INSTALLATION MANUAL

NZ TEATWAND EXACT V4

VERSION 4.1
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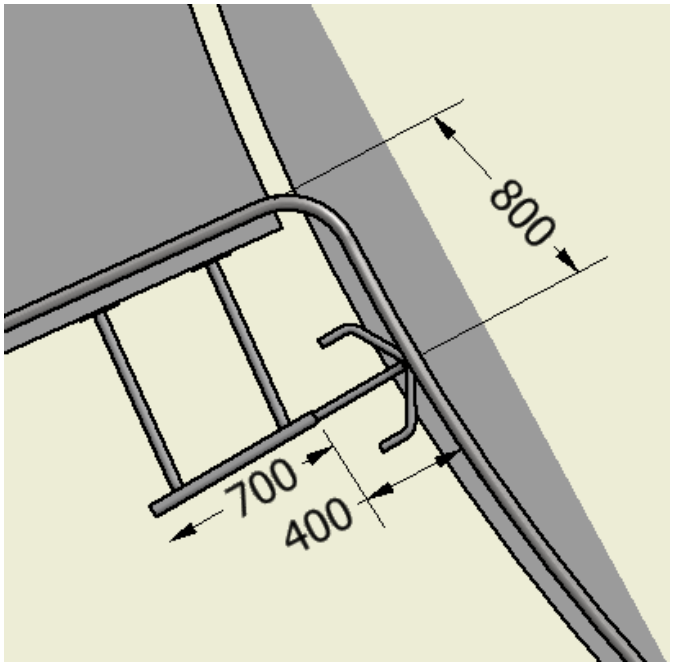
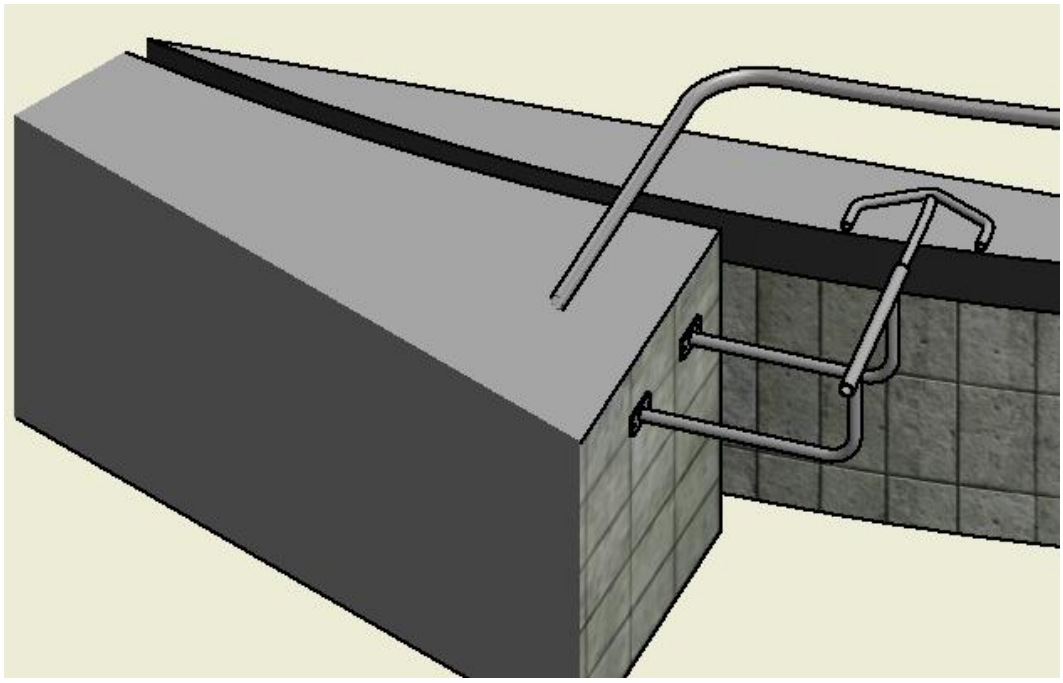
Teatwand™ Mounting

Support stand.

There are various ways of making a stand and sometimes it is very location specific as there are many different configurations in shed setups. The following section sets out the ideal setup for the Teatwand™ Exact, follow this as close as possible to get maximum effect from the Teatwand™ system.





To ensure good teat spray coverage the Teatwand™ should be mounted approximately one bail width from the exit (approx. 800mm see Appendix E.) This avoids spraying the last bail position as often the cow becomes restless prior to exit.

Looking at the Teatwand™ from behind it should be in line with the leg spreaders which may or may not be mounted on an angle on the platform (see pictures below for installation examples).

The above Teatwand™ support stand is made up of a top rail and two 90^{o} support posts. Ensure the Teatwand™ looks down the line of the bail divider.

The top rail is 600mm long and made from 32NB (approx. 40mm OD) galvanised pipe. The 90^{o} posts are also 32NB galvanised pipe. This top rail is fitted at approximately 125mm above the rotary platform. The Teatwand™ is attached to the top rail with 2 x 32mm clamps which support 2 x 5/8 stainless steel rods attached to 2 x 150mm clamps as shown. The stainless steel rods are cut at a length to have the overall height of the nozzle at 250mm above the rotary platform.

The front of the Teatwand™ (nozzle) should be initially positioned at the edge of the platform. This maximizes the distance the Teatwand™ can travel under the udder (500mm).

The guard

On many platforms a guard is necessary to deflect the Long Milk Tubes (LMT) or the ACR cord on a Milfos drop down cluster dairy. This guard can easily be incorporated as part of the support stand, as above. The inner rail for the guard is made of 25NB galv pipe which is inserted into the 32NB top rail.

Drill a hole in the top rail and weld a nut so that a bolt can be screwed into the top rail to secure the guard. The front of the guard rail is 700mm 25NB galv pipe bent to approx 90 degrees with two tails.

The inner guard rail may be bent upwards at the end as pictured to avoid being snagged and to better deflect the LMTs. Ensure that the Teatwand™ can travel freely above the guard so that the square section when fully extended does not catch on the guard. The front of the guard is positioned at the edge of the platform.

Teatwand™ position

The Teatwand™ should be mounted with the nozzle as close as possible to the edge of the platform without getting caught up when it moves past. The further in towards the centre of the platform the better as this will give a better coverage of the cow's teats.

Ensure the two 5/8 stainless steel rods are cut to the correct length to achieve the recommended 250mm nozzle height.

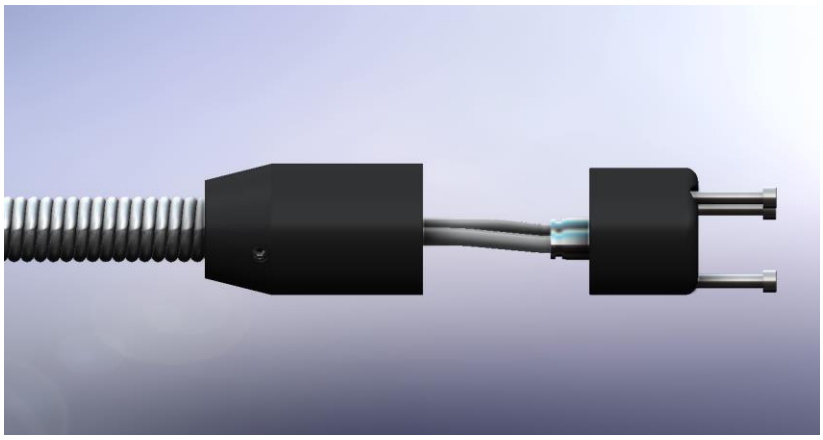
Teat spray hose guide Support Bracket

The Teat spray hose guide Support Bracket must be fitted to the rear end of the Teatwand™ to guide and support the 8mm lines correctly where it enters the rear of the Teatwand™. This bracket is supplied with the kit and clamps onto the backend of the Teatwand™ body.

Fitting the Teatwand™ Spray Hoses.

- Remove 3 cap screws from Nozzle Holder using a 5mm Allen key.

Figure 9



- Remove Spray Hoses from the push fit fittings in the back of the Nozzle Holder.
- Pull the old Spray Hoses through Teatwand™ from the Rear Pinch Guard.
- Unplug Spray Hoses from 8mm Unions between the back of the Teatwand™ and the Spray Solenoid Assembly
- Take 2 new Spray Hoses 3m long.
- Fully retract the Teatwand™.
- Fit the 2 hoses through the spring and through Teatwand™ taking care not to twist. There will be some resistance as the hoses are pushed through the Teatwand™ inner guard.

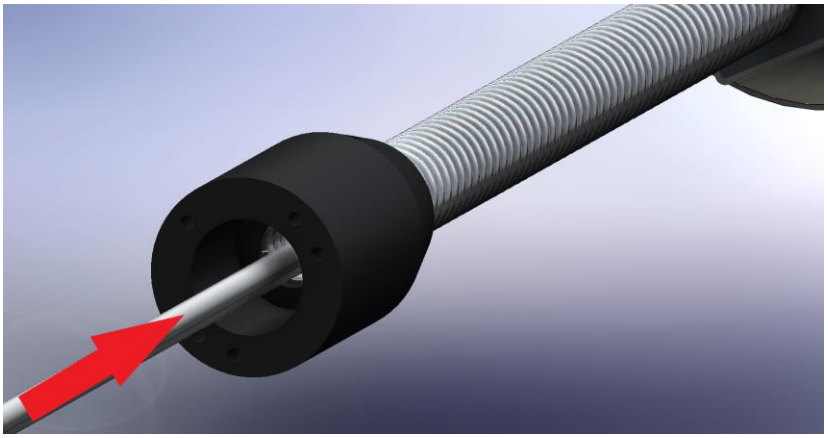


Figure 10

- Push the 2 hoses right through the Teatwand™ until they appear through the Pinch Guard on the rear plate of the Teatwand™. Pull the 2 hoses through the Teatwand™ leaving about 200mm at the nozzle end.
- Plug the hoses into the push fittings in the Nozzle Holder. Take care not to twist the hoses.

