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# **ADMIXTURE BATCHING SYSTEM**

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

## Your system comprises:

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## Information sheets included:

1. ME995 preset Batch Controller specification and options.
2. Basic electrical wiring guide.
3. Installation Guide (plumbing/commissioning).
4. Troubleshooting guide
5. Service adjustment guide (specs)
6. Flowmeter brochure spec (chosen flowmeter)
7. (if ordered) PLC/computer interface spec brochure

## 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 admix, which will be counted by the controller display. See wiring diagram.
- C. Install the flowmeter as per the installation guide found on the flowmeter brochure.
- D. Use shielded cable only for connection between flowmeter and Batch Controller.
- E. The ME995 Batch Controllers, when used with MES20 20mm flowmeters, have internal preset calibration of 1ml/1pulse. For other flowmeters, the calibration will be factory set on an approximate calibration number corresponding to the flowmeter selected. A calibration check must be performed prior to continuous use and commissioning of the system (see installation guide). Recalibration may be necessary for flowmeters other than MES20.

If unsure on any aspect of installation or operation, call ManuFlo or your local installer.

**Happy batching !!!!!!!!!!!!!!!**

# INSTALLATION GUIDE

for *ME995 Batch Controllers*

with **MES20 and other flowmeters**

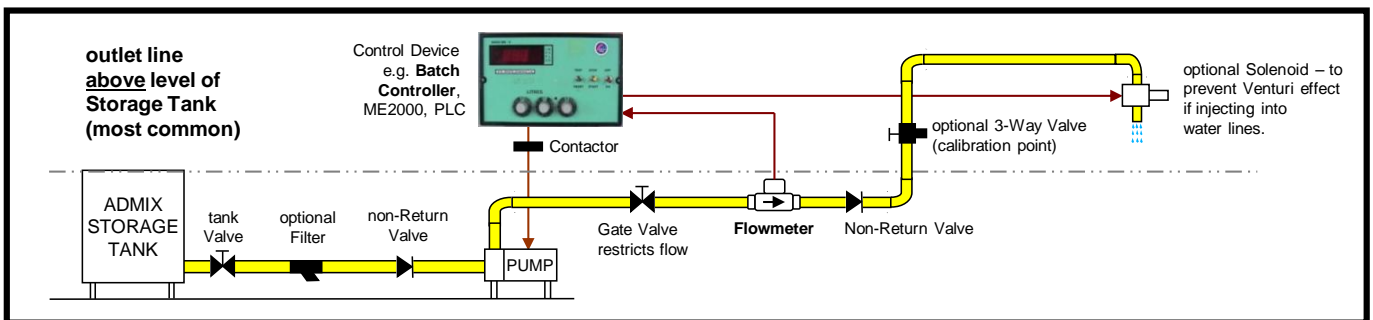
(1) Locate the most appropriate position to mount the MES20 flowmeter. Preferably:

- your site's flowmeters should be grouped together off the ground on a stand.
- protect the flowmeters from the elements by using a cover, which should be lightweight with handles for easy access by service personnel.
- a vibration free area is recommended, as the MES20 is sensitive to high vibrations which can cause some stray pulses (see the "Installation" section in the MES product brochure).

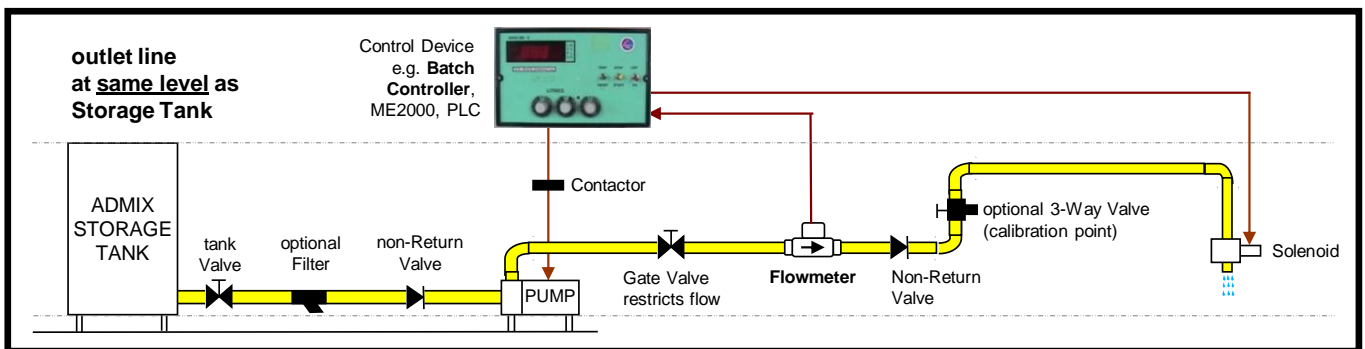
(2) Establish the outlet point position in relation to the storage tank:

