TEATWAND RAPID INSTALLATION & USER'S GUIDE

V1 CONTROLLER

VERSION 3.2

LAST EDITED: MARCH 18, 2024

ONFARM SOLUTIONS LIMITED

P.O. BOX: 28135,
BECKENHAM
CHRISTCHURCH 8242
NEW ZEALAND

FREEPHONE: 0800 888 212
AUSTRALIA FREEPHONE: 1300 767 596
INTL.: +64 21 984 482
EMAIL: info@onfarmsolutions.com

Table of Contents.

General Safety Warnings **5**
Preliminary Installation work for Teatwand™ Rapid System **6**
Teatwand™ Rapid. **7**
Slide Assembly Installation. **8**
Fitting the Cabinet Frame to the Slide Assembly. **11**
Mounting Teatwands™ to Slide. 12
Teatwand™ Rear Hose Guide. 12
Fitting Slide Bulkhead Bracket and Hoses. 13
Fitting the Rubberwear Guard 13
Services to Teatwand™ Rapid. **14**
Electrical Connection. 14
Compressed Air. 14
Water. 14
Teat spray. 14
Fitting the Teatwand™ Spray Hoses. **15**
Teat Spray Pump Assembly. **17**
Cabling. **18**
Sensor Installation. **19**
Locating the Stall Sensors. 20
Cow Sensor 23
Cow Position Sensor. 23
Locating the Cow and Cow Position Sensors. 24
Cabinet Layout. **25**
Setting the Teatwand™ and Slide Speed. **26**
Teatwand™ Speed Controllers. 26
Slide Speed Controllers. 26
Main Screen Login/Enabling the Teatwand™ Rapid. 27
Main Screen with Settings Page. 27
Slide Settings Page. 28
Manual Operation Page. 28
Slide Settings - Slide Setup page. 29
Wash Settings Page. 30
Left and Right Sprayer Settings. 31
Teatwand™ Settings Page. 31
Spray Settings Page. 32
Analog Settings Page. 33
Manual Operation Page 34
Help Page **34**
Commissioning. **35**
Set Up and Fine Tuning the Teatwand™ Rapid Slide. **36**
Set up Teatwands™. **36**
Tips and Tricks. **37**

APPENDIX A – LAYOUT DRAWING.....38

APPENDIX B – DEFAULT TIMING SETTINGS 39

APPENDIX C – ELECTRICAL LAYOUT.....40

APPENDIX D - SPRAY SEQUENCE TEAT COVERAGE 41

Teatwand EXACT

Teatwand RAPID

Congratulations on your purchase of a Teatwand product.

Teatwand is the flagship brand of Onfarm Solutions Ltd. The **Teatwand** concept was developed by Adrian Joe a veterinary consultant and Gary Arnott an automation engineer. They formed Onfarm Solutions Ltd in 2008 to develop automated teat spraying systems. Five prototype **Teatwand** systems were installed in Canterbury New Zealand in 2009. The **Teatwand 400** was introduced in 2010 and the **Teatwand Exact** in 2013. **Teatwand Rapid** was introduced for large scale fast-moving rotaries in the USA in 2018.
These new models are the result of farmer feedback and the implementation of the latest technology and engineering solutions as they emerge.
At Onfarm Solutions we are committed to continuous improvement the **Teatwand Exact** and **Teatwand Rapid** systems are testament to this.
Teatwand is currently installed in many countries around the world with over 700 installations in New Zealand, South Africa, Australia the USA, the UK and Europe.

General Safety Warnings

For installers and operators

WARNING – **Read all safety instructions and warnings**. Failure to do so may result in personal injury.

Work Area Safety.

Keep work area clean and well lit.

Keep children and bystanders away during installation and operation of machine.

HAZARDS:

- Wet floors – wear appropriate safety footwear to avoid slips.
- Cows – maintain a safe distance from the rotary to avoid being kicked.
- Electric Shock – take care using extension leads. Always use an RCD.

Personal Safety

Use appropriate PPE for the task at hand.

Observe manufacturers safety recommendations while using power tools.

Identify the location of all Emergency Stops. This is often a pull cord for the rotary both above and in the basement.

HAZARDS:

- Noise – Milking parlours can be noisy places, use appropriate PPE.
- Pinch Points - Maintain a safe distance from the moving rotary platform and any fixed pinch points.
- Crushing Hazards – Maintain a safe distance from the moving rotary platform and any potential crush points.
- Electric Shock - Electrical connection to power supply is 240/110V. Electrical connection between controller/power supply and the device is 24VDC.
- Compressed Air - When doing service work or maintenance turn off the compressed air supply at the Air Service Unit, this will remove residual pressure from the device. Immediately repair any compressed air leaks.
- Chemical Hazards - Teat spray can be hazardous. Avoid contact with skin and eyes. Use appropriate PPE.

Preliminary Installation work for Teatwand™ Rapid System.

Double systems – Pre and Post sprayers. Each Teatwand™ Rapid is a standalone \cable to each is required.

A 1 ¼''conduit to the basement is required for cabling to the Stall Sensors. Double systems require 2 cables, 1 for each unit both cables can run through the same conduit.

a) Fit Spread Eagle Leg Spreaders to the deck of the rotary. This is best done at least 2 weeks prior to Teatwand™ Rapid install to allow time for cows to adjust. See the Spread Eagle Leg Spreader install manual.
b) Establish a target for the Stall Sensors. This may require brackets/tags to be fitted to the rotary platform. This is best done immediately as some fabrication may be required. See Stall Sensor section in this manual.
c) Run conduits. See Appendix A - Layout Drawing.
d) Provide a 1'' compressed air supply to each system.
e) Provide for a teat spray supply line from the bulk supply to each system.
f) Provide a water supply to each system. There will be reticulated water at each side of the bridge for cleaning, a connection into this is sufficient.
g) Install an Ethernet cable from a modem in the dairy to the Controls Cabinet for online monitoring. Where a double system Pre & Post is being installed an Ethernet cable to each is required.

Please call/email your Onfarm Solutions contact with any questions

Teatwand™ Rapid.

The Teatwand™ Rapid automatic teat sprayer is the newest and most advanced of our Teatwand™ systems. Thorough spray coverage of all four teats is achieved with two Teatwands™ mounted on a moving Slide that follows the rotary platform as it passes. The Slide has three adjustable speeds that automatically track to the speed of the rotary platform. When the Stall Sensor is activated the Teatwands™ extend over the first ridge of the Spread Eagle Leg Spreader, the teats on the leading side of the udder are sprayed. As the rotary platform is moving slightly faster the Teatwands™ will retract over the second ridge of the Spread Eagle Leg Spreader, spraying the teats on the trailing side of the udder.

An automatic wash system keeps the unit clean and running efficiently. Each Teatwand™ Rapid is a standalone unit and can be fitted as a pre-sprayer or a post-sprayer or both.

Specifically designed for large fast-moving rotary parlours, the Teatwand™ Rapid automatic teat sprayer is a great labour savings solution with low maintenance costs.

Figure 1

Slide Assembly Installation.

See Appendix A for positioning and dimensions.

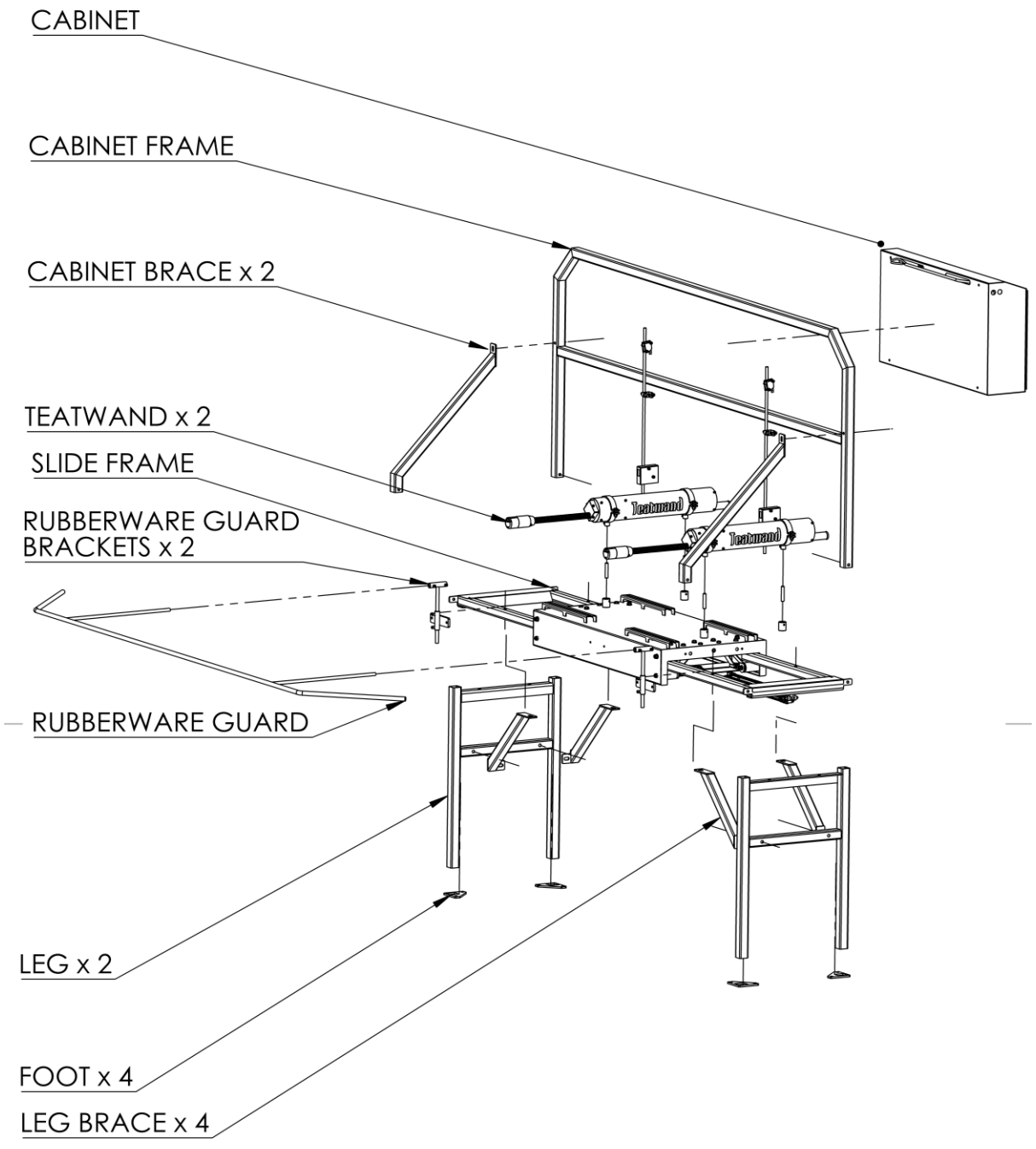


Figure 2

The Slide Assembly legs are supplied longer than required to allow for cropping of the legs to suit the angled floor of the parlour.

When the following steps are completed the top surface of the Slide will be 3'' above the top surface of the rotary platform and level in all directions.

