

ADMIXTURE BATCHING SYSTEMS

ME995 Batch Controllers with AMM-v2, or CMM Magflows

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 AMM, CMM)
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 by the controller display. See wiring diagram.
- C. Install the flowmeter as per the installation guide found on the flowmeter brochure.
(For AMM/CMM magflows make sure the fluid to be measured has a conductivity of more than 50m/s per cm.)
- D. Use shielded cable only for connection between flowmeter and Batch Controller. AMM flowmeters are supplied +12vdc from the batch controllers, CMM or MM flowmeters require 24vdc, so use a 12-24vdc step-up converter or use a separate 24vdc supply.
- E. The ME995 Models -1 thru to -6 Batch Controllers have fixed calibration of 1ml/1p and can be used with AMM15, AMM20 1000ppl flowmeters. ME995 (-7, -7D, -7DS prefix) models can be used with AMM25, CMM20, CMM25, flowmeters, the calibration is variable via K-factor to allow use. Batch Controller will be factory set on the K-factor 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).

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

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

Consult your local systems integrator / admix supplier or ManuFlo for advise.

ManuFlo®™
Flow Measurement & Control Products

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Rev: ME995-MAGS-admix-0520

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 or 24vdc signal cable from the flowmeters up to the rear of batch controller inputs.



Signal Cable:

Qty	Model	Description
1	WS3028	Signal Cable Heavy Duty 100 mtr roll • 2-core wire braid screen shielded - • AWG24

3 Way Valve

Qty	Model	Description
1	WS3028	SRS Pro Reduced bore 3 way valve • 3 x 5/8" threaded connections • brass construction • to provide isolation for decanting and calibration.

PUMP SELECTION

Order Code	Size	Type	Description	Power	Watts
ONGA413	1"	Onga 413	Single phase centrifugal pump 0.5hp. < 50LPM @12m/H	240vac	400
SJ35-04	1"	Davey SJ35-04	• Single phase centrifugal pump. 45 Litres/min. @10m/H • IP55 motor. 2900 rpm. 2.3 Amps.	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 1/4" 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 mottled 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.

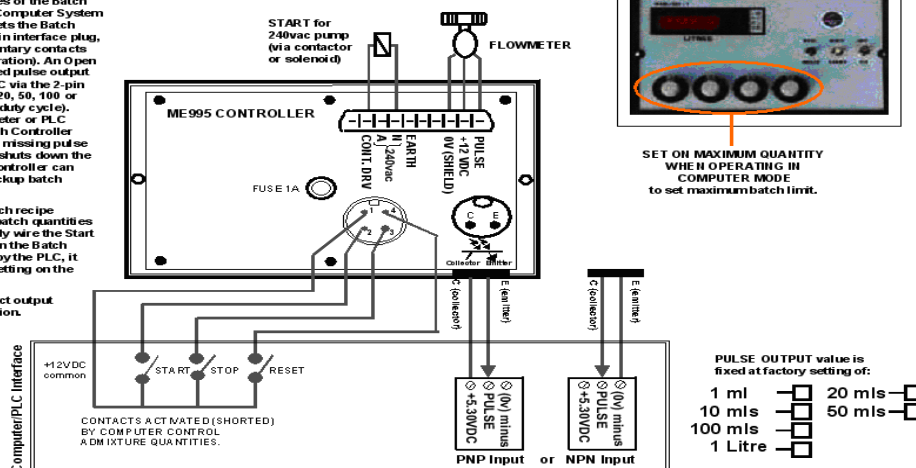
General Pump application use info:
 Centrifuge (CF) Pumps general use for typical chemical admixtures.
 Positive Displacement (PD) Pumps ideal for dispensing higher S.G. liquids Delivering faster flowrates and head heights. These pumps generate higher pressures so ManuFlo recommends a recirculation pressure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

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 mlspulse; 50% duty cycle). In the event of flowmeter or PLC malfunction, the Batch Controller overrides through its rising 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 of 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.



WIRING DIAGRAM: ME995 Batch Controller and Computer Batching System.

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INSTALLATION GUIDE

for *ME995 Batch Controllers*

with **AMM-v2 or CMM** mags flowmeters

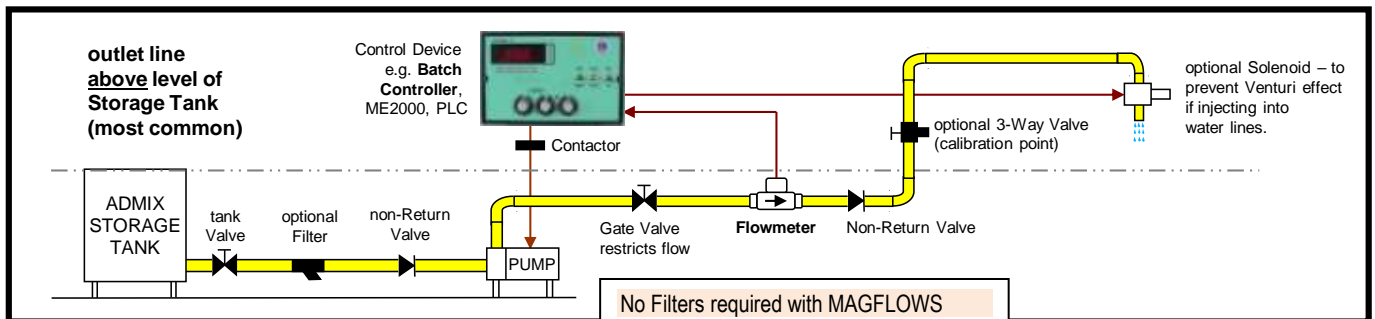
(1) Locate the most appropriate position to mount the magnetic flowmeter. Preferably:

- 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.
- To avoid any stray signal pulses a vibration free area is recommended, Refer to the relevant magnetic flowmeter datasheet for more detail (refer to the "Installation" section in the AMM, CMM, KMS product brochure).