**2a) If the outlet point is above the top of the storage tank (the most commonly used setup),** then the additional equipment you will need is at least: a pump, non-return valves or spring loaded check valves (12psi), flow restriction gate or ball valve and, optionally:

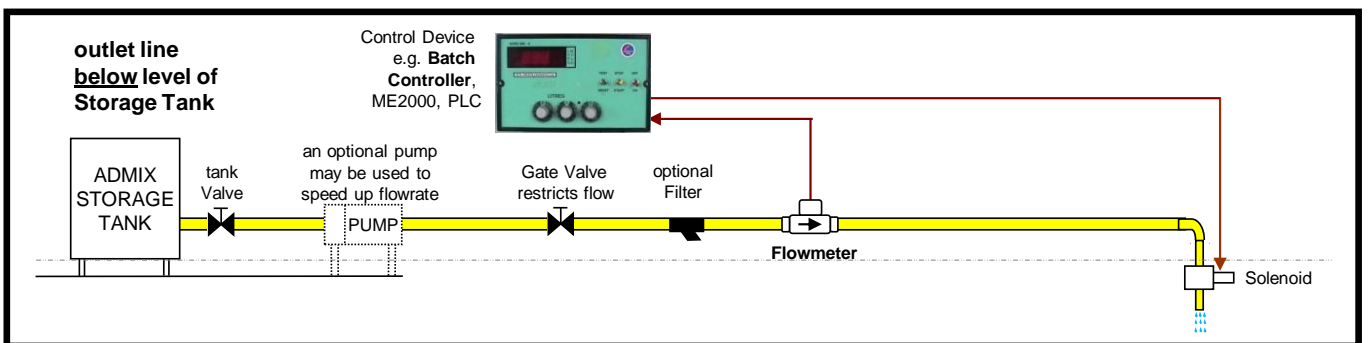
- a solenoid valve (air-assisted ball valve type) for instant shut off of flow, recommended to prevent the Venturi effect when injecting into water lines, but may not be required if the installation has reasonable head height.
- a 3-Way Valve to provide an easily accessible calibration point.
- ¾" to 1" pipeline or rigid hose.



**2b) If the outlet point is at the same level as the storage tank,** then the equipment you will need is at least: a pump, a flow restriction gate or ball valve, a flowmeter with pulse output, and a solenoid valve to stop free flow.



**2c) If the outlet point is below the level of the storage tank,** then the equipment you will need is at least: a flow control solenoid valve, a flow restriction gate or ball valve, and a flowmeter with pulse output.



## SELECTION OF PIPE LINE DIAMETERS (for MES20 20mm flowmeters)

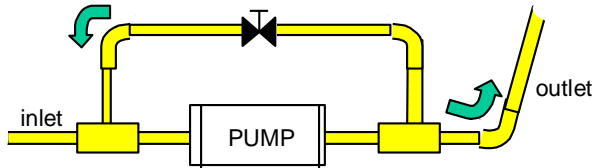
- ▶ For low flowrates and small batch quantities of liquid (approx < 2000mls), use ½" diameter pipe or hose (after the flowmeter).
- ▶ For medium to high flowrates, use ¾" to 1" diameter pipe. ▶ For very high flowrates, use 1¼".

NOTE: Pipeline can be flexible reinforced hose (NOT flexible expandable soft hose), rigid PVC or metallic.

*Warning: Running flowmeters over their maximum flow rating will damage them and cause overdosing.*

## PUMP SELECTION

▶ When 20mm MES20 flowmeters are used with fluids of specific gravity 1 - 1.25, then use centrifuge pumps of 0.5 - 1 horse power (e.g. 1" Onga 413 or Davey pumps. When using larger capacity flowmeters, a proportionally larger pump will apply). A flowrate upto 0.8 Litres per second can be achieved, depending on head height. ▶ For higher density fluids, positive displacement (PD) pumps are more suitable. Because of pressures generated by PD pumps, it is important to be able to restrict the flow – this can be achieved by using an inlet-to-outlet bypass flow valve to recirculate the flow line.



**Note:** This method of restriction of flow eliminates air being counted by MES flowmeters if the admix storage tank is empty.

## FILTERS

Although MES flowmeters can pass small solids without jamming, a considerable amount of foreign particles can be transferred into admix storage tanks. Therefore, it is advisable to install a box filter prior to positive displacement type flowmeters, to prevent blockage or damage to the flowmeter measuring chamber unit (Amiad™ Ystrainer 800-micron filter is recommended).

