



PULSE-8 PULSATION CONTROL

Version - December 2013
For Software Version V1.11

Part Number - 39-0142



PULSE-8 PULSATION CONTROL: INDEX

GOOD PRACTICE: Mains Supply:

- A separate mains supply and earth running directly from the consumer meter is essential.
- Avoid routing the mains cable to the power supply close to other supplies especially those providing intermittent current- motors that are starting and stopping continually or high power heaters with thermostatic control.
- Terminate in a sealed, fused, double pole switched outlet fitted with a 13Amp (Type 1362) fuse or trip. A 3-pin ring main socket is not suitable in parlour conditions. All mains cabling must be contained in a firmly secured durable conduit.

Pulse-8 Features and Specifications:

- **Input Voltage:** 90vAC - 264volts AC, 47 -63Hz.
- **Output Voltage:** 12volt DC or 24volt DC versions. (300 Watt)
- **Output Protection:** Over current auto reset protection.
- **Output Connectors:** Terminal blocks: 4 or 8 channel - selectable.
- **Pulsation Groups:** Channels 1 + 3, 2 + 4, 5 + 7 and 6 + 8.
- **Switched Polarity:** Negative - Common (positive +) terminal.
- **Channel Indicator:** LED to each channel on the front panel which flashes at the selected frequency. FUS and channel number displayed if channel fails due to current overload.
- **Solenoid Valves:** 40 12vDC Interpuls LE20 pulsators or 20 24vDC Interpuls LE20 pulsators or a maximum of 37.5 watts per channel in 8 channel mode and 75watts per channel in 4 channel mode.
- **Frequency Range:** Selectable on the front panel in single steps from 30 to 120 pulses per minute (ppm). The operating frequency is shown on a dedicated display.
- **Pulsation Ratio:** Selectable in 40 steps from 35:65 to 75:25 (On:Off).
- **Split Ratios:** Split ratios allows the ratios of outputs 1 + 3 and 5 + 7 to differ from 2 + 4 and 6 + 8. This helps to spread the load on the vacuum by generally avoiding both channel pairs being 'On' simultaneously. If split ratios are active, the SPLIT indicator will be illuminated.
- **Settings Memory:** The ratio and frequency data is retained in flash memory if the power is removed.
- **Reset Defaults:** Default settings:

Address:	01
4/8 Channel:	8
Pulsators 'On' at Power-Up:	Off
Frequency:	60ppm
Ratio 1:	60:40
Ratio 2:	60:40
- **Security:** Access mode prevents accidental or unauthorised data changes.
- **Display:** 5-segment LED display.
- **System Status:** Indicator LEDs for SPLIT, NORMAL, ACCESS, INVERT, and MERIDIAN BUS.

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About the Pulse-8

The Pulse-8 is an 8 channel pulsation control which can integrate with the MicroMarque3S parlour control and Micro Milk Meter system.

Pulse-8 Display:

Displays 'On' when the pulsation is running and 'Off' when the pulsation is off.

$r1 \neq r2$ Split Indicator:

Illuminates when different ratios have been selected for channel pairs 1 + 3, 2 + 4, 5 + 7 and 6 + 8.

$r1 = r2$ Normal Indicator:

Illuminates when the same ratios have been selected for channel pairs 1 + 3, 2 + 4, 5 + 7 and 6 + 8.

Setup Mode Indicator:

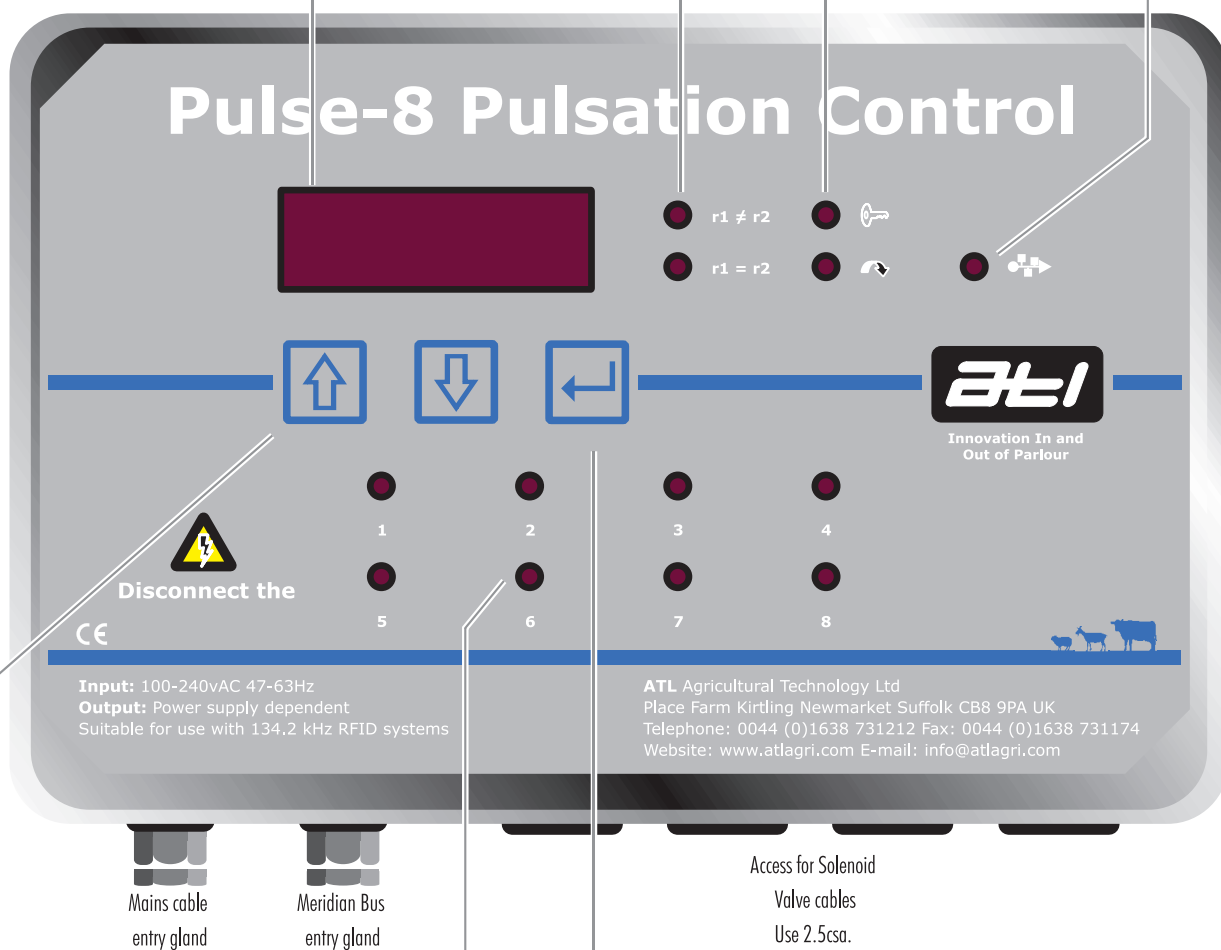
Illuminates during ACCESS mode whilst the machine parameters are being entered. Hold Up, Down and Enter.

Invert Indicator:

Illuminates when the On and OFF periods within a cycle have been swapped. Used for normally ON solenoid valves.

