AMM Admix MiniMag ME3000 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. ME3000 preset Batch Controller operation, specification and wiring.
2. Flowmeter operation, recommendations, and specification.
3. Plumbing installation guide.

Prior to installation:

A. Consider a good viewing and operating position for the ME3000 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 AMM Admix MiniMag Flowmeter in a straight pipe section, with the barrel union connectors supplied. Where the sensor is housed, the pipe must be full when measuring at all times. (if not the flowmeter will never stop pulsing).

D. Use shielded cable only between the AMM flowmeter and batch controller.

E. The ME995 Batch Controller will be factory set to a nominal calibration number corresponding to the pipe diameter and flowmeter 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 ME3000 Data Sheet).

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

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

ManuFlo ®™
Flow Measurement & Control Products
Rev: 0512/1

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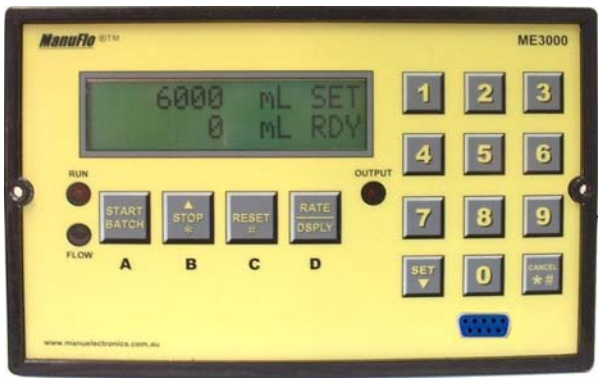
ME3000 MICROPROCESSOR PRESET BATCH CONTROLLER

FEATURES

- **Displays in ml, Litres, KL, grams, KG, US Gallons.**
- **Keypad input for batch setting, and programming.**
- **2 line x 16 character display for quantity set and dispensed. 3 indicator LEDs. IP64 front face.**
- **Alarm messages shown on LCD display.**
- **Safety features include missing pulse detection.**
- **Functions include Preact and preset maximum limit.**
- **Optional RS232 printer interface for batch tickets, and to download internal Event Log.**
- **Single channel, can be used with any size flowmeter.**
- **Optional PLC/Computer control interface.**



Shown with optional –FP front interface for easy access to download the internal event log.

The ME3000 microprocessor-based preset Batch Controller can be used with pulse output flowmeters of any size, for preset batch control applications. Batch counting can be in units of millilitres, Litres, KiloLitres, US Gallons (USG), grams or kilograms. The Controller is fully programmable, and has a range of safety features e.g. if no pulses arrive within a configurable batch start period, or if pulses are interrupted during the batch cycle or if the flow rate falls below the allowed minimum, then the pump voltage contact drive is automatically shut off and an alarm is raised.

- **RUN LED** indicates voltage contact output drive when pump or solenoid is activated.
- **FLOW LED** monitors and indicates incoming pulses from field flowmeter.
- **OUTPUT LED** indicates scaled pulses output from Batch Controller e.g. to a PLC/Computer.

Internal audible **ALARM** sounds momentarily upon completion of batch cycle, and continuously if an error occurs.

With the ME3000 Batch Controller using the same instrument housing, and the same 10-pin Weidmuller receptacle plug, as other ManuFlo Batch Controller models, changeover or upgrade is instant with no rewiring necessary. It can be easily interfaced with PLCs (through the optional computer control interface), thus incorporating the controller's safety features and providing a backup batch facility. An optional RS232 9600 baud interface allows the printing of batch tickets through an associated printer, and the downloading of the internal event log to a laptop/PC for analysis.

The controller operates from standard 220 - 250 vac (or optional 110 vac or 12 - 24 VDC) voltage supplies. Contact output drive is via a relay (optional open contact). Standard controllers are in panel mount form, or optionally can be housed in a metal box or IP65 ABS wall mount enclosure.

Displays
- Quantity set/dispensed
- Flowrate
- Backflow amount
- Grand Total (resetable)
- Batch Id (resetable)

Alarms
- No pulses from flowmeter
- Batch Limit exceeded
- Max Flow Limit exceeded
- Pulse Output Rate exceeded
- Backflow
- Overbatch

Configuration
- Batch units for display.
- Calibration input pulse scaling
- Output pulse scaling
- Pulse output rate limit
- Batch limit
- Backflow threshold
- Min/Max flow limits
- Batch Units
- Start/stop delay
- 4-20mA current output
- Preact
- No. of Batch Ticket copies.
- Time and date
- Date last calibrated

Features
- Event Log (500 batches)
- Indicator LEDs - Run/Flow/Output

Optional Outputs
- scaled Open Collector pulse output e.g. to PLC/Computer
- 4-20mA output representing flowrate

Optional Interfaces
- PLC/Computer control (stop/start/reset)
- RS232 9600 baud printer interface at rear for batch tickets and event log download.
- RS232 9600 baud interface at front for easy access for download of event log.

The ME3000 controller is designed for compatibility with ManuFlo flowmeters and many other types.

