

User Manual

ME3000 BATCH CONTROLLER

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1. INTRODUCTION

The ME3000 microprocessor-based preset keypad Batch Controller can be used with pulse output flowmeters of any size for preset liquid batch control applications.

Batch counting can be in units of millilitres, Litres (up to 2 decimal places), KiloLitres or MegaLitres. The Controller is fully programmable, and has a range of safety features e.g. if no pulses arrive within a configurable batch start period, or if pulses are interrupted during the batch cycle or if the flow rate falls below the allowed minimum, then the pump voltage contact drive is automatically shut off and an alarm is raised. The front face of the controller is rated IP64.

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

The controller operates from standard 220 - 250 vac (or optional 110 vac or 12 - 24 VDC) voltage supplies. Contact output drive is via a relay (optional open contact).

Standard controllers are in panel mount form, or optionally can be housed in a metal box or IP65 ABS wall mount enclosure.

1.1 Order Codes

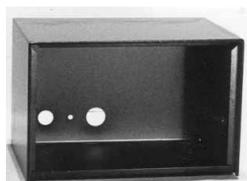
<u>Code</u>	<u>Description</u>
ME3000	Batch Controller, 240vac powered
	<u>Options</u>
-110	110 vac powered.
-DC	12-24 VDC powered.
-L	For connection to a coil-type flowmeter.
-OC	Open Contact output.
-OPA	Alarm output, Batch complete output, and 4 - 20 mA output.
-SC	RS232 Serial interface, 9600 baud.
-SSR	External command: Start/Stop/Reset, for connection to HB2500-SSR housing box.
-5P	5-pin computer interface plug (start, stop, reset, pulse, +12V). For PLCs such as Jonel, Eagle, Phoenix etc.
-MC	4-pin PLC Command (Start/Stop/Reset) interface plug. For Computers such as Compubatch, Dickenson Autocon etc.
-MC2	2-pin plug for scaled open collector pulse output, and also the 4-pin (-MC) external command (Start/Stop/Reset) interface plug. For PLC/Computers such as Compubatch, Dickenson Autocon etc.

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

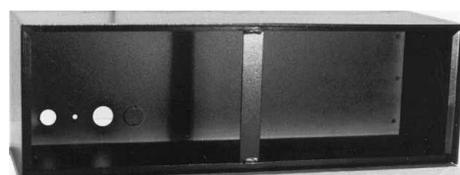
Table 1. ME3000 Order Codes

1.2 Accessories

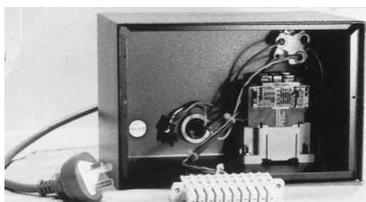
Code	Description			
APM-n93XS	<ul style="list-style-type: none"> • Thermal Ticket Printer. • with power supply. • suitable for custody transfer docket for ME3000-SC. 			
TMP	<ul style="list-style-type: none"> • ME3000-SC and APM-n93XS printer, wired and mounted in a key lockable rugged IP64 hinged enclosure. • automatic ticketing. Paper easily changed. • prints Batch ID, quantity, time and date. • 300 L x 300 H x 200 D mm. • ideal for delivery trucks or loading and discharge locations where a custody transfer docket is required. 			
SHB	Single metal box (houses one ME3000)			
SHB1	Single, with contactor, pump outlet	DIMENSIONS	SINGLE	DUAL
SHB2	Single, with 2 contactors, 2 pump outlets	WIDTH (W)	212 mm	420 mm
DHB	Dual metal box (houses two ME3000s)	HEIGHT (H)	142 mm	142 mm
DHB2	Dual, with 2 contactors, 2 pump outlets	DEPTH (D)	135 mm	135 mm
DHB3	Dual, with 3 contactors, 3 pump outlets			
-T	Terminal strip entry (in lieu of outlets) for non-Australian power connections.			
HB2500-SSR	<ul style="list-style-type: none"> • IP65 waterproof polycarbonate enclosure for one Batch Controller. • 290 L x 190 H x 146 D mm. • with hinged transparent lid cover, and gland kit. • with external command: Start/Stop/Reset. • Note: if this enclosure is required, then must order at the same time as Batch Controller. 			



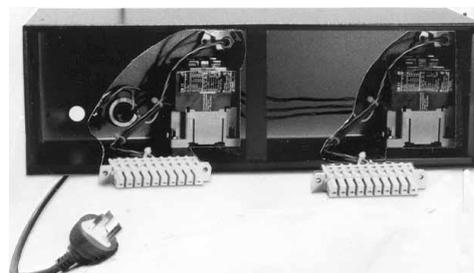
SHB - SINGLE HOUSING BOX



DHB - DUAL HOUSING BOX



SHB1 - SINGLE BOX WIRED



DHB2 - DUAL HOUSING BOX WIRED

Table 2. Accessories

2 Technical/Electrical Specification

Power supply	220-250 vac (optional 110 vac or 12-24 VDC)
Fuse	1 Amp (5 x 20mm case)
Frequency input	5 KHz max
Event Log	internally records up to approximately 300 batches
Output to flowmeter	12 VDC upto 100mA (if optional 12VDC supply used, then 8 VDC to flowmeter).
Relay	Max. 240 vac, 1 A (Open Contact or 100 vac on request).
Display	2 line x 16 character
LEDs	<ul style="list-style-type: none"> • Run (output to pump); • Flow (input pulses from flowmeter); • Output (scaled output pulses to PLC/Computer).
Connection	10 pin Weidmuller mating plug and socket
Batch entry	quantity selection and commands via IP64 keypad
Optional Outputs	<ul style="list-style-type: none"> • 4-20mA output. • Alarm indication. Is on when unacknowledged alarm exists. Open Collector, 45VDC, 150mA. • Batch Complete indication. Goes high momentarily at batch completion. Open Collector, 45VDC, 150mA.
Optional interfaces	<ul style="list-style-type: none"> • RS232, 9600 baud; • PLC/Computer stop/start/reset; scaled pulse output.
Front Face	IP64
Instrument housing	ABS hi-impact case mould
Mounting	Panel mount. Panel cutout :190 L, 122 H mm
External dimensions	206 L, 130 H, 90 D mm.
Weight	1 kg



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

2.1 Safety/Warnings

The ME3000 is not certified for intrinsically safe applications, and is not recommended for use in hazardous areas.

3. Front Layout



Figure 1. ME3000 Front View

Front Face is rated IP64.

3.1 Display

The Batch Controller has a 2 line, 16 character display, on which is shown batch data and any alarms. As shown in Figure 2 on page 5, the RATE/DSPLY button cycles through the display screens.

As shown in Figure 3 on page 6, the ME3000 also has modes to programme parameters and to calibrate the 4-20mA outputs. To enter these modes, from the SET RDY screen, simultaneously press the buttons marked with an asterisk "*" (i.e. STOP and CANCEL) for 5 seconds.

The screen will show the message: "PROGRAMME MODE PUSH BUTTON 'A'."

Then, either:

- a. to enter Programme Mode, press button A (START BATCH).
 - Use the buttons with up and down arrows (STOP and SET respectively) to step through the parameters.
 - Pressing the CANCEL button for 5 seconds exits Programme Mode from any point (any values set in Programme Mode will be retained).

or

- b. to enter Calibrate Mode, then instead of pressing button A, simultaneously press again the buttons marked with an asterisk "*" (i.e. STOP and CANCEL) for 5 seconds.
 - Use the button with the down arrow (SET) to step through the parameters.
 - Pressing the CANCEL button for 5 seconds exits Calibrate Mode from any point (any values set in Calibrate Mode will be retained).

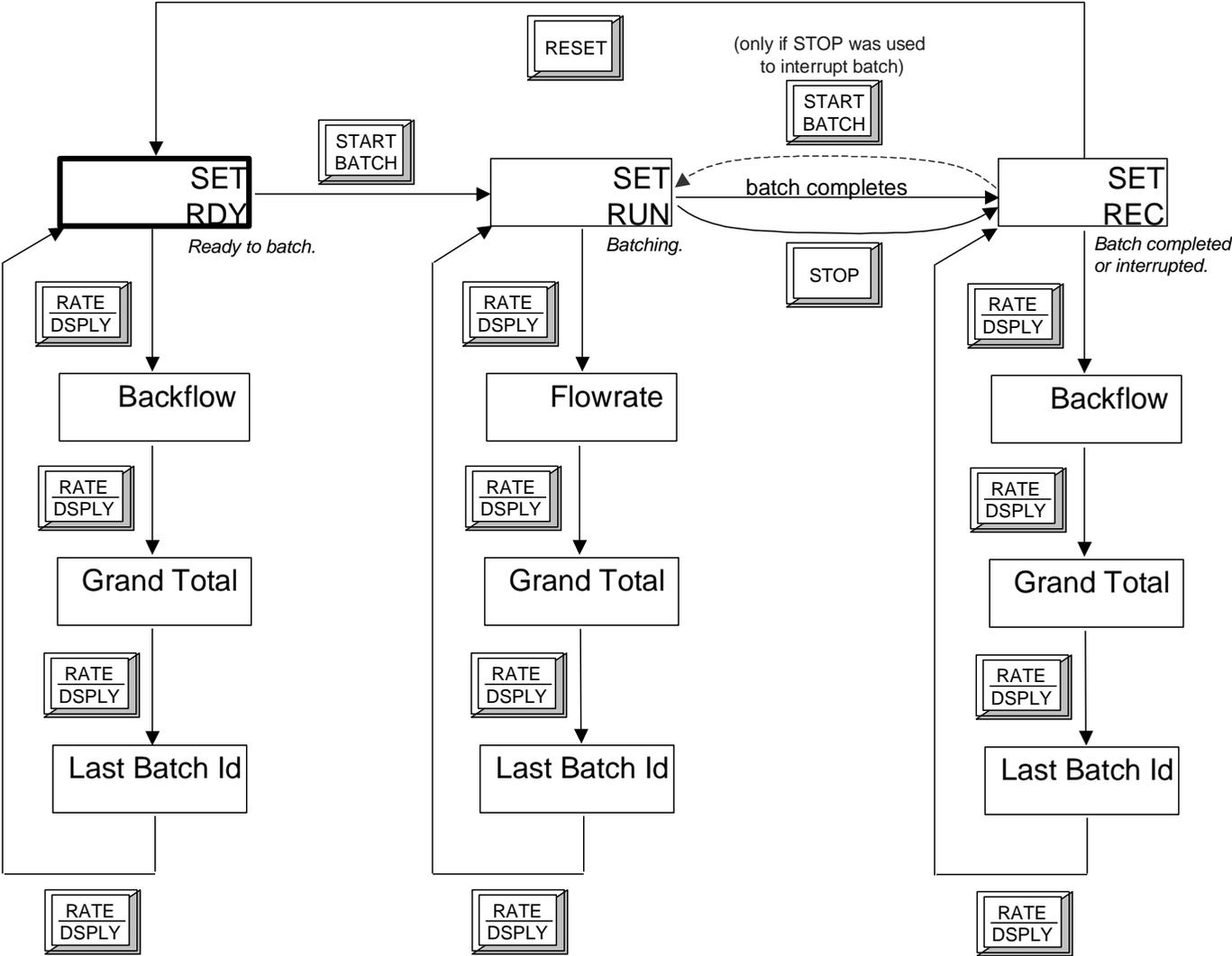


Figure 2. Display Screens

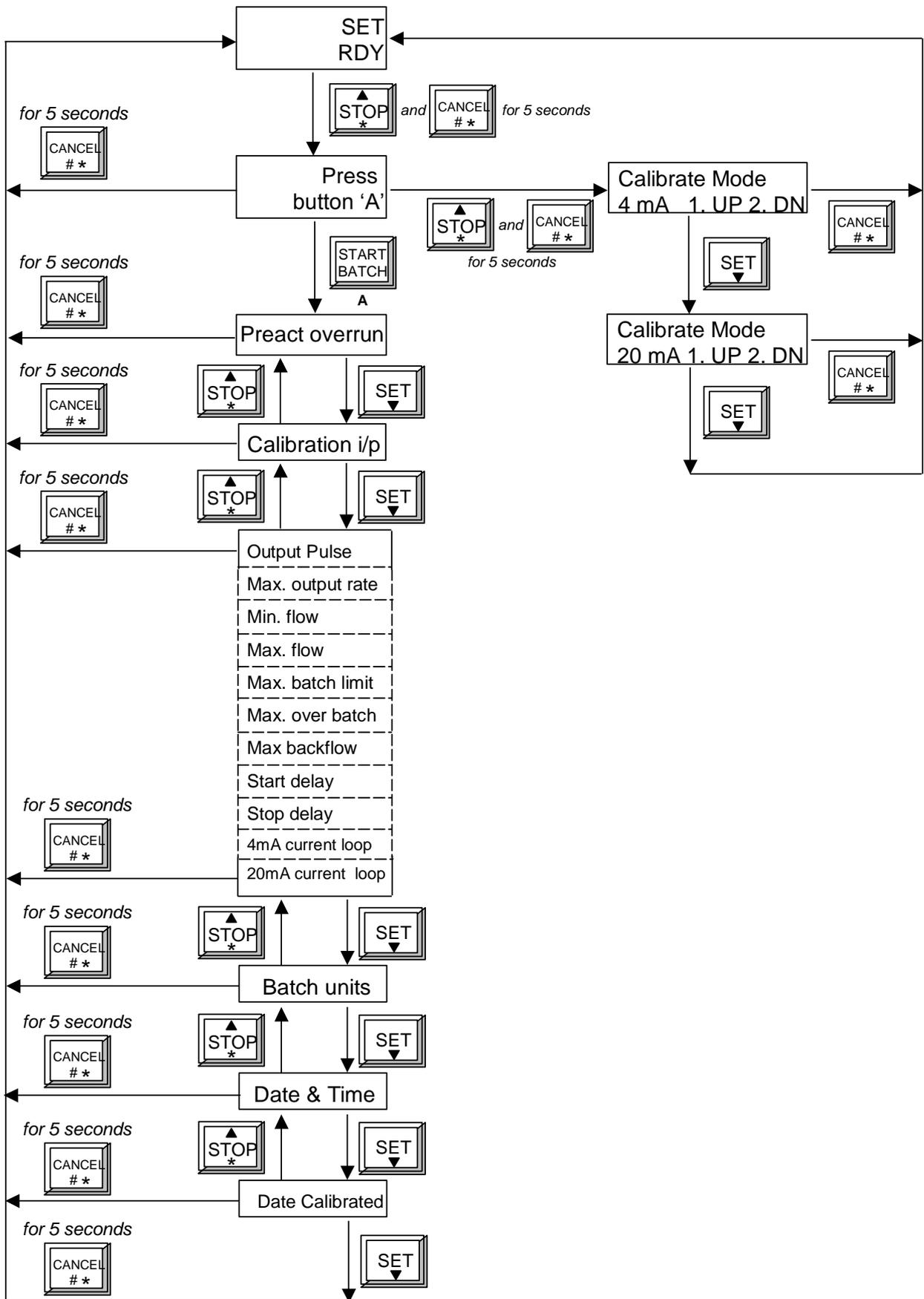


Figure 3. Programme Mode and Calibrate Mode Parameters

3.2 LEDs

The Batch Controller has 3 LEDs to indicate the status of inputs and outputs:

LED	Description
RUN	Indicates that the Batch Controller is activating the pump or solenoid.
FLOW	Monitors and indicates incoming pulses from flowmeter.
OUTPUT	Indicates the scaled pulses being output from the Batch Controller e.g. to a Computer.

