

# **ADMIXTURE BATCHING SYSTEM with ME995-MES**

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

## **Your system comprises:**



## **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. The controller is a panel mount design so mount into the cutout in your control panel or mount into the ManuFlo housing enclosure.
- B. Remove the detachable 10-pin plug from the rear of the ManuFlo controller. Wire the 240VAC supply (or DC powered as optionally ordered). 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 near 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.  
Note: The batch controller supplies the MES flowmeters with +12vdc.
- 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 !!!!!!!!!!!!!!!**

**ManuFlo**®™  
Flow Measurement & Control Products

Rev: ATM0520

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**Consult your local systems integrator / admix supplier or ManuFlo for advise.**  
**ManuFlo recommends all non-manuflo equipment be sourced locally if possible**  
**(e.g. Valves, hoses, solenoids, pipe fittings etc).**  
[\(or go visit a batch plant Install and see ManuFlo equipment in operation\)](#)

### **ADMIXTURE SYSTEM INSTALL PROCEDURE**

- Simply mount the batch controllers with the wired housing boxes in the batch hut.
- Mount the pumps on the stand with the flowmeters and fittings. Wire as per wiring diagrams.
- Protect all external 240vac power cables with channel conduit to protect from electrocution).
- Run the low voltage 12vdc signal cable from the flowmeters up to the rear of batch controller inputs.



### **PUMP SELECTION**

<u>Order Code</u>	<u>Size</u>	<u>Type</u>	<u>Description</u>	<u>Power</u>	<u>Watts</u>
ONGA413	1"	Onga 413	Single phase centrifugal pump 0.5hp. < 50LPM @12m/H	240vac	400
SJ35-04	1"	Davey SJ35-04	<ul style="list-style-type: none"> <li>• Single phase centrifugal pump. 45 Litres/min. @10m/H</li> <li>• IP55 motor. 2900 rpm. 2.3 Amps..</li> </ul>	240vac	370

Other suggested pump options:- Onga 400 (CF) 413-417 series centrifuge pump series.

Positive Displacement Pump options:

Mono Pumps 240vac CP25 @30LPM, CP800 @80LPM, CP1600 @120LPM. I/O 1 to 1 1/2" BSP-f

Onga Pumps 240vac JS110 @45LPM, JS120 @ 90LPM, I/O 1" to 1 1/4" BSP-f threaded connections.

Stats@10mtrs/H. Self-priming to 6 metres up to 25 metres head. (specs.with water)

**Ideal for higher S.G chemicals and faster flow delivery requirements.**



Davey SJ-35 Series Pumps – ideal for low cost delivery of water-based admixtures

- built to cover a wide range of applications. suitable for pumping clean non-aggressive liquids without solids or fibres in suspension. Strong durable.
- manufactured from molded materials giving superior resistance to corrosion. SS304
- Efficient design produces greater flow whilst maintaining low power consumption. Maximum working pressure : 410 kPa, Liquid temp. range 1 – 50 °C
- Max. Ambient temp. 55 °C. Motor: TEFC 2 Pole Continuously rated.
- Nominal speed: 2900 rpm, IP rating: IP55

**USE RE-INFORCED HOSE LINES for Admixture installs.**

**General Pump application use info:**  
Centrifuge (CF) Pumps general use for typical chemical admixtures.  
Positive Displacement (PD) Pumps ideal for dispensing higher S.G. liquids Delivering faster flowrates and head heights. These pumps generate higher pressures so ManuFlo recommends a recirculation pressure relief flow line be installed. Refer to our technical guides.

#### **Signal Cable:**

<u>Qty</u>	<u>Model</u>	<u>Description</u>
1	WS3028	<b>Signal Cable Heavy Duty 100 mtr roll</b> <ul style="list-style-type: none"> <li>• 2-core wire braid screen shielded -</li> <li>• AWG24</li> </ul>

#### **3 Way Valve**

<u>Qty</u>	<u>Model</u>	<u>Description</u>
1	WS3028	<b>SRS Pro Reduced bore 3 way valve</b> <ul style="list-style-type: none"> <li>• 3 x 5/8" threaded connections</li> <li>• brass construction</li> <li>• to provide isolation for decanting and calibration.</li> </ul>

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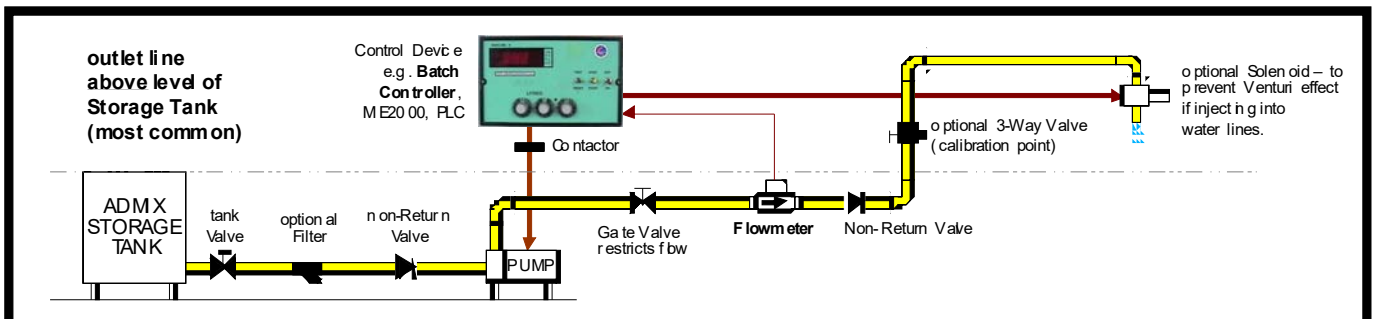
# INSTALLATION GUIDE for ME995 Batch Controllers with MES20 and other flowmeters

- (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, for the original MES20 as is sensitive to high vibrations which can cause some stray pulses. For Newer MES20 and MES20N there is less requirement as incorporate latest technology digital vibration free sensors. (see the "Installation" section in the MES product brochure).

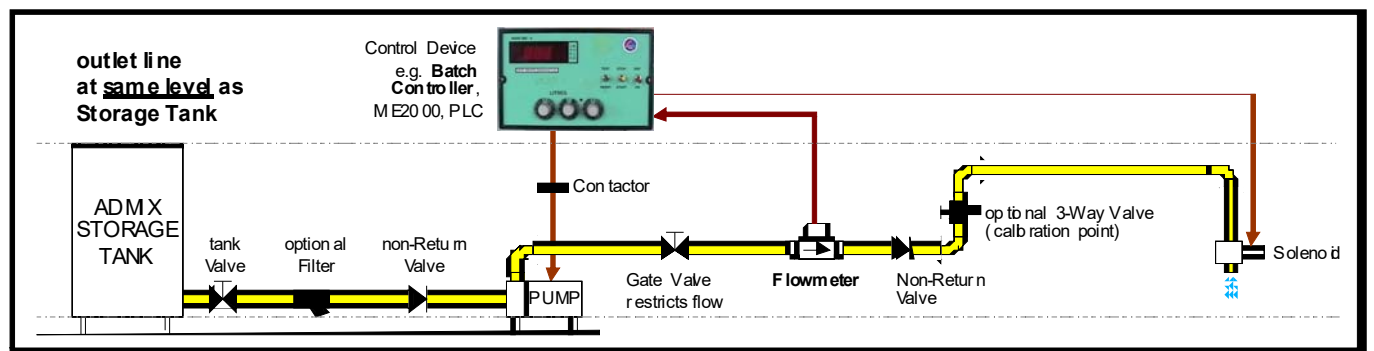
(2) Establish the outlet point position in relation to the storage tank:

