6.
Interfacing Flowmeters via ME995 batch controllers to PLC/Computer Controlled Batch Plants

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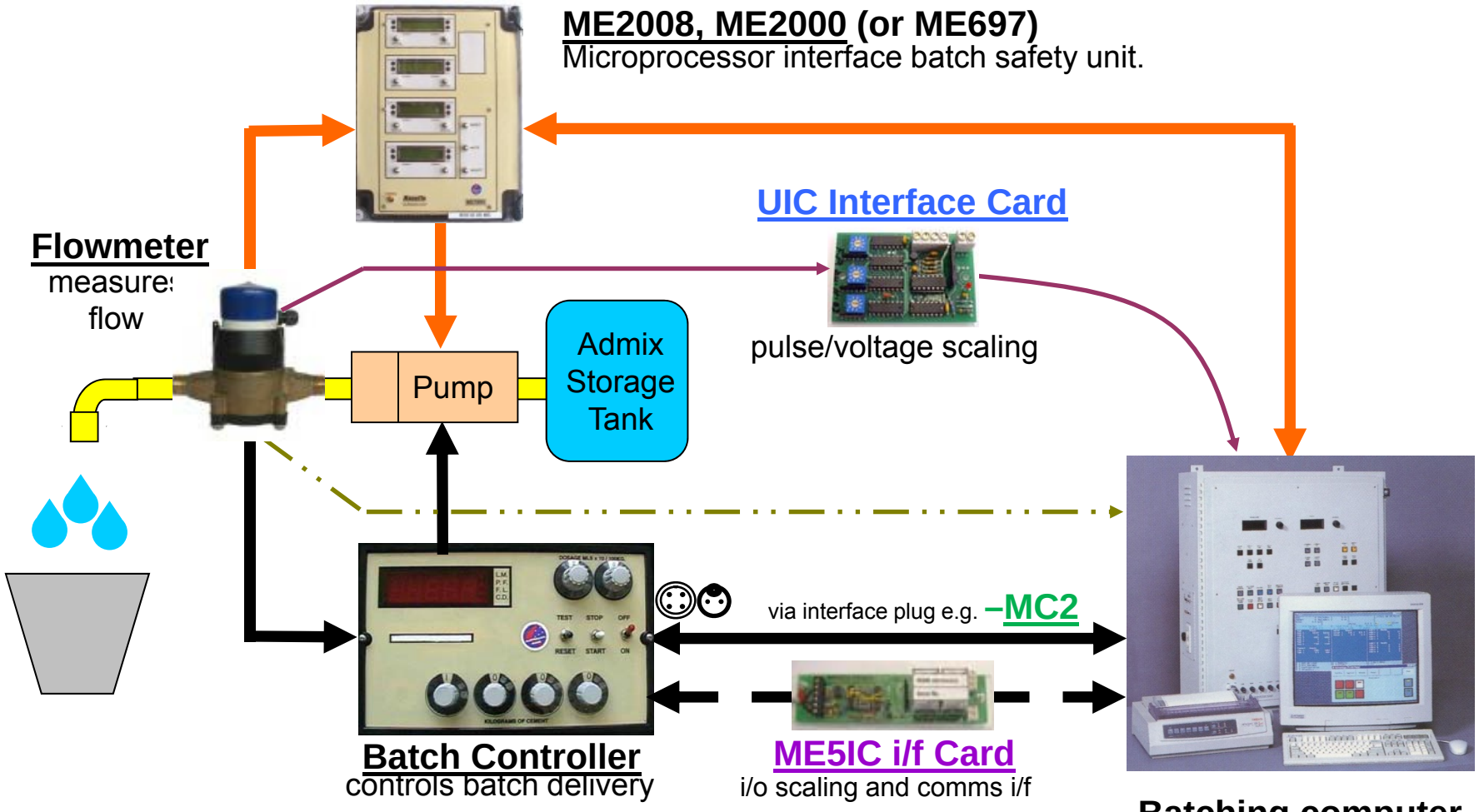
6. Automatic Batching via Computers



Quantity set by: Computer/PLC
Delivery controlled by: Batch Controller/MES2000/Computer/PLC

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Interface Options to PLC/Computer, if Required

PCB10 Flowmeter to Computer

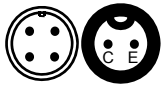
Pulse Divider for MES20 only

UIC/A2 Flowmeter to Computer

Pulse scaling.
24-240vac triac switching pulse output, and 5-12 VDC sink pulse output. With any flowmeter

UIC/D Flowmeter to Computer

Pulse Scaling.
5-30 VDC O.C. 4N33 isolated pulse o/p and 5-12 VDC sink output. With any flowmeter



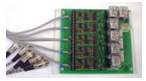
-MC2 Batch Controller to Computer

2-pin plug with OPTO 4N33 open collector pulse output, includes 4 pin external command (start/stop/reset) plug for PLCs.

