Innovation In and
Out of Parlour

CR20 Milking Point Control Manual

Version - 1.1

Date - November 2016

Part Number - 39-2020

Index

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Manual Versions

Version 1.0 - April 2016.....FirstVersion of Manual (Software v3.01)

Version 1.1 - November 2016.....FirstVersion of Manual (Software v3.17)

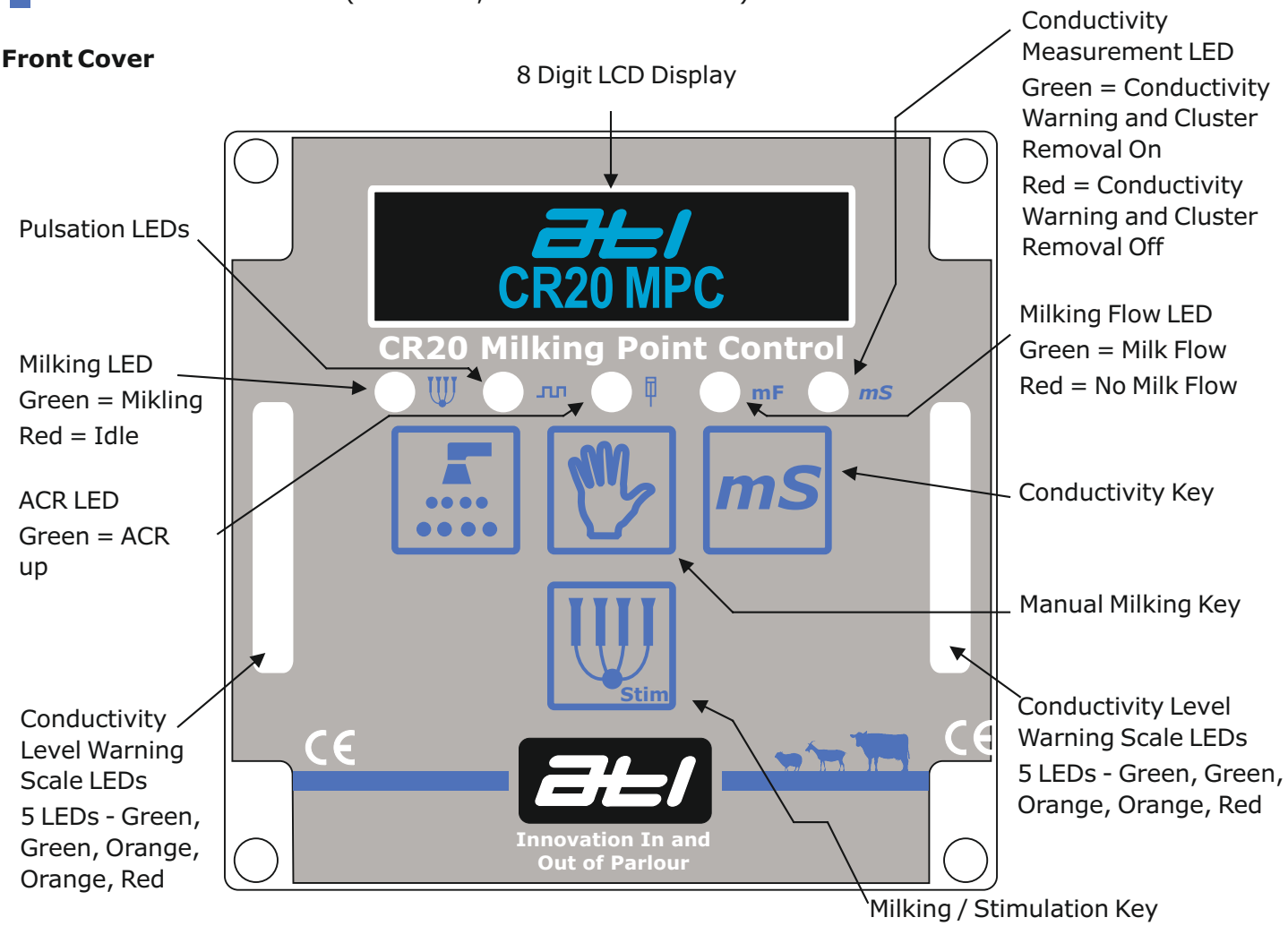
About the ACR Control

The CR20 Milking Point Control is one of the most useful additions to a milking parlour, allowing the operator to save time when milking. The ATL CR20 milking point control 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 milks conductivity;
- Colour bar graph display to indicate low to high conductivity at a glance;
- 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);
- Automatic idle after a user selectable period of inactivity;
- User programable wash time;
- User selectable conductivity warning and pull off levels;
- User selectable ACR pull off resistance and time;
- Simple bright display and warning lights;
- Pulsation control, with different ratios and frequency settings for milking and washing;
- 3 Stimulation modes (Automatic, Manual and disabled)