N 15022

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OPERATING INSTRUCTIONS

- Switch the power ON to unit. In a few seconds, the display shows SET and RDY(ready), with a zero quantity for RDY, all LED indicators and alarms are off. The unit is ready for batching or configuration.
- BATCHING: When SET/RDY is displayed, entering a batch quantity via the numeric keypad buttons will cause the displayed SET value to change and flash. Then, pressing the SET button locks in the new value, or pressing CANCEL reverts the value to its original setting, and the display digits stop flashing.
- Press the START BATCH button to start batch batching the set quantity. The RDY line title changes to REC (received).
- The voltage contact drive activates, the RUN LED illuminates indicating pump or solenoid are energized, followed by FLOW LED illuminating, indicating pulsing and operation of flowmeter. The digits on the REC (received) display line begin counting upward towards the selected batch quantity.
- Upon REC digits reaching the selected batch quantity the alarm sounds (short beep) indicating completion of batch; RUN, FLOW and OUTPUT LEDs turn off. The displayed SET and REC values should correspond. If REC digits overshoot target, then scale back the difference by changing the Preact value via the Configuration Mode (see below).
- To interrupt batch, push STOP button; REC counting will stop, and drive contact goes off. Push START BATCH to resume batch.
- On batch completion or termination, press RESET. Display REC line title changes to RDY (ready).
- To dispense the same set quantity again, press START BATCH. Otherwise, use the keypad to enter a new batch quantity.
  Warning: if RUN or FLOW LED indicators are on, but controller is not counting, discontinue use and call for service.
- EVENT LOG: using a straight-through female- to-female DB9 cable, connect from the Batch Controller's (optional) RS232 port (the optional front RS232 port provides easier access) to a Laptop/PC serial port. On the Laptop, start the HyperTerminal software (supplied as part of Windows), set up a connection at 9600 baud, 8 Data Bits, no parity, 1 stop bit, and capture text to a file. On the Controller, press the CANCEL and RESET buttons (those marked with '#') simultaneously for 5 secs, and the Event Log will download. To stop download, press CANCEL for 2 secs. See the ME3000 User Manual for more details.
- CONFIGURATION: The Controller is factory configured to your requirements, but can be re-programmed by the user if required.
- Configuration Mode is entered from the SET/RDY display by pressing the CANCEL and STOP buttons (those marked with a '*') simultaneously for 5 seconds.
- Use the buttons with the up/down arrows to step through configuration settings.
- When a configuration value is diplayed, entering a new value via the keypad causes the display value to change and flash. Then, pressing SET locks in the new value, or pressing CANCEL reverts value to its original setting, and the display digits stop flashing.
- Use the up/down arrows buttons to step through more configuration settings, or press CANCEL for 2 seconds to exit to the SET/RDY display.

CALIBRATION

1) The Batch Controller is set up for the connected flowmeter using the Calibration Input pulse scaling item under Configuration Mode, to match the flowmeter's output pulse value.

On-site calibration adjustment and test:

2) Must adjust what is shown as received (REC) on the Batch Controller LCD display to match a known amount dispensed. So, set batch quantity to say 190L, and batch into a 200 litre (44 gallon) drum.

3) If the amount collected is **more** than the REC amount shown on the LCD display, then **decrease the Calibration Input** value by the same % difference e.g. if collected 200L when 190L on LCD, this is 10L more or 5% over (10/190x100%).
So, decrease the calibration value by 5% i.e. if Calibration Input value is 300, new value is 300-5% = 300-15 = 285.

4) If the amount collected is **less** than the REC amount shown on the LCD display, then **increase the Calibration Input value** by the same % difference. e.g. if collected 180L when 190L on LCD, this is 10L less or 5% under (10/190x100%).
So, increase the calibration value by 5% i.e. if Calibration Input value is 300, new value is 300+5% = 300+15 = 315.

5) **PREACT:** To calibrate inflight overflow, enter Configuration Mode (as described above), and set the Preact value to the same overflow reading as indicated by the LCD display, where overflow = (the REC quantity) - (the SET quantity).

Example: You set 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 the received quantity usually overshoots. So, set 10 Litres on Preact to deduct the 10 Litres overshoot. Next batch, the set batch quantity, LCD REC reading and amount collected in drum are all 190 Litres.

SPECIFICATIONS

Power supply	220-250 vac (optional 110 vac or 12-24 VDC)
Fuse	1 Amp (5 x 20mm case)
Frequency input	5 KHz
Event Log	internally records 500 batches
Output to flowmeter	12 VDC, up to 100mA
Relay	Same as supply voltage, or Open Contact on request.
Display	2 line x 16 character, for quantity set and dispensed.
Connection	10 pin Weidmuller mating plug and socket
Batch entry	quantity selection and commands via IP64 keypad
Optional Outputs	scaled pulse output; 4-20mA output
Optional interfaces	RS232, 9600 baud; PLC/Computer stop/start/reset
Instrument housing	ABS hi-impact case mould
Mounting	Panel mount. Panel cutout :190 L, 122 H mm
External dimensions	206 L, 130 H, 90 D mm.
Weight	1 kg

Rear of ME3000 shown with optional -SC and -5P interfaces

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

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Batch Ticket

29/06/2005	11:30:10	000000000000002512	mL	MANUAL_RESET
29/06/2005	11:30:08	000000000000002512	mL	BATCH_B0001
29/06/2005	11:29:59	000000000000000000	mL	MANUAL_START
29/06/2005	11:29:57	000000000000002500	mL	BATCH_SET
29/06/2005	11:29:49	000000000000000000	mL	BATCHID_RESET
29/06/2005	11:29:42	000000000000000000	mL	GTOTAL_RESET
29/06/2005	11:29:32	000000000000009010	mL	MANUAL_RESET
29/06/2005	11:29:12	000000000000009010	mL	BACK_FLOW
29/06/2005	11:29:11	000000000000000950	mL	BATCH_B0005

Event Log example

ORDER CODES

ME3000 Batch Controller, 240vac.