-5P * Batch Controller to Computer

Superseded by ME2008.

5-pin interface plug: S/S/R, pulse, +12V.
On ME995 with ME5IC to PLC/computer e.g. Jonel-Archer, Command-Batch, Eagle.



ME5IC* Batch Controller to Computer

Pulse dividers, 240vac triac optos, start relays, reset relay,
Controller requires the '-5P' plug option

ME693* Flowmeter to Computer

OBSOLETE

ME697* Flowmeter to Computer

OBSOLETE

ME2008 Flowmeter to Computer

Variable pulse divisions,
AC triac or DC opto o/p pulse switching with pulse limiter. With any flowmeter

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Batching Computers

- Types of Batching Computers include:
  - Command-Batch Eagle/Alkon (see http://www.commandalkon.com)
  - Jonel-Archer (see http://www.jonel.com/readyMixBatch.htm)

Batching Computer System

  - Eagle by IPE, Batch-Tec, Matcon-Matic
  - United and many others

- ManuFlo do not supply Batching Computers but our equipment interfaces with computers in customer installations.
- Call ManuFlo if you are unsure as to the interface required.

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Computer/Batch Controller Interface Considerations

When interfacing a Computer with a Batch Controller or flowmeter, you must consider the Computer's:

- I/O:
  - ❑ Supply voltage
  - ❑ Command voltages
  - ❑ AC or DC pulses?
  - ❑ DC sink or source pulses?
- Maximum input frequency
- Scan time (width of pulse read)

Please consult with ManuFlo if you have any interfacing questions.

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Computer/Batch Controller Interface - Common Issues

- With AC voltage I/O computers, **AC pulse input frequency limit is 15 Hz**.
  Ensure the AC input frequency from the interface card and or flowmeter to the computer is not exceeded, else overdose could occur!
  Be particularly careful when using AEA at 10 mls/pulse – speeding up the flow can cause computer to lose pulses.
  DC pulse inputs are higher speed at 35 Hz. (PC based systems with DC can be 1000's Hz).
- Why do they use AC inputs ? Better isolation from lightning strikes, less industrial noise issues.

❑ scale input to the computer by using ManuFlo:
- UIC – Universal Interface Card with pulse scaling
- ME2008 – Microprocessor Interface Batch safety Unit
- ME693 - i/f card with pulse scaling and reset totaliser counter
- ME5IC – interface card with pulse dividers (via ME995 batch controllers)
- Direct – lower pulse resolution output from flowmeter (e.g. scaled magflow or MES)

- Computer may have leaky AC Optos. On computer batching system, the installing electricians:
  ❑ Must measure**,** on the batching computer, **the leakage voltage** (when a batch is NOT in progress) **between each black Opto's start 240v Active and Neutral.**
  ❑ If the leakage > 50 volts ac, then **resistor** (about 12 KΩ to 15 KΩ, 10 Watt) must be installed to each Opto on the batching computer to drain the leakage to Neutral.
  Otherwise, a relay/contactor activated by 240 vac could still be held on by 90-110 vac leakage and, consequently, pumping will not stop until the maximum batch limit (as set on
  Batch Controller or ME2000 –if used) is reached, & **an overdose of admixture could occur**.