**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:

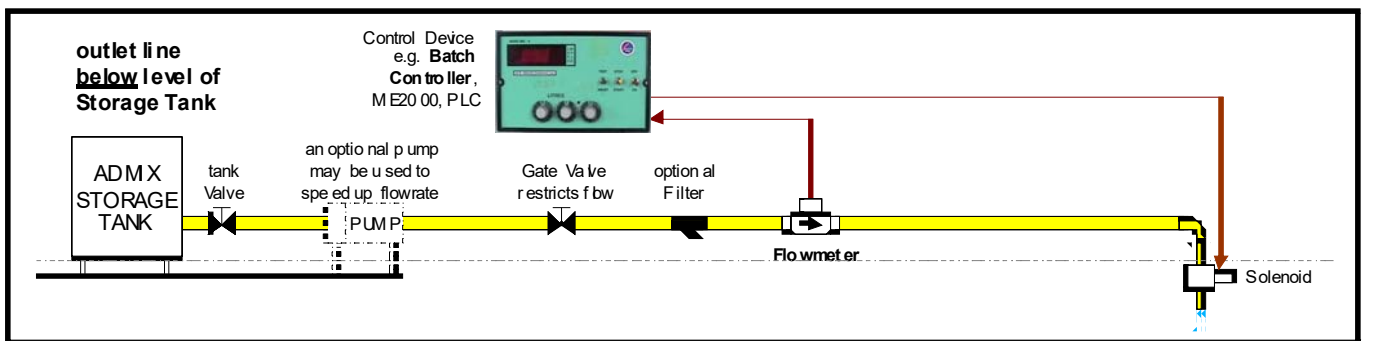
- a solenoid valve (air-assisted ball valve type) for instant shut off of flow, recommended to prevent the Venturi effect when injecting into water lines, but may not be required if the installation has reasonable head height.
- a 3-Way Valve to provide an easily accessible calibration point.
- ¾" to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

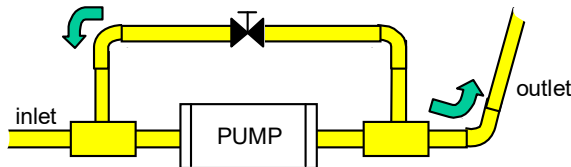
► For low flowrates and small batch quantities of liquid (approx < 2000mls), use ½" diameter pipe or hose (after the flowmeter). ► For medium to high flowrates, use ¾" to 1" diameter pipe. ► For very high flowrates, use 1¼".

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 may cause overdosing., so make sure to select the larger size 25, 32, 40mm MES flowmeters and hose line diameters to match your requirements.

## **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 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 possible blockage to the flowmeter measuring chamber unit (Amiad™ Ystrainer 800-micron filter is recommended). (regardless the ME995 safety detection watchdog system will warn of any problems with measurement).

## **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 e.g. Onga413 centrifuge 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.

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Flow Measurement Products

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## FEATURES

- LED displays
- 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 up-count 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 pre-act (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 set-point 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) +size type
ME995-1A	Millilitres, 0 dec. place, 4 digit to 9990	1000 fixed (MES20)
ME995-1	Millilitres, 0 dec. place, 5 digit to 99990	1000 fixed " "
ME995-2, -3, -2C, -2CH, -3K, -3KH	Dosage-rate calculation controllers – enquire for further details	1000 fixed " "
ME995-4	Litres, 2 dec. places, 4 digit to 90.000	1000 fixed " "
ME995-6	Litres, 1 dec. place, 3 digit to 90.0	1000 fixed " "
ME995-7	Litres, 0 dec. place, 4 digit to 9000 (x1 or x17 input)	1 to 999 K-factor (MES20,25,32,40)
ME995-7D	Litres, 1 dec. place, 4 digit to 900.0 (x1 or x17 input)	1 to 999 K-factor " " " " " "
ME995-7DS	Litres, 1 dec. place, 3 digit to 90.0 (x1 input)	1 to 999 K-factor " " " " " "

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

-MC2	PLC interface, Start/Stop/Reset volt free commands via 4pin & open collector pulse via 2pin (For Batch Controllers interfaced in a Computer/PLC controlled batch plant)
- 5P, with ME5IC	PLC interface via plug and special isolation command card (for USA based computer systems)
-S12	Two product control selection switch, sequential relay output drives. (2pump/valves/flowmeters)
-AO	Logic or relay output on batch complete or alarm condition
-110V	110vac Supply & control voltage
-DC-OC	12-24 VDC power supply input / output drive, with Open Contact output drive (5 Amps) which is via external voltages e.g. 12 or 24 VDC, 110 or 240vac
-24VAC-OC	24 vac power supply input / output drive (Neutral can be to Ground or floating)
-110-OC	110 vac power supply input / output drive
-OC	240vac supply, Open Contact output drive (5 Amps). Drive is via external voltages e.g. 12 or 24 VDC, 110 or 240vac

## 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.
-T	Terminal strip connection fitted in SHB1/DHB2 boxes for power/pump drives in lieu of GPO
HB2510	IP66 ABS waterproof clear swing lid enclosure –SS316-hinges.
SSR	External commands start/stop/reset IP65 rated (fitted to HB2510)

## SAFETY FEATURES

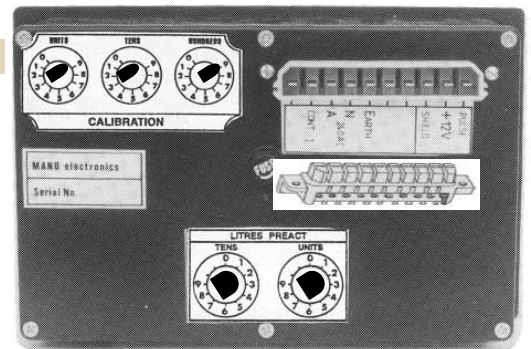
- \* **LIMIT (LM) LED** activates if batch cycle reaches locked internal limit, or if circuit diagnostics detect internal chip problem. Subsequently, there is automatic shutoff of voltage contact drive.
- \* **PULSE FAIL (PF) LED** activates if no pulses arrive within 1.5 seconds (variable) initial start 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