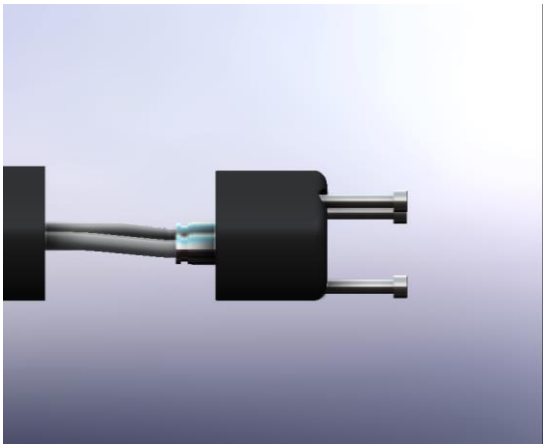


Figure 11

- Refit the Nozzle Holder using the 3 cap screws.
- Thread the hoses through the eyelet on the Rear Hose Guide and plug them back into the 8mm Unions.

Go to the Manual Controls page on the touchscreen and use the Spray Forward and the Spray Backward Nozzle buttons to purge teat spray through the hoses to the nozzles.

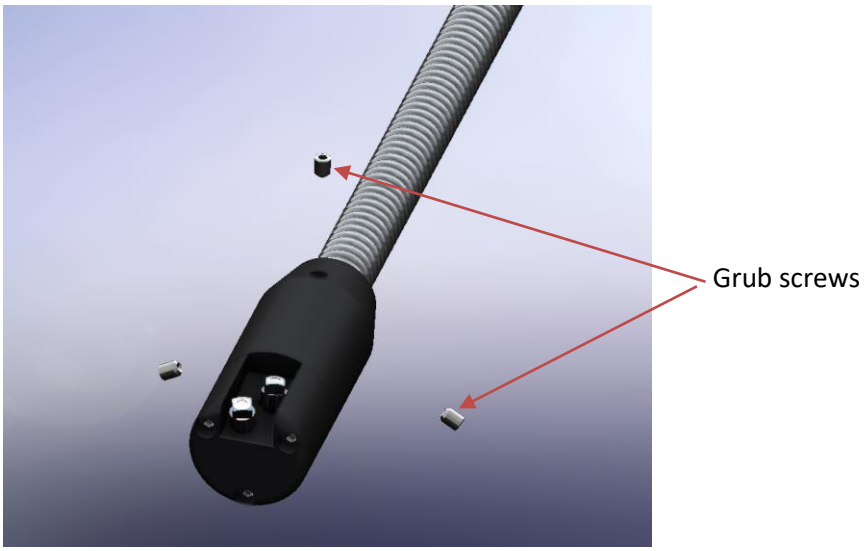
Check Nozzles spray pattern

- Nozzles have a 60 degree full cone spray pattern.
- Uneven spray pattern will require the cleaning or replacement of the nozzle.
- To clean nozzle – Remove from Nozzle Head – soak nozzles in hot water, use compressed air to blow through the nozzle from both directions, NEVER USE A SHARP OBJECT IN THE NOZZLE APERTURE. This will result in permanent damage to the nozzle.
- Refit nozzle. Take care not to cross thread the nozzle in the plastic Nozzle Head. This will result in permanent damage to the Nozzle Holder.

Adjusting the Nozzles to Vertical

From new the spring will relax causing the nozzle head to rotate a few degrees, adjustment will be required during the first 2 weeks from new or after fitting a new spring

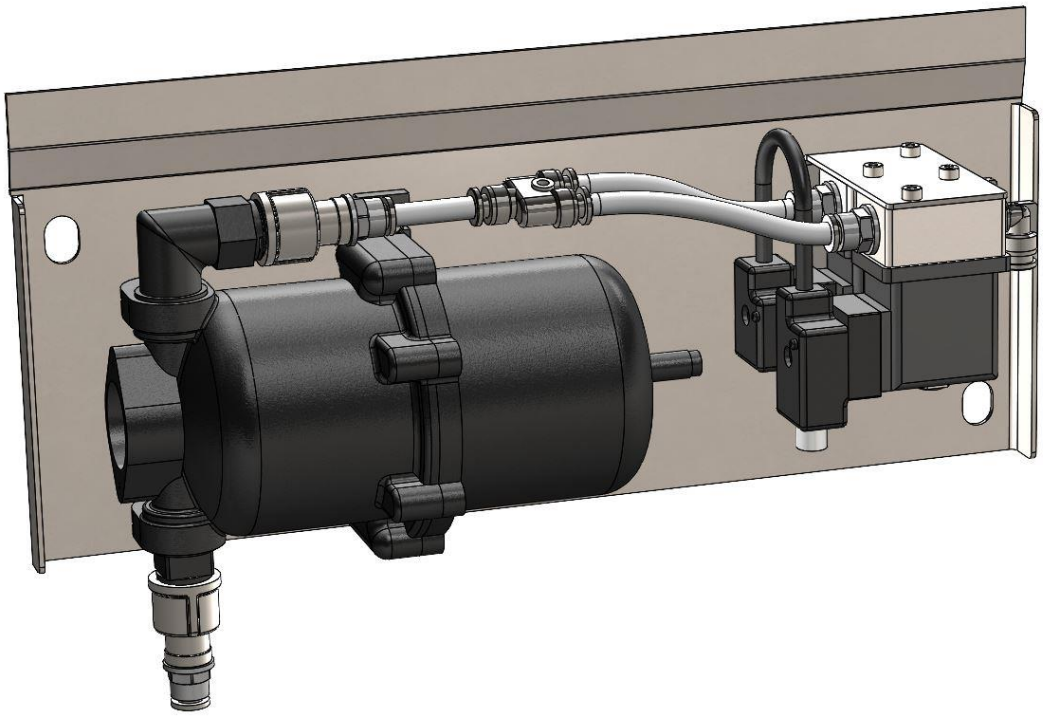
- Loosen the 3 grub screws that secure the nozzle head to the spring.
- Rotate Nozzle Head to vertical.
- Tighten grub screws.



Spray Solenoid Installation.

The Spray Solenoid assembly is mounted on the side of the bridge close to the teat sprayer

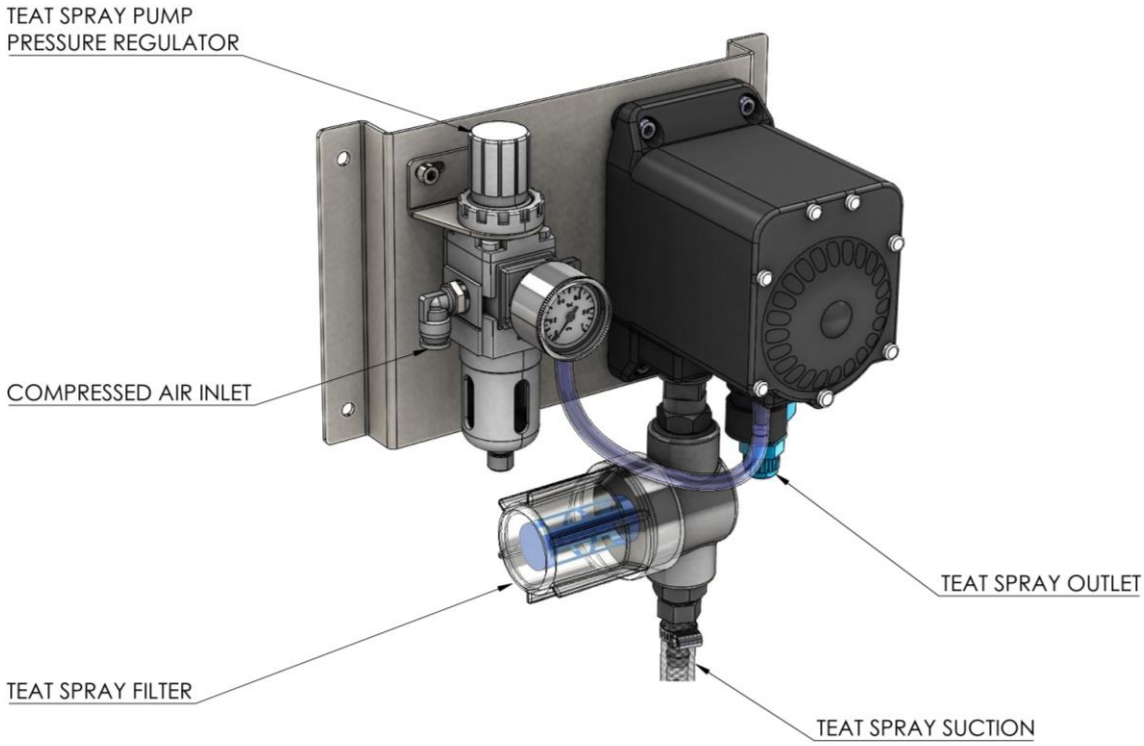
using 2 x 10mm masonry anchors. This assembly houses two 24Vdc spray solenoids (one for forward spray and one for reverse spray) and an accumulator to keep the pressure constant. The inlet hose connects to the 8mm push fit fitting on the accumulator and the teat spray hoses onto the solenoids. The inlet is fed by the pump with 8mm teat spray hose (thesameas the air hosing). Connect two 8mm clear teat spray lines to the outlet of Teatspray out solenoids and connect this using a straight union to the teat spray hoses to the back of the Teatwand™.



There is a cover that simply slides over this assembly (not shown) it has enclosed sides and is open at the bottom to allow for the spray hoses and the solenoid cable to exit the unit.

Teat Spray Pump Assembly.

- Air supply to regulator is required, 8mm line or ¼'' threaded fitting.
- Install above or close to the teat spray vessel.
- The pump will draw teat spray vertically from a maximum of 5m.
- Air pressure minimum 20psi maximum 100psi.
- For standard Nozzles pressure will be between 35-65 PSI.
- Higher pressure results in more spray being applied.



Fit the Touchscreen/Power Supply

A 240/110V to 24VDC power supply
is located in the touchscreen enclosure.

Position the Touchscreen/Power Supply on a wall nearby away from high pressure wash areas. Consult with the local Dairyman for location.

Refer to Appendix C for a larger drawing.

