
AMM Admix MiniMag ME995 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 AMM Admix MiniMag Flowmeter in a straight pipe section, with the same diameter pipe as the adaptor tee section, with atleast 5x diameter before, and 3x 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 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 ME995 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

a division of

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ME995-7D LITRES (Decimal point) PRESET CONTROLLER

FEATURES

- 4-Digit LED display
- 4x LED status indicators
- Preact function
- Preset maximum limit
- Missing pulse detection
- Counts in 0.1 Litres upto 999.9
- Optional PLC and computer interface
- Signal conditioning with K-factor adjustment
- Compatibility with most flowmeters



The ME995-7D LITRES decimal point preset Batch Controller can be used with most pulse output flowmeters, for preset liquid batching applications.

The controller incorporates a preact (overflow deduct) feature, K-factor adjustment, 4 LED status indicators and diagnostic safeties. With the ME995-7D Batch Controller using the same 10-pin Weidmuller receptacle plug as the previous models, changeover or upgrade is instant with no rewiring necessary. The ME995-7D 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 0.1 Litre increments upto a maximum 999.9 Litres.

The controller operates from standard 220 - 260 vac (or optional 110 vac or 12 - 24 VDC) voltage supplies. Contact output drive is via one (or optional two) relays. Standard controllers are in panel mount form, or can optionally be housed in a metal box or IP65 ABS wall mount enclosure.

The ME995-7D controller is designed for compatibility with all ManuFlo flowmeters and most other brands. Calibration is settable via rear selector 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 3.0 seconds (variable) initial start time period, or if pulses are interrupted during batch cycle and fall below (variable) pulse scanning time (typical 20Hz). 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 is 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.

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

OPERATING INSTRUCTIONS

ME995-7D

- * 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 o/p pulse value)/10.

e.g. AMM25 is 500 pulses/Litre, so Calibration = 500/10 = 050.

Note reverse sequence of dials: U=5, T=5, H=0, is a value of 050.

On-site calibration adjustment and test:

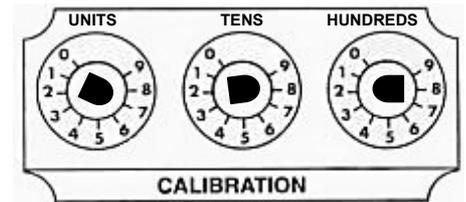
2) Must adjust what is shown on the Batch Controller display (red LEDs) to match a known amount dispensed, using the Calibration knobs. So, set Controller to 190.0L, and batch into a 200 litre (44 gallon) drum.

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 190.0L on LEDs, this is 10L more or 5% over (10/190x100%). So, decrease the calibration value by 5% i.e. if calibration set to 050, new value is 050-5% = 050-2 = 048 (Set Calibration U=8, T=4, H=0).

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 190.0L on LEDs, this is 10L less or 5% under (10/190x100%). So, increase the calibration value by 5% i.e. if calibration set to 050, new value is 050+5% = 050+2 = 052 (Set Calibration U=8, T=5, H=0).



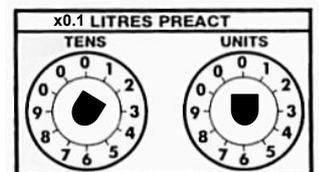
Example pulse flowmeter calibration settings

Note: x17 pulse input multiplier is used to enhance calibration resolution if flowmeter has < ~500 pulses/Litre.

Flowmeter	Size Ø	H T U	Signal input multiplier
MES20	20mm	1 0 0	x1
AMM20	20mm	1 0 0	x1
AMM25	25mm	0 5 0	x1

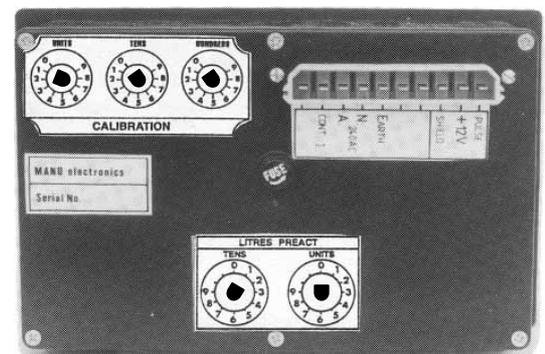
5) **PREACT:** Calibrating inflight overflow is via two rotary select knobs marked "TENS" and "UNITS" of 0.1 LITRES, located at the rear of controller. Simply set knobs to the overflow reading as indicated by the LED display.