With the Slide in the home position (with the air cylinder retracted) orientate the frame so the Slide will move from the home position in the direction of the rotary platform when the rotary platform is moving forwards.

1. Assemble the legs to the Slide Frame. Note orientation. See *Figure 2.*
2. Fit the Leg Braces, square the legs to frame. Tighten all bolts.
3. Position the Slide Frame with Legs attached. See Layout Drawing. *Appendix A*
4. Use temporary packers under the legs to level the Slide, end to end and side to side. The Slide Assembly will be too high. See *Figure 3*
5. Mark the leg positions on the floor.
6. Use a level to mark the rotary platform deck height on each leg.
7. Measure 3'' up from this and mark on the leg. This mark represents the final height of the top surface of the Slide.
8. From this mark measure to the top surface of the Slide. Note this measurement, referred to as dimension X in Figure 3.
9. Use this measurement and measure from the floor up each leg. Using a square mark all four faces of each leg.

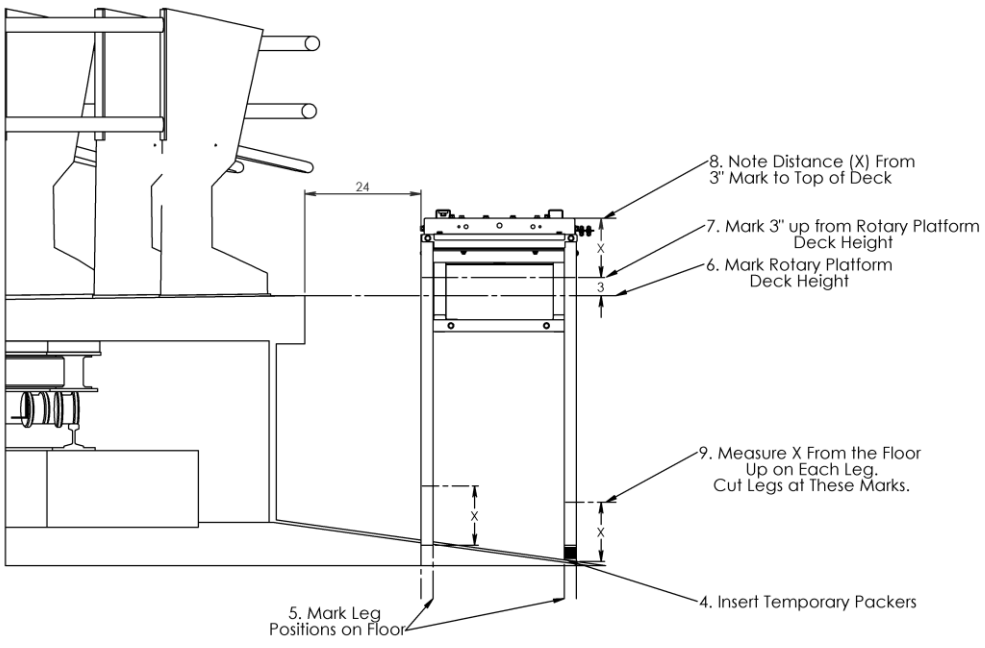


Figure 3

10. Cut the legs on this mark. Due to the sloping floor each leg will be a different length.
11. Slide the feet over the legs, check the orientation of the feet, see *Figure 2.*
12. Positioned the legs over the marks on the floor made in step 5, check the Slide is level, end to end and side to side.
13. Check measurements and positioning. See Layout Drawing. *Appendix A.* Check levels again.
14. Bolt feet to floor using ½'' x 3'' masonry anchors.
15. Check again the positioning is correct and the slide is level in both directions.
16. Weld the feet to the legs x 4.

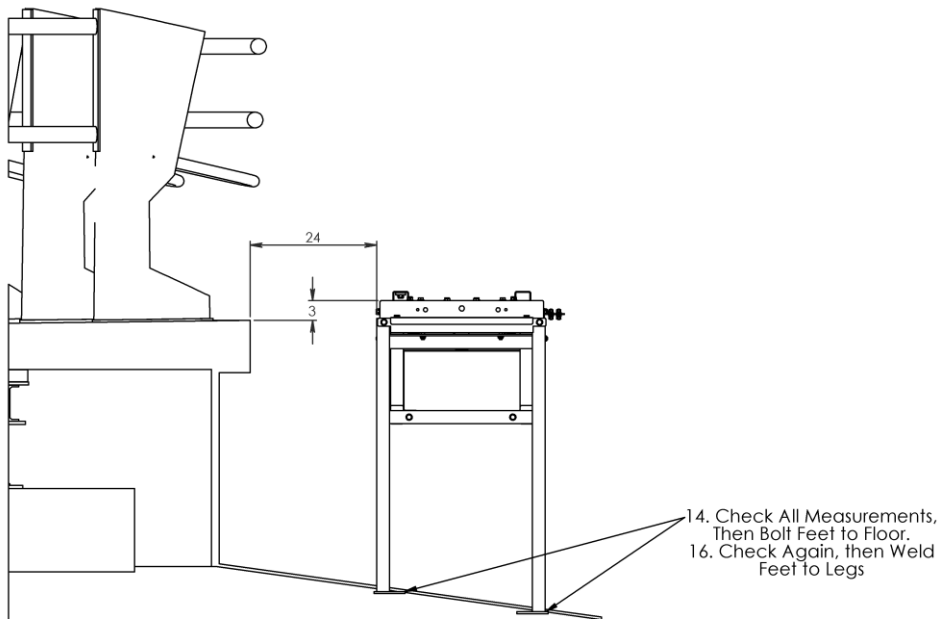


Figure 4

Fitting the Cabinet Frame to the Slide Assembly.

The Cabinet Frame is supplied with the cabinet fitted to the frame.

1. Stand the Cabinet Frame on the floor with the cabinet facing away from the rotary platform.
2. With 2 people pick up the Cabinet Frame and place it on top of the legs. See Figure 5.
3. Fit bolts through the Cabinet Frame to secure it to the Slide Frame Assembly.
4. Fit the Cabinet Braces. See Figure 5.
5. Level the Cabinet Frame and tighten all bolts.

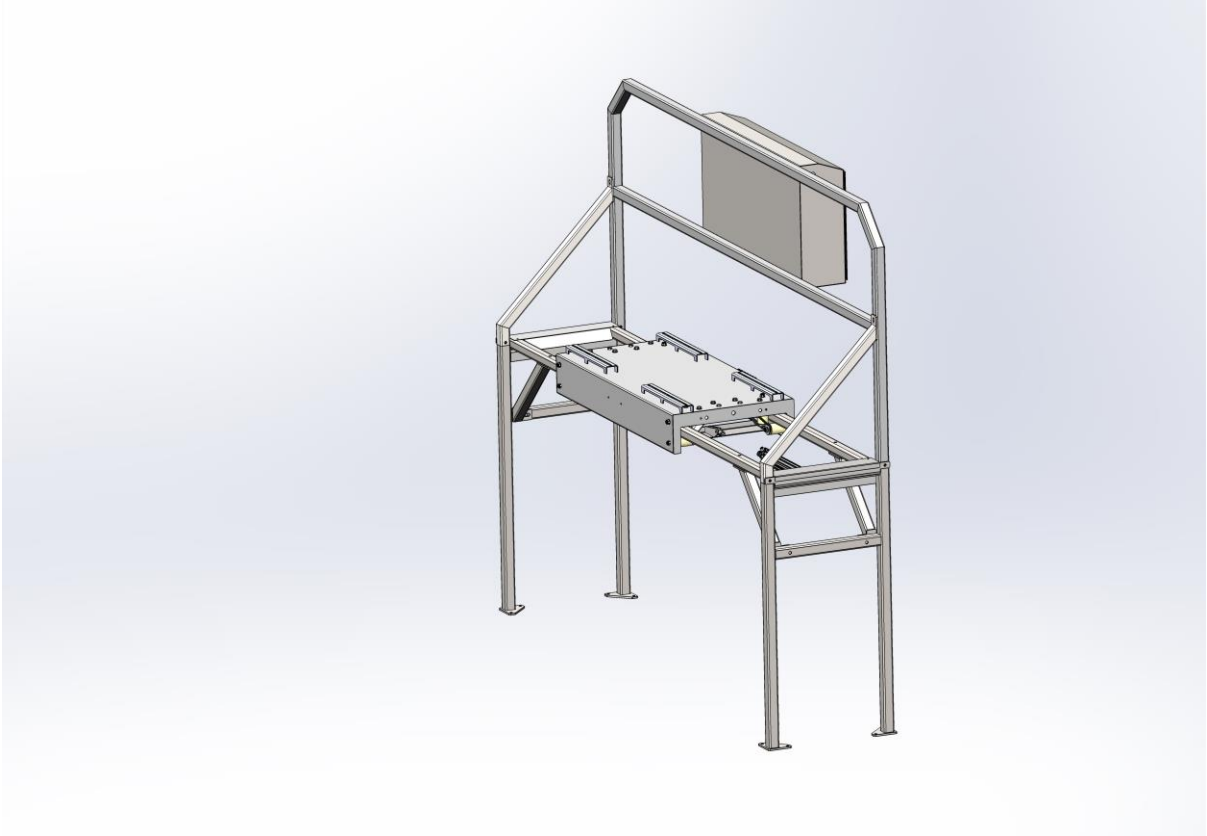


Figure 5

Mounting Teatwands™ to Slide.

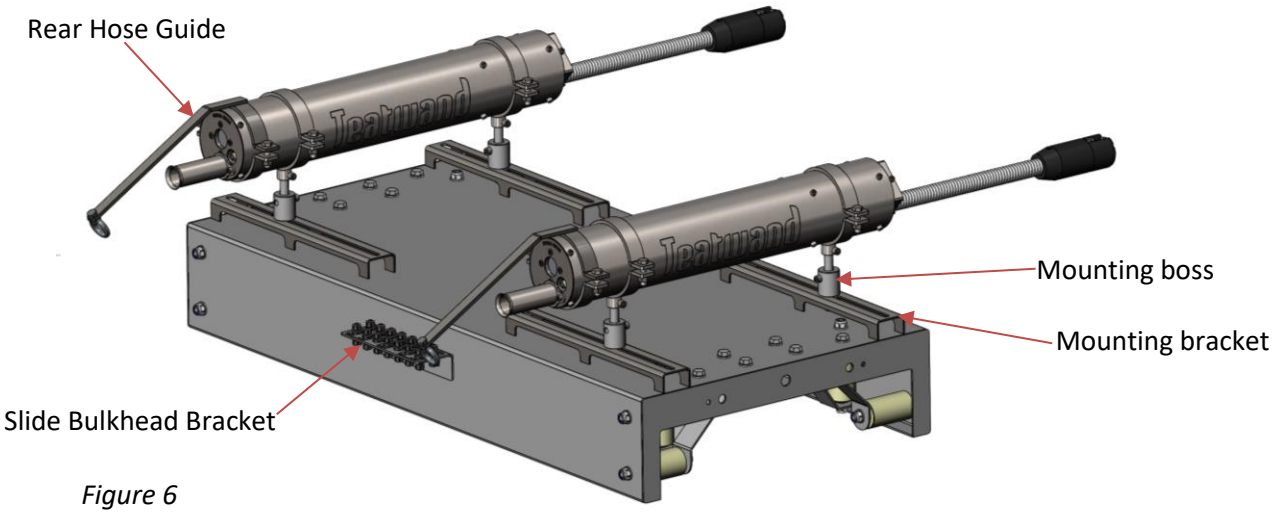


Figure 6

- Cut 4 pieces of 5/8 round bar 4'' long.
- Mount the Teatwands™ on the Slide leaving the Teatwand clamps a little loose to allow for setting up to the correct angle.
- The bottom of the nozzle holder is to be 8'' above the surface of the rotary.
- Position the Teatwands™ to match the distance between the stalls. They must be aligned on the center line of the stalls. The Teatwands™ will not be parallel with each other, they will be slightly closer at the nozzle end than at the back end. This applies to straight and angled stalls.
- Once the correct angle and spacing is determined tighten the Mounting boss onto the Mounting bracket.
- Tighten Teatwand clamps and boss lock bolts.