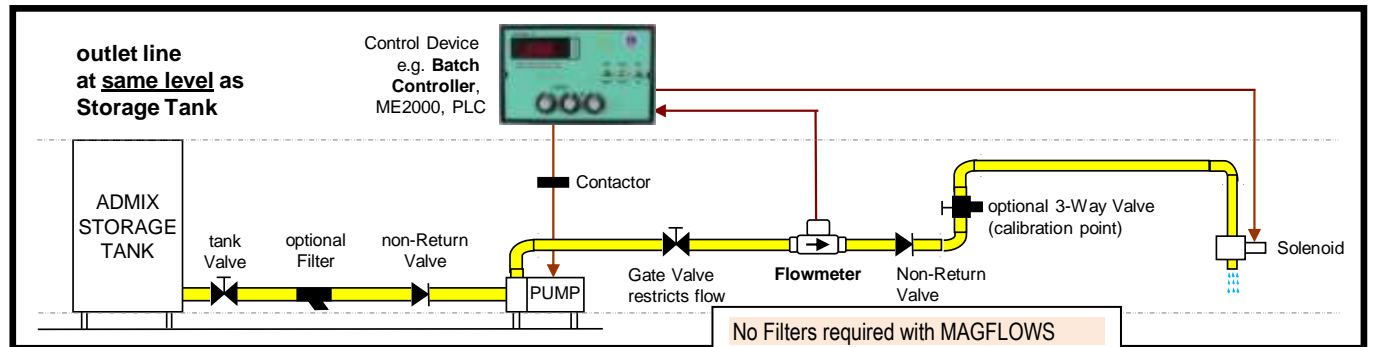
(2) Establish the outlet point position in relation to the storage tank:

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:

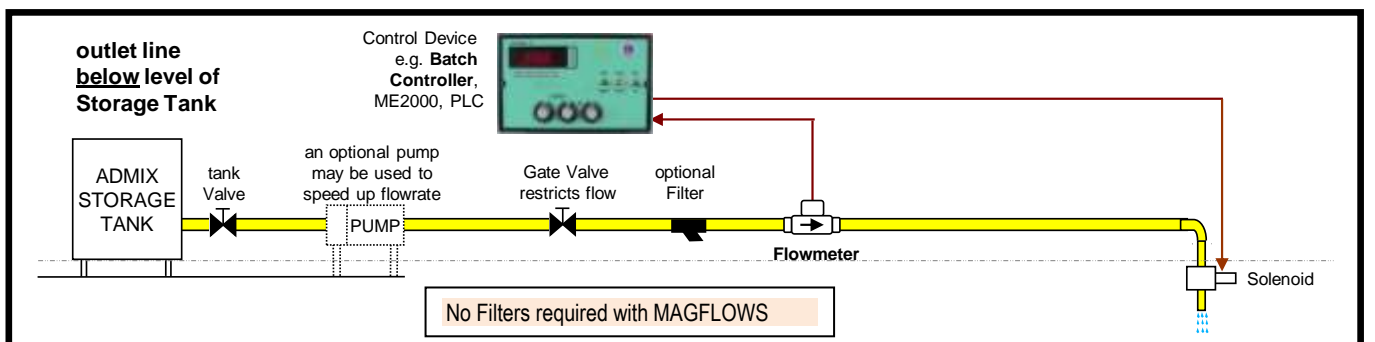
- a solenoid valve (air-assisted ball valve type) for instant shut off of flow, recommended to prevent the Venturi effect when injecting into water lines, but is not required if installation has reasonable head height and dispensing directly into mix.
- a 3-Way Valve to provide an easily accessible calibration point.
- 3/4" 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.



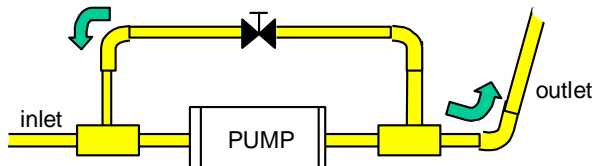
SELECTION OF PIPE LINE DIAMETERS (for AMM15/20 20mm, CMM25, MM 25mm flowmeters)

► 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.

PUMP SELECTION

► When measuring 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/regulate the flow and also relieve pressures— this can be achieved by using an inlet-to-outlet bypass flow valve to recirculate the flow line.



No FILTERS required. But Pipe lengths.

Not required with magnetic flowmeters as no moving parts. But allow 5 x dia. on inlet side and 3 x dia. on outlet of magflow of straight pipe of same diameter or larger of the flowmeter bore to flow condition straightening.

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 AMM electromagnetic flowmeters, use the +12 volts to power the units, for CMM & MM magflows which require 24vdc use the +12-24vdc power converters to power the units from the batch controllers).
- 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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Rev. 0406/1

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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)
ME995-1A	Millilitres, 0 dec. place, 4 digit to 9990	1000 fixed (AMM15/20, CMM10)
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 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 (all AMM/CMM)
ME995-7D	Litres, 1 dec. place, 4 digit to 900.0 (x1 or x17 input)	1 to 999 K-factor (all AMM/CMM)
ME995-7DS	Litres, 1 dec. place, 3 digit to 90.0 (x1 input)	1 to 999 K-factor (all AMM/CMM)

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
12-24C	+12 to 24vdc power converter step-up module for CMM mag flowmeters

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

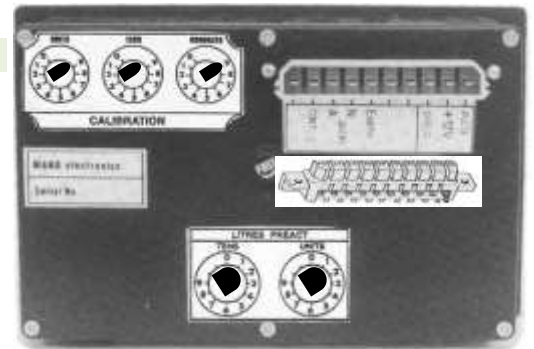
- * **LIMIT (LM) LED** activates if batch cycle reaches locked internal limit, or if circuit diagnostics detect internal chip problem. Subsequently, there is automatic shutoff of voltage contact drive.
- * **PULSE FAIL (PF) LED** activates if no pulses arrive within 1.5 seconds (variable) initial start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

