Teatwand STEPOVER

SERVICE MANUAL

VERSION 1.2
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Congratulations on your purchase of a Teatwand product.

Teatwand™ STEPOVER

The most recent addition to the Onfarm Solutions product range providing accurate efficient teat spraying for herringbone and parallel parlours.

Teatwand™ EXACT

Developed as a solution to accurately deliver teat spray to cows as they pass on rotary platforms.

Teatwand™ RAPID

The result of customer requests for a solution to teat spraying on large fast moving rotary platforms primarily in the USA.

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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 machinery.

HAZARDS:

- Wet floors and yards – wear appropriate safety footwear to avoid slips.
- Cows – always maintain a safe distance from the cows.
- Electric Shock – take care using extension leads. Always use an RCD.
- Laser Sensors – do not look directly into laser sensor.

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.

HAZARDS:

- Noise – Milking parlours can be noisy places, use appropriate PPE.
- Pinch Points – Swinging gates in the parlour and yards can create pinch points.
- Crushing Hazards – Maintain a safe distance from cows exiting the parlour and moving through the yards.
- Electric Shock - Electrical connection to power supply is 240/110V. Electrical connection between controller/power supply and the device is 24VDC.
- Compressed Air - Turn off compressed air supply and remove residual pressure from the device when doing service work or maintenance. Immediately repair any compressed air leaks.
- Chemical Hazards - Teat spray can be hazardous. Avoid contact with skin and eyes. Use appropriate PPE.

Teatwand Stepover System Overview.

The Teatwand Stepover automatic teat sprayer is the most recent product to be developed by Onfarm Solutions for herringbone and parallel dairies. The robust design uses stainless steel for strength and durability and our proven teat spray delivery system uses the same components as other Teatwand products. Designed to accurately teatspray cows as they enter and/or exit the milking parlour the Teatwand Stepover has four spray nozzles, two sets of two, independantly controlled to provide excellent coverage regardless of how fast the cow is moving.

Clever use of optical sensor technology, a smart program and simple push button controls make this a set and forget tool for the modern farmer.

An automatic nozzle wash function periodically cleans the nozzles and an optional automatic purge function will periodically blast clean water through all nozzles to reduce residual teat spray build up and ensure the nozzles are always clean.

There is an online monitoring option available to remotely check your Teatwand Stepover is functioning correctly. Information will be available on the number of cows sprayed, milking start and finish times and volume of teat spray used.

Daily Checklist for Teatwand Stepover System.

To be carried out by dairy staff.

- Check both sets of nozzles for blockages. Manually operate using the buttons on the controller, check the spray pattern.
- Check the wash function is working. Manually operate using the Wash button on controller. The dairy wash pump will need to be going.
- Check air pressure is at 40psi on the teat spray pump.
- Hose down the Stepover unit after every milking, take care not to direct high pressure water through the slotted holes in the Controls Cabinet.

Weekly Checks.

- Open the nozzle cover on the Teatwand Stepover unit. See Appendix 1. Clean and hose down the nozzle area.
- Clean the face of the two sensors in the Controls Cabinet using a damp cloth.

WARNING: DO NOT LOOK DIRECTLY INTO THE LASER.

- Using the manual buttons on the controller check the operation of both sets of spray nozzles and the wash nozzle.

Care and Maintenance of the Teatwand Stepover.

- The system should remain powered up at all times. Use the enable button to turn the system on and off but leave the power on to the system.
- The sensors will require weekly cleaning, lift the hinged lid of the Controls Cabinet, take a damp cloth, and clean the face of each sensor.
- Hose the Stepover unit down after every milking, taking care not to direct high pressure water through the slotted openings in the controls cabinet.
- Open the Nozzle cover and hose down every week.
- If the system is not being used for a period of time flush the teat spray lines with clean water. Place the suction hose from the pump in a 20l/5gal bucket of clean water and manually operate the spray back and spray forward buttons on the controller until clean water comes through. Follow this procedure whenever teat spray products are changed. Some teat sprays will react with each other causing nozzle blockages and even solenoid failure.
- Drain the air compressor regularly, moisture will be detrimental to the Teat Spray Pump.

Troubleshooting.

When Chlorine Dioxide is used as a teat spray it will be necessary to replace the teat spray accumulator every 6 months.

Spray timing – if the spray timing appears wrong, spraying early or late or randomly - carry out the following checks.