## COMMISSIONING BATCH CONTROL SYSTEMS

- Determine the most appropriate position to mount the Batch Controller so it will be clearly visible to the operator and within easy reach.
- Mount the Controller either in a panel cutout or in a standalone ManuFlo housing box.
- Electricians must refer to the relevant ManuFlo wiring diagram (supplied with the Controller). Ensure that there is no power to the Controller before connecting the flowmeter signal cable into the 10pin Weidmuller plug. When wiring the flowmeter, use 2-core shielded cable (use more cores if wiring more flowmeters) - this will supply the flowmeter(s) with 12VDC from the Batch Controller, and will transmit pulses from the flowmeter to the Batch Controller: 1 wire for pulse, 1 wire for +12 volts, and the shield as 0 volts return (For 2-wire contact closure flowmeters and electromagnetic flowmeters, do not use 12 volts).
- Connect the applicable power supply voltage to the controller(s). For pump applications, a heavy duty contactor (10 Amps for Onga413 pump) must be wired into the system. Contactors can be supplied by ManuFlo. Do not use plug-in relays.
- Power up the system. Reset and start a number of times to prime the system, until fluid appears at the outlet line and the Batch Controller digits begin counting.

**A volumetric calibration test should be performed when commissioning a new installation: place a calibrated vessel at the discharge point, set a batch quantity on the ManuFlo Batch Controller, batch the quantity and then check that the delivered quantity is what was requested. A calibration check should also be performed periodically (say every 3-6 months):**

- on the Batch Controller, select an amount of liquid e.g. 1000 mls. Then press Reset, then Start.
- at the calibrated container, check that the amount dispensed is as requested (e.g. 1000 millilitres).
- An overflow may occur due to the inability of the pump to stop instantly. The amount of overflow will depend on how fast the liquid is being dispensed and/or the closing time of the solenoid valve. The Batch Controller will count the overflow as part of the displayed total dispensed.
  - if the system is totally controlled via PLC/Computer, overflow will be adjusted by the computer; otherwise,
  - where a ME995 series Batch Controller is fitted with a Preact, simply set the Preact to the amount of overflow i.e. overflow = (actual amount dispensed, as shown on the Batch Controller display) minus (amount requested).

If required, slow down flow velocity by using a restriction gate valve, or install a quick-acting solenoid valve.

**Note:** If the flow is restricted excessively, the Batch Controller Pulse Fail circuitry will shut down the system for safety reasons, in which case open up the restriction gate valve.

**For safety**, when using ManuFlo Batch Controllers in a system controlled by a PLC/Computer with batch recipe software: **on the Batch Controller use the front selector switches to set the maximum batch limit and/or doserate**. Thereafter, in the event of a flowmeter or PLC malfunction, the Batch Controller will override the computer and stop the batch.

If unsure about any aspect of installation, please check the appropriate wiring diagram, product brochure and trouble shooting guide.

**ManuFlo**®™

Flow Measurement Products

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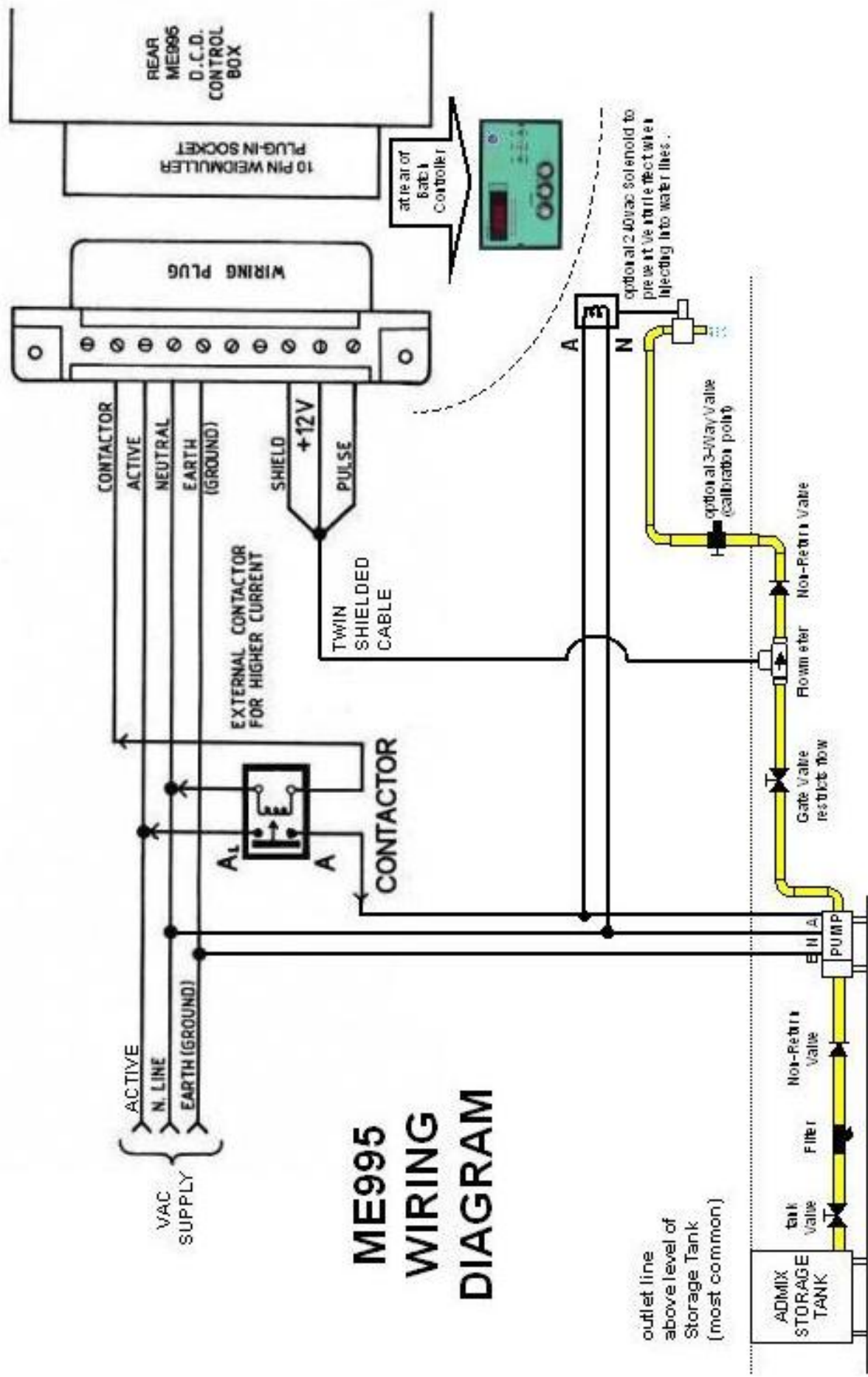
Rev. 0406/1