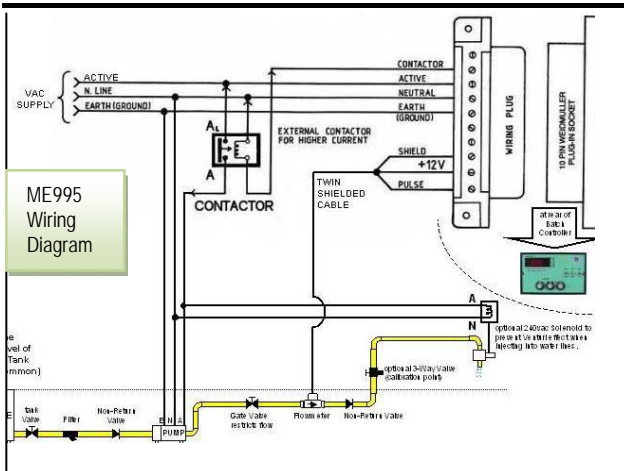
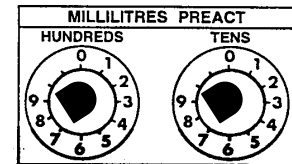
<b>Power supply</b>	220-260 vac (optional 24vac, 110vac or 12-24 VDC)
<b>Output to flowmeter</b>	12 VDC up to 100mA
<b>Relay outputs</b>	Max. 240 vac, 30 VDC 1 Amp. (or open contact drive where ordered)
<b>Frequency input</b>	5 KHz: x1 input, or 340 Hz: x17 inputs
<b>Displays</b>	7 segment LED (14mm H), (Qty 2-5, depends on model). 4x 3mm LED status indicators
<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



Rear of ME995 controller



Side 1-2 product selection option



SHB1



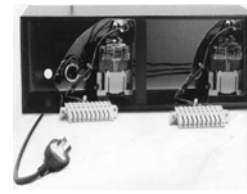
SHB1-T



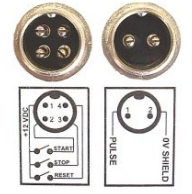
ME995 with HB2510



SHB1 rear



DHB2



MC2 (PLC interface)

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

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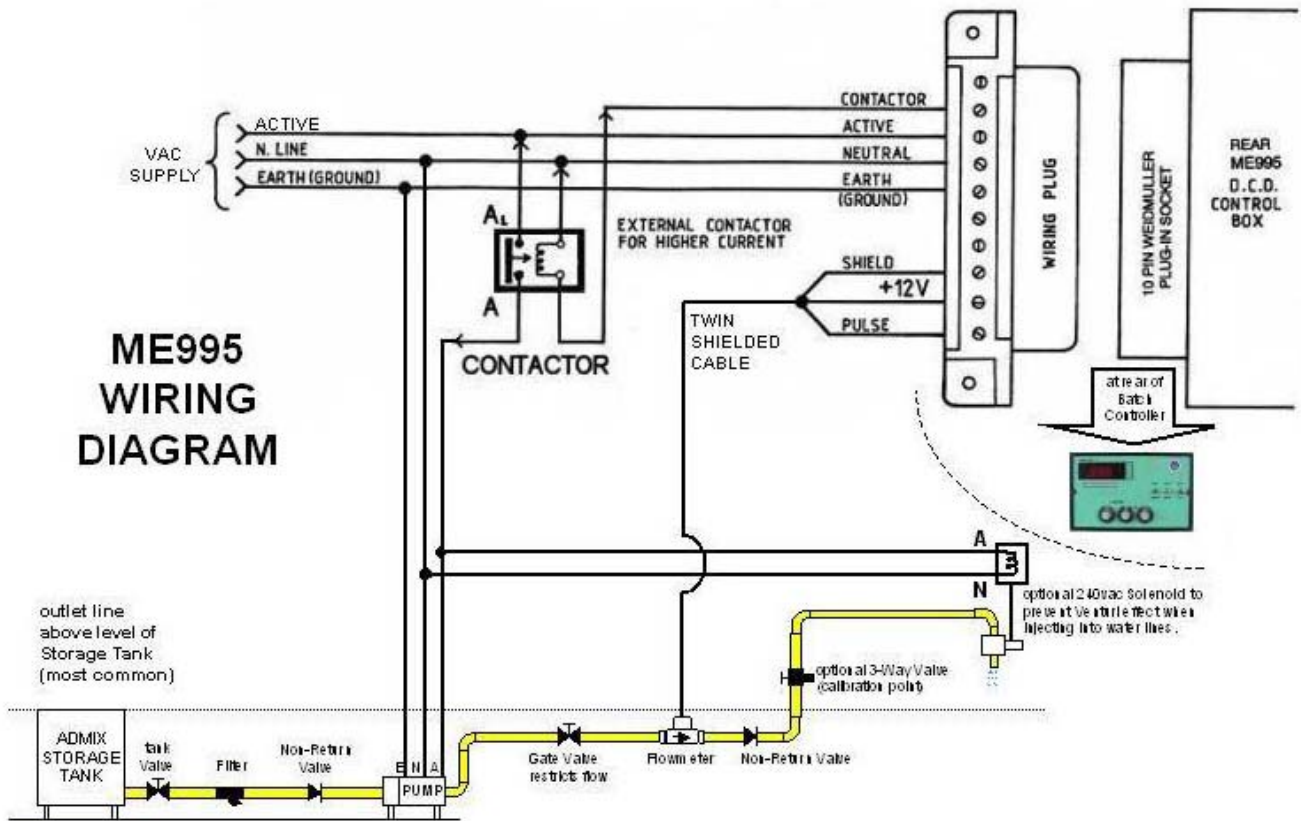
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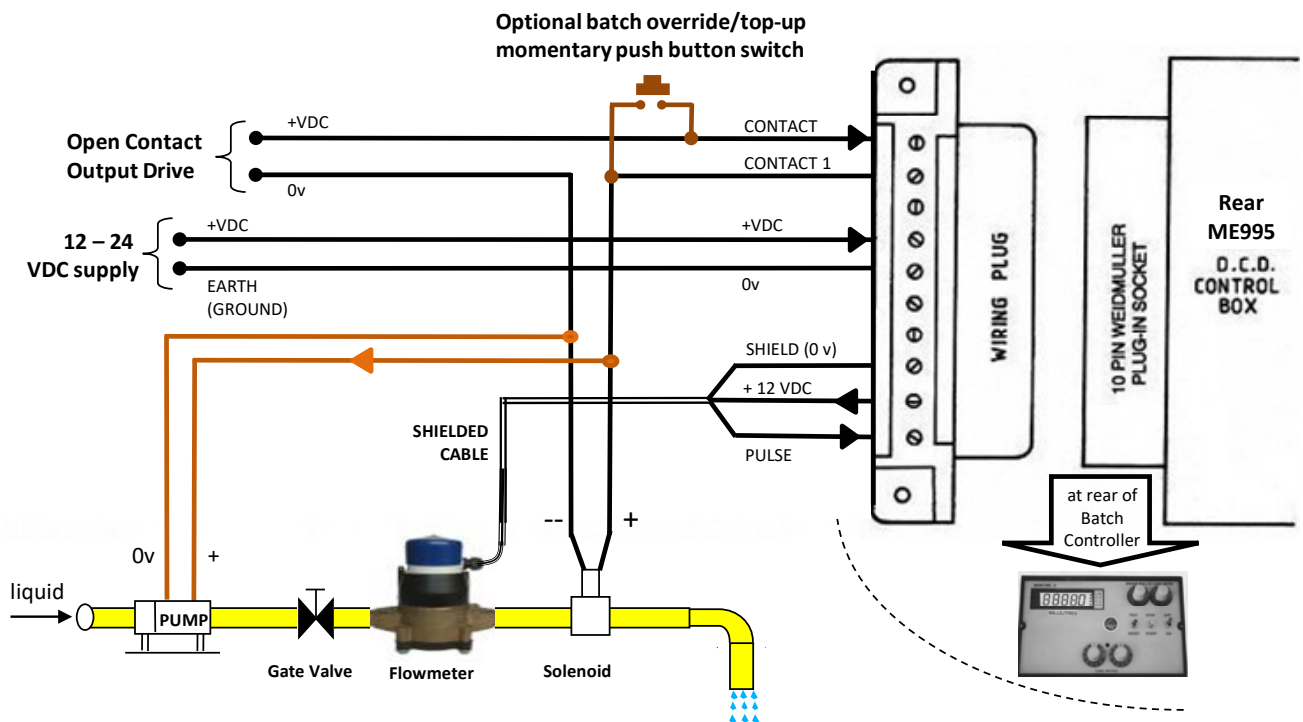
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### Standard AC Wiring for Pump and optional Solenoid