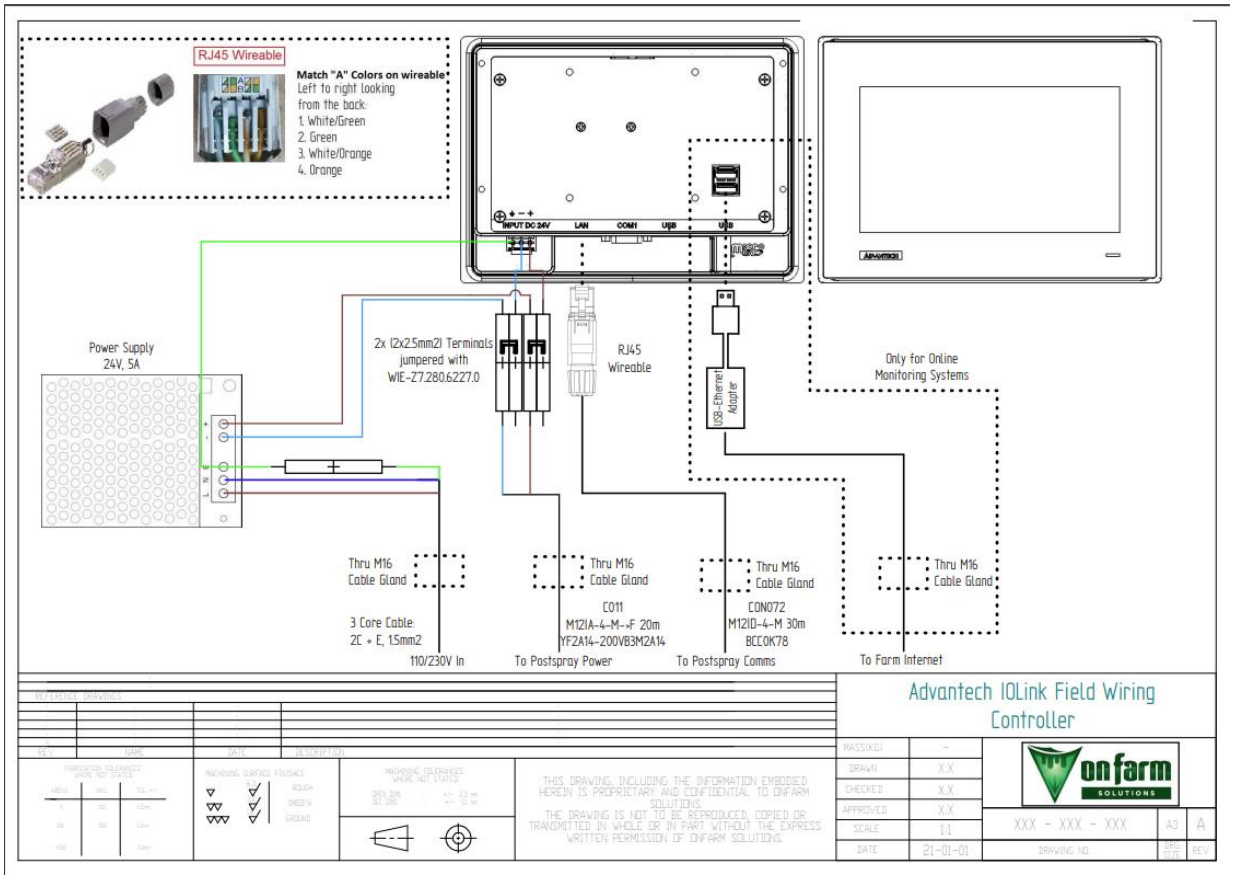


Figure 7

Cabling.

Solenoids and Sensors are connected to the I/O Link in the Controls Cabinet with pre-made cables.

Cables supplied with a Single System.

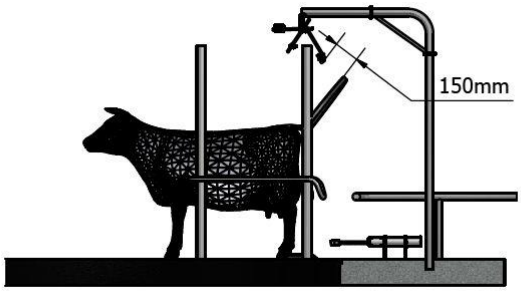
1. Extend Solenoid Cable - *C007* x 1. Extend Solenoid
2. M12 T Coupler – *C023* x 2. Fitted to the I/O Link.
3. Y Cable M12 to 2 x M12 plugs 3m – *C006* x 1 Stall sensors
4. Sensor cable 5m – *C010* x 3. Cow sensor, Cup sensor, Cow Position sensor.
5. Sensor cable 0.6m – *C022* x 2. Euro System only. I/O Link to Spray Solenoids
6. Sensor cable 5m – *C010* x 2 NZ System only. I/O Link to Spray Solenoids
7. Sensor cable 20m – *C011* x 1. From I/O Link to touch screen.
8. Sensor cable 20m – *C011* x 1 Euro System only. Stall sensors in basement.
9. Wireable RJ45 Plug – *CON071* x 1. Connect Ethernet cable to touchscreen.
10. M12 Single Ended Ethernet cable 30m – *CON072* x 1. I/O Link to touchscreen.

For a double system, cables 1 to 6 are supplied. Use cable no.6 to go between I/O links on post and pre.

Also supplied for a double system.

1. M12 T Coupler – *C023* x 1. I/O Link power connection between pre and post.
2. Sensor cable 0.6m – *C022* x 1. I/O link to T Coupler.

THE HOCKEY STICK.



The "hockey stick" is made from a length of 40mmNB galv pipe bent at right angles. The vertical section is best mounted either attached to the bridge or to the rear Teatwand™ right angle support post. Ideally this is about 1 m away from the edge of the platform**. It must be mounted in such a way that it is independent of any other railing (such as the bum rail) or support posts so that any vibration from these areas are not transferred to the hockey stick. The hockey stick supports the distribution board and sensors and any vibration will affect their operation.** The horizontal section of the hockey stick is best supported to the roof to give it stability (this is best supported at the end of the horizontal section). It may require further support if necessary.

The end of the horizontal section of the hockey stick which holds the sensor bracket is positioned so that it is at the centre point of the 3 key sensing points (i.e. cow, bail and cup as described below). The best way to determine this position is to move the platform so that the Teatwand™ is in line with the leading edge of the leg spreader. It is at this point that all 3 sensors need to be activated.

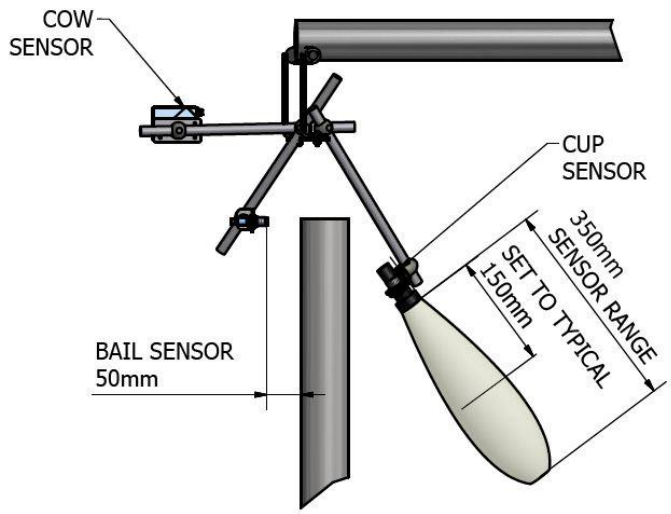
A 25mm cross bar about 800mm long is welded to the top of the end of the horizontal section and this cross bar holds the sensor bracket assembly.

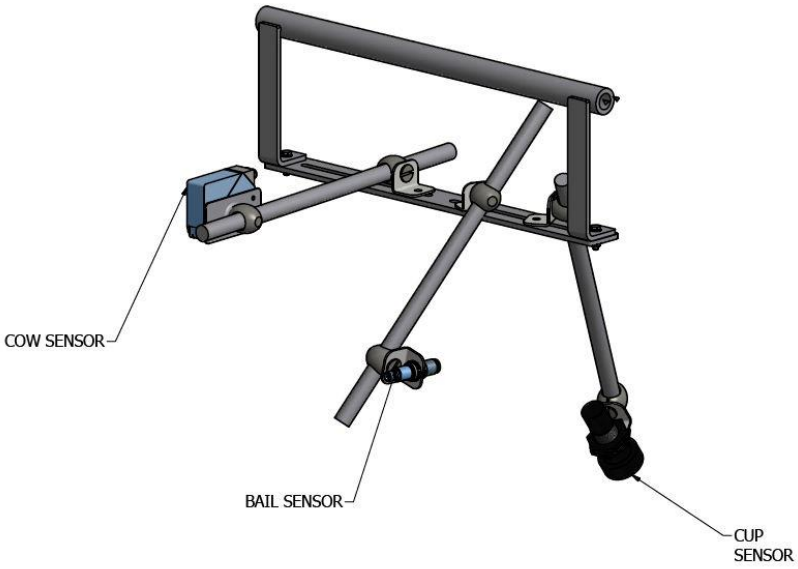
The cow position sensor bracket is mounted approximately half way down the vertical section of the hockey stick at an appropriate height to position the sensor just above the bum rail height so the sensor is pointing slightly downwards to the back end of the cow.

Appropriate 25 mm holes are drilled into the hockey stick to route the wiring for the various connections. There are usually two 25mm holes to be drilled- the cow/cup and bail sensor cables goes through the open end of the horizontal portion of the hockey stick and exits through a 25mm hole near the distribution board (ii) The cow position sensor cable is drilled just below the support bracket and goes up the horizontal pipe to exit just below the distribution board.

Sensor Installation.

The following graphics show examples of how the sensors can be mounted.





Sensor mounting.

Using the sensor bracket assembly.

Bail Sensors.

These sensors are photoeyes and will detect anything up to 200mm away. Two sensors are used side by side to determine the direction the rotary is moving.
The first sensor to be activated as the rotary is going forward is the Pre-Bail Sensor the second sensor is the Bail Sensor; this is the trigger that activates the Teatwand™™ Exact spray sequence.

IMPORTANT:

- Bail Sensors need to sense a point that is constant on every bail.
- These sensors must be activated only once per bail. Any unintended signal from pipework, hoses etc. will result in a sequence being activated at the wrong time causing possible damage to either the Teatwand™™ or equipment on the rotary.
- They must be mounted in such a way to allow for adjustment as they are used to fine tune the timing of the Teatwand™ Exact sequence.
- In most cases, these sensors can be mounted using the sensor bracket assembly to look at high framework on top of the rotary above the cows. Often they will be set up to detect 'Protrac' tags or the top of ACR rams.
- Where there is no high framework on the platform for the bail sensors to detect the sensors will need to be mounted in the basement. Tags or brackets may need to be fitted to the rotary for these sensors to detect.

Locating the Bail Sensors.