Teatwand™ Rear Hose Guide.

- The Teatwand™ rear hose guide must be fitted to the rear end of the Teatwand™ to guide and support the hoses where they enter the rear of the Teatwand™ See *Figure 6*.

Fitting Slide Bulkhead Bracket and Hoses.

- The Slide bulkhead bracket bolts to the Slide directly under the Control Cabinet. See Figure 6.
- Hoses from the Control Cabinet to the Slide are supplied cut to length. Standard Onfarm Solutions 8mm hose is used.
- When fitting hoses follow the labels on the Control Cabinet and the Slide bulkhead bracket.
- Avoid any twisted hoses and have enough length to allow for the Slides movement.

Fitting the Rubberwear Guard

- There is a rubberwear guard to be installed on the side close to the rotary to deflect the vacuum and milk hoses away from the Teatwand™ nozzles.
- Fit the two vertical rubberwear guard mounts to the Slide frame.
- Insert the vertical guard supports.
- Insert the rubberwear guard through the mounts. See *Figure 2.*
- Position guard to be an inch under Teatwand™ nozzle holders, and out far enough to push all the rotary rubberwear in front of Teatwand™ nozzles.
- Tighten all cap screws.

Services to Teatwand™ Rapid.

A bulkhead plate is fitted to the Rapid Cabinet Frame as an entry point for compressed air, teat spray and water. This is interchangeable from side to side. Electrical connection and Ethernet cable will be into the Control Cabinet to be determined on site.

Electrical Connection.

- The Teatwand™ Rapid system is 24V DC.
- There is a 110-240V power supply supplied with the system.
- Run 1.5mm power cables for 24VDC from the transformer to the Control Cabinet on the Teatwand™ Rapid.

Ethernet Cable.

- To be run from a Modem in the dairy to the Control Cabinet and plugged in to the Touchscreen/PLC.

Compressed Air.

- A 1'' compressed air line is required to supply compressed air at 100psi to the air service unit. The pressure regulator on air service unit will be set at 90psi.
- There are 2 x ½'' push fit fittings in the bulkhead plate for air supply to the Control Cabinet.

Water.

- A water supply to the Teatwand™ Rapid is required for the wash nozzles.
- Connect into the parlors wash water circuit.
- Water is connected is via an 8mm push fit fitting on the bulkhead plate.

Teat spray.

- A teat spray supply is required from the teat spray pump located close to the bulk supply of teat spray to the Teatwand™ Rapid. Teat spray is connected via an 8mm push fit fitting on the bulkhead plate.

Fitting the Teatwand™ Spray Hoses.

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

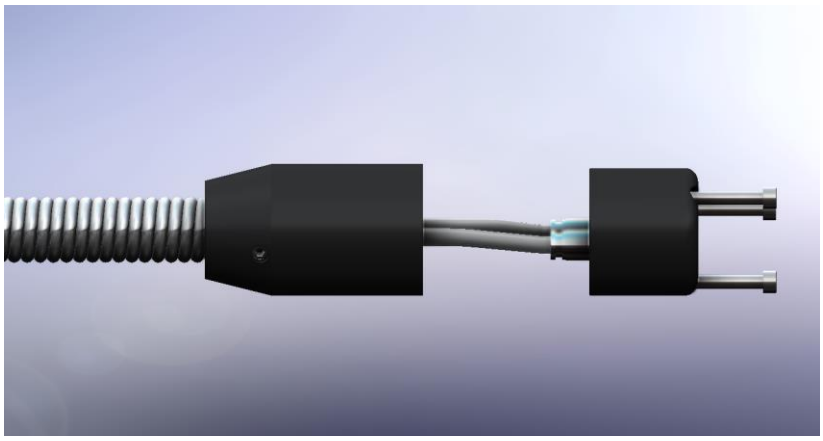


Figure 7

- 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 Pole.
- Take 2 new Spray Hoses 10ft 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.

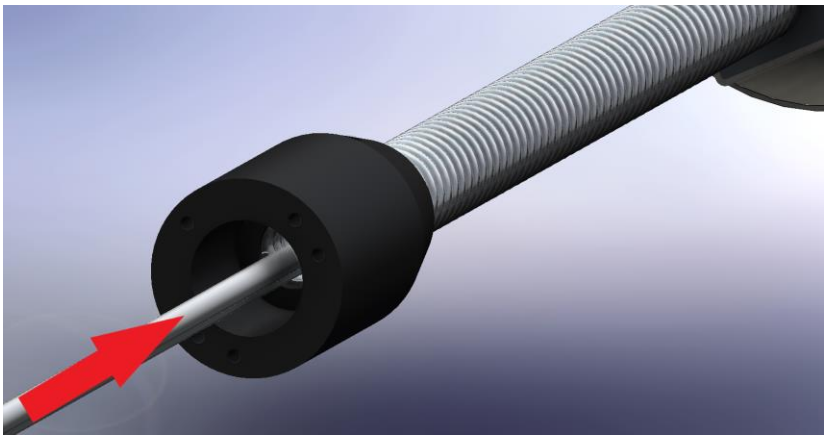


Figure 8

- 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.

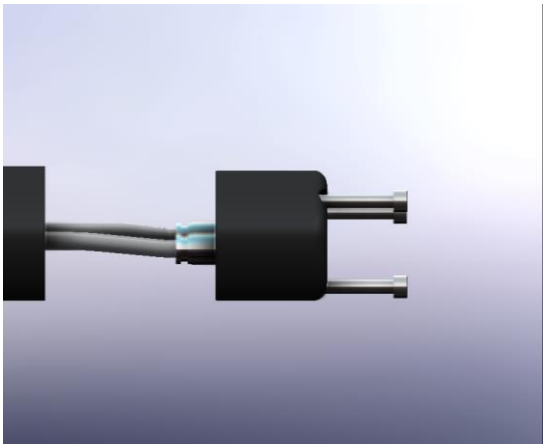


Figure 9

- 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 Touchscreen Manual Controls page and use the Purge Forward and Backward Nozzle buttons to purge the air from the hoses.
- Take note that the forward nozzle sprays when the Purge Forward Nozzle button is used. Simply swap the hoses at the 8mm Unions if the wrong nozzle is spraying.

Teat Spray Pump Assembly.

- Air supply to regulator is required, 8mm line or ¼'' threaded fitting into regulator
- Install above or close to the teat spray vessel
- The pump will draw teat spray vertically from a maximum of 15ft.
- Air pressure minimum 20psi maximum 100psi.
- For standard nozzles set pressure regulator between 35-65 PSI
- Higher pressure results in more teat spray being applied

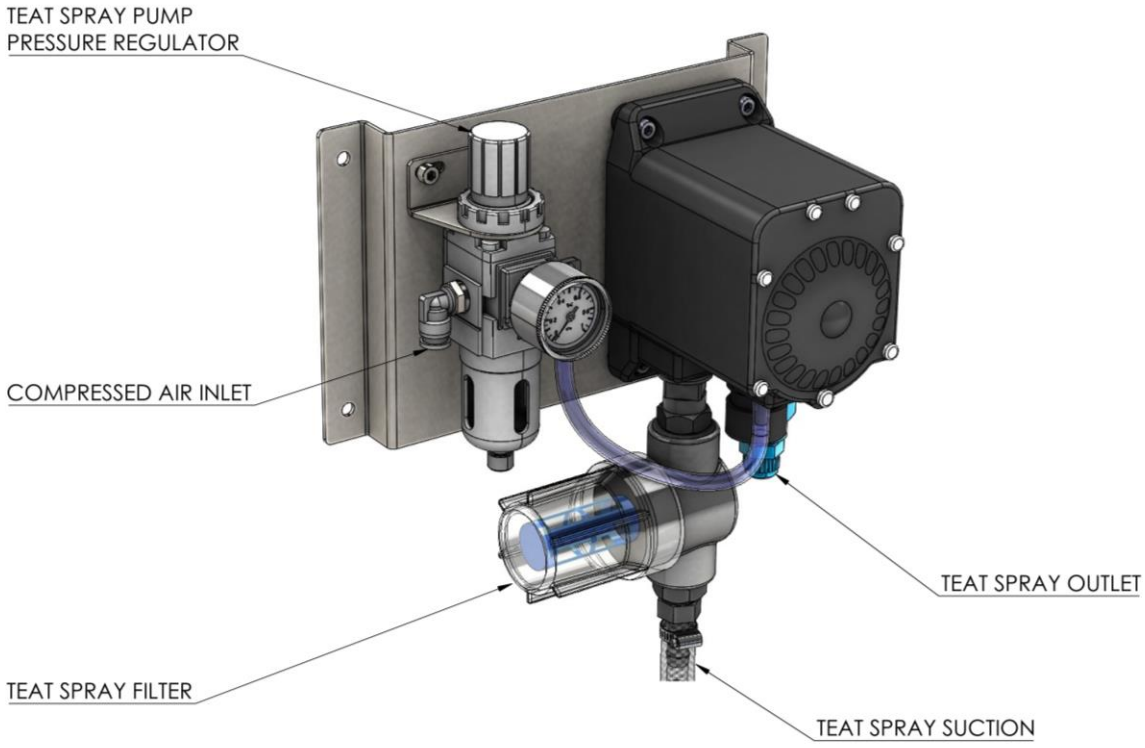


Figure 10

Cabling.

The Teatwand™ Rapid is supplied with the Control Cabinet pre wired.
Cables are supplied to connect from the 8 way distribution board to the sensors.
All cables have pre wired M12 moulded M/F plugs fitted.

Cables.

- Sensor cable 5m – *C010* x 2. Cow sensors
- Sensor cable 20m – *C011* x 1. Stall Sensors, to run to basement
- Y cable – *C006* x 1. Stall Sensors, to connect each sensor to *C011*
- Analogue sensor cable 5m shielded – *C012* x 2. Cow position sensors.

Ethernet cable to be supplied by installer.

See Appendix C for Electrical Layout.

Sensor Installation.

Stall Sensors.

