Innovation In and
Out of Parlour

MM20 Milking Point Control Manual

Version - 1.0

Date - April 2017

Part Number - 39-2120

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Manual Versions

Version 1.0 - April 2017.....FirstVersion of Manual (Software v3.20)

About the MM20 Milking Point Control

The MM20 Milking Point Control is one of the most useful additions to a milking parlour, allowing the operator to save time when milking by automating the cluster removal process and allowing individual milk yields to be measured and stored (if connected to the Micro M5).

The MM20 has been designed for smaller parlours. It can be connected to the Micro M5 via a communications bus allowing milk yields, milking times, and conductivity values to be stored against individual animals.

The ATL MM20 comes with the added extra of monitoring the conductivity of the milk. A flashing warning is displayed if the milk's conductivity is above a user selectable warning level, or pull off if the conductivity is above a user selectable pull off level. This extra function allows for advanced monitoring of your animals health, in a simple easy to use unit.

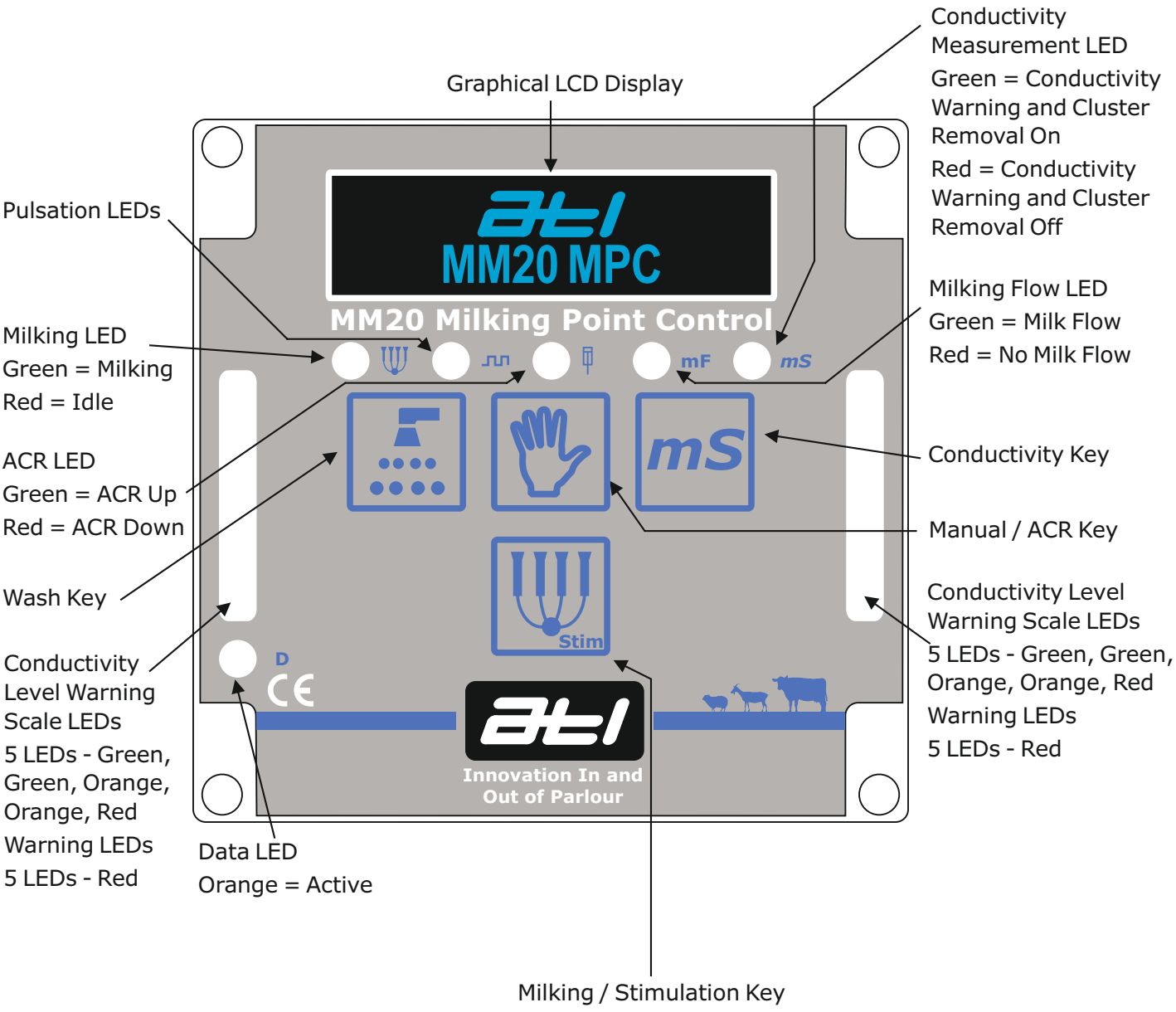
Features

- Simple numeric display of the milk yield (litres or kilos), milking time (minutes:seconds) and the milks conductivity (mS - millisiemens);
- 4 keys - automatic milking, manual milking, wash, and conductivity;
- Simple, bright, graphical LCD display;
- 6 LED windows for auto milking, pulsation, ACR, milk flow, conductivity and data;
- 3 Normal milking modes (ACR, Manual and Timed);
- 3 Additional Manual milking modes (ACR disabled, Conductivity pull off disabled, ACR and conductivity pull off disabled);
- Accurate milk yield measurement (±5%);
- Accurate milk flow measurement for ACR removal;
- Full pulsation control - 30 to 180 pulses per minute (ppm) and 35% to 75% ratios;
- Pulsation stop - pulsator only on when milking or washing;
- Stimulation pulsation with 3 stimulation modes (Automatic, Manual and disabled);
- Washing pulsation - runs pulsation at lower rate during washing to reduce liner wear;
- Automatic idle after a user selectable period of inactivity;
- User programable wash time with wash time elapsed and remaining displayed (minutes:seconds);
- User selectable conductivity warning and pull off levels;
- User selectable ACR pull off milk flow rate and time;
- Lift to start ACR input;
- Milk sweep / purge;
- Suitable for all herd / flock sizes (small or large);
- Total litres of milk measured per milking for each milk meter can be displayed and added together to easily check calibration;
- M2 communications bus - enables all MM20 controls to be put into milk or wash from 1 control and animal data to be sent / received from Micro M5 parlour control. Data available:
    - Identifies slow milker and uses different ACR settings to prevent early removal;
    - Warns if colostrum or antibiotic milk;
    - Warns if previous milk yield lower than expected;
    - Warns if previous conductivity lower than expected;
    - Warns if milking taking longer than expected;
    - Warns if milk yield lower than expected;
    - Warns if conductivity higher than expected;
    - Warns if milking time shorter than expected;

Features Continued

- Warning flags can be acknowledged against each animal using the manual key;
- If using time-based cluster removal can change the milking time for all points from 1 milking point;

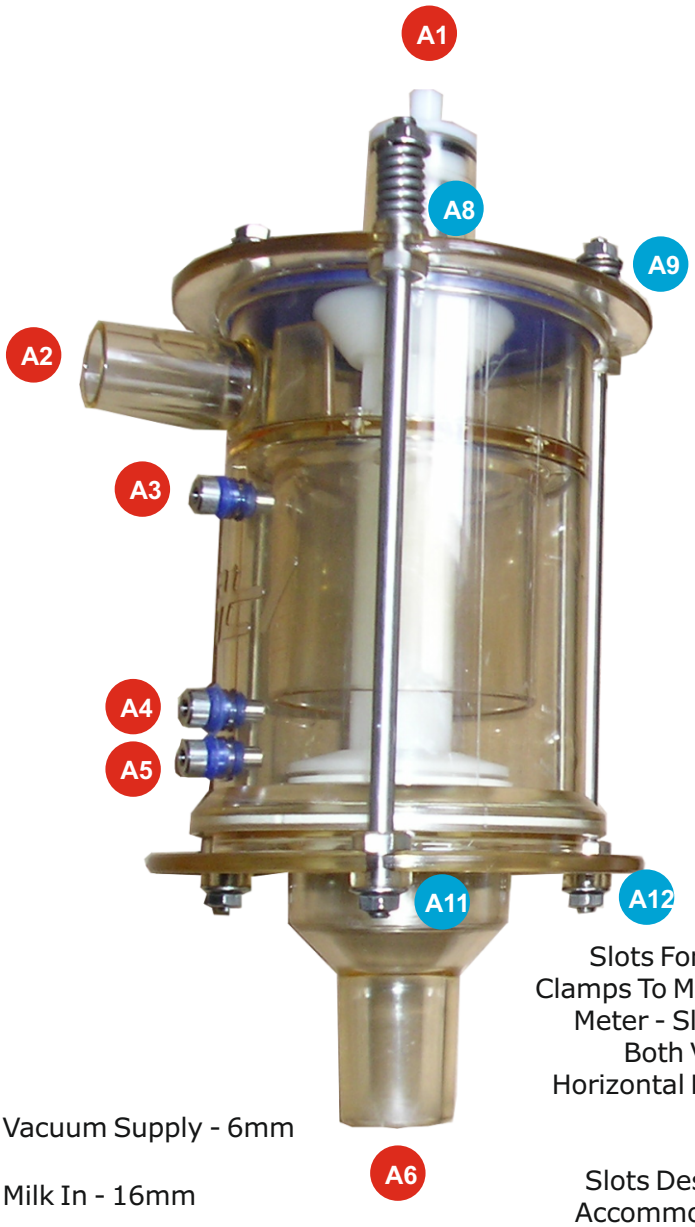
Front Cover



The Milk Meter Flask

The milk meter is despatched from ATL with the top bracket attached and milk inlet to right-hand side. Fit the milk meter onto the main bracket by releasing the M6 wing nut and slotting the top bracket onto the M6 stud. Locate the M5 flange nuts on the base of the milk meter into the 2 holes in the base of the main bracket. Make sure it is seated properly and tighten the wing nut.

NB - The milk meter flask used with sheep and goats is the same but the probe positions are different (A3, A4 and A5).

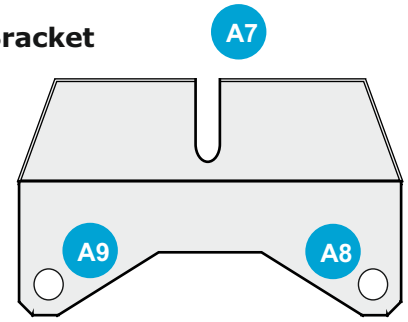


- A1 Vacuum Supply - 6mm
- A2 Milk In - 16mm
- A3 Top Probe
- A4 Bottom Probe
- A5 Ground Probe
- A6 Milk Out - 19mm

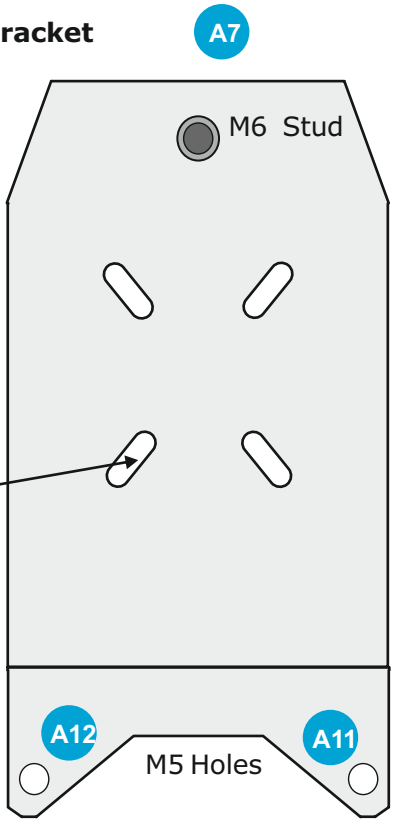
IMPORTANT

- Always install the milk meter level as the performance will be effected if not.
- The milk meter should be mounted above the milk pipe.
- Do not leave any dip in the milk out pipe - an air lock may form and performance of the milk meter may be affected if the milk meter cannot drain easily.