- Stop the platform at any bail in the exact position where the Teatwand™ will activate, that is where the Teatwand™ will extend over the first ridge of the legspreader.
- Using the mounting brackets supplied position the bail sensor to detect the tag or ACR ram. The sensors should be 25mm away from the object being detected and mounted to allow for adjustment. As these are the trigger that initiate a spray sequence there will be fine tuning required during commissioning.

This example shows sensors mounted above the cows detecting a metal tag close to the ACR ram.

This example shows a metal bracket fitted to the rotary and an angle iron bracket mounted to the concrete wall of the basement with the sensors mounted off that.

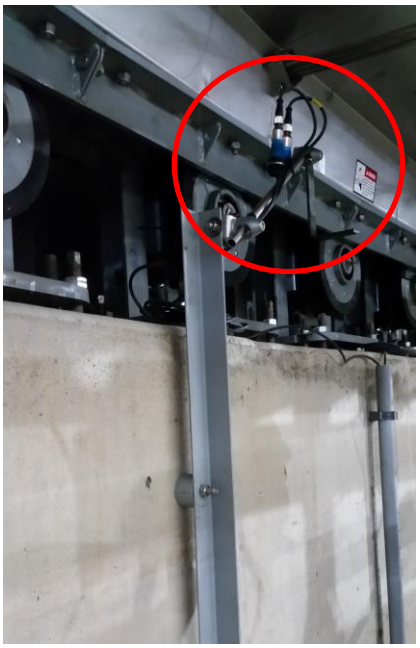


Figure 10

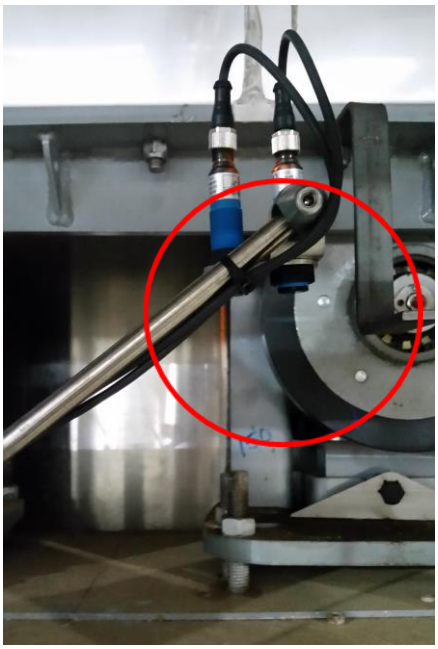
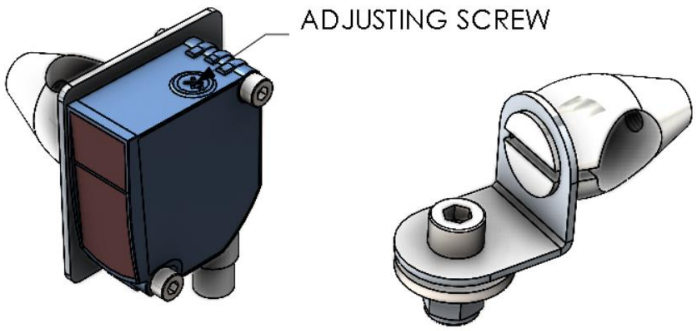


Figure 11

Cow Sensor.

This is a Digital Laser sensor that emits a red laser dot.
It has adjustment to set a maximum distance it will sense. Mounted on the Sensor Bracket it looks down into the stall to sense there is a cow. The Cow sensor must be sensing a cow when the stall sensor is triggered for the spray sequence to start.



To set up the Cow Sensor.

With the sensor plugged in and powered on there will be a green LED lit and there will be a red laser dot at the end of the beam. When the sensor is actively sensing something 2 orange LED's are lit either side of the green LED. The aim is to set the distance the sensor is detecting at about 500mm above the platform surface. Adjusting it clockwise increases the distance detected.

- Point the red dot at the surface of the platform, if the orange LED's are lit this means the sensor is detecting the platform. If the orange LED's are not lit turn the adjusting screw clockwise until the orange LED's are lit.
- Turn the adjusting screw counterclockwise until the orange LED's go out and continue to turn counterclockwise for half a turn.
- Place a hand or object about 500mm above the surface of the platform and check to see where the sensor detects it.

Note: This sensor must look at the hips of the cow (i.e. the widest part of the animal) and when the bail sensor turns on must be directed at the middle of the two hips.

Cluster/Cup Sensor.

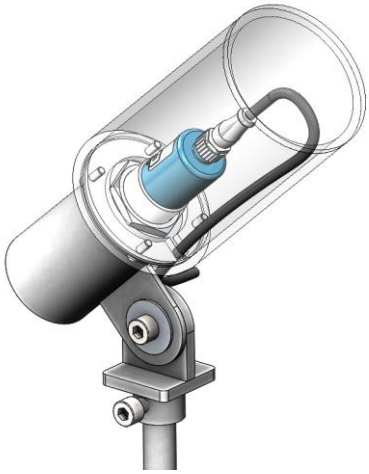
The purpose of this sensor is to detect if the cluster is attached to the cow. In some cases, there will be cows doing a second lap on the rotary in which case this sensor will detect the status of the cluster and deter a spray sequence if they are still attached. Many will have Position Take Off of the cluster and cows never do a second lap in these cases this sensor should be bypassed in the Manual Controls page on the touchscreen.

The LED screen on the side of the sensor indicates distance from the sensor to the object being detected. Adjust sensor to be 250mm from the target.

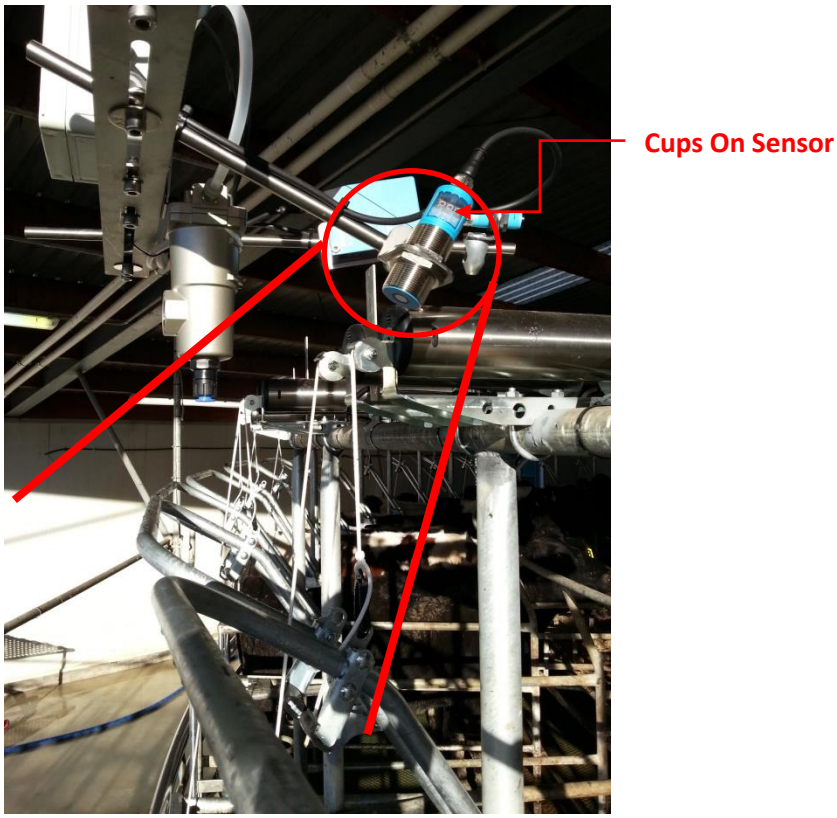
To reset this sensor to the factory settings, remove the plug from the sensor, hold down 'T1' button, refit plug, continue holding 'T1' for about 15s until "rESEt'' has passed through the screen.

This set up is used when detecting ACR stall gates

This set up is used when detecting the cups hanging up.



Note: The sensor should be positioned so it is aimed at the middle of the retention bar when the bail sensor turns on.



There is the ability to 'latch' this sensor, so it can be set up to detect the retention bars or the cluster hanging up earlier and from the moment of detection it can be latched for an adjustable period of time. This improves reliability when retention bars are damaged or the clusters are hung randomly. How to initiate the 'latch' is covered in the **Sensor Setup page.**

Cow Distance Sensor

This sensor is used to sense the cows' position in the bail. There are 3 positions used, Near. Mid and Far Cow. This allows fine tuning of the spray sequence start so that the spray starts only when it needs to i.e. for a far cow there is a delay before the spray starts. It is best mounted on a bracket attached to the vertical section of the hockey stick (which ideally is situated about 1m back from the edge of the platform), about 200mm above the rump rail height. The maximum range of the sensor is 5m.

Teatwand™ IO Link & Water Separator Installation

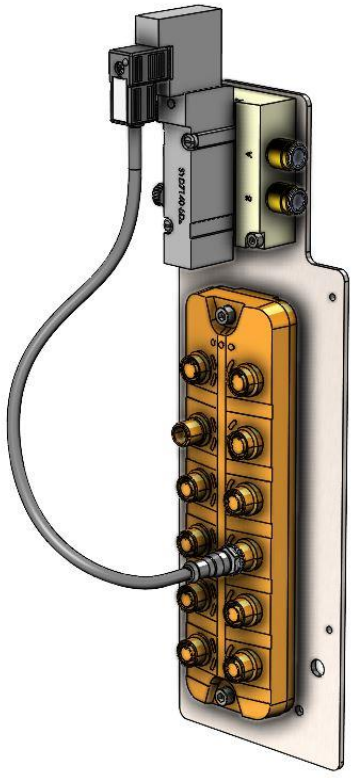
The Teatwand™ IO Link, Teatwand Extend Solenoid and water separator are mounted on towards the top of the vertical section of the hockey stick. The IO Link is where the solenoid and sensor cables connect.

The Cow and Cup sensors are connected using one of the Y cables. See appendix A.

The Pre-Bail and Bail sensors are connected using the other Y cable. See appendix A.

The Spray solenoids are connected using 2 x 5m M12 to M12 cables to each spray solenoid. See appendix A.

The Extend solenoid is connected using the 150mm M12 cable to solenoid plug as shown in the picture below.