### 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

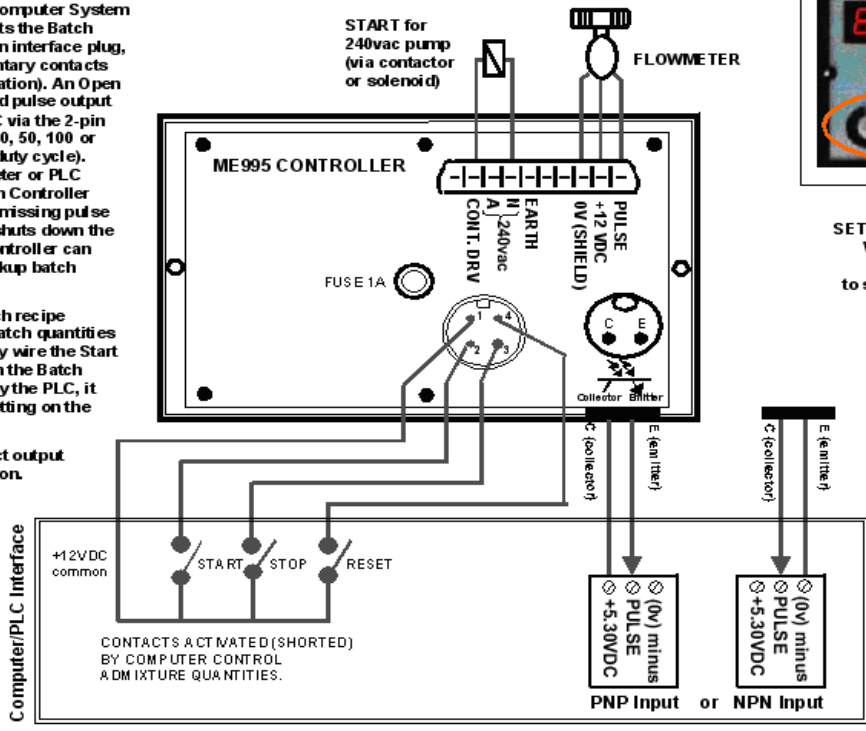


**OPERATION OF BATCH CONTROLLER WITH PLC CONTROLLED SYSTEM**

A maximum batch limit is set using the front selector switches of the Batch Controller. The PLC/Computer System starts, stops and resets the Batch Controller via the 4-pin interface plug, using volt-free momentary contacts (minimum 0.5 sec duration). An Open Collector opto-isolated pulse output is provided to the PLC via the 2-pin plug (fixed value 10, 20, 50, 100 or 1000 ml/pulse; 50% duty cycle). In the event of flowmeter or PLC malfunction, the Batch Controller overrides through its missing pulse detection safety and shuts down the system. The Batch Controller can also be used as a backup batch facility.

If the PLC has no batch recipe software control (or batch quantities are repeatable), simply wire the Start and Reset lines. When the Batch Controller is started by the PLC, it will batch up to the setting on the front dials.

Note: An alarm contact output is available as an option.



ME 995 series Batch Controller  
SET ON MAXIMUM QUANTITY WHEN OPERATING IN COMPUTER MODE to set maximum batch limit.

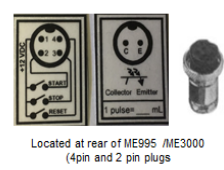
- PULSE OUTPUT value is fixed at factory setting of:
- 1 ml
  - 10 ml
  - 100 ml
  - 1 Litre
  - 20 ml
  - 50 ml

**WIRING DIAGRAM: ME995 Batch Controller and Computer Batching System.**

**(A) Interfacing to PLC using - MC2**



With PLCs, ME995 or ME3000 used as a Set Point Controller, or for added safety.



Located at rear of ME995 /ME3000 (4pin and 2 pin plugs)

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.

**ME995 Series Batch Controllers - Safety Features**

- **LIMIT (LM) LED** - illuminates if:
  - batch cycle reaches locked internal maximum limit, or
  - circuit diagnostics detect internal chip problem, with subsequent automatic shutoff of voltage contact drive.
- **PULSE FAIL (PF) LED** - activates if:
  - no flowmeter pulses arrive within initial 1.5 seconds (variable), or
  - pulses are interrupted or intermittent during batch cycle (fall below variable pulse scanning time, typical 30 Hz) with subsequent automatic shutoff of voltage drive to pump.
- **FLOW (FL) LED** - indicates pulses coming from field flowmeter, or if test is used.
- **CONTACT DRIVE (CD) LED** - output drive activated to pump or solenoid.



**Audible ALARM sounds:**

- momentarily upon completion of batch cycle,
- continuously if PULSE FAIL or LIMIT occurs LEDs are activated or if overflow runs 1000 ml (variable) past selected batch quantity.

**Warning: If Contact or Flow LED indicators are on,**

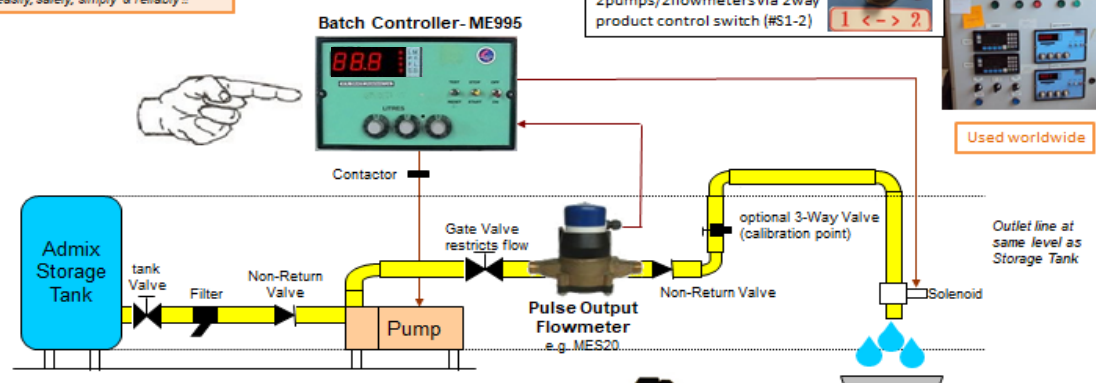
**but controller is not counting, discontinue use and call for service.**



**2. Semi-Automatic Batching**

New Country Install was Nov.2019  
Ghana Africa - dispensing chemicals easily, safely, simply & reliably !!