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## FEATURES

- LED display
- 4 x LED diagnostic indicators
- Preact/freefall function
- Preset maximum limit
- Missing pulse detection
- User friendly simple operation
- Optional PLC/computer interface & pulse/setpoint/alarm outputs
- Many configuration options



(Over 10,000 units in operation !!)

The ME995-series panel mount preset batch controllers are available in a range of configuration options. They are suitable for use with pulse output flowmeters for preset liquid batch control applications.

Using rotary selector switches, batch quantities are quickly and easily selected. The batch operator can cross-reference the upcount LED display counter with the originally selected batch quantity shown on the selector dials. The final batched quantity is displayed on the LED batch screen. Command operations are performed by toggle switches, and four LEDs indicate operational status conditions.

The controller incorporates a standard preact (overflow deduct) feature, K-factor adjustment (-7 series models only), 4 diagnostic status condition LED indicators. All wiring and output options are via plug sets, making replacement or maintenance a simple procedure, without having to rewire the installation. The ME995 is easily interfaced with PLCs, thus incorporating the controller's safety features and providing a setpoint system with a backup batch facility.

Standard controllers are in panel mount form, with 240vac input supply, 240vac output drive, and 12vdc to flowmeter. A range of enclosures are available, in metal or ABS, rated to IP65.

## CONFIGURATION OPTIONS

Model No.	Description	Input (Pulses/Litre)
ME995-1A	Millilitres, 0 decimal place, 4 digit to 9990	1000
ME995-1	Millilitres, 0 decimal place, 5 digit to 99990	1000
ME995-2, -3, -2C, -2CH, -3K, -3KH	Doserate calculation controllers – enquire for further details	1000
ME995-4	Litres, 2 decimal places, 4 digit to 90.00	1000
ME995-6	Litres, 1 decimal place, 3 digit to 90.0	1000
ME995-7	Litres, 0 decimal place, 4 digit to 9000	1 to 999
ME995-7D	Litres, 1 decimal place, 4 digit to 900.0	1 to 999

## OTHER OPTIONS (see ManuFlo Catalogue or datasheets for even more options)

-MC2	PLC interface, volt free commands 4pin & open collector pulse 2pin
- 5P, ME5IC	PLC interface via plug and special isolation command card (for industrial computer systems)
-S12	Two product control selection switch, sequential relay output drives.
-AO	Logic or relay output on batch complete or alarm condition
-110V	110vac Supply & control voltage

## HOUSING ENCLOSURES

SHB	Single Metal powder coated enclosure
SHB1	Single box, wired with 240vac contactor (for 1 hp pump), plug-in 240vac pump outlet, and plug
DHB	Dual Metal powder coated enclosure
DHB2	Dual box, wired with 2x 240vac contactors, 2x pump outlets, and 2x plugs for Batch Controllers.
HB2500	IP65 waterproof enclosure
SSR	External commands start/stop/reset IP65 rated (fitted to HB2500)

## SAFETY FEATURES

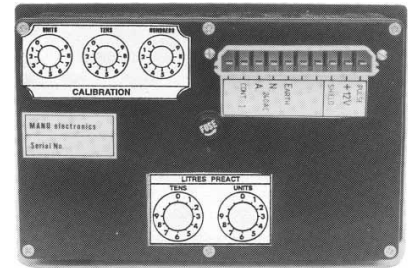
- \* **LIMIT (LM) LED** activates if batch cycle reaches locked internal limit, or if circuit diagnostics detect internal chip problem. Subsequently, there is automatic shutoff of voltage contact drive.
- \* **PULSE FAIL (PF) LED** activates if no pulses arrive within 1.5 seconds (variable) initial start time period, or if pulses are interrupted during batch cycle and fall below (variable) pulse scanning time (typical 30Hz). Subsequently, there is automatic shutoff of voltage contact drive.
- \* **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.
- \* **ALARM** sounds momentarily upon batch cycle completion, and continuously if PULSE FAIL or LIMIT LEDs activate or if overflow setting is reached.