Example: You select 100.0 Litres, batch the quantity, 101.0 Litres is shown on display, and 101.0 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 1.0 Litres on PREACT to deduct the 1.0 Litres overshoot (PREACT T=1, U=0 is a value of 1.0 Litres). Next batch, the selector Dials, LED reading and amount collected in drum are all 100.0 Litres.



SPECIFICATIONS

Power supply	220-260 vac (optional 110 vac or 12-24 VDC)
Output to flowmeter	12 VDC upto 100mA
Relay outputs	Max. 240 vac, 1A. Other outputs on request.
Frequency input	5 KHz. with x1 input, 300 Hz. with x17 input
Display	4 digits, 1 dec.place, Display LED (14mm H)
Connection	10 pin mating plug and socket
Fuse	1 Amp (5 x 20mm case)
Batch selection	Visual rotary select switches
Batch commands	Push toggle switches
Mounting	Panel mount
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 development, specifications are subject to change without notice.

AMM - ADMIX MINI MAG Magnetic Flowmeter

Sizes: 15mm (1/2"), 20mm (3/4"), 25mm (1")

FEATURES

- Very compact and light weight design in sizes 15mm (1/2"), 20mm (3/4") & 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

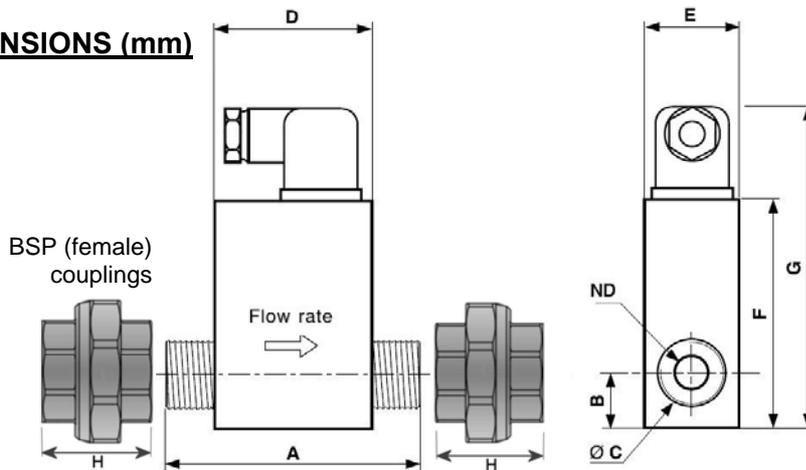
The Admix Mini Mag is a low-cost Electromagnetic Flowmeter designed for the economical measurement of chemical liquid admixtures and any other conductive liquid. The 15 and 20mm sizes output 1000 pulses per Litre (1 pulse / 1 ml), making them a direct replacement of MES20 admixture flowmeters in applications 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. 1/2", 3/4", 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.

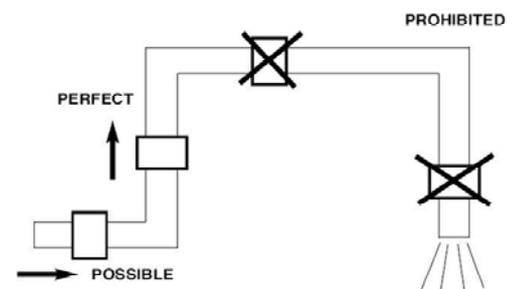
The operation of electromagnetic flow meters is based on Faraday's Law of Induction. A voltage is induced in a conductor as it moves through a magnetic field. This principle is applied in the Admix Mini Mag design. The voltage induced in the flowing liquid, is measured at two electrodes and is proportional 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
1/2"	84,5	18,5	1/2" MG	80	36	88	100	40	8
3/4"	90	20	3/4" MG	80	36	88	100	43	14
1"	90	22	1" MG	80	36	88	100	50	18