Controllers can be configured to dispense 2 admixture products  
2 pumps/2 flowmeters via 2 way product control switch (#S1-2)



Quantity set by: operator  
Delivery controlled by:  
**Batch Controller with multiple safety features.**  
Some earlier models still in use since 1980 !!



Used worldwide



#### FEATURES

- Flow Direction Detection with Forward/Reverse.
- Optional pulse value per litre on any given size.
- 4 – 35 V DC input voltage range.
- P.D. Nutating (wobbling) disc measuring chamber.
- Small impurities can pass chamber without jamming.
- Low hydraulic thrust minimises wear.
- High pulse output rate for precision flowrate and batching applications.
- Measures Admixtures to 1.4-SG.  
Accuracy largely unaffected by varying viscosities & S.G.
- $\pm 1.5$  % flow range accuracy curve.
- $\pm 0.2$  % repeatability or better
- Sizes 20, 25, 32 & 40mm



*New MES20-N pictured*

Conforms to AS3565-1988, designed to meet AS3901.

Approvals : C700-AWWA,SDWA-NSF372

The MES range of nutating disc, magnetically-coupled, positive displacement pulse output flowmeters (introduced in 1995, with most still operational) are suitable for a wide range of precision batching and flowrate monitoring applications, operating from low to high flow ranges.

Unlike rotary piston and oval rotor principle meters, the nutating disc flow chamber can pass small impurities without jamming, whilst maintaining exceptional measurement accuracy with only minimal headlosses. Measurement of concrete admixtures and water-based chemicals with varying specific gravities up to 1.4 is achieved with only insignificant calibration variations (hence not having to change calibration values).

The new Pulsehead with digital smart pulse (DSP) transmitter is a self-contained unit which couples to the meter body with a bayonet lock and turn fitting connection, while being fully isolated from the fluid measuring chamber. Pulse outputs are available as Digital Pulse Output (replaces the Transistor type) or Contact Closure. The pulsehead unit is rated to IP63 protection (when using the outer cover cap).

The latest MES flowmeter Pulsehead model "DSP" (*Digital Smart Pulse*), uses magnetic sensors and a microcontroller unit to process and sample the signals which provides latest technology ultra-stable pulse outputs.

In addition, DSP technology is optionally able to determine the direction of the flow, through three separate, live output channel options.

Further, optionally the number of pulses per litre can be ordered for the output pulse as well, to make it suitable for expanded applications.

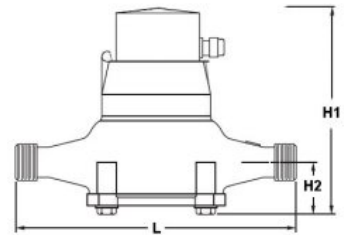
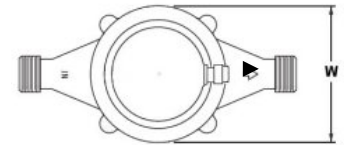
To make this design completely interchangeable with previous model pulseheads, the default output mode is standard with bi-directional pulse (Pulse output is live regardless of flow direction) and 1000 pulses per litre is standard on a 20mm measuring body. The different pulse value per litre will apply on the larger body sizes as per the table. Alternatively Output pulse value modes can be nominated at the time of purchase

## MES-P Flowmeters Specifications Table

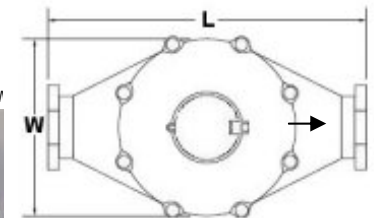
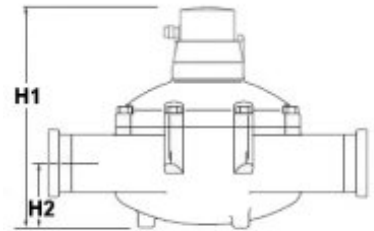
Model Number		MES20	MES25	MES32	MES40
Technical Specification					
Sizes (mm)		20mm	25mm	32mm	40mm
Digital (Standard)	Output rate (Pulses Per Litre)	Default/Standard: 1000 PPL on 20mm measuring body Available options: 1, 10, 20, 50, 100, 250, 500 & 1000			
	Standard outputs	1000	555	261	116
	Optional outputs	1 / 10 / 100 / 1000 pulses/litre (any size)			
	Supply voltage / current consumption	+ 4 to 30V DC // 3 – 17mA proportional to input voltage.			
	Maximum switching capacity	+ 30V DC, 500mA			
	Output options	1. Bi-directional pulse: Generates pulse on output regardless of the direction of flow. (Default/Standard) 2. Forward pulse: Generates pulse output as long as the direction of flow matches the arrow on measuring body. 3. Reverse Pulse: Only generates pulse output in case of backflow.			
Transistor (Superseded)	Output rate (Pulses Per Litre)	1000	555	261	116
	Supply voltage / current consumption	+ 5 – 25V DC / 5 – 25mA proportional to input voltage.			
	Maximum switching capacity	+ 25V DC, 500mA			
Contact closure	Output rate (Pulses Per Litre)	60.6	34	16	7.2
	Supply voltage / current consumption	No power supply needed. (2 Wire Connection)			
	Maximum switching capacity	+40V, 400mA			
Accuracy (min – max range)		± 1.5% (repeatability ± 0.2% or better of rate)			
Start Flow @ 5% (Litres/Minute)		0.6	1.1	1.5	3.0
Minimum Flowrate @ ±1.5 (Litres/Minute)		1.5	2.7	3.8	7.5
Nominal Flowrate (Litres/Minute)		45	65	125	200
Maximum Flowrate (Litres/Minute & Admix. s.g. 1.4)		54	80	132	268
Maximum Flowrate (Litres/Minute & Admix. s.g. 1.1)		70	102	168	340
Maximum Flowrate (Litres/Minute & Admix. s.g. 1.0)		80	112	185	375
Weight (including connectors)		1.3Kg	2.3Kg	4.7Kg	17Kg
Connection Type (BSP)		3/4" (Male)	1" (Male)	1 1/4" (Male)	1 1/2" Oval flanged kit, (Female)
Metric size reference		20mm	25mm	32mm	40mm
Maximum Working Pressure		1160 kPa (Headloss at nominal flowrate 25 kPa)			
Connection via IP67 PG9 cable gland entry Pulse head model IP63 rated with outer cap.		3 wire screw down terminals (use shielded signal cable)			
Maximum fluid temperature		50 °C			

## DIMENSIONS

Meter Size	mm	20 mm	25 mm	32 mm	40 mm
Length of threaded end meter	L	191	229	273	330
Overall Height of meter	H1	150	178	200	252
Height –underface to centreline	H2	35	48	54	65
Overall Width	W	92	111	165	205



dimensions for 20, 25, 32mm



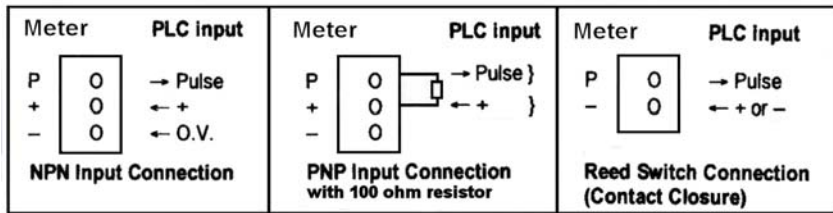
dimensions for 40 mm

## PULSE OUTPUT SPECIFICATIONS & CONNECTION

The Pulsehead unit (Digital Pulse/Transistor/Contact Closure) are of the same specification for all sizes. Pulseheads are interchangeable to another body size but be aware pulse value difference. For variable selectable scaling pulse output values, use **UIC/D** Universal Interface Card. For additional 24-240VAC Triac pulse switching, use **UIC/A** interface card.