Table 3. Status LEDs.

3.3 Buttons

Operation of the Batch Controller is via the front touch screen. As shown in Table 4 below, some buttons have different functions when the Controller is in Programme Mode, and pairs of buttons are used:

- to enter Programme Mode; and
- to dump the Event Log.

Button	Description
0 - 9	<ul style="list-style-type: none"> • Use to enter the digits of a value (displayed value flashes as new digits are entered). • In Programme Mode: <ul style="list-style-type: none"> ○ '1' cycles forward through the display units. ○ '2' cycles backward through the display units. • In Calibrate Mode: <ul style="list-style-type: none"> ○ '1' increases the 4 or 20 mA output. ○ '2' decreases the 4 or 20 mA output.
SET ▼	<ul style="list-style-type: none"> • After entering a value (displayed value is flashing), pressing SET locks in the new value. • In Programme Mode or Calibrate Mode, moves to the next item.
CANCEL * #	<ul style="list-style-type: none"> • When entering a value (displayed value is flashing), pressing CANCEL aborts entering the new value and reverts to the original value. • In Programme Mode, holding down CANCEL for 5 seconds exits Programme Mode.
START BATCH (A)	When the display shows SET RDY, pressing START BATCH starts the delivery of the batch quantity that is shown on the SET line.
▲ STOP * (B)	<ul style="list-style-type: none"> • Stops the delivery of a batch. • In Programme Mode, moves to the previous item.
RESET (C)	After a batch has been delivered, or has been interrupted by STOP, pressing RESET sets the display to SET/RDY, ready for the next batch.
RATE/DSPLY (D)	Cycles through the Display Screens.
* (STOP & CANCEL)	Pressing the STOP and CANCEL buttons (both are marked with an asterisk '*') simultaneously for 5 seconds enters Configuration Mode to programme the Batch Controller.
# (RESET & CANCEL)	Pressing the RESET and CANCEL buttons (both are marked with a hash '#') simultaneously for 5 seconds starts the download of the Event Log.

Table 4. Buttons.

3.4 Buzzer

The buzzer sounds whenever a key is pressed.

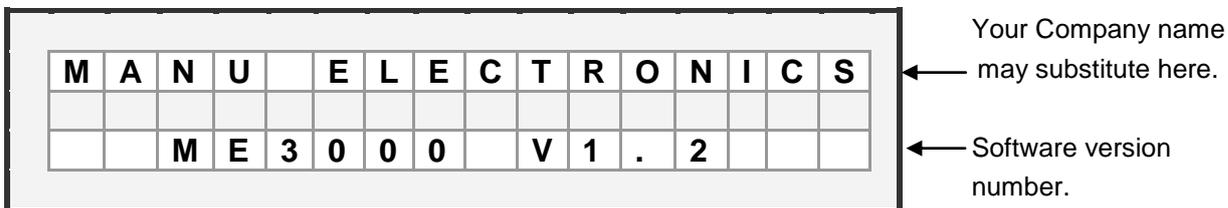
An internal audible ALARM sounds:

- momentarily upon completion of a batch; and
- continuously if an error occurs (in which case an alarm message will also be shown on the display).

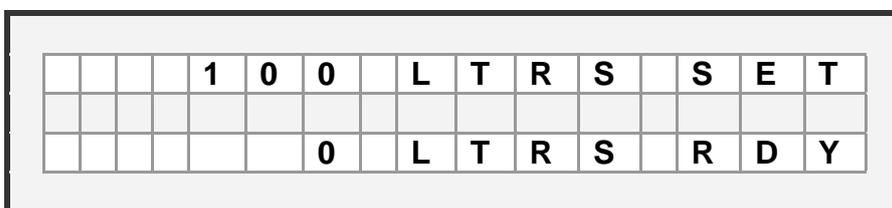
4. Operation

Connect the ME3000 (as described in section 7 on page 17) and apply power.

(1) On power up, the LCD shows the welcome display for a few seconds:



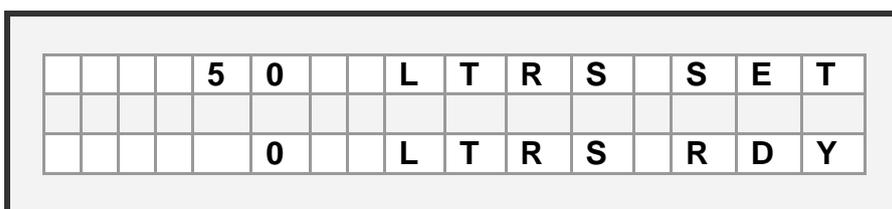
then the SET/RDY (Set/Ready) display is shown, and the Batch Controller is ready to batch:



Note: The batch quantity units are configurable (as explained in Table 6 on page 11), and can be:

- LTRS (litres) to 0, 1 or 2 decimal places
- MLS (millilitres)
- KL (kilolitres)

(2) Using the keypad buttons, enter the desired batch quantity e.g. 50 Litres. A short beep will be heard as each button is pressed.



The desired quantity will appear on the SET line of the display, and the digits will be flashing.

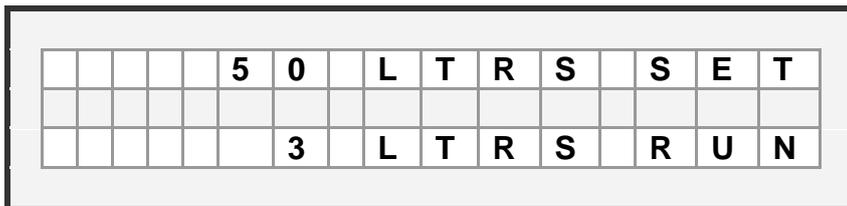
If the entered quantity is incorrect, then

- Press the CANCEL button.
- The value on the SET line will revert to its previous value.
- The digits on the display will stop flashing.
- Using the keypad buttons, enter the correct desired batch quantity.

If the entered quantity is correct, then

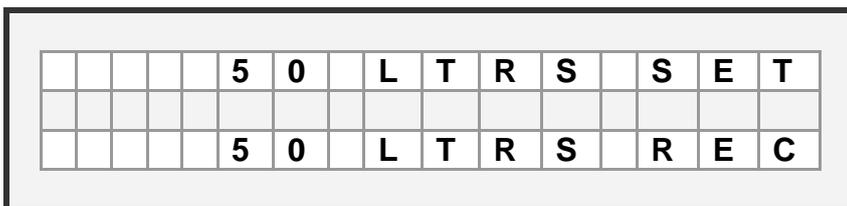
- Press the SET button.
- A long beep will be heard.
- The digits on the display will stop flashing.
- The entered value is now accepted as the new batch quantity.

- (3) To commence batching, press the START BATCH button.
- The batching will commence; and
 - The RUN LED will illuminate, to indicate that the Batch Controller is operating the connected pump/solenoid; and
 - The FLOW LED will illuminate, to indicate that the Batch Controller is receiving signal pulses from the flowmeter; and
 - The OUTPUT LED will illuminate, and will pulse according to the programmed output rate (see Table 6 on page 11). The OUTPUT LED will pulse irrespective of whether the Batch Controller is connected to a computer or not.
 - The display changes to SET/RUN, and as the batch progresses, the count on the RUN line increments towards the value on the SET line.



← The count increments as batch progresses.

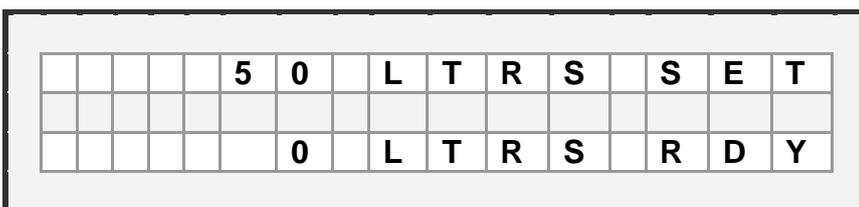
- (4) When the desired batch quantity is reached:
- there is a beep, to indicate the end of the batch; and
 - the RUN, FLOW and OUTPUT LEDs all go out; and
 - the display changes to SET/REC (Set/Received):



← Quantity requested.

← Quantity received.

- (5) To be ready to batch again, press the RESET button, and the display will revert to SET and RDY.



- (6) To commence the next batch, either:
- to use the quantity already set, press the START BATCH button.
 - for a different batch quantity, go to step (2)

- (7) A batch in progress can be interrupted or terminated by the user.

To interrupt a batch in progress, press the STOP button.

The batch can then either be:

- recommenced, by pressing the START button; or
- be terminated by pressing the RESET button.

(8) whether a batch is in progress or not, the user can cycle through other batching-related displays (see Table 5 below), by pressing the RATE/DSPLY button repeatedly.

value	description	availability	how reset
Backflow	Volume of liquid that has flowed (in either the forward or reverse flow direction) after the last batch completed	after end of a batch	Automatically, at start of each batch.
Flowrate	Rate of liquid flow.	during a batch	N/A
Grand Total	Total dispensed since the last time the Grand Total was reset.	always	Whenever ready for the next batch, display the Grand Total and press the RESET button for 5 seconds.
Last Batch Id	The Id number of the last batch.	always	Whenever ready for the next batch, display the Last Batch Id and press the RESET button for 5 seconds.

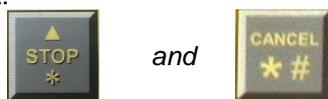
Table 5. Batching-related Displays.

5. Programme Mode

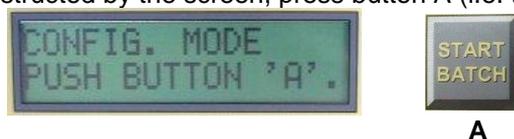
Programme Mode enables setup of the ME3000 parameters for a specific installation. The parameters are listed in Table 6 on page 11.

Programme Mode can only be entered if the screen shows SET and RDY. When the screen shows SET and RDY, Programme Mode is entered by:

- first simultaneously pressing for 5 seconds the buttons marked with an asterisk (“*”) i.e. the buttons STOP and CANCEL:



- then, when instructed by the screen, press button A (i.e. the START BATCH button).



The parameters are stepped through using the buttons:

- up arrow ▲ i.e. STOP (to step back)



and

- down arrow ▼ i.e. SET (to step forward).



Pressing the CANCEL button for 5 seconds exits Programme Mode from any point (any values set in Programme Mode will be retained).

To change the displayed parameter:

- To **enter** a new value, press the number buttons. The new value will flash. Then either:
 - to **accept** the new value, press the SET button. The new value will stop flashing and the next parameter will be shown (to step back to the previous parameter, press the up arrow button);
 - or
 - to **abort** the new value, press the CANCEL button. The value will revert to the unchanged value, and will stop flashing.



Parameter	Description
Preact overrun	<ul style="list-style-type: none"> The preact is the amount (in Litres), before the desired batch quantity is reached, when the pump is commanded to stop. This early stop command is necessary because the pump/valve can't stop/close instantaneously, and the batch amount requested must be reached just as the pump completes winding down. Initially, the preact should be set to zero, and then subsequently adjusted for your installation as described in section 5.1 on page 13.
Calibration input	<ul style="list-style-type: none"> The K-Factor of the attached flowmeter i.e. the number of pulses the flowmeter produces per Litre of liquid. This value is obtained from the flowmeter data sheet. Subsequently, the value can be adjusted if necessary - see section 2.5.2 on page 14.
Output pulse	<ul style="list-style-type: none"> The number of Litres represented by each pulse that is output from the ME3000 e.g. to a PLC/Computer. This value depends on the requirements of your installation. Any frequency input limitations of the computer need to be considered - see section 2.5.3 on page 15.
Max output rate	<ul style="list-style-type: none"> The maximum rate of pulses (in Hz) allowed to be output from the ME3000 e.g. to a computer. This value depends on the type of equipment the ME3000 is connected to, and can be determined from that equipments data sheet. If the ME3000 is connected to AC-input Computer, then this value should be ≤ 12 Hz.
Min flow	<ul style="list-style-type: none"> The minimum flowrate (in Litres/sec) that is allowed for the flowmeter to operate accurately. This value is stated on the flowmeter's data sheet as the minimum flowrate.
Max flow	<ul style="list-style-type: none"> The maximum flowrate (in Litres/sec) that is allowed for the flowmeter to operate accurately. This value is stated on the flowmeter's data sheet as the maximum flowrate.
Max batch limit	<ul style="list-style-type: none"> The maximum individual batch quantity (in Litres) that the ME3000 is allowed to dispense. This value depends on the requirements of your site.
Max overbatch	<ul style="list-style-type: none"> The maximum quantity (in Litres) that can be delivered in a batch, above the amount requested, before the Overbatch alarm occurs. This value depends on the requirements of your site e.g. 0.1 L for small dose Admixtures, 1 L for large volume Admixture batches.
Max backflow	<ul style="list-style-type: none"> The maximum quantity (in Litres) of flow allowed after batch completion, before the Backflow alarm occurs. This value depends on the requirements of your site - typically 0.2 L for Admix 20mm pipes.
Start delay	<ul style="list-style-type: none"> The time allowed (in secs) for the pump to start. Safeties only engage after the Start Time. This value depends on your installation. A typical value is 2 seconds.
Stop delay	<ul style="list-style-type: none"> The time allowed (in secs) for the pump to stop. Safeties only engage after the Stop Time. This value depends on your installation. A typical value is 2 seconds.
4mA current loop	<ul style="list-style-type: none"> The flowrate (in Litres/sec) that is represented when the current loop is 4mA. This value depends on the flowmeter being used, and is generally the same as the minimum flowrate as stated on the flowmeter data sheet..
20mA current loop	<ul style="list-style-type: none"> The flowrate (in Litres/sec) that is represented when the current loop is 20mA. This value depends on the flowmeter being used, and is generally the same as the maximum flowrate as stated on the flowmeter data sheet..
Batch units	<p>When the Batch Units parameter is displayed, use the '1' and '2' numeric buttons to cycle backward and forward (respectively) between the types of batch units:</p> <p>0 ml : millilitres, no decimal place 0 L : Litres, no decimal place 0.0 L : Litres, 1 decimal place 0.00 L : Litres, 2 decimal places 0 KL : KiloLitres, no decimal place</p> <p>Press the SET button to lock in the selected units.</p>
Date & time	<ul style="list-style-type: none"> The current date and time, in format: dd-mm-yy hh:ss The hour 'hh' is in 24-hr format e.g. 15 for 3pm. The date and time automatically advance once set.
Last Calibrated Date	<ul style="list-style-type: none"> The date the ME3000 was last calibrated or inspected, in format: dd-mm-yy. This date is a record only and does not automatically change.