PLUMBING

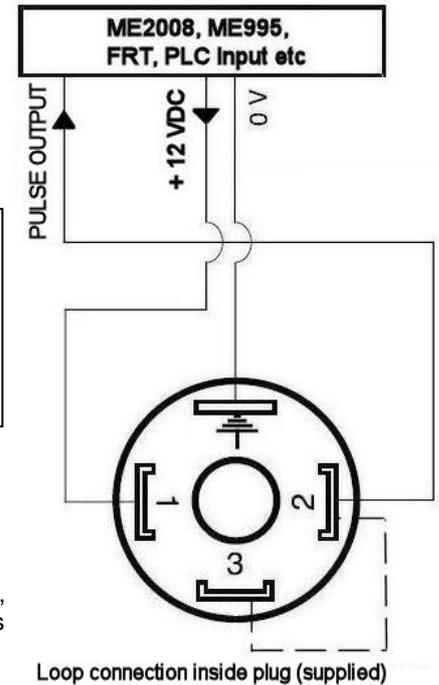


Flow meter sizes	Measuring Range	Fixed Pulse Value	Order Codes
15mm (08mm bore)	1.0 - 50 Litres/min	1000 pulses/Litre	AMM15
20mm (12mm bore)	2.0 - 110 Litres/min	1000 pulses/Litre	AMM20
25mm (20mm bore)	3.0 - 210 Litres/min	500 pulses/Litre	AMM25

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

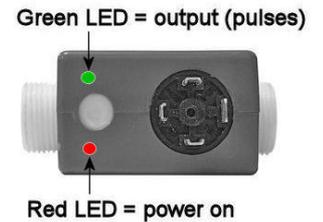
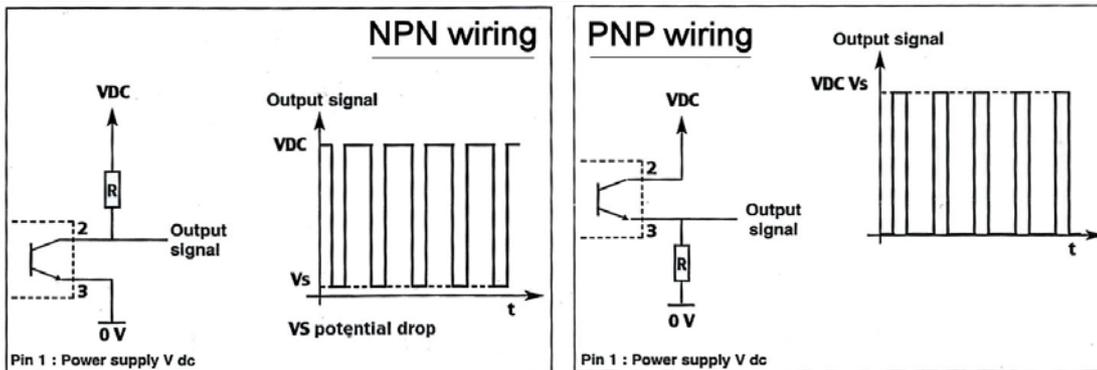
Electrical Connection DIN 43650 plug set

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 will occur. (Generally the correct size flowmeter for the flowrate should be selected to avoid this). Flowmeter will measure below minimum flowrate but at a reduced accuracy (e.g. ±10%).

