ME995-7 / RPFS-P WATER BATCHING SYSTEM

Congratulations on choosing a *ManuFlo* ®™ (Manu Electronics) preset batch control system.
You will now join over three thousand satisfied customers worldwide.

Your system comprises:

Information sheets included:

1. ME995 preset Batch Controller operation and specification.
2. Flowmeter operation, recommendations, and specification.
3. Plumbing installation guide.
4. Electricians wiring diagram.
5. Troubleshooting guide

Prior to installation:

A. Consider a good viewing and operating position for the ME995 Batch Controller.

B. Remove the detachable 10-pin plug from the rear of the ManuFlo controller. Wire the 240vac supply. Wire the Active/contact drive, Neutral and Earth from the solenoid valve or return from the external contactor if driving a pump. If starting a pump, make sure the contactor is of sufficient amperage rating to handle the pump current draw. Consider wiring an override button (N.O. with spring return) for manual batching or top up of water, which will be counted by the controller display. See wiring diagram.

C. Install the Rota Pulse paddlewheel sensor (RPFS-P) in a straight pipe section, with the same diameter pipe as the adaptor tee section, with 10x diameter before, and 5x diameter after, the sensor with no elbows, reducers, valves or restrictions within this pipe run. Where the sensor is housed, the pipe must be full when measuring.

D. The paddlewheel sensor comes with 5mtr cable. For extended lengths, use shielded cable only.

E. On pipe sizes over 50mm, consider using an air-assisted solenoid butterfly or angle seat valve, as electrically-operated diaphragm valves can be very slow in closing (valves are available from ***ManuFlo*** ®™). Preferably, use a 240vac solenoid coil, as the Manu controller provides 240vac to the coil when started. Otherwise, consult ***ManuFlo***®™ for options.

F. The ME995 Batch Controller will be factory set to a nominal calibration number corresponding to the pipe diameter selected. However, a calibration check must be performed on-site prior to continuous use, and recalibration may be necessary (for details on calibration, see the appropriate ME995 Data Sheet).

If unsure on any aspect of installation, call your local supplier or ***ManuFlo***®™.

Happy batching !!!!!!!!!!!!!!!

ManuFlo ®™
Flow Measurement & Control Products
Rev: 04/20-AM

a division of

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ME995-7 LITRES PRESET BATCH CONTROLLER DATASHEET

FEATURES

- **4-Digit LED display.**
- **4 LED status indicators.**
- **Preact function.**
- **Preset maximum limit.**
- **Missing pulse detection.**
- **Counts in Litres upto 9999.**
- **Optional PLC and computer interface.**
- **Signal conditioning, with K-factor.**
- **Compatibility with most flowmeters.**

The ME995-7 LITRES preset Batch Controller can be used with most pulse output flowmeters, for preset liquid batch control applications.

The controller incorporates a preact (overflow deduct) feature, K-factor adjustment, 4 LED status indicators and diagnostic safeties. With the ME995-7 Batch Controller using the same 10-pin Weidmuller receptacle plug as the previous models, making changeover or upgrade instant with no rewiring necessary. It can be easily interfaced with PLCs, thus incorporating the controller's safety features and providing a backup batch facility.

With 4 rotary selector switches, batch quantities are easily selected. The batch operator can also visually refer to the numbered selector dials for the selected batch quantity. Command operations are by user-friendly toggle switches, and four LEDs indicate operational status conditions.

Batch counting is in 1 Litre increments, up to a maximum 9000 Litres.

The controller operates from standard 220 - 260 vac (or optional 24vac, 110vac or 12 - 24 VDC) voltage supplies. Contact output drive is via one (or optional two) relays. (or with –OC open contact drive to allow control output switching drive of any external voltage). Standard controllers are in panel mount form, or optionally can be housed in a metal box or IP65 ABS wall mount enclosure.

The ME995-7 controller is designed for compatibility with ManuFlo flowmeters and many other types. Calibration for the desired flowmeter is selectable via the rear dials.

SAFETY FEATURES

* **LIMIT (LM) LED** activates if batch cycle reaches locked internal limit or if circuit diagnostics detect internal chip problem. There is subsequent automatic shutoff of voltage contact drive.
* **PULSE FAIL (PF) LED** activates if no pulses arrive within 1.5 seconds (variable) initial start time period, or if pulses are interrupted during batch cycle and fall below (variable) pulse scanning time (typical 30Hz). There is subsequent automatic shutoff of voltage contact drive output.
* **FLOW (FL) LED** monitors and indicates incoming pulses from field flowmeter, or if TEST is used.
* **CONTACT DRIVE (CD) LED** indicates voltage contact output drive when pump or solenoid are activated.
* Internal audible **ALARM** sounds momentarily upon completion of batch cycle, and continuously if PULSE FAIL or LIMIT LEDs are activated or if overflow runs 26 litres over selected batch quantity.

OPERATING INSTRUCTIONS ME995-7

* To operate, push each of the toggle switches ON-OFF, START-STOP and TEST-RESET to the desired function.
* Switch the power ON to unit. Select required batch quantity using rotary number dial selector switches.
* RESET unit. The LED displays zero and all LED indicators and alarm turns off. The unit is ready for batching.
* START unit; voltage contact drive activates. CONTACT DRIVE LED illuminates indicating pump or solenoid are energized, followed by FLOW LED illuminating, indicating pulsing and operation of flowmeter. The digits begin counting upward towards the selected batch quantity.
* Upon digits reaching the selected batch quantity the alarm sounds (short beep) indicating completion of batch; CONTACT DRIVE and FLOW LEDs turn off. LED display digits and selected batch quantity should correspond. If LED digits overshoot target, use PREACT (inflight,freefall) overflow deduct dials (located at rear of controller unit) to scale back the difference.
* To interrupt unit before completion of batch, push STOP toggle; digit counting will stop, drive contact off. Push START toggle to resume batch.
* TEST toggle is used to test digit counting, switch contacts, alarm conditions or generate output pulses for computer interfacing. TEST does not activate pump or solenoid.

Warning: if CONTACT or FLOW LED indicators are on, but controller is not counting, discontinue use and call for service.

CALIBRATION

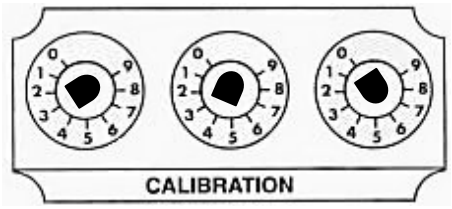
1) The Batch Controller is initially set up for the connected flowmeter using the Controller's Calibration rotary selector knobs (at rear of unit) marked UNITS, TENS and HUNDREDS to match flowmeter's output pulse value.
Note reverse sequence of dials: e.g. U=0, T=0, H=3, is a value of 300.

On-site calibration adjustment and test:

2) Must adjust what is shown on the Batch Controller display (red LEDs) to match a known amount dispensed, using the Calibration knobs. So, set Controller to 190L, and batch into a 200 litre (44 gallon) drum.

3) If the amount collected is **more** than is shown on the LED display, then **decrease** the set calibration value by the same % difference
e.g. if collected 200L when 190L on LEDs, this is 10L more or 5% over (10/190x100%). So, decrease the calibration value by 5% i.e. if calibration set to 300, new value is 300-5% = 300-15 = 285 (Set Calibration U=5, T=8, H=2).