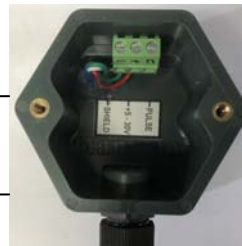
**To connect, remove the moulded housing cover, followed by the housing lid (2 screws). Pass the cable through the gland entry and connect to the terminal connector strip. Screw down on wire, tighten gland and reseal housing and fit cover cap.**

**To avoid signal interference, use shielded cable only.**



**Standard NPN/PNP digital pulse switching 4-30VDC.**  
**The internal transistor will drive up to 500mA**  
**For PNP input fit a 1.5 to 1.8K resistor**  
 (Value depends on input impedance) **between + and P.**

MES Internal Junction View



- DSP-OC suitable for ManuFlo devices (no pull up resistor)
- DSP suitable for other input devices (pull resistor fitted inside)

## INSTALLATION

1. Install the meter undercover for longevity, the pulsehead is now rated IP63 when hood cap is secured.
2. Consider an accessible area for any future service. Flush out pipes thoroughly before connecting flowmeter in pipework.
3. Flowmeters may be installed in any position without affecting accuracy (but not upside down).
4. **Ensure arrow on meter body coincides with forward flow direction.**
5. Although chamber can pass small impurities, if the fluid contains large impurities, a 1000 micron filter should be fitted prior to meter.
6. 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 hammer pressures on the flowmeter chamber) provided that the plumbing configuration allows the pipe to remain full where the flowmeter is located.
7. Never exceed the rated maximum flow of the meter, as this could cause damage to the measuring chamber components and/or cause severe overdosing of liquid. Once installed, the flowmeter must measure a full pipe of liquid at all times.
8. Avoid installing the transistor pulse unit in high vibration areas, as this may cause false pulses.
9. **IMPORTANT: AS THE LAST STEP OF INSTALLATION, A CALIBRATION CHECK OF THE FLOWMETER MUST BE PERFORMED.**

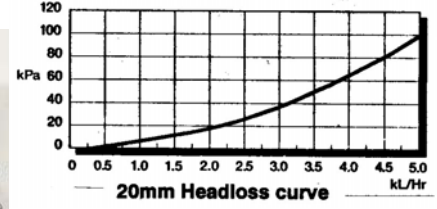
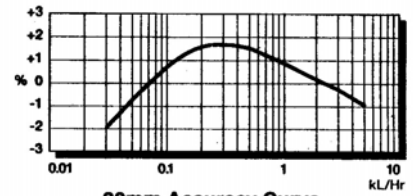
## MAINTENANCE

If flow becomes excessively restricted, or meter is out of calibration, or output pulses cease, then:

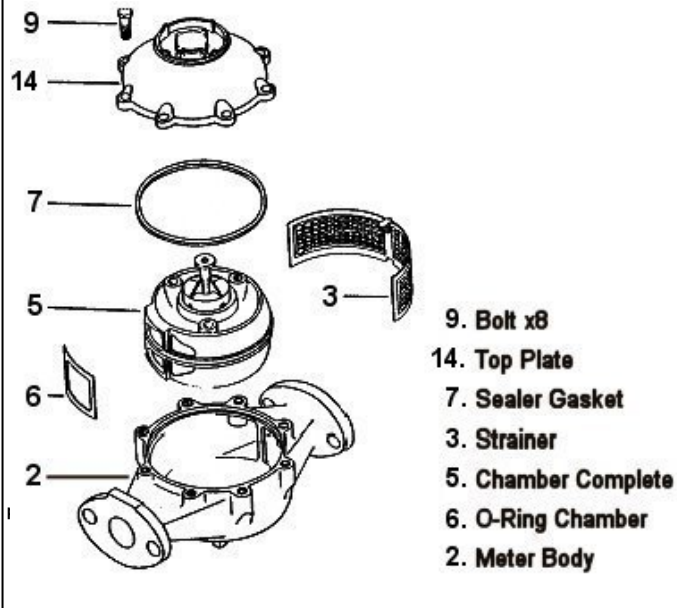
1. Where fitted, push in the pulsehead locking pin; hold pulsehead and turn it anti-clockwise, then pull up and remove pulsehead from the meter body.  
**CAUTION: Do not press on, or impact, the copper base of the pulsehead.** Use a magnet (or **UMT8** ManuFlo tester) and rotate at the copper base of the pulsehead -this should generate some pulses. (Note: Older transistor/optical pulseheads can be shaken to generate pulses). If not, check voltage supply, connections and cable. If all are OK, then proceed to step 2.  
 If still not working change and upgrade with new DSP (DSP-OC) digital pulsehead.
2. To access measuring chamber (Meter sizes 20, 25 and 32mm) rotate or remove meter body. Remove the base screws, base plate and base sealing ring. Using pliers, pry and pull out the white strainer to free the measuring chamber unit for removal and inspection. For the 40mm size undo the top body plate bolts x8.
3. If required, clean chamber parts in warm water with detergent or diluted acid/water 1:5 ratio. Remove any solids which may be impeding rotation. Be sure internal nutating disc roller pin is in place and that shutter plate is refitted. Blow into the chamber port to see it spins freely. Reassemble meter by reinserting measuring chamber and reposition it with strainer. Re-fit other components and test the meter.
4. If the MES meter runs dry after measuring chemicals, make sure to flush out the meter chamber with water.
5. To avoid moisture ingress to electronics, ensure cable entry gland is secure, cables are looped downwards and the meter is under cover.  
**IMPORTANT: AFTER ANY SERVICE, MUST PERFORM A CALIBRATION CHECK OF THE FLOWMETER**