Options:

Code	Description	Code	Description
-DC	12-24 VDC powered.	**-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.	**-MC**	4-pin PLC/Computer Command (Start/Stop/Reset) interface plug.
-110	110 vac powered.	**-MC2**	2-pin plug for scaled open collector pulse output. Includes 4-pin external command (Start/Stop/Reset) interface plug.
-L	For connection to a coil-type flowmeter.	**-SSR**	External command: Start/Stop/Reset, for connection to HB2500-SSR housing box, or for remote control facility.
-OC	Open Contact pump output.	**-SC**	RS232 serial interface, 9600 baud, at rear, for connection to printer.
-OPA	Alarm output.	**-FP**	RS232 port on front (includes XC4834 RS232 to USB converter cable), in addition to an RS232 port at back, for easy access to download data to laptop.
-OPB	Batch complete output.	**XC4834**	DB9 Serial to USB converter cable.
-OPC	4 - 20 mA output.		

e.g. “ME3000” is the standard Batch Controller, 240vac powered, without any of the options, whereas “ME3000-MC2” is an ME3000 Batch Controller with a scaled open collector pulse output, and external Start/Stop/Reset.

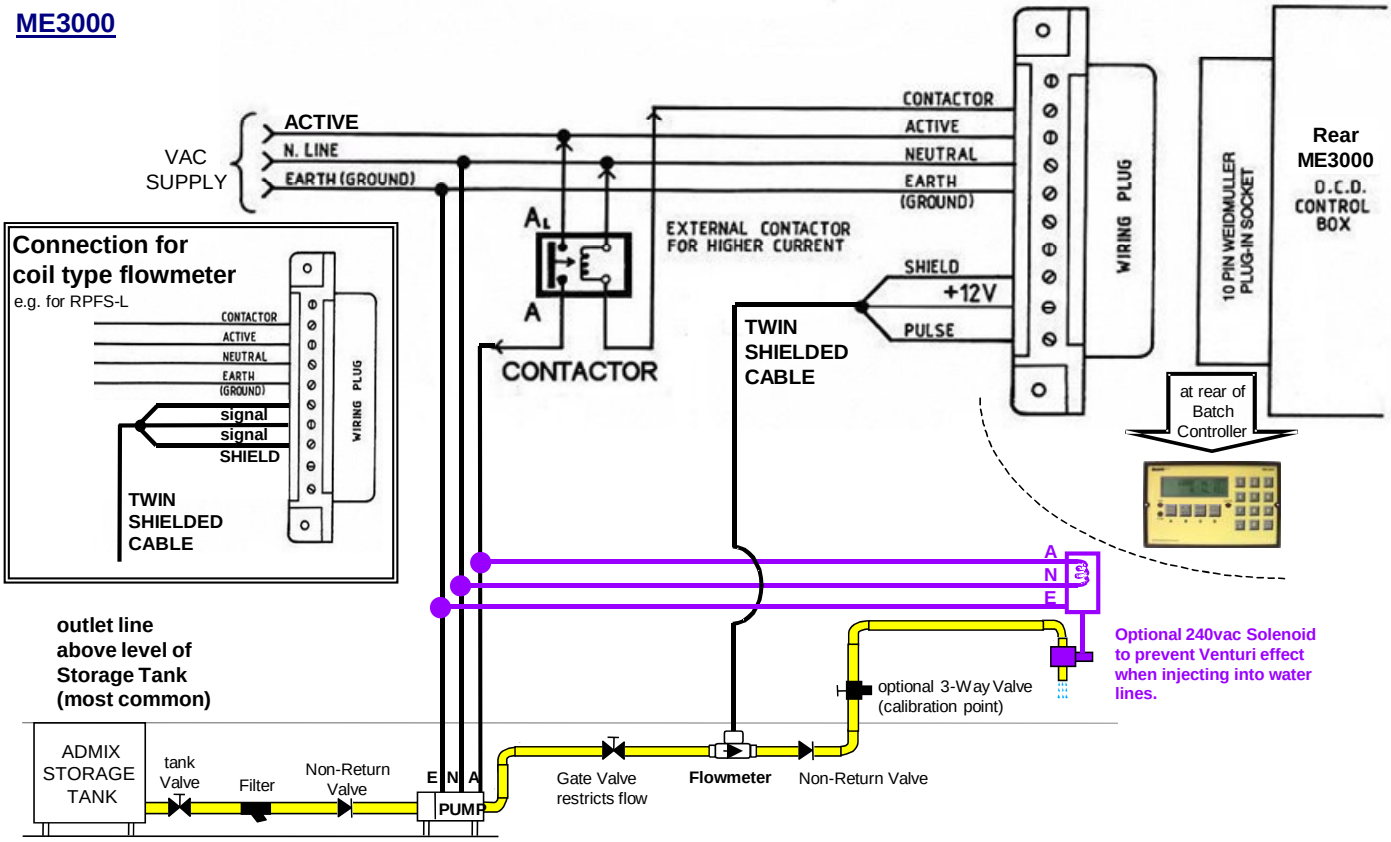
BATCH TICKET ACCESSORIES

Code **Description**

APM-n93XS
- Thermal Ticket Printer, without power supply.
- suitable for custody transfer dockets for ME3000-SC.