**OPERATING INSTRUCTIONS**

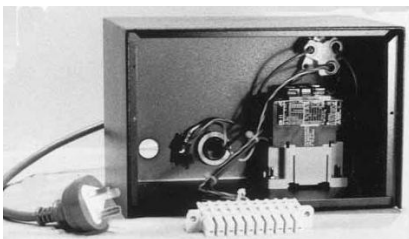
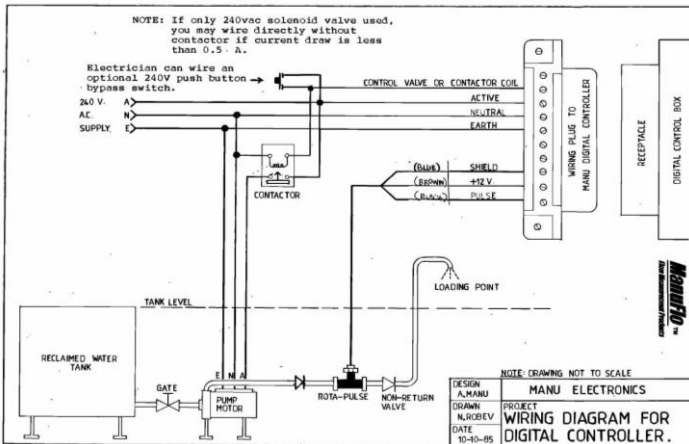
- \* Switch ON the power to unit. Select required batch quantity using rotary number dial selector switches.
- \* RESET the unit. The LED displays zeroes, and all LED indicators and any alarms turns off. The unit is now ready for batching.
- \* To operate, push each of the toggle switches ON-OFF, START-STOP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

**SPECIFICATIONS**

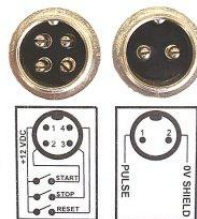
<b>Power supply</b>	220-260 vac (optional 110 vac or 12-24 VDC)
<b>Output to flowmeter</b>	12 VDC up to 100mA
<b>Relay outputs</b>	Max. 240 vac, 30 VDC 1 Amp
<b>Frequency input</b>	5 KHz: x1 input, 340 Hz: x17 inputs
<b>Display</b>	7 segment LED (14mm H)
<b>Connection</b>	10-pin Weidmuller mating plug and socket
<b>Fuse</b>	1 Amp (5 x 20mm case)
<b>Batch selection</b>	Visual rotary select switches
<b>Batch commands</b>	Push toggle switches
<b>Mounting</b>	Panel mount
<b>Instrument housing</b>	ABS hi-impact case
<b>External dimensions</b>	206 L, 130 H, 90 D mm
<b>Panel cutout</b>	190 L, 122 H mm
<b>Weight</b>	1 kg



ME995-6 in HB2500-SSR IP65 enclosure



SHB-1 Metal box wired, c/w contactor/plug/outlets.



External PLC Command Option



Batch Controllers interfaced in a Computer/PLC batch plant.

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

# MES20

## PULSE OUTPUT ADMIXTURE FLOWMETER

### Size 20mm - Positive Displacement

#### FEATURES

- Measures Admixtures (Specific Gravity  $\leq 1.4$ )
- Nutating disc measuring chamber.
- Small impurities can pass chamber without jamming.
- Low hydraulic thrust minimises wear.
- Exclusive 1 pulse per 1 millilitre output.
- $\pm 1.5\%$  accuracy curve.
- $\pm 0.2\%$  repeatability of rate.
- Conforms to AS3565-1988, Designed to meet AS3901.



MES20 Transistor pulse

MES20-R Reed switch pulse

The MES20 magnetically-coupled positive displacement pulse output flowmeter, with its nutating disc measurement principle flow chamber, provides a high resolution pulseout, making it suitable for a wide range of precision batching and flowrate monitoring applications, operating over a wide flow range.

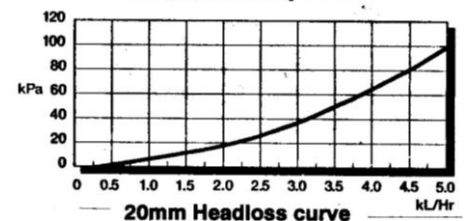
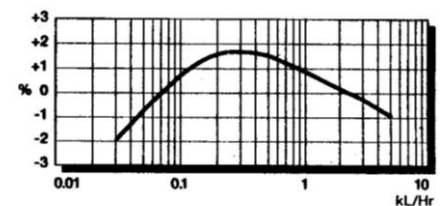
The MES20 was introduced in 1995, and is now used throughout the world. It is the primary choice for most construction chemicals suppliers throughout Australasia and other parts of the world for measuring and dispensing liquid admixture chemicals.