Top Bracket



Main Bracket



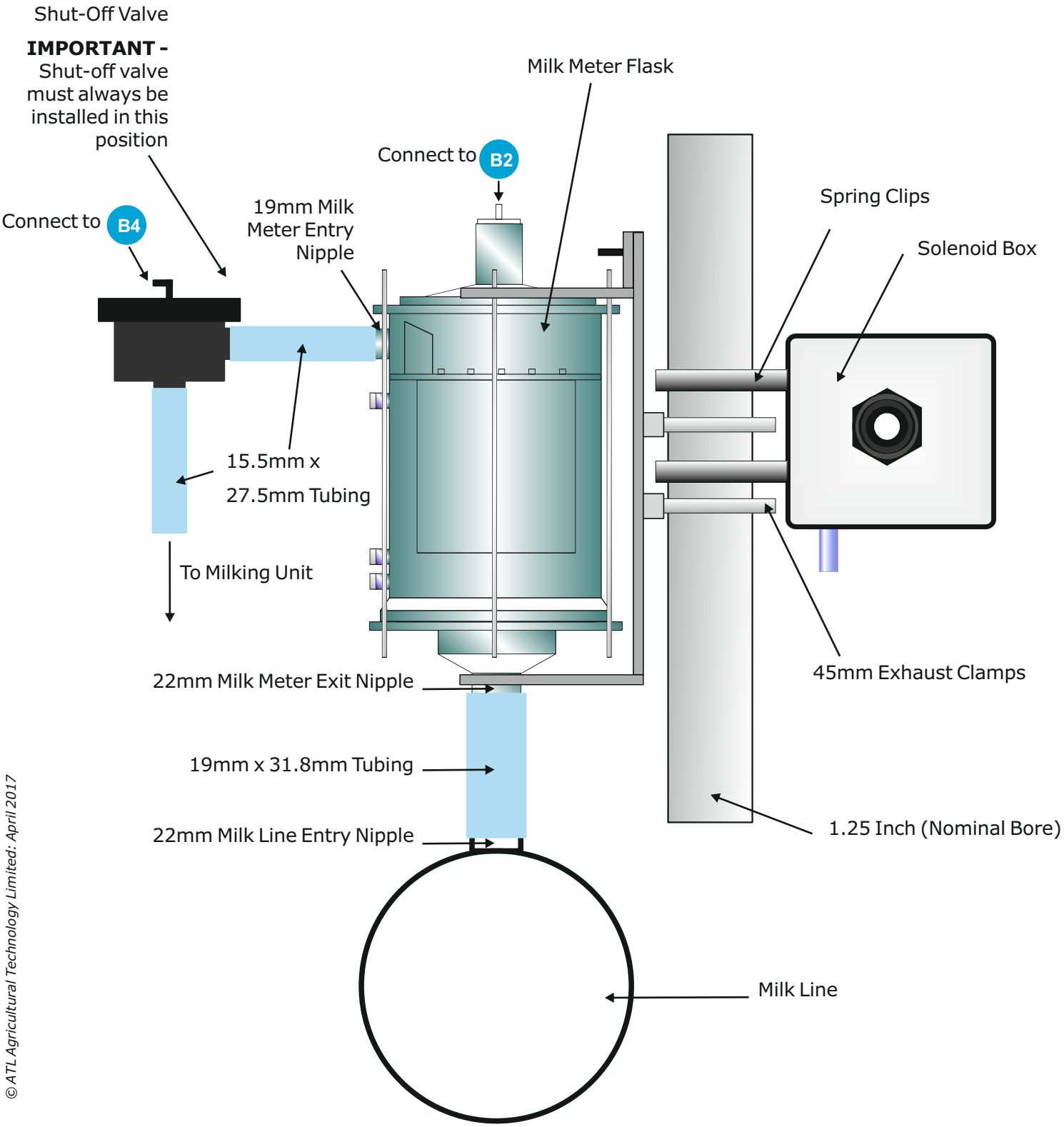
Slots For Exhaust Clamps To Mount Milk Meter - Slots Allow Both Vertical & Horizontal Mounting

Slots Designed To Accommodate 35-45mm Exhaust Clamps

ATL Supplies 45mm Exhaust Clamps As Standard - These Fix To 1.25 Inch (Nominal Bore) Tube

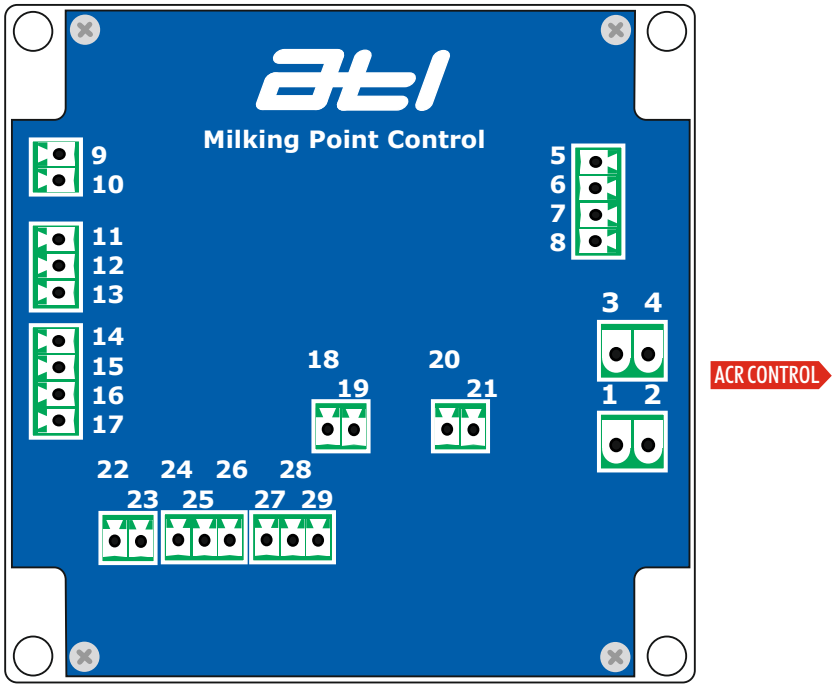
Milk Meter Flask and Solenoid Box Mounting - High Level

The milk meter and the solenoid box are mounted on the same 1.25” nominal bore tube. The diagram below shows the preferred mounting arrangement.



Milking Point Control Wiring Connections

The milking point control wiring connections are shown in the diagram and corresponding table below. The control comes with two 4 port glands. The 4 port gland can take a maximum cable OD of 6.5mm.



Number	Connects To	Cable Specification
1	Power In +12vDC	Minimum 1.0mm²2 core 10A cable
2	Power In -12vDC	Minimum 1.0mm²2 core 10A cable
3	Power Out +12vDC	Minimum 1.0mm²2 core 10A cable
4	Power Out -12vDC	Minimum 1.0mm²2 core 10A cable
5	Milk Meter Bottom Probe	Probe Cable Red
6	Milk Meter Middle Probe	Probe Cable Green
7	Milk Meter Top Probe	Probe Cable White
8	Milk Meter Probe Screen	Probe Cable Screen
9	Auto Start Ram -	Factory Fitted to Auto Start Ram
10	Auto Start Ram +	Factory Fitted to Auto Start Ram
11	M2Bus In Screen	Twisted Pair Data Cable Screen
12	M2Bus In Data B	Twisted Pair Data Cable Black
13	M2Bus In Data A	Twisted Pair Data Cable Red
14	M2Bus Out Screen	Twisted Pair Data Cable Screen
15	M2Bus Out EOL Link	Only connect when instructed by ATL
16	M2Bus Out Data B	Twisted Pair Data Cable Black
17	M2Bus Out Data A	Twisted Pair Data Cable Red
18	Side Input +Ve Input	Minimum 0.5mm² 0.5A cable
19	Side Input -Ve Input	Minimum 0.5mm² 0.5A cable

Milking Point Control Wiring Connections Continued

Number	Connects To	Cable Specification
20	Side & Auto Start +Ve Supply	Minimum 0.5mm^2 0.5A cable
21	Side & Auto Start -Ve Supply	Minimum 0.5mm^2 0.5A cable
22	Meter Solenoid -12vDC	Factory Fitted to Control Valve
23	Meter Solenoid +12vDC	Factory Fitted to Control Valve
24	ACR Solenoid -12vDC	Factory Fitted to Control Valve
25	ACR & Shut Off Valve Solenoid +12vDC	Factory Fitted to Control Valve
26	Shut Off Valve Solenoid -12vDC	Factory Fitted to Control Valve
27	Pulsation Solenoid Channel 1 -12vDC	Factory Fitted to Control Valve
28	Pulsation Solenoids +12vDC	Factory Fitted to Control Valve
29	Pulsation Solenoid Channel 2 -12vDC	Factory Fitted to Control Valve

IMPORTANT - DO NOT INSTALL TWO CABLES THROUGH 1 CABLE HOLE IN THE 4 PORT GLAND. THIS WILL INVALID THE WARRANTY.

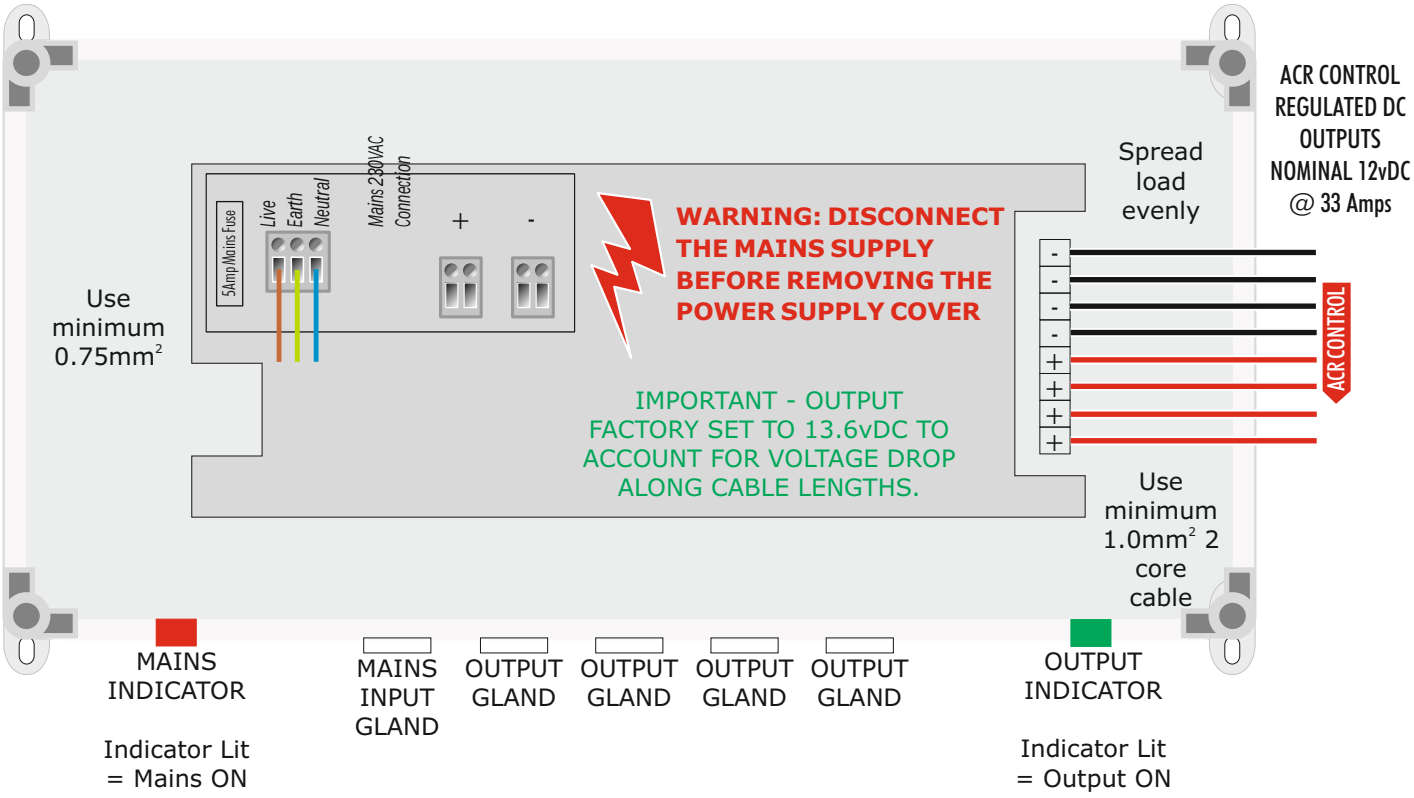
IMPORTANT - THE POWER OUT CONNECTIONS SHOULD NOT BE USED UNLESS ABSOLUTELY NECESSARY.

12vDC 396 Watt Power Supply Wiring Connections

- Mains Voltage: 100-240volt AC
- Output Voltage: Nominal 13.6volt DC
- Mains Fuse: 5 Amp
- Automatic Over Current Protection
- Maximum Number Of Milking Point Controls With ATL Control Valves: 60

  Maximum Number Of Milking Point Controls With ATL Control Valves & Pulsation: 30

  NB - Maximum number of ACR controls will depend upon ACR control valve solenoid specifications - if unsure please contact ATL.
- Ensure the loading on each power supply is as even as possible.
- Recommended ACR Solenoid Spec: 12volt DC Continuous Operation Normally Closed with power rating up to 3 watts.
- Recommend system is powered on all of the time to prevent condensation build up on electronic components.