1. Switch the power off to the device for 2 minutes and switch back on again.
2. Check the face of the sensors are clean, use a soft damp cloth to clean the face of the sensors.

WARNING: DO NOT LOOK DIRECTLY INTO THE LASER.

3. Look closely at the face of the sensor, the red coloured window, any sign of condensation on the inside of the sensor indicates there is moisture present. This usually means the sensor will need to be replaced.
4. Check the sensors are functioning correctly by observing the LEDs on the back of the sensors.

Part # S010

The 'run' LED will illuminate green when the sensor is powered up. This should be illuminated all the time.

'Q2' LED should be illuminated yellow all the time indicating the laser is detecting the far side of the race. If 'Q2' is not illuminated check the laser is detecting the far side of the race.

'Q1' LED will illuminate yellow when a cow passes through the race.

If 'Q1' is illuminated all the time, check the face of the sensor is clean or check to see what the sensor is detecting. Condensation in the sensor may cause 'Q1' to remain on all the time. 'Q1' will only detect objects up to 500mm (19.5inches) away from the face of the sensor.

If 'Q1' is flickering as cows pass or when there are no cows check and clean the face of the sensor, check the sensor alignment.

These sensors are preprogramed at the factory and cannot be reset however it may be necessary to recalibrate the sensors. If a sensor has been replaced it will require calibration when installed.

Calibrating the sensors.

There are two sensors, they are identical, they measure distance. The first sensor the cows pass is the 'Start' sensor the second is the 'Finish' sensor.

Calibration will set a 'near' point and a 'far' point, once calibrated the sensors will measure between these two points. Begin with the 'Start' sensor, the first sensor the cow's pass.

- Place an object or a hand in front of the sensor at the position of the near rail.
- Press and hold the 'Calibrate Near' button. There will be a beep.
- Place an object or have someone hold their hand at the position of the rail on the far side of the lane in line with the laser dot.
- Press and hold the 'Calibrate Far' button. There will be a beep.
- These settings will automatically transfer to the 'Finish' sensor.

Fine tuning spray start and finish times – the sensors are pre-set at 550mm (21.5inches) apart, this has been optimised to suit most herds. However, it is possible to change the start and finish times of the spray sequence. To make the Stepover start spraying earlier move the 'Start Sensor' closer to the approaching cow. To make the Stepover finish spraying later move the 'Finish Sensor' further away from the approaching cow. This will make the entire spray sequence longer. Moving one or both of these sensors closer together will make the spray sequence shorter. Adjustments to these sensors must only be done after observing a large sample size of cows to ensure any adjustment made does not result in some cows being inadequately sprayed.

Poor Spray pattern from the Nozzles – the nozzles have a 60-degree full cone spray pattern. To check the spray patterns, use the 'Spray Back' and 'Spray Forward' buttons on the controller to manually operate the nozzles. Observe the individual nozzle performance. If one or two nozzles are not spraying well, remove them and clean them out by immersing in hot water for a minute and blowing through with compressed air from both directions. Refit and check again if there is no improvement the nozzles will have to be replaced. If all four nozzles appear to be displaying a poor spray pattern check the teat spray pump is set at 35-40psi and there is not air in the spray lines. At the spray pump on the suction side there is a filter, check it is clean and not blocked in any way.

Missing Smaller Cows – It may be necessary to lower the controls cabinet if the system is missing smaller cows in the herd. The recommended height off the ground is 1200mm (47'') however if it is missing smaller cows, it should be set up at 1100mm (43'')

Recommended Maintenance Schedules.

Schedule 1. Up to 2000 cows per day per Stepover Sprayer.

Six Monthly Maintenance.

- If Chlorine dioxide is used as teat spray replace the teat spray accumulator. (FF002)

Annual Maintenance.

- Include weekly checks.
- Replace spray nozzles. (FF053)
- Replace Rotary Wash Nozzle. (FF048)
- Clean the teat spray filter located on the suction side of the spray pump.
- Check U Bolts and clamps on the Controls Cabinet are tight.

Two Yearly Maintenance.

- Include Annual Maintenance.
- Replace Spray Solenoids. (FF054)

Three Yearly Maintenance.

- Include Two Yearly Maintenance.
- Replace Wash Solenoid. (FF056)
- Replace Purge Solenoid. (FF055) – USA version only
- Replace Teat Spray pump. (PUMP001)

Schedule 2. 2000 to 5000 cows per day per Stepover Sprayer.

