MRTU6 with Saddle Clamp Fittings for PVC or PP Rural

The MRTU6 resettable counter flowmeter is designed and manufactured in Australia by ManuFlo. The MRTU6 has a unique 'quick release' slip insertion stem section designed to be inserted to the ManuFlo 1" nipple adaptors (part BSPB etc) which allows the display head to be fitted to most 1" BSP female entries. Usually, the MRTU6 is pre-fitted with a ManuFlo 'T' piece pipe adapter, 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, the advantage being we pre-install the MRTU6 for you on to the fitting and pre-calibrate on our NMI certified test rig (sizes 20mm - 100mm) to obtain the best K-factor value. Or optionally you may purchase our BSPB or BSPB-LS pipe adaptor nipples (1" BSP M external thread) in brass or optional version BSPSS in 316 SS material.

The MRTU6 is suitable for 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 resettable totaliser and rate flowmeters and with optional pulse output to data logger or PLC. NOTE: As standard the pulse output is live even when lid is closed however this feature can be disabled by adding -PNL (pulse is disabled when lid closed) to the order code.

The flowmeter's only moving part (a stainless steel alloy rotor which turns as liquid flows past it) allows registration in Litres (L) or KiloLitres (KL) with up to 3 decimal places on the 6 digit Liquid Crystal resettable display counter with flowrate indicator in Litres per minute (L/M) or Litres per second (L/S) up to 2 decimal places. The main body component, consisting of the electronic counter board, is housed in a robust ABS-UV resistant IP65 enclosure. The LCD display is visible through the toughened ABS-UV window and sealed by a recessed gasket and 4 stainless steel screws. A special scratch resistant film allows optimal reading even in the harshest conditions. The impact resistant ABS-UV lid protects the LCD from prolonged sun exposure, contaminants and breakage.

To operate, open the hinged lid and the previously recorded total will be present, open and close the lid again and the Liquid Crystal Display is zeroed ready for a new batch measurement. Liquid flow turning the rotor blades causes counting on the display. The internal lithium battery has a typical life of 8+ years depending on environmental conditions.



SPECIFICATIONS AND DETAIL

Flowrange and Accuracy	±2.5% (0.6 - 8.0 m/sec velocity)
	±1.5% (0.7 - 7.0 m/sec velocity, 10:1 flow curve)
Display readout	Flowrate: 5 digit (3x6.5mm) in L/M or L/S up to 2 decimal place
	Counter: 6 digit (5x12mm) in Litres (L), KiloLitres(KL) up to 3 decimal place
Calibration	via 3 internal pushbuttons
	via PC with RFID reader and EWM Calibration software or (coming soon) ANDROID device with built-in NFC and EWM application
Power Source	3.6v 2100mAh Lithium battery
Environmental	IP65
	0% to 75% relative humidity
	Up to 2000m Altitude
Max. Operating Ambient	5 °C - 40 °C
Temperature	
Max. Pressure Plastic Pipes	1100 kPa for PVC Tee's, PVC & Poly saddle clamps
Max. Pressure Metal Pipes	1600 kPa for Galvanised Iron, Stainless steel and Gunmetal Tee pieces
Pulse Output (optional)	• via optional IP67 M12 plug set (5m lead). N-Channel MOSFET, 5-100VDC 1 Amps Max
	• scalable from 1 to 1000 Litres per pulse, 100 Hz maximum, 5 ms pulse width
External Reset Input (optional)	Passive input via 2 wire volt free contact for PLC or external totaliser reset switch.
Weight (head only, unpacked)	0.4 kg

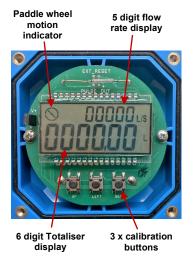
MATERIALS:	SHORT STEM BODY	LONG STEM BODY						
MRT Housing	ASA-UV & 316 SST Screws (x4)							
Viewing Window	Polycarbonate-UV (c/w 3M 'anti scratch' protection film)							
Housing Gasket	Neoprene							
Body / Bushes	Delrin / Delrin	Bronze / Delrin						
O-Rings	Nitrile							
Rotor	Stainless Steel	17-4PH						
Axle	Tungsten Ca	ırbide						
Lock Cap	Polypropyle	ene						
Nipple Adaptor	PVC or Brass or 316 SST Brass							
Pipe Fitting Range	Refer Pag	e 6						