ACR CONTROL

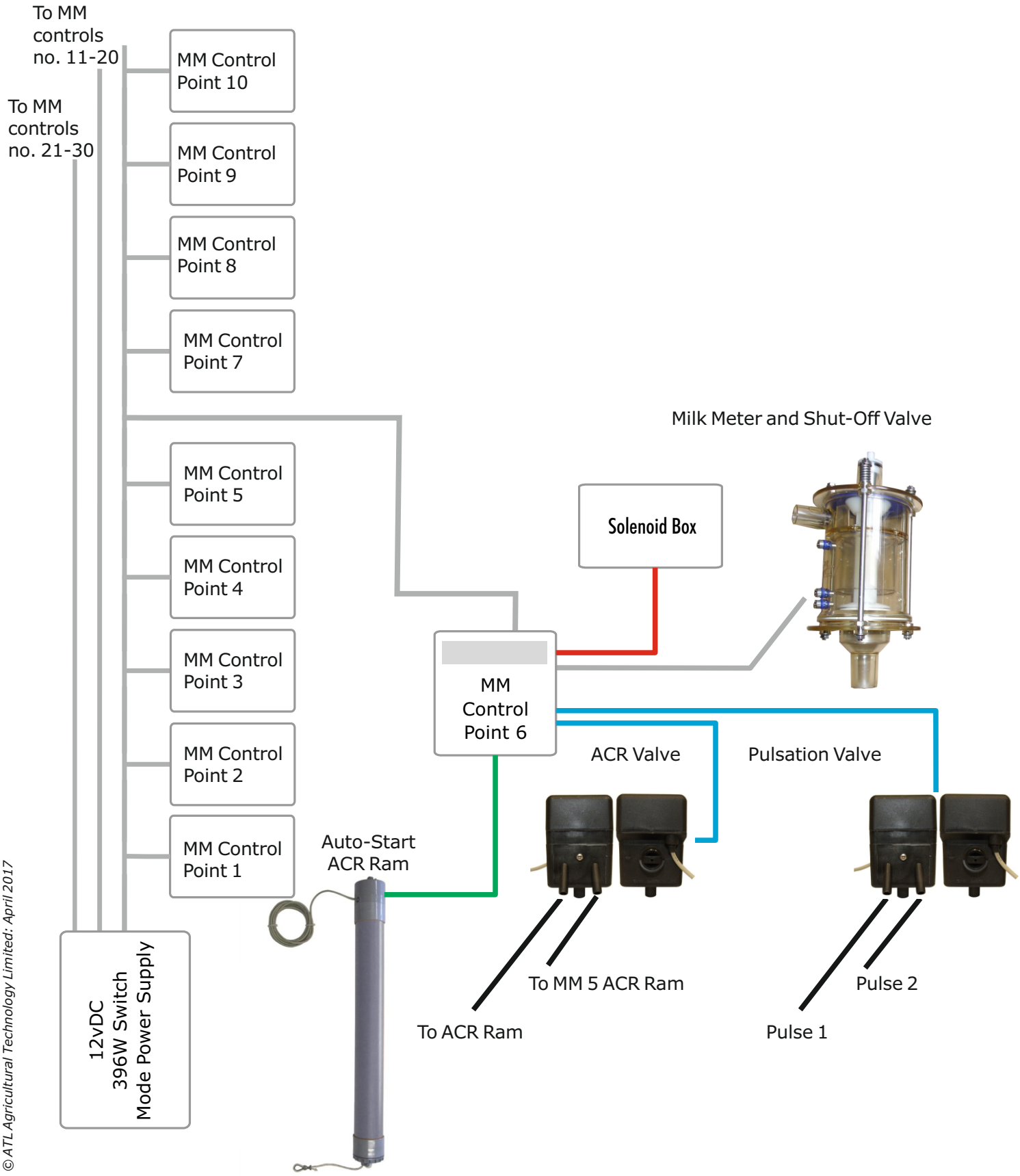
Connect to ACR controls.

Output Specification: Nominal 12vDC @ 33 Amps

IMPORTANT - Use different cable for each block of 10 MM controls to provide for current requirements of system. This is based upon using CV20 control valve with nominal 3 watts per solenoid coil. If using existing control valve, please check wattage and reduce numbers accordingly.

A 24vDC power supply can also be used Please make sure all solenoids are 24vDC.

System Wiring Overview



System Wiring Overview - Wire Colours

The individual wiring colours for each output / input wire are detailed below, please note, some wires are omitted as they will have different colours.

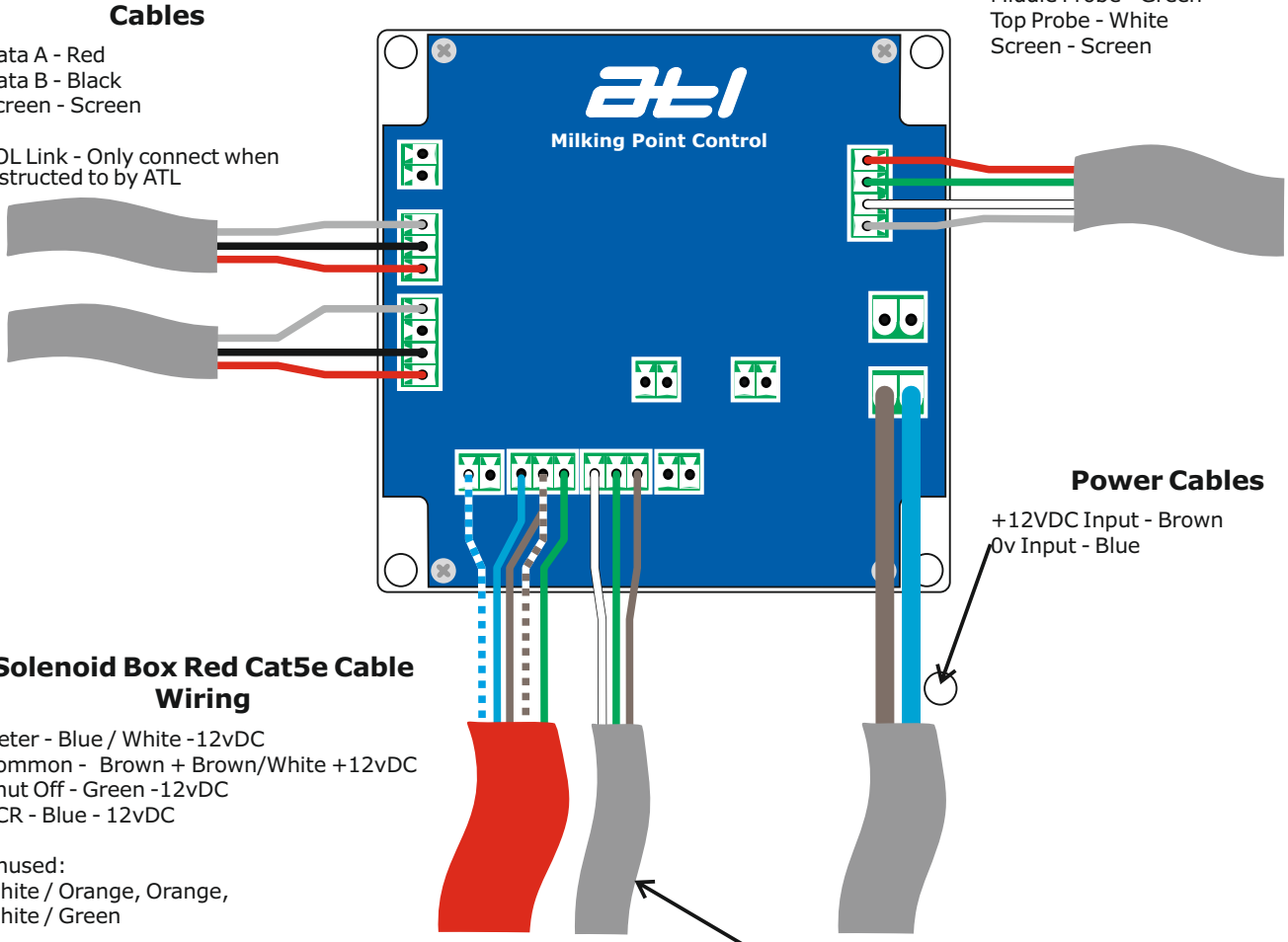
Milk Meter Probe Cables

Bottom Probe - Red
Middle Probe - Green
Top Probe - White
Screen - Screen

M2Bus Communications Cables

Data A - Red
Data B - Black
Screen - Screen

EOL Link - Only connect when instructed to by ATL



Power Cables

+12VDC Input - Brown
0v Input - Blue

Solenoid Box Red Cat5e Cable Wiring

Meter - Blue / White -12vDC
Common - Brown + Brown/White +12vDC
Shut Off - Green -12vDC
ACR - Blue - 12vDC

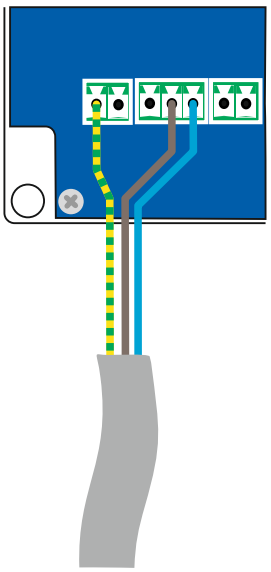
Unused:
White / Orange, Orange,
White / Green

Pulsation Cables

For ATL Pulsators:
Pulse Output 1 - White
+12VDC Common - Green
Pulse Output 2 - Brown

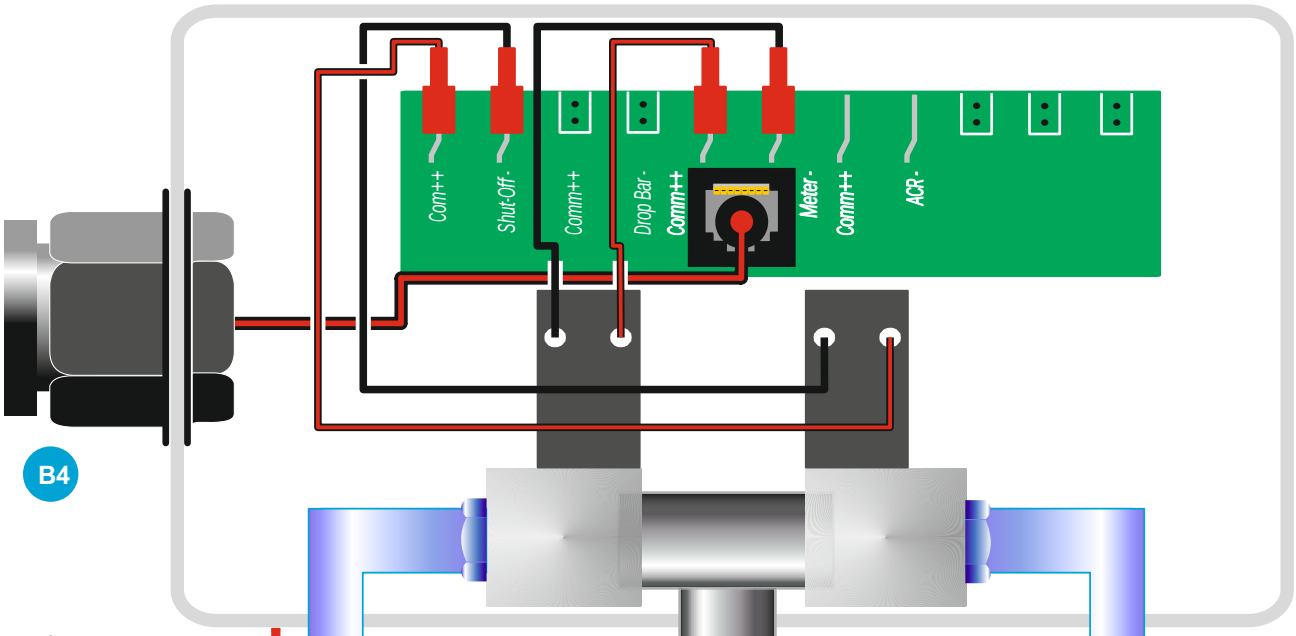
Solenoid Box 3 Core Mains Cable Wiring

Meter - Green / Yellow -12vDC
Common - Brown +12vDC
Shut Off - Blue -12vDC



Solenoid Box Installation - For Solenoid Boxes with a PCB

The solenoid box contains two solenoids, one is used to operate the milk meter plunger, the other the shut-off valve. The box is fitted with two spring clips to enable easy installation to a 1.25 inch (nominal bore) tube. The solenoid box is delivered pre-wired.