When Chlorine Dioxide is used as a teat spray it will be necessary to replace the teat spray accumulator every six months.

Six Monthly Maintenance.

- Include weekly checks.
- Replace spray nozzles. (FF053)
- Replace Rotary Wash Nozzle. (FF048)
- If Chlorine dioxide is used as teat spray replace the teat spray accumulator. (FF002)
- Clean the teat spray filter located on the suction side of the spray pump.

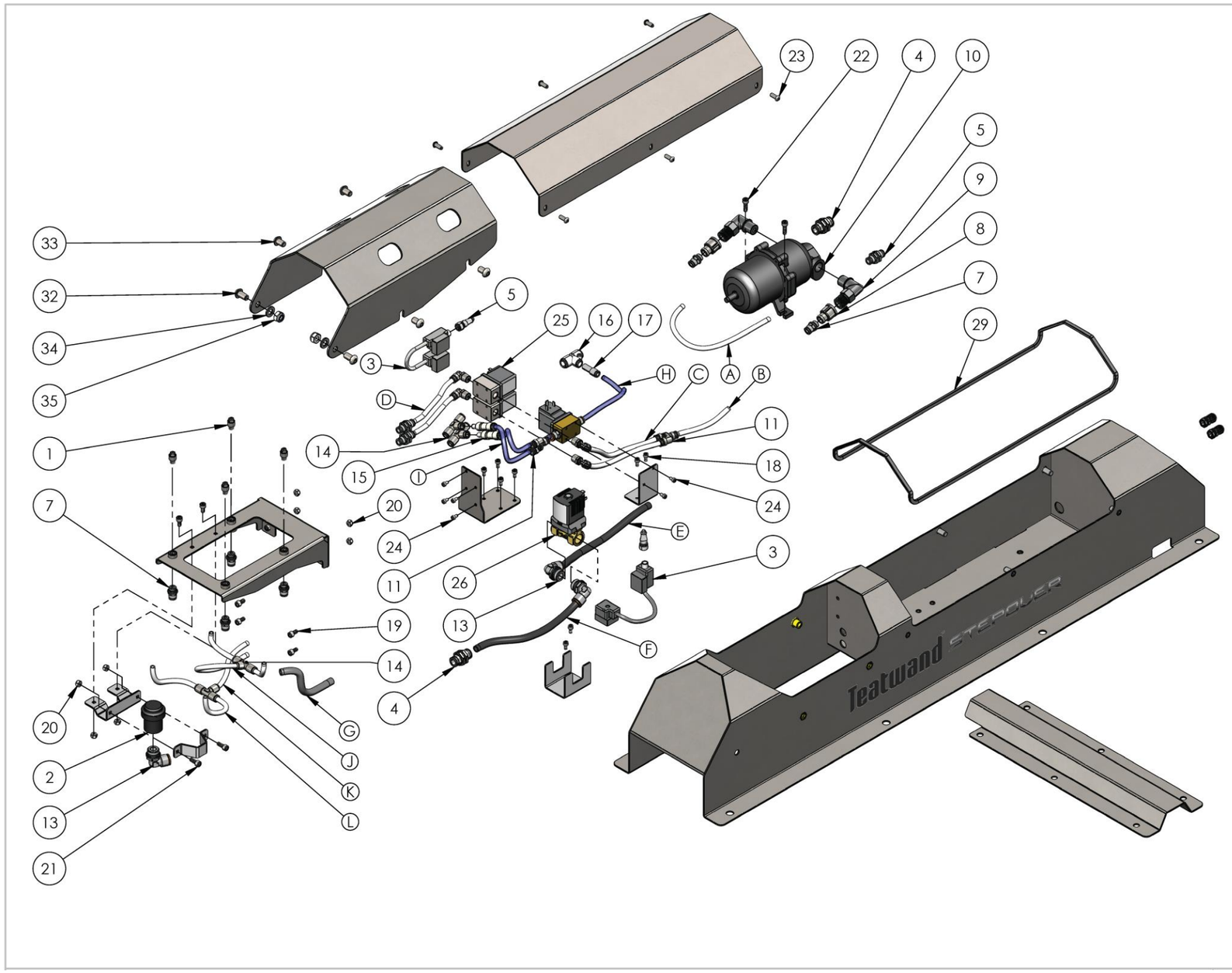
Annual Maintenance.