PIPE SIZE versus FLOW RANGE GUIDE

	Flowrange (Litres/minute) Min Max							
Pipe Size	Min	Max						
(mm)	@ ± 2.5%	@ ± 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						
225	1670	16700						
250	2060	20600						
280	2580	25860						
300	3260	30770						
315	3270	32730						
500	8700	81900						



Irrigation Application MRTU6-GAL50-T2



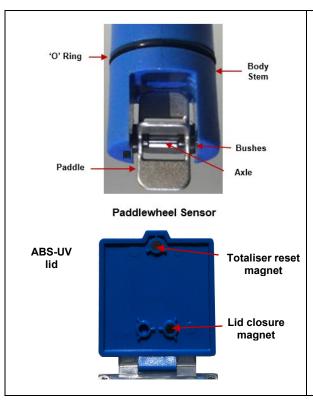


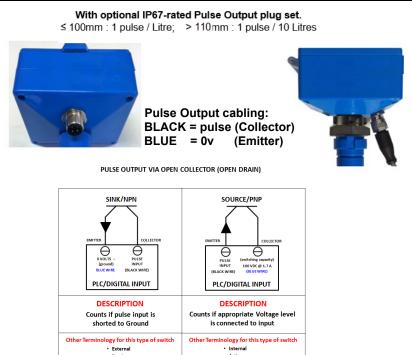


Internal view - PCB

Standard 'Short Stem' body version, pipe ID up to 100mm ID Side view dimensions

'Long Stem' body version (-LS) for pipe sizes > 100mm ID







Warning: The pulse output signal from the MRT is an open drain (open collector) dry contact, with fixed positive pulse width of 5mS (10mS total duration) with maximum 100Hz frequency capability. Therefore, is suitable primarily for LCD pulse counters & Dataloggers. In many instances, this pulse may not drive PLC inputs when connected directly and the specifications of your PLC/Logger input should be checked for suitability prior to purchase. You may consider purchasing from ManuFlo our UIC pulse booster card which will safely interface between the flowmeter and connected device refer http://www.manuelectronics.com.au/pdfs/UIC.pdf For a full explanation and specifications of the pulse output please click the following link from Manuflo's website http://www.manuelectronics.com.au/pdfs/MRT%20Flowmeter%20Pulse%20output.pdf

SPARE PARTS	
Code	Description
MRT-TC	Top cover including hinged lid with magnets & SS screws
MRT-CU	Special anti-scratch film from 3M
PW-N	Paddlewheel (rotor) and bushes



Adapter Tee keyway fittings are available in:

2. Galvanized Iron threaded connections:

- 1. PVC Class 18 Cat. 19 (glue-ends) pressure pipe sizes: 20, 25, 32, 40, 50, 65, 80 & 100 mm. PVC high pressure saddle clamps: 50, 80, 100, 150, 200 and 300mm.
- BSP (F): pipe sizes 25, 32, 40 and 50 mm; BSP (M) pipe sizes 80 and 100mm (includes 600mm length of same diameter pipe).
- 3. Copper/Brass BSP (male) threaded connection end process pipe tube tees 20 and 25 mm.
- 4. Polypipe saddle clamps in pipe sizes 50, 63, 75, 90, 110 mm, up to 315mm. PVC saddles 40, 50, 80, 100, 150, 200 and 300mm.
- 5. Stainless steel 25, 32, 40 and 50 mm, others fabricated on request.

Insertion to Pipe (see FIG 1 below):

Ideally the *MRTU6* is purchased factory fitted, and calibrated on our test rig with the chosen pipe adapter fitting (listed above) however should you wish to mount to your own pipe fittings, you must ensure the ManuFlo nipple adaptor option is mounted correctly so that the *MRTU6* rotor is in line with flow direction and the end of the nipple adaptor is protruding approx. one centimeter (10mm) past the Internal Diameter of the pipe so that when the sensor is inserted in to the nipple adaptor it resides at the optimum position to capture flow.