These sensors are photoelectric and will detect anything from ¼'' to 14''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-Stall Sensor the second sensor is the Stall Sensor; this is the trigger that activates the Teatwand™ Rapid spray sequence.
Pre-spray and post-spray installations will have 2 x Stall Sensor assemblies.

IMPORTANT:

- Stall Sensors need to sense a point that is constant on every stall.
- These sensors must be activated only once per stall. 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™ Rapid sequence.
- Stall Sensors are usually mounted in the basement.
- Tags or brackets may need to be fitted to the rotary for these sensors to detect. See *Figures 9 through15.*
- In some cases, these sensors can be mounted to look at high framework on top of the rotary above the cows.
- A 20m/60ft cable is supplied to connect from the Teatwand™ Rapid Control Cabinet to the Stall Sensors. From this cable a 'Y Cable' is used to connect to each sensor.

A bracket for mounting this assembly to suit the parlour is to be made onsite.

Locating the Stall Sensors.

The Stall Sensors can be fitted anywhere around the internal diameter of the basement. It is the positioning of the sensors within any given stall that is critical. Where the cable/s enter the basement is often the best area for the Stall Sensors to be fitted.

a. Ensure both Teatwands™ are fitted to the Slide.
b. Press the stop button on the home screen to disable the system. With the system disabled the sensors remain live.
c. Turn off air supply at the Air Service Unit.
d. Stop the rotary at any stall in the exact position where the Teatwands™ will activate. That is where the Teatwands™ will extend over the first ridge of the Spread Eagle Leg Spreader. This may have to be done during a parlour wash time.
e. With the rotary stopped in position go to where the cables enter the basement.
f. Select a tag for the Stall Sensors to detect. Consider potential mounting options. See *Figures 11 through 17.*
g. Mark the position of the selected tag on the basement wall.
h. The Stall Sensors will be mounted with 1'' of clearance between the face of the sensor and the tag.
i. Fabricate a bracket and fit the Stall Sensor assembly using a 1ft length of sensor rod. Position the Stall Sensors in the centre of the sensor rod.
j. Fit the bracket with the Stall Sensor assembly aligned to the position marked on the wall and with the Stall Sensor assembly detecting the tag with 1'' of clearance. There will be adjustment (left and right) of the sensors on the sensor rod. The bracket will be off set from the mark on the wall.
k. Position the 'pre-stall' sensor 1'' to 2'' away from the tag that will activate it when the rotary is moving in the forward direction. Fine tuning is done by adding delay to this signal on the touchscreen.
l. Fit cables, tie off all excess. Check clearance with all moving parts.

IMPORTANT: Check for at least 2 full rotations that there is clearance of tags with all stationary objects and that the sensors have clearance with all moving objects. Check both sensors are activated with every tag, there is a LED at the plug end of these sensors to indicate activation

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

Figure 11

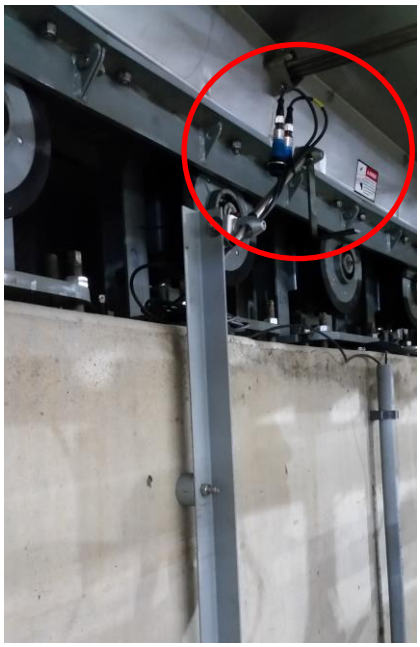


Figure 12

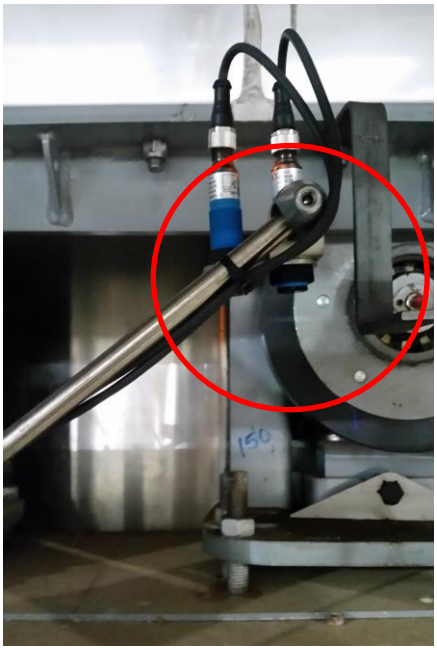


Figure 13

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 14

Figure 15

This example shows a bracket mounted to the rotary using existing holes in part of the structure and the sensors are mounted off an angle iron bracket fitted to the concrete wall of the basement

Figure 16

Figure 17

This example uses existing brackets on the rotary with the sensors mounted on the basement wall facing up. Where possible it is recommended sensors point down to limit the build-up of dirt on the sensor face and reduce the need for cleaning.

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 Control Cabinet Frame 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.

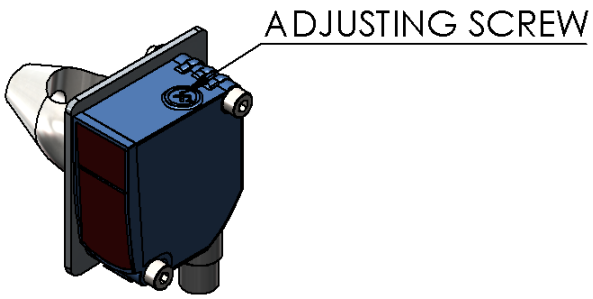


Figure 18

Cow Position Sensor.

- This is an analogue laser sensor mounted towards the bottom of the Control Cabinet to look at the back end of the cow. *See photo*. It feeds back information to the PLC regarding the cow's position in the stall. This information is used to select the spray pattern best suited.
- The cow distance sensor must be zeroed. To do this loosen the sensor and point the laser dot at the rump rail. Go to the touchscreen, in the analogue settings page press the 'Tare' button.
- To reset this sensor to factory settings, remove the plug from the sensor, hold the 'select' button down, refit the plug, continue holding the 'select' button until Q1 near and far, Q2 near and far and slow LEDs flash. Sensor must be zeroed after reset.

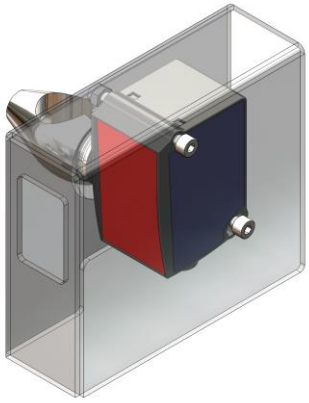


Figure 19

Locating the Cow and Cow Position Sensors.

- Cow and cow position sensors to be mounted directly above the Teatwands™ as shown. See Figure 20.
- This drawing shows Teatwands™ set up for straight stalls, Teatwands™ will be angled for angled stalls and the sensors must be positioned directly behind each Teatwand.
- The mounting brackets for these will be fitted on site. Drilling and tapping 5/16'' holes are required.

CAUTION. Unplug incoming air, spray and water lines in Control Cabinet. Remove services bulkhead, remove all lines from frame BEFORE DRILLING.

Figure 20

Cabinet Layout

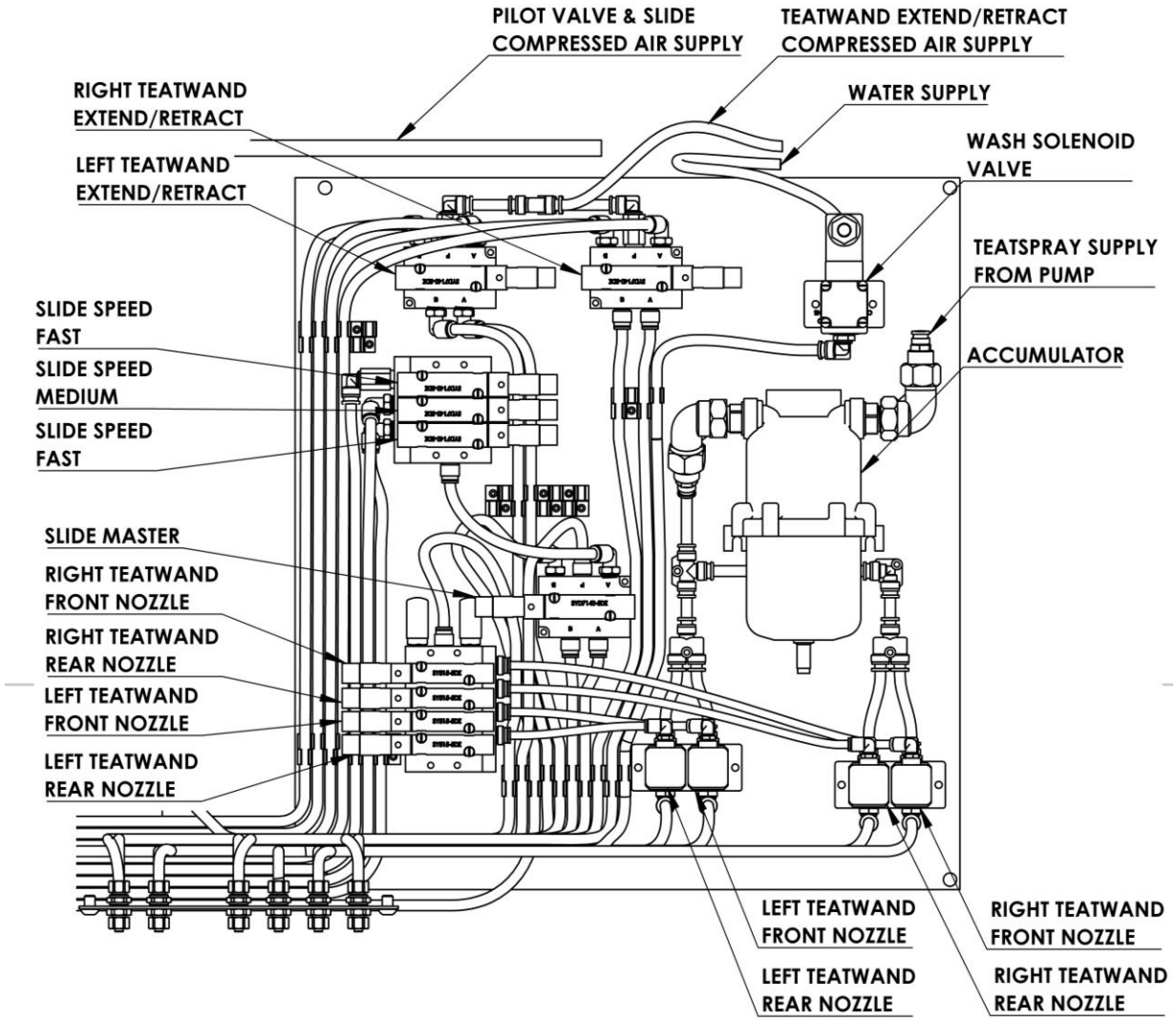


Figure 21

Setting the Teatwand™ and Slide Speed

The speed the Teatwands™ extend and retract and the speeds the Slide extends and retracts are controlled with pneumatic flow control valves. Located in the Control Cabinet these valves control the exhaust air from the respective pneumatic cylinders.