Front Cover

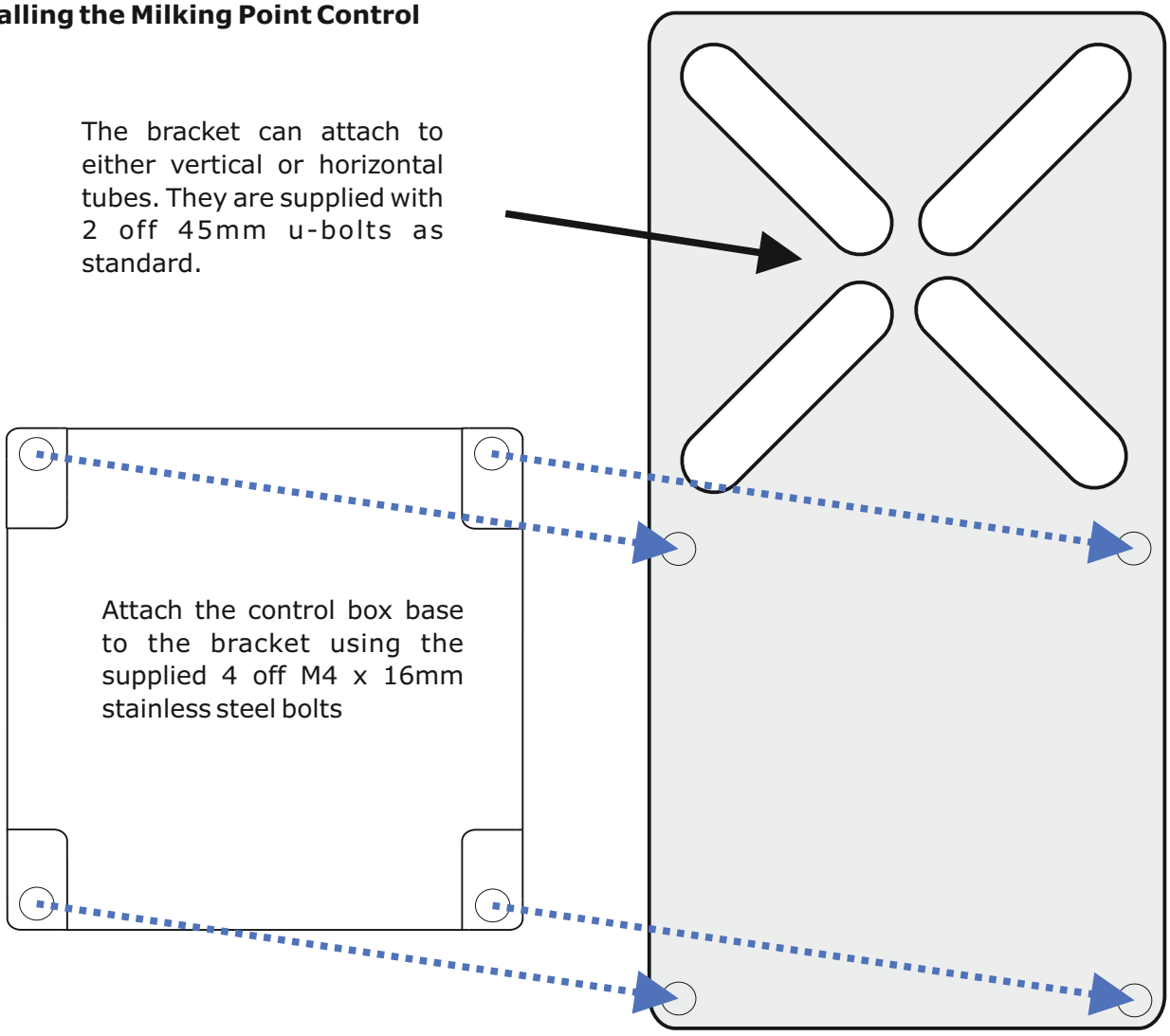


Installing the Sensor

The ACR sensor should be installed so that it is aligned correctly. The vertical alignment should match the picture shown above. If the sensor is not installed in this alignment, it will not function correctly.

Installing the Milking Point Control

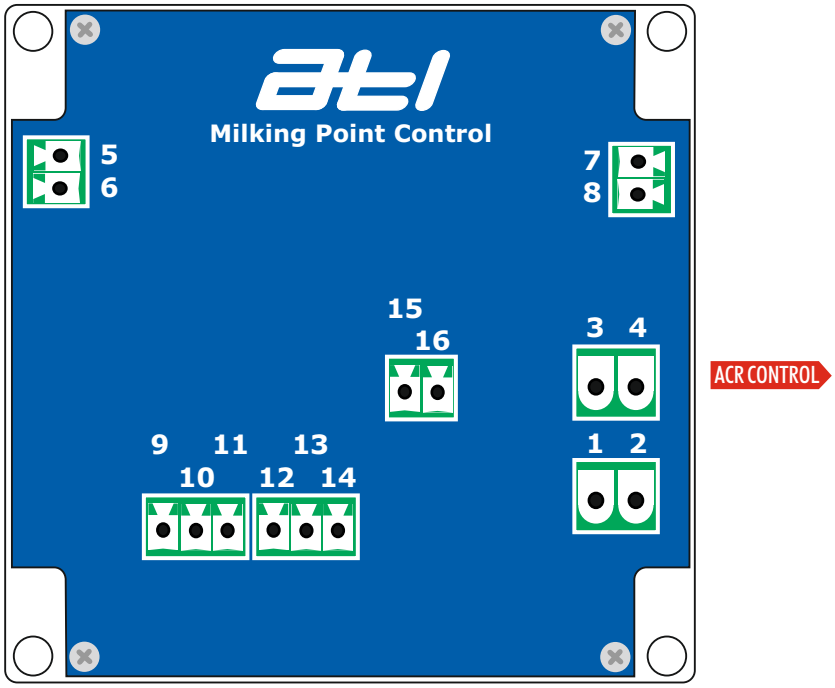
The bracket can attach to either vertical or horizontal tubes. They are supplied with 2 off 45mm u-bolts as standard.



Attach the control box base to the bracket using the supplied 4 off M4 x 16mm stainless steel bolts

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	Auto Start Ram -	Factory Fitted to Auto Start Ram
6	Auto Start Ram +	Factory Fitted to Auto Start Ram
7	ACR Sensor +	Factory Fitted to ACR Sensor
8	ACR Sensor -	Factory Fitted to ACR Sensor
9	ACR Solenoid -12vDC	Factory Fitted to Control Valve
10	ACR & Shut Off Valve Solenoid +12vDC	Factory Fitted to Control Valve
11	Shut Off Valve Solenoid -12vDC	Factory Fitted to Control Valve
12	Pulsation Solenoid Channel 1 -12vDC	Factory Fitted to Control Valve
13	Pulsation Solenoids +12vDC	Factory Fitted to Control Valve
14	Pulsation Solenoid Channel 2 -12vDC	Factory Fitted to Control Valve
15	+ve Supply for Auto Start Ram	Minimum 0.5mm² 0.5A cable
16	-ve Supply for Auto Start Ram	Minimum 0.5mm² 0.5A cable