Meridian Bus Indicator:

Flashes indicating communicating correctly when connected to Meridian Bus.



Up and Down Keys:

Used to increase or decrease the frequency and ratio settings. Use the Up key to acknowledge Fuse failures.

Channel Indicators:

Illuminate when channel is on

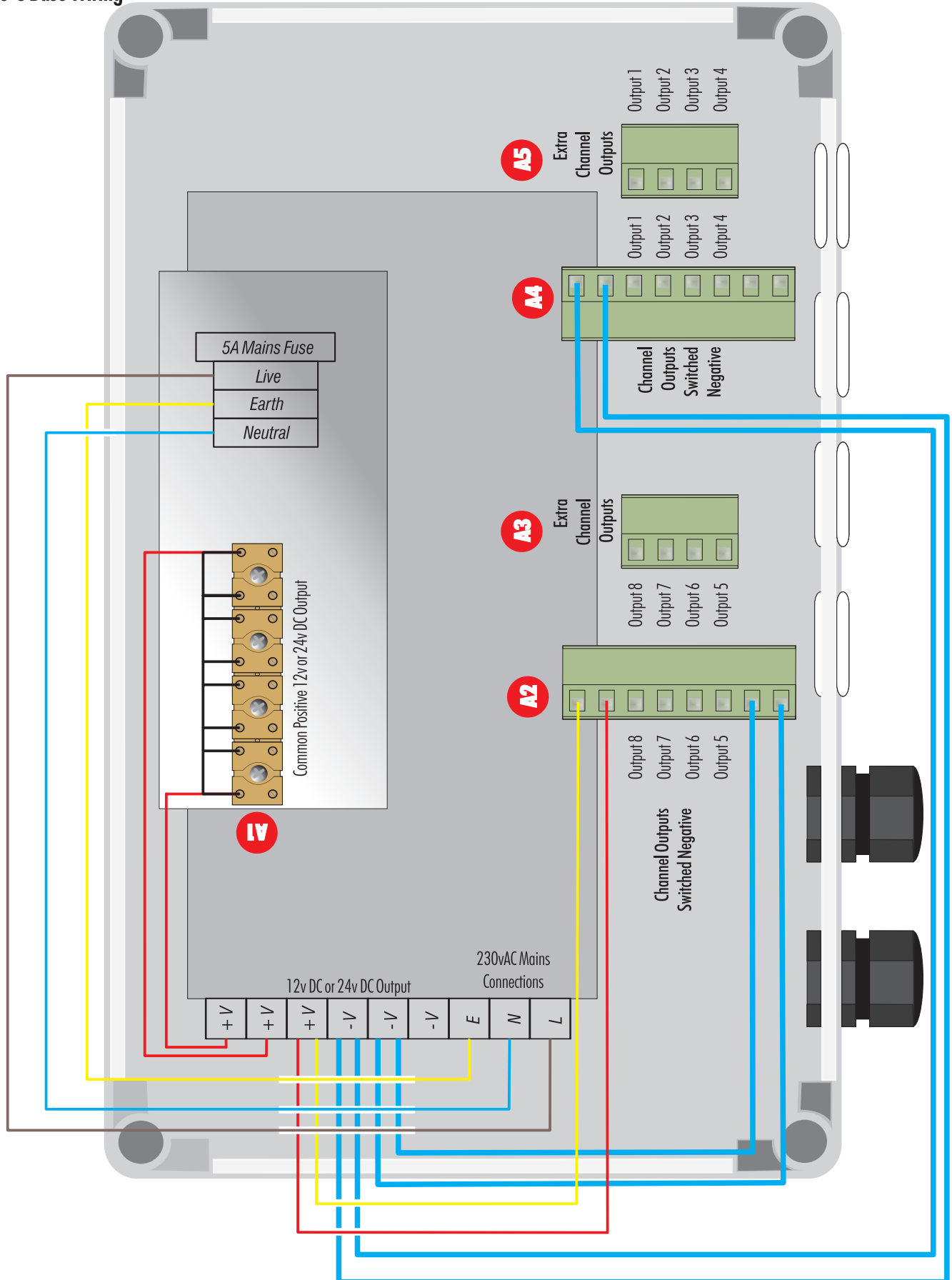
Enter Key:

Used to turn pulsation on or off, and to save settings.