- Include Six Monthly Maintenance.
- Replace Spray Solenoids. (FF054)
- Check U Bolts and clamps on Controls Cabinet are tight.

Two Yearly Maintenance.

- Include Annual Maintenance.
- Replace Wash Solenoid. (FF056)
- Replace Purge Solenoid. (FF055) – USA version only
- Replace Teat Spray pump. (PUMP001)

Appendix 1. Teatwand Stepover Unit: Exploded Vie



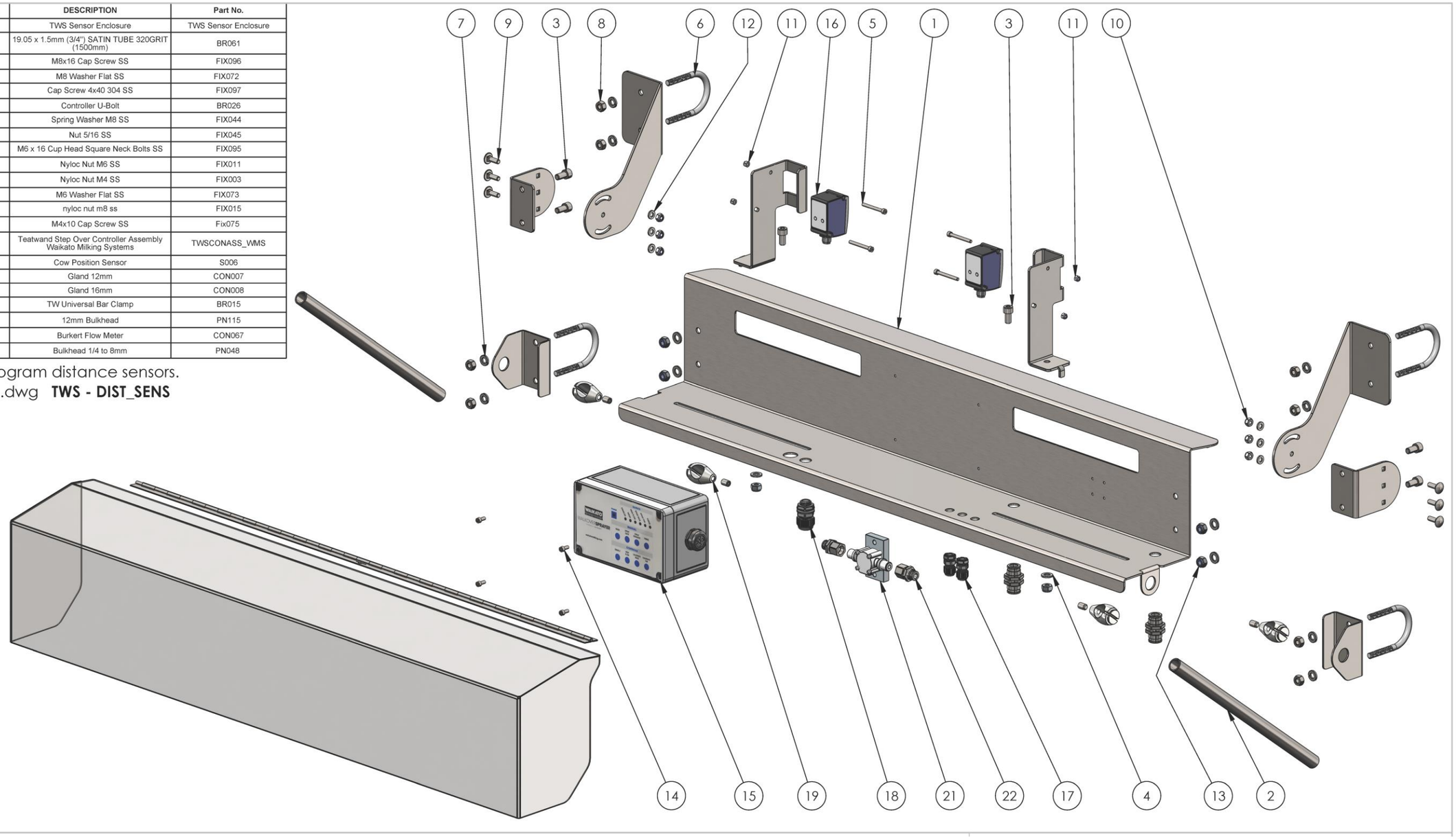
ITEM NO.	QTY.	DESCRIPTION	PART NO.
1	4	STEPOVER NOZZLE (WL 1/2-60DEG NOZZLE IN 316SS)	FF053
2	1	ROTARY WASH NOZZLE	FF048
3	2	DOUBLE SPRAY SOLENOID PLUG	C008
4	2	12mm BULKHEAD	PN115
5	3	8mm BULKHEAD SS	PN060
6	4	8mm TO ¼ ELBOW SS (BURKERT)	PN117
7	6	STRAIGHT 8mm TO 1-4 BSP (BURKERT)	PN118
8	2	STAINLESS STEEL ⅛ TO ¼ REDUCER	FF035 S/S
9	2	SNAP IN VITON ELBOW WITH ⅛ THREAD	FF047
10	1	TEATWAND ACCUMULATOR	FF002
11	2	8mm Y CONNECTOR SS	PN061