## MATERIAL SPECIFICATIONS

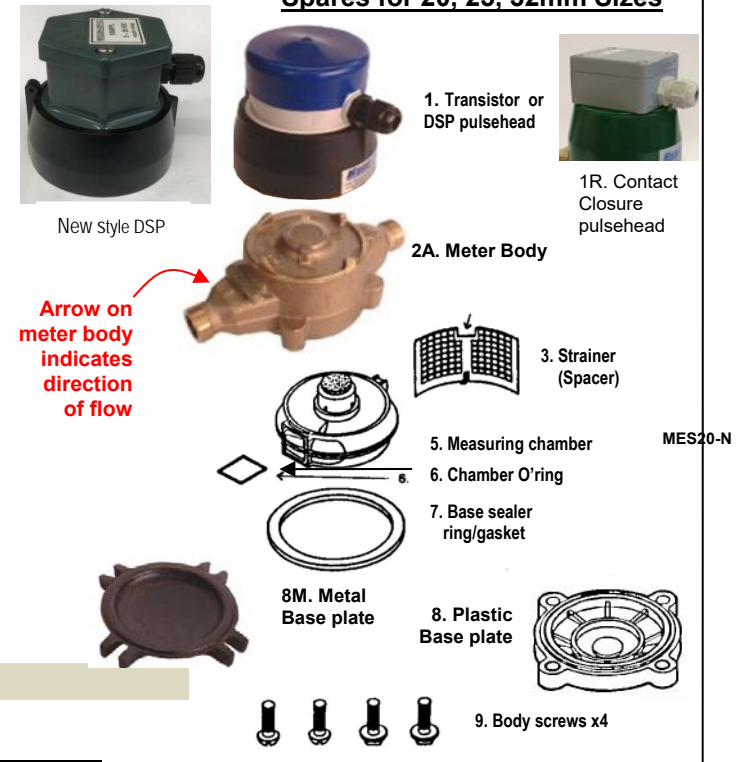
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|----------------------|--|
| 1. Pulsehead         | - Polyacetal & ASA-UV.   |
| 2A. Meter body       | - Cast gunmetal. AS1565 C83810   |
| 3. Strainer          | - Polyolefin.  |
| 4. (Not used)        |  |
| 5. Measuring chamber | - Nepton (synthetic polymer), SS316,<br>Polymer barium ferrite magnet. |
| 6. Chamber O-ring    | - NBR rubber.  |
| 7. Base sealer ring  | - NBR rubber. (optional 20mm EDPM )                                    |
| 8. Base plate        | - 20mm: Synthetic Polymer.   |
| 8M. Base plate       | - 25 & 32mm: Steel powder coated.                                      |
| 9. Base body screws  | - Stainless Steel.   |
| 14. Top Plate        | - 40mm: Gunmetal.  |



### Spares for 40mm size



### Spares for 20, 25, 32mm Sizes



## FLOWMETER ORDER CODES:

Code	Description
MES20-N	20mm Digital pulse OC (1000 pulses/Litre)
<b>Output options:</b>	
-DSP-OC	Standard issue (works with all ManuFlo equipment)
-DSP	Optional issue (with internal pull-up resistor)
Special Optional Pulse output 1/10/100/1000 pulses per Litre	
<b>Options for 20 mm size only:</b>	
MES20R	20mm Contact Closure pulse o/p (60.6 pulses/Litre)
-E	With EDPM base gasket seal (part# -7E)
-T	with Teflon-lined body and couplings for 20mm only

Code	Size	Pulse Type	Pulses / Litre
MES25	25mm	Digital -OC	555
MES25R	25mm	Contact Closure	34
MES32	32mm	Digital -OC	261
MES32R	32mm	Contact Closure	16
MES40	40mm	Digital -OC	116
MES40R	40mm	Contact Closure	7.2

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

**ManuFlo** <sup>®</sup>™

Flow Measurement & Control Products

Rev: 05/20

a division of

**MANU ELECTRONICS PTY LTD**

Web: [www.manuelectronics.com.au](http://www.manuelectronics.com.au)



# Batch Controllers – Troubleshooting

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
<ul style="list-style-type: none"> <li>No power to batch controller, displays not on</li> </ul>	<ul style="list-style-type: none"> <li>Blown fuse or fuse holder not tight/broken</li> <li>+12vdc and O.V. shorted</li> <li>No main power supply</li> <li>Broken transformer</li> </ul>	<ul style="list-style-type: none"> <li>Check fuse, tighten fuse holder (at rear of controller)</li> <li>Check wiring, rear of controller &amp; at flowmeters, replace cables.</li> <li>Check power supply, check wiring</li> <li>Return to ManuFlo for repair</li> </ul>
<ul style="list-style-type: none"> <li>Pulse fails at start of batch</li> </ul>	<ul style="list-style-type: none"> <li>Air pocket</li> <li>Restriction gate valve closed</li> <li>Empty liquid tank</li> <li>Pump not turning</li> <li>Solenoid valve not opening</li> <li>Seized flowmeter chamber</li> <li>Flowmeter pulsehead faulty</li> <li>Signal cable cut or bad joint</li> <li>Pipes/hoses clogged or air pocket.</li> <li>Buildup coagulated admix at discharge point</li> <li><b>Seized PUMP due to sticky admix</b></li> </ul>	<ul style="list-style-type: none"> <li>Prime line by shorting output drive (C=Contact &amp; A=Active)</li> <li>Open gate valve</li> <li>Check liquid level</li> <li>Check and service pump</li> <li>Check and service solenoid valve or non return valve stuck closed. Flush out the flow-line, purge air pocket</li> <li>Service and clean flowmeter chamber, replace if required</li> <li>Replace with new pulsehead, or connections corroded.</li> <li>Check signal cable</li> <li><b>Hit the PUMP with a Rubber mallet to loosen it, then re-batch. Failing that then strip/clean or change the pump</b></li> </ul>

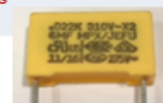
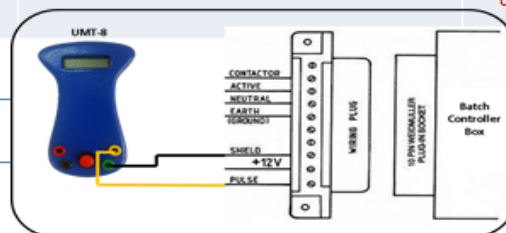
**WARNING: In any pulse-fail or repeat malfunction condition, remove the truck mixer from the sock loading point.**

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
<ul style="list-style-type: none"> <li>Pulse fails during batch cycle</li> </ul>	<ul style="list-style-type: none"> <li>Flowrate too slow</li> <li>Flowrate too fast</li> <li>Blocked filter restricting flow</li> <li>Measuring chamber clutching</li> </ul>	<ul style="list-style-type: none"> <li>Open restriction gate valve or increase flowrate pulse fail timing capacitor (see service guide).</li> <li>Chamber clutching, slow down flowrate via restrictor valve. Check flowmeter specs for performance operating range</li> <li>Cleanout filter</li> <li>Cleanout chamber or replace</li> <li>Clean, service or replace the flowmeter parts</li> </ul>
<ul style="list-style-type: none"> <li>Display digits count slowly after batch complete</li> </ul>	<ul style="list-style-type: none"> <li>Non return valve faulty (jammed open)</li> <li>Vibration</li> </ul>	<ul style="list-style-type: none"> <li>Clean, service or replace</li> <li>If Vibration – eliminate or use new MES-DSP Pulseheads.</li> </ul>
<ul style="list-style-type: none"> <li>Batch target display counter above batch selection</li> </ul>	<ul style="list-style-type: none"> <li>Flowrate too fast, excessive overflow</li> </ul>	<ul style="list-style-type: none"> <li>Turn down gate valve to restrict flowrate or set preact (overflow deduct) function to compensate (ME995 models –located at rear of unit)</li> <li>Reduce delivery pipe diameter</li> </ul>
<ul style="list-style-type: none"> <li>During calibration test, more admix collected than indicated</li> </ul>	<ul style="list-style-type: none"> <li>Flowmeter chamber part missing</li> <li>Chamber excessively worn, liquid is slipping through without registration</li> <li>S.G. below 1.0</li> <li>MES20 under excessive pressure with AEA slippery admix</li> </ul>	<ul style="list-style-type: none"> <li>Check flow chamber, check O-rings are seated correctly (MEK20/MES20 roller bush or O ring)</li> <li>Replace with new chamber, recheck calibration</li> <li>Replace chamber and restrict flowrate or recalibrate via controller (certain models only) or recalibrate via card</li> <li>Place restriction valve after pump and prior to flowmeter</li> </ul>