The vacuum pipe must be reinforced to work optimally.

B1

6mm Milk Meter

B3

6mm Shut-Off Valve

The vacuum pipe must be reinforced to work optimally.

The vacuum pipe must be reinforced to work optimally.

B2

8mm Vacuum Supply

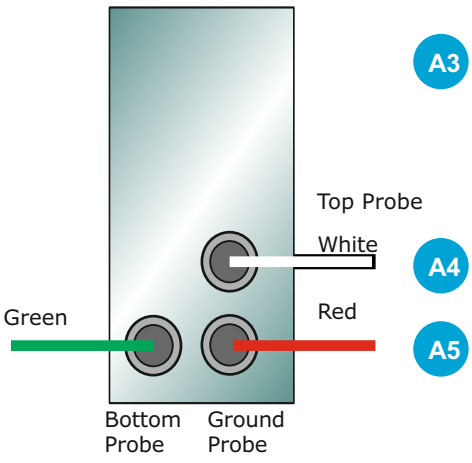
B1 Connect a piece of 6mm vacuum pipe to the milk meter (A1).

B2 Connect a piece of 8mm vacuum pipe to the vacuum source.

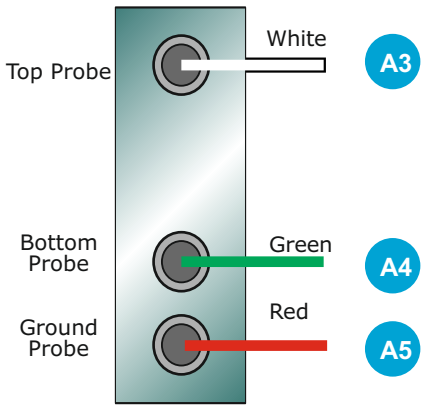
B3 Connect a piece of 6mm vacuum pipe to the shut-off valve.

B4 Connect into the milk meter display; see diagrams on page 14.

Sheep and Goats Milk Meter Sensor Connection Diagram

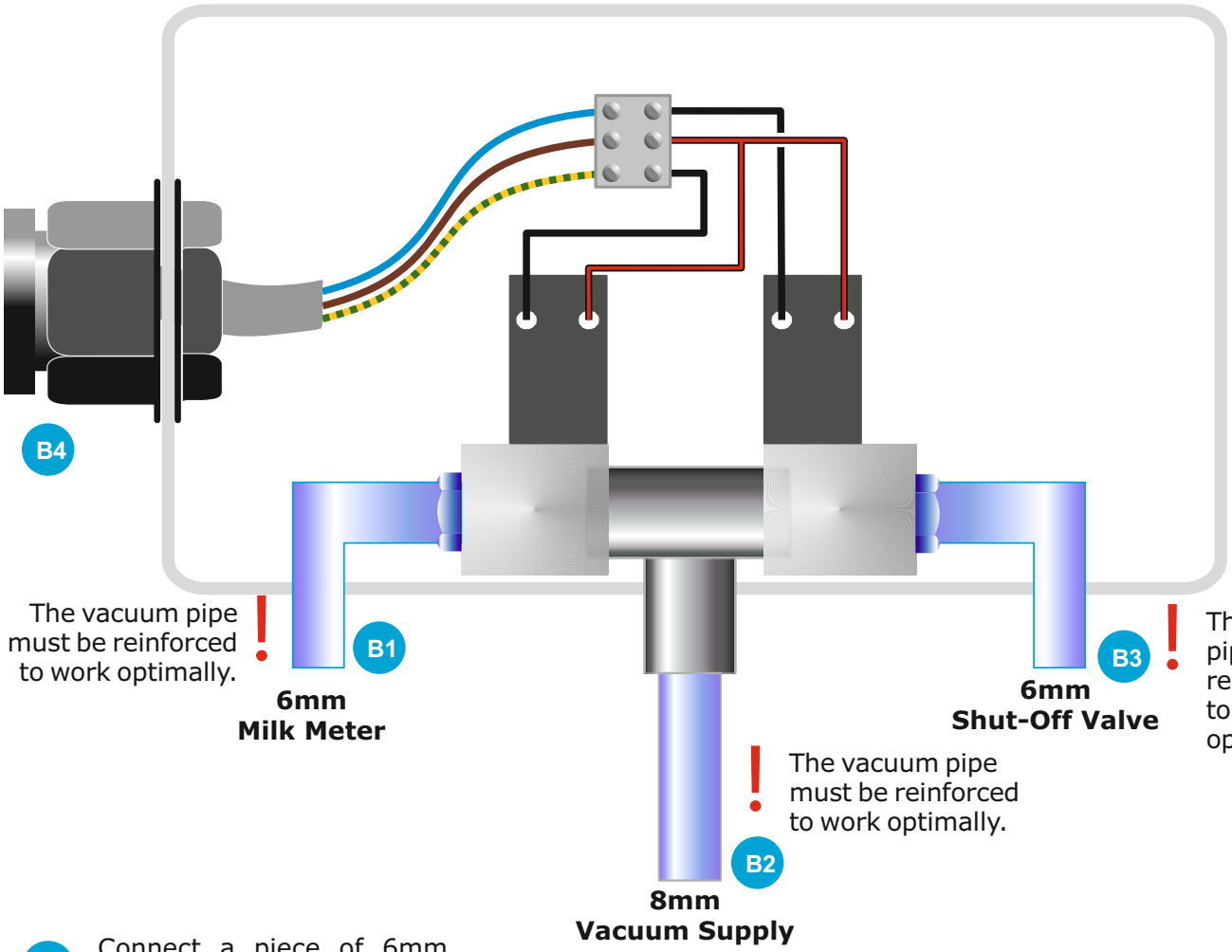


Cows Milk Meter Sensor Connection Diagram



Solenoid Box Installation - For Solenoid Boxes without a PCB

The solenoid box contains two solenoids, one is used to operate the milk meter plunger, the other the shut-off valve. The box is fitted with two spring clips to enable easy installation to a 1.25 inch (nominal bore) tube. The solenoid box is delivered pre-wired.



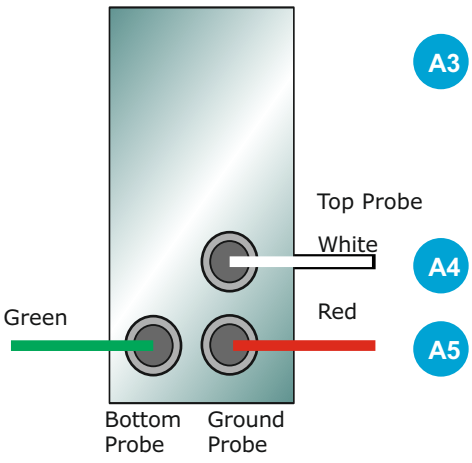
B1 Connect a piece of 6mm vacuum pipe to the milk meter (A1).

B2 Connect a piece of 8mm vacuum pipe to the vacuum source.

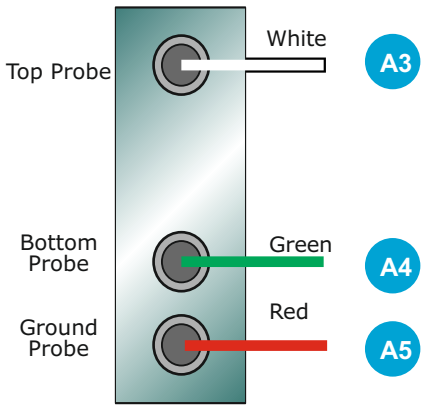
B3 Connect a piece of 6mm vacuum pipe to the shut-off valve.

B4 Connect into the milk meter display; see diagrams on page 13.

Sheep and Goats Milk Meter Sensor Connection Diagram



Cows Milk Meter Sensor Connection Diagram



Setting up the MM20 Milking Point Control

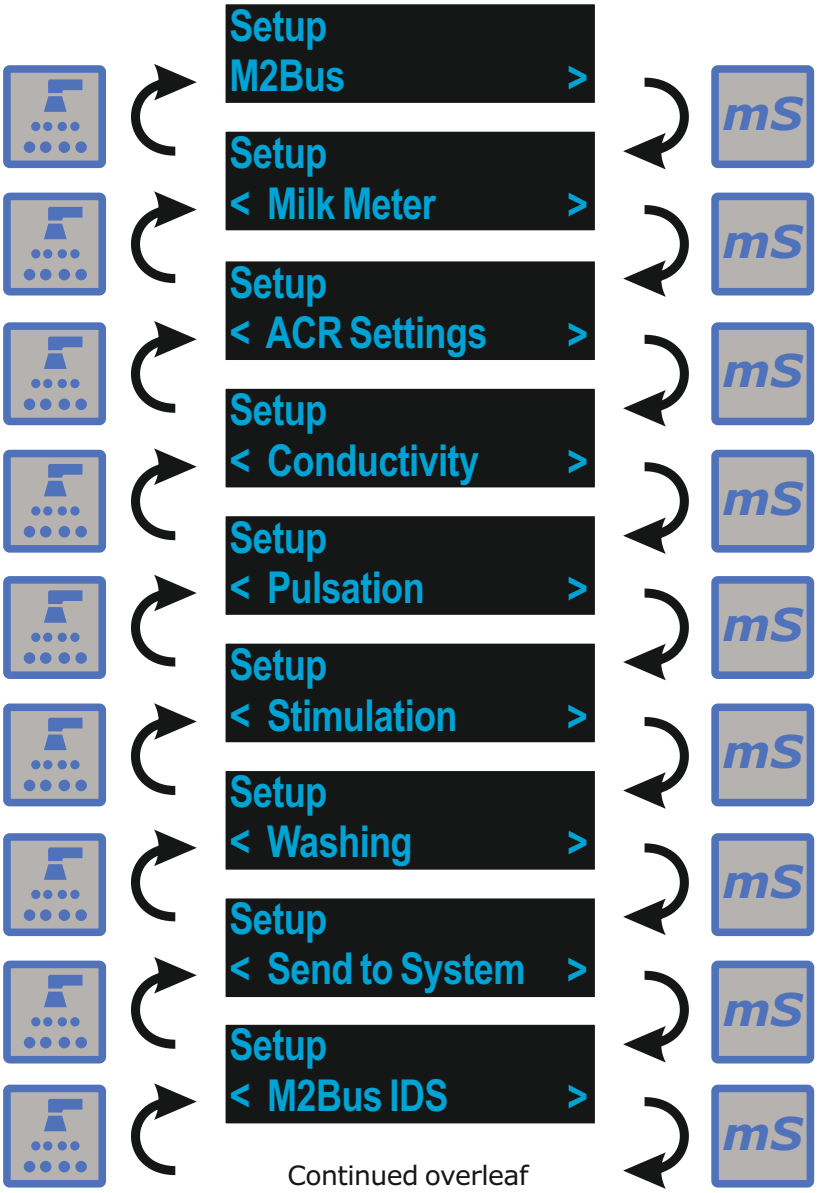
Before it can be used, the milking point control system must be setup. This is outlined in the following pages:

Accessing the Settings

Press and hold the Wash, Milk and Conductivity keys together.

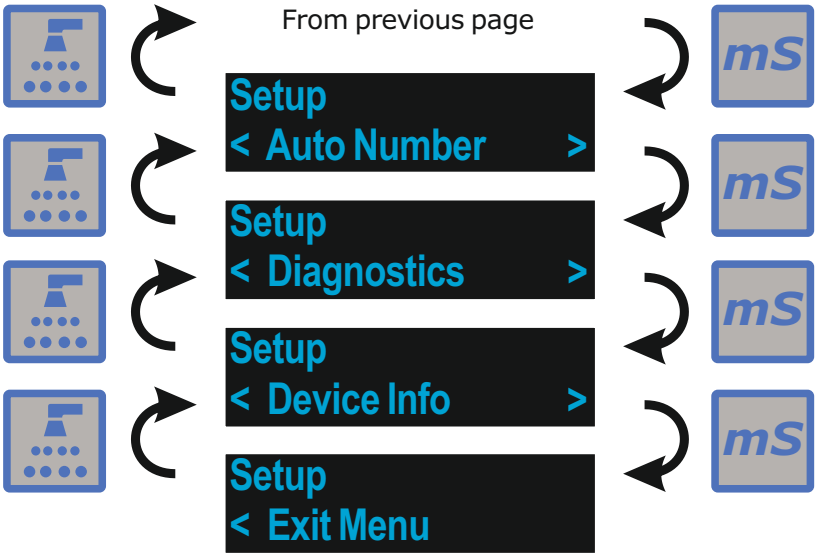
The Setup Menu

The setup menu is divided into sections, each section deals with a specific part of the control. The sections can be stepped through using the Wash and Conductivity keys, and accessed using the Milk key.