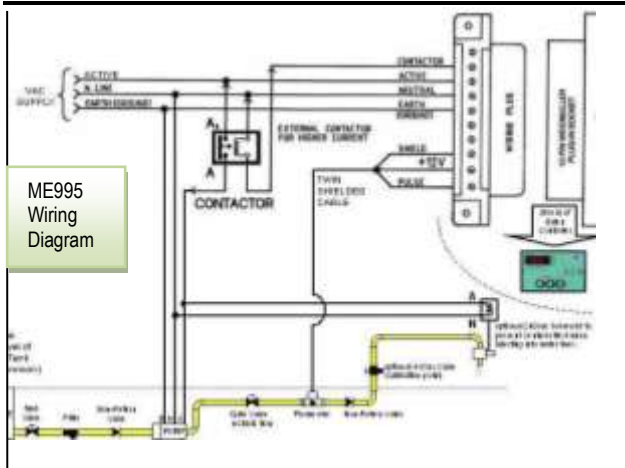
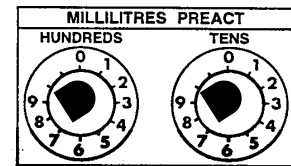
Power supply	220-260 vac (optional 24vac, 110vac or 12-24 VDC)
Output to flowmeter	12 VDC up to 100mA
Relay outputs	Max. 240 vac, 30 VDC 1 Amp. (or open contact drive where ordered)
Frequency input	5 KHz: x1 input, or 340 Hz: x17 inputs
Displays	7 segment LED (14mm H), (Qty 2-5, depends on model). 4x 3mm LED status indicators
Connection	10-pin Weidmuller 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
External dimensions	206 L, 130 H, 90 D mm