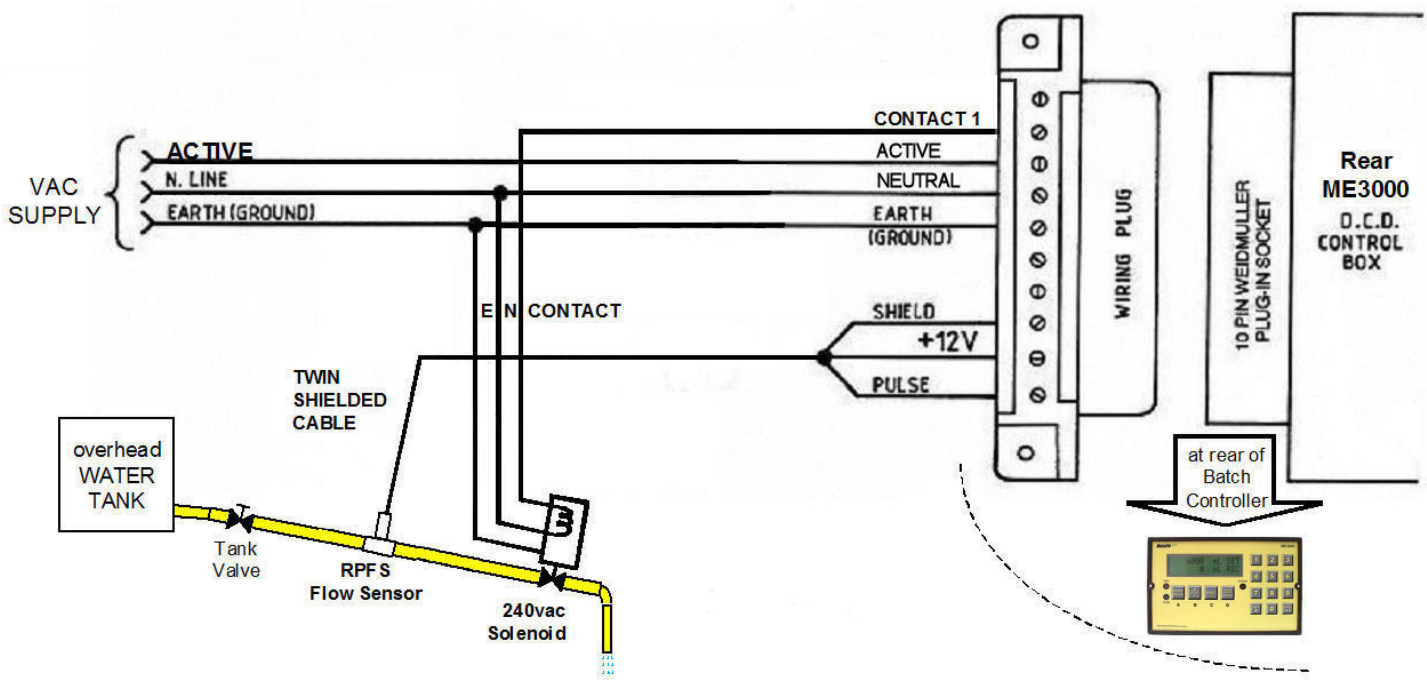
TMP
- ME3000-SC and APM-n93XS printer, wired and mounted in a key lockable rugged IP64 hinged enclosure.
- automatic ticketing.
- prints Batch ID, quantity, time and date.
- ribbon and paper easily changed.
- Ideal for delivery trucks or loading and discharge locations where a custody transfer docket is required.

ME3000



Standard AC Wiring for Pump and optional Solenoid

Note the different connection to the Batch Controller Wiring Plug if the flowmeter is a coil type.



Wiring for AC Solenoid without Pump

Batch Controller supply: 240vac. Solenoid: 240vac

AMM - ADMIX MINI MAG Magnetic Flowmeter

Sizes: 15mm (½"), 20mm (¾"), 25mm (1")