Continued overleaf

The Setup Menu Continued



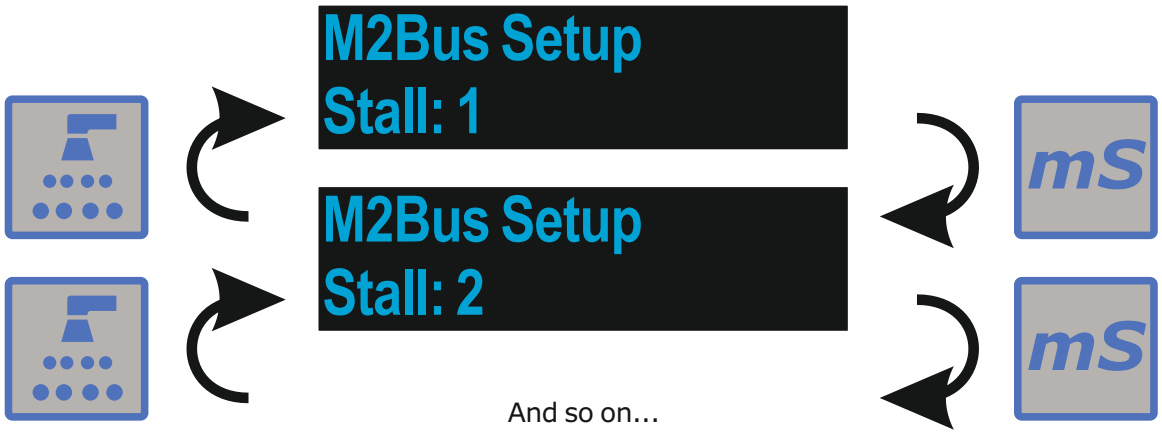
Pressing the Milk key when on a menu item will allow the user to edit the menu items in that item.

The M2Bus Menu

The M2Bus menu contains the settings controlling the Meridian 2 communications bus. There are a number of settings, each listed in the following pages.

The Stall Number Setting

The Stall number setting is the unique control address. Each control must have a different number for the communications bus to function and data to be transferred correctly. The range is 1 to 255. The factory default is 1.



Press the Conductivity key to increase the stall

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the stall

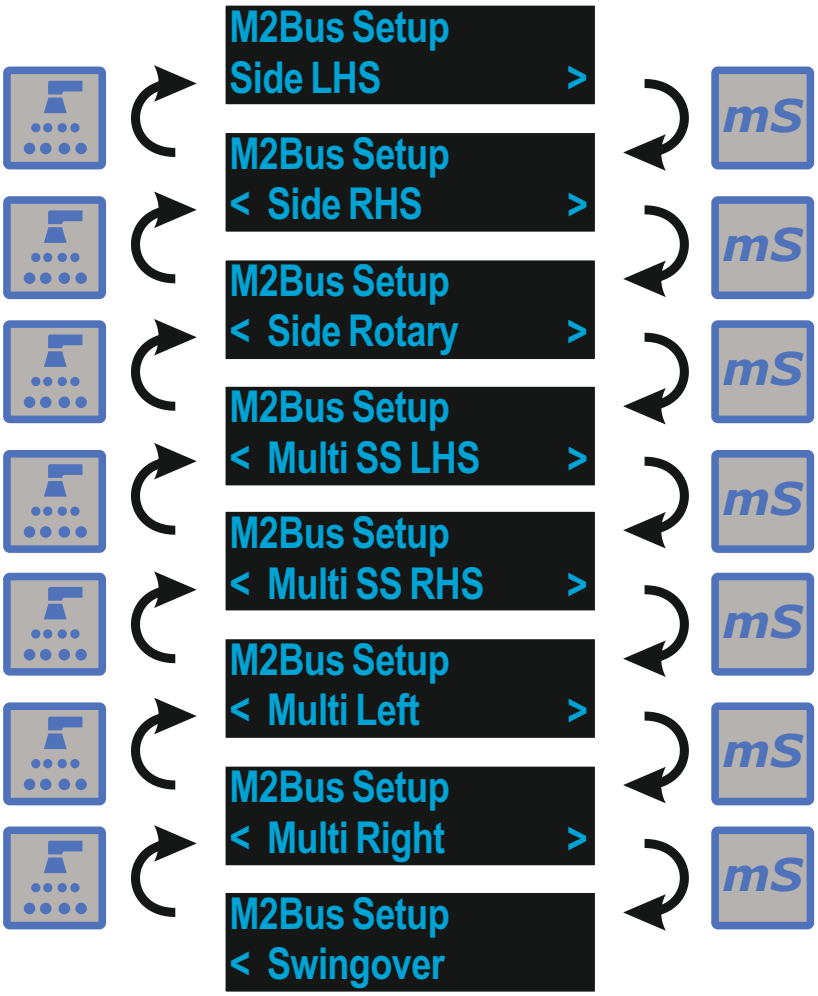
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The next menu item is now displayed.

The Parlour Type Setting

This setting selects the type of parlour the milk meter control is being installed on - doubled up, rotary, multi-stall single sided, multi-stall double sided and swingover parlours. Multi-stall allows for parlours where one milking unit is shared between 2 or 3 animal standings - this is especially popular on goat and sheep parlours. The factory default is Side LHS.



Pressing the Milk key will save the current setting. If the setting chosen is a multi stall one, the menu will display the width setting, otherwise it will return to the main setup menu.

The Stall Width Setting (Visible only when the Side setting is one of the multi stall options)

The side width setting allows the user to input the number of stalls the control will milk, the default is 2, the maximum is 3.

Press the Conductivity key to increase the width 

Press the Wash key to decrease the width 

When the correct setting is selected, press the Milk key to store the data. 

The control will return to the main menu.

The Milk Meter Menu

The Milk Meter menu contains the settings controlling the operation of the milk meter. There are a number of settings, each listed in the following pages.

The Units Setting

The Units setting allows the operator to choose whether the milk yield is displayed in litres or kilograms. The factory default is litres.

Pressing the Milk key will save the current setting and move onto the next menu item.

The Drop Setting

The drop value is the calibration setting for the milk meter 'dump' value. It is the milk meter flask chamber volume in millilitres or grams (depends upon the units setting). The range is 10ml/g to 500 ml/g. The factory default is 200ml which is for cows . For goats and sheep it should be changed to 55ml/g.

Press the Conductivity key to increase the value 

Hold the Conductivity key to increase in 10s

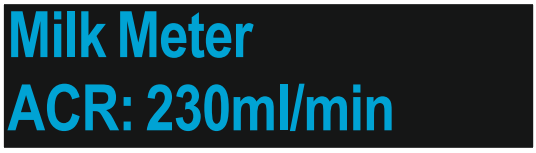
Press the Wash key to decrease the value 
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The next menu item is now displayed.

The ACR Setting

The ACR setting controls when the ACR is activated. The ACR is only activated when the flow rate reaches or drops below this value. When this happens the end of milking procedure is initiated. It is measured in millilitres or grams per minute of milk flow (depends upon the units setting). If an animal is being over-milked, this value should be increased, and if the animal is being under-milked, it should be decreased. The range is 10ml/g per minute to 500ml/g per minute. The factory default is 230ml/g per minute = cows - change to 180ml/g per minute for goats and sheep.



or

Press the Conductivity key to increase the value 

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the value  Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data. 

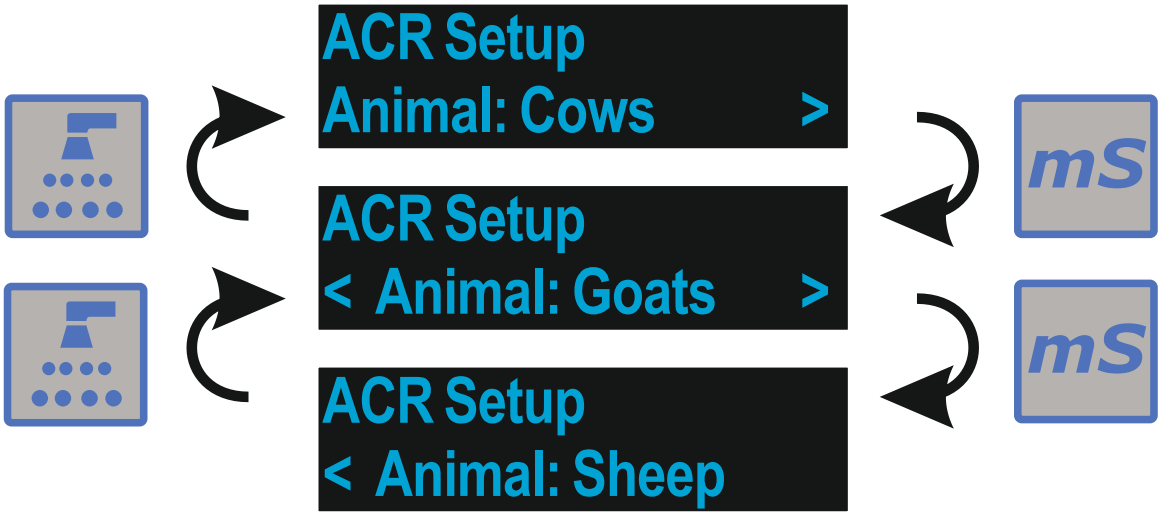
The main setup menu is now displayed.

The ACR Settings Menu

The ACR settings menu contains the settings for how the control will function as an ACR. There are a number of settings, each listed in the following pages;

The Animal Type Setting

The Animal Type setting selects the type of animal being milked using the control and changes the nomenclature displayed accordingly. Pressing the Conductivity key will step through the available animal types, pressing the Wash key will step back. Pressing the Milk key will save the animal type and move onto the next setting. The factory default is cows.



Pressing the Milk key will save the current setting and move onto the next menu item.

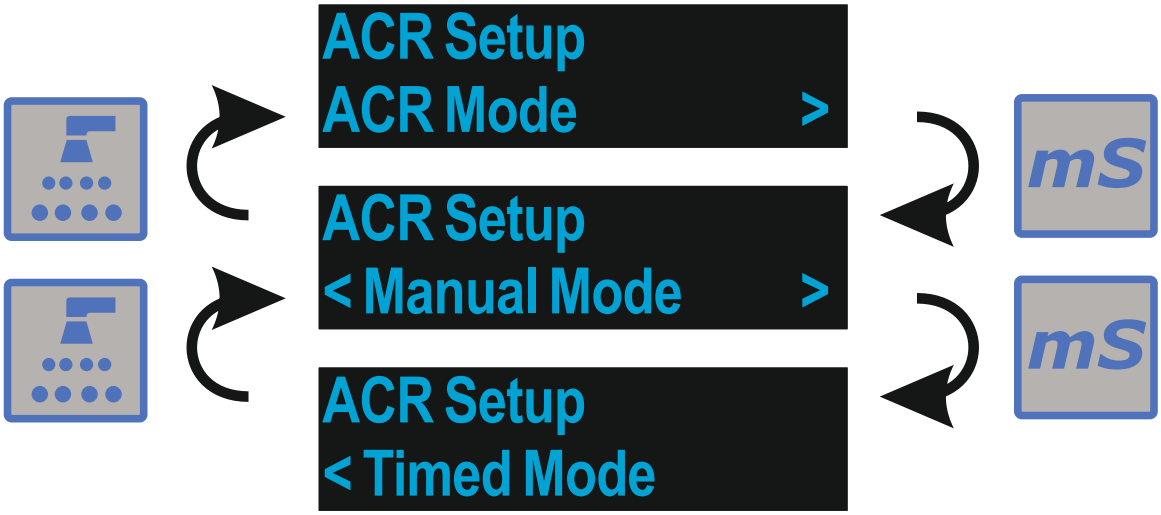
The ACR Mode Setting

The ACR Mode setting controls how the milking point control will function when milking an animal. There are three modes available, these are; ACR, Manual and Timed. Pressing the Conductivity key will step through the available configurations, pressing the Wash key will step back. Pressing the Milk key will save the setting and move onto the next setting.

ACR Mode - Uses the milk flow and automatically removes the milking unit when the flow rate drops below a certain flow (ml/minute or g/minute - milk meter - or resistance - cluster remover).

Manual Mode - Operator starts and stops the milking via pressing keys on the control unit. Milk flow rate is ignored throughout.

Timed Mode - Milking for preset length of time. Units can then be allowed to drop off (sheep/goats) or automatically removed using ACR cylinder. Flow rate is ignored throughout.