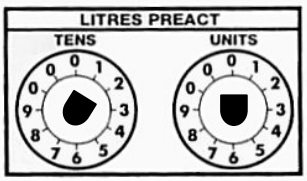
4) If the amount collected is **less** than is shown on the LED display, then **increase** the set calibration value by the same % difference.
e.g. if collected 180L when 190L on LEDs, this is 10L less or 5% under (10/190x100%). So, increase the calibration value by 5% i.e. if calibration set to 300, new value is 300+5% = 300+15 = 315 (Set Calibration U=5, T=1, H=3).



Example pulse flowmeter calibration settings
Note: x17 pulse input multiplier is used to enhance calibration resolution if flowmeter has <58 pulses/Litre.

Flowmeter	Size Ø	H T U	Signal input multiplier
RPFS	25mm	0 7 5	x1
PMS25	25mm	1 0 0	x 1
RPFS	32mm	7 8 2	x17
RPFS	40mm	5 1 0	x17
RPFS	50mm	3 4 0	x17
RPFS	80mm	1 2 4	x17
RPFS	100mm	0 7 8	x17

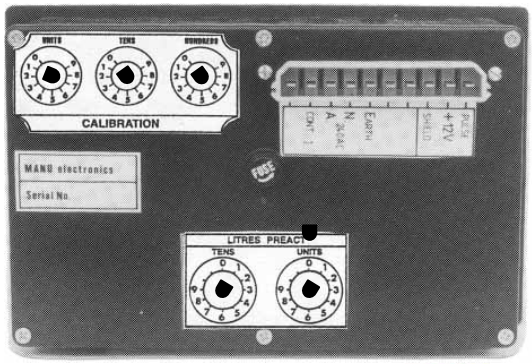
5) **PREACT:** Calibrating inflight overflow is via two rotary select knobs marked "TENS" and "UNITS" of LITRES, located at the rear of controller. Simply set knobs to same overflow reading as indicated by the LED display.



Example: You select 190 Litres, batch the quantity, 200 Litres is shown on display, and 200 Litres is collected in drum. A valve may take extra time to close, so what is selected on dials usually overshoots on display. So, set 10 Litres on PREACT to deduct the 10 Litres overshoot (PREACT T=1, U=0 is a value of 10 Litres). Next batch, the selector Dials, LED reading and amount collected in drum are all 190 Litres.

SPECIFICATIONS — ME995-7

Power supply	220-260vac (optional 24,110 vac or 12-24 VDC)
Output to flowmeter	12 VDC upto 100mA
Relay outputs	Standard Max. 240 vac, 1 A. (Other outputs as per spec. option ordered)
Frequency input	5 KHz: x1 input, 340 Hz: x17 input. (min.10hz)
Display	4 digits, 7 segment LED (14mm H)
Connection	10 pin Weidmuller mating plug & socket
Fuse	1 Amp (5 x 20mm case)
Batch selection	Visual rotary select knob switches
Batch commands	Push toggle switches
Mounting	Panel mount
Weather Rating	Indoor only IP51 (for outdoor use HB2510 box)
Instrument housing	ABS hi-impact case mould
External dimensions	206 L, 130 H, 90 D mm
Panel cutout	190 L, 122 H mm
Weight	1 kg



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

ORDERING CODES — ME995-7

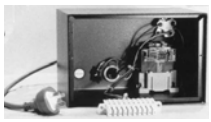
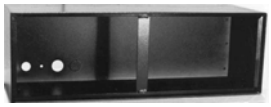
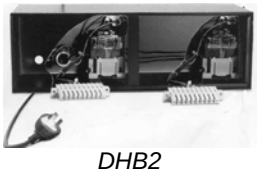
ME995-7 Batch Controller, 240 vac supply and output, with 12 VDC power to flowmeter (standard).

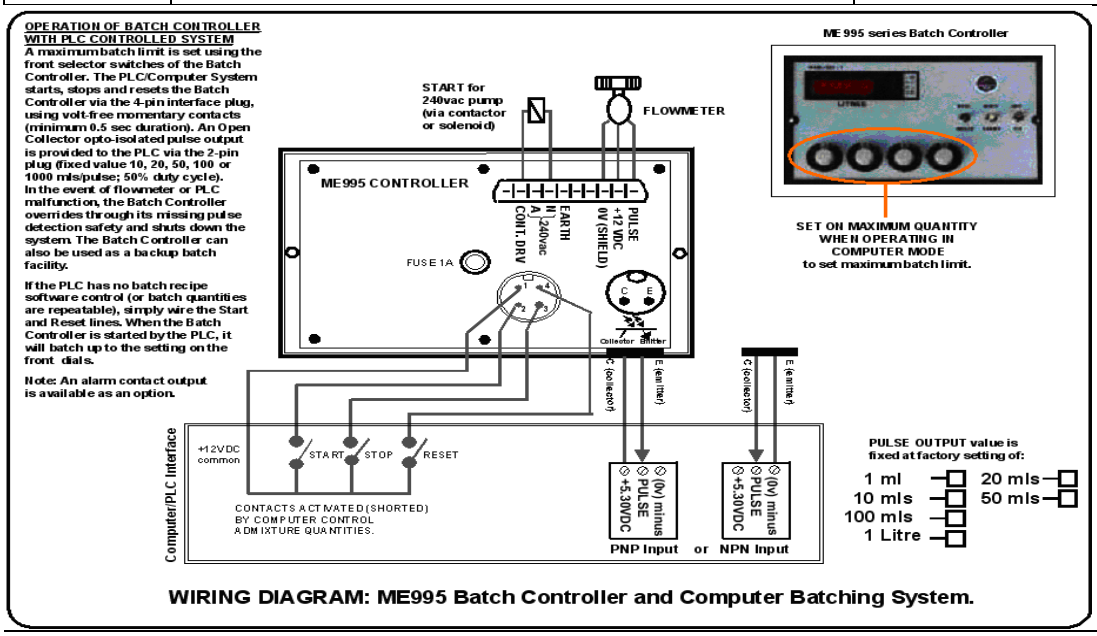
Options:

Code	Description	Code	Description
-DC-OC	12-24 VDC power supply input/output drive, with Open Contact output drive (5 A) which is via external voltages	**-5P**	5-pin computer interface plug (start, stop, reset, pulse,+12V) for use with ME5IC interface card for **Jonel, COMMANDbatch etc PLCs.**
-24VAC	24 vac powered and output.	**-MC**	4-pin PLC/Computer Command (Start/Stop/Reset) interface plug.
-110	110 vac powered and output.	**-MC2**	• 2-pin plug for scaled 4N33 open collector pulse output (1 pulse/ 1 Litre). • Includes 4-pin external command (Start/Stop/Reset) interface plug.
-OC	Open Contact pump/valve output, for use with any driving voltage (maximum 5A current).	**-SSRBC**	External command: Start/Stop/Reset, for connection to HB2500-SSR housing box, or for remote control facility.
-A0	Contact output: alarm/batch-complete voltage relay or logic state	**-S12**	switch: two product changeover output drive. Allows 2 flowmeter-inputs/pump-drives. 

e.g. “ME995-7” is the standard Batch Controller, 240vac powered, whereas “ME995-7-MC2” is an ME995-7 Batch Controller with a scaled open collector pulse output and a Start/Stop/Reset PLC commands interface.