FEATURES

- **Very compact and light weight design in sizes 15mm (½"), 20mm (¾") & 25mm (1").**
- **1000 pulses/Litre (15, 20mm sizes), 500 pulses/Litre (25mm size).**
- **15 and 20mm models are directly interchangeable with MES20 20mm flowmeters.**
- **Measurement range 0.2 to 10 m/s @ +/- 2%.**
- **PVDF lined sensor, Stainless Steel 316 electrodes with integrated grounding rings.**
- **BSP(male) threaded end connections. Supplied with .**
- **Virtually maintenance free, with no moving parts.**
- **Measures liquids with conductivity > 20µS/cm, to 40°C.**
- **Accuracy is unaffected by varying viscosity or specific gravity of liquids.**
- **12 VDC powered (can be directly powered from ManuFlo devices, has LEDs for pulse and power indication (optional 24 VDC for use directly with 24V PLCs).**
- **Easy plug-in wiring connections via DIN43650-A plug set to IP65 rating.**

shown without couplings

INTRODUCTION

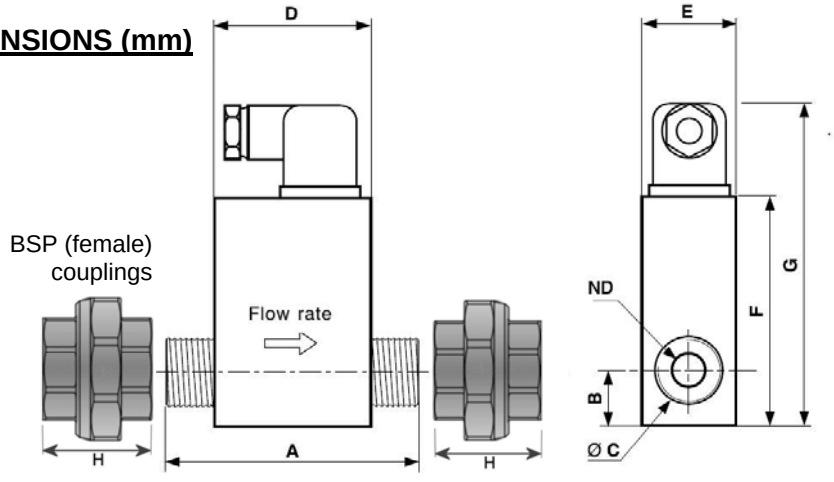
The Admix Mini Mag is a low-cost Electromagnetic Flowmeter designed for the economical measurement of chemical liquid admixtures and any other conductive liquid. The 15 and 20mm sizes output 1000 pulses per Litre (1 pulse / 1 ml), making them a direct replacement of MES20 admixture flowmeters in applications where there is a high content of solids in the measured liquid. Liquids with an electrical conductivity of at least 20µS/cm can be measured. The processor/electronics is integrated with the flowmeter sensor, so these two elements form a very compact package.

The Admix Mini Mag is available in three sizes: 15, 20 and 25mm connections i.e. ½", ¾",1" with 8mm, 12mm and 20mm bores respectively. With no moving parts, and an obstruction-free bore, this type of flowmeter is ideal for measuring a wide range of liquids up to a temperature of 40°C, with no head losses and virtually no ongoing maintenance. The Admix Mini Mag is ideal for measurement of admixtures in concrete batch plants, flowrate and total display for shotcreting and general process batching applications.

Admix Mini Mag is powered by standard +12VDC supply, and can be used directly with the complete range of ManuFlo or any other Instrumentation e.g. ManuFlo ME995 and ME3000 Batch Controllers, ME2008 and UIC interface boards, FRT303 and ME5 indicators.

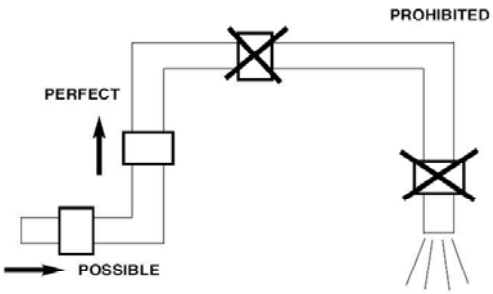
The operation of electromagnetic flow meters is based on Faraday's Law of Induction. A voltage is induced in a conductor as it moves through a magnetic field. This principle is applied in the Admix Mini Mag design. The voltage induced in the flowing liquid, is measured at two electrodes and is proportional to the average flow velocity. The microprocessor then scales this signal voltage to be read in digital units.

DIMENSIONS (mm)



Model	A	B	Ø C	D	E	F	G	H	ND
½"	84,5	18,5	½" MG	80	36	88	100	**40**	8
¾"	90	20	¾" MG	80	36	88	100	**43**	14
1"	90	22	1" MG	80	36	88	100	**50**	18

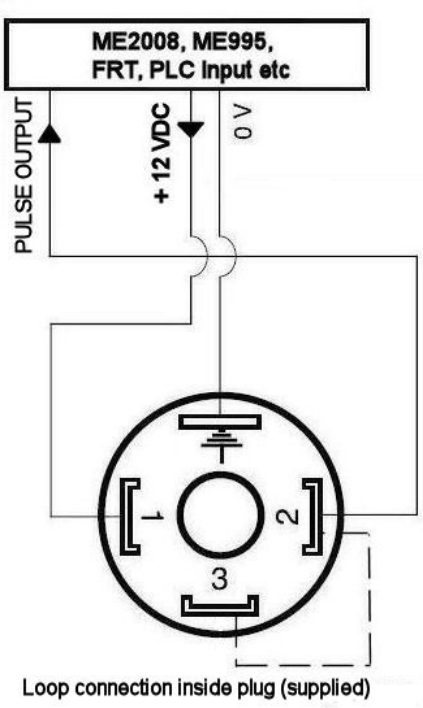
PLUMBING



Flow meter sizes	Measuring Range	Fixed Pulse Value	Order Codes
15mm (08mm bore)	1.0 - 50 Litres/min	1000 pulses/Litre	**AMM15**
20mm (12mm bore)	2.0 - 110 Litres/min	1000 pulses/Litre	**AMM20**
25mm (20mm bore)	3.0 - 210 Litres/min	500 pulses/Litre	**AMM25**
	For 24 VDC powered option, add suffix **-24** to Order Code		