Pressing the Milk key will save the current setting and move onto the next menu item.

If the milking mode selected is ACR, the ACR hold off setting will be shown next.

If the milking mode selected is Manual, the vacuum delay setting will be shown next.

If the milking mode selected is Timed, the milking time setting will be shown next.

The ACR Hold Off Delay Setting (Visible only when the Milking Mode is ACR)

The ACR hold off setting lets the user specify the length of time before the ACR becomes active after the start of milking. The range is from 10 seconds to 240 seconds. The factory default is 120 seconds.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The kick off delay setting is now displayed.

The Kick Off Delay Setting (Visible only when the Milking Mode is ACR)

The kick off delay setting lets the user specify the length of time after the ACR hold off delay has passed, that if an ACR take off occurs, the control will give a kick off alert. The range is from 30 seconds to 999 seconds.

The factory default is 180 seconds.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The Milk Sensing Resistance Setting

The Milking Sensing Resistance setting lets the user specify the resistance the milk has to be before a 'dump' of the milk meter is triggered. This enables exact trigger point to be set and can be helpful if milk is very frothy. The range is from 25 ohms to 999 ohms. The factory default is 750 ohms.

Press the Conductivity key to increase the value

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the value

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The vacuum delay function is now displayed.

The Milking Time Setting (Visible only when the Milking Mode is Timed)

The milking time setting lets the user specify the length of time the animal will be milking for in timed mode. The range is 10 seconds to 900 seconds. The factory default is 180 seconds.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The vacuum delay setting is now displayed.

The Vacuum Delay Setting

The vacuum delay setting allows the user to set a delay between the operation of the shut-off valve closing to shut off the vacuum and the ACR ram operating. It should be set to a value that ensures that as the shut-off valve operates at the end of milking, the vacuum decays to a point where the cluster is just about to fall before the ACR ram operates. The range is from 1 second to 10 seconds. The factory default is 3 seconds.

Press the Conductivity key to increase the time 

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time 
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data. 

The purge function is now displayed.

The Purge Setting

The purge setting is a YES / NO setting. When the ACR ram operates, setting the purge to YES makes the shut-off valve momentarily open to purge any milk residues into the milk line. The factory default is YES.

Press the Conductivity key to enable the setting. 

Press the Wash key to disable the setting. 

When the correct setting is selected, press the Milk key to store the data. 

If the purge setting is enabled, the purge hold off function is now displayed, otherwise, the ACR settings main menu is displayed.

The Purge Hold Off Setting (Visible only when the Purge is Yes)

It allows a delay to be set between the ACR operating and the purge activating. It is for installations with flushing systems. The range is from 1 seconds to 60 seconds. The factory default is 1 second.

Press the Conductivity key to increase the time 

Hold the Conductivity key to increase in 10s

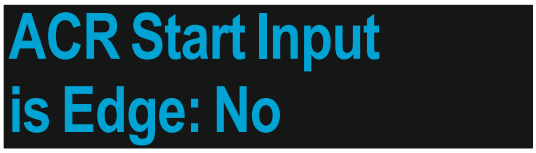
Press the Wash key to decrease the time 
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data. 

The start input is edge function is now displayed.

The Start Input Is Edge Setting

The start input is edge setting is a YES / NO setting. This setting selects between the start input being a pulse (low to high - YES) or an edge trigger (NO). The factory default is NO .



Press the Conductivity key to enable the setting. 

Press the Wash key to disable the setting. 

When the correct setting is selected, press the Milk key to store the data. 

The ACR Swing to Start Setting (Visible only when the Side setting is Swing Over)

This setting enables to meter to start automatically when the swingarm is swung to change sides. It requires a swingover switch to function and can be used on both stand-alone and systems connected to a Micro. The factory default is NO.

Press the Conductivity key to enable the setting.

Press the Wash key to disable the setting.

When the correct setting is selected, press the Milk key to store the data.

The ACR main menu item is now display.

The Conductivity Settings Menu

The Conductivity settings menu contains the settings for how the conductivity functions on the control will function. There are 3 settings, each listed in the following pages;

The Conductivity Global Enable Setting

The conductivity global enable setting is a YES / NO setting, this setting enables or disables the conductivity features of the control. The factory default is YES.

Press the Conductivity key to enable the setting. 

Press the Wash key to diable the setting. 

When the correct setting is selected, press the Milk key to store the data. 

If conductivity is enabled the conductivity warning level function is now displayed, otherwise the conductivity main menu item is displayed.

The Conductivity Warning Level Setting (Visible only when the Conductivity is Yes)

The conductivity warning level setting is the conductivity level whereby the conductivity warning scale LEDs will flash . The range is from 2 millisiemens to 20 millisiemens. The factory default is 5.5 millisiemens.

Press the Conductivity key to increase the value in tenths 

Hold the Conductivity key to increase in whole units.

Press the Wash key to decrease the value in tenths 

Hold the Wash key to decrease in whole units.

When the correct setting is selected, press the Milk key to store the data. The conductivity pull off function is now displayed. 

The Conductivity Pull Off Level Setting (Visible only when the Conductivity is Yes)

The conductivity pull off level setting allows the user to set the conductivity level at which the ACR activates and the cluster is removed from the animal. The range is from 2 millisiemens to 20 millisiemens. The factory default is 6 millisiemens.

Press the Conductivity key to increase the value in tenths

Hold the Conductivity key to increase in whole units

Press the Wash key to decrease the value in tenths

Hold the Wash key to decrease in whole units

When the correct setting is selected, press the Milk key to store the data.

The conductivity main menu item is now displayed.

The Pulsation Settings Menu

The Pulsation settings menu contains the settings for how the pulsation outputs function on the control. There are a number of settings, each listed in the following pages.

The Pulsation Global Enable Setting

The pulsation global enable setting is a YES / NO setting, this setting enables or disables the pulsation features of the control. The factory default is YES.

Press the Conductivity key to enable the setting.

Press the Wash key to disable the setting.

When the correct setting is selected, press the Milk key to store the data.

If pulsation is enabled, the pulsation type function is now displayed, otherwise the pulsation main menu item is displayed.

The Pulsation Type Setting (Visible only when Pulsation is Yes)

The pulsation type setting allows the control to be set to alternate or simultaneous pulsation. The factory default is alternate. Press either the Right or Wash keys to toggle between the two modes.

When the correct setting is selected, press the Milk key to store the data.

The pulsation output invert function is now displayed.

The Pulsation Output Invert Setting (Visible only when Pulsation is Yes)

The pulsation output invert setting is a YES / NO setting. This setting will invert the outputs for pulsators which function in reverse. The factory default is NO.

Press the Conductivity key to enable the setting.

Press the Wash key to disable the setting.

When the correct setting is selected, press the Milk key to store the data.

The pulsation frequency function is now displayed.

The Pulsation Frequency Setting (Visible only when Pulsation is Yes)

The pulsation frequency setting controls the frequency of the pulsation during milking. The range is 30 to 180 pulses per minute. The factory default is 60 pulses per minute.

Press the Conductivity key to increase the value

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the value

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The pulsation ratio fo channel 1 is now displayed.

The Pulsation Ratio 1 Setting (Visible only when Pulsation is Yes)

The pulsation ratio 1 setting controls the ratio of channel 1's on time as a percentage of the total time. The factory default is 60 percent on.

Press the Conductivity key to increase the time 

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time 
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data. 

The pulsation ratio for channel 2 is now displayed.

The Pulsation Ratio 2 Setting (Visible only when Pulsation is Yes)

The pulsation ratio 2 setting controls the ratio of channel 2's on time as a percentage of the total time. The factory default is 60 percent on.

Press the Conductivity key to increase the time 

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time 
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data. 

The Wash Pulsation Frequency Setting (Visible only when Pulsation is Yes)

The wash pulsation frequency setting controls the frequency of the pulsation during washing. The factory default is 60 pulses per minute.

Press the Conductivity key to increase the value 

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the value 
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data. 

The wash pulsation channel 1 ratio is now displayed.

The Wash Pulsation Ratio 1 Setting (Visible only when Pulsation is Yes)

The wash pulsation ratio 1 setting controls the ratio of channel 1's on time as a percentage of the total time when washing. The factory default is 60 percent on.

Press the Conductivity key to increase the time 

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time 
Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data. 

The Wash Pulsation Ratio 2 Setting (Visible only when Pulsation is Yes)

The wash pulsation ratio 2 setting controls the ratio of channel 2's on time as a percentage of the total time during washing. The factory default is 60 percent on.

Press the Conductivity key to increase the time 

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time  Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The pulsation main menu item is now displayed.

The Stimulation Settings Menu

The Stimulation settings menu contains the settings for the stimulation function on the control. There are a number of settings, each listed in the following pages.

The Stimulation Global Enable Setting

The stimulation global enable setting is a YES / NO setting, this setting enables or disables the stimulation features of the control. The factory default is YES.

Press the Conductivity key to enable the setting. 

Press the Wash key to disable the setting. 

When the correct setting is selected, press the Milk key to store the data. 

If stimulation is enabled, the automatic stimulation setting is now displayed, otherwise, the stimulation main menu item is displayed.

The Automatic Stimulation Enable Setting (Visible only when Stimulation is Yes)

The automatic stimulation enable setting is a YES / NO setting, this setting enables or disables the automatic stimulation function of the control. The factory default is NO.

Press the Conductivity key to enable the setting. 

Press the Wash key to disable the setting. 

When the correct setting is selected, press the Milk key to store the data. 

The automatic stimulation initial delay function is now displayed.

The Automatic Stimulation Initial Delay Setting (Visible only when Stimulation is Yes)

The automatic stimulation initial delay setting controls the delay before stimulating the animal to produce milk. The factory default is 20 seconds.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The stimulation increment interval is now displayed.

The Stimulation Increment Interval Setting (Visible only when Stimulation is Yes)

The stimulation increment interval setting controls the time taken to increase the normal milking pulsation frequency and ratios to the stimulation frequency and ratios. The factory default is 5 seconds.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

The Stimulation Time Setting (Visible only when Stimulation is Yes)

The stimulation time setting controls the length of stimulation for the animal. The factory default is 15 seconds.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The stimulation maximum multiplier is now displayed.

The Stimulation Maximum Multiplier Setting (Visible only when Stimulation is Yes)

The stimulation maximum mulitipler setting controls maximum length of stimulation when the user lengthens the stimulation manually by holding the milk key when stimulation is enabled, for example if this is 6, the maximum time stimulation can occur for is 6 times the stimulation time. The factory default is 6 .

Press the Conductivity key to increase the value

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the value

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The stimulation frequency is now displayed.

The Stimulation Pulsation Frequency Setting (Visible only when Stimulation is Yes)

The stimulation pulsation frequency setting controls the frequency of the pulsation during the stimulation of the animal. The factory default is 60 pulses per minute. This cannot be lower than the pulsation frequency.

Press the Conductivity key to increase the value

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the value

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The stimulation pulsation ratio 1 is now displayed.

The Stimulation Pulsation Ratio 1 Setting (Visible only when Stimulation is Yes)

The stimulation pulsation ratio 1 setting controls the ratio of channel 1's on time as a percentage of the total time when stimulating. The factory default is 60 percent on.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The stimulation pulsation ratio 2 is now displayed.

The Stimulation Pulsation Ratio 2 Setting (Visible only when Stimulation is Yes)

The stimulation pulsation ratio 2 setting controls the ratio of channel 2's on time as a percentage of the total time during stimulation. The factory default is 60 percent on.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The stimulation main menu item is now displayed.

The Wash Settings Menu

The Wash settings menu contains the settings for the wash function on the control. There are 3 settings, each listed in the following pages;

The Automatic Idle Time Setting

The automatic idle time setting controls how long the milking point control will hold outputs on after no input is received from the user, this allows the system to turn off unwanted outputs when the parlour is not running, thus saving energy. The range is 5 to 360 minutes. The factory default is 15 minutes.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The wash time setting is now displayed.

The Wash Time Setting

The wash time setting controls how long the milking point control will run its wash routine before switching to idle. The range is 1 to 720 minutes. The factory default is 30 minutes.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The wash water resistance setting is now displayed.

The Wash Water Resistance Setting

The Wash Water Resistance setting lets the user specify the resistance the wash water has to be before a 'dump' of the meter is triggered. This enables a different resistance to be used for the wash water, as often the milk trigger is too low for clean water to register. The range is from 25 ohms to 3000 ohms. The factory default is 750 ohms.

Press the Conductivity key to increase the value

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the value

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The flood time setting is now displayed.