PULSE-8 PULSATION CONTROL: 2

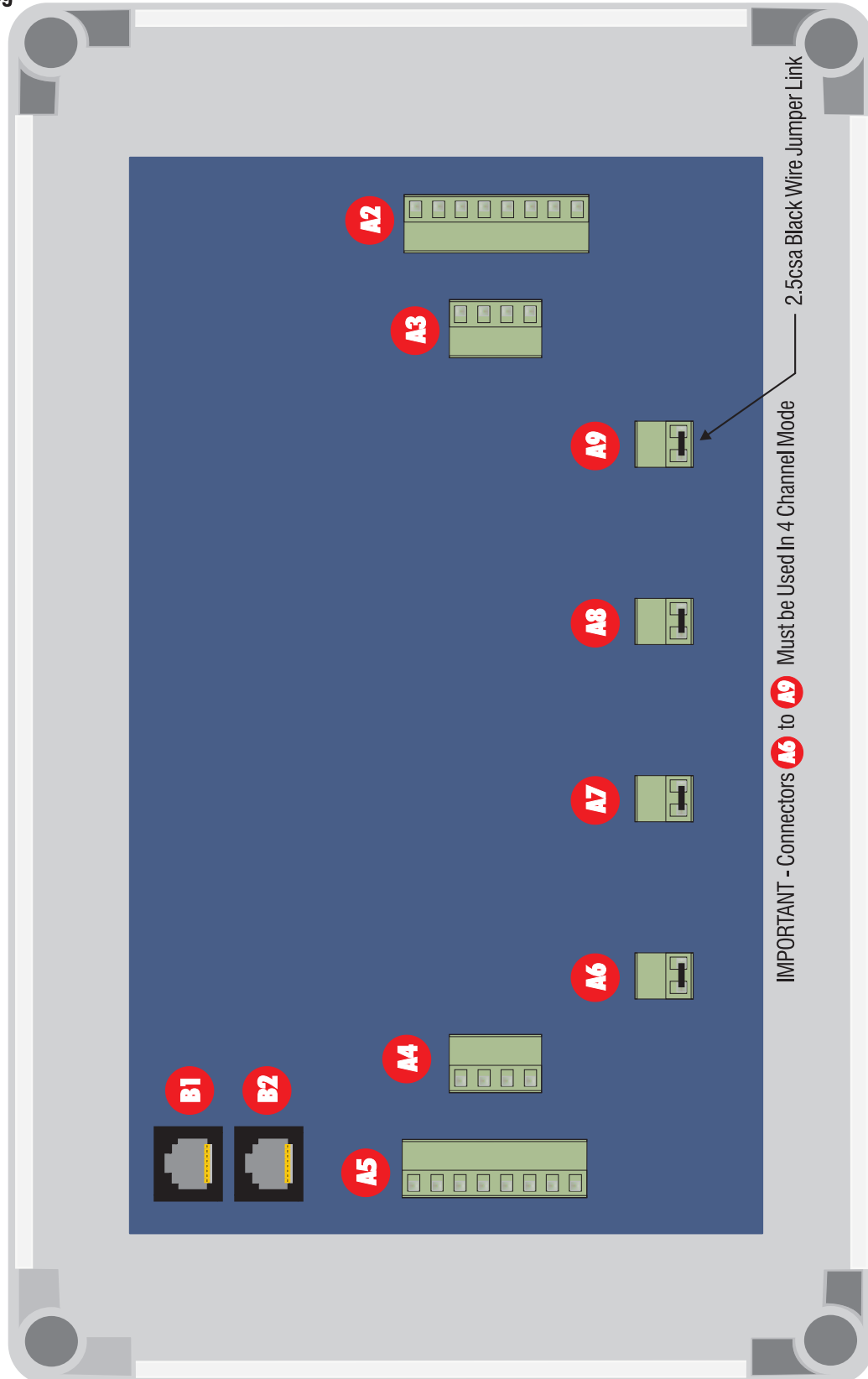
Pulse-8 Base Wiring





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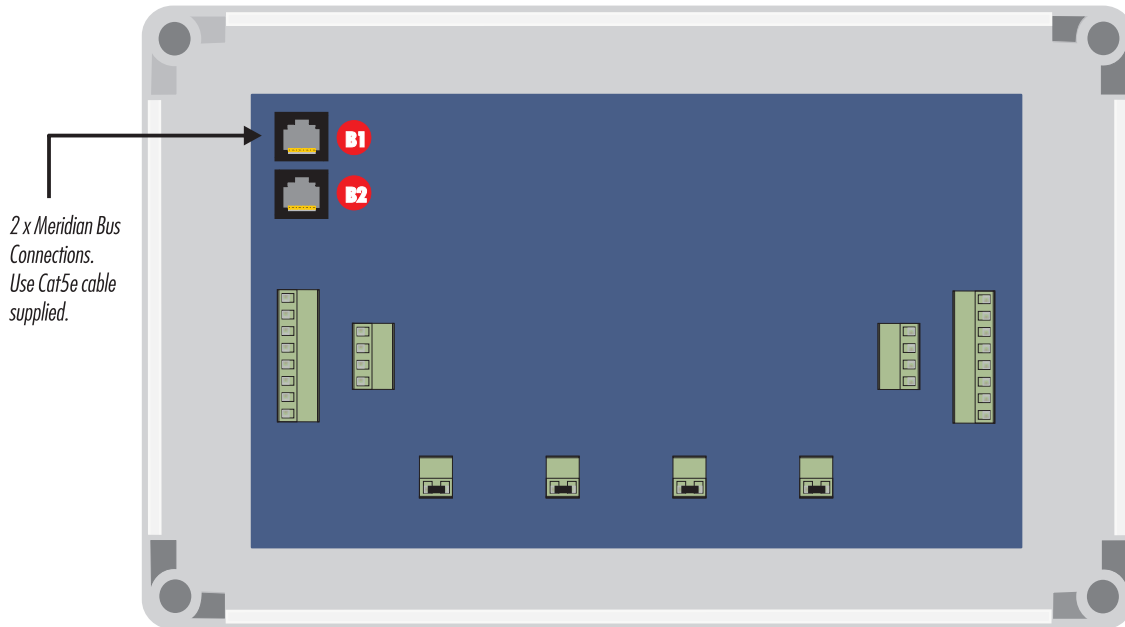
Pulse-8 Lid Wiring



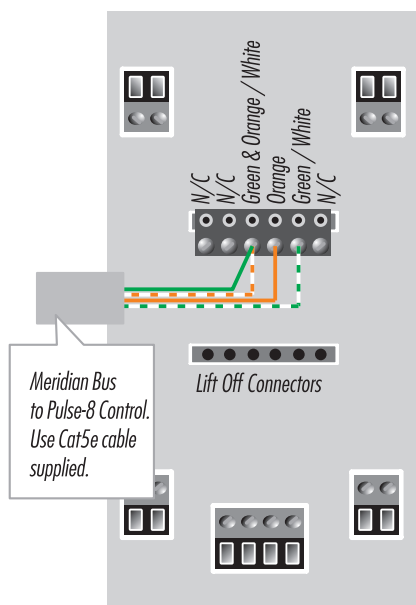


PULSE-8 PULSATION CONTROL: 4

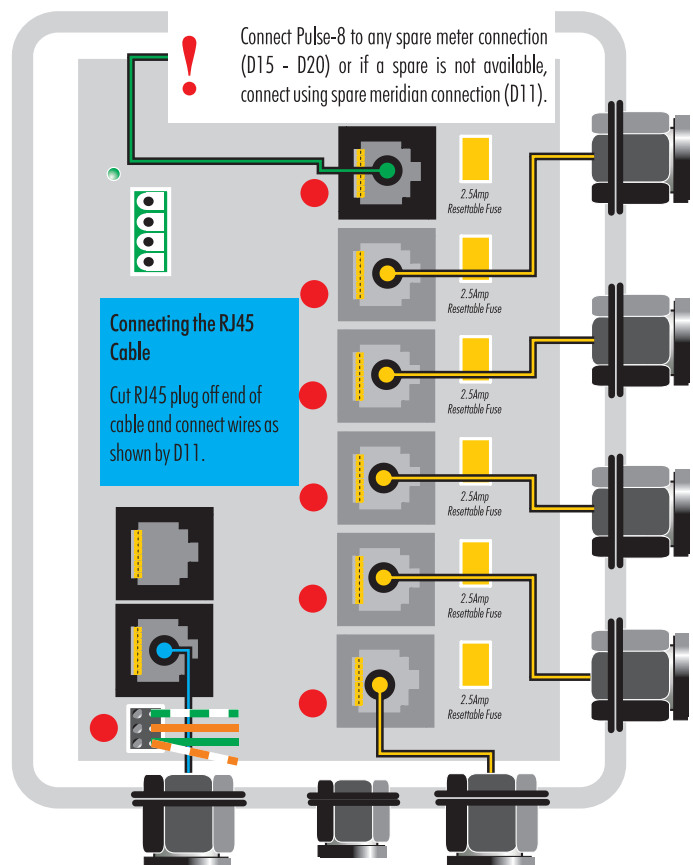
Meridian Bus Connections



MicroMarque3S Parlour Control: Meridian Bus Connections



Micro Milk Meter System: Meridian Bus Connections





PULSE-8 PULSATION CONTROL: 5

Siting and Wiring the Pulse-8 in 8 Channel Mode

The Pulse-8 should be sited to allow easy access and minimal cable runs to the solenoid valves. The common (positive +) supply should be taken from connector block terminal **A1** and looped to all of the solenoids. Use 2.5csa red cable.

The appropriate (negative -) switched supply is taken from the 4-way or 8-way plug-in connectors (see below - connectors **A2** to **A5**) to each solenoid valve depending upon the parlour configuration and number of channels in use. Use 2.5csa blue cable.