Table 6. Programme Mode Parameters.

Table 7 below lists, for each parameter, the default value and typical application values.

Parameter	Units	Default value (Note 1)	Typical Application Values	
			for Admix batching using MES20 flowmeter	for Water batching using RPF5-P-GAL50 flowmeter
Preact overrun	Litres	0.000	0 (Note 2)	0 (Note 2)
Calibration input	pulses/Litre	0.001	1000 (Note 3)	20.2 (Note 3)
Output pulse	Litres/pulse	1000	0.010 (Note 4)	1 (Note 4)
Max output rate	Hz	10	15 - 1200 (Note 4)	15 (Note 4)
Min flow	Litres/sec	0.010	0.025	1.2
Max flow	Litre/sec	1.000	1.1	13.0
Max batch limit	Litres	0.1	50	1000
Max overbatch	Litres	0	1	10
Max backflow	Litres	0.100	0.2	10
Start delay	seconds	2.0	2	3
Stop delay	seconds	1.0	2	3
4mA current loop	Litres/sec	0.000	0.025	1.2
20mA current loop	Litres/sec	1.000	1.1	13
Batch units		mL	mls, or 0.00 L	L
Date & time		00/00/00 00:00	as applicable	as applicable
Last calibrated date		00/00/00	as applicable	as applicable

Table 7. Default and Typical Parameter Values

- Note 1 The default values are NOT typical operational values - they have been chosen for safety, so that should an unconfigured ME3000 be inadvertently installed, any adverse impact will be minimised.
- Note 2 Preact value is initially zero. It must then be adjusted as described in section 5.1 on page 13.
- Note 3 Calibration Input may need to be adjusted during the life of the flowmeter, as described in section 2.5.2 on page 14.
- Note 4 Any frequency input limitations of the computer need to be considered in setting this value. See section 2.5.3 below.

A Program Data Sheet (see page 40) is provided with each ME3000. Before installing an ME3000, ensure that it has been suitably programmed for your installation.

5.1 Setting the Preact Value

Pumps do not stop immediately, and valves do not close immediately. If a pump/valve is commanded to close at the moment when the required batch quantity is reached, then the required batch quantity will be exceeded because extra liquid will be delivered whilst the pump winds down and/or whilst the valve takes time to close (Figure 4 below). Therefore, without preact, the quantity delivered usually overshoots what is set on the ME3000.

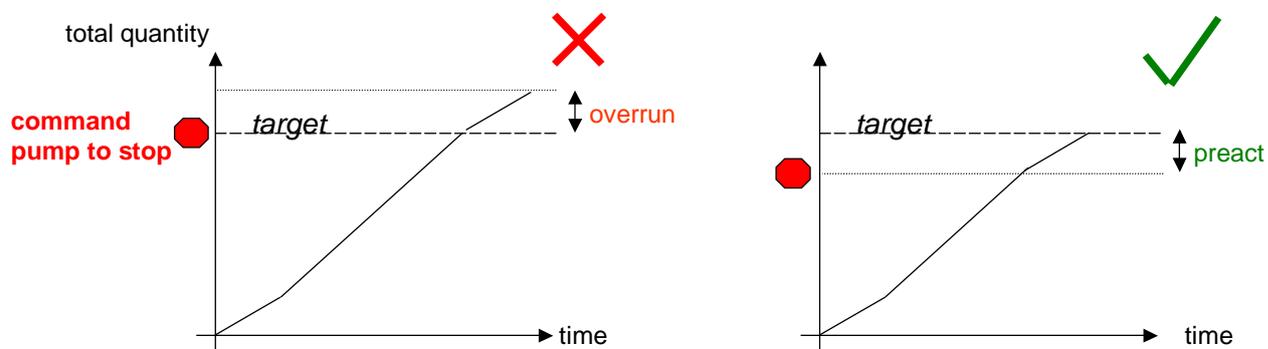


Figure 4. Preact.

To ensure the quantity set is delivered exactly, the Batch Controller must command the pump/valve to stop/close slightly before the required quantity is reached. This amount is called the Preact (or inflight overflow). The Preact value to be programmed into the ME3000 is simply the same overflow reading as indicated by the display. Note: The preact value should be set only after the calibration input (K-factor) has been set (see section 2.5.2 below).

Example: Preact value is zero. You set 190 Litres to be batched, and then perform the batch. At batch completion, 200 Litres received is shown on the ME3000 display, and 200 Litres is collected in a drum (i.e. 10 Litres over). So, set Preact to 10 Litres, to deduct the 10 Litres overshoot. Next batch, the amount set, received and collected in the drum are all 190 Litres.

The preact usually only needs to be set once for an installation, and all subsequent batches will be correct.

5.2 Setting/Changing the Calibration Input

The ME3000 *Calibration Input* parameter must be set according to the pulses/Litre output by the flowmeter (called the flowmeter's K-factor) e.g. MES20 produces 1000 pulses/Litre. This value can be obtained from the flowmeter data sheet.

Some types of meters can wear during their operational life, resulting in small changes to their K-factor and consequently there is a change in the percentage variation between the amount batched and the amount requested. These changes can be compensated for by changing the *Calibration Input* parameter in the ME3000.

To calculate the adjusted value for the *Calibration Input*, must match what is shown by the ME3000 as received with a known amount dispensed,

e.g. say Controller is set to 190L, and is batched into a 200 litre (44 gallon) drum.

- If the amount collected is more than is shown by the ME3000 as received, then decrease the set *Calibration Input* value by the same percentage difference

So, if say 200L is collected and the ME3000 shows 190L as received, this is 10 Litres more or 5% over ($10/190 \times 100\%$). The *Calibration Input* value must be decreased by 5% i.e.
if *Calibration Input* value is set to 1000, new value is $1000 - 5\% = 1000 - 50 = 950$.

- Conversely, if the amount collected is less than is shown as received by the ME3000, then increase the set calibration value by the same percentage difference.

So, if say 180 Litres is collected and the ME3000 shows 190L as received, this is 10 Litres less or 5% under ($10/190 \times 100\%$). The *Calibration Input* value must be increased by 5% i.e.
if *Calibration Input* value is set to 1000, new value is $1000 + 5\% = 1000 + 50 = 1050$.

5.3 Output pulses to computer

With computers from the USA, usually their AC pulse input frequency limit is 12-15 Hz. If this pulse frequency to the computer input is exceeded, then the computer can lose pulses and overdose can occur.

If the ME3000 is connected to a US AC-input computer, then to prevent possibility of overdose:

- the ME3000 parameter *Max Output Rate* \leq 15 Hz; and
- the ME3000 parameter *Output Pulse* must be scaled appropriately so that the pulse rate to the computer does not exceed 15 Hz (less than 12 Hz is desirable) e.g. MES20 flowmeter gives 1000 pulses/Litre, and has a maximum flowrate of 70 Litres/min or 1.16 Litres/second. So, at maximum flow, pulses produced are 1.16 Litres/sec x 1000 pulses/Litre = 1166 pulses/sec or 1166 Hz, which is much too high. Consequently, output pulses from the ME3000 must be scaled to 0.100 Litres/pulse (i.e. 10 pulses/Litre), so that the maximum output pulse rate becomes 1.16 Litres/sec x 10 pulses/Litre = 11.6 Hz (see Figure 5 below).

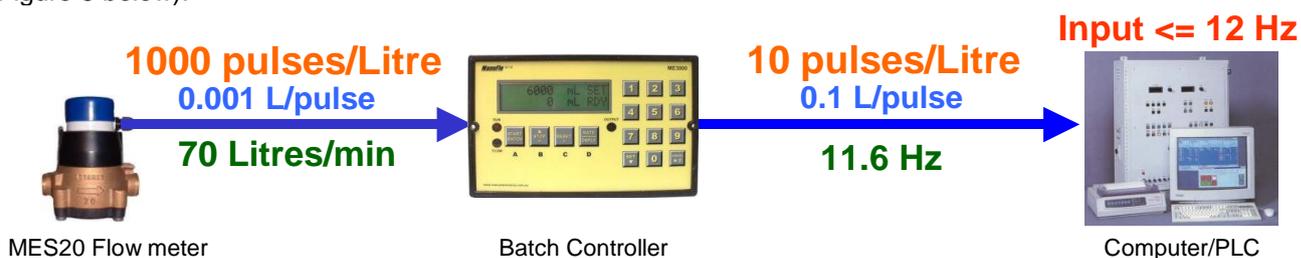


Figure 5. Pulse Scaling Example

Table 8 below shows the maximum safe flowrate for various Output Pulse scaling values, so that the input frequency to a computer does not exceed 12 Hz.

ME3000 Output Pulse	pulses/Litre	Max. Safe Flowrate		Input to Computer
		Litres/sec	Litres/min	
0.010 Litres/pulse	100	0.120	7.2	12 Hz
0.020 Litres/pulse	50	0.240	14.4	12 Hz
0.050 Litres/pulse	20	0.600	36.0	12 Hz
0.100 Litres/pulse	10	1.200	72.0	12 Hz
0.200 Litres/pulse	5	2.400	144.0	12 Hz

Table 8. Pulse Scaling for AC-input Computers

6. Calibrate Mode for 4-20mA

Calibrate Mode is used to calibrate the 4-20mA output (if that option is fitted), so that exactly 4mA and 20mA are output at the minimum and maximum current. Before using Calibrate Mode, connect a multimeter across the ME3000's current output to be able to measure the current produced.

When the ME3000 screen shows SET and RDY, Calibrate Mode is entered by:

- first simultaneously pressing the buttons marked with an asterisk "*" (i.e. STOP and CANCEL) for 5 seconds;
- the screen will show the message "PROGRAMME MODE PUSH BUTTON 'A'."
- then, instead of pressing button A, again simultaneously press the buttons marked with an asterisk "*" (i.e. STOP and CANCEL) for 5 seconds.

The parameters (the 4mA output setting, and the 20mA output setting) are stepped through using the button down arrow ▼ button i.e. SET.

C	A	L	I	B	R	A	T	E		M	O	D	E		
4	m	A					1	.	U	P		2	.	D	N

C	A	L	I	B	R	A	T	E		M	O	D	E		
2	0	m	A				1	.	U	P		2	.	D	N

Pressing the CANCEL button for 5 seconds exits Calibrate Mode from any point (any values set in Calibrate Mode will be retained).

To change the output current for the calibration item being displayed:

- press the '1' button to increase the current output; or
- press the '2' button to decrease the current output.

and observe the current on your attached multimeter.

7. Wiring

7.1 Rear View

The ME3000 is in a sealed polycarbonate enclosure. The rear view of the standard ME3000 Batch Controller is shown in Figure 6 below.

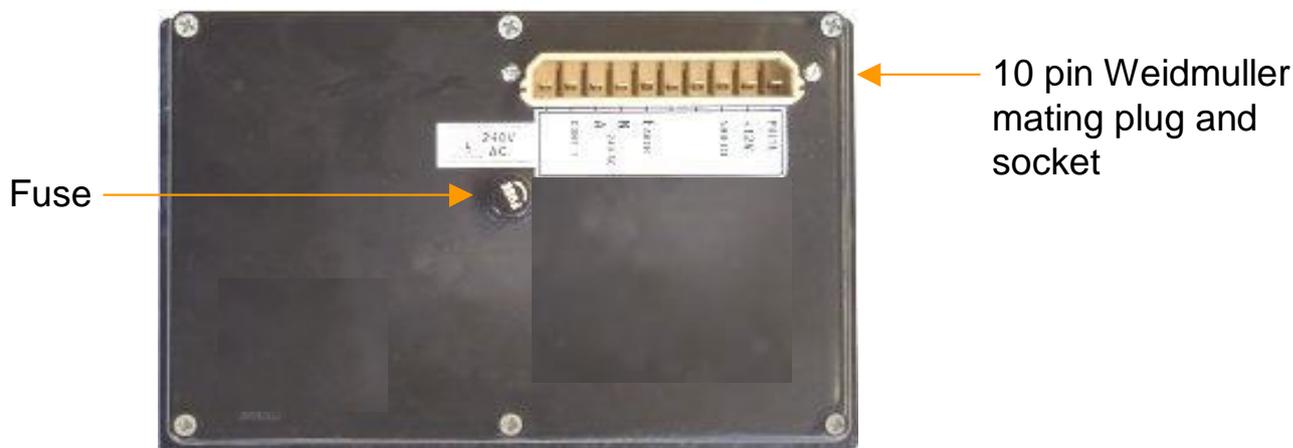


Figure 6. Rear of Standard ME3000

7.2 Standard Wiring

The usual wiring for a 240vac powered ME3000 Batch Controller is shown in Figure 7 “ME3000 - Standard AC Wiring” on page 18.

Figure 8 on page 19 shows a wiring example for a DC powered Batch Controller.

7.3 Connection/Interface options

Coil Flowmeter Connection

If the ME3000 is to be connected to a flowmeter with inductive coil pulse output (e.g. a ManuFlo RPFS-L flow sensor), then:

- the ME3000 must be ordered with option “-L”, so it can be factory configured internally to operate with a coil flowmeter; and
- the wiring diagram of
- Figure 7 (note the insert box describing coil flowmeter connection) on page 18 must be followed for connection of the coil flowmeter.

Open Contact Output

If the ME3000 is to operate using an Open Contact connection, then:

- the ME3000 must be ordered with option “-OC”, so it can be factory configured internally; and
- the wiring diagram of Figure 9 on page 20 must be followed for an Open Contact connection.