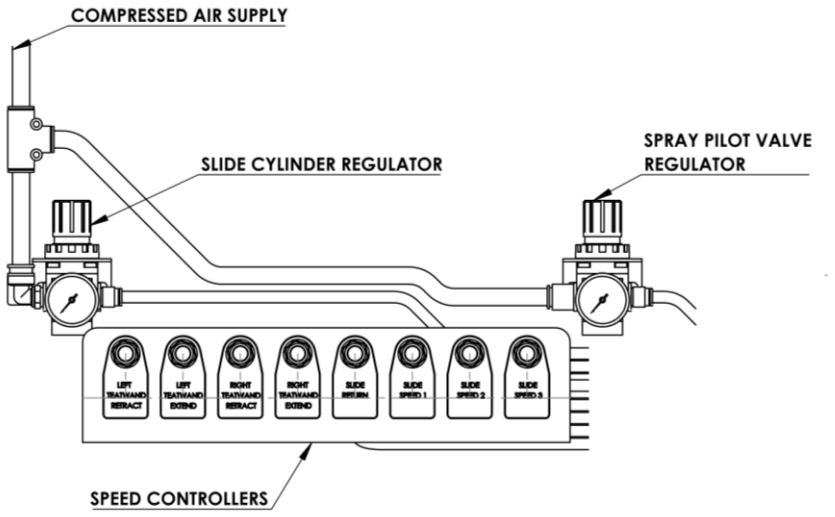


Figure 22

Teatwand™ Speed Controllers.

- Adjust individual Teatwand™ extend and retract speeds with the rotary running at the fastest milking speed used in the parlour.

Slide Speed Controllers.

- The Teatwand™ Rapid Slide has 3 speeds. Speed 1 (slow), Speed 2 (medium) and Speed 3 (fast).
- Adjust these speed controllers so the Teatwand™ Rapid Slide extends slightly slower than the rotary for each respective speed.

Slide Return Speed Controller.

- This is used to adjust the return speed of the Slide to the home position.

Slide Cylinder Pressure Regulator.

- To be set at 60psi

Spray Pilot Valve Pressure Regulator.

- To be set at 60psi.

Navigating the Touchscreen.

Main Screen Login/Enabling the Teatwand™ Rapid.

- The main screen is the starting point for all Teatwand™ adjustments and operation.
- The system can be enabled and disabled by pressing Start or Stop.
- To access the Rapid settings, press the Eng Login button and enter the password - **2002**

Figure 23

Main Screen with Settings Page.

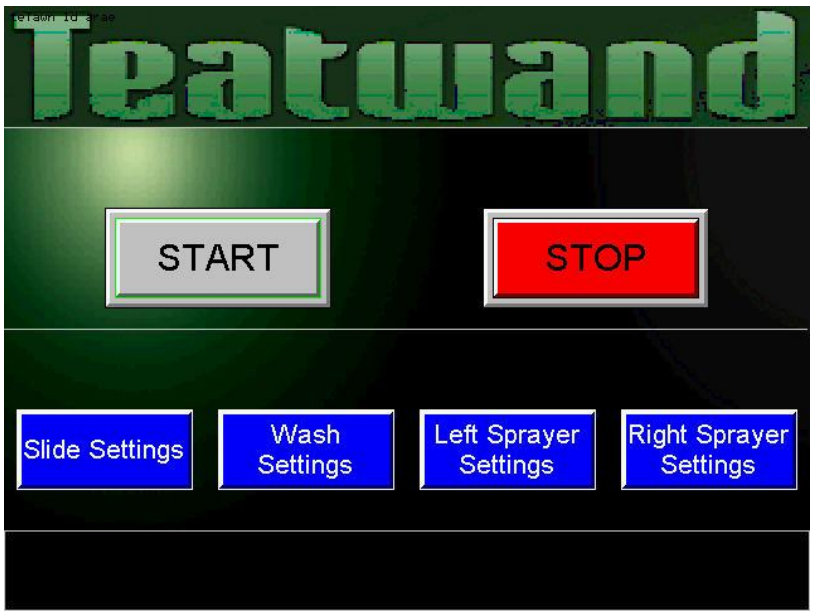


Figure 24

Slide Settings Page.

- Access to Slide Settings and Manual Operation.

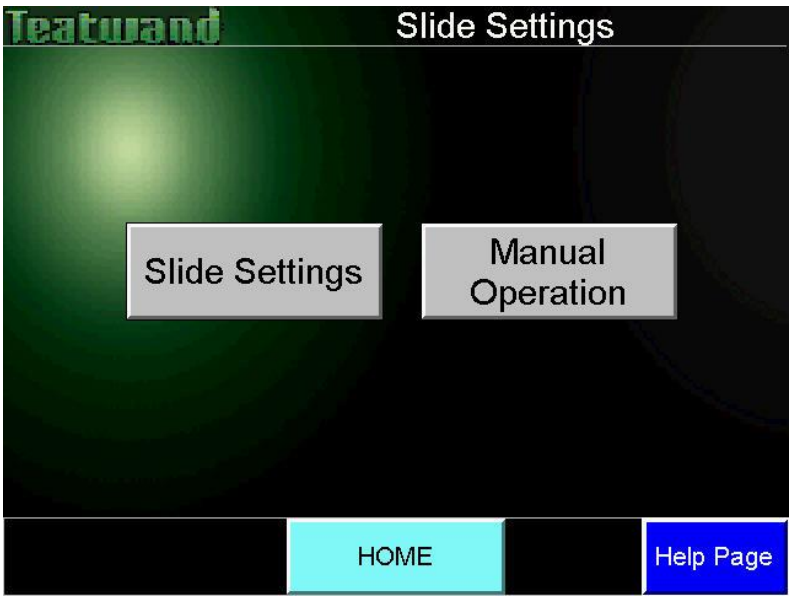


Figure 25

Manual Operation Page.

- Manually operate the Slide at slow, medium and fast speeds.

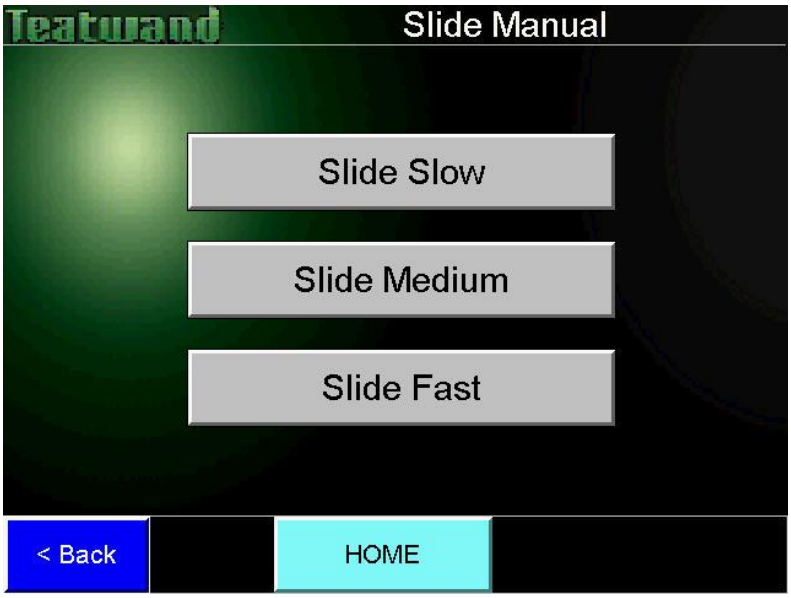


Figure 26

Slide Settings - Slide Setup page.

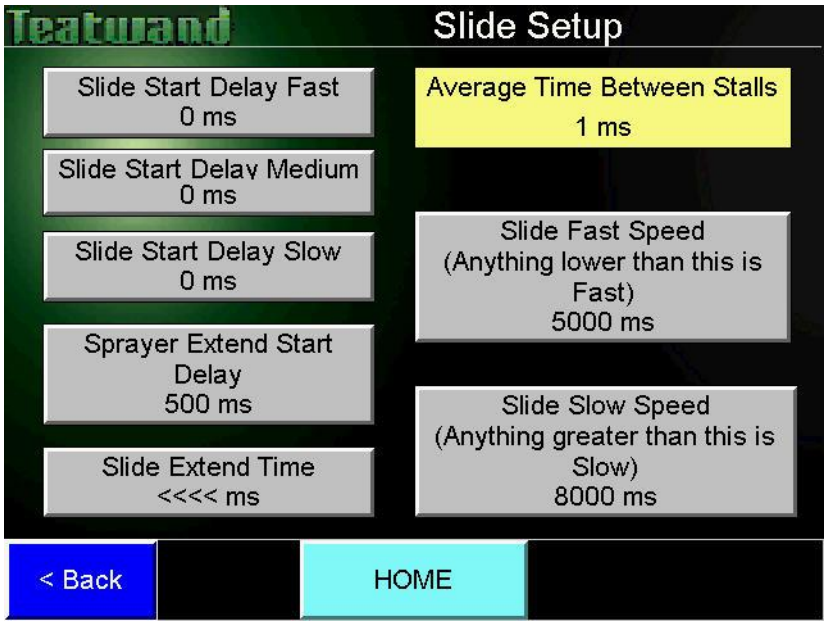


Figure 27

Slide Setup

- Average Time Between Stalls –this value is gathered from the Stall Sensors and indicates the actual time between stalls.
- Slide Start Delay Fast: An adjustable delay from when the Stall Sensor has been activated to start the Slide moving when the rotary is at fast speed.
- Slide Start Delay Medium: An adjustable delay from when the Stall Sensor has been activated to start the Slide moving when the rotary is at medium speed.
- Slide Start Delay Slow: An adjustable delay from when the Stall Sensor has been activated to start the Slide moving when the rotary is at slow speed.
- Sprayer Extend Start Delay: An adjustable delay to start the Teatwand™ extending after the Slide starts moving.
- Slide Extend Time: An adjustable time to make the Slide extend for longer. The Slide should always extend fully.
- Slide Fast Speed: Run the rotary at the fastest milking speed. Check 'Average Time Between Stalls' value add 200 ms. Enter this value into Slide Fast Speed. (Set this before setting the Slide speeds using the speed control valves)

- Slide Slow Speed: Run the rotary at the slowest milking speed. Check ‘Average Time Between Stalls’ value, subtract 200 ms. Enter this value into Slide Slow Speed. (Set this before setting the Slide speeds using the speed controllers)

  Slide Medium Speed: This speed is calculated to be in between the Slide Fast Speed time and the Slide Slow Speed time.

Wash Settings Page.

- Wash nozzles are fitted to the Slide and each Teatwand™.