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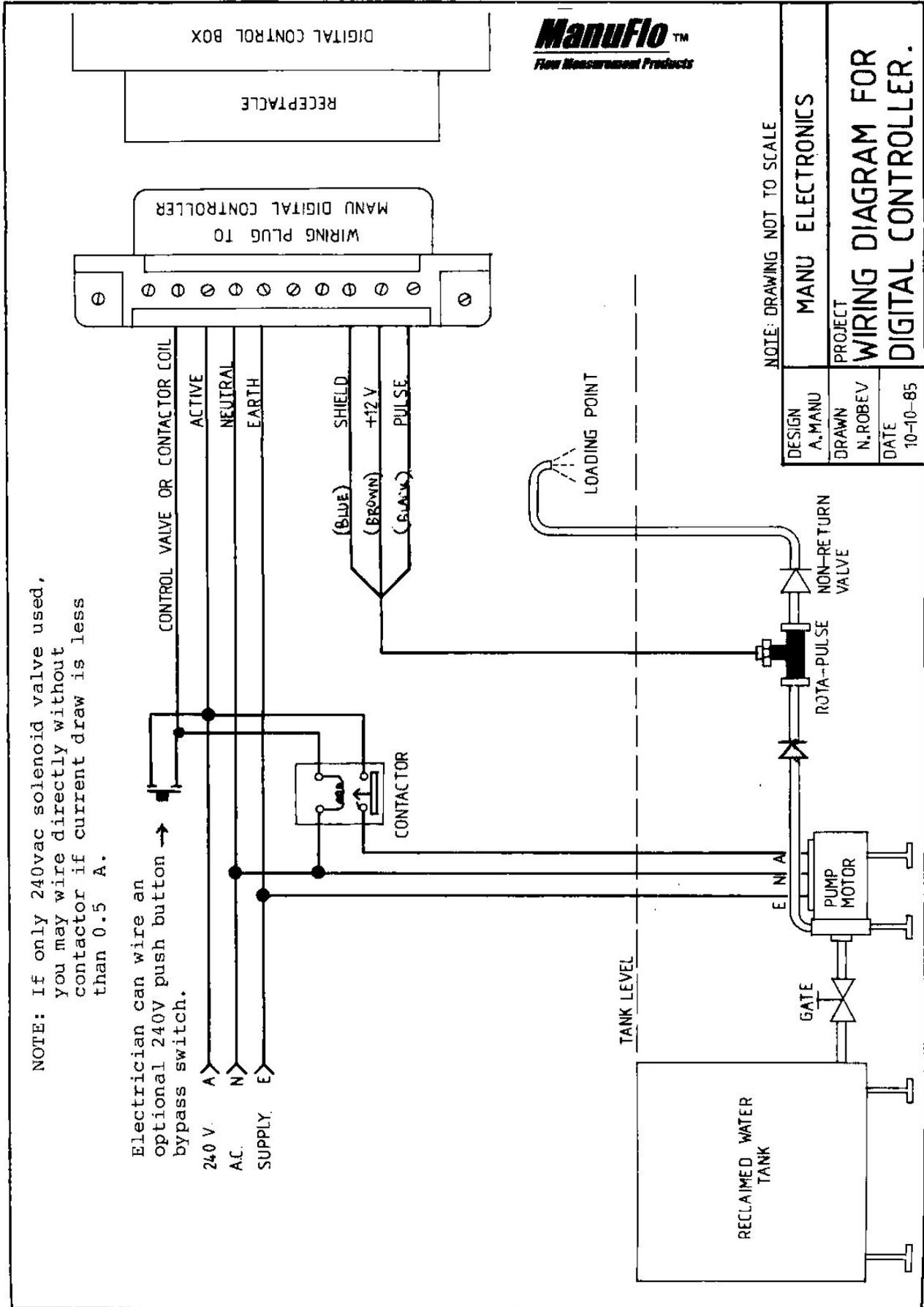
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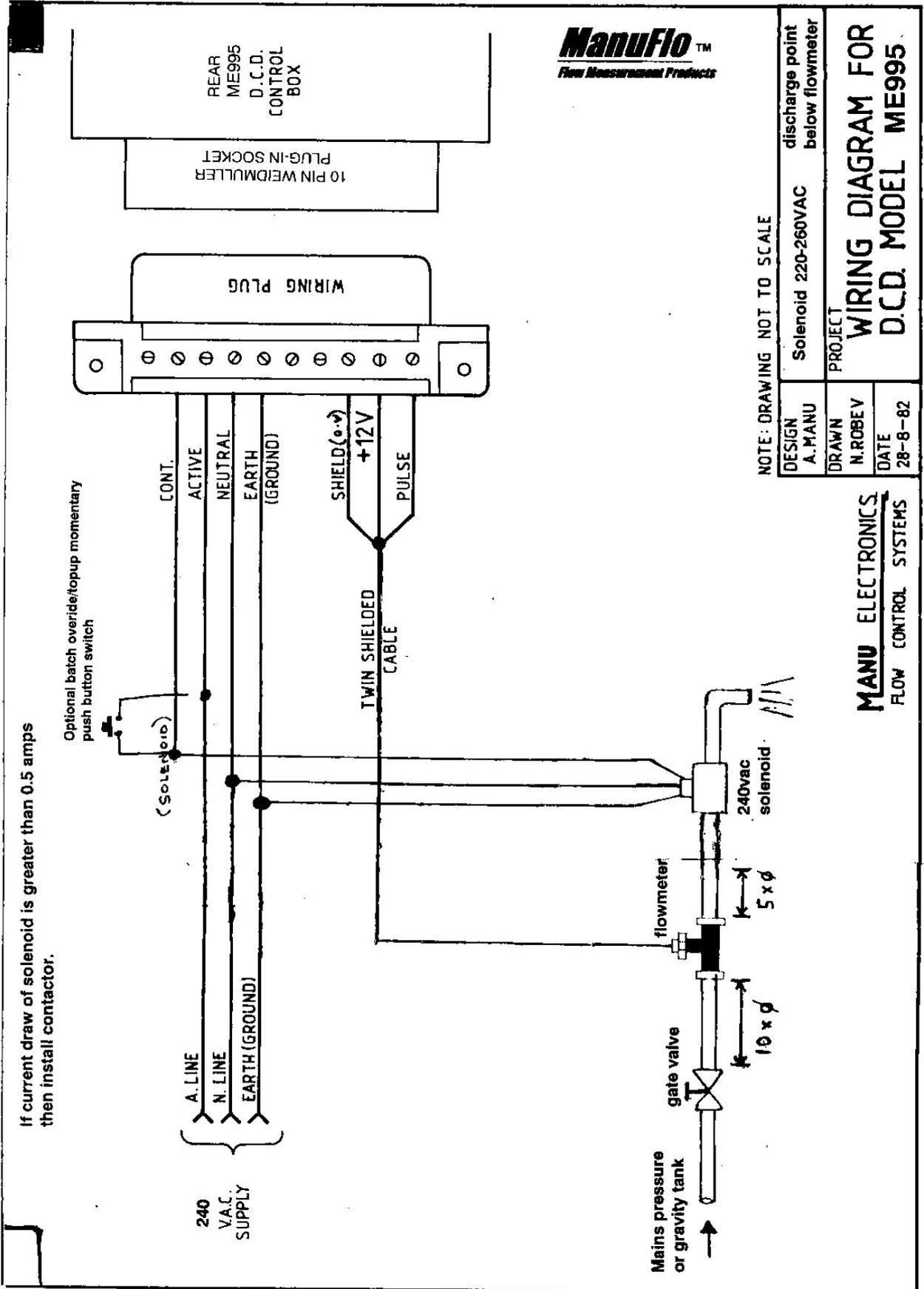
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TROUBLE SHOOTING GUIDE