For Tapping into Existing or Larger Pipe Works (see Fig. 1 below):

Use ManuFlo **BSPB, BSPB-LS** (Long Stem) Brass or **BSPSS** Stainless Steel pipe adapter keyway nipple - with locknut, which has a 1" OD BSP thread for screwed insertion into 1"(female BSP) half-sockets which can be welded directly to pipe, the BSPB fittings can be coupled to any 1" BSP female entries including saddle clamps.

Using optional pulse output:

Connect M12 mating connector to flowmeter as per the diagram below. To ensure environmental suitability rating of connector pair, use a tool to tighten the connector.



Pin 3 – 0V (Blue) Pin 4 - Pulse (Black)

Installation Conditions:

- 1. Hydraulic conditions must ensure the *MRTU6* flowmeter has a full pipe flow section when measuring (see FIG 3 below).
- 2. To maintain the stated accuracy curve, lengths of <u>straight pipe section</u> (i.e. without any restrictions bends, taps or valves), of the same diameter as the pipe adapter fitting, must be in place for a minimum **10 x pipe diameters** on the incoming (upstream) side, and **5 x diameters** on the exit (downstream) side, of the flowmeter. This will help eliminate flow turbulence to ensure optimum accuracy performance. (see FIG 4).
- 3. The *MRTU6* can be installed in horizontal, inclined or vertical pipe positions. (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).

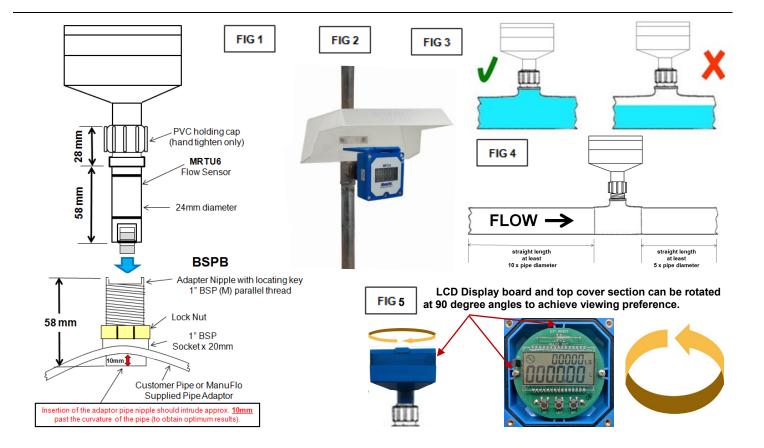
Exposure to Weather:

To prevent LCD fading due to prolonged use in direct sunlight **close lid after viewing**. You may also consider a weatherproof housing around the flowmeter in particularly exposed areas (see Fig 2).

Display Head Rotation:

After removing holding screws the *MRTU6* top cover and LCD board may be rotated in 90° increments to obtain optimum viewing angle (see FIG 5). Ensure screws are returned and top cover is sealed properly after re-locating head.

^{**}Further custom-made fittings are available on request.



MAINTENANCE MRTU6

Recommended Periodic Checks:

With clean liquids, sensor check of the paddle wheel is recommended once every year. In applications with reclaimed or contaminated fluids, regular monthly (at least quarterly) maintenance checks are recommended.

Removal of MRTU6 from Pipe adaptor Fitting 'Square' Keyway Type Nipple Adaptor:(see FIG 5)

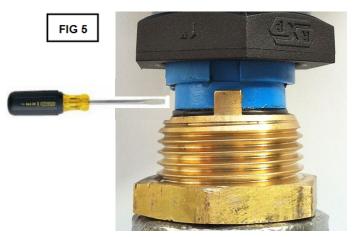
- 1 Unscrew the black PVC locking cap (anti-clockwise).
- 2 Hold the neck of the Tee piece in your left hand grasp the enclosure firmly with your right hand and pull upwards (do not twist) until the sensor pops out of the fitting. If the sensor won't release go to step 3.
- 3 Place a small to medium sized flat thin bladed screwdriver in the join where the sensor meets the nipple adaptor (See FIG 5), twist the screw driver to prize the two apart then pull upwards again until the sensor is released.