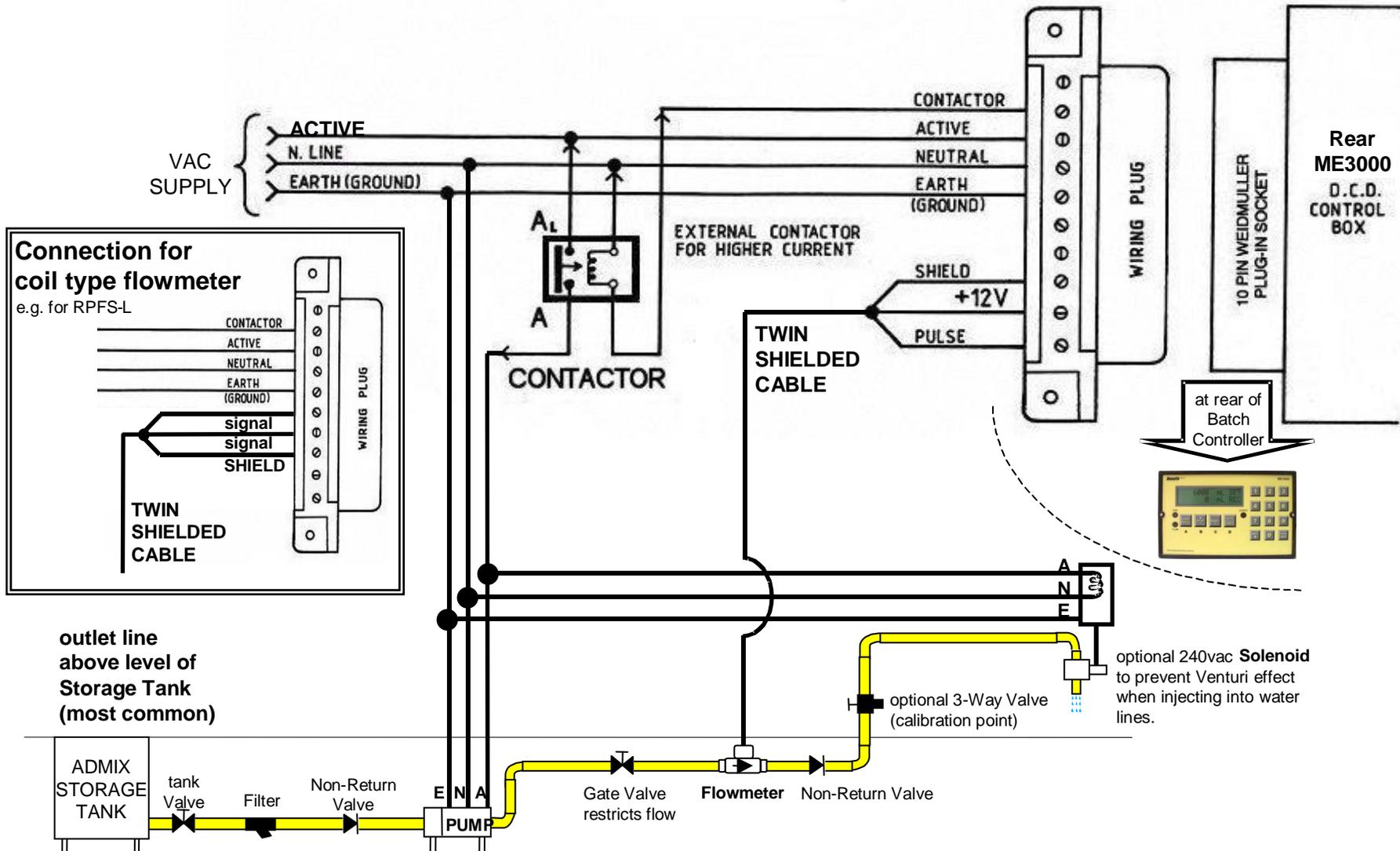


Figure 7. ME3000 - Standard AC Wiring
 Note different connection to Wiring Plug if flowmeter is a coil type.

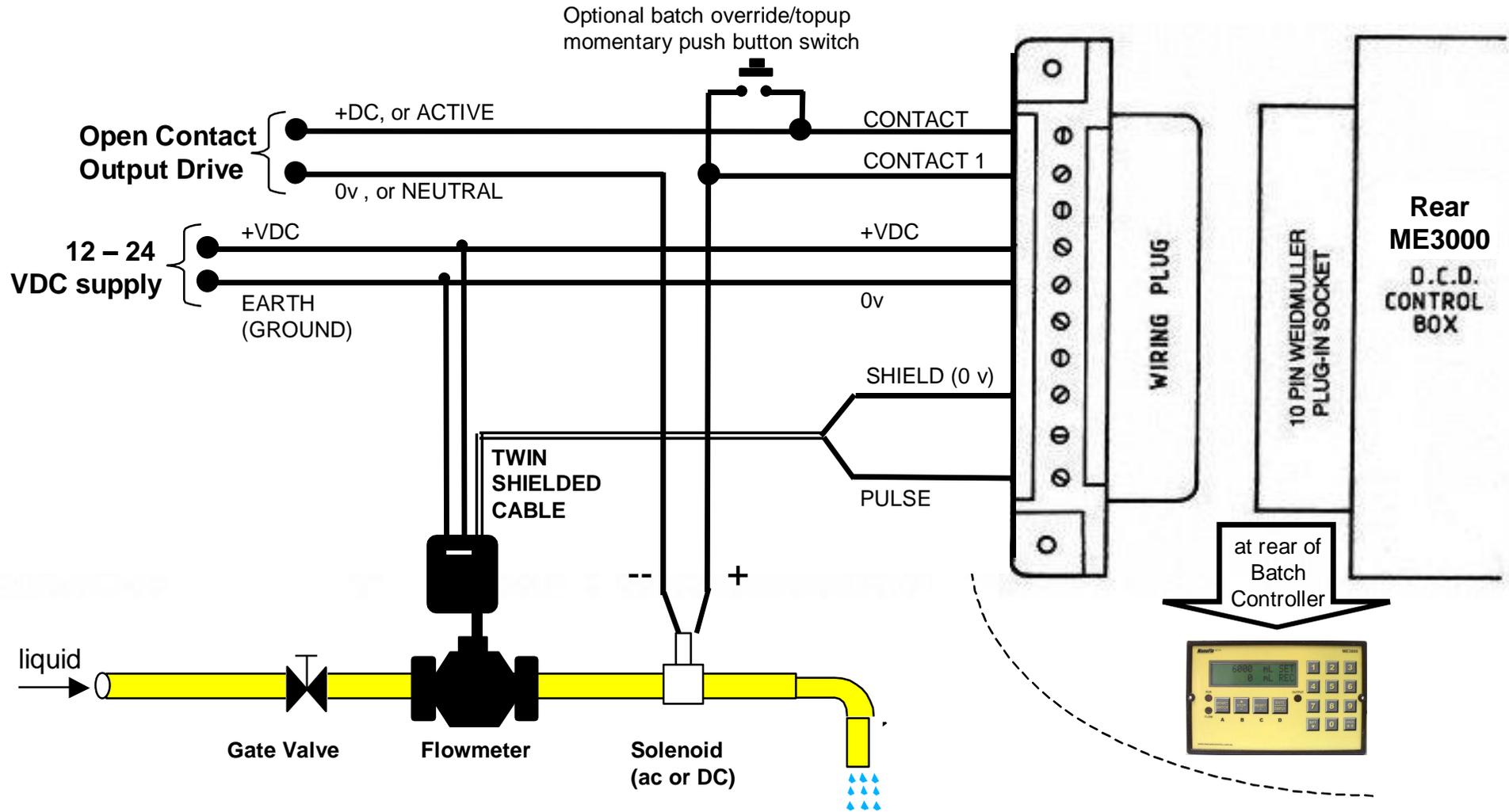


Figure 8. Wiring for DC-powered Batch Controller

NOTE: if current draw of solenoid is greater than 0.5 Amps, or if using a pump, then install a contactor.

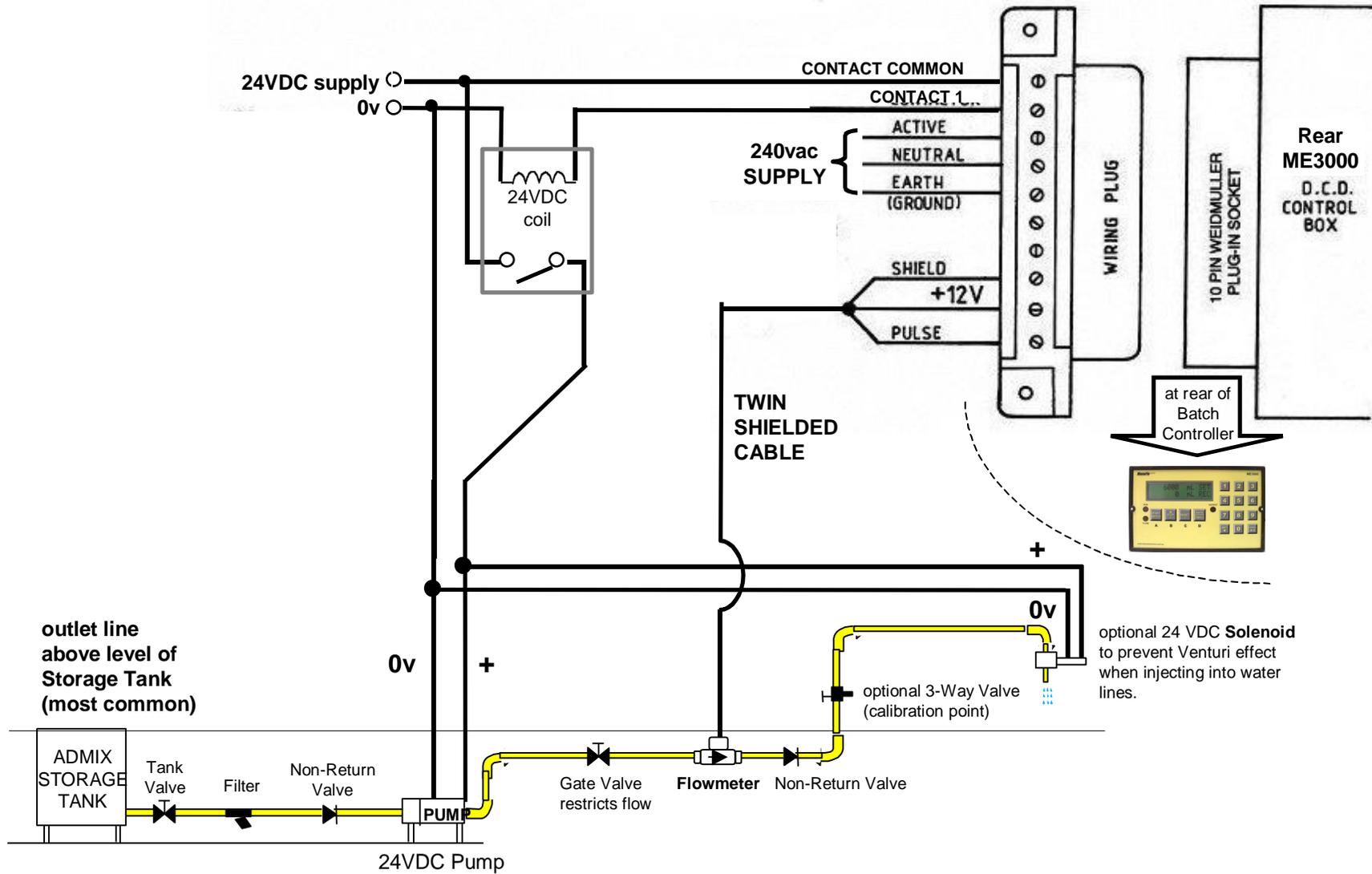


Figure 9. Wiring for DC Open Contact
 Batch Controller supply: 240vac. Open Contact DC supply and output.

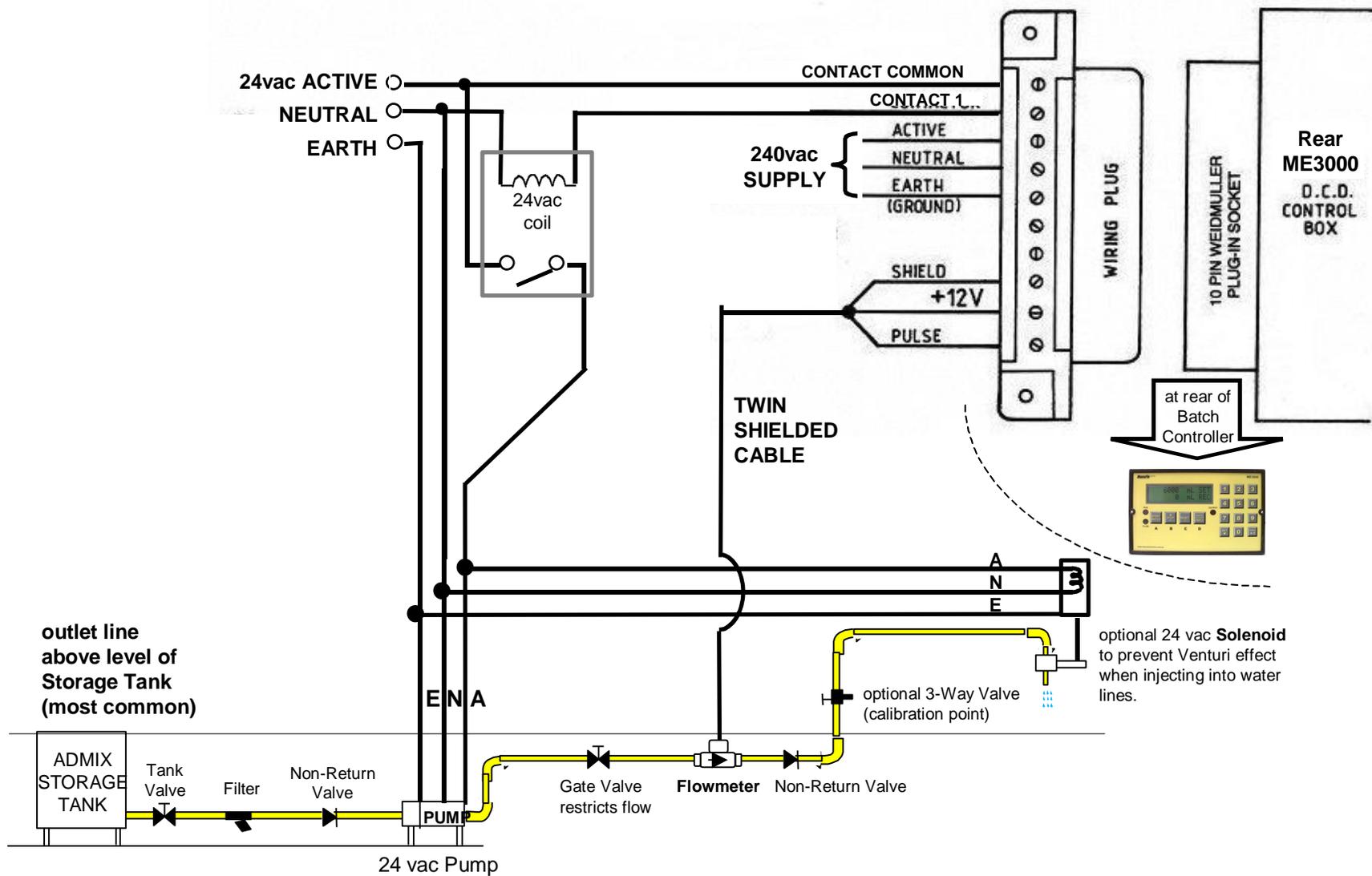


Figure 10. Wiring for AC Open Contact

Batch Controller supply: 240vac. Open Contact ac supply and output.