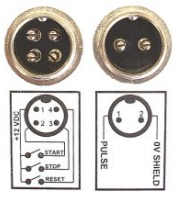
HOUSING ENCLOSURES

SHB **SHB1**	Single enclosure. Powder coated metal. Single enclosure. Powder coated metal. Wired with 240vac contactor (for 1 hp pump), plug-in 240 vac pump outlet and plug.	 *SHB*	 *SHB1*
SHB1-T	as for SHB1 above, but with terminal wiring entry connection instead of 240vac pump outlet		
DHB **DHB2**	Dual enclosure. Powder coated metal. Dual enclosure. Powder coated metal. Wired with 2x 240vac contactors, 2x pump outlets, and 2x plugs for Batch Controllers.	 *DHB*	 *DHB2*
DHB2-T	as for DHB2, but with terminal wiring entry connections (instead of mains lead and pump outlets).		
HB2510 **-SSR**	IP65 waterproof single enclosure. External commands: Start/Stop/Reset. IP65 rated (option fitted to HB2510).		*HB2510-SSR IP65 enclosure shown with ME3000 Batch Controller*

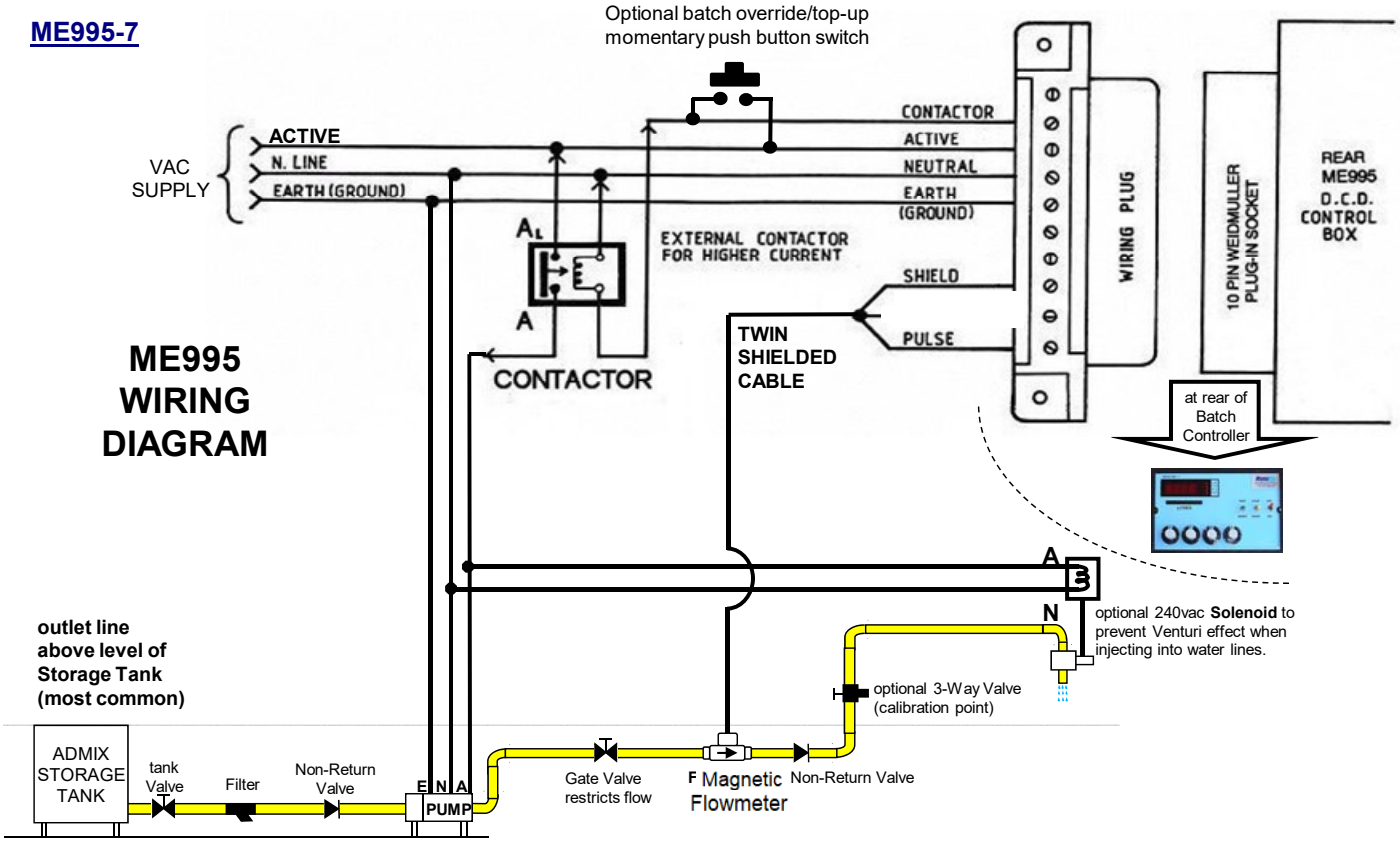


WIRING DIAGRAM: ME995 Batch Controller and Computer Batching System.

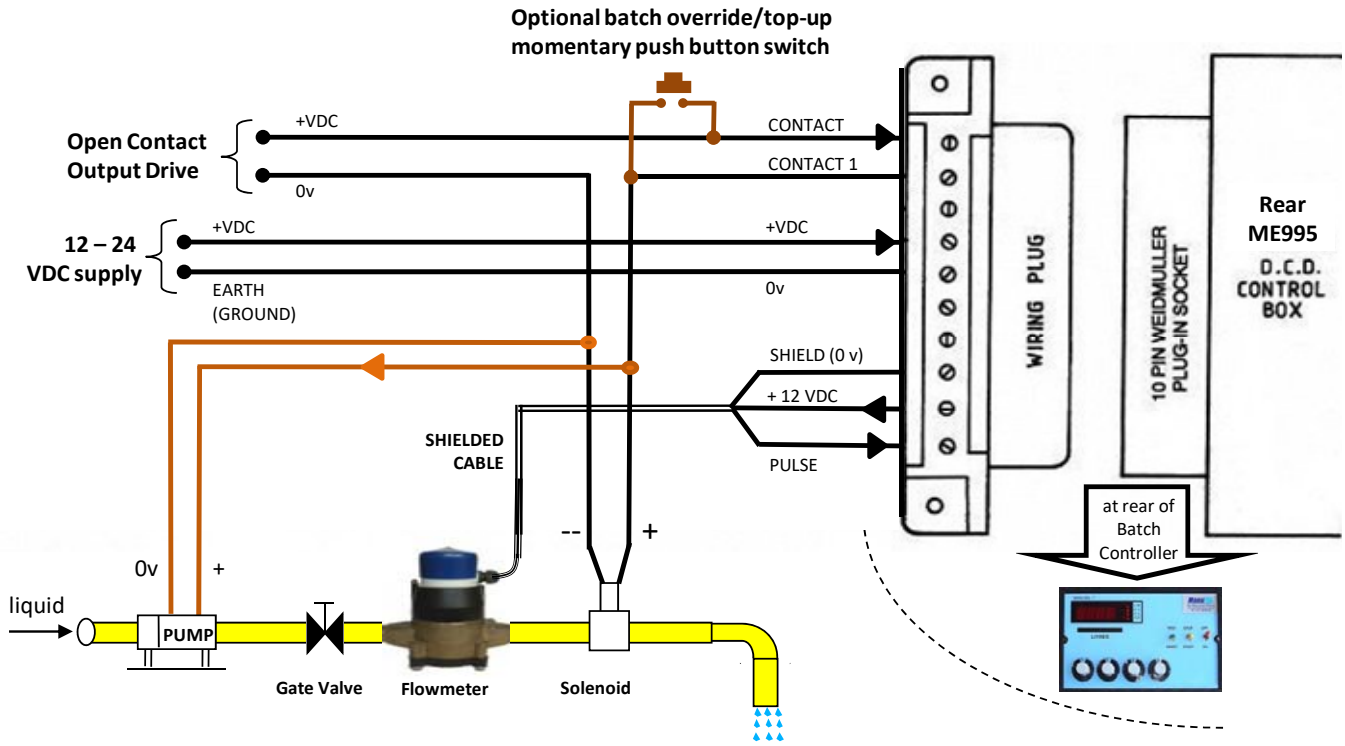
-MC2
I/O PLC/Computer controlled Interface option. Incorporates the safety features of ME995 and provides operator backup batch facility.