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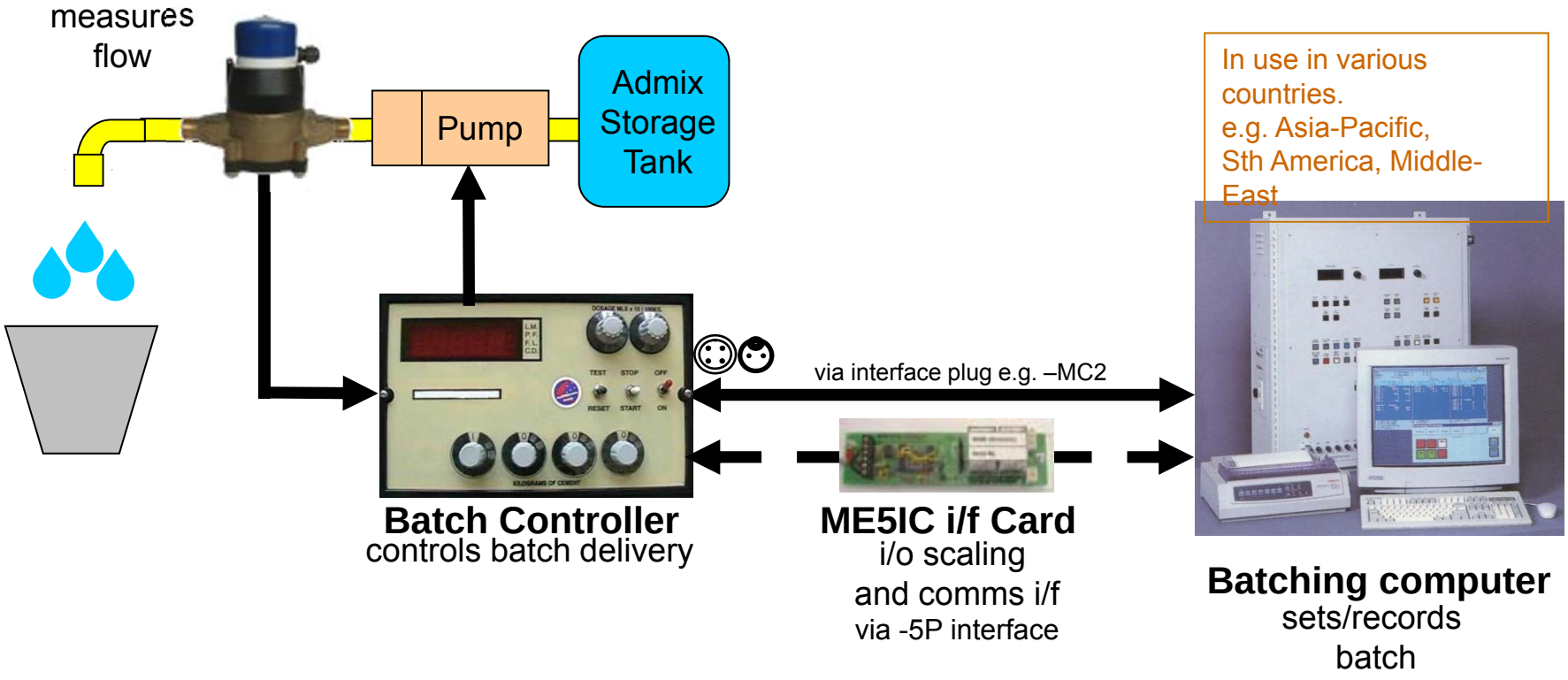
Interfacing with ME995 Batch Controllers

- Having Batch Controller incorporates safeties e.g. Batch Limit, Pulse Fail.
- Batch Controller provides manual control should Computer/PLC fail.



Quantity set by: Computer/PLC
Delivery controlled by: Batch Controller/Computer/PLC

Eliminates Bottle Requirement

This setup is being phased out, superseded by ME2008

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ME995 Series Batch Controllers
Using – MC2 PLC Interfacing

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

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.

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

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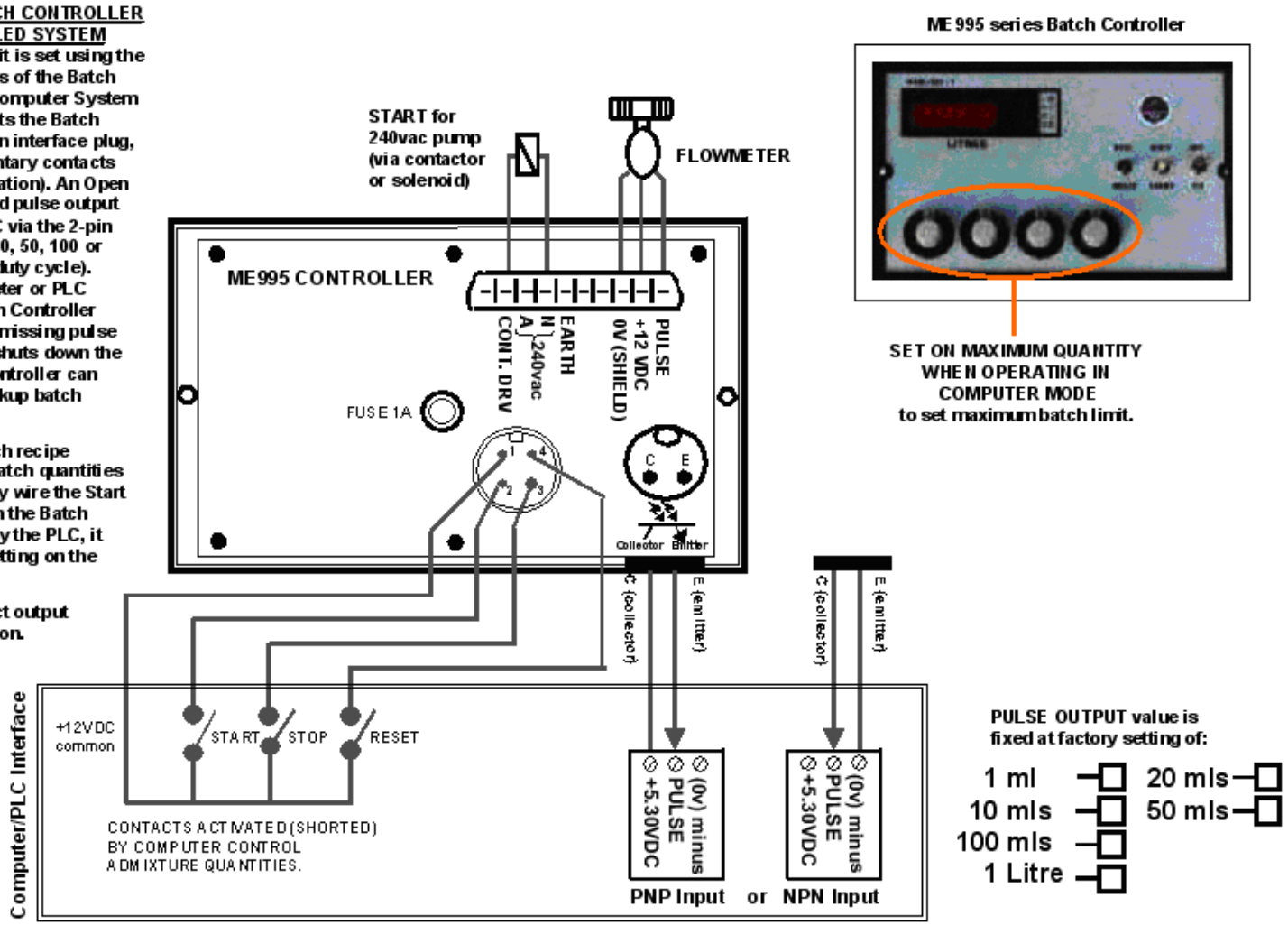
ME995 Series Batch Controllers - PLC Interfacing – MC2