Panel cutout	190 L, 122 H mm
Weight	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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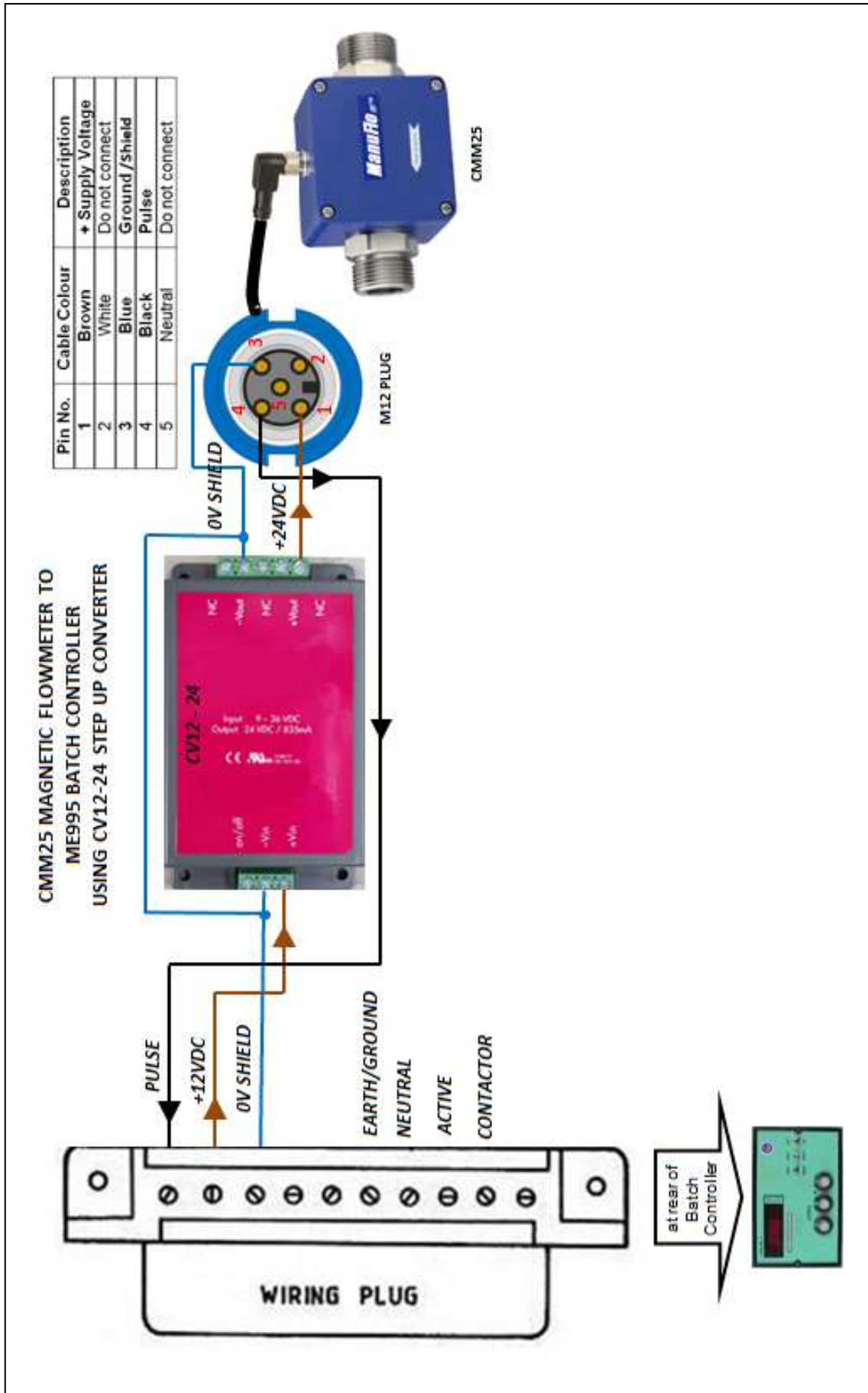
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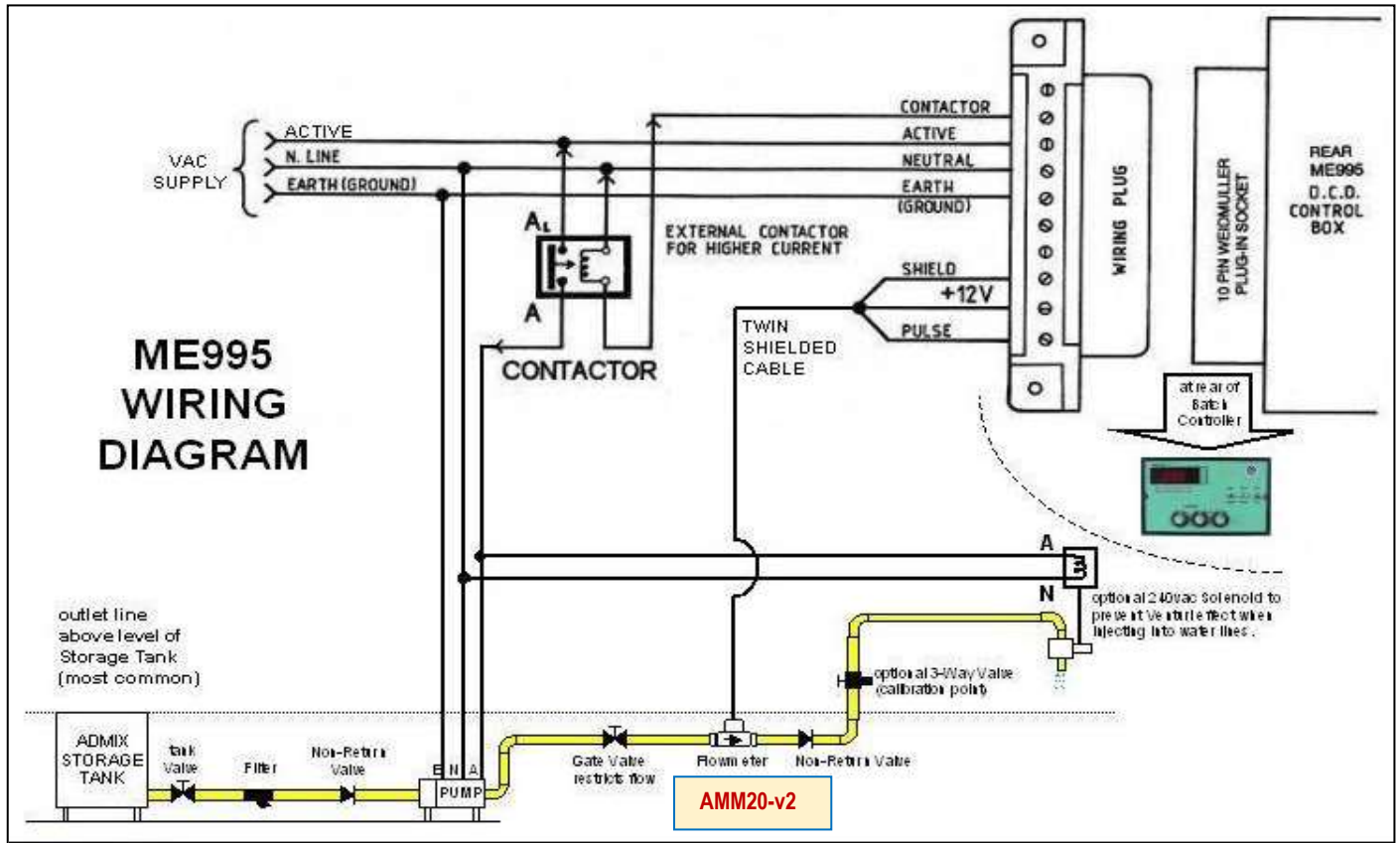
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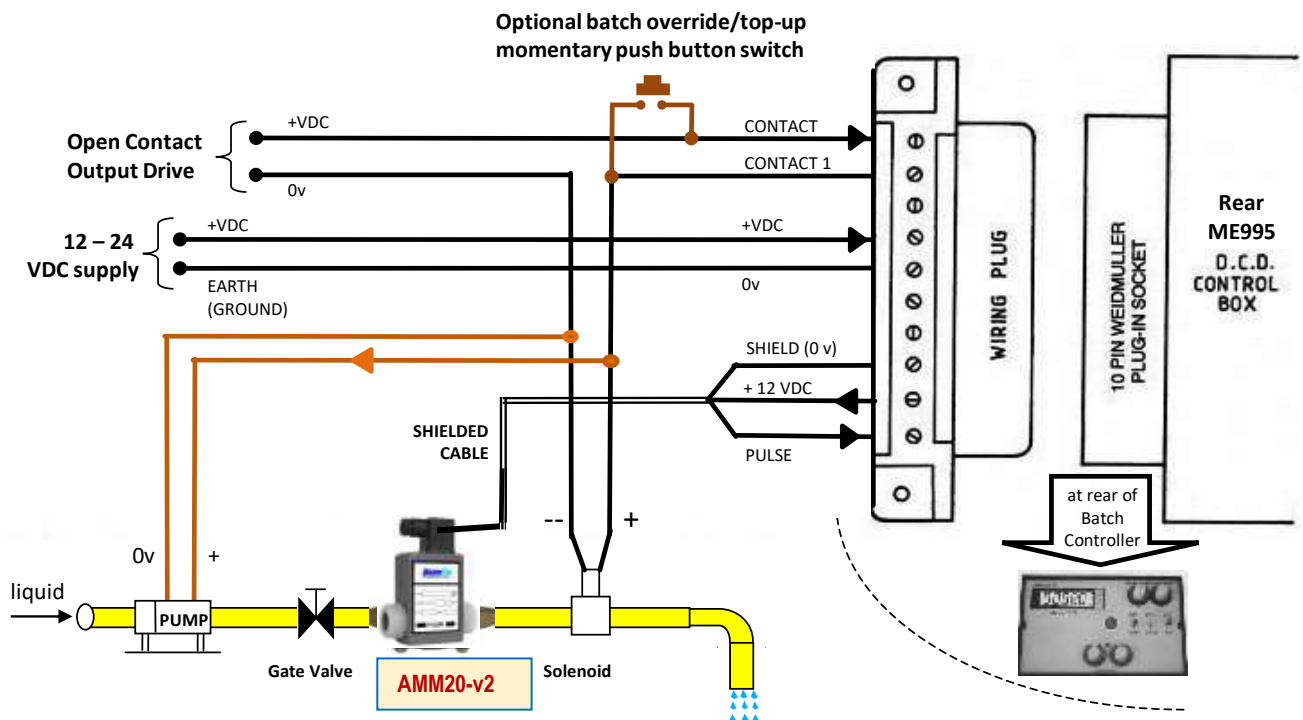
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Wiring diagram showing connection using +12 to 24VDC step-up converter for ME995 with CMM +24VDC Magflows