FOR ELECTROMAGNETIC FLOWMETER SYSTEMS

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 insufficient (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 •Solenoid valve not opening •Restriction or service gate valve closed •Empty liquid tank •Pump not turning •Pump foot valve failed •Signal cable cut, bad joint at JB, •Magflow not properly earthed to pipe	•000 calibration -pulsefails. Make sure a calibration value is set, three switch shafts -H,T,U- located at rear top left of controller •Check and service solenoid valve, check output control voltage is 240vac(N & C, pins 7&9) when pushing start button •Open gate valve •Check liquid level •Check and service pump •Empty pipe, Install non-return valve •Check signal cable (pulse and ground) for continuity at junction box near magflow meter. If cut or oxidised- repair/replace •Check earthing straps are connected to steels pipes and or to S/S earthing(s). Then connect to a master earth in plant.
•Pulse fails during batch cycle	•Flowrate too slow •Pipe buildup restricting flow	•Open restriction gate valve, or increase flowrate pulse fail timing capacitor (see service guide). •Cleanout pipelines, calcium buildup on pipewalls -recycle systems
•Display digits count slowly after batch complete	•Solenoid valve not properly closed •Magflow not properly earthed to pipe	•damaged seal, faulty solenoid •Check earthing(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.

Below for UIC/A interface cards, ME2000 or ME995-7D 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. •service solenoid valve, check air pressure
•Intermittant overflow past batch select or liquid does not stop	•Faulty solenoid valve not closing properly, insufficient air pressure	
•More liquid collected than indicated	•Pulses to fast for computer input •calibration error •probes insulated with buildup	•change pulse parameter on pulsedivider card and PLC input. •Check calibration value controller, interface card or PLC. •Clean magflow tube
•Less liquid collected than indicated	•Requires recalibration test	•Set new calibration figure, rear switches or interface card (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.

System overbatch 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 preact 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 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 3.0 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 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 pulserate safety. Most ManuFlo Batch Controllers have a standard 30 counts per second (30Hz) pulserate safety setting. If the pulses from the flowmeter drop below 20Hz, the controller will shut down the output voltage drive, and turn on the Pulse Fail LED and alarm warnings. The 20Hz standard setting is typical with dispensing systems using AMM25 magflow flowmeters, where if the flowrate drops below 20 counts per second the pulse fail safety will activate (20 pulses/Litre), 20 Hz = 0.04 Litres/sec minimum flowrate required. If flow drops below 0.04 Litres/sec, the pulsefail will activate. The equation is:

$$\text{Pulsefail frequency (Hz)} = (\text{Pulses/Litre}) \times (\text{minimum flowrate of pipe diameter in Litres/sec})$$

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 pulseoutput 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 desoldering the limit lead wire (connected to the rear of rotary switch solder pads) and resoldering the wire to set the desired quantity (see diagram below).

Standard factory set values are T2: 2µF capacitor, T1: 0.1 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)