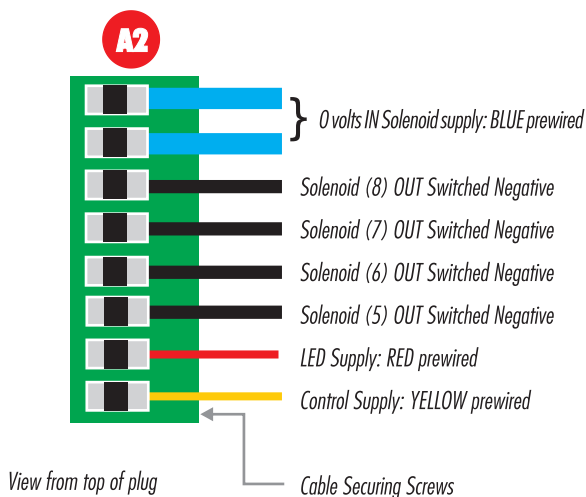
The Pulse-8 requires a 230volt 50Hz AC supply from a switched, fused outlet, not a 13amp plug and socket. Use a 5Amp fuse. The Pulse-8 is available with either a 12volt or 24volt power supply.

A negative supply wire (blue) and two control supply wires (red + yellow) are pre-fitted to the 8-way plug-in connector **A2**. Ensure that the plug-in is firmly located in the socket on the circuit board.

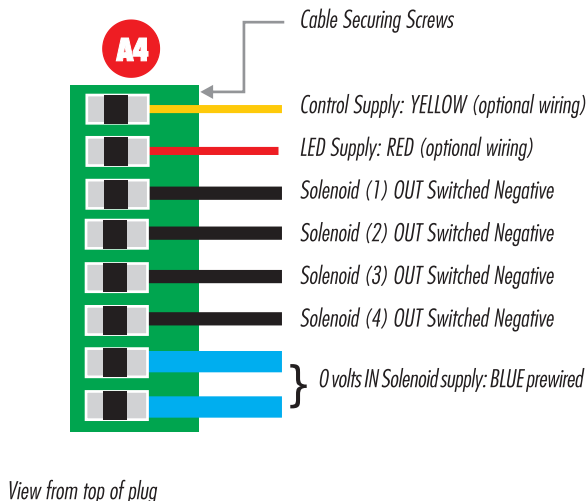
The Pulse-8 can be used in either 4 channel or 8 channel mode - in 8 channel mode the 2-way plug-in connectors **A6** to **A9** should be disconnected and 8 channel mode selected in the setup routine.

The solenoid valves/ pulsators should be wired into the pre-fitted plug-in connectors using suitable cabling. It is good practice to fit anti back-EMF diodes (1N4002) to all solenoid valves / pulsators to prevent interference.

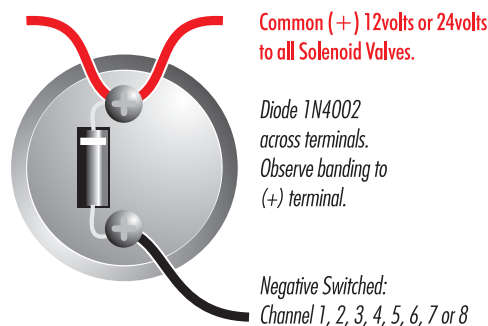
Circuit Board Plug In Connector Channels 5 -8: Check orientation before fitting to Control Board



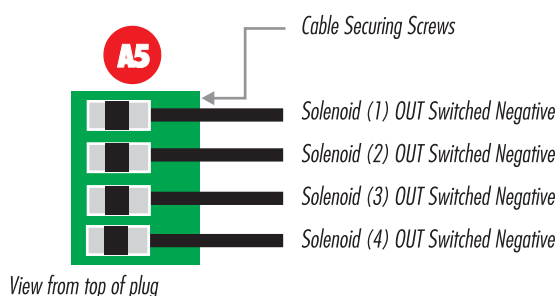
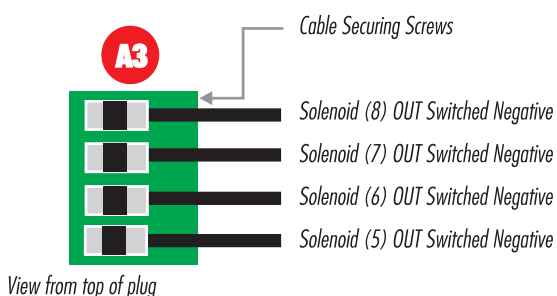
Circuit Board Plug In Connector Channels 1-4: Check orientation before fitting to Control Board



Solenoid Valve: Diode connections



Additional Plug In Connector Channels 1-4 and 5-8: Check orientation before fitting to Control Board





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Siting and Wiring the Pulse-8 in 4 Channel Mode

The Pulse-8 should be sited to allow easy access and minimal cable runs to the solenoid valves. The common (positive +) supply should be taken from connector block terminal **A1** and looped to all of the solenoids. Use 2.5csa red cable.

The appropriate (negative -) switched supply is taken from the 4-way or 8-way plug-in connectors (see below - connectors **A2** to **A5**) to each solenoid valve depending upon the parlour configuration and number of channels in use. Use 2.5csa blue cable.

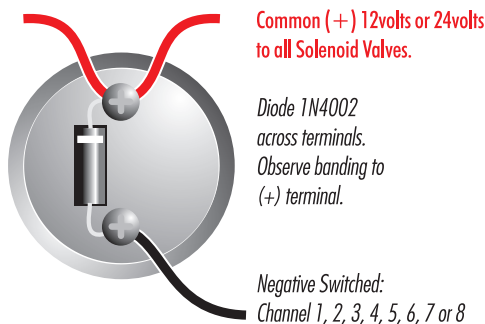
The Pulse-8 requires a 230volt 50Hz AC supply from a switched, fused outlet, not a 13amp plug and socket. Use a 5Amp fuse. The Pulse-8 is available with either a 12volt or 24volt power supply.

A negative supply wire (blue) and two control supply wires (red + yellow) are pre-fitted to the 8-way plug-in connector **A2**. Ensure that the plug-in is firmly located in the socket on the circuit board.

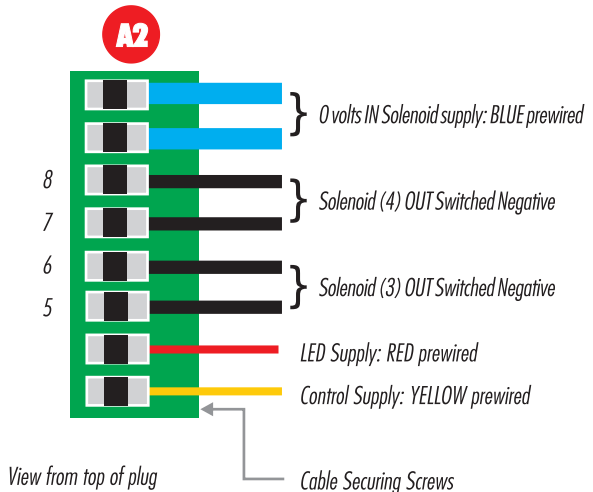
The Pulse-8 can be used in either 4 channel or 8 channel mode - in 4 channel mode the 2-way plug-in connectors **A6** to **A9** should be connected and 4 channel mode selected in the setup routine. .

The solenoid valves/ pulsators should be wired into the pre-fitted plug-in connectors using suitable cabling. It is good practice to fit anti back-EMF diodes (1N4002) to all solenoid valves / pulsators to prevent interference.