ME995-7



Standard AC Wiring for Pump and optional Solenoid



Wiring for DC-powered Batch Controller with DC Open Contact Output Drive to Pump and/or Solenoid

NOTE: if current draw of solenoid is > 0.5 Amps, or if using a pump, then install a contactor

RPFS ROTA PULSE FLOW SENSOR
(Slip Insertion Paddlewheel)

DATASHEET

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 for low current applications.**
- **High Pressure options to 2000kpa**
- **50°C or 120°C temperature models.**
- **Simple installation and maintenance.**
- **Large range of pipe adapter fittings in sizes 20 to 110mm.**
  (Larger pipe sizes to 500mm using "Long Stem" –LS version)
- **Stainless Steel 17-4PH paddlewheel rotor without magnets.**
- **Australian made since 1984. (Now with new high speed bush option).**

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 four model variants:

- **RPFS-P** for liquids up to 50°C (plug-in cable)
- **RPFS-H** for liquids up to 120°C

All model variants insert directly into a large range of pipe adapter fittings available in PVC, Galvanized Iron, Brass, Stainless Steel or Polypipe materials, covering pipe sizes 20 to 110mm (standard sizes). This makes the RPFS suitable for a wide range of liquid flow measurement, monitoring and batching applications. Using the BSPB & BSPSS fittings adaption to larger size pipes is possible depending on pipe wall thickness, alternatively the Long Stem (-LS) versions with adaptors are then used.

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 head losses.

Each of the 4 blades of the rotor (paddlewheel) extends approximately one centimetre 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 model is specially constructed with a metal shielding jacket making it 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**	
Supply voltage	5-30VDC	5-30VDC	
Output signal	NPN open collector	NPN open collector	
	50% duty cycle pulse	50% duty cycle pulse	
Current draw @ 5VDC / 24VDC	2.5mA / 10mA	2.5mA / 10mA	
Max. switching current	200 Ma (at 24VDC)	200 mA (at 24VDC)	
Cable length	5 metres, plug-in cable	2 metres cable	
	3-core (3 wire)	2-core shielded (3 wire)	
Fluid temperature	50 °C max.	120 °C max.	
Weather rating	IP67	IP65	
Pressure rating	200psi	400psi	
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 110mm standard, Larger pipes via BSPB-LS special adaptor or saddle clamps.		

MANU ELECTRONICS PTY LTD
41 Carter Road, Brookvale NSW 2100
Website: http://www.manuelectronics.com.au

SENSOR CONSTRUCTION

Model	RPFS-P	RPFS-H		
Body	Delron (Acetal)	Brass		
O-rings x 2	Neoprene	Viton		
Rotor	Stainless Steel 17-4PH			
Bushes	Delron			
Axle	Tungsten Carbide			
Lockcap	PVDF	Brass		
Dimensions Overall (approx.)	130L x 30W mm	150L x 30W mm		

ORDERING CODES:-

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

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	

SPARE PARTS

PW-N Spare wheel

PWAH Axle

PC5 5 mtr m12 lead

LC Locking Cap

BS020 Orings

MAINTENANCE

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 quarterly maintenance checks are recommended.

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

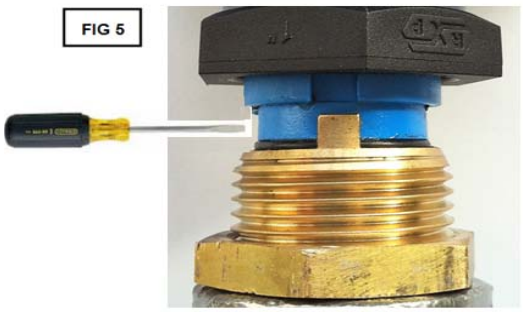
1 - Unscrew the black PVC locking cap (anti-clockwise).
2 - Place a small to medium sized flat thin bladed screwdriver in the join where the insertion sensor body meets the nipple adaptor (See FIG 4), twist the screw driver to prize the two apart till the slots clear the keyways, then pull or twist upwards until the sensor is released (never pull via the cable).

Removal of RPFS 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 RPFS body with your right hand and turn slowly anti-clockwise until the sensor hydraulically raises out of slot then pull upwards out of the socket (never by the cable).

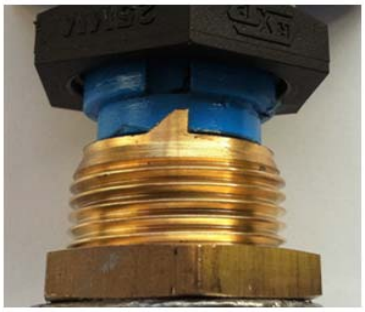
**When returning the sensor to nipple adaptor insert so the keyway and slots line up then then push down until they locate. Screw the black locking cap clockwise to hold the sensor in place (hand tightened only).

FIG 5



Standard fitting 'Square' Keyway

FIG 6



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 RPFS sensor ceases to count, the paddlewheel may be blocked, remove inspect and clean as described above.
- If the RPFS pulses when there is no flow, a nearby 50Hz AC field is probably causing these false counts. Move the flow sensor away from the 50Hz field, or move the source of the field if practical.
- If the standard cable length supplied is not sufficient and needs extending contact ManuFlo for suitable 'screened' cable and never run extended cable across or near to other cables that are potential EMF sources.