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 mls/pulse; 50% duty cycle). In the event of flowmeter or PLC malfunction, the Batch Controller overrides through its missing pulse detection safety and shuts down the system. The Batch Controller can also be used as a backup batch facility.

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

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



WIRING DIAGRAM: ME995 Batch Controller and Computer Batching System.

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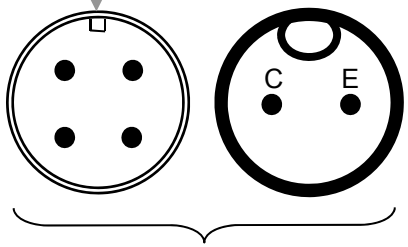
ME995 Series Batch Controllers - PLC Interfacing – MC2

For interfacing a Batch Controller to PC-based, low-voltage DC input Computers e.g. CompuBatch Systems, Dickinson Autocon, United Weighing etc

-MC option

4-pin PLC command plug (volt free) : start, stop, rest.



2-pin plug with OPTO 4N33 open collector pulse output 1 or 10ml / pulse

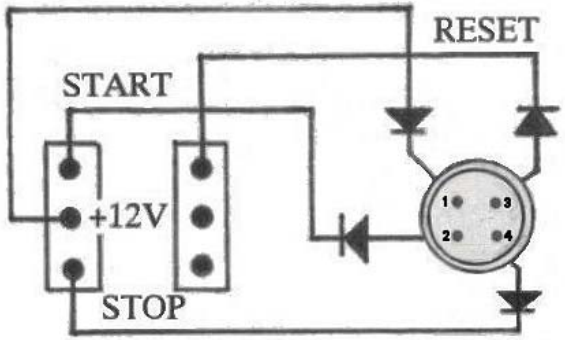
-MC2 plugset option

-MC2-C for connection to **Compubatch** PLCs (source) and
-MC2 for **Dickinson Autocon** computers (sink) , and others.

-S*n* option, combined with MC2 or MC2-C, for 10, 20, 50 or 100 ml/pulse output (where *n* is the pulse value required) depending on the PLC input rate.

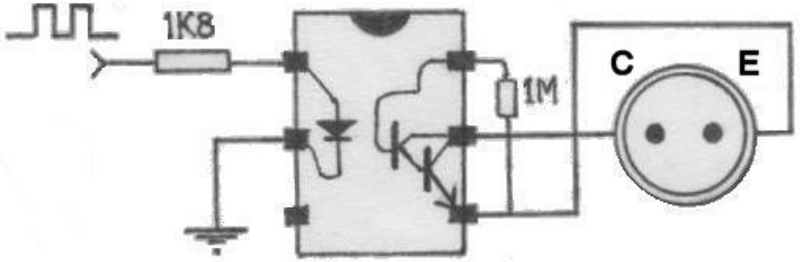
Note: On ME3000 Batch Controllers, the pulse o/p is scaleable via software.

Inside Batch Controller



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.

Inside Batch Controller



The 2-pin plug provides opto-isolated open collector 5-25VDC (maximum 120mA via the internal 4N33 opto) pulse output to the PLC inputs.