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

AMM - ADMIX MINI MAG-v2 Sizes: 15mm (1/2"), 20mm (3/4"), 25mm (1")

Magnetic Flowmeter

New improved model with virtual empty pipe detection

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 BSP (female) couplings.
- 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 to 24 VDC powered (can be directly powered from ManuFlo devices, has LEDs for pulse and power indication)
- Easy plug-in wiring connections via M12 plug and socket set, 5m cable & IP65 rating.



INTRODUCTION

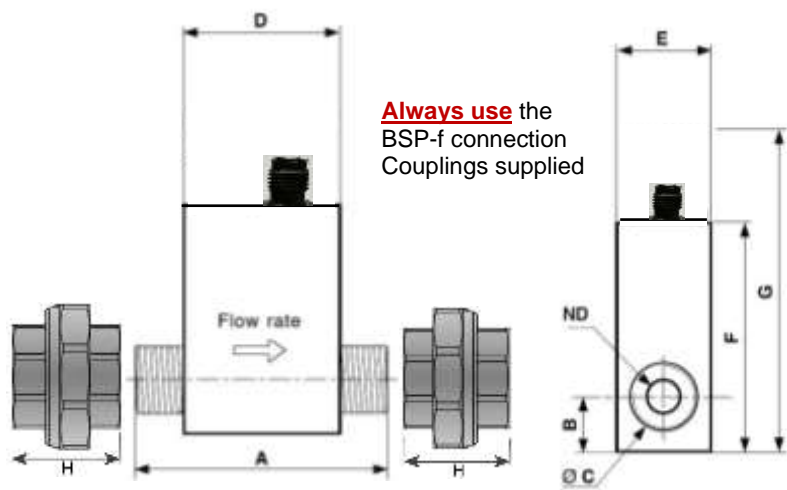
The Admix Mini Mag is a low-cost Electromagnetic Flowmeter designed for the economical measurement of chemical liquid admixtures and any other conductive liquid. **The 15 and 20mm sizes output 1000 pulses per Litre (1 pulse / 1 ml), making them a direct replacement option for MES20 admixture flowmeters 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 and general process batching applications. Density of the liquid, its temperature or its pressure have virtually no influence on the measurement accuracy.

Admix Mini Mag is powered by +12 to 24VDC 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.

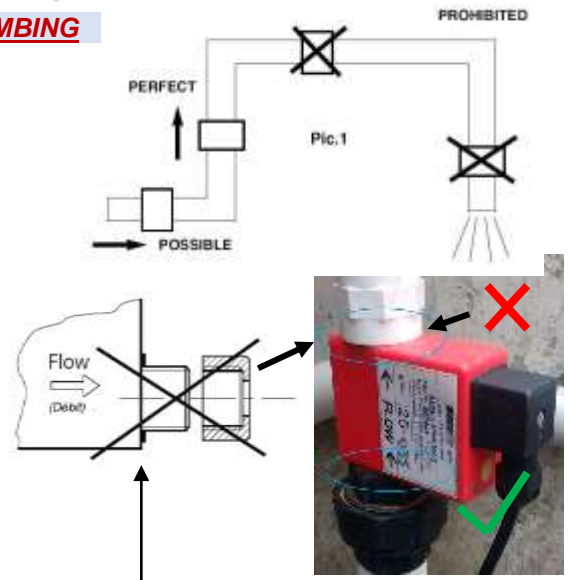
The operation of electromagnetic flow meters is based on Faraday's Law of Induction. A voltage is induced in a conductor as it moves through a magnetic field. This principle is applied in the Admix Mini Mag design. The voltage induced in the flowing liquid, is measured at two electrodes & is proportional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



WARNING:: Always use the Poly coupling connectors supplied by ManuFlo. Never screw up pressing against the body housing as can cause stresses damaging the product. (Allow min. 5mm gap distance).

Flow meter size	Weight	Measuring Range	Fixed Pulse Value	Order Code
15mm (08mm bore)	0.4 kg	1.0 - 45 Litres/min	1000 pulses/Litre	AMM15
20mm (12mm bore)	0.4 kg	3.0 - 100 Litres/min	1000 pulses/Litre	AMM20
25mm (20mm bore)	0.4 kg	5.0 - 180 Litres/min	500 pulses/Litre	AMM25

The pin designations are:
 NPN Pulse output,
 passive, optocoupler
Pin 1 = + 12-24VDC (+) supply
Pin 2 = not used
Pin 3 = Ground (0v)
Pin 4 = Pulse (Collector)

Accuracy ±2% of range, <1.0% of rate
Body Housing ABS
Liner Material PVDF with EDPM seals.
Electrodes S/S316
Grounding Rings S/S316
Protection class IP67
Max. Fluid Temp. -10 °C to +60 °C
Max. Pressure 8 bar @ 40°C, 10 bar @ 20°C
Conductivity Minimum 20µS/cm
Supply power +12 to 24 VDC (+/-10%) @ 40mA (3.6W max.)