Adapter Tee keyway fittings are available in:

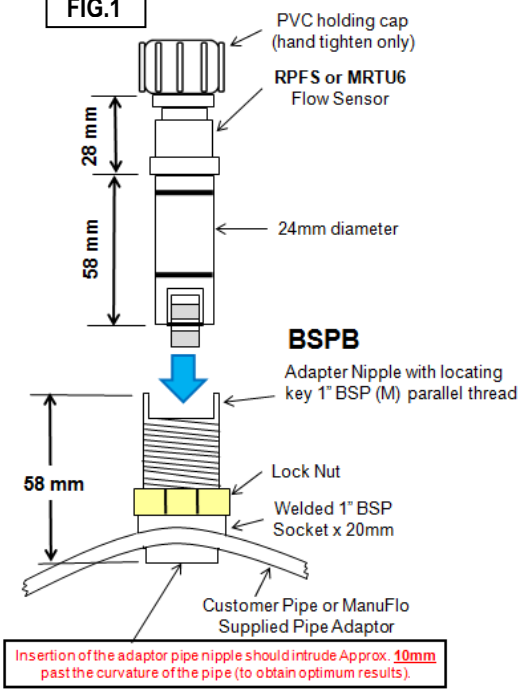
1. PVC Class 18 Cat. 19 Slip tees (F-glue-ends) pressure pipe
   Sizes: 20, 25, 32, 40, 50, 65, 80 & 100 mm.
   PVC high pressure saddle clamps: 40, 50, 80 and 100mm.
2. Galvanized Iron threaded connections:
   BSP (F): pipe sizes 25, 32, 40 & 50 mm;
   BSP (M) pipe sizes 80 & 100mm.
3. Gunmetal BSP(m) threaded connection end pipe tube tees 20 mm.
4. Polypipe saddle clamps in pipe sizes 40, 50, 63, 75, 90, 110 mm
5. PVC saddles 40, 50, 80 and 100mm.
6. Stainless steel 25, 32, 40 & 50mm, larger sizes fabricated on request.
7. FOR PIPE SIZES 110mm and larger refer to the RPFS-LS model

**Further custom made fittings are available on request.

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.

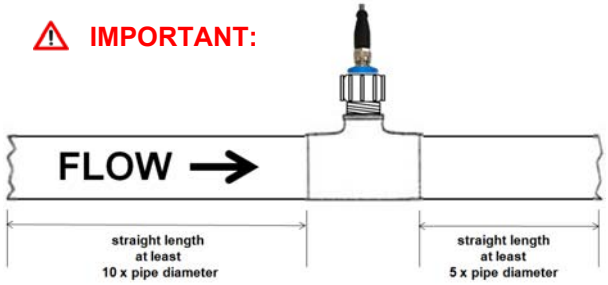
Installing Into Existing Pipe Lines

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).

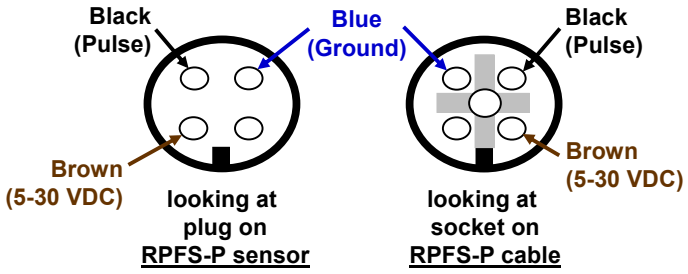


Selection of pipe diameter:
(For best results, use the table below):

Pipe size (mm)	Flowrange (Litres/min) Min	Flowrange (Litres/min) Max	Pulses/Litre (approx.) (1)(2)
20	13	160	116
25	20	250	75
32	30	410	46
40	50	640	30
50	90	1000	20
63	132	1580	11.7
65	120	1690	12
75	180	2250	8.3
80	190	2560	7.3
90	244	3240	5.7
100	300	4005	4.6
110 (-LS)	343	4845	3.8
125 (-LS)	426	6255	3.0
140 (-LS)	516	7850	2.4
150 (-LS)	600	9010	2
160 (-LS)	650	10200	1.8
195 (-LS)	900	15200	1.22
200 (-LS)	950	16000	1.16
250 (-LS)	1480	25000	0.7
280 (-LS)	1850	31400	0.6

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

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.

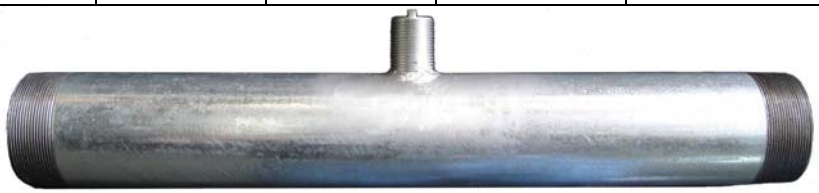
(1) For >315mm diameter pipes:
Pulses per Litre = 50273 / [(Pipe diameter in mm) $^{2.016}$]

(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 pulse rate given the pipe diameter and flow conditions. Once calibrated, meter will give linear and repeatable results within the flow range

ORDER CODES FOR PIPE ADAPTOR FITTINGS

RPFS

Material	GAL	PVC	PVC	Polypropylene	Polypropylene	STAINLESS	BRASS	BRASS
Type	T-Piece	slip T-piece	Saddle Clamp	Saddle Clamp	Saddle Clamp	T-Piece	T-piece	Socket
For	Gal pipe	Pressure pipe	Pressure pipe	Pressure 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: 1" BSP Brass pipe socket adaptor for 25-100mm pipes also **BSPB** & **BSPSS** nipple adaptor
40 mm	GAL40	PVC40	PVC40SC	SCP40	SC40	SS40		
50 mm	GAL50	PVC50	PVC50SC	SCP50	SC50	SS50		
63 mm				SCPE63	SC63			
65 mm		PVC65		SCP65	SC75			
75 mm					SC75			
80 mm	GAL80	PVC80	PVC80SC	SCP80	SC90			
80 mm	GAL80-F *(Table D flanged)*							
90 mm				SCPE90	SC90			
100 mm	GAL100	PVC100	PVC100SC	SCP100	SC114			
100 mm	GAL100-F *(Table D flanged)*							
110 mm				SCPE110	SC110			BSOC: 1" BSP Brass pipe socket adaptor for 100-500 mm pipes also **BSPB-LS Long Stem** nipple adaptor
125 mm				SCPE125-LS	SC125-LS			
140 mm					SC140-LS			
150 mm			PVC150SC-LS	SCP150-LS	SC160-LS			
160 mm				SCPE160-LS	SC160-LS			
200 mm			PVC200SC-LS	SCP200-LS	SC200-LS			
225 mm				SCPE225-LS	SC225-LS			
250 mm				SCP250-LS	SC250-LS			
280 mm					SC280-LS			
300 mm			PVC300SC-LS	SCPE300-LS	SC315-LS			
315 mm					SC315-LS			
500 mm								
								
	Galvanised iron threaded ends BSP (female) 2000 kPa Note: 25mm can be supplied with straight pipe sections already fitted (Part GAL25-T2)	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 **& BSPB BSPB-LS BSPSS** nipple adaptors **(see Fig 1 Page 3)**