12	2	STRAIGHT 8mm TO 1-4 BSP (BURKERT)	PN120
13	3	ELBOW 12MMX1-2 BURKERT	PN114
14	4	8mm Tee S-S (Burkert)	PN119
15	2	8mm NON RETURN VALVE	PN017
16	1	REDUCING TEE 12MMX10MM	PN122
17	1	REDUCER 10-8mm	PN012
18	8	CAP SCREW 5X10 304 SS	FIX004
19	6	CAP SCREW 6X12 304 SS	FIX007
20	8	NYLOC NUT M6 SS	FIX011
21	2	CAP SCREW 6X16 304 SS	FIX008
22	2	CAP SCREW 6X20 304 SS	FIX009
23	6	BUTTON HEAD CAP SCREW 6X16 304 SS	FIX047
24	6	CAP SCREW M4X8 S/S	FIX091
25	2	TEATSPRAY VALVE (BURKERT) 1/4" S/S	FF054
26	1	WASH VALVE (BURKERT) 1/2" BRASS	FF056
27	1	WASH VALVE (BURKERT) 1/4" BRASS	FF055
28	1	TWS SPRAY ENCLOSURE	TWS SPRAY ENCLOSURE
29	1	RUBBER CHANNEL	RUBBER_CHANNEL
30	2	GLAND 12mm	CON007
31	2	SENSOR CABLE 5m MALE-FEMALE M12	C010
32	2	M10 X 20 BUTTON HEAD CAP SCREW SS	FIX107
33	4	M10 X 16 BUTTON HEAD CAP SCREW SS	FIX108
34	2	M10 WASHER FLAT SS	FIX071
35	2	M10 NYLOC NUT SS	FIX082