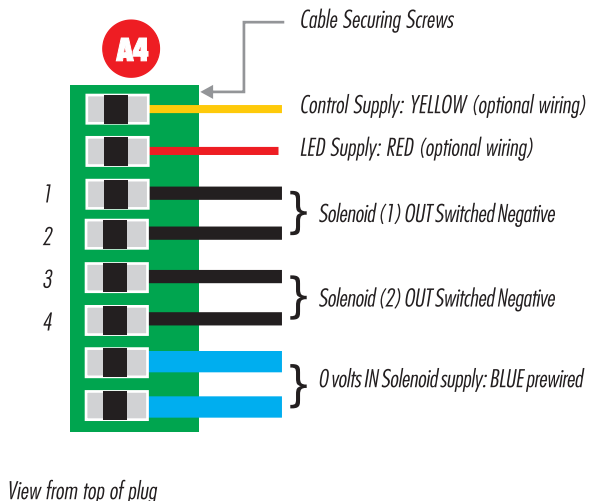
Solenoid Valve: Diode connections



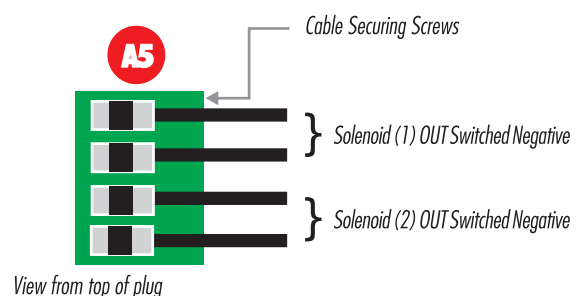
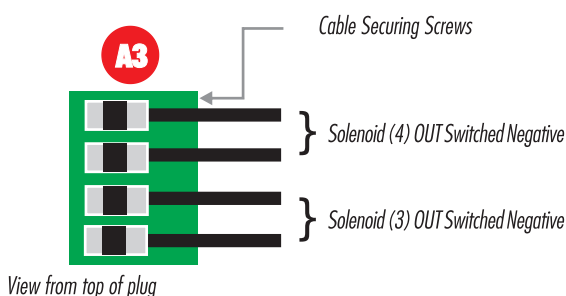
Circuit Board Plug In Connector Channels 3 -4: Check orientation before fitting to Control Board



Circuit Board Plug In Connector Channels 1-2: Check orientation before fitting to Control Board



Additional Plug In Connector Channels 1-2 and 3-4: Check orientation before fitting to Control Board





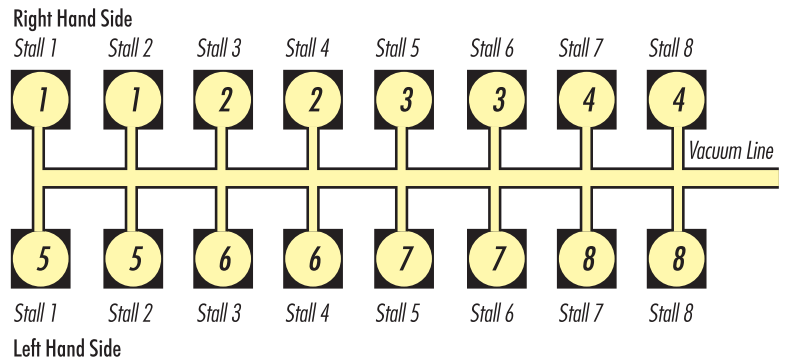
PULSE-8 PULSATION CONTROL: 7

8 Channel Pulsation Configurations

8/1 Configuration

The illustration right shows a 16/16 parlour with the Pulse8 in 8/1 configuration. The parlour is divided into 8 sections each of two stalls with one Pulse-8 channel driving each section. There is only one solenoid valve to each stall, so all four teat cups on a cluster are pulsed together.

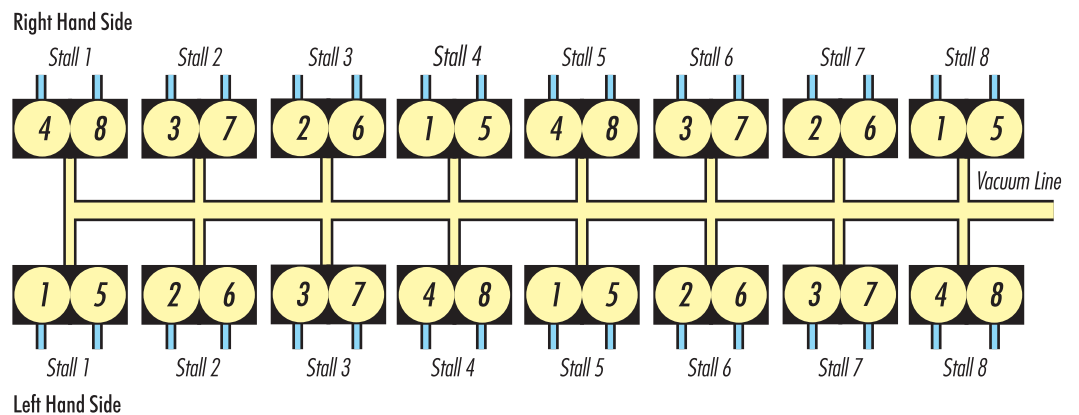
The numbers in circles represent the Pulse-8 channels.



2/2 Configuration

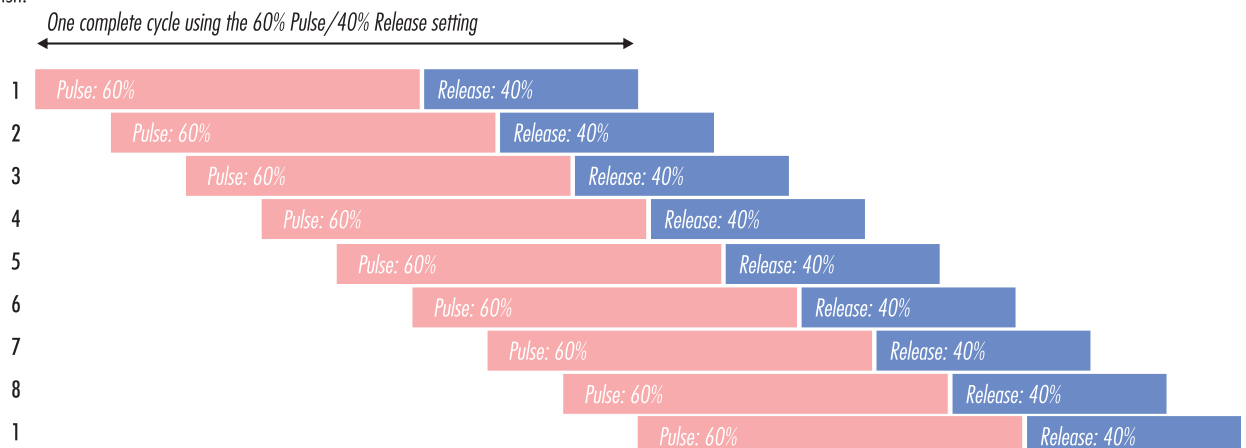
A 16/16 parlour with Pulse-8 2/2 configuration is illustrated below. Every stall has two solenoid valves fitted, one for each pair of teat cups on the cluster. The teat cup pairs may be arranged either diagonally or front-to-back and because they are connected to different Pulse-8 channels, will pulse alternately.