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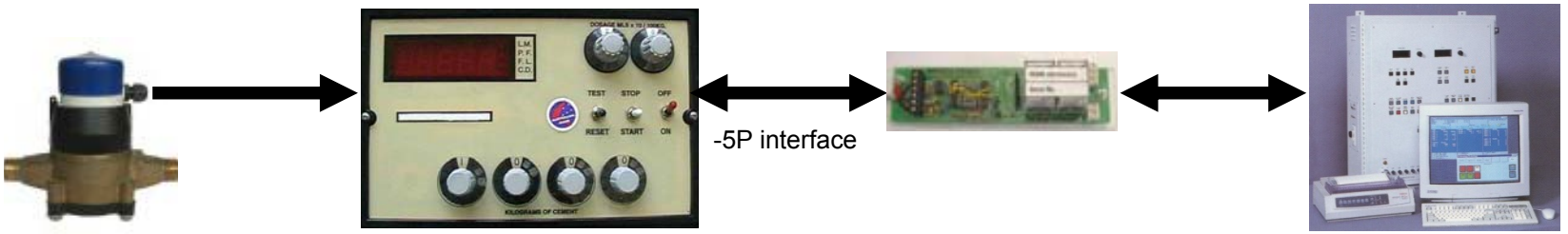
Interface Cards – Using ME5IC

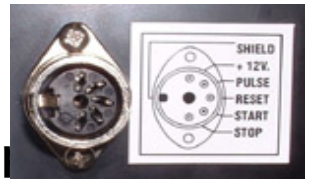
Slowly Superseded by ME2008.



MES20 Flowmeter | Batch Controller | ME5IC | Computer/PLC

ME5IC:

- **Interface card (1 to 5 channel options)**
- Provides interfacing of ManuFlo **Batch Controllers to Computer/PLC**. Primarily designed for interfacing to American Command-batch, Eagle, Alcon and Jonel industrial computer batching systems.
- Enables incorporation of the Batch Controllers and their **safeties** to the Computer/PLC batch system, and provides an **independent backup batch facility**.
- Used with ME188/ME995 Batch Controllers.
- **Batch Controller must be fitted with the "–5P" 5-pin interface plug o**



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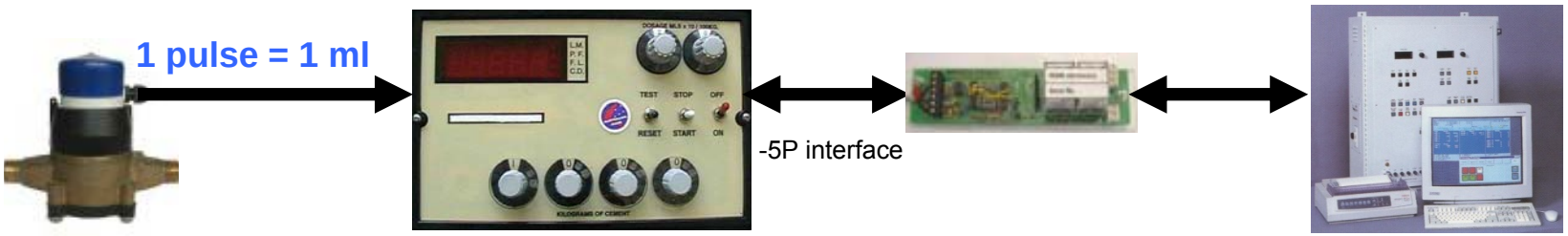
Interface Cards – with ME5IC

Slowly Superseded by ME2008.

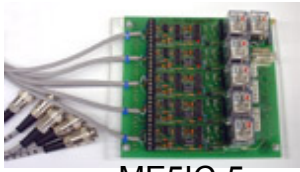


ME5IC enables:

- PLC/computer to control the ManuFlo Batch Controller, and
- PLC/computer to accept input from MES20 flowmeter (1ml/1pulse output) that is
  - opto isolated, and
  - in divided pulse form.

Superseded by ME2000/8

ME5IC-5	**5 channel INTERFACE CARD** e.g. ME995-controller/MES20 to Computer PLC, with pulse dividers, 240vac triac optos, start relays, reset relay, 2metres wired comms cable, and 5 pin interface plug (**Suits Eagle** or computers using Opto22 yellow case inputs & black case outputs). Note: Batch Controller requires the '-5P' plug option to connect to ME5IC-5.
ME5IC-4	As for ME5IC-5 above, but 4 channels only (4 admixtures).
ME5IC-2	As for ME5IC-5 above, but 2 channels only (2 admixtures).
ME5IC-1	1 channel interface card, for 1 admixture.
ME5IC-1W	1 channel interface card, **for WATER** e.g. use with ME995-7.