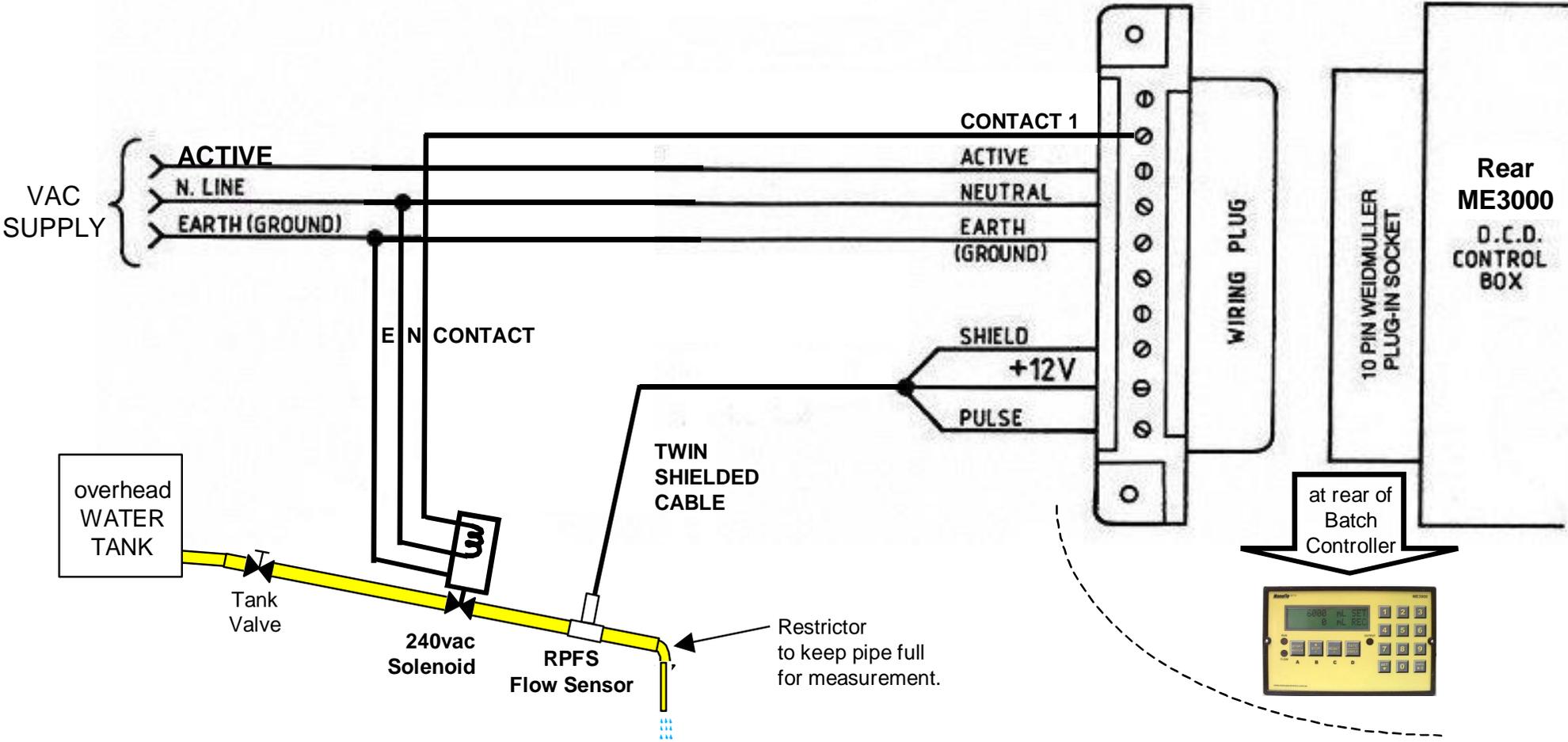


Figure 11. Wiring for AC Solenoid without Pump

Batch Controller supply: 240vac. Solenoid: 240vac

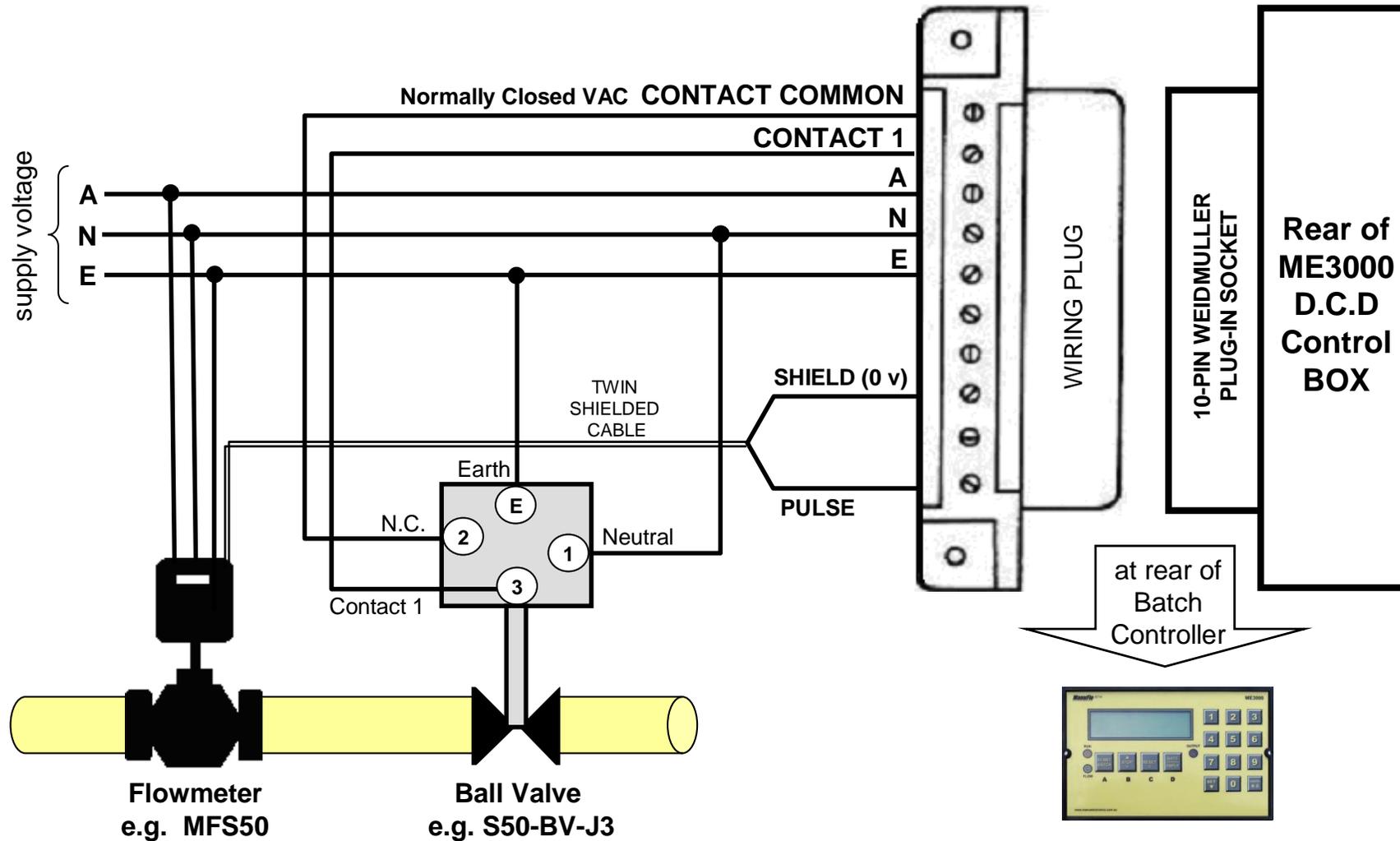


Figure 12. Wiring for AC Motor-Driven Ball Valve

For valve applications without air pressure.

Note: if an optional pump is used as well as a Ball Valve, then a contactor must also be wired in (as shown in Figure 10 on Page 21).

Alarm, Batch Complete and 4-20 mA output

If the ME3000 “-OPA” option is ordered, then a 6-way terminal strip (Figure 13 below) is provided at the rear of the controller, to output:

- 4-20mA output for flowrate indication; and
- Alarm. Is Normally Open. Comes on when there is an unacknowledged alarm; and
- Batch Complete. Normally low. Goes high momentarily when a batch completes.

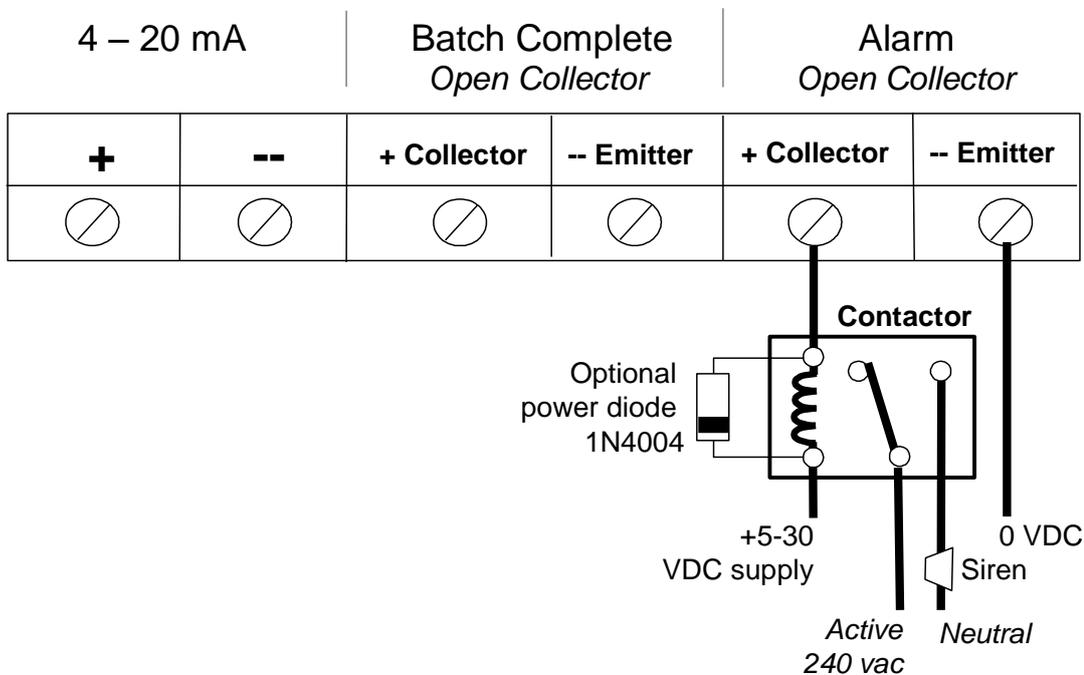
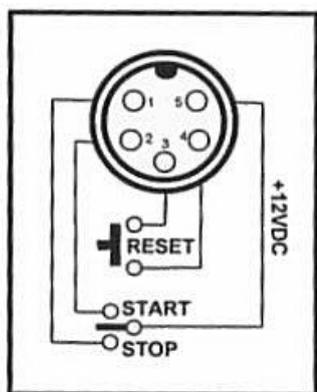


Figure 13. -OPA option

The alarm output is shown with a sample circuit to connect to an external alarm indication.

Start/Stop/Reset for Housing Box

If the ME3000 “-SSR” option is ordered, then a plug is provided at the rear of the controller to enable the controller to receive Start, Stop or Reset commands from a waterproof HB2500-SSR housing box. The HB2500-SSR housing box and the ME3000-SSR Batch Controller should be ordered at the same time.



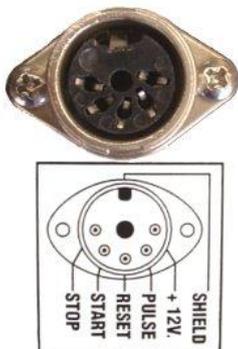
-SSR plug external connections



ME3000-SSR in HB2500-SSR housing box

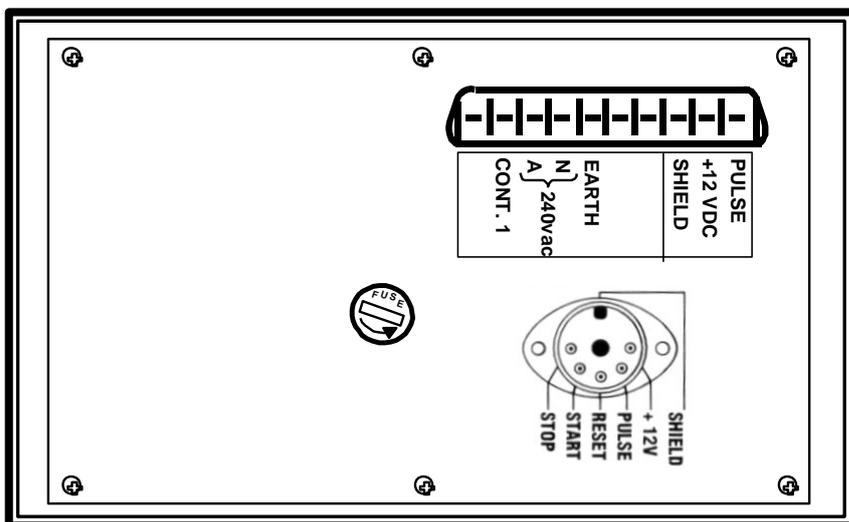
Figure 14. -SSR Plug

5-pin computer interface plug



The -5P option is a 5-pin (Start, Stop, Reset, Pulse, +12V) computer interface plug fitted to the ME3000 Batch Controller (Figure 15 below) so it can interface to PLCs such as Jonel, Eagle and Phoenix (normally via an ME5IC-type Interface card, as shown in Figure 16 below).