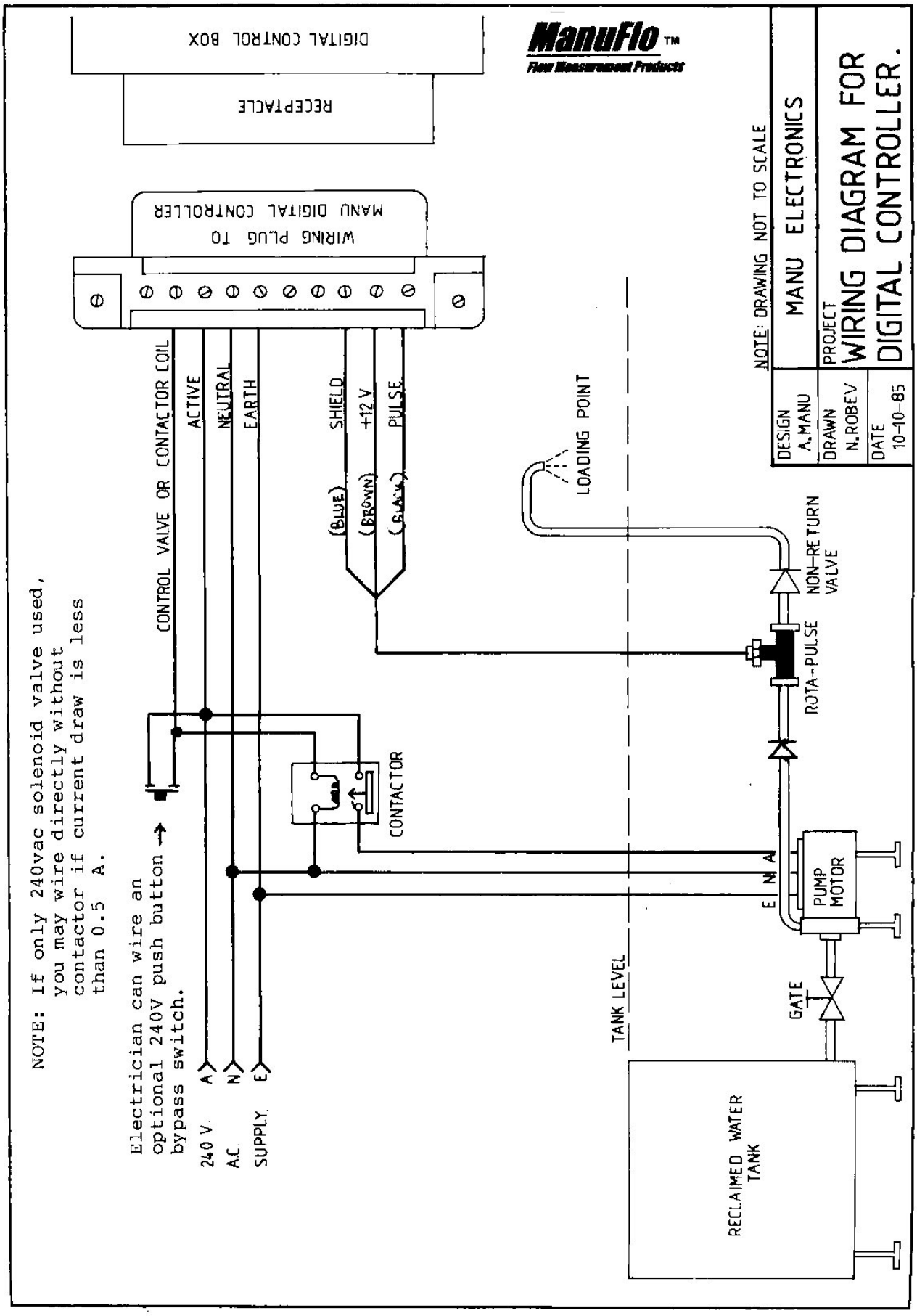
GAL80 - 80mm Galvanized Iron pipe adapter
(80mm ϕ x 600mm long)

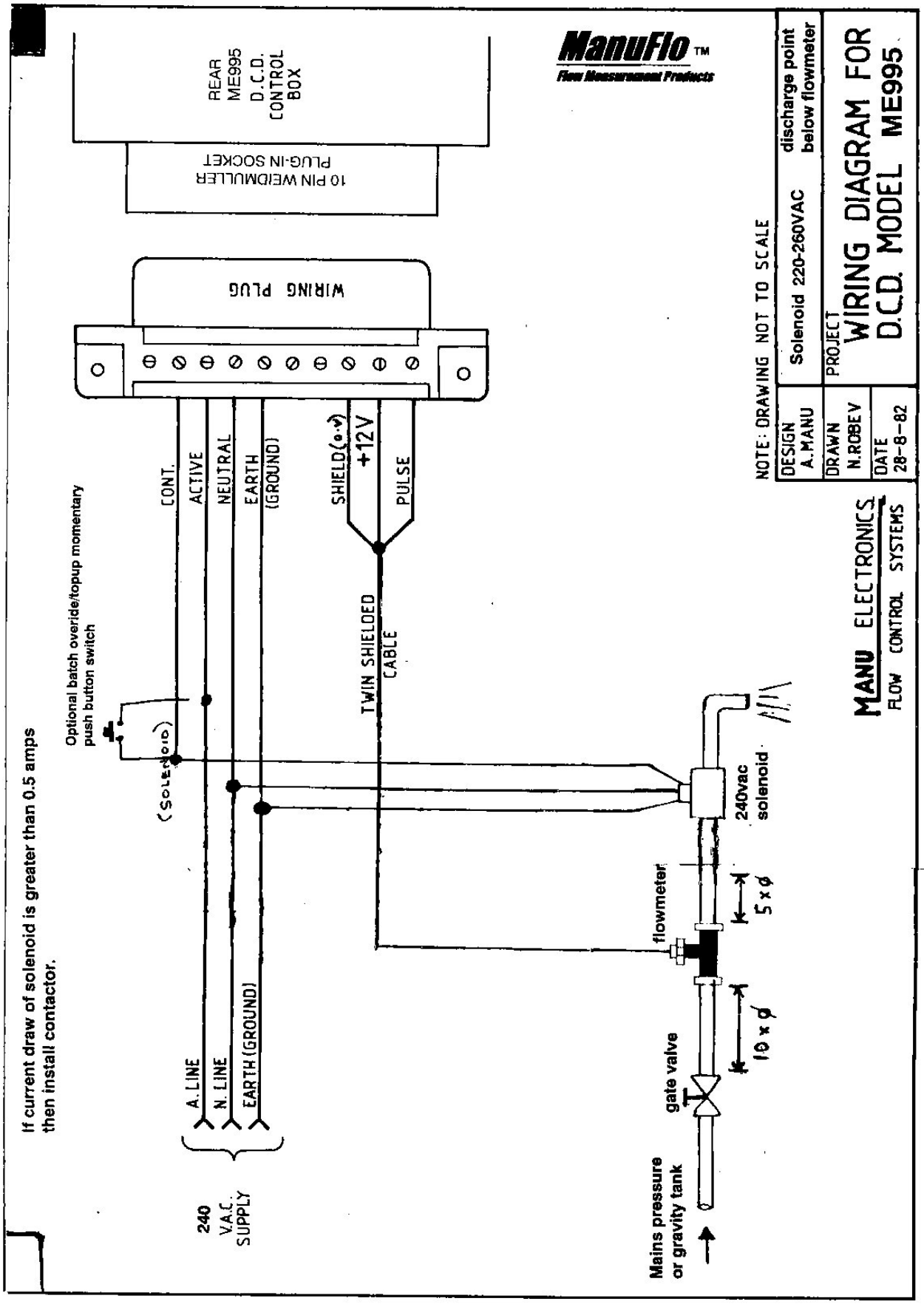
BSPSS Stainless Steel adapter nipple for 25-100mm pipes