ME5IC-5

ME5IC-1

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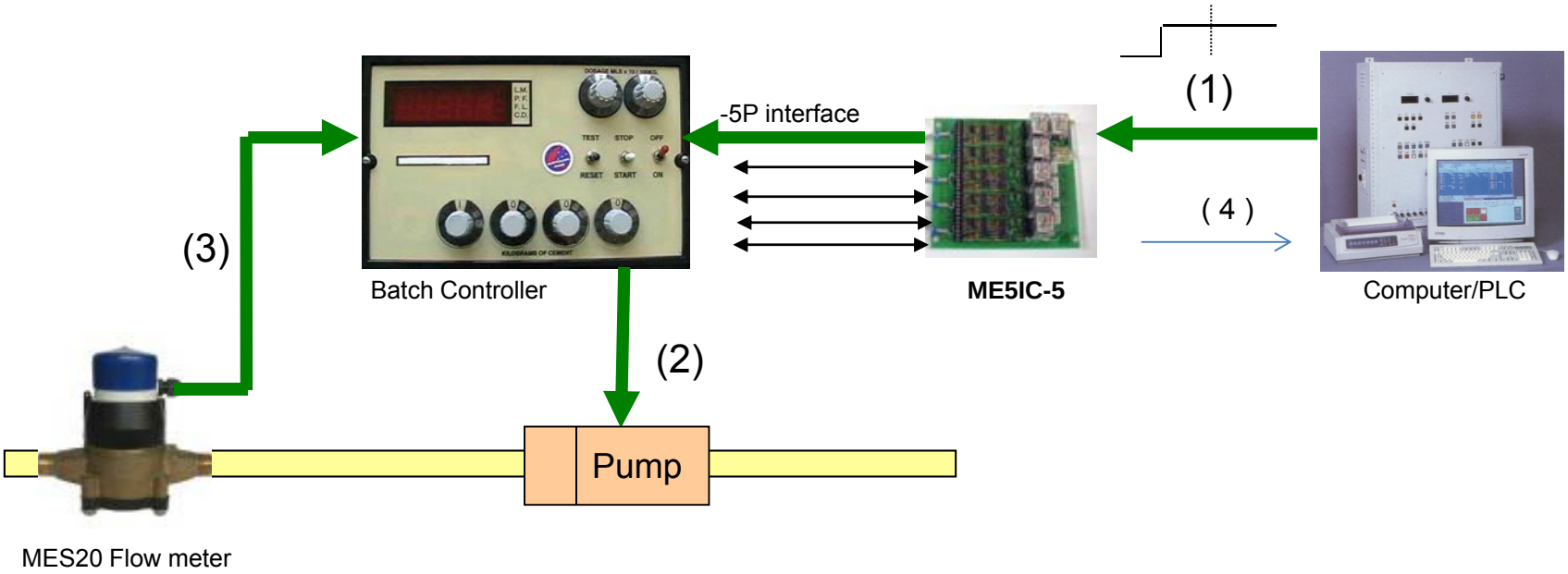
Interface Cards – ME5IC-5 – Operation

Slowly Superseded by ME2008.

(e.g. 240vac Eagle – 5 channel Admixtures)



(1) The **computer 'start' command** is via Computer's Black Opto22.
The Opto stays on for the duration of computer batch cycle.
The start voltage to Batch Controller must be **on for at least 0.5 seconds**

(2) **Batch Controller starts** : activates 240vac drive to pump and/or solenoid.

(3) Once liquid flow begins, flowmeter will **pulse** to the Batch Controller.
(4) Scaled pulses to computer input.

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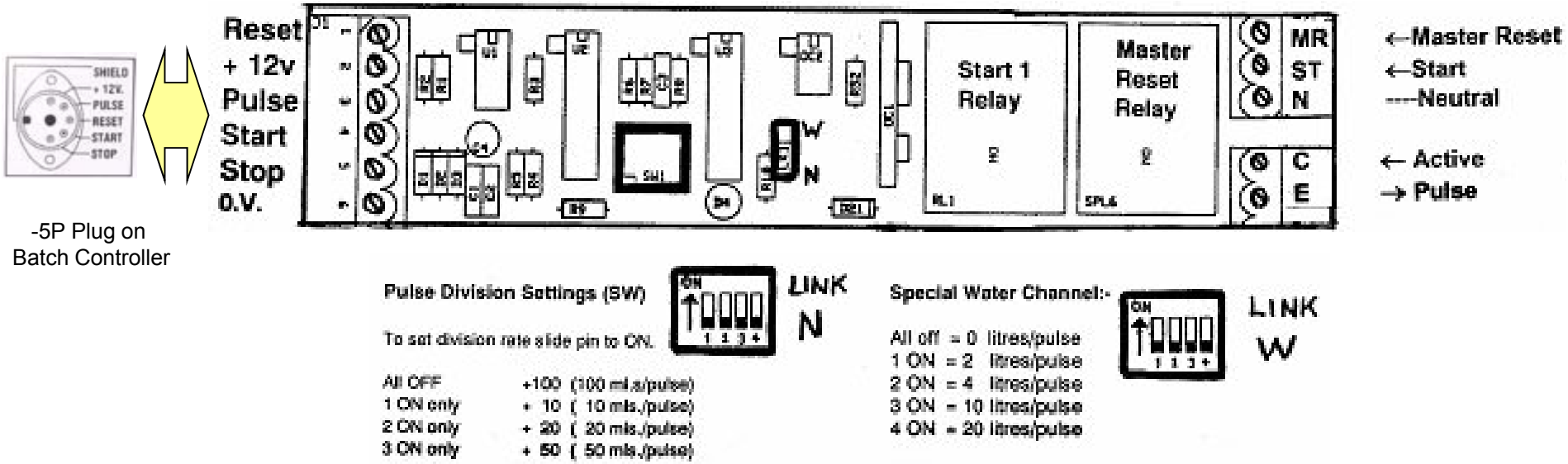
Interface Cards – ME5IC-1

Obsolete. Superseded by ME2008.