The nutating (wobble) disc measurement flow chamber employed in the MES20, makes the meter operate with only minimal headlosses and can pass small impurities without jamming. Measurement with a wide range of varying viscosity and specific gravity liquid water based admixtures is possible with only minimal calibration variations. The optimum operating flow rate is at nominal (Nom) flow, expect at least 10-15 years operating life of the chamber with admixture liquids.

The pulsehead (electronic) is fully self contained unit, which attaches to the main meter body with a bayonet turn and lock fitting mechanism. Although the MES20 was designed primarily for economical measurement of concrete admixtures, it is also used for a wide range of other water based liquid measurement applications.

#### TECHNICAL SPECIFICATIONS

Size	: 20mm
Pulse output rate: Transistor	: 1 per 1 millilitre (1000/Litre), Transistor output.
Reed switch	: 60.6 per Litre, contact closure.
Voltage supply	: +5 to 25 VDC
Supply current - Transistor version	: 5mA to 25mA proportional to supply voltage
- Reed Switch	: switching upto 100mA.
Accuracy (min - max range)	: $\pm 1.5\%$ (repeatability $\pm 0.2\%$ )
Start flow @ 5%	: 0.6 Litres per minute
Minimum (Min) flow	: 1.5 Litres per minute
Nominal (Nom) flow	: 45 Litres per minute
Maximum (Max) flow	: 54 Litres per minute (Admix s.g. 1.4) 68 Litres per minute (Admix s.g. 1.1) 75 Litres per minute (Water s.g. 1.0)
Maximum working pressure	: 1160 kPa
Headloss at nominal flow	: 25 kPa
Maximum fluid temperature	: 50 °C
Weight	: 1.8 kg



**INSTALLATION**

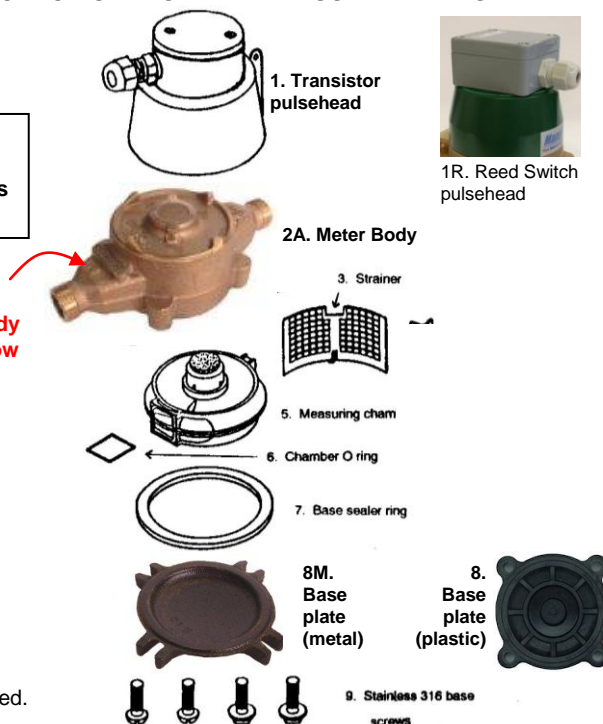
1. Meter body end threads are male 20mm 3/4" BSP. Arrow on meter body indicates direction of flow.
2. Install meter undercover, as the pulsehead is splashproof only (rated IP54). NOTE: use only shielded cable for all wiring
3. Consider an accessible area for any future service. Flowmeters may generally be installed in any plane without affecting accuracy (but not upside down if particles are present, as mag-drive assembly may be obstructed).
4. Meter can emit stray pulses in high vibration areas, so avoid high vibration areas, or install rubber dampeners, or use the MES20R reed switch version which is immune to vibration (has lower resolution pulse).
5. Flush out pipes thoroughly before connecting flowmeter. Ensure arrow on meter body coincides with forward direction of flow.
6. Although meter passes small impurities, a filter box or strainer (800 micron cartridge filter recommended) may be fitted prior to flowmeter, especially if fluid contains granules or many impurities.
7. Any flow restriction or regulation valve should be fitted preferably before the flowmeter. Quick-closing valves should be fitted before the meter if used for higher-end flowrates (thus avoiding sudden pressures on the flowmeter chamber) provided that the plumbing configuration allows the pipe to remain full where the flowmeter is located.
8. Once installed, flowmeter must be full of liquid at all times.
9. **IMPORTANT: AS LAST STEP OF INSTALLATION, A CALIBRATION CHECK OF FLOWMETER MUST BE PERFORMED.**