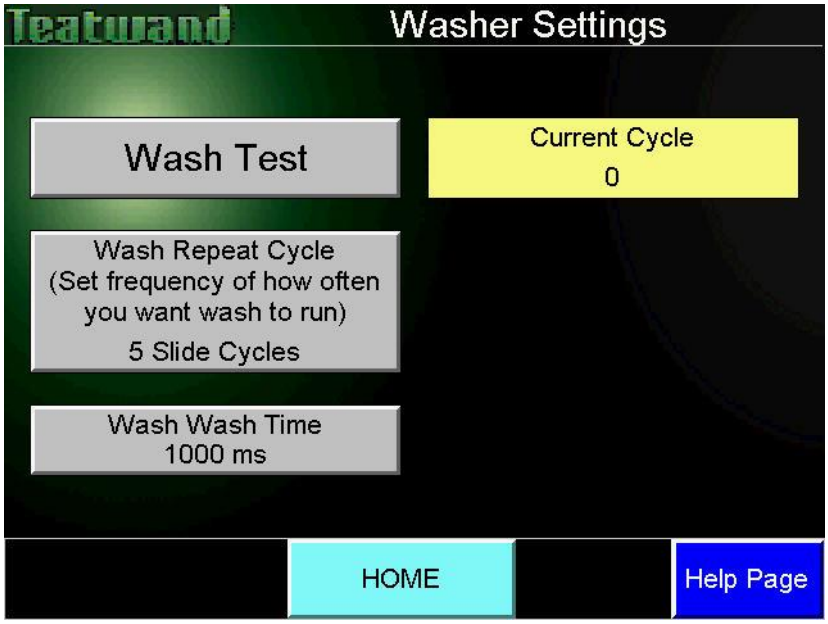


Figure 28

- Wash test – Manual test button.
- Wash repeat cycles – Set frequency for wash system to operate
- Wash time – Set length of time for each wash.

Left and Right Sprayer Settings.

- Each Teatwand™ is individually controlled, there are separate pages for left and right sprayers.

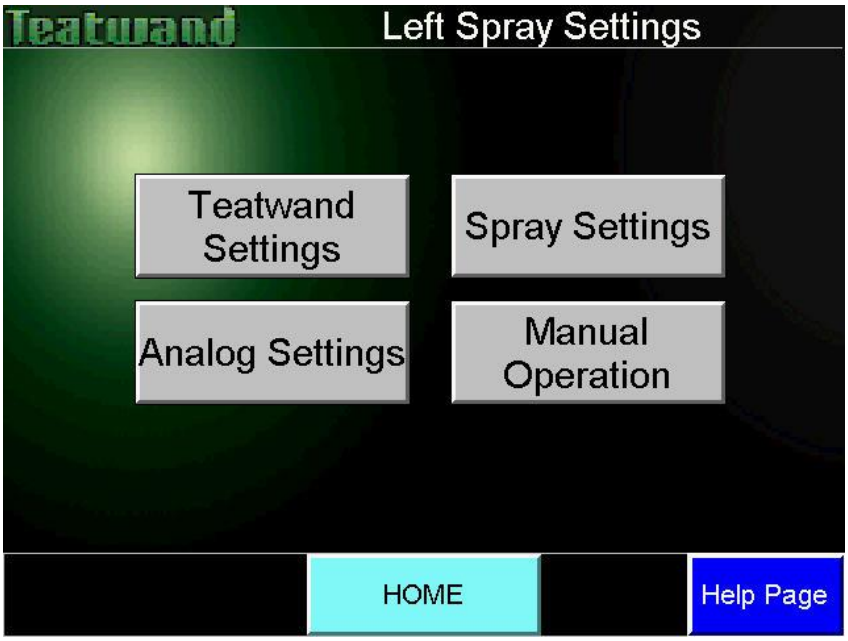


Figure 29

Teatwand™ Settings Page.

- Allows the user to adjust settings for Near, Mid and Far Teatwand™ extend times.

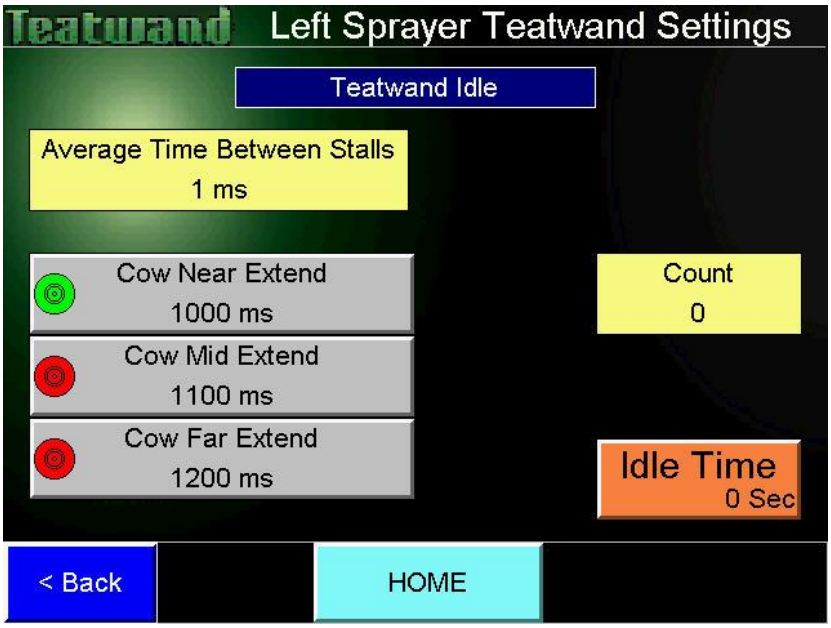


Figure 30

Spray Settings Page.

- 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.
- Spray and Delay times are adjusted on the Spray Settings pages.

- **Delay Spray (1,2,3):** Delay spray introduces a pause before each spray operation to manage the amount of spray used.
- **Spray (1,2,3) Time:** This is the amount of time the spray solenoids are held open for. Spray 1 and 3 is the forward spray solenoid and Spray 2 is the reverse spray solenoid.

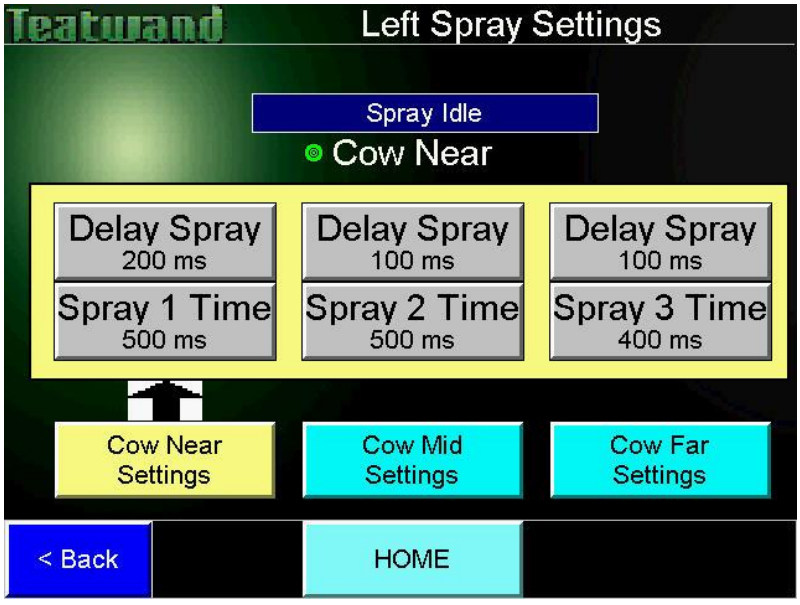


Figure 31

The Teatwand™ will spray in the mode shown on screen, ignoring the Cow Position Sensor. When Cow Near Settings is highlighted the Teatwand™ will only spray using the Cow Near spray profile.

See Appendix B for default settings. The Default settings are a starting point, fine tuning will be required for final set up.

Analog Settings Page.

- The Cow Position Sensor is an analog laser sensor that must be zeroed once installed. This sensor registers the position of the cow within the stall and provides the program with information to select either Near, Mid or Far Cow spray patterns.

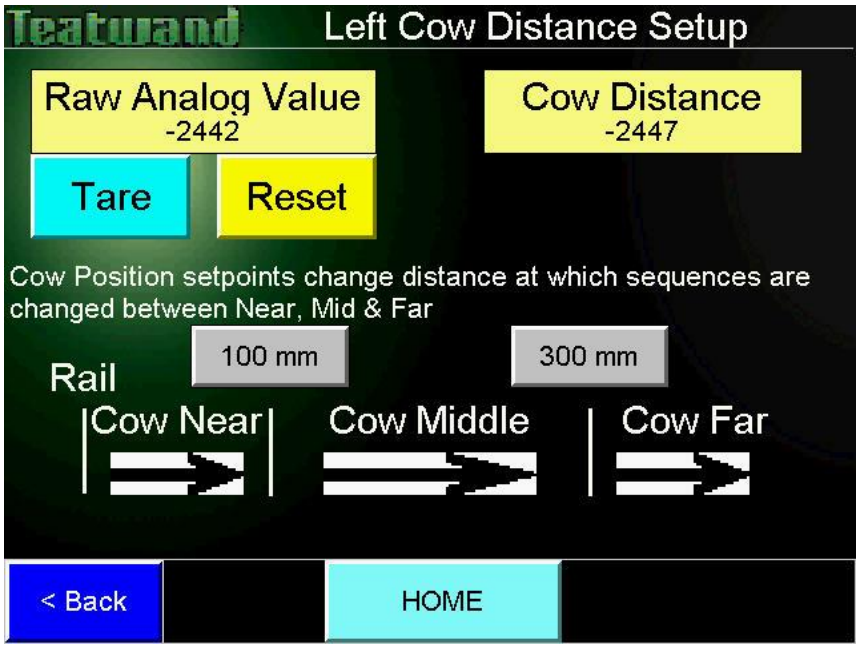


Figure 32

- With the laser directed at the rump rail directly behind the cow press the “Tare” button to zero the sensor. The raw analog value will be zero or very close to it. This sensor is very sensitive and vibration will be detected, the value will modulate around a zero point.
- The 2 grey buttons indicate the points where the spray pattern will change from one cow position to the next. 100mm and 300mm are the default settings for this sensor. These are adjustable. By pressing either button a touchpad will appear where a new value can be entered. In cases where there are many smaller cows in the herd the 300mm value may need to be increased.

Manual Operation Page

- Allows the user to manually operate the Teatwand™, purge the spray nozzles and bypass sensors. Cup sensor will be bypassed.