ITEM NO.	QTY.	DESCRIPTION	PART NO.	LENGTH (mm)
A	1	8mm - TUBING POLYETHELENE NATURAL	TU001	400
B	1			100
C	2			225
D	2			170
E	1	12mm TUBING BLUE	TU010	300
F	1			280
G	1			200
H	1			300
I	2			120
J	1	8mm - TUBING POLYETHELENE NATURAL	TU001	300
K	1			240
L	4			110

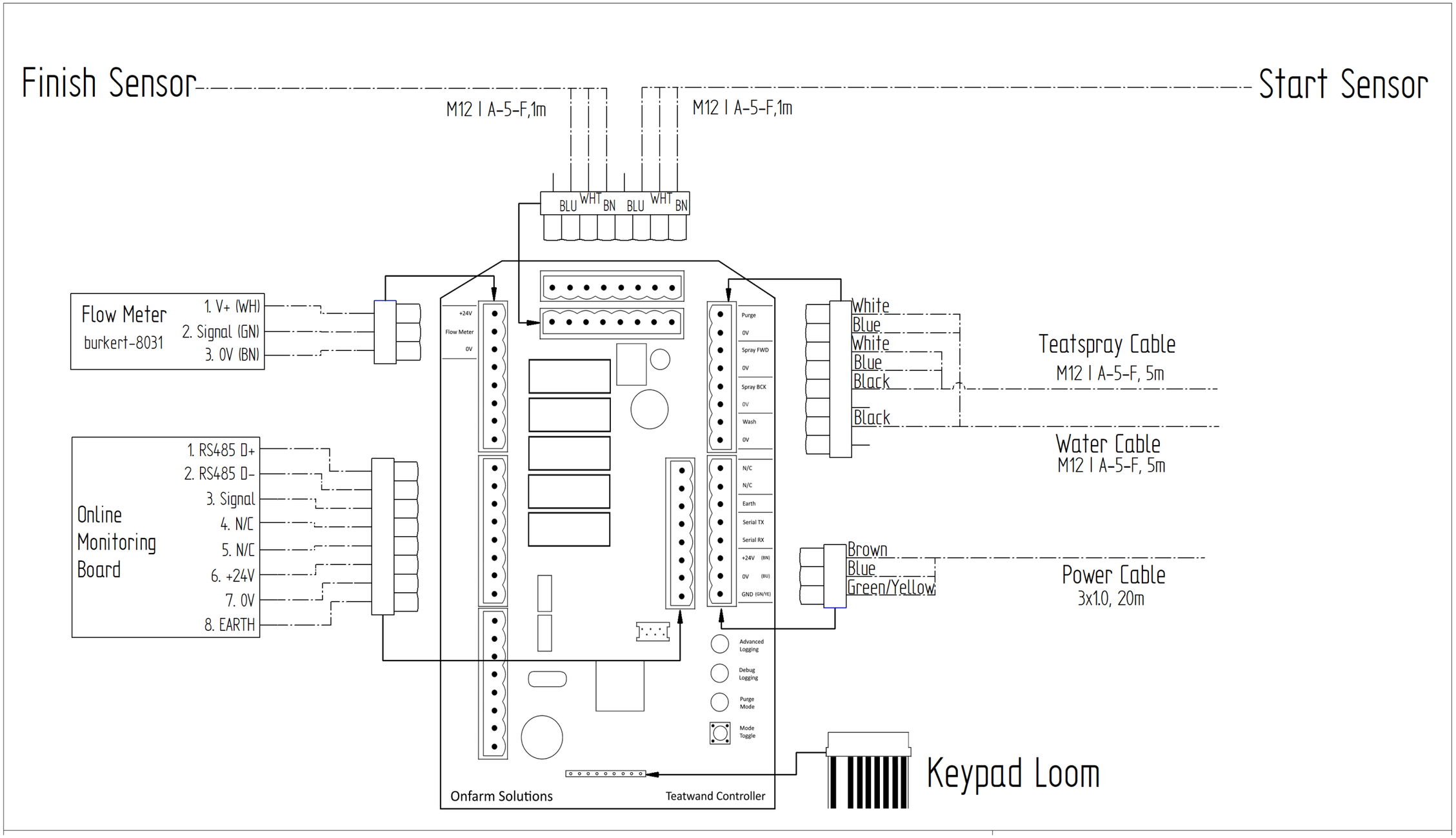
Appendix 2. Teatwand Stepover Controls Cabinet: Exploded View

ITEM NO.	qty.	DESCRIPTION	Part No.
1	1	TWS Sensor Enclosure	TWS Sensor Enclosure
2	2	19.05 x 1.5mm (3/4") SATIN TUBE 320GRIT (1500mm)	BR061
3	6	M8x16 Cap Screw SS	FIX096
4	6	M8 Washer Flat SS	FIX072
5	4	Cap Screw 4x40 304 SS	FIX097
6	4	Controller U-Bolt	BR026
7	8	Spring Washer M8 SS	FIX044
8	8	Nut 5/16 SS	FIX045
9	6	M6 x 16 Cup Head Square Neck Bolts SS	FIX095
10	6	Nyloc Nut M6 SS	FIX011
11	4	Nyloc Nut M4 SS	FIX003
12	6	M6 Washer Flat SS	FIX073
13	6	nyloc nut m8 ss	FIX015
14	4	M4x10 Cap Screw SS	Fix075
15	1	Teatwand Step Over Controller Assembly Waikato Milking Systems	TWSCONASS_WMS
16	2	Cow Position Sensor	S006
17	2	Gland 12mm	CON007
18	1	Gland 16mm	CON008
19	4	TW Universal Bar Clamp	BR015
20	2	12mm Bulkhead	PN115
21	1	Burkert Flow Meter	CON067
22	2	Bulkhead 1/4 to 8mm	PN048

Note: Program distance sensors.
Refer to .dwg **TWS - DIST_SENS**



Appendix 3. Wiring Diagram



Appendix 4. PCB Detail.