The Wash Flood Time Setting

The wash flood time setting lets the user specify the length of time the meter will flood the flask, to ensure the meter is correctly washed. The range is 10 seconds to 120 seconds. The factory default is 20 seconds.

Press the Conductivity key to increase the time

Hold the Conductivity key to increase in 10s

Press the Wash key to decrease the time

Hold the Wash key to decrease in 10s

When the correct setting is selected, press the Milk key to store the data.

The Start In Wash Setting

The start in wash setting is a YES / NO setting, this setting enables or disables the control to start in wash when the control first power's up, this allows automatic plant washers to wash the system automatically, the user is then able to take the system out of wash to milk. The factory default is NO.

Press the Conductivity key to enable the setting.

Press the Wash key to disable the setting.

When the correct setting is selected, press the Milk key to store the data.

The wash main menu item is now displayed.

The Send to System Setting

The Send to System settings menu allows the settings entered into one control to be sent to all the milking point controls on the system via the communications bus. Select the number of controls on the system. The range is 1 to 255. The factory default is 1.

Press the Conductivity key to increase 

Hold the Conductivity key to increase in 10

Press the Wash key to decrease 
Hold the Wash key to decrease in 10s

When the correct number of controls has been selected, press the Milk key to send the settings to the controls. 

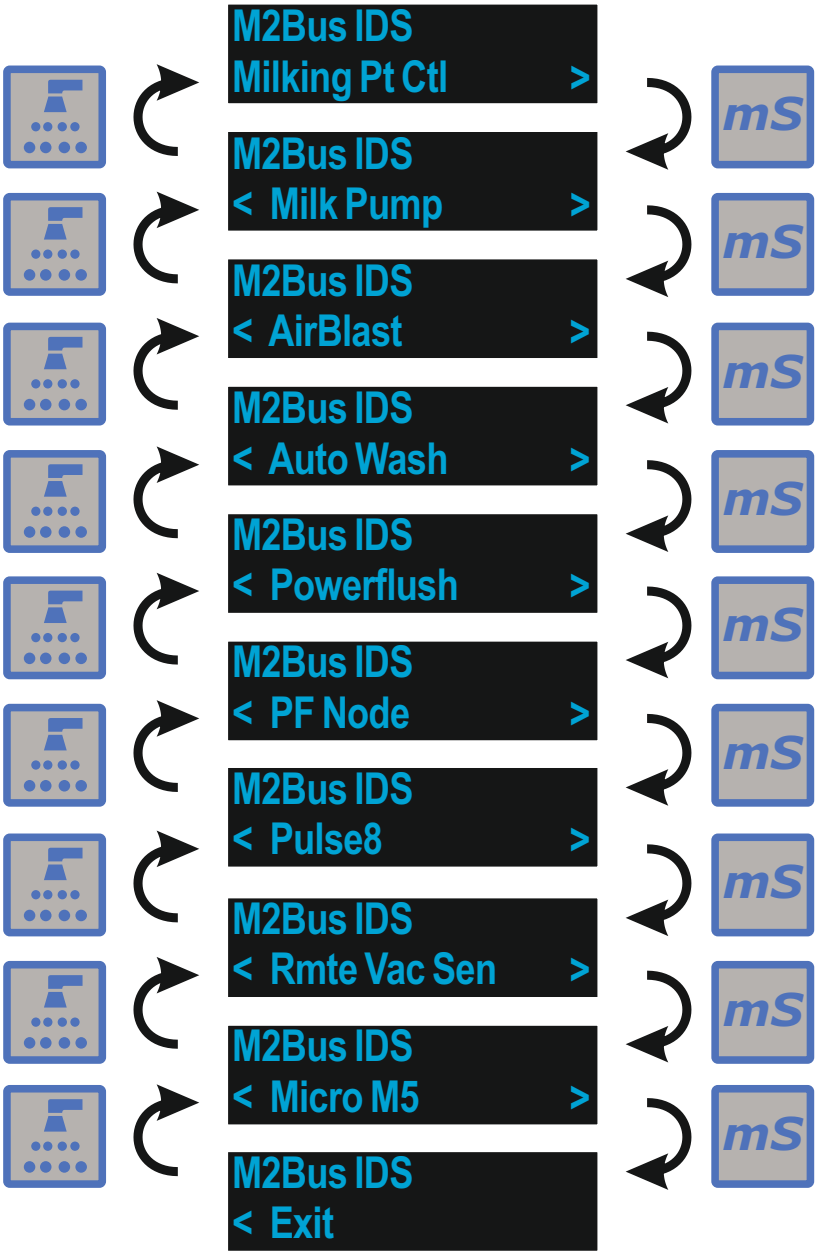
If the settings cannot be sent to a control, an error will be reported as shown above.

If sending the settings is successful, the screen will show 'Update Finished'.

Press the Milk key to return to the main menu. 

The M2Bus IDS Menu

The M2Bus IDS menu allows the user to check the communications bus is working correctly, there are a number of menu items:

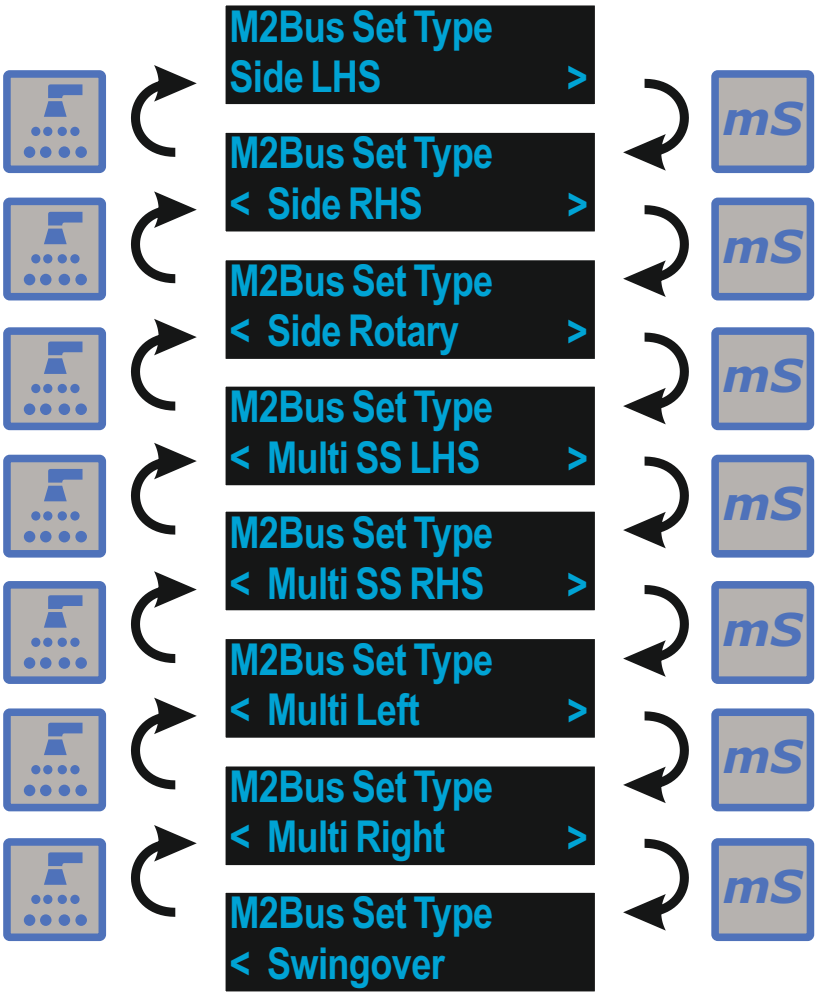


Pressing the Milk key when on a menu item will allow the user to check the communications to that item and to exit back to the main menu.

Press the Milk key to exit back to the M2Bus IDS menu.

The Auto Number Setting

This setting allows milking point controls that are on the communications bus to be simply allocated their stall numbers, saving setup time. First select the type of parlour the milk meter control is being installed on - doubled up, rotary, multi-stall single sided, multi-stall double sided, swingover parlours and width if selecting a multi-stall configuration.



Pressing the Milk key will place all controls on the communications bus into Auto Number mode, or, if selecting a multi-stall configuration the width setting will show.

The Stall Width Setting (Visible only when the Side setting is one of the multi stall options)

The side width setting allows the user to input the number of stalls the control will milk, the default is 2, the maximum is 3.

When the correct setting is selected, press the Milk key to start the auto numbering routine.

The Auto Number Routine

The basic method of operation of this routine is to allow the user to press a single key to identify a device as a stall number, allowing for the fast numbering of a parlour to occur simply by walking past all meters a pressing one key on each.

When the auto numbering mode is activated the screen will alternate between 'Auto Number' and the stall number i.e. 1L for stall 1 on the left hand side, for multi stall single sided parlours the side letter is not shown.

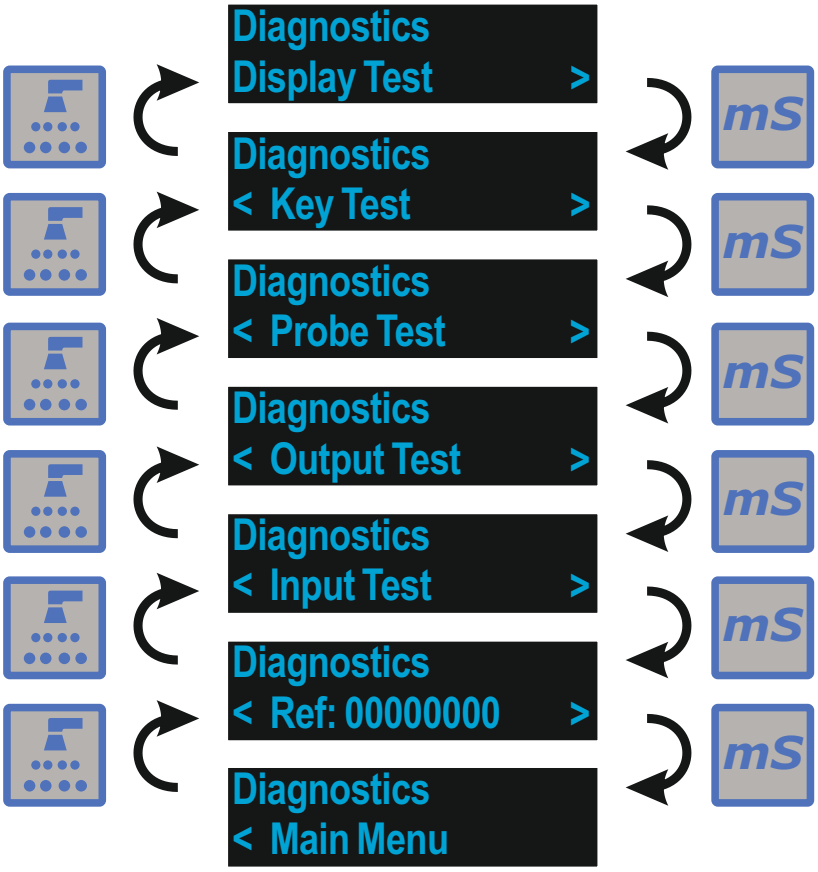
Pressing the conductivity key will store the current stall number on the device and begin searching for the next stall number.

Pressing the wash key will allow the user to undo an incorrect stall number identification and redo it with the correct one.

Press the Milk key to exit the routine.

The Diagnostics Menu

The diagnostics menu allows the user to diagnose issues with the control, there are a number of menu items:



Pressing the Milk key when on a menu item will allow the user to access that item.

The Display Test Diagnostics Menu Item

The Display Test will turn on all pixels on the display, pressing the Milk key will return to the diagnostics menu.

The Key Test Diagnostics Menu Item

The Key Test menu item allows the testing of the keys, it will show the name of the key which has been pressed, pressing the Milk key will return to the diagnostics menu.

NB - The manual key is labelled ACR.

The Probe Test Diagnostics Menu Item

The Probe Test menu item will show the current value in milli-siemens of the probe, this allows the user to check the probe input is working correctly.

Press the Manual key to select the top probe.

Press the Wash key to select the bottom probe.

Press the Milk key to return to the diagnostics menu.

The Output Test Diagnostics Menu Item

The output test menu item allows the user to turn on and off all outputs on the control for testing.

Press the Conductivity key to step to the next output.

Press the Wash key to step to the previous output.

Press the Milk key to toggle the output.

To exit the output test routine, scroll to the end using the Conductivity key and press the Milk key when on the Main Menu item.