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

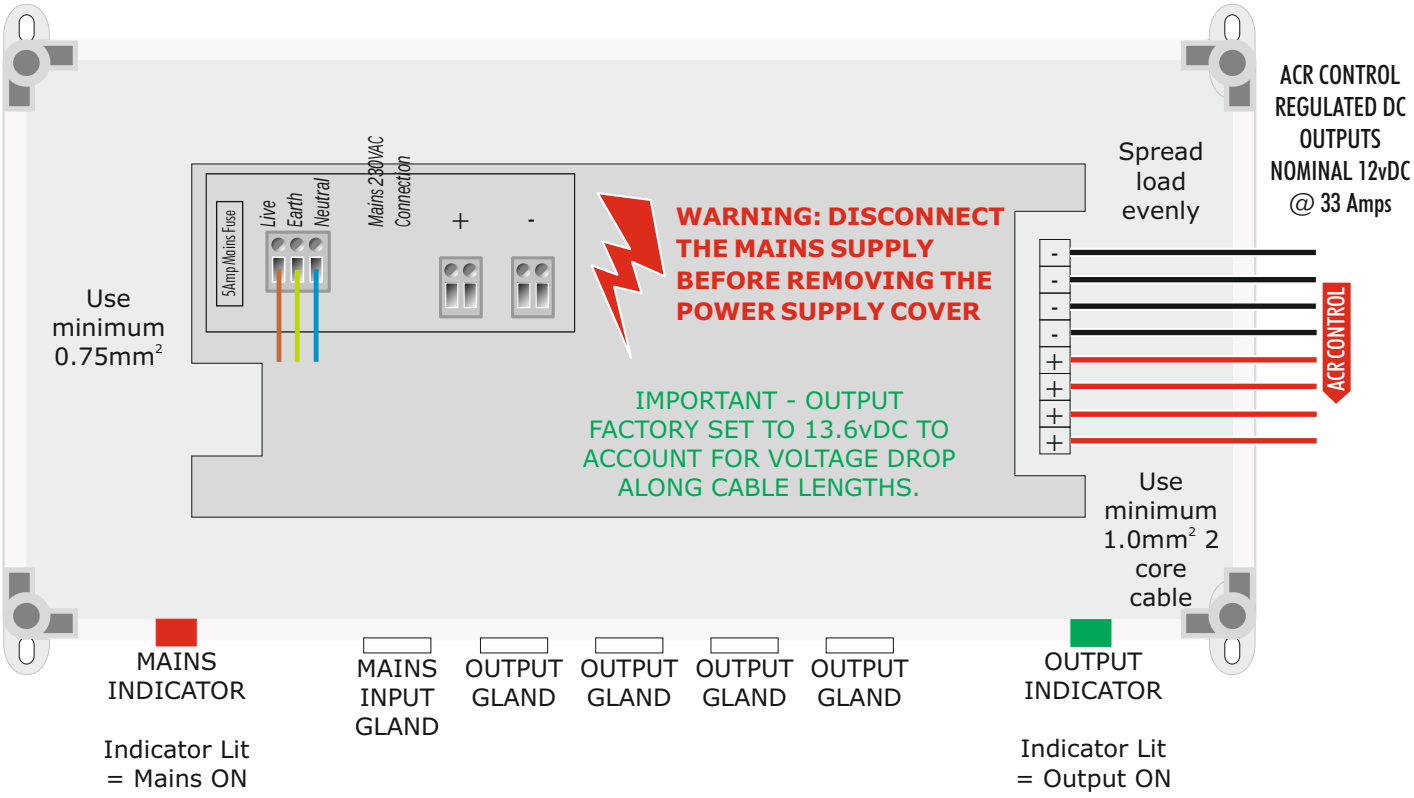
Switch Mode Power Supply Wiring Connections

- 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 Interpuls CV20 ACR Valve: 60

  Maximum Number Of Milking Point Controls With Interpuls CV20 ACR Valve & 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 ACR 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.