The Water Separator fits to the bottom of this bracket. 8mm airline connects to the inlet of the water separator, supplied from the compressor via an 8mm T-union. Connect the outlet of the water separator to port 'P' of the Extend Solenoid (between the speed control valves).

Navigating the Touchscreen.

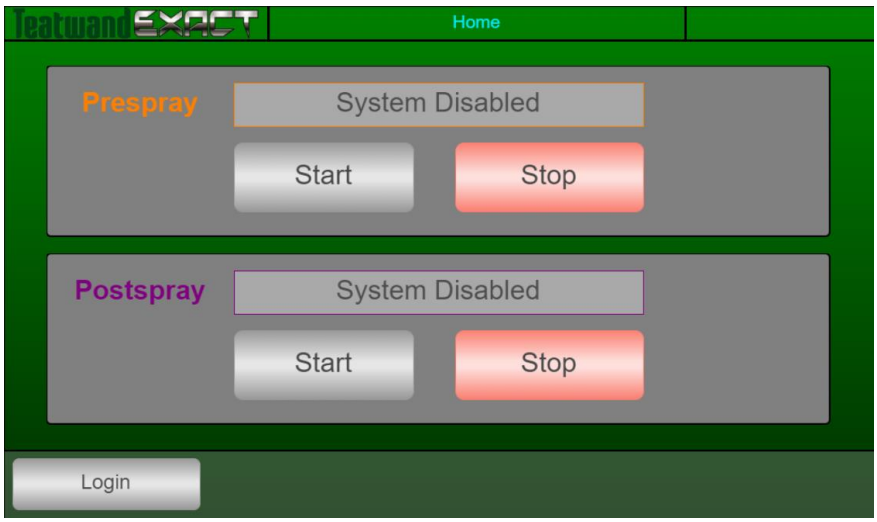
On most pages there will be blue question mark icons ? next to the various buttons. These provide the user with explanations about the various functions.

Home Pages.

The Home page is the starting point for all Teatwand™ adjustments and operations.

This is the default Home screen. This screen will come up when the controller is powered up.

Once logged in the screen can be configured as a single system and other functions can be activated.



Logins.

Logins are required to access many of the settings. The system **Start** and **Stop** buttons are active without logging in.

Customer Logins:

Operator – **2002**

In operator mode you can:

- Manually trigger the Teatwand
- bypass sensors
- toggle/bypass backoff
- view all system settings (but not edit)

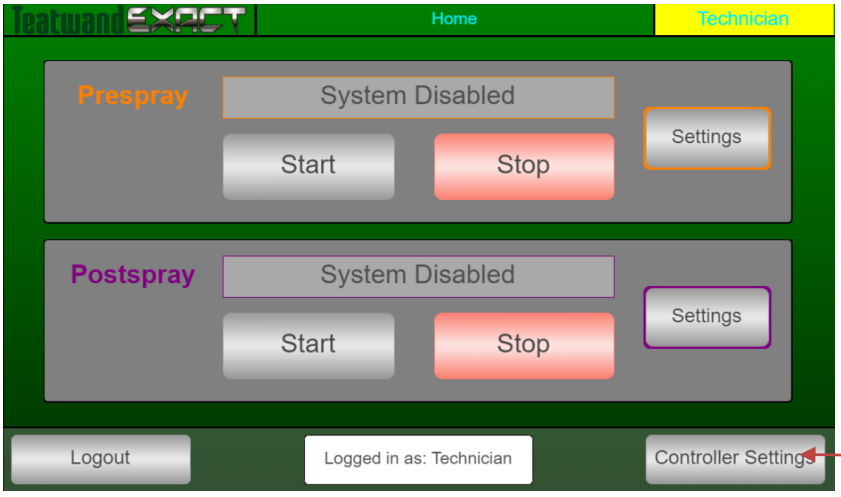
Technician – **5927**

When logged in as a technician you can access and edit all settings.

Once logged in a banner will appear on the top right-hand corner of the Home Page indicating which Login has been applied.

Login times out after 30 minutes or use the Logout button on the Home Page to Logout.

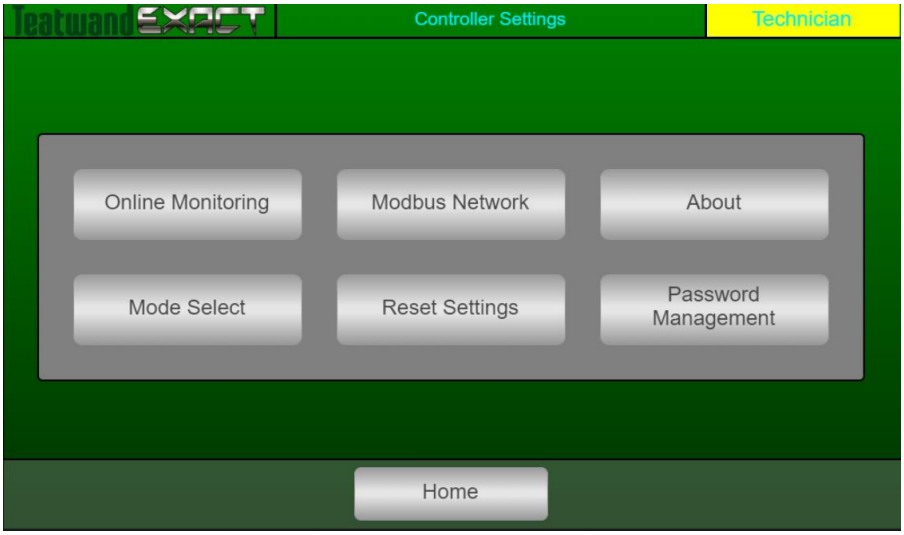
Once logged in as a Technician this page will appear.



Controller Settings button

Use the Controller Settings button to access the Controller Settings Page where the Home Page can be changed to a single system either Pre Spray or Post Spray. On the Controller Settings page other options can also be activated.

Controller Settings page.



Online Monitoring.
If Online Monitoring has been optioned use this page to Enable or Disable Online Monitoring, information regarding the connection status and Device ID is also displayed.

Modbus Network.
This page indicates the status of the Ethernet connection and if it is a double system there will be 2 Slaves connected, a single system will have 1 Slave connected.

About Page.
This page displays information regarding the software version and controller identification.

Mode Select.
This is where the correct System Mode can be selected, Pre, Post or Pre_Post and other options can be activated. See below.

Reset Settings.
Use this page to reset all settings to factory default settings. This will also reset the passwords to the defaults. If the Reset All Settings button is used the system will need to be recommissioned.

Password Management.
Both the Operator and Technician passwords can be changed on this page. **Once changed it is important to remember the change. The original default passwords can be recovered using the Reset All Settings button.**

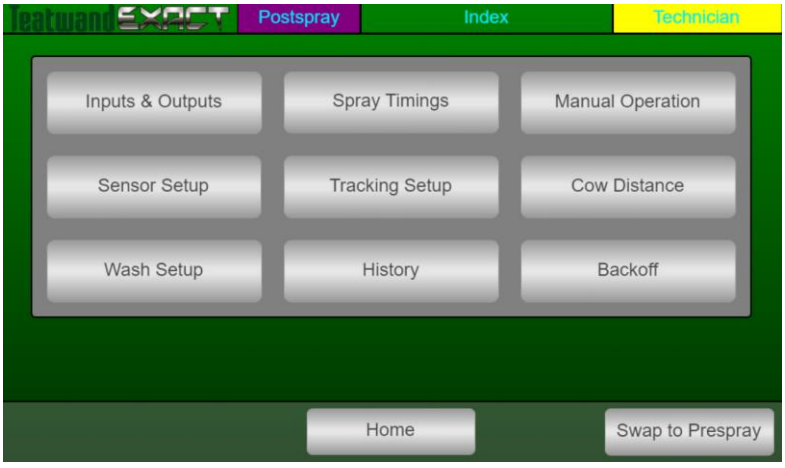
Mode Select page.

Select System Mode. Use the drop-down box and select the correct system, Pre spray, Post spray or Pre/Post spray.

Postspray & Prespray Options. If the system has been optioned with Backoff, Wash and or Monitoring the appropriate option must be activated. These options are set to **off** by default if any are being used, they must be activated on this page.

Once logged in as a Technician a 'Settings' button will be accessible from the Home page. This opens the Settings Index page.

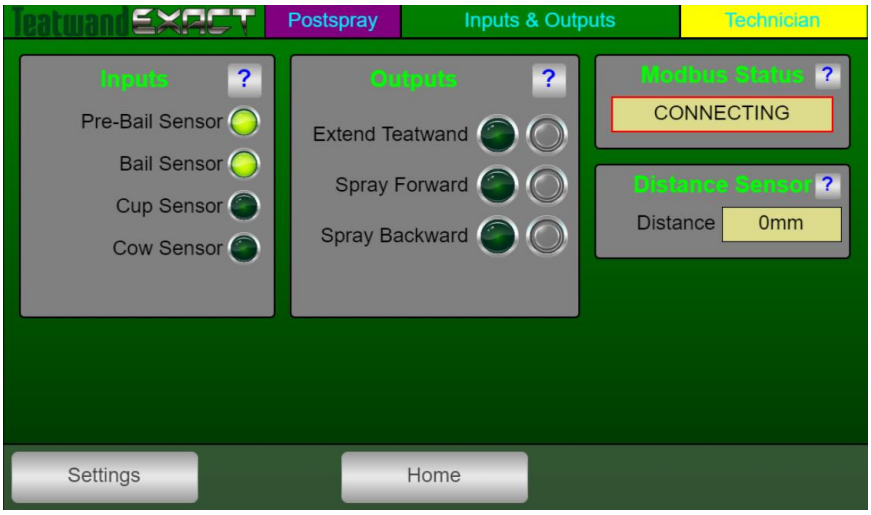
Settings Index page.



This page provides access to all settings sub-menus.

Depending on how the system is configured, some of the settings sub-menus may be hidden (Backoff/Wash)

Inputs & Outputs page.