BSPB brass adapter nipple for 25-100mm pipes

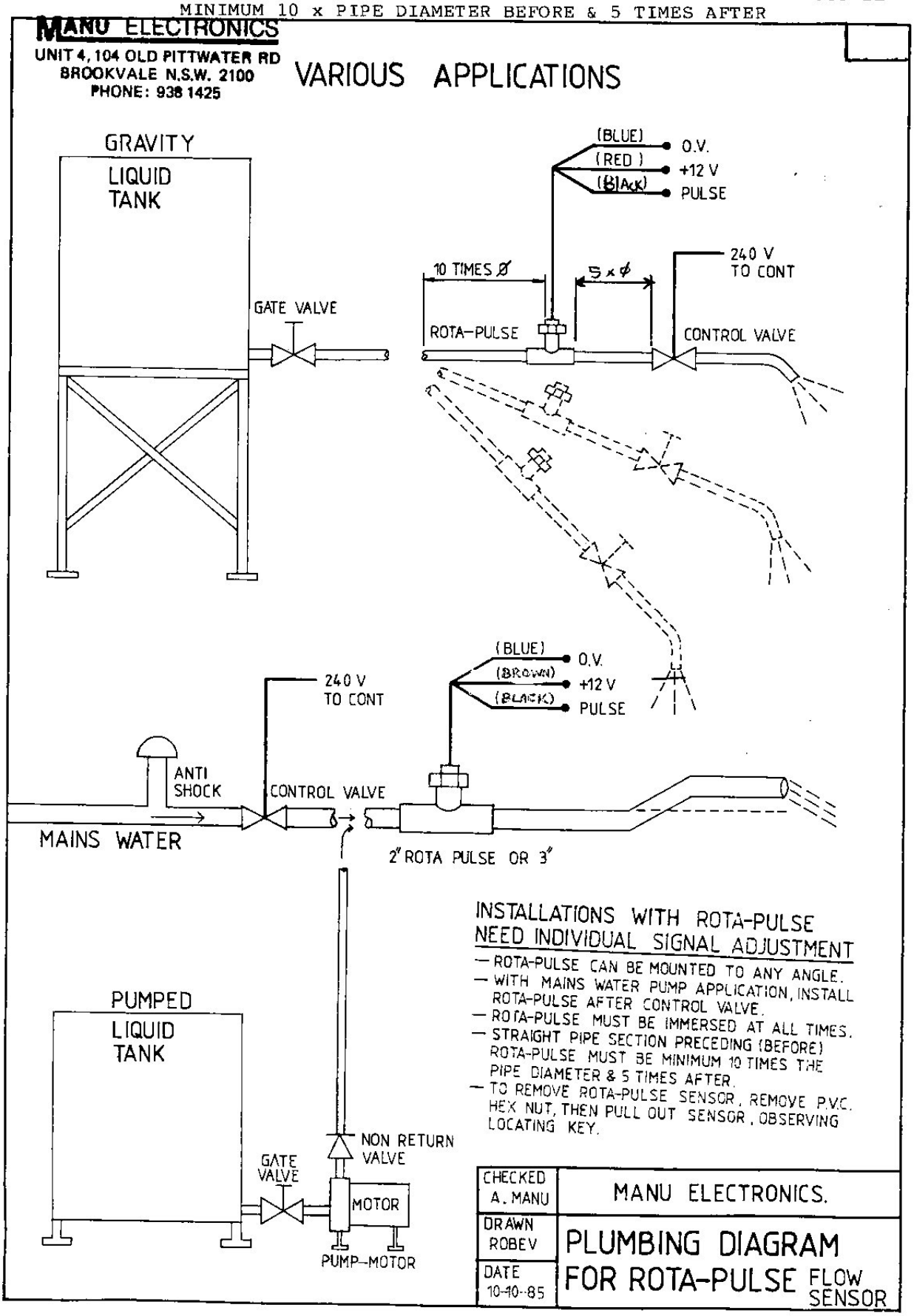
Due to continuous product improvement, specifications are subject to change without notice.

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





IMPORTANT: STRAIGHT PIPE SECTION BEFORE ROTA PULSE FLOW SENSOR MUST BE MINIMUM 10 x PIPE DIAMETER BEFORE & 5 TIMES AFTER



TROUBLE SHOOTING GUIDE
FOR BATCH CONTROLLER / ROTA PULSE FLOW METER SYSTEMS

ManuFlo ®TM

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
•No power to batch controller or displays not on	•Blown fuse or holder not tightened	•Check fuse, tighten fuse holder (at rear of controller)
	•+12vdc and O.V. shorted	•Check pulse cable from DCD to RPFS meter
	•No main power supply	•Check power supply, check wiring
•Pulse fails at start of batch (1.5 seconds after)	•Check calibration (K-factor) setting	•000 calibration -pulsefails. Make sure a calibration value is set, three switch shafts -H,T,U- located at rear top left of controller
	•Seized paddlewheel	•Remove RPFS, inspect; if calcium buildup clean with diluted acid, check axle/bushes, make sure paddlewheel spins freely.
	•Solenoid valve not opening	•Check and service solenoid valve, check output control voltage is 240vac(N & C, pins 7&9) when pushing start button. Or other voltage as per specification output
	•Restriction or service gate valve closed	•Open gate valve
	•Empty water tank,	•Check water level
	•Pump not turning	•Check and service pump
	•Pump foot valve failed	•Empty pipe, Install non-return valve
	•Signal cable cut, bad joint at JB, oxidized cable- leakage	•Check signal cable for 12VDC at junction box near RPFS meter If no power, cable cut or oxidized- repair/replace. Unwire RPFS, take up to batchroom, remove extension cable & hardwire RPFS direct into the Batch controller (P,+,-), spin wheel should count on display, if so, then extension cable or connections at JB faulty, if no counts & 12vdc present then RPFS faulty
	•RPFS not positioned in pipe	•Check RPFS slots are in keyway position, lock cap secured Paddlewheel not inserted into flow stream
	•RPFS Flowmeter faulty	•Replace with new RPFS
•Pulse fails during batch cycle	•Flowrate too slow	•Open restriction gate valve, or increase flowrate pulse fail timing capacitor (see service guide). Pipe diameter too big for flow
	•Pipe buildup restricting flow	•Cleanout pipelines, calcium buildup on pipe walls -recycle systems
	•Paddlewheel problem	•Calcium buildup on wheel, soak in diluted acid. Warn bushes.
•Display digits count slowly after batch complete	•Non return valve faulty (jammed open)	•Clean, service or replace
	•Solenoid valve not properly closed	•damaged seal, faulty solenoid
•Batch target display counter counts past batch selection	•Flowrate too fast excessive overflow	•Turn down gate valve to restrict flowrate or set pre-act (overflow deduct) function to compensate
		•Reduce delivery pipe diameter
•Intermittent overflow past batch select or water does not stop	•Faulty solenoid valve not closing properly, insufficient air pressure	•service solenoid valve, check air pressure
•Wet loads, more water collected than indicated	•Paddlewheel bushes worn	•Check paddlewheel
	•Wheel dirty, flowing over range	•Replace with new paddlewheel, recalibrate
•Dry loads, less water collected than indicated	•Requires recalibration test	•Set new calibration figure, rear switches (See calibration guide for details -ME995-7 brochure)
•Controller starts counting when power switched on	•Active and contact power drive short circuited	•Contactor fused due to excessive current draw from pump
		•Relay fused due to excessive current draw on solenoid coil - install higher current rated contactor or install contactor.
•Controller- FL(flow), LM(limit), and or CD(contact drive) LEDs on	•Controller malfunction, IC failure Diagnostic warning	•Replace controller or call for service and advise