Accuracy	±2% full range, <1.0% of rate
Process connections	BSP(male) threaded ISO228, ½", ¾", 1".
Liner Material	PVDF
Electrodes	S/S316
Grounding Rings	S/S316
Protection class	IP65
Max. Fluid Temp.	-10 °C to +40 °C
Max. Pressure	6 bar @ 40°C, 10 bar @ 20°C
Conductivity	Minimum 20µS/cm
Supply power	+12 VDC @ 40mA (optional +24V @ 20mA)
Pulse output	NPN pulse, VDC max: 28V, I max: 50mA, Diode and poly-switch protected.

The pin designations are:
NPN Pulse output,
passive, optocoupler
Pin 1 = + 12VDC (+) supply
Pin 2 = Pulse (Collector)
Pin 3 = Minus (Emitter)
Pin 4 = - Ground (0v)



ELECTRICAL CONNECTIONS

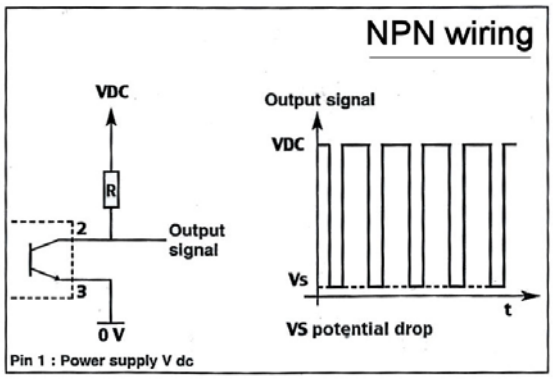
Electrical Connection DIN 43650 plug set

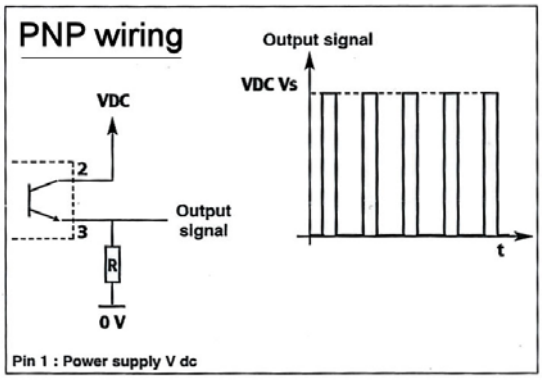
To wire: Use minimum 2 core shielded cable. Unscrew the DIN female plug, remove the gland, pass the signal/power cable through the gland and connect as per diagram to designated pins Tighten the gland and then refit DIN plug, tighten screw to assure a secure seal to IP65 rating.

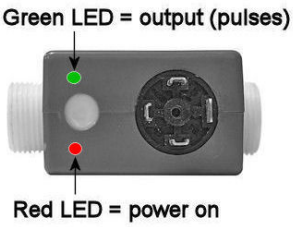
CONNECTION

Caution: Never use the instrument without a load resistance. Check the load resistance "R" before connecting the power.

Note: All ManuFlo devices e.g. ME995, ME2008, UIC, FRT etc. have an inbuilt pull-up resistor so not applicable/required.







Standard model 12 VDC power supply: Resistance value R for VDC = 12 V **R = 1000 Ω**
With the option 24 VDC power supply: Resistance value R for VDC = 24 V **R = 2000 Ω**

INSTALLATION & CONDITIONS OF USE

- **It is essential that the meter tube be always completely filled with liquid.**
  Partial filling, or an empty pipe, will result in pulse fluctuations from 1 – 900Hz. Keep the pipe full at all times.
- The flowmeter will transmit pulses in the forward flow direction only. Reverse flow (backflow) will not be measured.
- The installation orientation is arbitrary. The flowmeter should not be installed in the vicinity of strong electromagnetic fields.
- Valves or other shutoff devices should not be installed immediate to the flowmeter. Allow some **straight pipe before and after the flowmeter (length upstream: 5x diameter, length downstream: 3x diameter)** before fitting elbows, valves etc.
- For accurate measurement, the diameter difference of the transition from the pipeline to the flowmeter should be kept to a minimum.
- Flowmeter has inbuilt Stainless Steel grounding rings.
- Fluid temperature range of –10 to +40 °C. Pressure up to 10bar @20°C. Conductivity of fluid must be > 20 µS/cm.
- After prolonged period of use, if the calibration is found to be significantly inaccurate then the flowmeter probes may be excessively coated, so remove and wipe the inside of the flowmeter tube. The flowmeter is rated to IP65, but as a safeguard after installation, place a cover over the flowmeter and make sure signal cable is looped downward to avoid trailing water ingress through cable gland.
- WARNING: Do not exceed the maximum recommended flowrate as overdose may occur. (Generally the correct size flowmeter for the flowrate should be selected to avoid this). Flowmeter will measure below minimum flowrate but reduced accuracy (e.g. ±10%).