**NOTE: After servicing any flowmeter, always perform a volumetric calibration test. Make sure glands are sealed, pulse cable is lopped downward, and meters are under cover and protected from water ingress.**

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
<ul style="list-style-type: none"> <li>Less admix collected than displayed</li> </ul>	<ul style="list-style-type: none"> <li>Possible syphoning effect if fed (mixing) into flowing water line</li> <li>Liquid flows backward after batches</li> </ul>	<ul style="list-style-type: none"> <li>Fit ball valve solenoid or do not feed into flowing water line, or check valve</li> <li>Non-return valve faulty, service or replace</li> </ul>
<ul style="list-style-type: none"> <li>Controller starts counting when power switched on, does not stop at batch complete</li> </ul>	<ul style="list-style-type: none"> <li>Active and contact power drive short circuited</li> <li>Contactors sticky or fused</li> </ul>	<ul style="list-style-type: none"> <li>Short circuit on PCB, check PCB or replace</li> <li>External pump contractor relay fused or need higher ampere rating, replace contractor</li> </ul>
<ul style="list-style-type: none"> <li>Controller not counting but flow and/or contact drive LED's are on</li> </ul>	<ul style="list-style-type: none"> <li>Controller malfunction, IC failure</li> </ul>	<ul style="list-style-type: none"> <li>Replace controller, ring ManuFlo for urgent advice</li> </ul>
<ul style="list-style-type: none"> <li>Controller counts although pump off (contact drive LED off)</li> </ul>	<ul style="list-style-type: none"> <li>Dried out main electro capacitor, leads to unstable +12VDC line to circuit.</li> <li>Moisture on PCB –return to ManuFlo dry out clean</li> </ul>	<ul style="list-style-type: none"> <li>Replace electrolytic capacitor (Pre ME995 units)</li> </ul>
<ul style="list-style-type: none"> <li>Controller counts up a batch cycle but no admixture delivered</li> </ul>	<ul style="list-style-type: none"> <li>Flowmeter (MES) measuring air</li> </ul>	<ul style="list-style-type: none"> <li>Can occur with positive displacement pumps. Fit a recirculation line on inlet/outlet of pump. See install guide brochure.</li> </ul>
<ul style="list-style-type: none"> <li>Controller Limit "LM" LED light triggers disabling controller or spike of counts appears on display counts suddenly when engaging start toggle</li> </ul>	<ul style="list-style-type: none"> <li><b>Spike caused by 240vac contactor coil</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Fit a 0.1uF 275vac&gt; mains capacitor across the coil to filter initial start spikes</b></li> </ul>

Use UMT-8 Tester to check the functions of the inputs.



**Flowrate lower than average speeds.** Pipes hoses are clogged. Clogged near SOK -- pump has rubbish in the centrifuge rotor -- clean out pump -- gate valve seized -- rubbish jammed in non return valve -- suction side of pump issues -- piping blockages etc. change to PD pump -- close bypass valve if installed to increase pressure of flowrate

**NOTE: In winter, liquid may flow slower causing Pulse Fail. We recommend:**

- Opening up the restriction valve **OR**
- Fitting the capacitor to change Batch Controller T1 timing

**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.

**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 tuen 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)

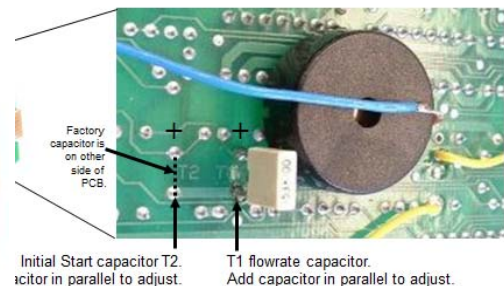
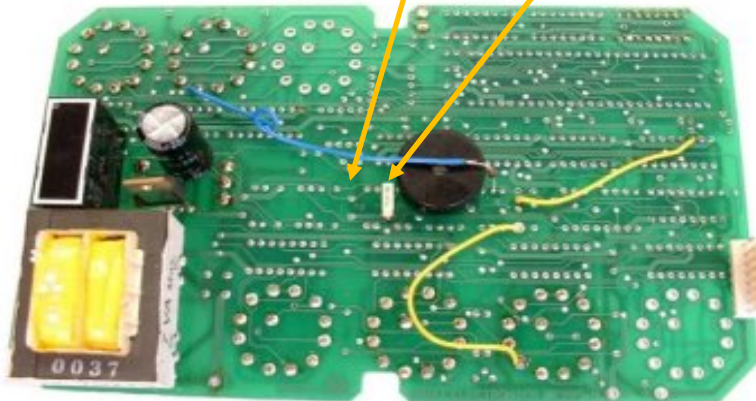
Standard factory set values are T2: 1µF capacitor, T1: 0.02 µF capacitor. Use the following tables to change factory set values.

**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)





# Batch Controller Calibration Test

## Volumetric Calibration Test should be performed when commissioning installation

- place a **calibrated vessel** at the discharge point
- on the Batch Controller, **select an amount** of liquid e.g. 1000 mls.
- press Reset, then Start to **batch** the quantity
- at the calibrated container, **check** that the amount dispensed is as requested.



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  

$$\text{overflow} =$$

$$(\text{actual amount dispensed, as shown on the Batch Controller display})$$

$$\text{minus (amount requested).}$$



If required:

- slow down flow velocity by using a restriction gate valve;
- avoid over-batching by using the Preact function, or installing a quick-acting solenoid valve.

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

**ManuFlo**®  
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## ME6008M Batch Monitor Printer Driver Unit

**NEW**

Connect up to 8x ME188 / ME995

**WIDE Printer**  
 dot matrix tractor feed LX350-II printer  
 234mm wide printout  
 80 characters

**OR**

**COMPACT Printer**  
 dot matrix paper Roll DP8340 printer  
 84mm wide printout  
 40 characters

DATE	TIME	CH-1	CH-2	CH-3	CH-4	CH-5	CH-6	CH-7	CH-8
9-09-11	20:00:01	20:14	000000	000100	000000	000000	000000	000000	000000
9-09-11	20:00:02	20:14	000000	000000	000100	000000	000000	000000	000000

**Provides multi-channel batch log/printout for manual premix concrete batch plants using ME188 and ME995 batch controllers.**

- **Monitors/prints up to 8 channels of admixture or water.**
- Provides an automatic QA end-of-batch printout, for use in concrete batch plants.
- Internally logs at least 500 batch events, downloadable to your laptop/PC now via optional front-access DB9 RS232 connector (comes with RS232-to-USB adapter).
- All records are time stamped from the unit's Real Time Clock, and have a Batch Number ID, time and date. Simply parallel flowmeter pulses and connect to the ME6008M, which then connects to a serial printer or PC.
- Grand Totals and the Batch History can also be printed(or dumped to a PC) on demand.
- Fully programmable, and the user can set parameters including K-Factors (PPL).
- Simple to install - same size as the ME995-series Batch Controllers, with same cutout.
- **New features:**
  - Extra RS232 connector on front, for easy access to download log to laptop.
  - Units (mL or L) indicated in printout.