The numbers in circles represent the Pulse-8 channels.



The Pulsation Cycle

Diagram showing the timing relationship between the 8 channels during a cycle start and finish.





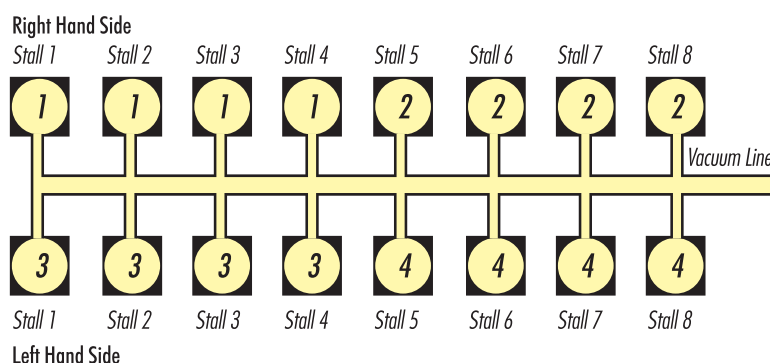
PULSE-8 PULSATION CONTROL: 8

4 Channel Pulsation Configurations

4/1 Configuration

The illustration right shows a 16/16 parlour with the Pulse-8 in a 4/1 configuration. The parlour is divided into 4 quadrants each of four stalls with one Pulse-8 channel driving each quadrant. There is only one solenoid valve to each stall, so all four teat cups on a cluster are pulsed together.

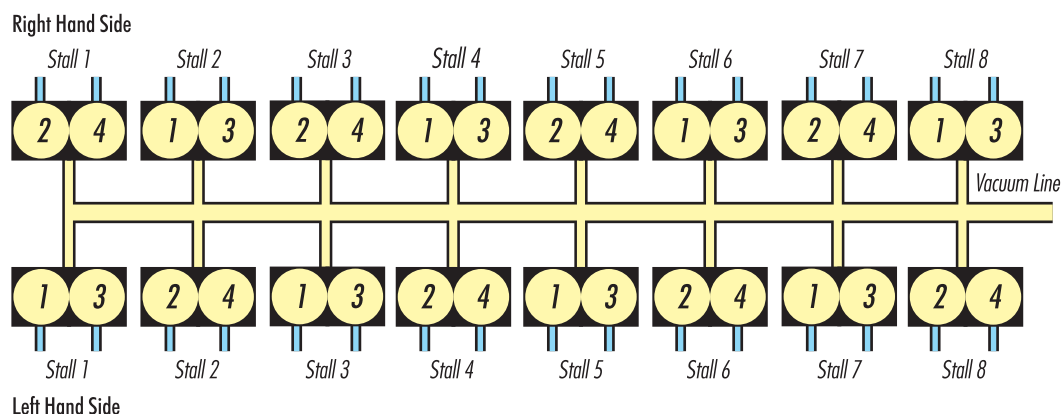
The numbers in circles represent the Pulse-8 channels.



2/2 Configuration

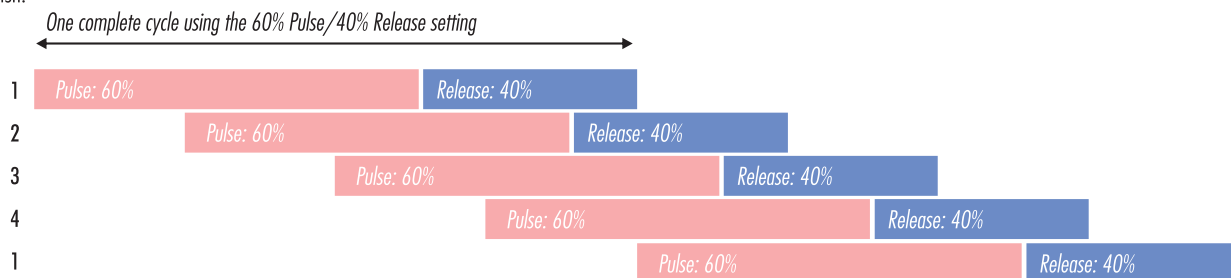
A 16/16 parlour with the Pulse-8 in a 2/2 configuration is illustrated below. Every stall has two solenoid valves fitted, one for each pair of teat cups on the cluster. The teat cup pairs may be arranged either diagonally or front-to-back and because they are connected to different Pulse-8 channels, will pulse alternately.

The numbers in circles represent the Pulse-8 channels.



The Pulsation Cycle

Diagram showing the timing relationship between the 4 channels during a cycle start and finish.



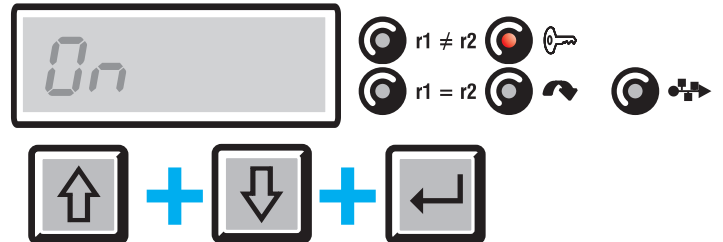


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Setting Up the Pulse-8

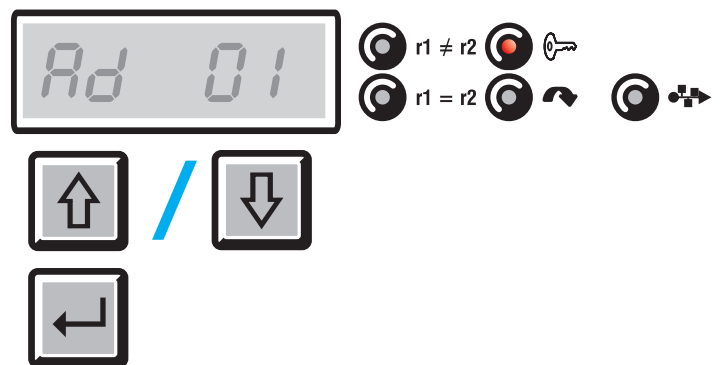
Entering Access Mode:

With the power on, Press and Hold UP, DOWN and Enter. The unit will display 'Ad 01' and is now in Access mode.



Setting the Address:

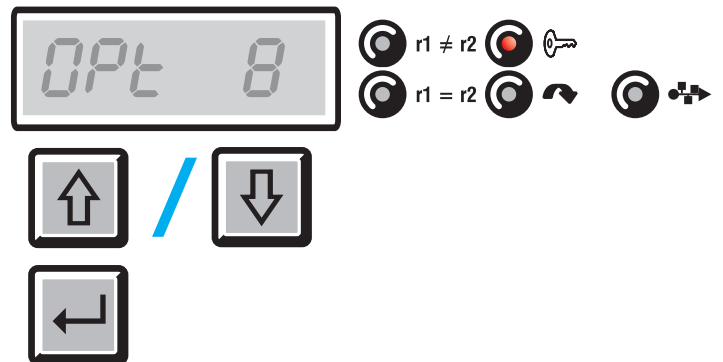
With Access Mode enabled and 'Ad 01' displayed, press the UP or DOWN keys to choose a valid address. NB - Address only required where Pulse-8 is connected to MicroMarque3S and default of address 01 should not require changing. Press ENTER to save and move onto setting 4 or 8 channel mode.