- Start, Stop, Reset is generated externally by voltage-free momentary contact between these command lines and the internal +12V of the Batch Controller.
- Pulse output is between Pulse and 0V. Maximum load is 8mA 12VDC sinking pulse.



matching 5-pin plug (supplied if not using the ME5IC interface card).

Figure 15. -5P Interface Plug

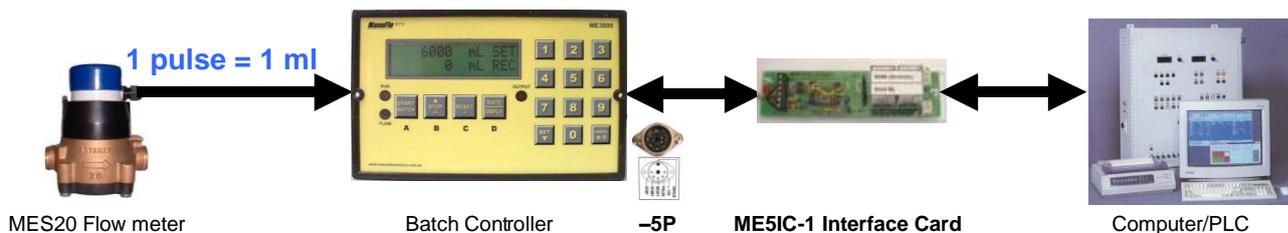
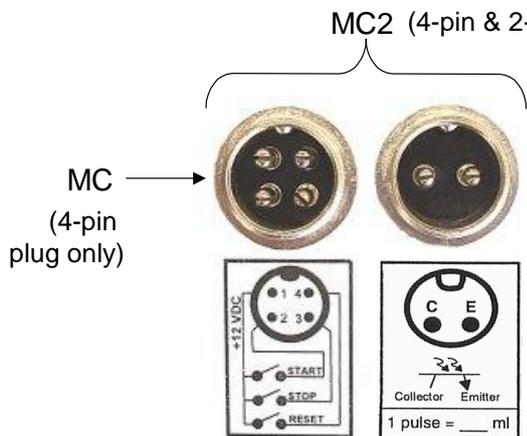


Figure 16. Interface to PLC, using -5P with ME5IC-type interface card

MC-series Interface Plugs

The MC-series interface plugs are either a 4-pin only (-MC option), or 4-pin and 2-pin (-MC2 option), interface socket/plug configurations fitted as an option to the ME3000 Batch Controller, that provide an interface to PLCs/Computers such as Compubatch and Dickenson Autocon.



- The 4-pin plug allows an external PLC to command a Batch Controller (to Start/Stop/Reset the Batch Controller) via a volt-free momentary (minimum 0.5 second) contact that actuates the internal 12 VDC of the Controller's Start/Stop/Reset signal.
- The 2-pin plug provides opto-isolated open collector 5-25VDC (maximum 120mA via the internal 4N33 opto) pulse output to the PLC inputs.

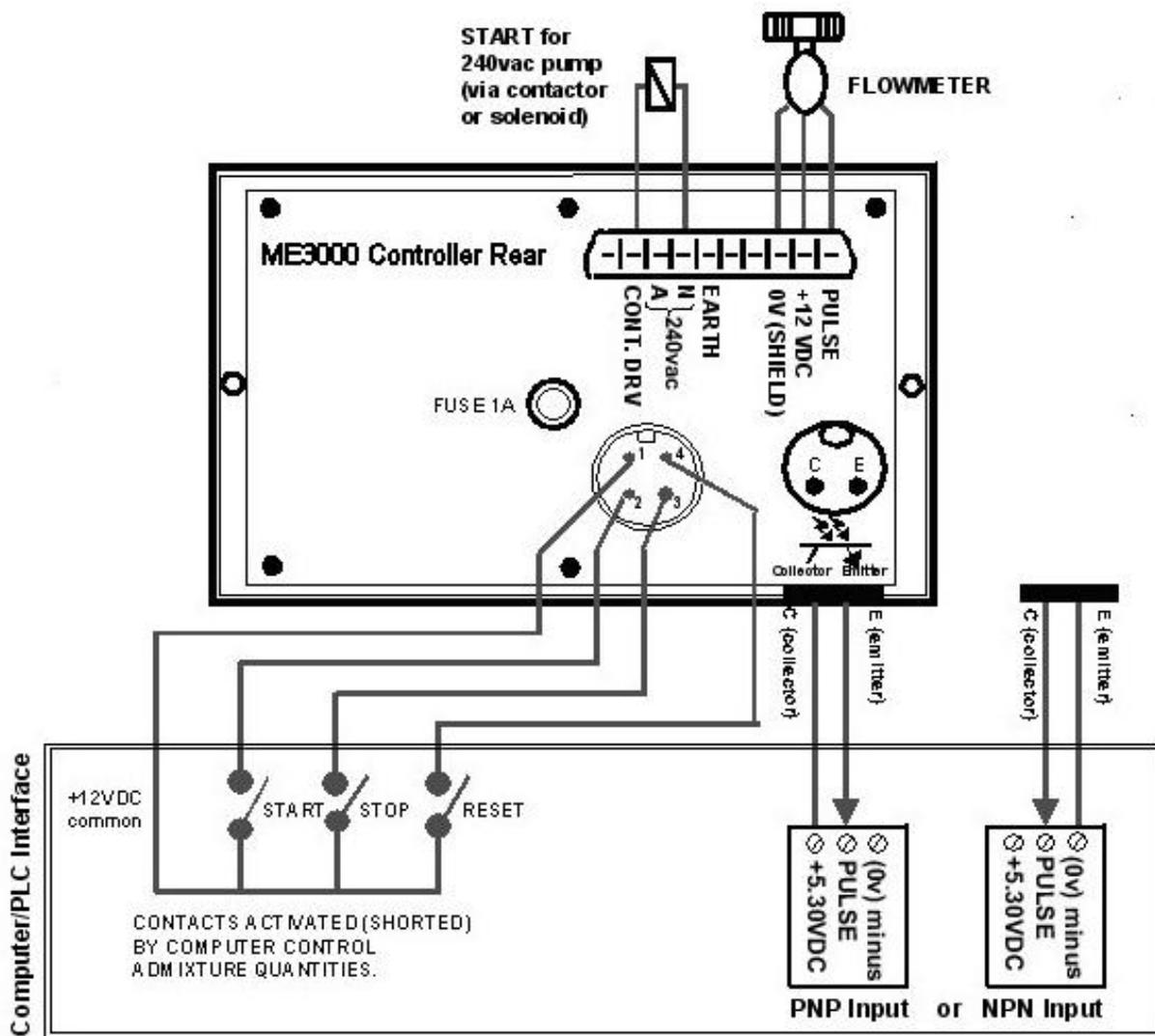


Figure 17. MC-series Interface Plugs

8. Mounting

The ME3000 is a panel-mount type unit. Housing enclosures are also available (see section 1.2 on page 2).

9. ALARMS & TROUBLESHOOTING

If an alarm occurs, then:

- alarm text is shown on the display; and
- the internal buzzer sounds; and
- the alarm output (if the -OPA option is fitted) comes on; and
- the alarm is logged in the Event Log.

To cancel an alarm, press the CANCEL button.

<u>PROBLEM</u>	<u>MEANING/ CAUSE</u>	<u>SUGGESTED SOLUTION</u>
ALARM- BACKFLOW	Liquid has flowed after the batch has completed.	<ul style="list-style-type: none"> • ensure that Check Valve is not faulty.
ALARM- OVERRUN	Batching has not stopped after being commanded to stop.	<ul style="list-style-type: none"> • ensure solenoid valve is operating correctly. • ensure pump can turn off - contactor may be sticky or fused, or may need to be a higher ampere rating. Replace contactor.
ALARM- BATCH LMT	The amount dispensed has exceeded the maximum allowed batch quantity.	<ul style="list-style-type: none"> • ensure that the quantity requested by the operator does not exceed the batch limit (see Table 6, page 11) programmed in the Batch Controller. • ensure that any Computer control program is not requesting a quantity that is greater than the batch limit (see Table 6, page 11) programmed in the Batch Controller. • ensure solenoid valve is functioning. • ensure pump can turn off - contactor may be sticky or fused, or may need to be a higher ampere rating. Replace contactor. • ensure that the signal cable from the flowmeter is correctly shielded, so that stray counts are not being caused by interference. • Active and contact power drive may be short circuited on Batch Controller PCB. Check or replace PCB or call ManuFlo. • change the Batch Limit value (see Table 6, page 11) that is programmed in the Batch Controller.
ALARM- MAX FLOW	The flowrate has exceeded the maximum allowed flowrate.	<ul style="list-style-type: none"> • reduce the flow through the flowmeter. • change the allowed maximum flowrate (see Table 6).
ALARM- MIN/NOPLS	The flowrate has fallen below the minimum allowed flowrate, or there are no pulses to indicate any flow.	<ul style="list-style-type: none"> • ensure flowmeter is functioning i.e. that flowmeter is not jammed. • check cabling from flowmeter. • change the allowed minimum flowrate (see Table 6)

<u>PROBLEM</u>	<u>MEANING/ CAUSE</u>	<u>SUGGESTED SOLUTION</u>
ALARM- O/P RATE	The scaled output pulses from the ME3000 to the PLC have exceeded the maximum allowed rate.	<ul style="list-style-type: none"> • re-scale the output rate to allow for the maximum flowrate that will be experienced (see Table 6). • ensure flowmeter is not damaged.
ALARM- OVERBATCH	The quantity dispensed has exceeded the quantity requested, by more than the allowed amount.	<ul style="list-style-type: none"> • change the preact value (see Table 6). • ensure solenoid valve is operating correctly. • change the allowed overbatch limit (see Table 6).
Can't enter Programme Mode	Batching display is not SET and RDY i.e. reset has not been pressed after a batch has completed.	Ensure the batching display shows SET and RDY i.e. RESET button has been pressed after a batch has completed.
Can't reset Batch Id	Batching display is not SET and RDY i.e. reset has not been pressed after a batch has completed.	Ensure the batching display shows SET and RDY i.e. RESET button has been pressed after a batch has completed.
Can't reset Grand Total	Batching display is not SET and RDY i.e. reset has not been pressed after a batch has completed.	Ensure the batching display shows SET and RDY i.e. RESET button has been pressed after a batch has completed.
No power to batch controller, display not on	<ul style="list-style-type: none"> • Blown fuse or holder not tightened • +12vdc and 0V shorted • No main power supply 	<ul style="list-style-type: none"> • Check fuse, tighten fuse holder (at rear of controller). • Check wiring at rear of controller and at flowmeter, replace cable if necessary. • Check power supply, check wiring.
Pulse fails during batch cycle	<ul style="list-style-type: none"> • Flowrate too slow • Flowrate too fast • Blocked filter restricting flow • Measuring chamber clutching • Calcium buildup on pipewalls restricting flow. • Calcium buildup on paddlewheel • Worn bushes on paddlewheel. 	<ul style="list-style-type: none"> • Open restriction gate valve or increase flowrate pulse fail timing capacitor (see service guide). • Chamber clutching, slow down flowrate via restrictor valve check flowmeter specs for performance operating range. • Cleanout filter. • Cleanout chamber or replace. • Clean out pipelines. • soak paddlewheel in diluted acid. • replace bushes or whole paddlewheel assembly.
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. • External pump contactor relay sticky or fused, due to excessive current draw from pump. 	<ul style="list-style-type: none"> • Check PCB for short circuit, or replace. • Replace contactor with one of higher ampere rating.

<u>PROBLEM</u>	<u>MEANING/ CAUSE</u>	<u>SUGGESTED SOLUTION</u>
	<ul style="list-style-type: none"> Relay fused due to excessive current draw on solenoid coil. 	<ul style="list-style-type: none"> install higher current-rated relay.
Controller not counting but Flow and/or Contact drive LEDs on	<ul style="list-style-type: none"> Controller malfunction, IC failure 	<ul style="list-style-type: none"> Replace controller, ring ManuFlo for urgent advice.
Controller counts up a batch cycle but no admixture delivered	<ul style="list-style-type: none"> Flowmeter (MES) measuring air 	<ul style="list-style-type: none"> Can occur with positive displacement pump. Fit a recirculation line on inlet/outlet of pump.
Intermittant overflow past batch select or liquid doesn't stop.	<ul style="list-style-type: none"> Faulty solenoid valve not closing properly due to insufficient air pressure 	<ul style="list-style-type: none"> service solenoid valve check air pressure
Pulse fails at start of batch	<ul style="list-style-type: none"> Air pocket Restriction gate valve closed Empty tank Pump not turning Non-return valve stuck closed. Solenoid valve not opening. If flowmeter is positive displacement type (e.g. MES20), seized flowmeter chamber. Flowmeter pulsehead faulty, or connections corroded. Signal cable cut or bad joint. Calibration Input (K-factor) value incorrect If flowmeter is paddlewheel type (e.g. RPFS), paddlewheel has seized. Pump foot valve failed. RPFS flowmeter signal cable cut, bad joint at Junction Box, oxidised cable-leakage. RPFS Paddlewheel is not positioned in pipe or is not inserted correctly into the flow stream. RPFS Flowmeter faulty. 	<ul style="list-style-type: none"> Prime line by shorting output drive (C=Contact and A=Active) Open gate valve. Check liquid level in tank. Check and service pump. Check and service non-return valve. Check and service solenoid valve, check output control voltage is correct when start button is pushed. Service and clean flowmeter chamber, replace if required. Replace with new pulse head. Check signal cable. In ME3000, check and adjust Calibration Input value if necessary. Remove paddlewheel flow sensor, and inspect. Clean with dilute acid (4 parts water, 1 part hydrochloric acid), check axle/bushes, ensure paddlewheel spins freely. Empty pipe, install non-return valve. Check signal cable for 12VDC at junction box near RPFS meter. If no power, cable is cut or oxidised - repair/replace. Unwire the RPFS, take up to batchroom, remove extension cable and hardwire RPFS direct into the Batch controller (P,+,-), spin wheel, should count on ME3000 display. If so, then extension cable or connections at Junction Box is faulty; if no counts but 12VDC is present then RPFS is faulty. Ensure that RPFS slots are in the keyway position, and that lock cap is secured. Replace with new RPFS.