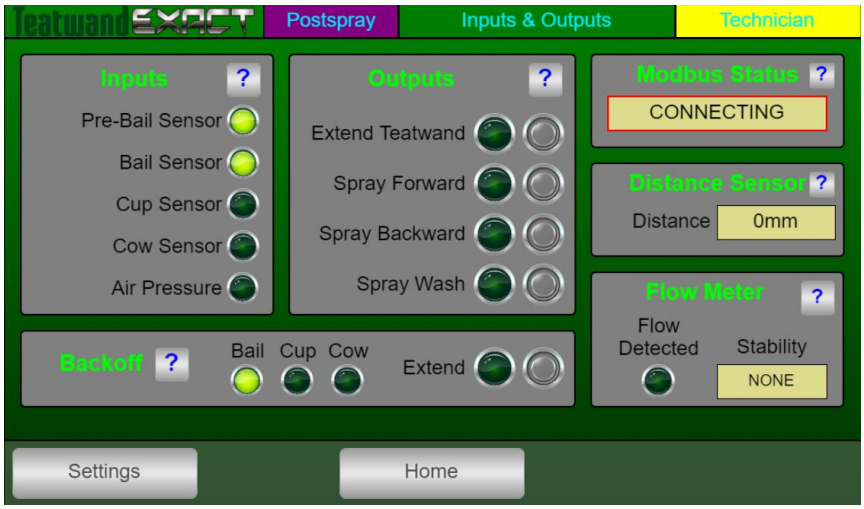


This page is used to check on the status of the inputs and outputs. Press the buttons to trigger an output.

Modbus Status monitors communications with the I/O block and reports errors. It should display 'CONNECTED'.

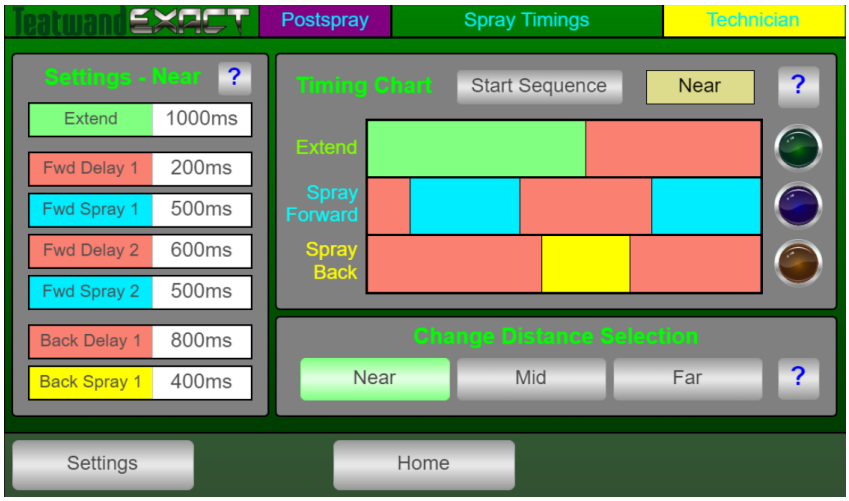
Distance Sensor box displays the raw value from the Cow Position Sensor.

The above image is how this page will appear when none of the options have been activated.



If the Teatwand™ System is fully optioned this page will include an Air Pressure input a Wash output a Flow Meter indicator and Backoff input indicators and a manual Extend output button.

Spray Timings page.



The Settings box. These settings are used to set up individual spray patterns for each spray distance. Near, Mid and Far distances are measured by the Cow Position sensor.

Teatwand™ Extend time can be set for each cow position. Extend times will be set during commissioning.

Delay and Spray time settings. The Teatwand™ selects from 3 different spray profiles for each cycle based on the cows position in the stall, Cow Near, Cow Mid and Cow Far. With each cycle of the Teatwand™ there are 3 bursts of Teat Spray from 2 nozzles.

Spray 1 from the forward nozzle, Spray 2 from the back-facing nozzle and Spray 3 from the forward nozzle. A delay prior to each spray determines when each spray will start. See Appendix C for default settings.

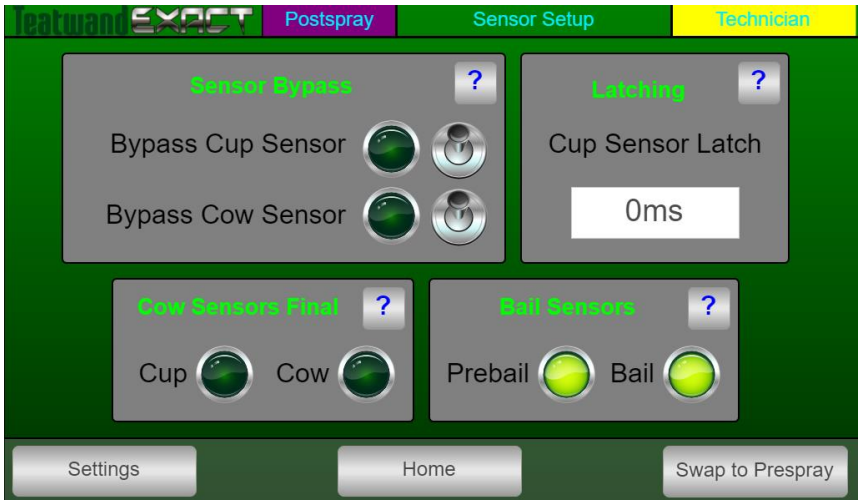
The Timing Chart shows a visual representation of the spray pattern timings. Start Sequence button will force the Teatwand™ to cycle for the selected spray distance.

Change Distance Selection box allows for the selection of different distances. This is used when setting spray and delay timings. The Teatwand™ will spray in the selected distance mode while this page is open. Go out of this page to return the Teatwand™ to automatically selecting the correct distance.

Manual page.

Teatwand™ can be extended manually, Spray Forward and Spray Backward can be manually triggered and different spray sequences can be tested.

Sensor Setup page.



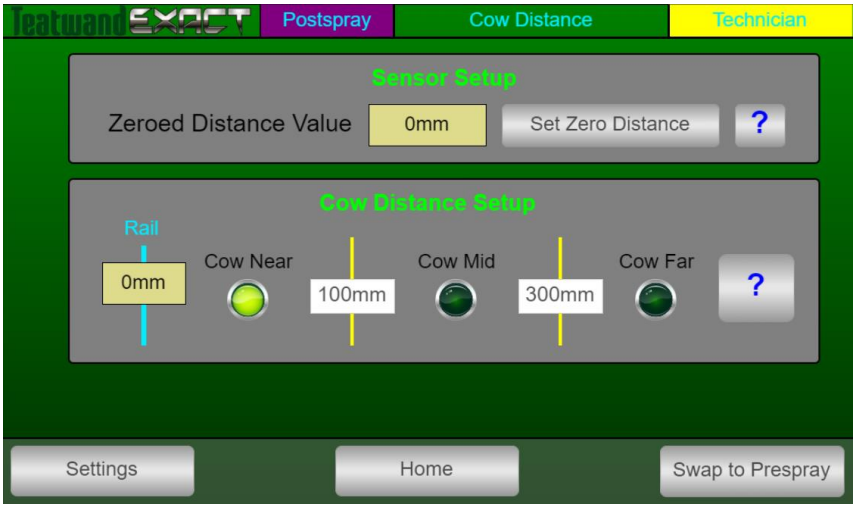
The Cup and Cow sensors can be bypassed. This feature is useful during commissioning and when operating the Teatwand™ with no cows on the rotary. If the Cow or Cup sensors fail, they may be bypassed temporarily. When the Cow sensor is bypassed the Teatwand™ will spray empty stalls and if the Cup sensor is bypassed the Teatwand™ will spray regardless of whether the cluster is still on the cow. When there is no Cup sensor, in parlours with position take-off, the Cup sensor must be bypassed all the time. Latching. The Cup Sensor can be latched on for a set period. Cow Sensors Final. Indicates the status of the Cup and Cow sensors during operation. Bail Sensors. Indicator lights illuminate when the sensors are triggered. Both are illuminated by default if the sensors are not plugged in.

Tracking Setup page.

This page is used during commissioning to set the maximum fast stall time and minimum slow stall time. Using the Delay settings the Teatwand™ must be fine tuned to suit the different rotary speeds. The Teatwand™ program is constantly monitoring the speed of the rotary and will automatically adjust the Teatwand™ operation to suit. The Teatwand™ must be set up to operate correctly at the fastest milking speed of the rotary. For slower rotary milking speeds a delay is added to the starting time of the Teatwand™ sequence.

This page can be a useful diagnostic tool, if the rotary is being run at speeds outside of the parameters set this will be flagged in the Current Speed box.

Cow Distance page.



Used during commissioning or if a new Cow Distance Sensor is fitted. The sensor must be zeroed at the rump rail. With the laser dot aimed at the rump rail use the Set Zero Distance button to set a zero distance value. The near/mid/far thresholds are configured in this page.

History Page.

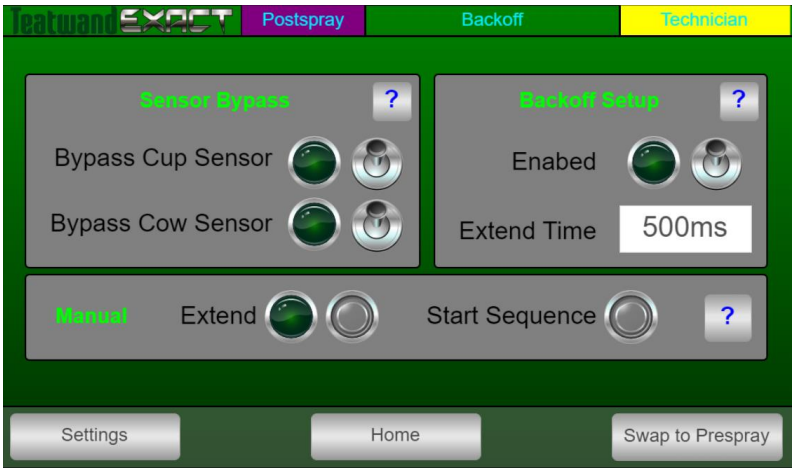
Bail trigger history shows when the bail sensors detect something:
FORWARD – Standard bail trigger. This is what we want to occur
REVERSE – Platform is detected to be moving backwards
BAIL – Bail sensor triggered but no prebail sensor detected
PREBAIL – Prebail sensor triggered but no bail sensor detected

Spray sequence history shows the decisions around if it should spray or not and the distance selected to spray at. (near/mid/far)

Wash page.

This page will only be available if the system is configured with the wash option. Use Spray Time to set the duration of the wash. Enter the number of cycles in the Frequency box to trigger how often the wash will activate. Use the 'Test +1' button to manually increment the cycle counts. If the Frequency is set at 5 press the Test +1 button 5 times to manually check the wash function. Wash Output light is on when a wash cycle is active, the adjacent button will manually activate the wash for as long as the button is held on.