Setting 4 or 8 Channel Mode

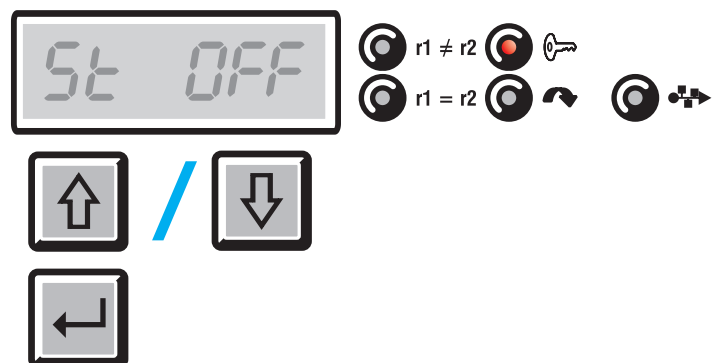
The Pulse-8 can operate in either 4 or 8 channel outputs. The default setting is 8 channels. With Access Mode enabled and 'Opt 8' displayed, press the DOWN key to change into 4 channel mode. The display will show 'Opt 4' when 4 channel mode has been selected. Press ENTER to save and move onto setting the pulsators on or off on power up.

NB - Wire links need to be connected if Pulse-8 being operated in 4 channel mode - see page 3.



Setting Pulsators ON or OFF on Power Up:

The Pulse-8 can be set to have the pulsators ON or OFF when it is powered up. The default setting is OFF. With Access Mode enabled and 'St OFF' displayed, press the UP key to display 'St ON' and have pulsators ON when the Pulse-8 is powered up. Press the DOWN key to display 'St OFF' and have to pulsators OFF when Pulse-8 is powered up. Press ENTER to save and move onto setting the frequency.



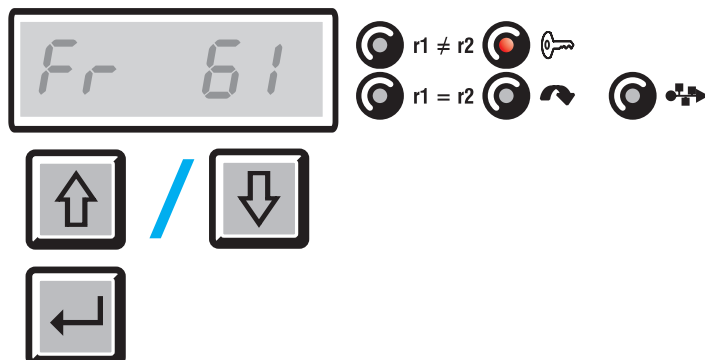


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Setting Up the Pulse-8

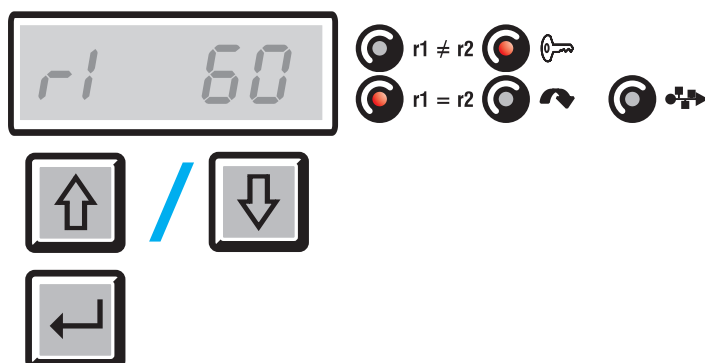
Setting the Frequency:

The frequency is measured in pulses per minute (ppm) and can be set within the range 30 to 120ppm in single steps. With Access Mode enabled and the frequency displayed (i.e. 61), press the UP or DOWN keys depending upon whether an increase or decrease in frequency is required. The display shows the frequency selected. The unit will resume pulsing at the new frequency. Press ENTER to save and move onto setting ratio 1.



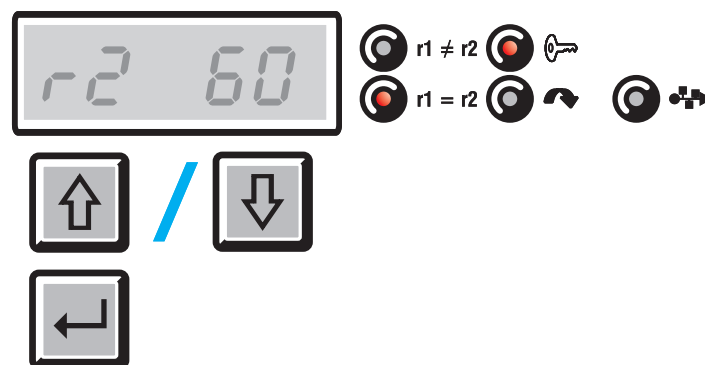
Setting Ratio 1 (For 'Odd' Outputs):

The ratio represents the percentage of the pulse length that the solenoid valve is energised. So, for example, a ratio of 60 displayed means that the solenoid valve will be on for 60% of the pulse duration and 40% off. To change the setting for channels 1 + 3 and 5 + 7, press either the UP or DOWN key for an increase or decrease in the value. Ratios may be changed in single steps from 35% to 75%. Press ENTER to save and move onto setting ratio 2.



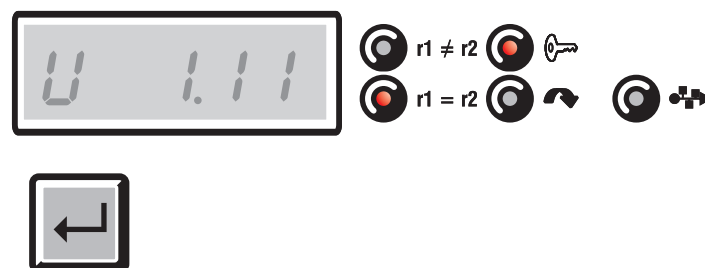
Setting Ratio 2 (For 'Even' Outputs):

The ratio represents the percentage of the pulse length that the solenoid valve is energised. So, for example, a ratio of 60 displayed means that the solenoid valve will be on for 60% of the pulse duration and 40% off. The unit must be in the Access Mode to make changes to ratio 2. To change the setting for channels 2 + 4 and 6 + 8, press either the UP or DOWN key for an increase or decrease in the value. Ratios may be changed in single steps from 35% to 75%. Press ENTER to save and display the software version.



Displaying the Software Version:

This displays the software version - the U on display equals a V for version.
Press ENTER to save and exit.





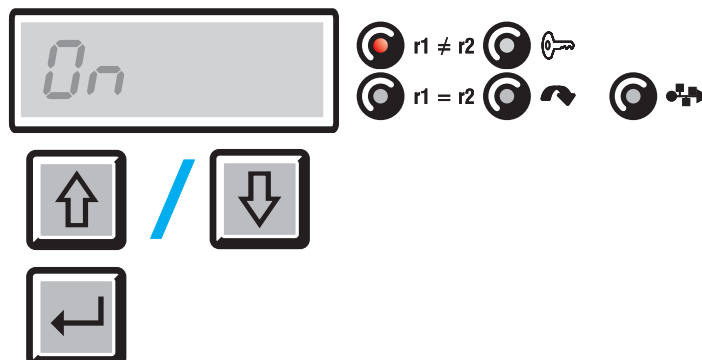
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Setting Up the Pulse-8

Using the Split Function:

It is often desirable to have different ratios for channels 1 + 3, 5 + 7 and 2 + 4, 6 + 8 since the variable pulsing spreads the load on the vacuum line. If the ratios 1 and 2 are different, the SPLIT indicator will illuminate as a warning.