Removal of MRTU6 from Pipe adaptor Fitting 'Triangular' Keyway Type Nipple Adaptor:(see FIG 6)

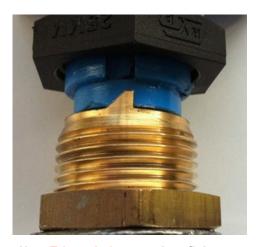
- 1 Unscrew the black PVC locking cap (anti-clockwise).
- 2 Hold the neck of the Tee piece in your left hand grasp the enclosure with your right hand and turn slowly anti-clockwise until the sensor pops out of slot then pull upwards out of socket.

**When returning the sensor to nipple adaptor insert so the keyway and slots line up then pull down until they locate. Screw the black lock nut clockwise to hold the sensor in place (hand tightened only).

FIG 6



Standard fitting 'Square' Keyway



New 'Triangular' turn replace fitting

Cleaning:

- 1 If the paddlewheel (rotor) and or sensor body is coated with scale, immerse the sensor section in diluted hydrochloric acid, scour gently if required.
- 2 For ease of removal or refitting of sensor we strongly recommend to lubricate the body O-rings using petroleum jelly.
- 3 If the paddlewheel requires servicing, push out the axle using a small hole punch or similar implement, remove the paddle wheel and service or replace rotor and/or axle as required (spare parts available from ManuFlo).

Fault Diagnosis & Rectification:

- If the LCD display is blank, the MRTU6 may be in sleep mode because it is not receiving input pulses from the paddlewheel. 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, remove inspect and clean as described above.
- If the MRTU6 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.
- When not in use, keep the outer lid should be closed. If prolonged direct exposure to sunlight causes the LCD to fade or discolour, return the MRTU6 to ManuFlo for servicing.
- Should the device still not operate please return or contact ManuFlo Support.

Removing the Top Cover:

The top cover should not be removed inside the initial 12 months warranty period otherwise warranty may be voided. But in the event that the cover is opened it is imperative that the O ring seal is pushed into the groove before fastening the screws to close the unit up again, otherwise it will become crimped and thus leave a cavity for water to ingress between the top and bottom cover, this invariably results in destruction of the PCB.



FLOWMETER ORDERING CODE

MRTU6

Base Model	Code Position A	В	С	D	E	F	G	Н	ı	J	K
MRTU6 - (up to 100mm)	Refer to Pipe Adaptor Selection (Page 6)	Pulse -	P Scale -	T Units -	T DP -	F Units -	F DP -	Sleep -	Reset -	ER -	CAL

MRTU6 - LS (>100mm)									
Pulse Output Options: Without pulse output (Default) With pulse output ('pulse live' lid open or closed) With pulse output ('pulse not live' when lid closed)	0 P PNL								
Pulse Output Scaling 1 Pulse / Litre (Default) 1 Pulse / 10 Litres 1 Pulse / 100 Litres 1 Pulse / 1000 Litres									
Totaliser Display Units: Litres (Default) Kilolitres		L KL							
Totaliser Decimal Place: Without Decimal Place (Default) With 1 Decimal Place With 2 Decimal Places With 3 Decimal Places			0 1 2 3						
Flow Rate Display Units: Litres / Minute (Default) Litres / Second Flow rate Display Off				L/M L/S 0					
Flow Rate Display Decimal Place: Without Decimal Place With 1 Decimal Place (Default) With 2 Decimal Places					0 1 2				
Sleep Mode (Battery Conservation): Sleep in 5 Minutes (Default) - LCD Turns off aft Sleep Function Off - Display is always live (reduced)					999.9 min	s. S5 SO			
Totaliser Reset Options: Reset (Default) Totaliser is reset each time the Wake Reset - Wakes the display and retains To Reset Disabled - Totaliser reset function disable	otal (unless lid cl						R WR RD		
External Reset Option: No external reset (Default) External Reset - Totaliser reset via external input	ıt (includes IP67	⁷ plug and socke	t c/w 5m cab	ole)				0 ER	
# Calibration Preference (based on application Standard (Default) - Factory standard calibration Vertical - Flowmeter calibrated in the vertical pla Horizontal - Flowmeter calibrated in the horizont	on orientation: P ne to match cus	stomers applicati	on	rtical, >25m	m calibrate	ed in Horiz	ontal plar	ie	S V H