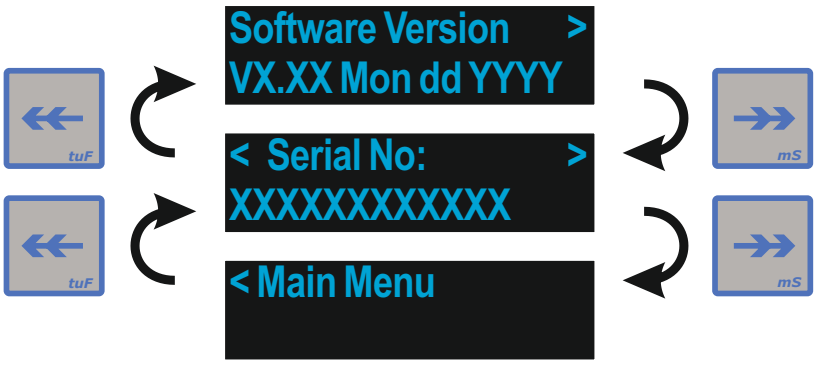
The Input Test Diagnostics Menu Item

The Input Test menu item shows the state of the start input on the control.

Press the Milk key to return to the diagnostics menu. 

The Device Info Menu

The device info menu allows the user to view information about the software in the control;



The software version menu item will show the version of the software as well as the build date.

The serial number will show the serial number of this control.

Press the Milk key 

when < Main Menu displayed to exit.

Using the MM20 Control

The ACR control has 6 main milking modes - these are:

1. Automatic ACR removal and conductivity enabled;
2. Automatic ACR removal and conductivity disabled;
3. Manual ACR removal and conductivity enabled;
4. Manual ACR removal and conductivity disabled;
5. Timed Milking and conductivity enabled;
6. Timed Milking and conductivity disabled;

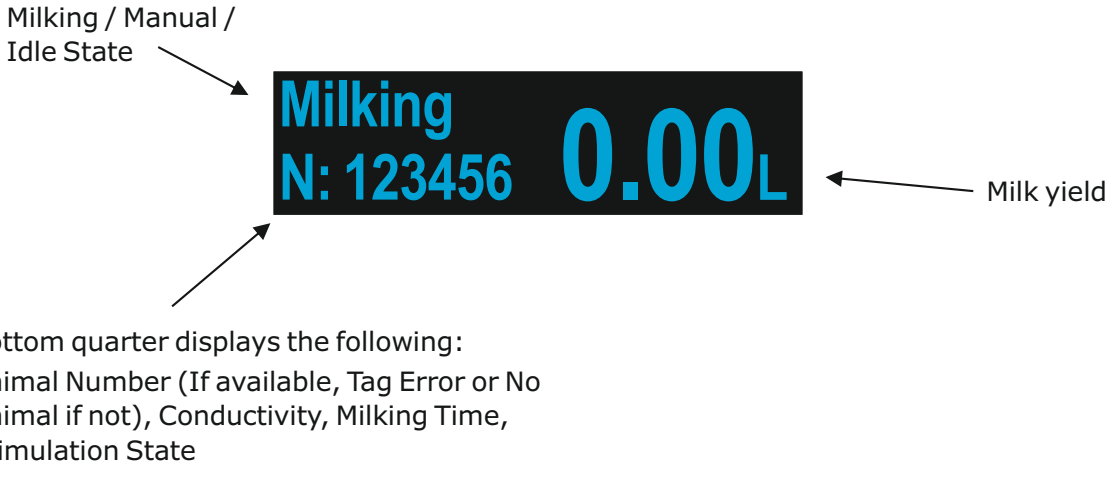
Automatic ACR removal allows the user to start the milking process and the ACR control completes it (i.e. the ACR ram removes the clusters from the animal and the milking is finished without user intervention).

Manual ACR removal allows the user to control the whole milking process from cluster attachment to removal.

Timed Milking allows the user to milk an animal for a specific time, then have the ACR remove the clusters from the animal.

The Milking Procedure

- Press the milking key to start milking in automatic mode or if in swing over mode, swing the arm, or if lift-to-start is connected, lift the cluster;
- The LCD display will show the milk yield on the right hand side and the milking mode on the top left. The animal number, milking time and conductivity value alternate in the bottom left of the LCD display;
- The status LEDs will show the respective states (milking will be green, pulsation will be running, ACR will be red, milk flow will indicate when milk is detected and conductivity will be green);
- The milking will continue until the ACR removes the cluster in ACR Mode, the time has elapsed in Timed mode or the Milk button is pressed in Manual mode, EXCEPT if the conductivity of the milk exceeds the conductivity pull off level whereby the cluster will be removed from the animal;
- If the animal is a slow milker or the cluster is removed early, press the milk key to restart milking.



Method of Stimulation

The MM20 Milking Point Control can provide the animal with stimulation when milk flow is not detected, or when the user decides to apply stimulation.

When automatically stimulating the control will wait the stimulation delay, if milk is not detected within this time, the control will start to ramp up the pulsation frequency until it matches the stimulation pulation frequency, it will also alter the pulsation ratios.

When stimulating the control will show "Stim: XX:XX" on the display in the bottom left hand side where the milking status information is shown, where XX:XX will show the stimulation time left.

The pulsation frequency and ratios will be ramped up to their stimulation settings using the interval delay to delay between changes.

Once milk is detected on the bottom probe of the milk meter, the control will begin to ramp down the pulsation frequency and ratios.

The user may start manually stimulating the animal at any time by pressing and holding the milking button.

The max multiplier setting is used when the user presses the stimulate button, this allows a maximum stimulation time to be set, and allows the user to cancel the stimulation by pressing the stimulation button until the control returns to normal milking mode.

Conductivity Warning Level Indicators and Pull Off

- The conductivity level is shown in two ways:

  1. The highest conductivity level in millisiemens recorded during the animals milking is shown on the LCD display;

  2. The conductivity level warning scale LEDs give a visual indication of the conductivity of the milk of the animal. If the conductivity level is less than or equal to the conductivity warning level, 3 combinations of LEDs display dependent upon the conductivity level. These are:

     2.1 - 1 green LED - conductivity level less than or equal to 1/3 of conductivity warning level;

     2.2 - 2 green LEDs - conductivity level less than or equal to 2/3 of conductivity warning level;

     2.3 - 2 green LEDs and 1 yellow LED - conductivity level between 2/3 of conductivity warning level and conductivity warning level;

- If the conductivity level is above the conductivity warning level but below the conductivity pull off level, 2 green LEDs and 2 yellow LEDs flash on the conductivity level warning scale LEDs. Further investigation of the animal is required to ascertain whether there is mastitis or another infection.
- If the conductivity level is above the conductivity pull off level, 2 green LEDs, 2 yellow LEDs and 1 red LED flash and the ACR ram removes the cluster from the animal. Further investigation of the animal is required to ascertain whether there is mastitis or another infection.
- If you are milking a mastitic animal, the conductivity warning level indicators can be turned off by pressing the Conductivity key. The conductivity LED will change to red to indicate this.

- If the user would like the conductivity warning level indicator, but not the cluster removed from the animal, set the conductivity pull off level to the maximum setting of 20.0 millisiemens.

Information about Milk Conductivity Measurement

The electrical conductivity of milk is an indication that there might be an infection within the animal (i.e. mastitis). Scientific research suggests that a healthy cow will have a conductivity measurement in the range of 4.0 to 5.5 millisiemens at 25°C. Therefore, an infection can be assumed at values above 5.5 millisiemens. However, this should be backed up by further testing such as the California Milk Test (CMT) to determine whether there is an infection that needs addressing.

It should be noted that the conductivity measurement provided on the milking point control is a guide and should be treated as such.

NB - The conductivity warning level and pull off level are user settable and therefore can be altered to suit individual farm requirements.

Animal Data

The MM20 Milking Point Control can display warnings and allow the user to edit flags against animals.

Animal Warnings

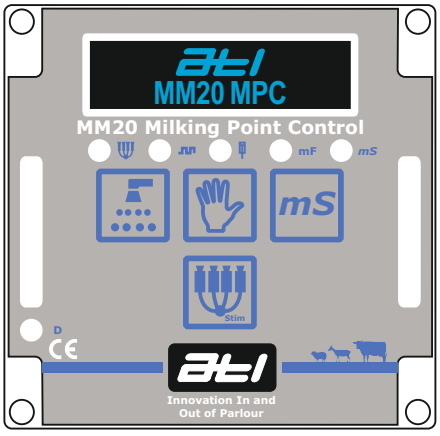
When the MM20 is linked to the ATL Micro M5 control, animal warnings can be displayed against an animal, the control will flash red led's along the side of the box and display the warning flashing between the animal number and the warning text, the user is required to press the Manual key to acknowledge the warning before being allowed to milk the animal.

Press the Manual key to scroll through the list of warning lockups until they are all acknowledged.

The Washing Procedure

- If the clusters are raised, press the manual key on all milking points to lower them, and then place them into the jetters.
- Press the System Wash key combination (Press the Wash key and the Manual key and hold for 2 seconds) to put the system into wash mode.

- The LCD display will show WASH, the elapsed wash time and the remaining wash time;
- The milking point control will remain in wash mode for the user set wash time period;
- At any point, the user can press the wash button to cancel the washing process;
- At the end of wash mode, the control will idle with all outputs off;
- We recommend that the parlour is cleaned by the circulation of milk stone remover at prevention strength on a weekly basis.



Monthly Routine Maintenance

- Visually inspect the MM10 control boxes for damage. Any damage will admit water causing the premature failure of the electronics and should be fixed as soon as possible;
- Inspect the vacuum lines from the control valve for contamination. Any contamination could indicate the ACR sensor diaphragm has failed;
- Check the Milk Meter flask is clean and there is no milk stone build up on the probes in the flask.

Six Monthly Routine Maintenance

- In addition to the above monthly checks, check the ACR ram and make sure it operates smoothly.

Yearly Routine Maintenance

- In addition to the above monthly and six monthly checks, we recommend replacement of the milk meter flask diaphragm, plunger seal, bottom seal, probe grommets, top nipple o-ring and shut-off valve diaphragm.
- Thoroughly inspect the control valve, making sure it is clean and operates correctly. Service as required.

Parlour Wash Down

- The MM10 control enclosure is IP65 rated. However, no indirect or direct pressure washing should be used to wash the MM10 control unit, as this will cause the seals to fail and water to ingress and damage the electronic components. Please note that water damage is not covered under warranty.

Checking the Calibration of the Milk Meter System

It is recommended that a Calibration Check is carried out on each Milk Meter annually.

To check the calibration follow the instructions on calibrating the milk meter on page 55.

The resulting relative error should be not more than +/-5%; if the error is more than this it will be necessary to re-calibrate the Milk Meter.

Milk Meter Calibration Check Form - SAMPLE

Milk Meter No.			Original Drop Value	
Reading No.	Scales - Kilogram	Scales - Litres*	Control - Litres	____
1	12.5	12.0	11.2	____
2	12.3	11.8	11.0	____
3	12.5	12.0	11.2	____
Total	37.3	35.8	33.4	____

A = Total Weighing Scale Readings (litres)

B = Total Control Readings (litres)

C = Ratio of A to B

D = Milk Meter Drop Value During Test

E = New Calculated Drop Value

A		B		C
35.8	divided by	33.4	equals	1.07
C		D		E
1.07	multiplied by	200	equals	214

* To convert the kilogram reading on the scales into litres please use the following formula:
Litres = Kilogram / 1.04

Milk Meter Calibration Form - PLEASE COPY AND USE

Milk Meter No.			Original Drop Value	
Reading No.	Scales - Kilogram	Scales - Litres*	Control - Litres	____
1				____
2				____
3				____
Total				____

A = Total Weighing Scale Readings (litres)

B = Total Control Readings (litres)

C = Ratio of A to B

D = Milk Meter Drop Value During Test

E = New Calculated Drop Value

A		B		C
	divided by		equals	
C		D		E
	times by		equals	

* To convert the kilogram reading on the scales into litres please use the following formula:
Litres = Kilogram / 1.04

Additional Items Required to Install a Milk Meter System

- 8mm ID PVC signal pipe (10mm OD nipple) to connect from auxiliary vacuum line to solenoid box. Length required installation dependent.
- 4mm ID PVC signal pipe (5mm OD nipple) to connect from solenoid box to shut-off valve.
- 4mm ID PVC signal pipe (5mm OD nipple) to connect from solenoid box to Milk Meter flask top nipple.
- 19mm ID milk tube for connection to the Milk Meter outlet.
- 15.5mm ID milk tube for connection to the Milk Meter inlet.
- Fixings to fix the Milk Meter flask to the parlour frame.
- Milk line inlets suitable for 19mm milk tube, if not already available.
- Conduit, mounting and cable for wiring to bringing power to the Milk Meter controls.
- If using an existing ACR ram and solenoid, the solenoid must be 12vDC (Consult ATL for other voltages).