NB - If it is necessary to set all channels to the same ratio, put the unit into Access Mode and examine the settings for ratio 1 and ratio 2. Choose whichever ratio is suitable using either the UP or DOWN keys until the SPLIT indicator is extinguished. All channels will now have the same ratio setting.



Using the Pulse-8 with Normally Open Solenoids:

To save power, some solenoid valves are designed to be normally OPEN, which means that they are open and will pass a vacuum when un-energised; when power is applied to them they block the vacuum line. The Pulse-8 can accommodate these valves by swapping the ratio values. So, for a conventional setting of say 60% on and 40% off, for normally on valves these are swapped to become 60% off and 40%.

To invert the ratios, put the Pulse-8 into Access Mode and reverse the ratio settings. For example, if the ratio settings are 60:40 for normally CLOSED solenoids, the ratio settings should be changed to 40:60 for normally OPEN solenoids. The INVERT indicator will now illuminate.



The Meridian Bus Indicator:

The Pulse-8 can be connected to the MicroMarque3S and the Micro Milk Meter system using the meridian bus connections provided. For more information on the functions available when the Pulse-8 is connected to the aforementioned systems, see page 12.





PULSE-8 PULSATION CONTROL: 12

Linking to the MicroMarque3S Parlour Control

If the Pulse-8 is linking to a MicroMarque3S, the following setup needs to take place.

IMPORTANT - For these subroutines to be available the software in the MicroMarque3S control needs to be:

MAIN PCB - V4.29 or greater

ENABLE / DISABLE PULSE-8: Subroutine 400

This subroutine turns the link to the Pulse-8 on or off.

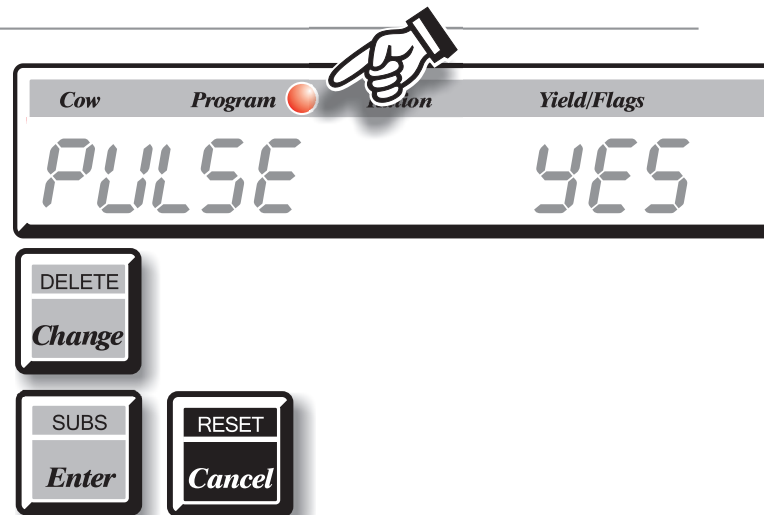
Check that Program Mode is selected.

Run the subroutine. The message 'PULSE' is displayed with 'yes' or 'no' in the Yield/Flags window.

Press Change to toggle between 'yes' and 'no'.

Press Enter to store the new setting.

Press Cancel to exit the subroutine.





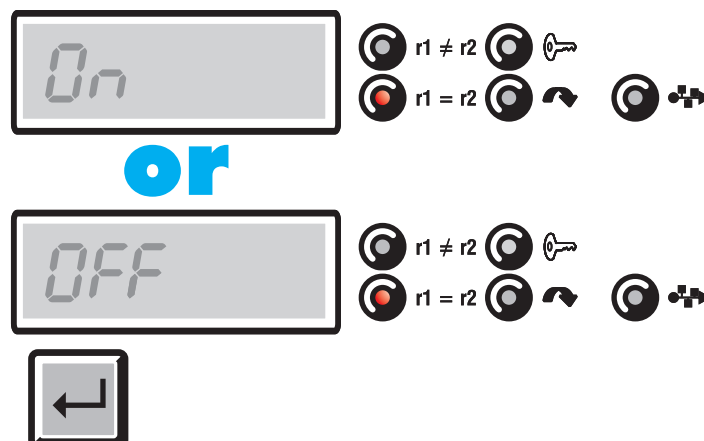
PULSE-8 PULSATION CONTROL: 13

Using the Pulse-8

The Pulse-8 can be used either as a stand-alone product or linked to the MicroMarque3S and Micro Milk Meter System providing additional functionality.

Turning the Pulsators ON and OFF

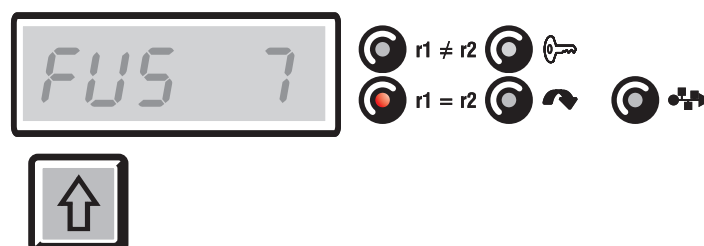
The pulsators connected to the Pulse-8 can be turned on or off by pressing the ENTER key. The display will show 'On' and 'OFF'.



Channel Overload Protection:

If too much current is drawn by an individual channel due to a faulty pulsator, the channel will automatically switch off to protect itself. The Pulse-8 will display 'FUS' and the number of the channel which has switched off (i.e. 'FUS 7' means that channel 7 has switched off to protect itself). To exit the channel overload protection routine, press the UP key. If more than one channel has switched off to protect itself, pressing the UP key will step through the other channels.

NB - Pressing the UP key to exit the channel overload protection routine will not prevent this from happening again and the pulsator causing the problem needs to be identified and repaired as necessary.



Functionality via linking to MicroMarque3S Parlour Control:

If the Pulse-8 is linked to the MicroMarque3S parlour control, this enables a 'PULS FAIL' attention to be displayed on the aforementioned parlour control if the channel overload protection routine runs on any of the Pulse-8 channels. This allows for quicker diagnosis of problems with pulsators and removes the reliance on operators detecting pulsator failures.

Press the 'Attn' key on the MicroMarque3S control;

'PULS FAIL' will be displayed;

Go to the Pulse-8 to check which channel(s) has switched off due the channel overload protection routine running.



Functionality via linking to the MicroMarque3S and Micro Milk Meter System:

If the Pulse-8 is linked to the MicroMarque3S and Micro Milk Meter System, this enables the MILKING, WASH and IDLE keys on the Wash Control to turn the pulsators ON, ON and OFF respectively, from the milking parlour pit.

Press the MILKING key to turn the pulsators ON;

Press the WASH key to turn the pulsators ON;

Press the IDLE key to turn the pulsators OFF.