**MATERIAL SPECIFICATIONS**

- |                        |                            |
|------------------------|----------------------------|
| 1. Pulsehead           | - Polyacetal with PVC.     |
| 2A. Meter body         | - Gun metal AS1565 C83810. |
| 3. Strainer            | - Polyolefin.              |
| 4. (not used)          |                            |
| 5. Measuring chamber   | - Nepton                   |
| 6. Chamber O ring      | - NBR rubber               |
| 7. Base sealer ring    | - NBR rubber               |
| 8. Base plate          | - plastic                  |
| 8M. Base plate         | - Cast Iron, powder coated |
| 9. Base body hex screw | - Stainless steel 316      |
| 11. (not used)         |                            |
| 12. (not used)         |                            |

**NOTE: A full complement of spare parts is available.**

arrow on meter body indicates direction of flow



**PULSE OUTPUT SPECIFICATIONS**

**1) Standard NPN/PNP transistor 1 ml/pulse 5-25VDC**

The internal transistor will drive up to 250mA.

For PNP input (12-24VDC) fit a 1.5 to 1.8K resistor (see below).

(Value depends on input impedance).

Fixed pulse output options via PCB card insert available as:

10, 20, 50, 100 mls./pulse (Voltage supply limited +5 to 15VDC).

Re-transmission distance up to 1000 metres.

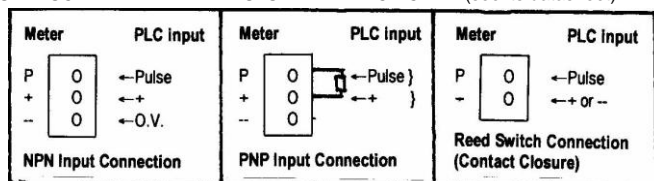
**USE SHIELDED CABLE ONLY.**

**2) Reed switch contact closure 60.6 pulses/ Litre**

Switching current up to 100mA. Current limiting resistor & debounce capacitor fitted.

FOR 24 to 240 VAC PULSE OUTPUT USE **UIC/A2**

FULLY SCALABLE DIVIDED PULSE INTERFACE CARD (see its datasheet).



**FLOWMETER ORDER CODE:**

MES20	Transistor pulse 1000 pulses/Litre
MES20R	Reed Switch 60.6 pulses/Litre

**MAINTENANCE**

If flow becomes excessively restricted, or meter is out of calibration, or pulsehead stops pulsing, then:

1. Where fitted, push in the locking pin. Hold the pulsehead, turn it anticlockwise, pull up and remove. **CAUTION: Do not press on, or impact, the copper base of the pulsehead.** Shake pulsehead in left-right motion - this should generate some pulses. If not, check wiring cable connector. If still no pulses, replace the pulsehead. If pulsehead does pulse, then problem may be in flow chamber, so proceed to step 2.
2. To access the measuring chamber, first rotate or remove meter body to access the base screws. Unscrew the 4 x hex bolts in the base, remove base plate and base seal ring. Using long nose pliers, pry and pull out white strainer screen thus unlocking measuring chamber assembly. Remove chamber and inspect.
3. If required, clean chamber parts in warm water or dilute acid (4:1 Water:Hydrochloric-acid). Make sure internal chamber wobble disc roller pin is in place and shutter plate is refitted. Re-assemble meter by reinserting measuring chamber; secure in position with strainer. Refit other components and test meter.
4. After use with chemicals, if MES20 is removed from pipeline, be sure to flush out working chamber with water.
5. To avoid moisture ingress to electronics, always make sure all cable entry glands are secure, cables are looped downwards and the meter is under cover. **IMPORTANT: AFTER ANY SERVICE, A CALIBRATION CHECK OF THE FLOWMETER MUST BE PERFORMED.**

Due to continuous product improvement, specifications may change without notice.