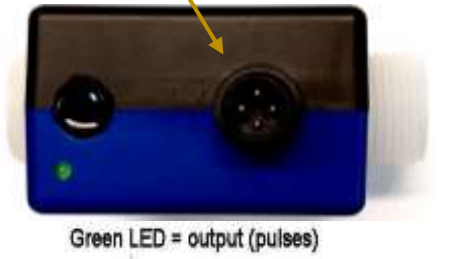
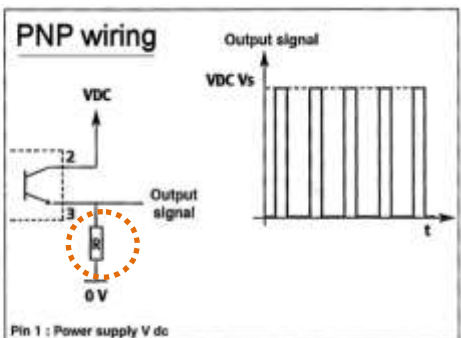
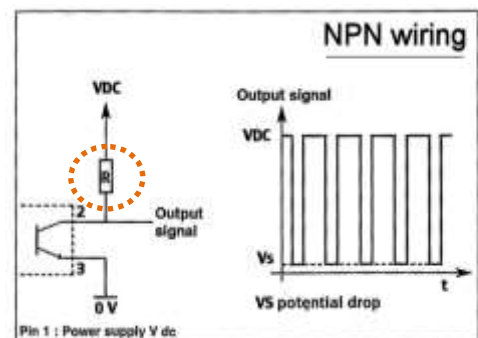
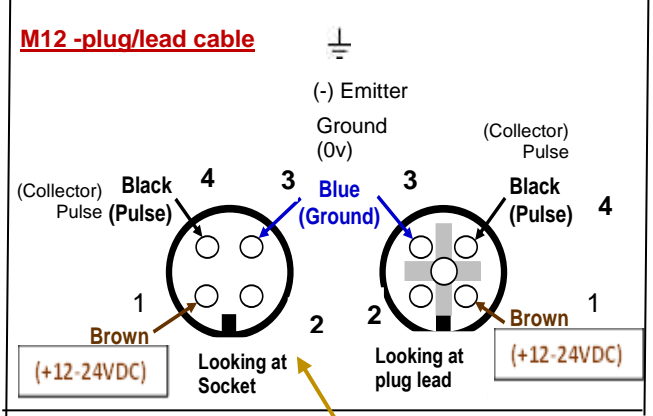
Pulse output NPN pulse, VDC max: 28V, I max: 50mA, Diode and poly-switch protected.

ELECTRICAL CONNECTIONS

Electrical Connection: M12 plug set (4pin) IP67 when tightened.
 To wire: Assure to screw tighten the matching m12 plug-set connectors.
 Use 2 core shielded cable for any extra cable lengths.,

CONNECTION

Caution: For non-ManuFlo devices 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) have an inbuilt pull-up resistor so "R" is not required/applicable.



Recommendation: Resistance RL ~2.5 kΩ (12 V) or ~5 kΩ (24 V) for versions NPN and PNP.

INSTALLATION & CONDITIONS OF USE

- **The flowmeter tube must be always completely filled with liquid when measuring.**
 Unlike the previous model, the new v2 model (blue/blk case) is now standard with virtual empty pipe (therefore if the pipe was to empty, the unit will not pulse).
- 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 IP67, 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.
- **WARNING:** Do not exceed the maximum recommended flowrate as overdose could occur and exert undue pressures on the probe seals. (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%).

ManuFlo™
 Flow Measurement & Control Products
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 www.manuflo.com

FEATURES:

- Very compact, light weight design.
- Sizes 15mm (1/2"), 20mm (3/4") & 25mm (1").
- High resolution Pulse output signal.
- 1000 PPL (15mm), 500 PPL (20mm), 100 PPL (25mm size).
- Full scale Accuracy $\pm 1.5\%$, $\pm 0.3\%$ of rate, 1% repeatability.
- PEEK sensor tube, Stainless Steel 316 electrodes
- BSP (M) threaded end connections.
- Electrical connection via M12 Plug and socket set.
- Virtually maintenance free, with no moving parts.
- Measures liquids with conductivity $> 50\mu\text{S/cm}$.
- Process temperature to 90°C , pressure to 1600 kPa.
- Accuracy is unaffected by varying viscosity or specific gravity of liquids.
- No moving parts, nothing to block.



INTRODUCTION:

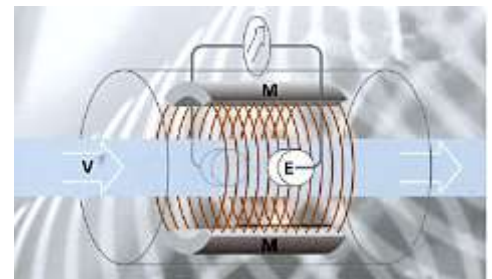
The CMM Mini-Mag is a low-cost compact Electromagnetic Flowmeter, suitable for industrial applications for flowrate and totaliser liquid metering and batching.

Liquids with an electrical conductivity of at least $50\mu\text{S/cm}$ can be measured. The converter/processor is inbuilt on the flowmeter sensor primary. These two elements form a very compact package.

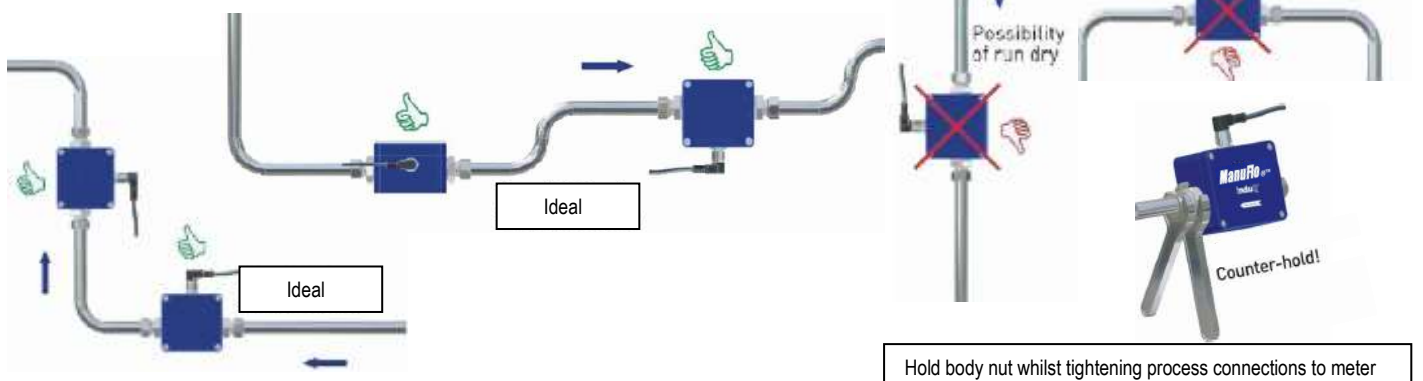
With no moving parts and an obstruction-free bore, this type of flowmeter is ideal for measuring a wide range of conductive liquids (that are chemically aggressive, or dirty) up to a temperature of 90°C , with minimal head losses and virtually no ongoing maintenance. CMM Mini-Mag is ideal for measurement of recycle water or water based liquids including admixtures with impurities, providing flowrate or total display for shotcrete and for process batching/monitoring applications. The MiniMag can be used in conjunction with a remote ManuFlo FRT-303 Indicator, ME4-T reset counter, ME-series Batch Controllers, ME2008 batch interface cards, UIC scaler cards or can be connected to 3rd party PLCs via the onboard pulse output.