System Wiring Overview

To ACR controls no. 11-20

To ACR controls no. 21-30

ACR Control Point 10

ACR Control Point 9

ACR Control Point 8

ACR Control Point 7

ACR Control Point 5

ACR Control Point 4

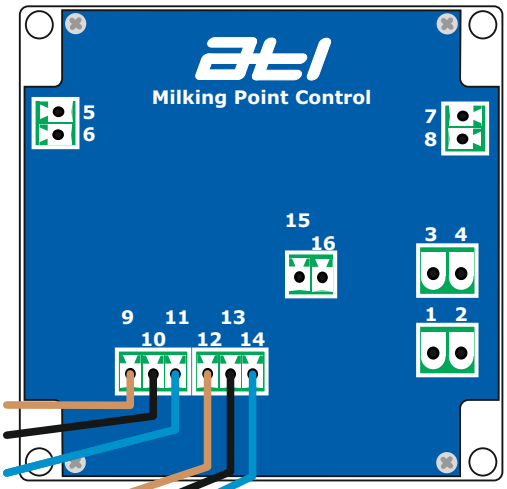
ACR Control Point 3

ACR Control Point 2

ACR Control Point 1

396W Switch Mode Power Supply

NB - The 12vDC power cable is daisy chained between the ACR controls.



Interpuls Cv20 Wiring

ACR & Shut Off	Brown	-12vDC
	Black Common	+12vDC
	Blue	-12vDC
Pulsation	Brown	-12vDC
	Black Common	+12vDC
	Blue	-12vDC

ACR Sensor and Shut-Off Valve

ACR Control Point 6

Auto-Start ACR Ram

Control Valve

Pulsation Valve

To Shut-Off Valve in Sensor

To ACR Ram

Pulse 2

Pulse 1

Setting up the Milking Point Control

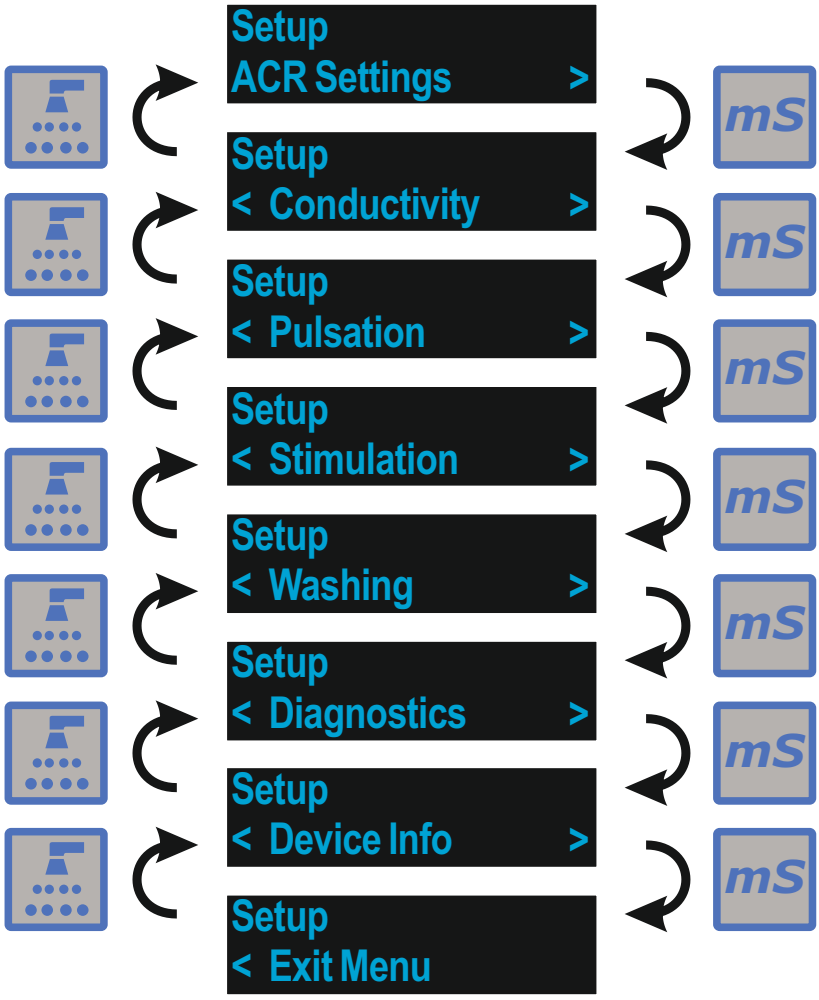
Before it can be used, the milking point control system must be setup. This is outlined in the following pages:

Accessing the Settings

Press and hold the Wash and Milk keys together first and then press the Conductivity key, whilst holding the Wash and Milk keys.

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.



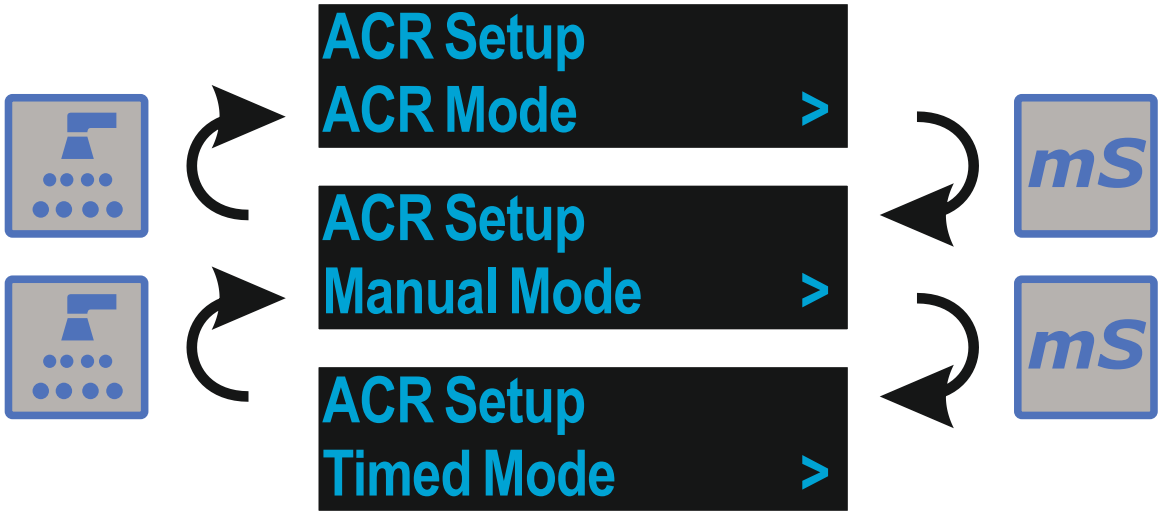
Pressing the Milk key when on a menu item will allow the user to edit the menu items in that item.

The ACR Settings Menu

The ACR settings menu contains the settings for how the control will function as an ACR. There are 10 settings, each listed in the following pages;

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.



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 ACR pull off resistance setting is now displayed.

The ACR Pull Off Timer Setting (Visible only when the Milking Mode is ACR)

The ACR pull off timer setting lets the user specify the length of time the resistance must be above the ACR pull off resistance setting before the ACR is activated. The range is from 1 second to 30 seconds.