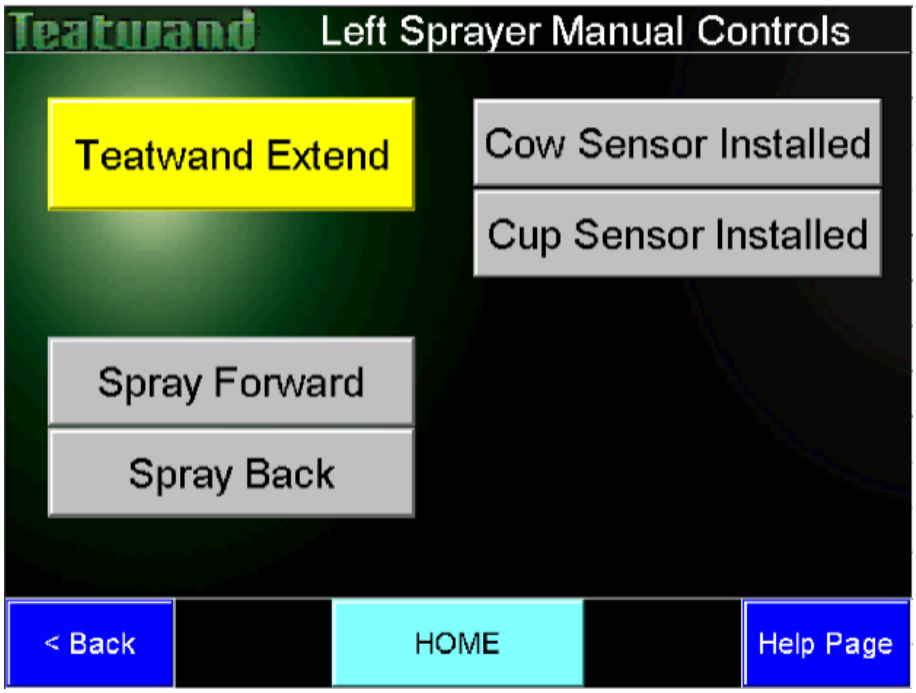


Figure 33

Help Page

- Shows the operation of inputs and outputs.

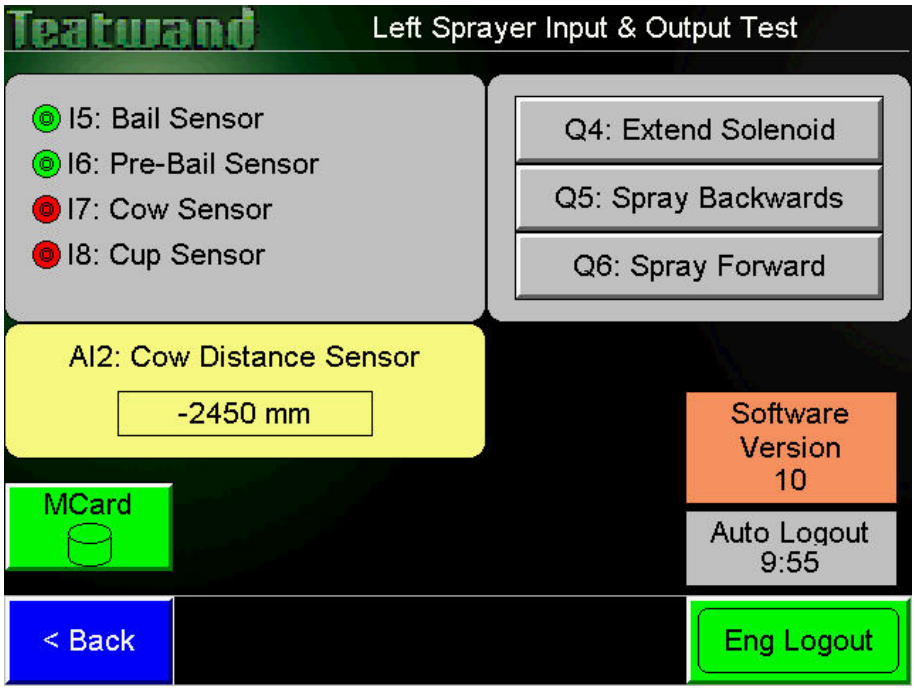


Figure 34

Commissioning.

a. Turn on power to controller.
   - Check the touchscreen displays the home page.

b. Turn on air supply to system.
   - Check pressure is at 90psi on the Air Service Unit. Check for leaks.
   - Check Teatwands™ are plumbed correctly, i.e. they stay retracted with air on.
   - Use Manual Page in touchscreen to check Teatwands™ extend operation.

c. Turn on Teat spray.
   - Set pressure at pump regulator to 40psi.
   - Check for leaks
   - Use Manual Page in touchscreen to purge teat spray through hoses.
   - Check forward spray and back spray are correct, swap spray hoses at 8mm unions if required.

d. Turn on Water.
   - Check for leaks
   - Use Washer Settings Page to manually operate wash nozzles.

e. Check Inputs. (Sensors)
   - With the rotary turning, go to the help page
   - Check Stall Sensors are connected correctly, the Pre-Stall first then the Stall Sensor. Swap plugs on sensors if required.
   - Check Cow Sensor is aligned correctly – looking down and slightly angled across the stall to look at the cows back. Set the distance so the sensor is reading towards the front of the stall but not picking up on steelwork beyond that.
   - Set the Cow Position Sensor. Point the red laser dot at the rump rail. Go to the Settings Page in the touchscreen, open the Analog Settings Page. Press the 'Tare Button'. This sets a zero point for the sensor and it measures from that point. Realign the Cow Position Sensor to look at the back end of the cow.

f. Setting the Stall Sensor position.
   - Stop the rotary at a position where the Teatwand™ would extend over the first ridge of the Spread Eagle Leg Spreader. Go to the Stall Sensors and position the 'Pre-Stall' Sensor 1'' to 2'' away, before the tag will activate it, fine tuning is done by means of adding delay to this signal on the Slide Setup page on the touchscreen, 'Slide Start Delay'.

Set Up and Fine Tuning the Teatwand™ Rapid Slide.

Ensure the default settings are entered into the Spray Settings and Teatwand™ Settings Pages – see Appendix B.

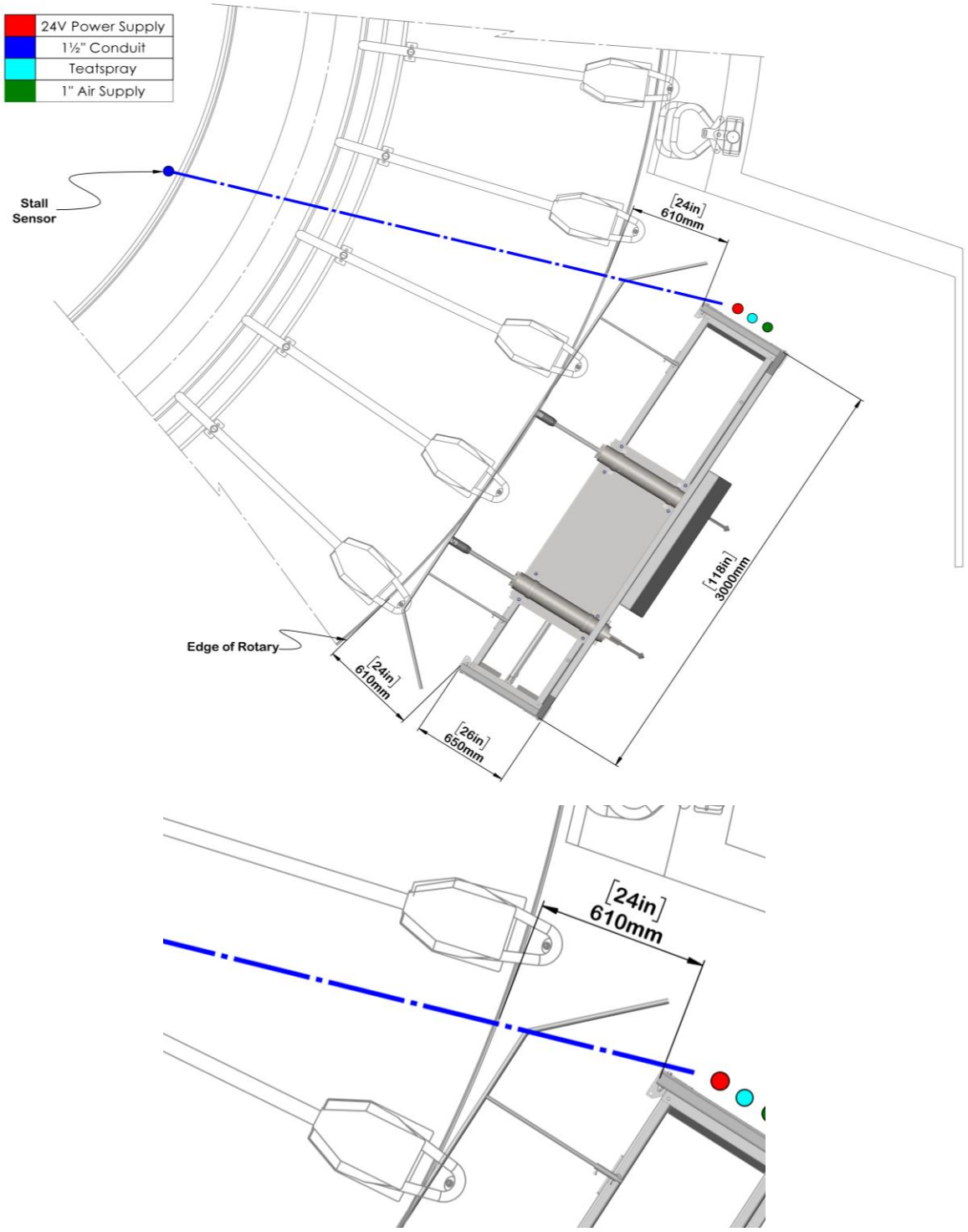
- Set Slide speeds first.
- Disconnect the solenoid plugs from the Teatwand™ left and right solenoids, to disable the Teatwands™ while making initial settings.
- Set teat spray pump regulator to zero to avoid wasting spray product.
- Go to the Manual Page on the touchscreen – Bypass the Cup Sensor
- Press Start button on touch screen. If the Slide does not move with the rotary check the Cow Sensors are detecting cows.
- Run the rotary at the fastest milking speed used in the dairy.
- Use speed controller for Slide Speed 3 to set the Slide speed slightly slower than the rotary. Slide should extend fully, adjust Slide Extend time.
- Repeat for slowest milking speed – Slide Speed 1 speed controller.
- Repeat for medium milking speed – Slide Speed 2 speed controller.
- Use the Slide Start Delay function to add delay to the start of the Slide operation. Watch the nozzles while the Slide is moving, are they tracking over the Spread Eagle Leg Spreaders on the rotary? Add or subtract delay to achieve this. It may be necessary to move the Stall Sensors a little.

Set up Teatwands™.

- Refit Teatwand™ left & right solenoid plugs.
- Press the start button, the Teatwands™ will operate as the Slide moves.
- Use the Sprayer Extend Delay function to add delay if the Teatwand™ is activated too early. If the Teatwand™ is activated too late reduce the Slide Start Delay value.
- The Teatwand™ should extend fully over the first ridge of the Spread Eagle Leg Spreader and retract over the second ridge without hitting cows' legs.
- Run the rotary at Slow and Medium speeds and use the Slide Start Delay functions to set up for the respective rotary speeds.
- To achieve this, it may be necessary to adjust Teatwand™ extend times in the Teatwand™ Settings Page and adjust the Teatwand™ extend and retract speed control valves.
- Set teat spray pump to 40psi, look for good coverage on all 4 teats. It may be necessary to adjust spray pattern in the spray settings page.