ME5IC-1 Single channel Card Schematic

MR (Master Reset) connect to computer OPTO output control active RESET signal.
ST (Start) connect to computer OPTO output control START signal (will stay ON for duration of batch).
N (Neutral) connect to Neutral voltage line from computer/PLC supply board.

<u>5-24 VDC pulse option</u>:

C (Collector) ← : connect to Computer pulse input line OPTO (White),
E (Emitter) → : connect to 0.V. input line.

<u>24-240 vac pulse option</u>:

C (Collector) ← : Active line from Computer supply line
E (Emitter) → : 24-240 vac pulse to Computer input pulse OPTO (Yellow).

Card can be piggy-backed to existing ME5IC-5 multi-channel cards by paralleling Neutrals and Master reset wires.

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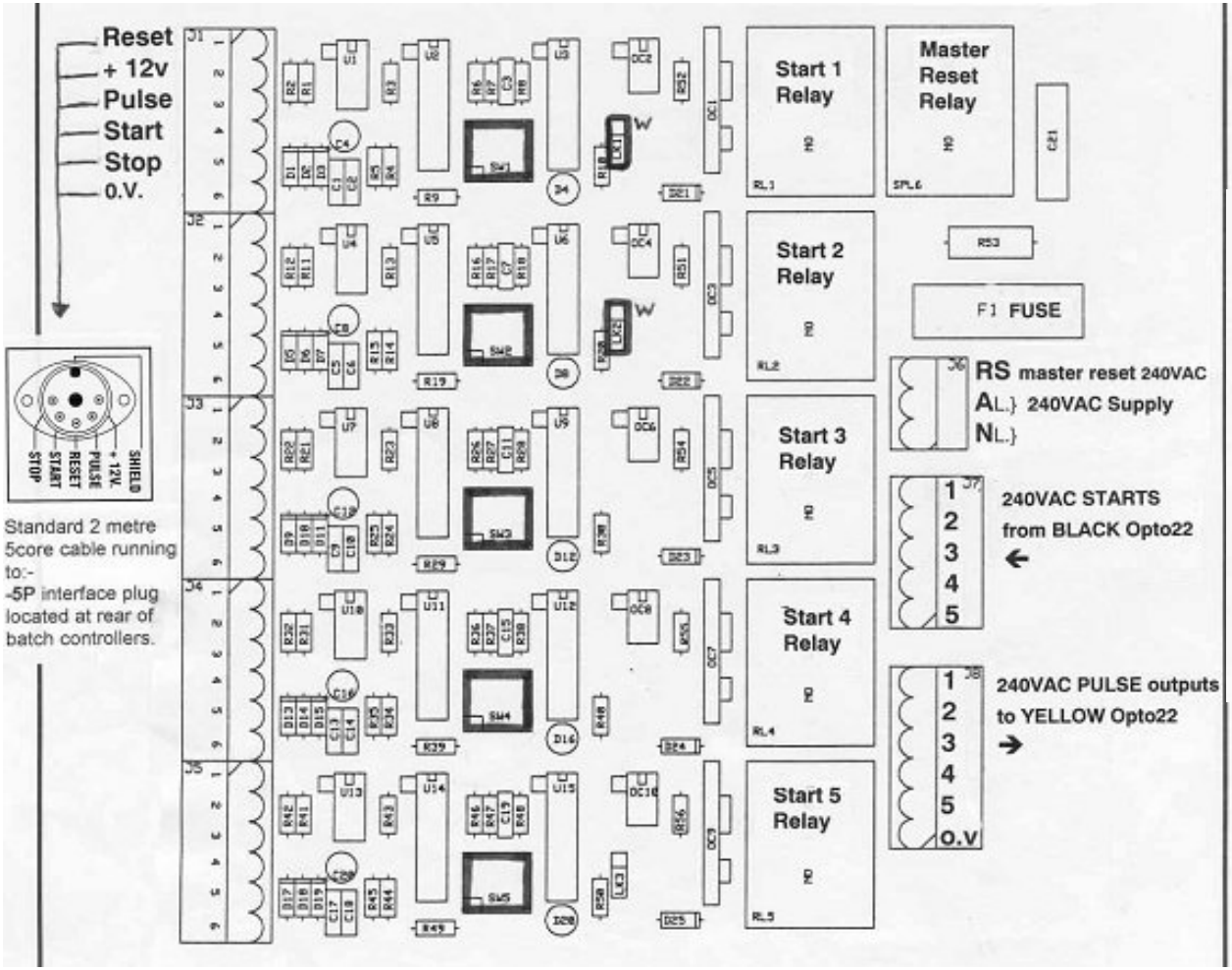
Interface Cards – ME5IC-5 – DIP Settings

Obsolete. Superseded by ME2008.