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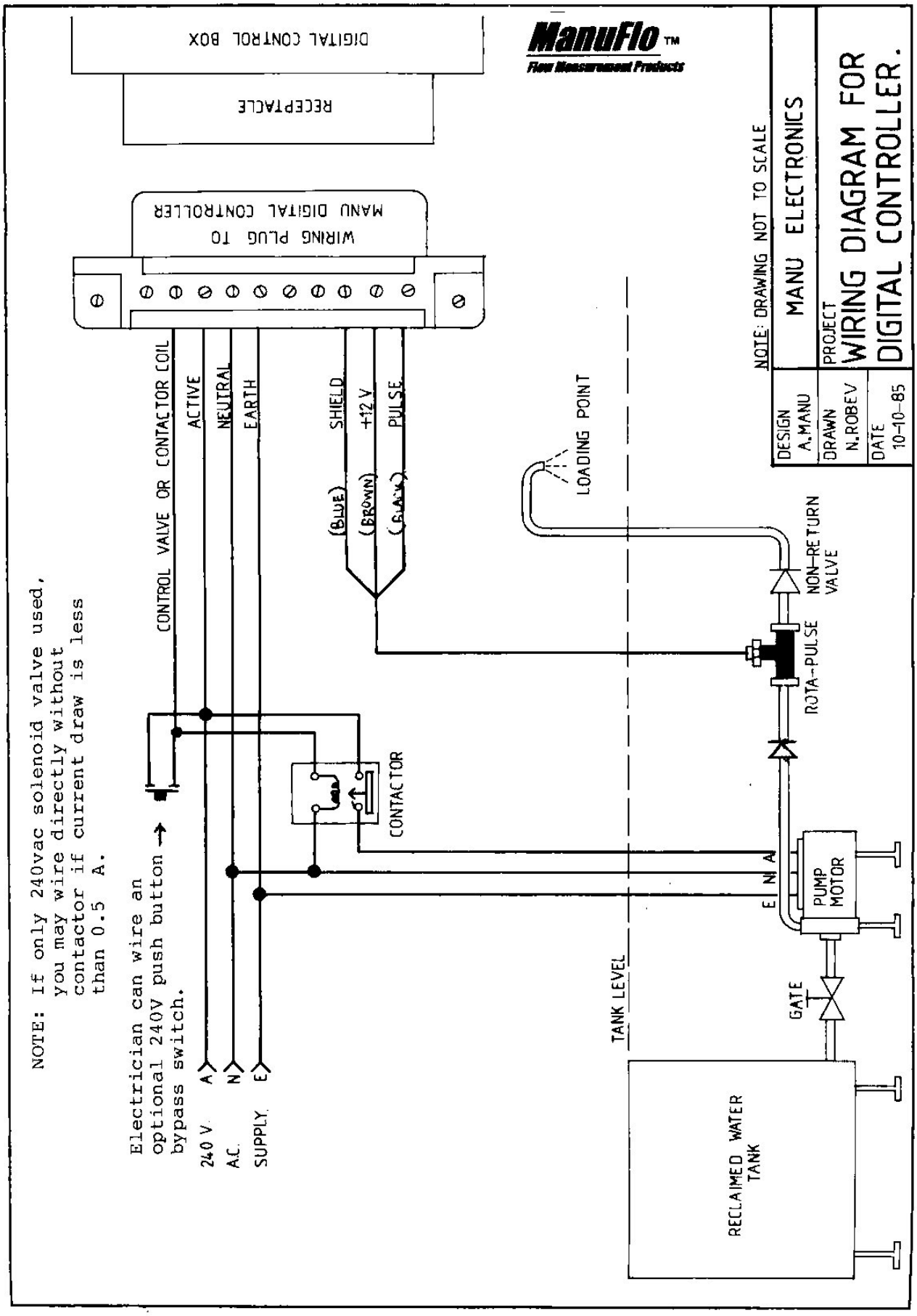