Tips and Tricks.

- The Teatwand™ Rapid Slide needs to be set to move slightly slower than the rotary.
  When activated by the Stall Sensor the Teatwands™ will extend over the leading ridge of the Spread Eagle Leg Spreader spraying the leading side of the cows udder. As the rotary is travelling a little faster than the Slide the Teatwands™ will retract over the trailing ridge of the Spread Eagle Leg Spreader spraying the trailing side of the cows udder.
- Ensure the Cup Sensors are bypassed in the Manual Control Page. This sensor is only fitted in situations where there is no position take off of the cluster and cows may go around the rotary twice.
- Teatwand™ missing cows. Check Cow Sensors are correctly aligned and the distance setting on the sensor is set to detect a position towards the front of the stall.
- Teatwand™ missing same stall every rotation. Check the tag/object the Stall Sensors are reading for that stall.
- Spray usage. In the spray settings page, a total of 1500ms spray time will deliver 20mls of spray at 40psi.
- Default settings. Start the fine-tuning process with the default settings


24V Power Supply
1½" Conduit
Teatspray
1" Air Supply
Stall Sensor
[24in] 610mm
[118in] 3000mm
Edge of Rotary
[24in] 610mm
[26in] 650mm
[24in] 610mm

APPENDIX B – DEFAULT TIMING SETTINGS

Near Spray Timing

Spray 1 Delay: 300 ms. Spray 2 Delay: 100 ms. Spray 3 Delay: 100 ms.

Spray 1 Time: 500 ms. Spray 2 Time: 500 ms. Spray 3 Time: 500 ms.

Mid Spray Timing

Spray 1 Delay: 400 ms. Spray 2 Delay: 100 ms. Spray 3 Delay: 100 ms.

Spray 1 Time: 500 ms. Spray 2 Time: 500 ms. Spray 3 Time: 500 ms.

Far Spray Timing

Spray 1 Delay: 700 ms. Spray 2 Delay: 0 ms. Spray 3 Delay: 0 ms.

Spray 1 Time: 500 ms. Spray 2 Time: 500 ms. Spray 3 Time: 500 ms.

Teatwand™ Extend Times

Cow Near Extend 1200ms

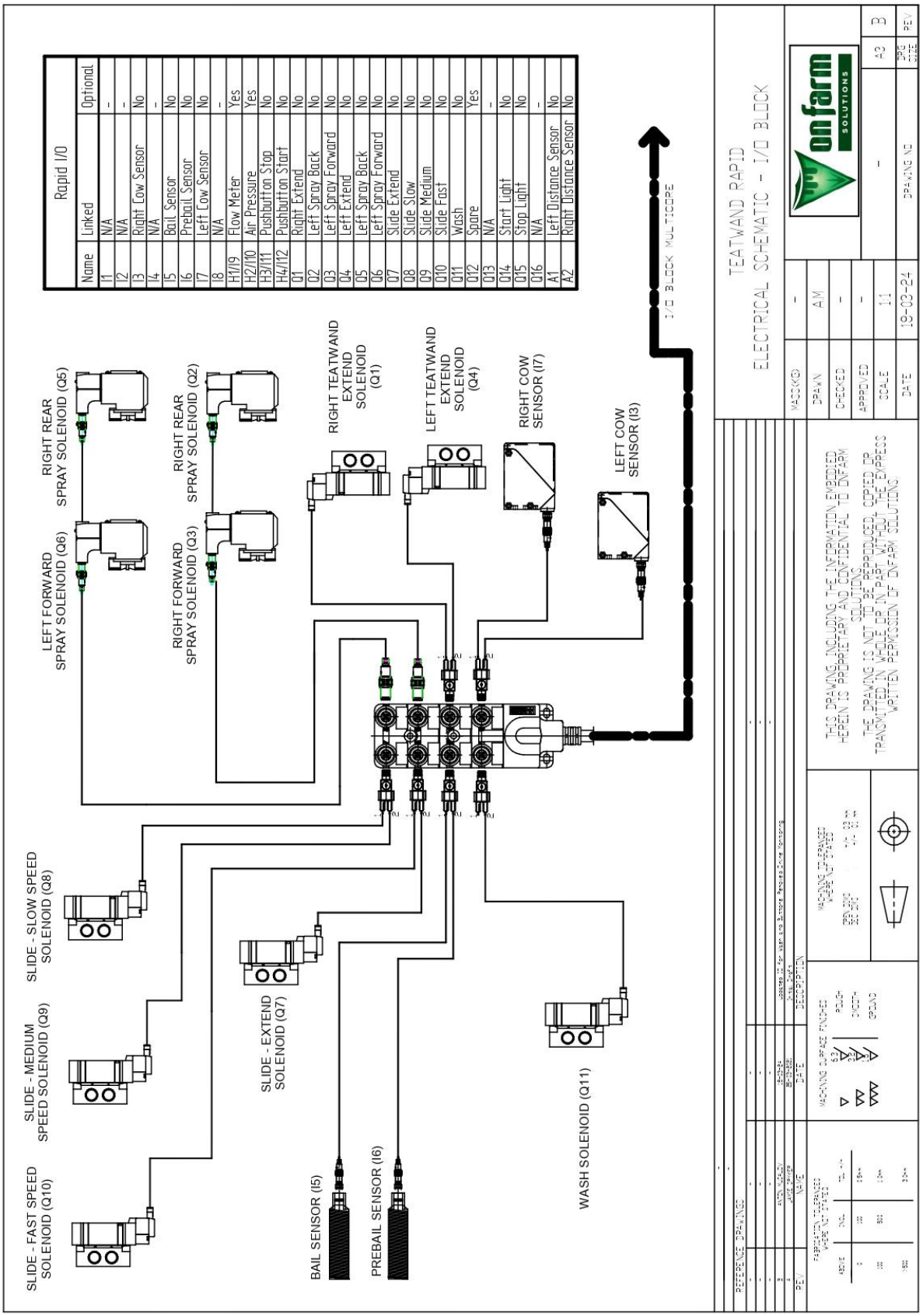
Cow Mid Extend 1300ms

Cow Far Extend 1400ms

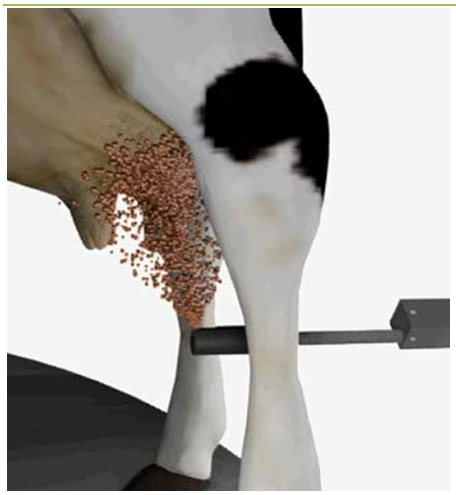
Analogue Distance Settings

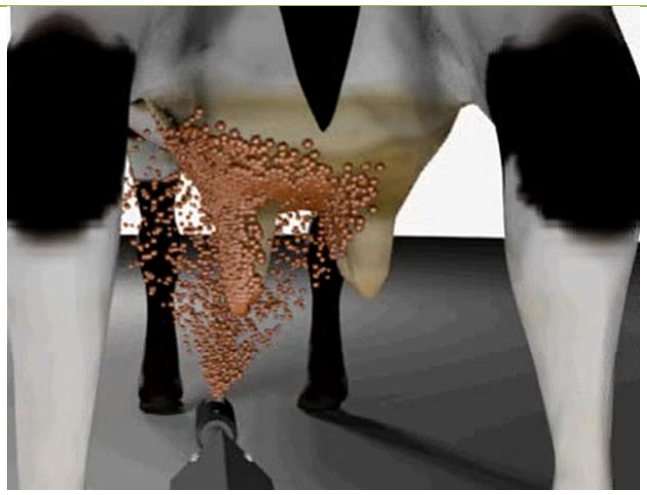
Cow Mid 200mm Cow Far 300mm

APPENDIX C – ELECTRICAL LAYOUT

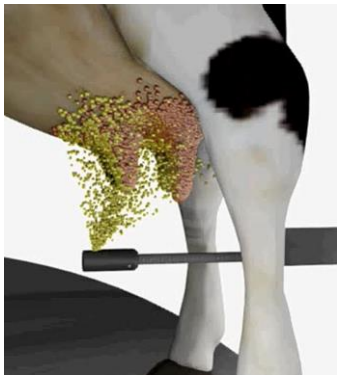


APPENDIX D - SPRAY SEQUENCE TEAT COVERAGE

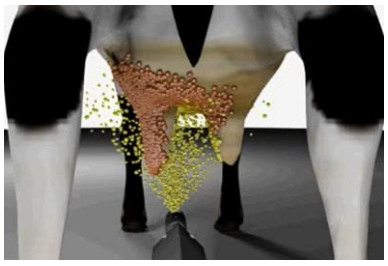




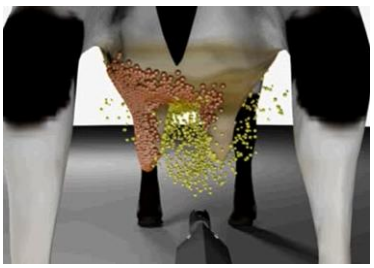
First Forward Spray



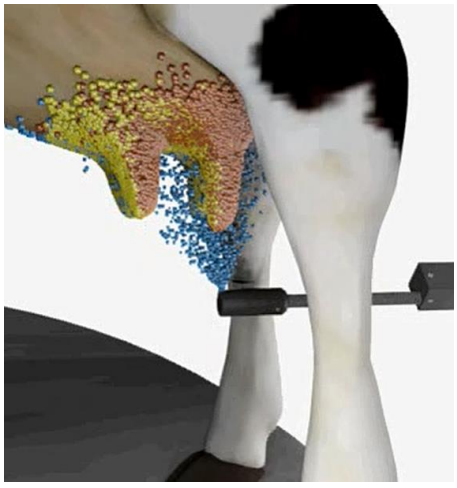
Reverse Spray

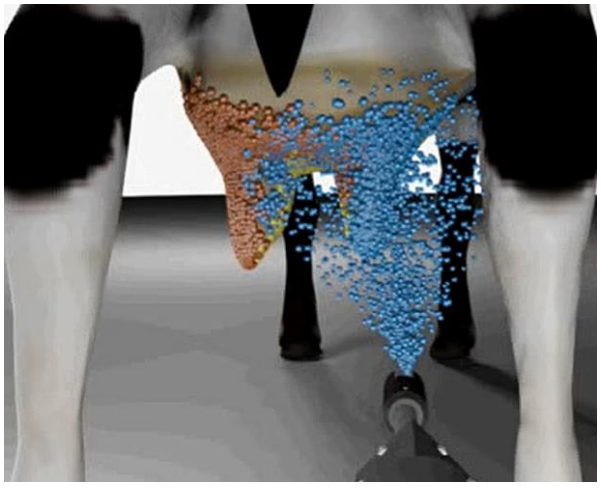


Reverse Spray Starting



Reverse Spray Stopping





Second Forward Spray