Pulse Division Settings (SW)

To set division rate slide pin to ON.

All OFF	+100 (100 ml.s/pulse)
1 ON only	+ 10 (10 mls./pulse)
2 ON only	+ 20 (20 mls./pulse)
3 ON only	+ 50 (50 mls./pulse)

Special:- DIP switches 1 & 2 optionally for water batch controllers: Set LINK to W.
+2 (2 litres per pulse)

2 ON only+2 (2 litres/pulse)
3 ON only+5 (5 litres/pulse)
All OFF +10 (10 litres/pulse)

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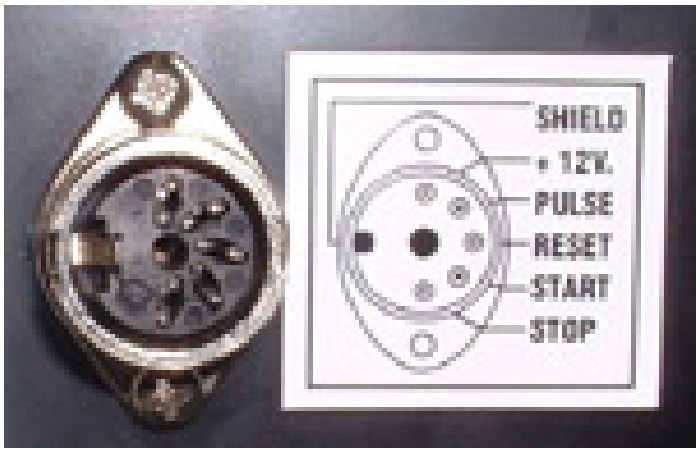
ME995 Series Batch Controllers - PLC Interfacing – 5P



-5P: Optional 5-Pin Computer Interface Plug.
For use with ManuFlo **ME5IC** interface cards to Eagle/Jonel/Alcon computers.

Sends 1 pulse/ml to be divided by ME5IC.

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

Superseded by ME2008.

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Interface Cards – ME5IC – Troubleshooting

Obsolete. Superseded by ME2008.

Symptom	Solution
1. Computer continues batching on after batch target.	Optos when switching off, can have residual leakage voltage, high enough to keep relay coil of ME5IC in on-state, driving Batch Controller and pump until it reaches its setting on front dials. Measure between Neutral and Active of Opto, if above 50vac in off-state, fit a 10-15K 10watt resistor to drain leakage to neutral. Generally in this situation, batch will run to setting on ManuFlo controller. If running past settings, contactor coil may be stuck on (i.e. is faulty). Turn off power and replace contactor.
2. Computer display and ME995 display not matching.	Check that the divided pulse value on ME5IC and computer pulse input value are matched e.g. 10mls/pulse. Note: Preferably use ME995 controllers that display in total millilitres or litres dispensed.
3. Calibrated collected quantity matches ME995 display but not computer display quantity. Computer misses pulses.	Check pulse divider value on ME5IC card, check computer input value. Pulses to AC computer inputs must not exceed 13HZ or max. scanning time. Check pulse dividers and compter input (Admix Flowspeed mls/sec) divided by (divided pulse value) =< 13HZ. E.g. AEA flowing at 150ml/sec through divider of 10ml/pulse = 15HZ. Means computer i/p will miss pulses, and overdose will occur. So, restrict flow or increase divider to 20mls/pulse.
4. Reset, start or stop function to ME995 not working. ME995 counts but no counts to ME5IC (LED pulse not blinking).	Check 5-pin (-5P) interface plug at rear of ME995 Batch Controller, may not be properly secured and locked (intermittent contact), or wire broken inside plug. Open plug and inspect wiring joints. Inspect connections from cable entering ME5IC interface plug. Wire may be shorted – inspect.
5. ME995 Batch Controller stops under batch target.	Front dial batch settings below computer batch targets. Select to higher value. Pulsefail LED activated, flowmeter blockage/problem, check flowmeter.
6. ME995 alarm condition	This indicates batch has been interrupted, or overbatched. Before releasing truck load, check ME995 and computer displays. If discrepancy, dump load or compensate. Call for service. Refer to ME995/MES20 troubleshooting/maintenance guides.
7. After above checks, ME5IC still appears defective.	After consultation with installer/admix supplier or ManuFlo, replace ME5IC card or ME995 controller or Flowmeter or OPTO. Check operation guides for each product.

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