The factory default is 6 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 ACR pull off resistance function is now displayed.

The ACR Pull Off Resistance Setting (Visible only when the Milking Mode is ACR)

The ACR pull off resistance setting lets the user specify the maximum resistance that the milk is allowed to be before the ACR pull off timer is activated. If the resistance goes above the value and then falls back below, the ACR pull off timer is reset. The range is from 25 ohms to 999 ohms. The factory default is 500 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 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 delays 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 diable 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 start in wash setting is displayed.

The Purge Hold Off Setting

This setting is only displayed if the purge setting is ON. 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

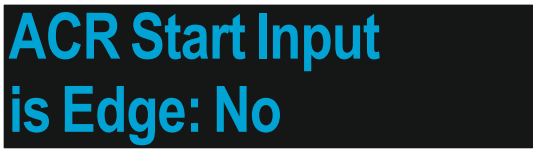
Press the Wash key to decrease the time 
Hold the Wash key to decrease in 10s

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 diable 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

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

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 conductivity pull off function is now displayed.

The Conductivity Pull Off Level Setting

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 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 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 9 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 diable 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

The pulsation type setting is the allows the control to be set to alternate or simultaneous pulsation. The factory default is alternate. Press either the Wash or Conductivity 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

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 diable 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

The pulsation frequency setting controls the frequency of the pulsation during milking. 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

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 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 for channel 2 is now displayed.

The Pulsation Ratio 2 Setting

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 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 frequency is now displayed.

The Wash Pulsation Frequency Setting

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

The wash pulsation ratio 2 setting controls the ratio of channel 2'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 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 2 ratio is now displayed.

The Wash Pulsation Ratio 2 Setting

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 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 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 9 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 diable 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

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 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. 

The automatic stimulation initial delay function is now displayed.

The Automatic Stimulation Initial Delay Setting

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 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 increment interval is now displayed.

The Stimulation Increment Interval Setting

The stimulation increment interval setting controls the time take 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

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

The stimulation time setting is now displayed.

The Stimulation Time Setting

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 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 maximum multiplier is now displayed.

The Stimulation Maximum Multiplier Setting

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

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.

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 1 is now displayed.

The Stimulation Pulsation Ratio 1 Setting

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 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 2 is now displayed.

The Stimulation Pulsation Ratio 2 Setting

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 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 main menu item is now displayed.

The Wash Settings Menu

The Wash settings menu contains the settings for the stimulation 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 import is recieved from the user, this allows the system to turn off unwanted outputs when the parlour is not running, this saving energy. The factory default is 15 minutes.

Press the Conductivity key to increase the value 10s

Hold the Conductivity key to increase in

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 main menu item is now displayed.

The Wash Time Setting

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

Press the Conductivity key to increase the value 10s

Hold the Conductivity key to increase in

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 start in wash setting is now displayed.

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 without the need to an input, 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.