WARNING:

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

<u>PROBLEM</u>	<u>MEANING/ CAUSE</u>	<u>SUGGESTED SOLUTION</u>
Display digits count slowly after batch complete	<ul style="list-style-type: none"> • Non-return valve faulty (jammed open). • Solenoid valve not properly closed, due to damaged seal or faulty solenoid. 	<ul style="list-style-type: none"> • Clean, service or replace the non-return valve. • Repair/replace solenoid.
amount received excessively exceeds amount requested	<ul style="list-style-type: none"> • Flowrate too fast. 	<ul style="list-style-type: none"> • Turn down gate valve to restrict flowrate • In ME3000, change Preact value to compensate. • Reduce delivery pipe diameter.
During calibration test more admix collected than indicated	<ul style="list-style-type: none"> • Flowmeter chamber part missing. • Chamber excessively worn, liquid is slipping through without registration • Specific Gravity below 1.0 • MES20 under excessive pressure th AEA slippery admix 	<ul style="list-style-type: none"> • Check flow chamber, Check O-rings are seated correctly (MEK20/MES20 roller bush or O-ring). • Replace with new chamber, recheck calibration. • Replace chamber and restrict flowrate, or recalibrate via controller or recalibrate via interface card. • Place restriction valve after pump and prior to flowmeter.

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

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.
--------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

10. Serial Interface option

The ME3000 can be fitted with an optional RS232 interface (Order Code option “-SC”, see Table 1 on page 1) which is a DB9 male serial connector (see Figure 18 below). This allows:

- the printing of batch tickets through an associated printer. This is usually as part of the TMP configuration using the APM-n93XS printer (see Table 2 on page 2), although any 9600 baud serial printer can be connected; and
- the downloading of the internal Event Log to a laptop/PC for analysis (see section 10.5 on page 35).



Figure 18. DB9 (Male) Serial connector

10.1 Connection to printer

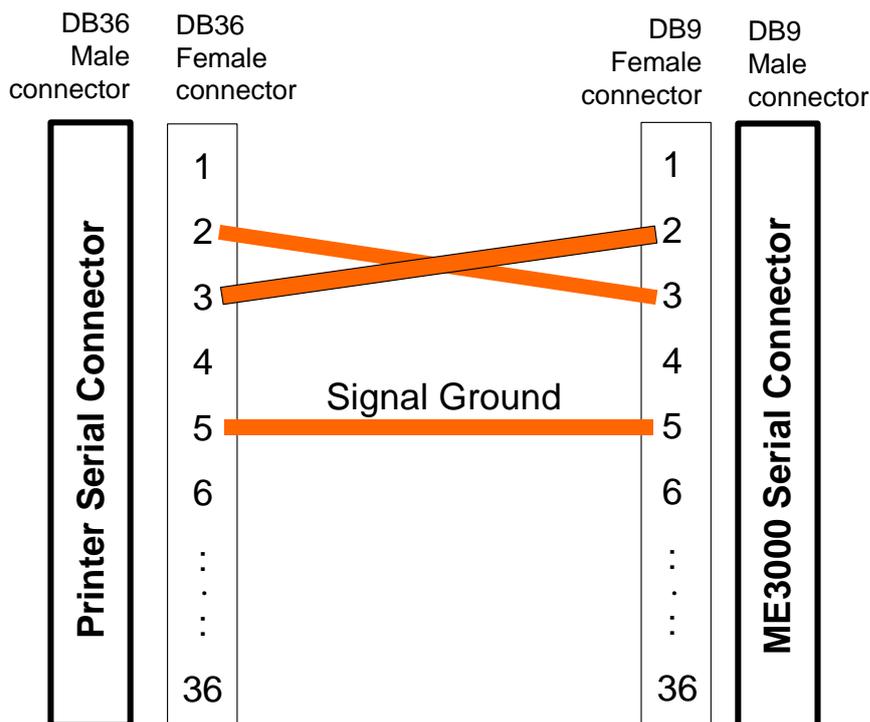


Figure 19. Serial cable wiring for connecting to printer

10.2 Batch Tickets

If a 9600 baud printer is attached to the ME3000 via the optional RS232 interface, than a Batch Ticket (see Figure 20 below) will be printed at the end of each batch.

The quantity quantity shown on the on batch docket is truncated to one decimal place e.g. 2.16 Litres will be shown as 2.1 Litres.



Figure 20. Batch Ticket example

Note that:

- A Batch Ticket is printed when:
 - a batch completes; or
 - when a batch in progress is terminated by pressing the STOP button and then (after a few seconds) the RESET button.
- Batch completion, and the use of the STOP button, is recorded in the Event Log (see section 10.4 on page 34).

Whenever the ME3000 is ready to batch (the batching display is SET RDY), the Batch Id can be reset by:

- pressing the RATE/DSPLY button repeatedly to show the Last Batch Id (see Table 5 on page 10); then
- pressing the RESET button for 5 seconds.

10.3 Connection to laptop

Figure 21 below is the wiring diagram for a serial connection between the ME3000 and a laptop or PC, to be able to download the Event Log.

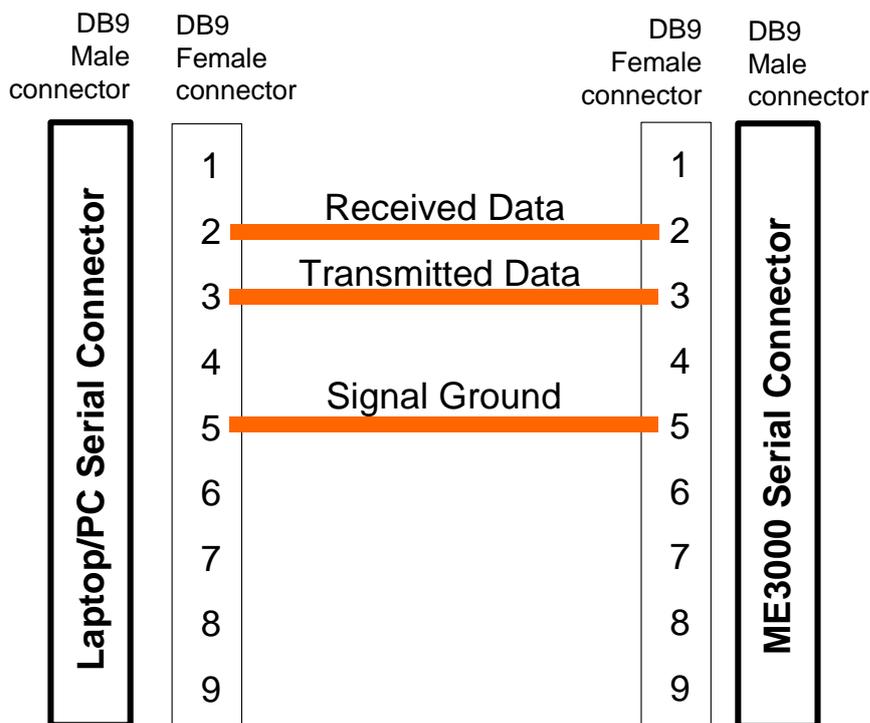


Figure 21. Serial cable wiring for connection to Laptop/PC

The user can construct their own cable for the serial connection, or there are commercially available cables and adapters, as shown in Figure 22 and Table 9 below.

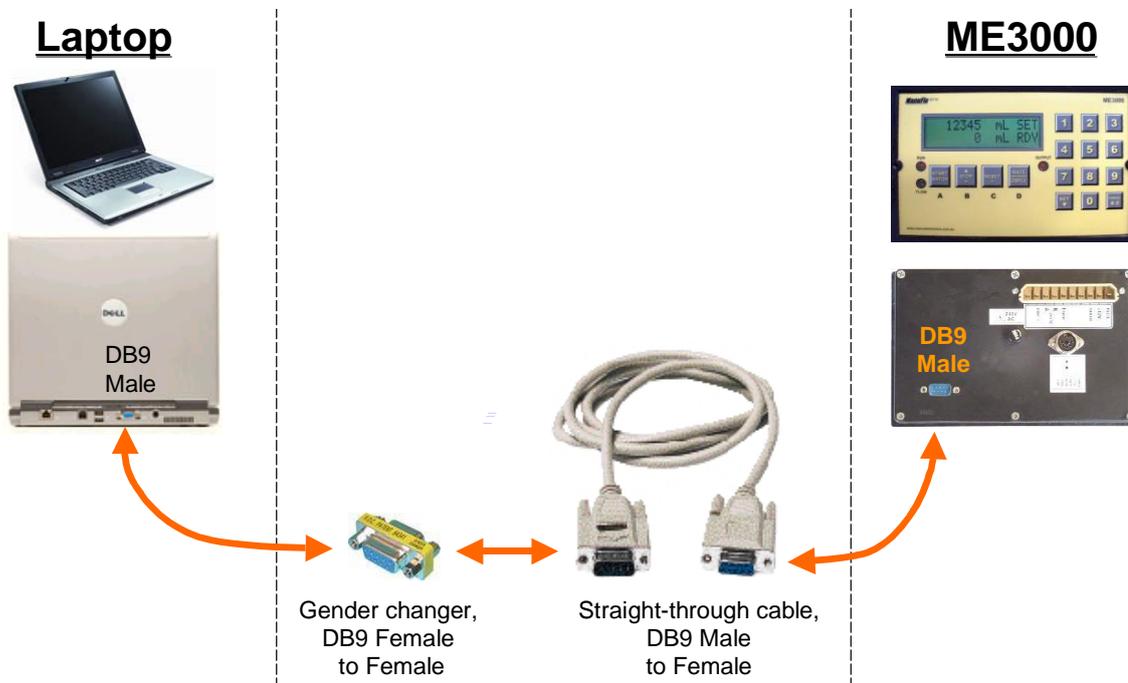


Figure 22. Connecting to Laptop/PC

type	ORDER CODE	
	from Dick Smith	from Jaycar
straight- through cable, DB9 Male to Female	X2610	WC7534
<i>and</i>		
Gender changer, DB9 Female to Female	X2675	PA0901

Table 9. Cables commercially available in Australia for connecting to Laptop/PC.

10.4 Event Log

The ME3000 maintains an internal log of significant events. The log is circular, so older data is overwritten by new data.

The format of data is:

DD/MM/YY HH:MM TTTTTTTTTTTTTTTTTTTmL MESSAGE

where:

DD/MM/YY : Date.
 HH:MM : Time (HH:MM in 24 hour format).
 TTTTTTTTTTTTTTTTTTT : Volume in millilitres - is generally the Grand Total, but for relevant messages is the batch quantity.
 MESSAGE : Brief text description of the event e.g. the Batch Id.

Table 10 below shows the types of events that are recorded, and Figure 23 on page 35 is an example of an Event Log downloaded to a Laptop/PC.

Event type	Volume Quantity	Message
Alarm - backflow threshold exceeded	Grand Total at the time	BACK_FLOW
Batch completion	The quantity batched	BATCH_Bnnnn, where nnnn is the Batch Id number
Alarm - maximum batch quantity exceeded	Grand Total at the time	BATCH_LMT
Alarm - quantity delivered exceeds quantity set by more than allowed	Grand Total at the time	BATCH_OVER_RUN
SET button pressed to set batch quantity	Quantity set to be batched	BATCH_SET
Batch Id has been reset	Grand Total at the time	BATCHID_RESET
Calibrate Mode has been entered	Grand Total at the time	CALIBRATE_MODE
RESET command from Computer	Grand Total at the time	COMPUTER_RESET
START command from Computer	Grand Total at the time	COMPUTER_START
STOP command from Computer	Grand Total at the time	COMPUTER_STOP
The ME3000 has been factory reset	Grand Total at the time	FACTORY_RESET
Grand Total has been reset	Grand Total at the time	GTOTAL_RESET
The ME3000 is powered on	Grand Total at the time	INITIALISATION
RESET button pressed	Grand Total at the time	MANUAL_RESET
START button pressed to start batch	Grand Total at the time	MANUAL_START
STOP button pressed to interrupt a batch	Grand Total at the time	MANUAL_STOP
Alarm - flowrate above allowed maximum	Grand Total at the time	MAX_FLOW
Alarm - flowrate below allowed minimum	Grand Total at the time	MIN_FLOW
Alarm - max allowed output rate exceeded	Grand Total at the time	O/P_RATE
Alarm - batch still in progress after being commanded to stop	Grand Total at the time	OVER_BATCH
Programme Mode has been entered	Grand Total at the time	PROG_MODE
Normal Run Mode has been entered	Grand Total at the time	RUN_MODE

Table 10. Event types recorded in the Event Log.

29/06/2005	11:30:10	000000000000002512	mL	MANUAL_RESET
29/06/2005	11:30:08	000000000000002512	mL	BATCH_B0001
29/06/2005	11:29:59	000000000000000000	mL	MANUAL_START
29/06/2005	11:29:57	000000000000002500	mL	BATCH_SET
29/06/2005	11:29:49	000000000000000000	mL	BATCHID_RESET
29/06/2005	11:29:42	000000000000000000	mL	GTOTAL_RESET
29/06/2005	11:29:32	000000000000009010	mL	MANUAL_RESET
29/06/2005	11:29:12	000000000000009010	mL	BACK_FLOW
29/06/2005	11:29:11	000000000000009050	mL	BATCH_B0005

Figure 23. Event Log example

10.5 Downloading the Event Log

- 1 The Event log is accessed by downloading it from the ME3000 to a laptop or PC. **To be able to download the Event Log, the ME3000 must have the optional Serial Interface (-SC) installed.**
- 2 Connect the ME3000 to a laptop or PC: using a straight-through female-to-female DB9 cable, connect from the Batch Controller’s RS232 port to the serial port of a Laptop/PC (see Figure 21 on page 32 and Figure 22 on page 33).
- 3 On the Laptop/PC, start the HyperTerminal software, which is supplied as a part of Windows.
- 4a If HyperTerminal has not already been configured to communicate with the ME3000, then start HyperTerminal.

In Windows XP, HyperTerminal is menu item:

Start > All Programs > Accessories > Communications > HyperTerminal

Go to step 5a.