## FOR BATCH CONTROLLER / FLOWMETER ADMIX DISPENSING SYSTEMS

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SUGGESTED SOLUTION</b>
•No power to batch controller displays not on	•Blown fuse or holder not tighten •+12vdc and O.V. shorted •No main power supply	•Check fuse, tighten fuse holder (at rear of controller) •Check wiring, rear of controller & at flowmeters, replace cables. •Check power supply, check wiring
•Pulse fails at start of batch	•Air pocket •Restriction gate valve closed •Empty liquid tank •Pump not turning •Solenoid valve not opening •Seized flowmeter chamber •Flowmeter pulsehead faulty •Signal cable cut or bad joint	•Prime line by shorting output drive (C=Contact & A=Active) •Open gate valve •Check liquid level •Check and service pump •Check and service solenoid valve or non return valve stuck closed. •Service and clean flowmeter chamber, replace if required •Replace with new pulsehead, or connections corroded. •Check signal cable
<b>WARNING: In any pulse-fail or repeat malfunction condition, remove the truck mixer from the sock loading point.</b>		
•Pulse fails during batch cycle	•Flowrate too slow  •Flowrate too fast  •Blocked filter restricting flow •Measuring chamber clutching	•Open restriction gate valve or increase flowrate pulse fail timing capacitor (see service guide). •Chamber clutching, slow down flowrate via restrictor valve check flowmeter specs for performance operating range •Cleanout filter •Cleanout chamber or replace
•Display digits count slowly after batch complete	•Non return valve faulty (jammed open)	•Clean, service or replace
•Batch target display counter above batch selection	•Flowrate too fast, excessive overflow	•Turn down gate valve to restrict flowrate or set preact (overflow deduct) function to compensate (ME995 models) •Reduce delivery pipe diameter
•During calibration test more admix collected than indicated	•Flowmeter chamber part missing •Chamber excessively worn, liquid is slipping through without registration •S.G. below 1.0 •MES20 under excessive pressure with AEA slippery admix	•Check flow chamber, Check Orings are seated correctly (MEK20/MES20 roller bush or o'ring) •Replace with new chamber, recheck calibration •Replace chamber & restrict flowrate or recalibrate via controller (certain models only) or recalibrate via card. •Place restriction valve after pump and prior to flowmeter
<b>NOTE: After servicing any flowmeter, always perform a volumetric calibration test. Make sure glands are sealed, pulse cable is looped downward, and meters are under cover and protected from water ingress.</b>		
•Less admix collected than displayed.	•Possible syphoning effect if fed (mixing) into flowing water line. •Liquid flows backward after batches	•Fit ball valve solenoid or do not feed into flowing water line, or check valve. •Non-return valve faulty, service or replace
•Controller starts counting when power switched on, does not stop at batch complete	•Active and contact power drive short circuited •Contactor sticky or fused	•Short circuit on PCB, check PCB or replace •External pump contactor relay fused or need higher ampere rating, replace contactor
•Controller not counting but flow & or contact drive LED's on	•Controller malfunction, IC failure	•Replace controller, ring Manu for urgent advise.
•Controller counts although pump off (contact drive LED off)	•Dried out main electro capacitor	•Replace electrolytic capacitor (Pre ME995 units)
•Controller counts up a batch cycle but no admixture delivered	•Flowmeter (MES) measuring air	•Can occur with positive displacement pumps, fit a recirculation line on inlet/outlet of pump. See install guide brochure.
•When the target dosage is reached, the buzzer goes off and the "LM" limit LED is illuminated.	• If the external contactor (power relay) is in close proximity to the Batch Controller, then sometimes when the external contactor disengages, a voltage spike is generated that triggers the LED.	• Install a 0.033 $\mu$ F 240vac maincap capacitor across the coil of the contactor. This will absorb the voltage spike and eliminate the problem.

### **Sequential fault finding and rectification**

1. If a another Manu 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 Manu controller. Remove the flowmeter pulsing head only from meter body. Shake the pulsehead in a forward/backward circular motion. Check the Manu controller - it should have registered a number of counts on the display. If so, the pulsehead and electrical connection are probably OK. If no counts are registered, check that 12VDC is supplied to pulsehead, and if so, replace pulsehead. (Manu controller should be switched off when connecting new pulsehead). If no 12v at meter, then replace signal cable.
3. Flowmeter measuring chamber is jammed, damaged, filter blocked etc. For minimum service time, replace with a new measuring chamber. (For servicing chamber, refer to flowmeter brochure).

### **System overbatch problem**

1. The selector knob number dials on the Manu preset batch controller may not be positioned correctly, and therefore do not correspond to the rotary switch numeric values.
2. To test, set all numbered dials to the zero position, 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. Now check that the exposed switch shafts (black) flat side are horizontal. If not, turn shafts horizontal and refit the numbered dial knob to the zero number setting. For dosage switches, position to zero and push the TEST button. Digits should not count (except in the ME995-3 model). If digits count, then remove grey knob and check as described in 1.
3. If batch controller is tested and found to be operating correctly, then proceed to checking and testing flowmeter components.

**If in further doubt, contact your local representative, or ManuFlo at phone +61 2 9938-1425, 9905-4324.**

## SERVICE ADJUSTMENTS

### to safety timings and limits for ME995 - ME188 preset batch controllers.

**INITIAL START (T2):** Once start toggle is pressed, controller allows a standard 1.5 seconds for pulses to arrive from the flowmeter. If there are no pulses within the 1.5 second time period, the controller will shut down the output voltage drive, and will 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 capacitor values and location on PCB.

**FLOWRATE (T1):** If pulses do arrive within the allocated initial start time, the controller then locks in pulserate safety. Most Manu batch controllers have a standard 30 counts per second (30Hz) pulserate safety setting. If the pulses from the flowmeter drop below the 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 concrete admixture dispensing systems using MES20 (1ml/1 pulse) flowmeters, where if the flowrate drops below 30 millilitres per second the pulse fail safety will activate. The flowrate (frequency) 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 capacitor values and location on 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 (MES20 20mm 1 pulse/1ml output flowmeter). 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. But the limit setting can be reduced by simply desoldering the limit lead wire (connected to the rear of the rotary switch solder pads) and resoldering 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
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)