Backoff Page.



The Backoff is a device used in conjunction with the Teatwand™ Exact to encourage cows to exit their stall as the rotary passes the bridge.

Commissioning Procedure.

Set the Stall Sensor position.

- Stop the Rotary at a position where the Teatwand™ would extend over the first ridge of the Leg spreader.
- Go to the Stall Sensors and position so that the Pre-Bail sensor is activated. There maybe some fine tuning required later.

Set the Extend Time on the Spray Settings page.

- The Teatwand™ should be set up to extend and retract as slowly as possible without hitting cows legs with the rotary running at the fastest milking speed. The Extend Time determines how long the Teatwand™ remains extended for and is closely related to the Speed Control Valves found in the Controls Cabinet on the Extend Solenoid manifold. There are two, one to control extend speed and one to control retract speed.
- Open the speed control valves fully. The Teatwand™ will Extend and Retract at the fastest speed.
- On the Settings page select Far Cow Timing, with this page open the Teatwand™ will operate with these settings. Use the default settings as a starting point.

- Run the rotary at the fastest milking speed and observe the Teatwand™ sequence.
- Increase the Extend Time value in increments of 100ms until a pause can be observed at the end of the stroke.
- If there is available time and the Teatwand™ is well clear of the cows legs slow the Extend and Retract speeds down using the Speed Controllers in the Controls Cabinet. Adjust these in increments of one half of a turn.
- Observe the operation. Increase the Extend Time value if the Teatwand™ is not fully extending. For the Far Cow setting the Teatwand™ needs to pause at the end of the stroke.
- The aim is to balance the Speed Controller settings with the Extend Time setting while maintaining a pause at the end of the stroke and not hitting cows legs.
- Go back to the Spray Settings page and select Near Cow Timing in Extend Time enter a value 300ms less than the Far Cow Extend Time.
- Observe the operation. Is the Teatwand™ fully extending? If not increase the Extend Time value in increments of 50ms until there is a brief pause.
- Set the Mid Cow Extend Time to a value between the Near and Far settings.

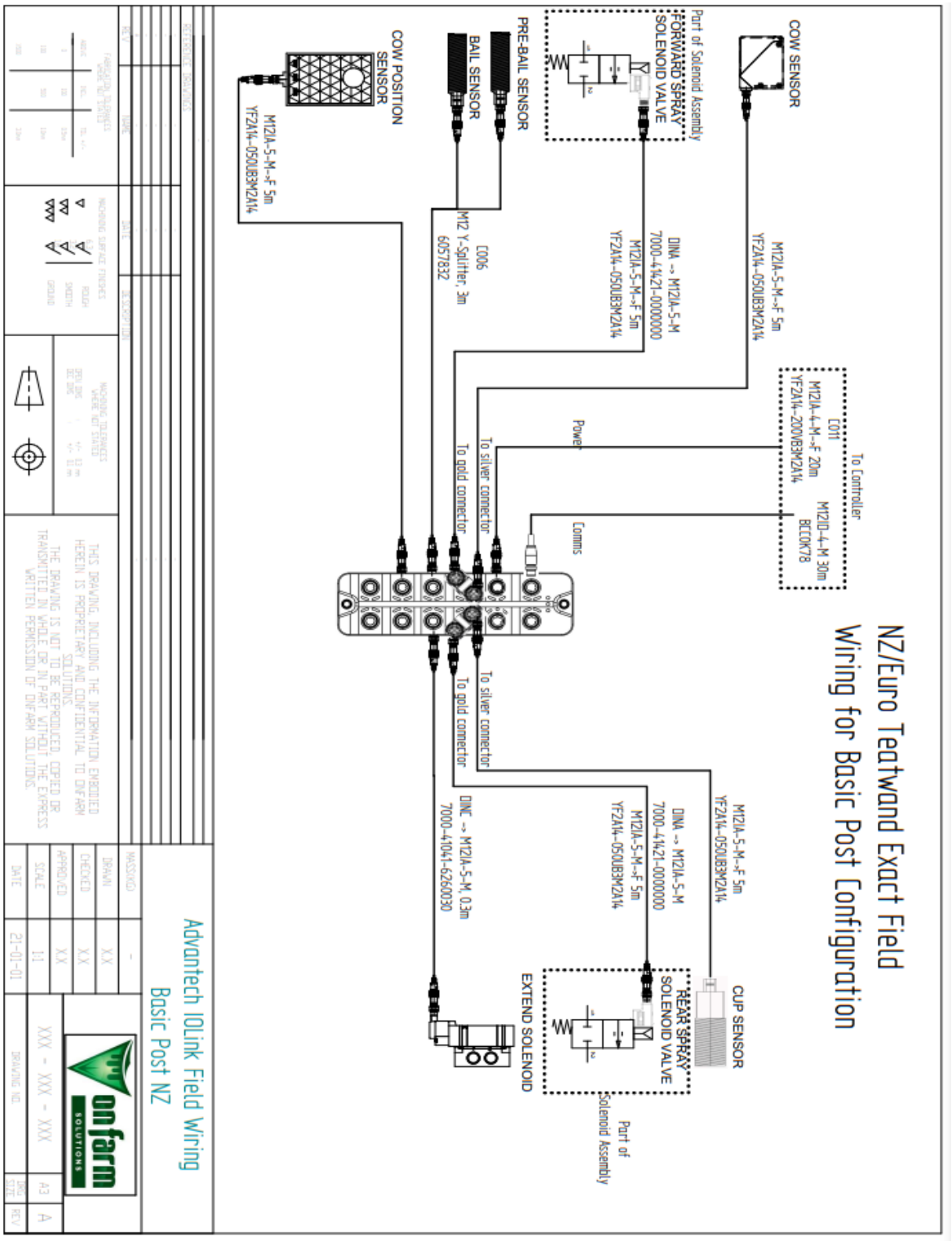
Tracking Setup. Go to the Tracking Setup page.

- Check all fast and slow speed values are set at zero.
- Run the rotary at the fastest milking speed, allow at least 3 stalls to pass.
- Press the Set button for Fast Stall Time, the Current Speed will be copied into the Fast Stall Time box.
- Run the rotary at the slowest milking speed, allow at least 3 stalls to pass.
- Press the Set button for Slow Stall Time, the Current Speed will be copied into the Slow Stall Time box.
- With the rotary running at the slowest milking speed observe the Teatwand™ operation. It will be firing too early, go to the Slow Stall Delay box and enter 200ms. Observe the Teatwand™, it will now be firing later. Adjust the value in the Slow Stall Delay box until the Teatwand™ is firing centrally over the leg spreader.

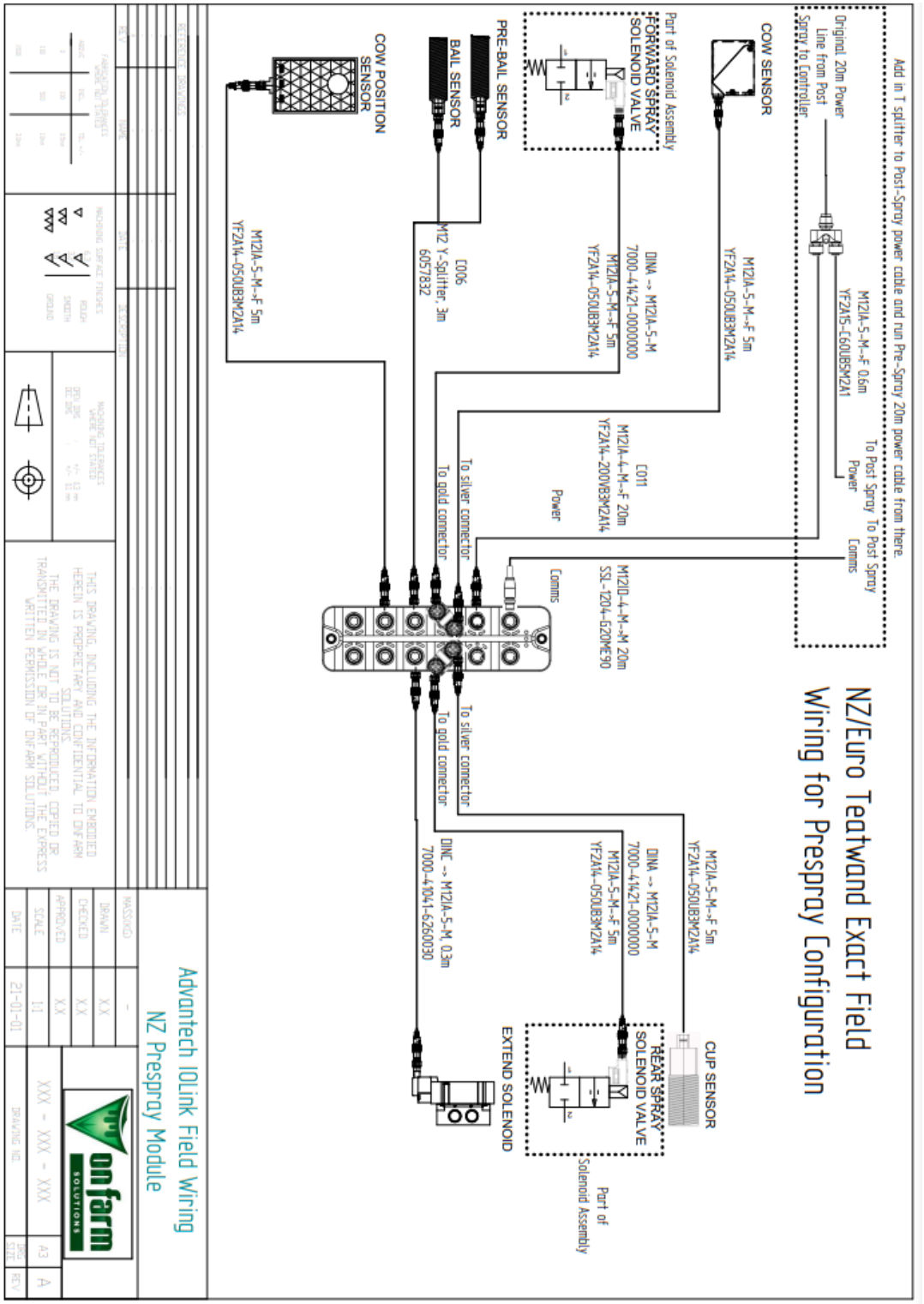
Setting the Spray Timings. Go to the Spray Timings page.