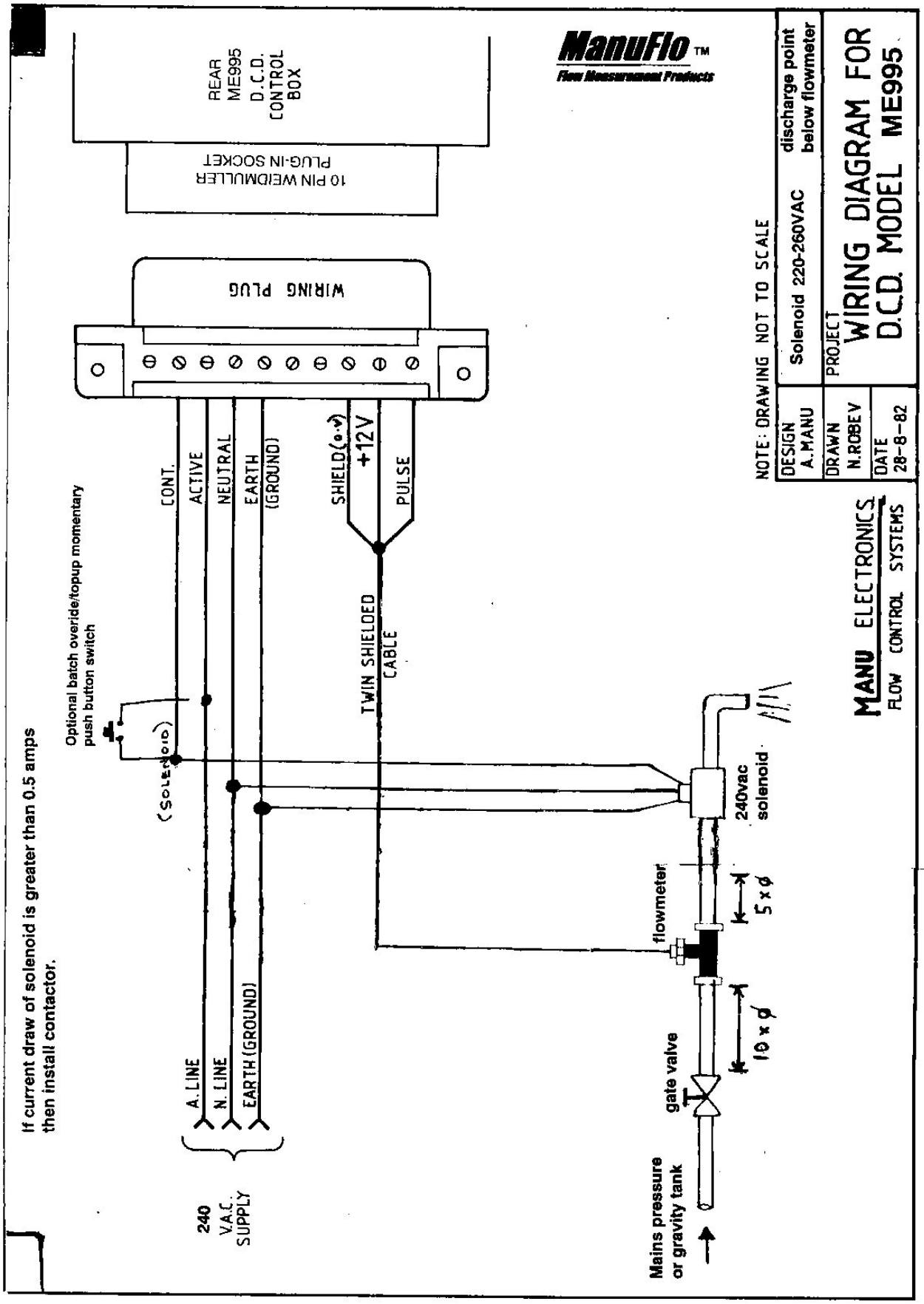

TROUBLE SHOOTING GUIDE

FOR ELECTROMAGNETIC FLOWMETER SYSTEMS

ManuFlo ®TM

WITH BATCH CONTROLLER:-

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
•No power to batch controller or displays not on	•Blown fuse or holder not tightened •No main power supply	•Check fuse, tighten fuse holder (at rear of controller) •Check power supply, check wiring
•No or incorrect power to magflow	•DC power insufficent (DC units only) •No main power supply (AC units)	•Use voltmeter to measure or check wiring •Check power supply, check wiring
•Pulse fails at start of batch (2.5 seconds after)	•Check calibration (K-factor) setting	•000 calibration -pulsefails. Make sure a calibration value is set,
	•Solenoid valve not opening	•Check and service solenoid valve, check output control voltage is 240vac(N & C, pins 7&9) when pushing start button
	•Restriction or service gate valve closed	•Open gate valve
	•Empty liquid tank	•Check liquid 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,	•Check signal cable (pulse and ground) for continuity at junction box near magflow meter, If cut or oxidised- repair/replace
•Pulse fails during batch cycle •Pipe buildup restricting flow	•Flowrate too slow •Cleanout pipelines, calcium buildup on pipewalls -recycle systems	•Open restriction gate valve, or decrease flowrate pulse fail
•Display digits count slowly after batch complete	•Solenoid valve not properly closed	•damaged seal, faulty solenoid
	•Magflow not properly earthed to pipe	•Check earthring(s). Then connect to a master earth in plant. (especially mags with no inbuilt earthprobe).
	With AMM mag EMPTY PIPE LINE	**MAKE SURE PIPE IS FULL OF LIQUID AT ALL TIMES**

AT this point if all of the above suggestions fail to rectify problem, then electromagnetic flowmeter may require replacement due to faulty electronics or moisture in flowtube coils.

conditions:-

•Batch target display counter counts past batch selection	•Flowrate too fast excessive overflow	•Turn down gate valve to restrict flowrate or set preact (overflow deduct, inflight) function to compensate •Reduce delivery pipe diameter near end of line.
•Intermittant overflow past batch select or liquid does not stop	•Faulty solenoid valve not closing properly, insufficent air pressure	•service solenoid valve, check air pressure
•More liquid collected than indicated	• •change pulse input parameter on decrease value by same percentage factor. •calibration error ••Clean magflow tube	
•Less liquid collected than indicated	•Requires recalibration test	•Set new calibration figure, increase PPL factor (See data sheet calibration guide for specific product)

Sequential fault finding and rectification

1. If a 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.

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