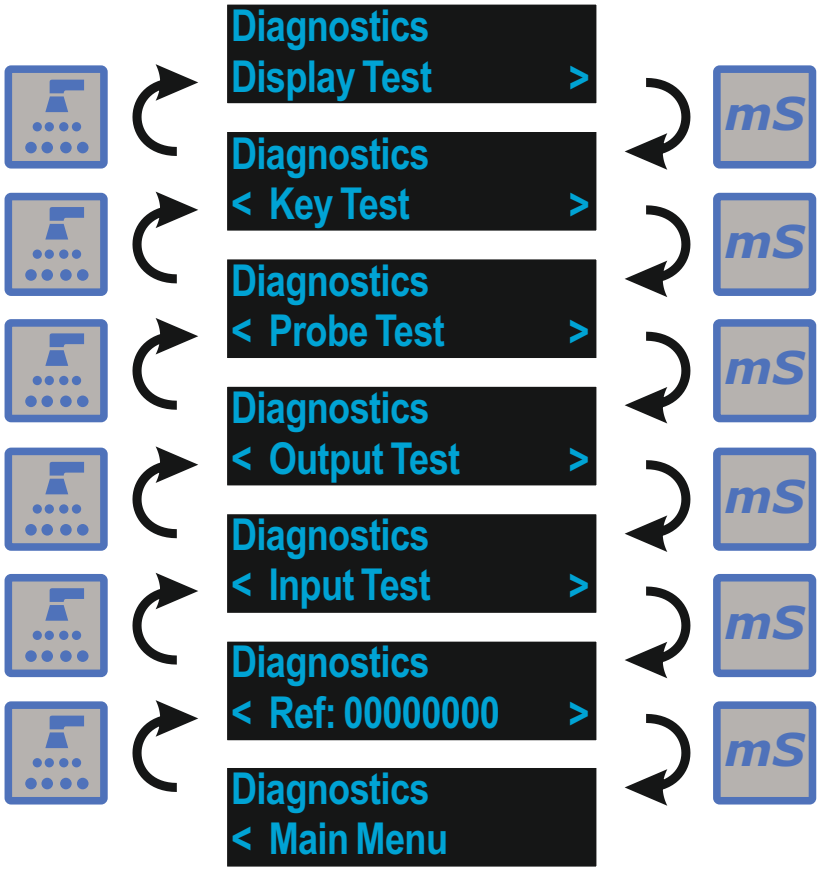
Press the Wash key to diable the setting.

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

The wash main menu item is now displayed.

The Diagnostics Menu

The diagnostics menu allows the user to diagnose issues with the control, there are 7 menu items;



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

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 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.

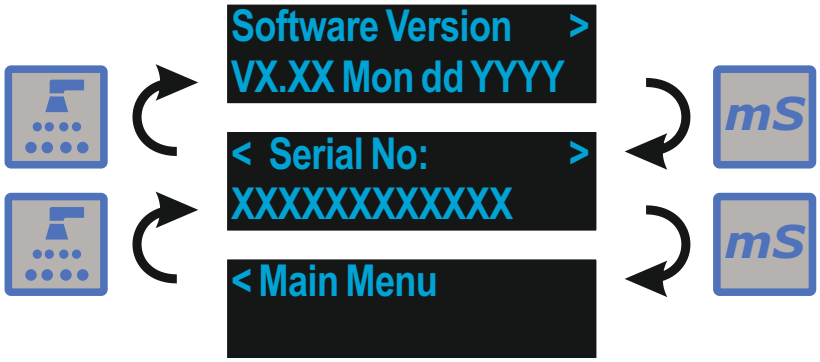
The Input Test Diagnostics Menu Item

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.

Using the ACR 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 (When in Automatic ACR mode with conductivity enabled)

- Press the milking key to start milking in automatic mode;
- The LCD display will cycle between the milking mode, the milking time and the conductivity value;
- 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 automatically 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 manual key. The ACR control will then continue in manual mode until the user manually finishes the milking.

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.

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.
- To put the ACR control into wash mode, by pressing the wash key. Carry this out on all milking points.

- 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 ACR 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 ACR sensor is clean and there is no milk stone build up on the steel rings in the ACR sensor.

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 ACR sensor diaphragm.
- Thoroughly inspect the control valve, making sure it is clean and operates correctly. Service as required.

Parlour Wash Down

- The ACR control enclosure is IP65 rated. However, no indirect or direct pressure washing should be used to wash the ACR 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.

Additional Items Required to Install ACR System

- 8mm ID PVC signal pipe (10mm OD nipple) to connect from control valve to ACR sensor / shut-off valve and from control valve to ACR ram. Length required installation dependent.
- 19mm milk tube for connection to the ACR sensor. The ACR sensor has 21mm OD inlet and outlets.
- Fixings to fix the ACR sensor 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 ACR controls.
- If using an existing ACR ram and solenoid, the solenoid must be 12vDC, otherwise an automotive relay will be required (P/N 16-1048).