PRINCIPLE OF OPERATION:

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 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 read in digital units.

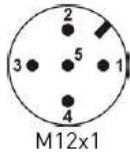


INSTALLATION:



ELECTRICAL CONNECTIONS: (Via M12 5-pin screwed socket and 3mtr plug lead connector)

Pinout:



Possible pinout:

- Pin 1: **+ Supply Voltage**
- Pin 2: d. n. c. (do not connect)
- Pin 3: **GND**
- Pin 4: Frequency
- Pin 5: **PULSE**

Pin No.	Cable Colour
1	Brown
2	White
3	Blue
4	Black
5	Neutral

+24VDC

Ground (o.v.)

Pulse



SPECIFICATIONS:

Accuracy (of range):	+/- 1.5%	Accuracy (of reading):	± 0.3%
Repeatability:	1 %	Response Time:	<500 mS
Supply Power:	24 VDC (± 10%) @<150mA	Plug connector:	M12 x 1 plug and socket set (5pin)
Liquid Temp.:	-20 °C to 90 °C	Ambient Temperature	-10 °C to 70 °C
Max. Pressure:	1600 kPa	Ingress Rating	IP65 (IP67 with M12 plug)
Flow Indication:	LED proportional Flashing	Flow Direction:	Forward (arrow label)

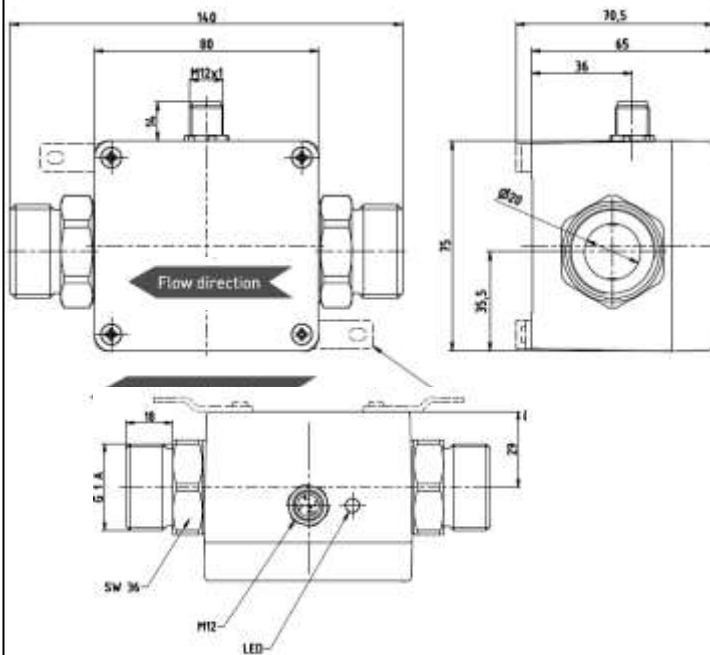
MATERIALS OF CONSTRUCTION (All models):

Housing:	Cast Aluminum
Electrodes:	Stainless steel 1.4571
Process connections:	Stainless steel 1.4571
Measuring tube:	PEEK-GF30
O-rings:	EPDM (FKM Optional)

VARIOUS MODELS:

Order Code:	CMM15	CMM20	CMM25
Connection Size:	15mm	20mm	25mm
Actual Bore Size:	7mm	10mm	20mm
Thread G BSP M	G ¹ / ₂ " ISO 228 M	G ³ / ₄ " ISO 228 M	G1" ISO 228 M
Order Code: Barrel-Union connectors Bsp-f	SBU15	SBU20	SBU25
Flow Range (Litres/minute)	0.5 - 30	1 - 60	5 - 250
Signal output starts (Litres/minute):	0.4	0.9	4
Pulse output (Pulses/Litre)	1000	500	100
Pulse Signal shape:	Square wave, pulse duty ratio 50:50, Push-Pull		
Signal current:	< 100mA, current limited		

DIMENSIONS: CMM25



WIRING WITH ME995:

As the CMM mags require +24VDC power, use the The Part no: CV12-24VDC step-up power converter. Connect from the +12VDC of the batch controller To input of converter, output of converter wires to + supply of magflow. See diagram below:-

Batch Controllers – Troubleshooting

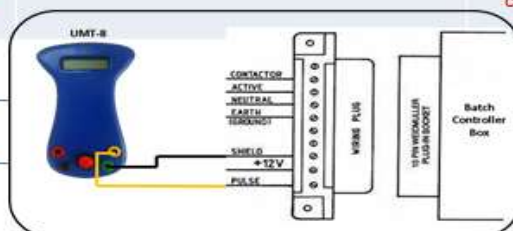
PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
<ul style="list-style-type: none"> No power to batch controller, displays not on 	<ul style="list-style-type: none"> Blown fuse or fuse holder not tight/broken +12vdc and O.V. shorted No main power supply Broken transformer 	<ul style="list-style-type: none"> Check fuse, tighten fuse holder (at rear of controller) Check wiring, rear of controller & at flowmeters, replace cables. Check power supply, check wiring Return to ManuFlo for repair
<ul style="list-style-type: none"> Pulse fails at start of batch 	<ul style="list-style-type: none"> Air pocket Restriction gate valve closed Empty liquid tank Pump not turning Solenoid valve not opening Signal cable cut or bad joint Pipes/hoses clogged or air pocket. Buildup coagulated admix at discharge point Seized PUMP due to sticky admix 	<ul style="list-style-type: none"> 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. Flush out the flow-line, purge air pocket Cleanout manflow tube or replace Check signal cable Hit the PUMP with a Rubber mallet to loosen it, then re-batch. Failing that then strip/clean or change the pump