MRTU6 flowmeter sizes 20 - 25mm are factory calibrated in the 'vertical up' position, sizes 32mm> are calibrated in the horizontal plane with a small incline. For these larger sizes there is a small difference (approx. 6%) in the calibration 'K-Factor' from horizontal to vertical calibration, this difference is noticeably greater for flow downward position where gravity plays a part. If the accuracy is critical to your application you should specify your preferred calibration position at order placement.

Example:

Base Model Pipe Adap	or	В		С		D		Е		F		G		Н		ı		J		K
MRTU6 - GAL25-T	-	Р	-	1	-	L	-	0	-	L/M	-	1	-	S5	-	WR	-	0	-	S
Position Selection De	cript	ion:																		
Code A: GAL25-T2 25r	ım G	AL p	ipe a	daptoi	r wit	h stra	ight	pipe I	leng	ths										
Code B: PPul	e ou	tput					-		_											

Code C: 1.....Pulse output 1 pulse / Litre Code D: L.....Totaliser in Litres Code E: 0.....Totaliser without decimal point L/S...... Flow rate units Litres / Second Code F: 1..... Flow rate with 1 decimal point Code G: Code H: \$5...... Display sleep after 5 minutes inactivity

Code I: WR...... Wake reset function

0..... Without external reset Code J:

S..... Standard factory calibration orientation Code K:

Populate for your selection: (If no selection made MRTU6 will be supplied as per 'Default' factory settings highlighted in blue above)

MRTU6												
Base Model	Pipe Adaptor	Α	В	С	D	Е	F	G	Н	I	J	K



** Pipe fitting options for the MRTU6 are as per the following table however other fitting types may also be available on request**

Material	GAL	PVC	PVC	Polypropylene	Polypropylene	STAINLESS	BRASS	BRASS
Type	T-Piece	slip T-piece	Saddle Clamp	SaddleClamp	SaddleClamp	T-Piece	T-piece	Socket
For	Gal pipe	Pressure pipe	Pressure pipe	PVC Irrigation pipe	Poly Pipe Black	S/Steel pipe	Brass pipe	
20 mm		PVC20					BRA20	
25 mm	GAL25 (-T2)	PVC25				SS25	BRA25	
32 mm	GAL32	PVC32				SS32		BSOC:
40 mm	GAL40	PVC40	PVC40SC	SCP40	SC40	SS40		1" BSP
50 mm	GAL50	PVC50	PVC50SC	SCP50	SC50	SS50		Brass pipe socket
63 mm 65 mm		PVC65		CODCE	SC63			adaptor
		PVC05		SCP65	SC75			for
75 mm 80 mm	GAL80	PVC80	PVC80SC	SCP80	SC80			32-500mm
80 mm	GAL80-F	1 7 0 0 0	1 000000	301 00	3000			pipes also
00 111111	(Table D flanged)							BSPB &
90 mm	(100000 = 000000)				SC90			BSPSS
100 mm	GAL100	PVC100	PVC100SC-LS	SCP100-LS				nipple
100 mm	GAL100-F (Table D flanged)							adaptor
110 mm	- 1				SC110-LS			
125 mm				SCP125-LS	SC120-LS			BSOC:
140 mm					SC140-LS			1" BSP Brass
150 mm			PVC150SC-LS	SCP150-LS	30110 23			pipe socket
160 mm			1 1010000-20	001 100-20	SC160-LS			adaptor
200 mm			PVC200SC-LS	SCP200-LS	SC200-LS			for
			F V C 2003 C - L 3					32-500 mm pipes
225 mm				SCP225-LS	SC225-LS			also
250 mm				SCP250-LS	SC250-LS			BSPB-LS
280 mm					SC280-LS			Long Stem
300 mm			PVC300SC-LS	SCP300-LS		l.		n ipple adaptor
315 mm					SC315-LS			auapto.
500 mm								
			0					
	Galvanised	PVC	PVC	PVC	Poly-pipe	Stainless	Brass	1" BSP
	Iron, threaded ends BSP(female).	T-piece Class 18, Cat 19	1400 kPa		agricultural Saddle Clamps.	Steel 316 T-piece.	T-piece	Brass pipe socket
	` ,	Cal 18		≤ 150mm:	≤ 150mm:	BSP	BSP	adaptor
	2000 kPa	Glue-in		1600 kPa	1600 kPa	(female)	(female)	& BSPB
	NOTE: 25mm	(female)				threaded	threaded	BSPB-LS BSPSS
	can be supplied	` ′		> 150mm:	> 150mm:	entry	entry	nipple
	with straight	1100 kPa		1000 kPa	1000 kPa		•	adaptors
	pipe sections					2000 kPa	2000	(see Fig 1
	already fitted						kPa	Page 3)
	(Part GAL25-T2)							