- In the Spray Settings Selection box choose the cow position, Near, Mid or Far. The Teatwand™ will spray for whatever cow position is selected while this page is open. Going out of this page will reinstate automatic selection of the appropriate cow position.
- Use the default settings for each cow position and observe the spray pattern. Make adjustments to the delays and spray times to achieve good teat spray coverage.

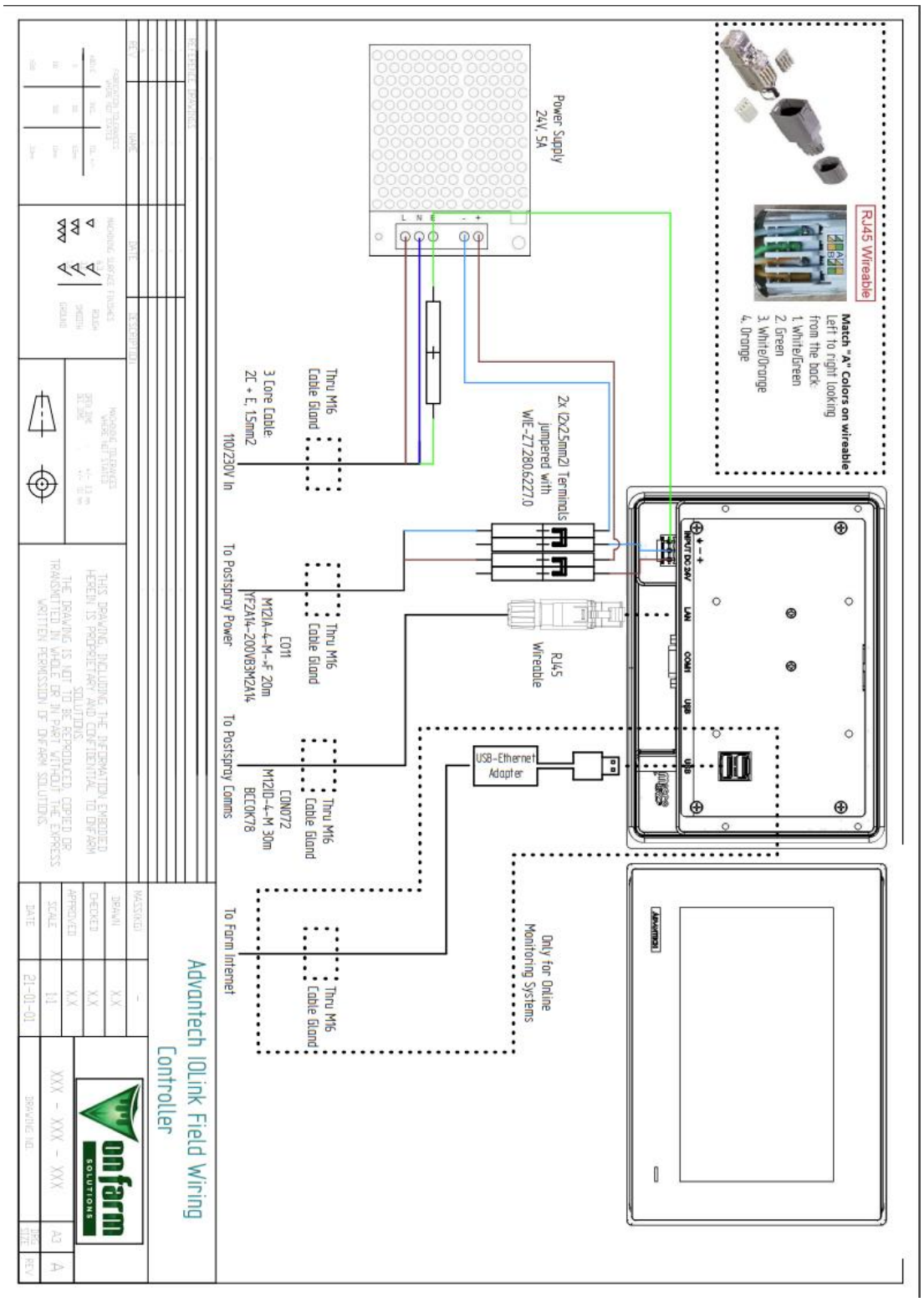
Appendix A - Electrical Layout - Exact Post Spray



Appendix B – Electrical Layout - Exact Pre Spray.



Appendix C – I/O Link Field Wiring Controller.



Appendix D – Default Settings

Near Spray Timing		
Extend Time: 1000 ms		
Fwd Delay 1: 200 ms	Back Delay 1: 800 ms	Fwd Delay 2: 600 ms
Fwd Time 1: 500 ms	Back Time 1: 400 ms	Fwd Time 2: 500 ms

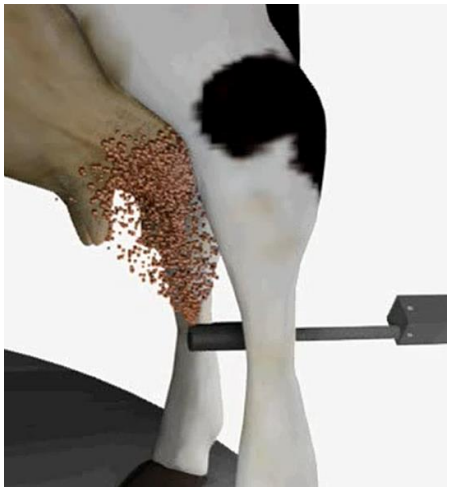
Mid Spray Timing		
Extend Time: 1100 ms		
Fwd Delay 1: 300 ms	Back Delay 1: 880 ms	Fwd Delay 2: 560 ms
Fwd Time 1: 500 ms	Back Time 1: 400 ms	Fwd Time 2: 500 ms

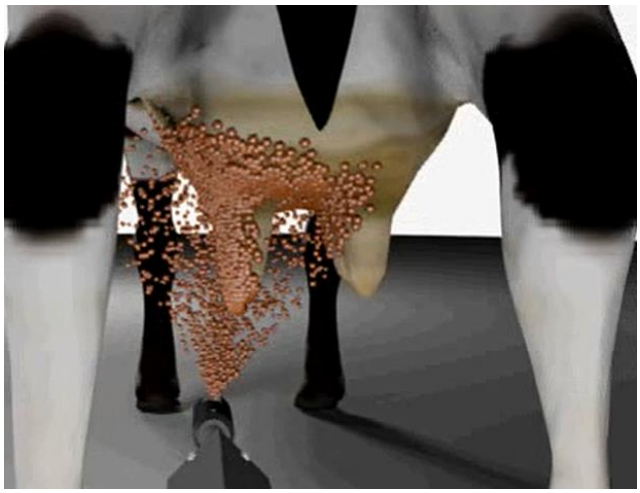
Far Spray Timing		
Extend Time: 1200 ms		
Fwd Delay 1: 400 ms	Back Delay 1: 950ms	Fwd Delay 2: 400 ms
Fwd Time 1: 500 ms	Back Time 1: 300 ms	Fwd Time 2: 500 ms

Speed Limits
Fast Speed: 4000 ms
Slow Speed: 15000 ms

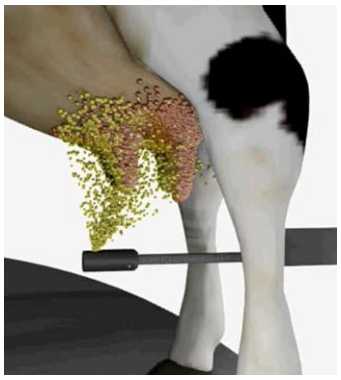
Cow Distance Settings	
Near Distance: 100 mm	Mid Distance: 300 mm

Appendix E - Spray sequence teat coverage

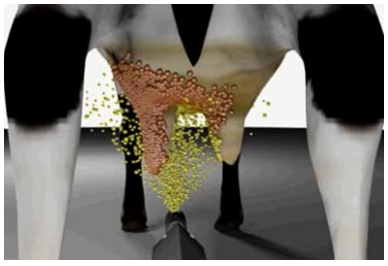




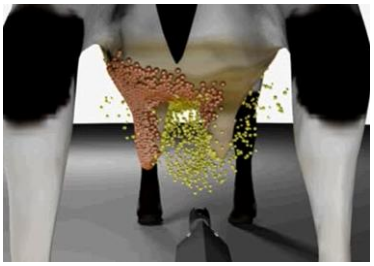
First Forward Spray



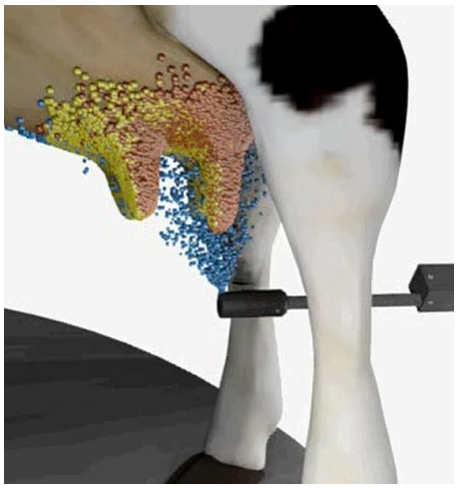
Reverse Spray

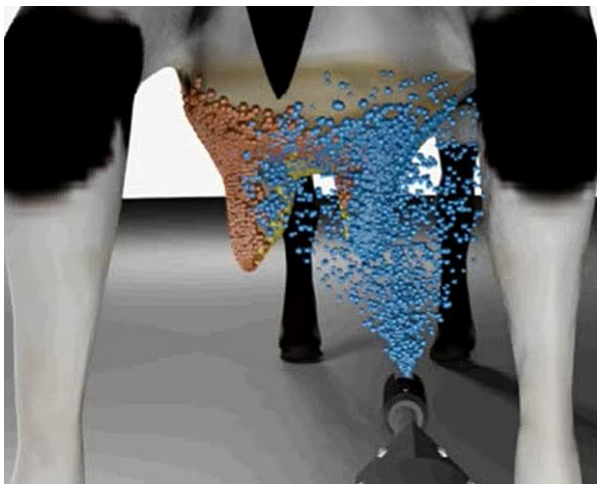


Reverse Spray Starting



Reverse Spray Stopping





Second Forward Spray