Sequential fault finding and rectification

1. If another ManuFlo controller (any model) is available, simply unplug doubtful unit and plug in exchange unit. If the new unit is also not operating correctly, then the problem is isolated to the pulse flowmeter or wiring.
2. When checking flowmeter, reset the ManuFlo controller. Remove the flow sensor and spin the paddlewheel. Check that the ManuFlo controller has registered a number of counts on its display. If so, the electrical connections are probably OK. If no counts are registered, check that 12VDC is supplied to the flow sensor. If supplied, then switch off the ManuFlo controller and replace the RPFS flow sensor.
3. The flow sensor paddlewheel is jammed, damaged etc. (For servicing, refer to the flow sensor brochure).

System over batch problem

1. Selector knob batch dials on ManuFlo Batch Controller may not be positioned correctly, and therefore not correspond to rotary switch numeric values.
2. To test, set all numbered dials to the zero position 0000. Then press the RESET toggle. The alarm should beep momentarily - this will indicate correct alignment of dials. If alarm does not beep, this indicates incorrect alignment of number dials. To rectify, remove the grey colored cap from dial, unscrew knob and pull knob off. Check that the exposed switch shaft's flat (black) side is horizontal. If not, then turn to horizontal and refit the numbered dial knob to the zero number setting. Also check the calibration and pre-act knob settings which are located at the rear of the controller
3. If the Batch Controller is found to be operating correctly, then proceed to checking and testing the flowmeter components.

If in further doubt, contact your local representative, or ManuFlo on ph +61 2 9938 1425 or 9905 4324.

SERVICE ADJUSTMENTS

to safety timings and limits for ME995 (ME188) preset batch controllers.

INITIAL START (T2): Once the START toggle is pressed, the controller allows a standard 1.5 seconds for pulses to arrive from the flowmeter. If there are no pulses within the standard 1.5 second time period, the controller will shut down the output voltage drive, and turn on the Pulse Fail LED and alarm warnings. In some applications, the 1.5 second delay may not be long enough, due to slow opening solenoids or slow pressure buildup pumps etc. The initial start time period can be increased by soldering a tantalum capacitor in parallel with the standard capacitor value found on the rear of the Printed Circuit Board (PCB). See Table 1 and diagram below, for values and location on the PCB.

FLOWRATE (T1): If pulses do arrive within the allocated initial start time, the controller then locks the pulse-rate safety. Most ManuFlo Batch Controllers have a standard 30 counts per second (30Hz) pulse-rate safety setting. If the pulses from the flowmeter drop below 30Hz, the controller will shut down the output voltage drive, and turn on the Pulse Fail LED and alarm warnings. The 30Hz standard setting is typical with water dispensing systems using RPFS-P paddlewheel flowmeters, where if the flowrate drops below 30 counts per second the pulse fail safety will activate e.g. 50mm pipe diameter section (20 pulses/Litre), 30 Hz =1.5 Litres/sec minimum flowrate required. If flow drops below 1.5 Litres/sec, the pulse-fail will activate. The equation is:

Pulse-fail frequency (Hz) = (Pulses/Litre) x (minimum flowrate of pipe diameter in Litres/sec)

The flowrate (frequency Hz) minimum setting can be adjusted by soldering a capacitor in parallel with the standard capacitor found on the PCB. See Table 2 and diagram below, for values and location on the PCB.

Note: The flowrate safety timing is changed if required by very low flowrate applications, or when using flowmeters other than the most commonly used RPFS-P paddlewheel pulse output flowmeters. (low pulse-rate/litre flowmeters). When controller/flowmeter systems are ordered, we supply the safety timing setting to suit your chosen flowmeter, thus always providing the safest possible watchdog system.

LIMIT (LM): The maximum permissible batch limit is determined by the factory-set internal limit value. The factory setting is always at the maximum value. The limit setting can be reduced by simply de-soldering the limit lead wire (connected to the rear of rotary switch solder pads) and re-soldering the wire to set the desired quantity (see diagram below).

Standard factory set values are T2: 1µF capacitor, T1: 0.02 µF capacitor.

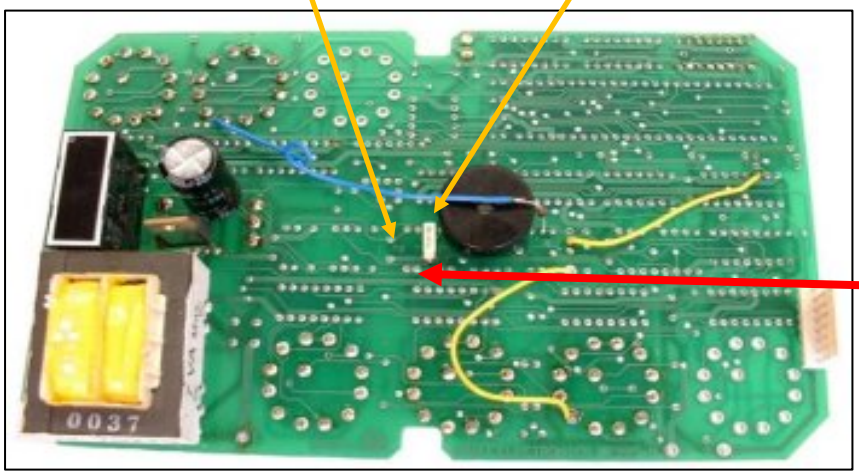
Use the following tables to change factory set values.

Table 1. INITIAL START TIMING (T2)

Extra Capacitor value	Extra timing
1 µF	1.5 seconds
2 µF	3.0 seconds
3.3 µF	4.1 seconds
4.7 µF	5.8 seconds

Table 2. FLOWRATE TIMING (T1)

Total Capacitor value	Frequency Hz (pulses per second)
0.01 µF	30 Hz (RPFS-P)
0.02 µF	25 Hz
0.03 µF	20 Hz (low flowrate MES20)
0.1 µF	07 Hz
0.2 µF	03 Hz
1.0 µF	0.2 Hz (PSM20-T flowmeters)



Disable pulsefail:- to disable initial start and flowrate pulsefail safety, connect 50Ω resistor between + side of T2 capacitor and master +12vdc voltage rail.