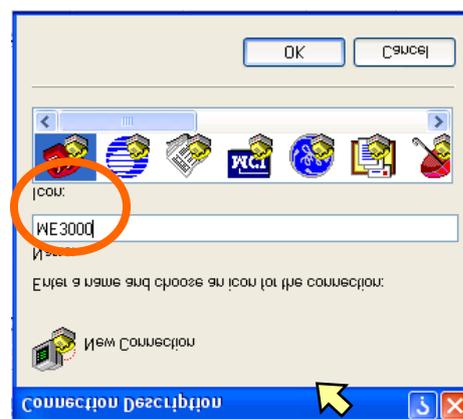
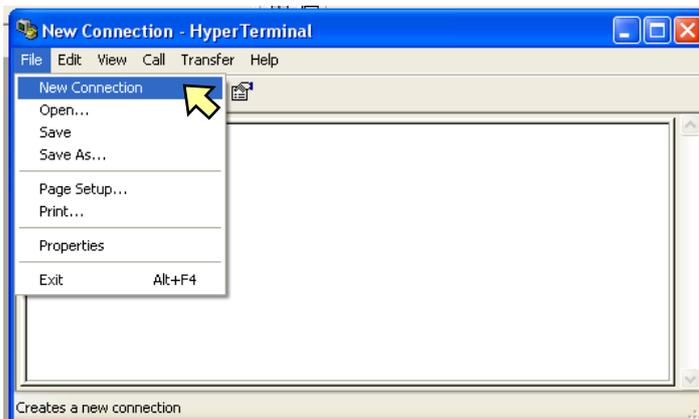
- 4b If HyperTerminal has already been configured to communicate with the ME3000 (as explained in this manual), then start the pre-configured connection.

In Windows XP, a pre-configured ME3000 HyperTerminal connection is under menu:

Start > All Programs > Accessories > Communications > HyperTerminal > ME3000.ht

Go to step 5d.

- 5a In HyperTerminal, create a *New Connection* and name it “ME3000”.



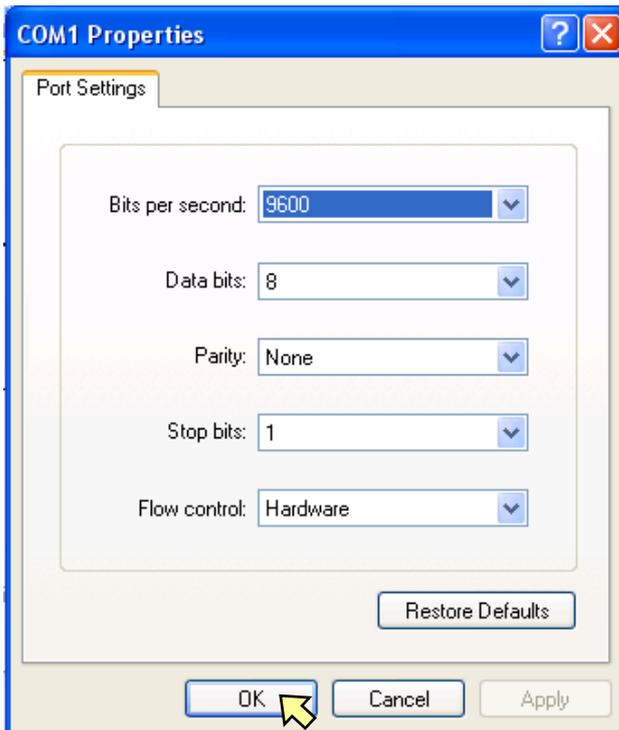
Click on OK.

5b Set *Connect Using* to the COM port corresponding to the Laptop/PC serial port:



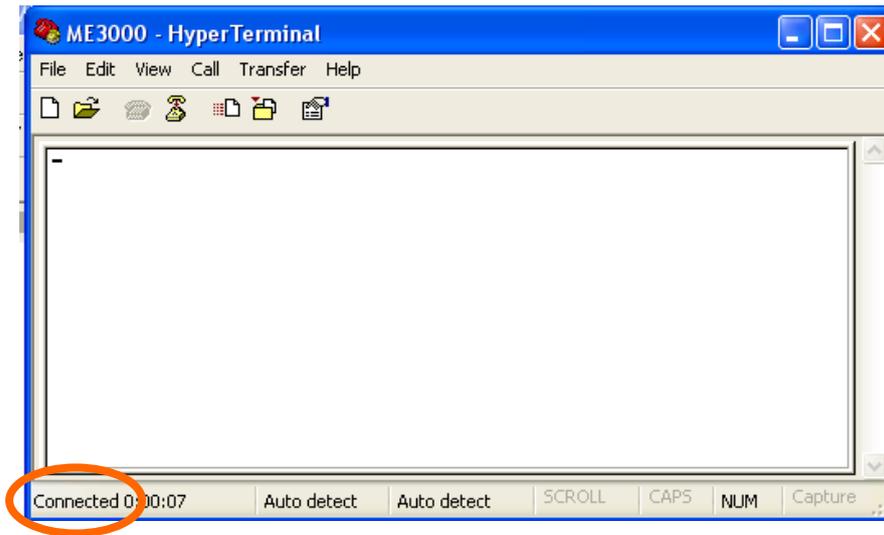
Click on OK.

5c Set the COM port settings:

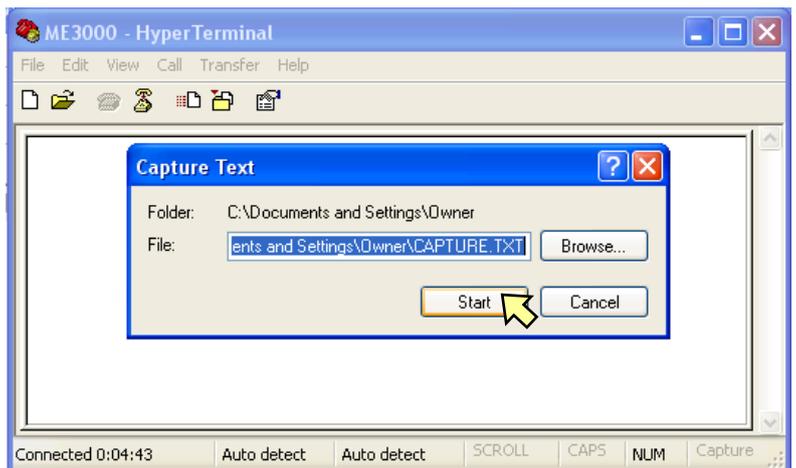
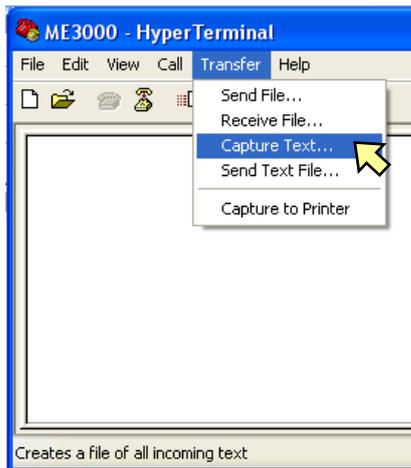


Click on OK.

5d The connection is now connected.



6 Enter the name of a file (e.g. CAPTURE.TXT) where the Event Log is to be written to (doesn't have to be a pre-existing file):



Click on START.

- 7 On the ME3000, press the CANCEL and RESET buttons (those marked with '#') simultaneously for 5 secs:

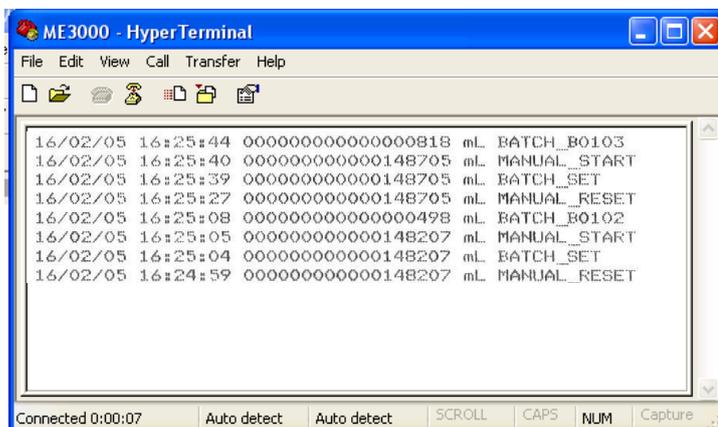


The ME3000 display will show that the event log is downloading:



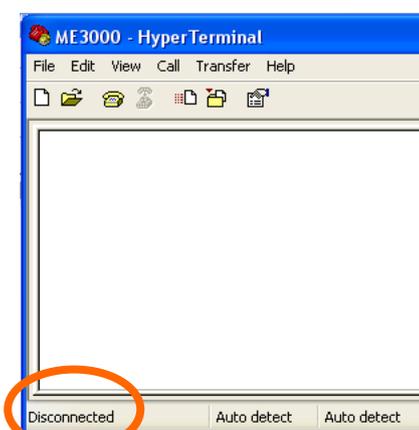
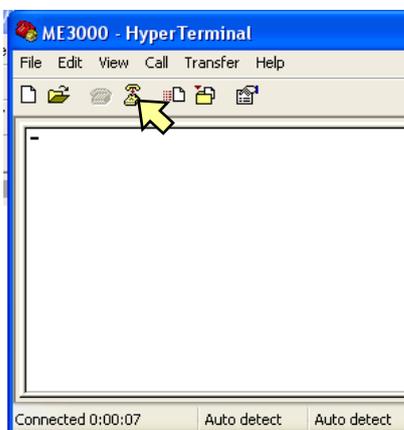
Whilst the '>' symbol is moving on the ME3000 display, the Event Log is downloading.

As the entire Event Log downloads, it will appear in the HyperTerminal Window and will simultaneously be written to the capture file.

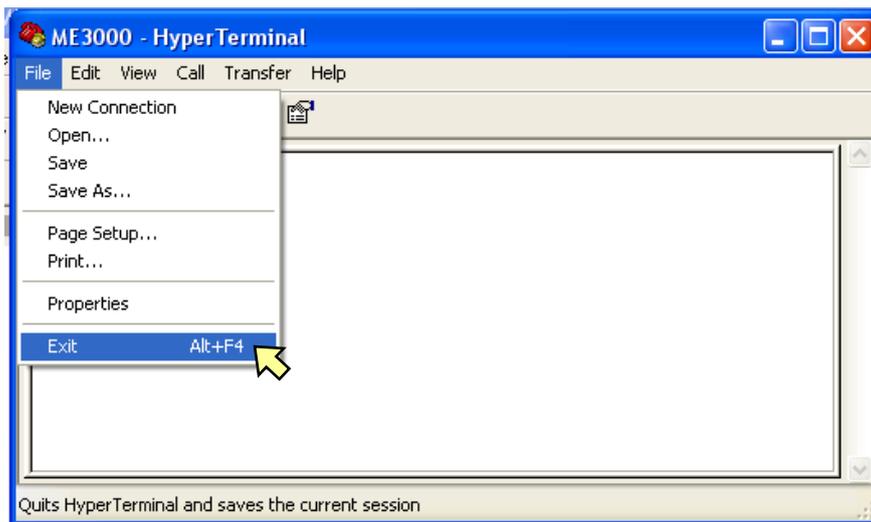


Note: there can be pauses during the download - this does not mean that the download is finished. Whilst the '>' symbol is moving on the ME3000 display, the Event Log is still being downloaded.

- 8
 - Either wait for the download to complete (the ME3000 display will return to SET RDY); or
 - the download can be terminated by pressing the CANCEL button for 2 secs (information written to the capture file will be retained).
- 9 In HyperTerminal, click on the phone icon, and the connection disconnects.

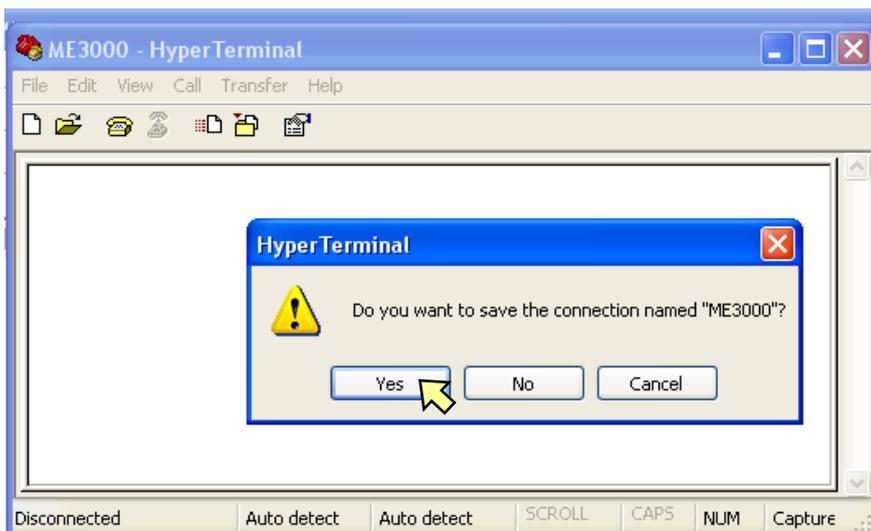


10a Exit HyperTerminal:



- 10b If this is the first time HyperTerminal has been set up for the ME3000, then you will be asked whether to save the connection.

Click on YES.



HyperTerminal will close.

- 11 To read the Event Log, open the capture file (that was set up in step 6).

11. Programme Data Sheet

Every ME3000 that is factory programmed for a specific installation is delivered with a Programme Data Sheet, an example of which is shown on the next page.

ME3000 BATCH CONTROLLER - PROGRAM DATA SHEET

Date _____

Customer _____

Serial No. _____ **S/W Ver** _____ **Setup by:** _____

for Flowmeter MES RPFS RMS Other: _____

Pipesize (mm) 20 25 32 50 Other: _____

PLC/Computer Compubatch D/Autcon Eagle Jonel Other: _____

Options

-110

-DC

-L

-OC

-SC

-SSR

-OPA

-5P

-MC

-MC2

Preact overrun					<input type="checkbox"/>				Litres				
Calibration input					<input type="checkbox"/>				pulses/Litre				
Output pulse					<input type="checkbox"/>				Litres/pulse				
Max output rate									Hz				
Min flow					<input type="checkbox"/>				Litres/sec				
Max flow					<input type="checkbox"/>				Litre/sec				
Max batch limit					<input type="checkbox"/>				Litres				
Max overbatch					<input type="checkbox"/>				Litres				
Max backflow					<input type="checkbox"/>				Litres				
Start delay					<input type="checkbox"/>				seconds				
Stop delay					<input type="checkbox"/>				seconds				
4mA current loop					<input type="checkbox"/>				Litres/sec				
20mA current loop					<input type="checkbox"/>				Litres/sec				
Batch units	<input type="checkbox"/> 0 mL <input type="checkbox"/> 0 L <input type="checkbox"/> 0.0 L <input type="checkbox"/> 0.00 L <input type="checkbox"/> 0 KL												
Date & time	<input type="checkbox"/> done (Sydney time)												
Last calibrated date					/				/				

Notes: _____