GAL80 - 80mm Galvanized Iron pipe adapter (80mm φ x 600mm long)

IMPORTANT:

The display head is factory programmed according to the pipe size, and the display head and its pipe adapter are calibrated together to operate as one unit.

DO NOT remove the flowmeter and place it on a different sized pipe adapter, because the display will require re-calibration before it can measure properly on the new pipe size.

RECALIBRATION MRTU6

Calibration is via the three internal pushbuttons (marked **UP**, **LEFT and SET**) located underneath screen.

Original 'Push button method'

- Note: The calibration (K-factor) characteristics can vary up to 6% between horizontal or vertical runs.
- Run liquid through the MRTU6 into a calibrated vessel or load cell, until at least 50 Litres is displayed on the MRTU6. For accuracy, keep flowrate continuous and above minimum flowrange for the pipesize.
- Compare the actual amount collected against what is displayed on the MRTU6. If the amount collected matches the amount displayed within ±2%, then no adjustment to calibration is necessary.
- Formula: Percentage error = (Amount displayed Amount collected) / Amount displayed x 100
- If the percentage error is more than ±2%, please follow 1 point calibration procedure.
- **To access buttons**, open the hinged lid and remove the four SST screws holding the viewing window to the enclosure. Set the viewing window aside in a safe place you will now be able to see the green electronics board.

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

Internal Push Buttons UP, LEFT and SET



1 Point Calibration Function: (User friendly, No calculations needed)

Step 1. Press **UP** button for approximately 5 seconds

LCD display in 1 point calibration mode.



Step 2. Start flow (Run liquid through the MRTU6)

- Calibration will automatically start upon flow detection.
- Display must have at least 100 counts or more to have an accurate calibration before stopping the flow.

Page 10

Example: Display = 119 C (counts)



RECALIBRATION MRTU6

Step 3. Stop flow

• After flow is completely stopped, wait for approximately 10 seconds and the display will update to allow entry of collected amount of liquid in litres.

LCD display, 10 seconds after flow stops.



Step 4. Enter volume collected in Litres.

Example: Volume = 20.15 Litres



- Press LEFT button to select desired digit to be change.
- Press **UP** button to change the value of selected digit.
- Press **SET** to lock in the changed value.

Step 5. Press SET to display Gear Rate.

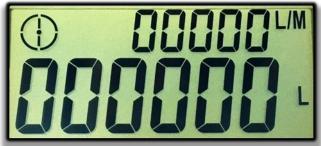
Example: Gear Rate: 4.9 Counts/Litre



Note:

Gear Rate value will be shown for approximately 5 seconds then display will revert to counting mode (main display), this is the indication that the meter has been successfully re-calibrated.

Example: Main display in L/M and Litres (L)



Step 6. Verify that the meter has been properly re-calibrated.

- Do one or more test run and verify if the MRTU6 displayed amount is now within ±2% error.
- If satisfied, properly mount the glass window and locking ring back to its original state.
- Otherwise, repeat Steps 1 to 6

Note: MRPU5 re-calibration procedure is still applicable to MRTU6 meters. If MRPU5 re-calibration procedure is preferred, please refer MRPU5 User's Manual.



IOTES:	
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