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

<ul style="list-style-type: none"> Display digits count slowly after batch complete 	<ul style="list-style-type: none"> Valve not solenoid not closing properly 	<ul style="list-style-type: none"> Clean, service or replace
<ul style="list-style-type: none"> Batch target display counter above batch selection 	<ul style="list-style-type: none"> Flowrate too fast, excessive overflow 	<ul style="list-style-type: none"> Turn down gate valve to restrict flowrate or set preact (overflow deduct) function to compensate (ME995 models –located at rear of unit) Reduce delivery pipe diameter
<ul style="list-style-type: none"> During calibration test, more admix collected than indicated 	<ul style="list-style-type: none"> K-Factor setting not correctly entered to match the flowmeter PPI. Preact setting too low – change. 	<ul style="list-style-type: none"> Fluid is not sufficiently conductive. If all else fails, replace the flowmeter.

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

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. Check the flowmeter has the correct voltage supply. Remove the flowmeter from the flowline and clean out the inner tube passing a cloth thru it. Re-instal and run the system. If still no counts the pulse cable may be broken or junction wire connection area, replace it. Run the system Check the Manu controller - it should have registered a number of counts on the display. If no counts are registered, replace the flowmeter. (Manu controller should be switched off when connecting new flowmeter).



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, AMM15/20, CMM15, 1 pulse/1ml output flowmeter, CMM25 100ppl). 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)

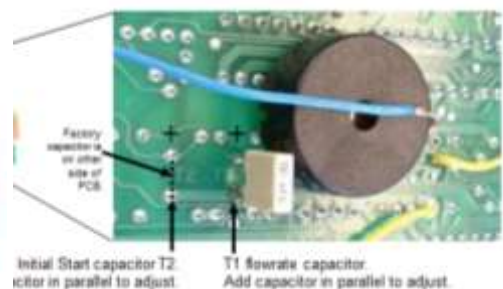
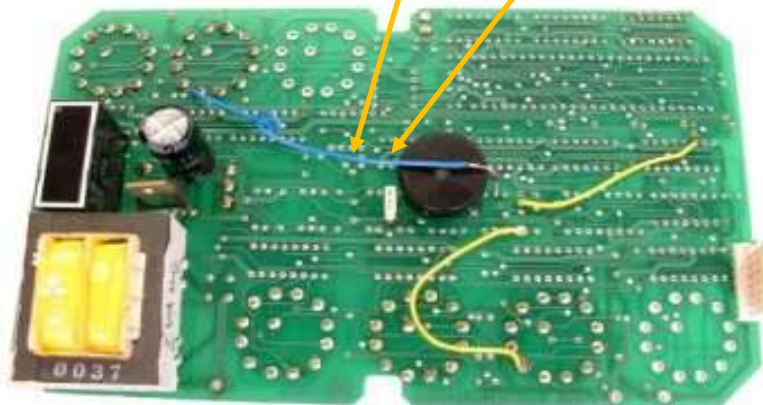
Standard factory set values are T2: 1µF capacitor, T1: 0.02 µF capacitor. Use the following tables to change factory set values.

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 (1000ppl units)
0.02 µF	25 Hz " " "
0.03 µF	20 Hz (low flowrates) " " "
0.33uF >	For CMM and MM magflow models 100 pulses per litre units



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.

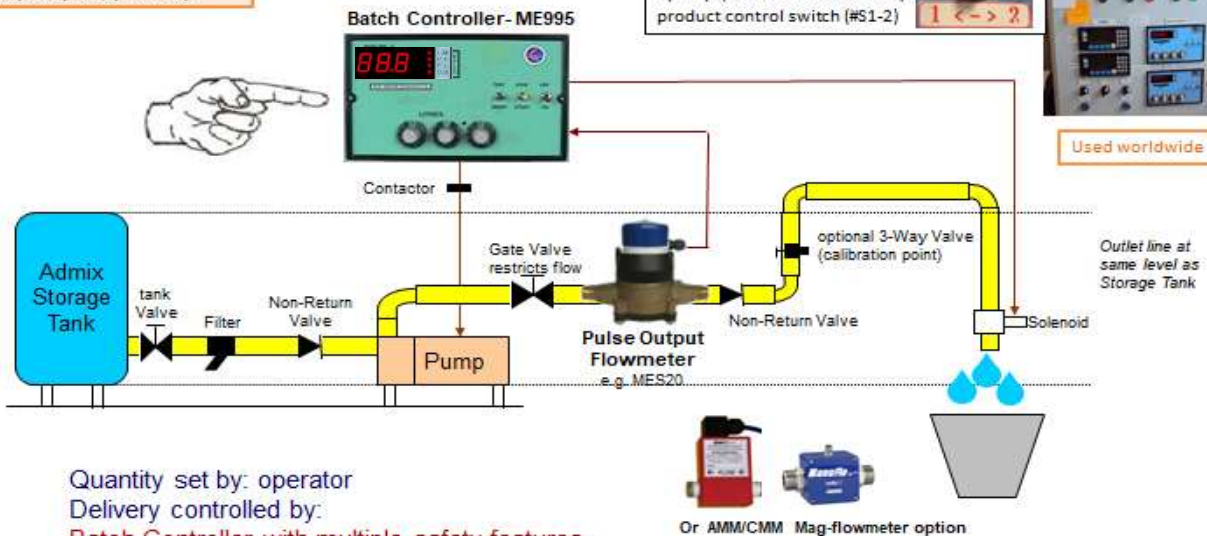
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 (C) Manu Electronics 2015

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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 !!

Or AMM/CMM Mag-flowmeter option

ManuFlo®
 (C) Manu Electronics 2020

No Filters required with MAGFLOWS

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When using the **CMM15,20,25** Magflows the voltage step up converter is required Part # CV12-24 (12 to 24vdc)

For **AMM-v2** the +12VDC of the batch controller can be used to power the flowmeter directly.