VERDERFLEX®



Peristaltic Cased Tube Pump

Appendices

Vantage 5000

Version 1.0v-07/2016

Print-No. 01



CE

VERDER
passion for pumps

Version 1.0v-07/2016
Print-No. 01

Vantage 5000

Table of contents

1. **Appendix A**
Pump Specification

2. **Appendix B**
Spare Parts Replacement

3. **Appendix C**
Ordering Information

4. **Appendix D**
Remote Control Options

5. **Appendix E**
25 WAY Remote I/O Connector

6. **Appendix F**
Breakout Box

7. **Appendix G**
Error, Warning, Event Codes and Descriptions

8. **Appendix H**
Formatting the USB drive

9. **Appendix I**
Standards

Appendix A

1 Pump Specifications

1.1 Specification ratings

Size	Value
Operating temperature	+5 °C to +40 °C (41°F to 104 °F)
Storage temperature	-40 °C to +70 °C (40°F to 158 °F)
Humidity (non-condensing)	long—term ≤ 80 %
Maximum altitude	Setup height above sea level ≤ 1000 m (3280 ft)
Power consumption	<230 W
Supply voltage	100-240 VAC 50/60 Hz <230 W
Maximum voltage fluctuation	+/-10% of nominal voltage. A well regulated electrical mains supply is required along with cable connections conforming to the best practice of noise immunity
Installation category (overvoltage category)	II
Pollution degree	2
IP	IP66 to BS EN 60529. Equivalent to NEMA 4X as per NEMA 250 *(indoor use - protect from prolonged UV exposure)
dB rating	<70dB(A) @ 1.0m*
Control ratio	4000:1
Maximum speed	400 rpm

Table 1 Specification ratings

** Sound pressure level is measured by the responsible body at both operators position in normal use and at whatever point 1.0m from the enclosure of the equipment that has the highest sound pressure rating.*

1.2 Rotor options

Rotor Options	Tube Bore (mm)	Tube Type
LP 1.6WT Tube, Lower Pressure	1.6	Continuous Tubing; Tube Assemblies
	3.2	
	4.0	
	4.8	
	6.4	
	8.0	
LP 2.4WT Tube, Lower Pressure	3.2	Continuous Tubing; Tube Assemblies
	4.8	
	6.4	
	8.0	
	9.6	
MP 2.4WT Tube, 4 BAR Pressure	3.2	Tube Assemblies
HP 2.4WT Tube, 7 BAR Pressure**	3.2	Tube Assemblies

Table 2 Rotor options

*** Before using a new tube assembly, make sure the pump is run in the counter-clockwise direction for 1 minute.*

1.3 Tube options

For safety reasons we do not recommend pumping liquids greater than 80°C (176°F). The following criteria are important when selecting a tube:

- Chemical resistance
- Food grade quality
- Tube life
- Physical compatibility

Type	Feature
Verderprene	General purpose tubing
Silicone	High sterility tubing
Other	Others

Table 3 Verderflex Tube Variants

Appendix B

2 Spare Parts Replacement

DANGER

- Isolate the pump from the main power supply before opening the pump door or performing any positioning, removal or maintenance operation.

Note

Disconnect pump from pipework and close supply side values to prevent spillages.

2.1 Continuous Tube Replacement

1. Open the pump door.
2. Release the bottom tube clamp first by pressing up.
3. Remove the tube then release tube clamp.
4. Rotate the rotor assembly in a clockwise direction by hand, using the vertical guide rollers if necessary.
5. Release the top tube clamp to unlock the tube.
6. Remove the tube and release the tube clamp.

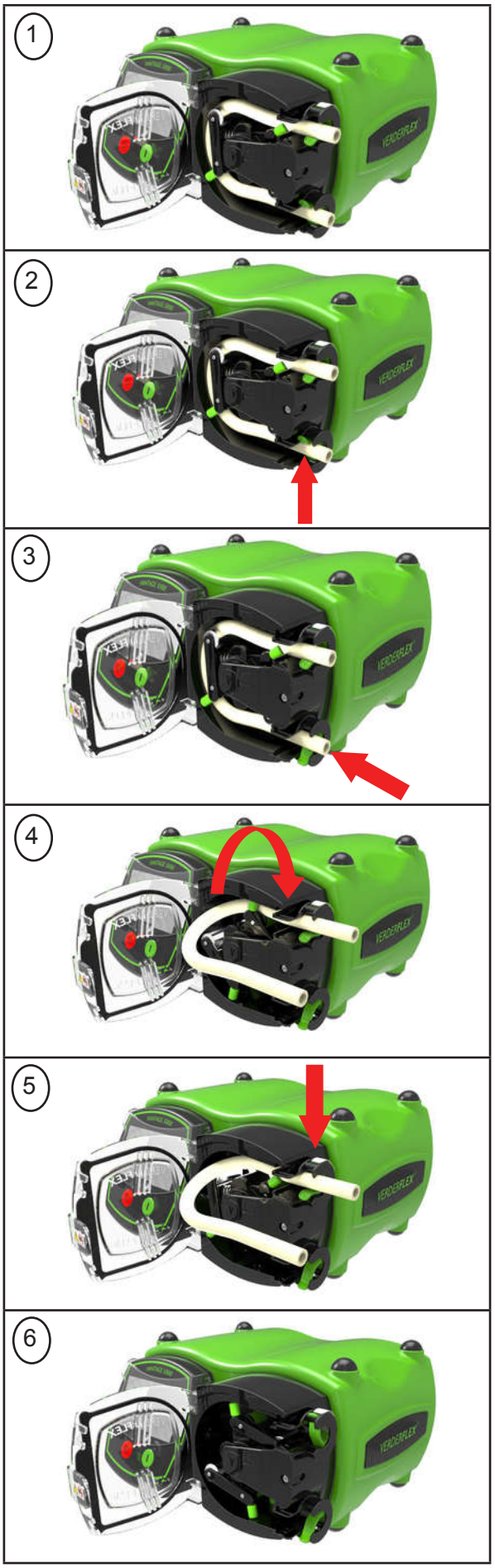


Figure 1 Continuous Tube Replacement

2.2 Tube Element Replacement

DANGER

- Isolate the pump from the main power supply before opening the pump door or performing any positioning, removal or maintenance operation.

Note

Disconnect the pump from pipework and close the supply side values to prevent spillage.

1. Open the pump door.
2. Slide the lower tube element housing out of the pump head.
3. Rotate the rotor assembly in a clockwise direction by hand, using the vertical guide rollers if necessary.
4. Gently pull the tube out while rotating.
5. Continue to turn the rotor assembly in clockwise direction.
6. Slide the tube element housing out of the pump head.

Note

If this is difficult a flat bladed screwdriver can be used. Remove the bearing strut plug and insert the screwdriver through into the groove in the rotor body.

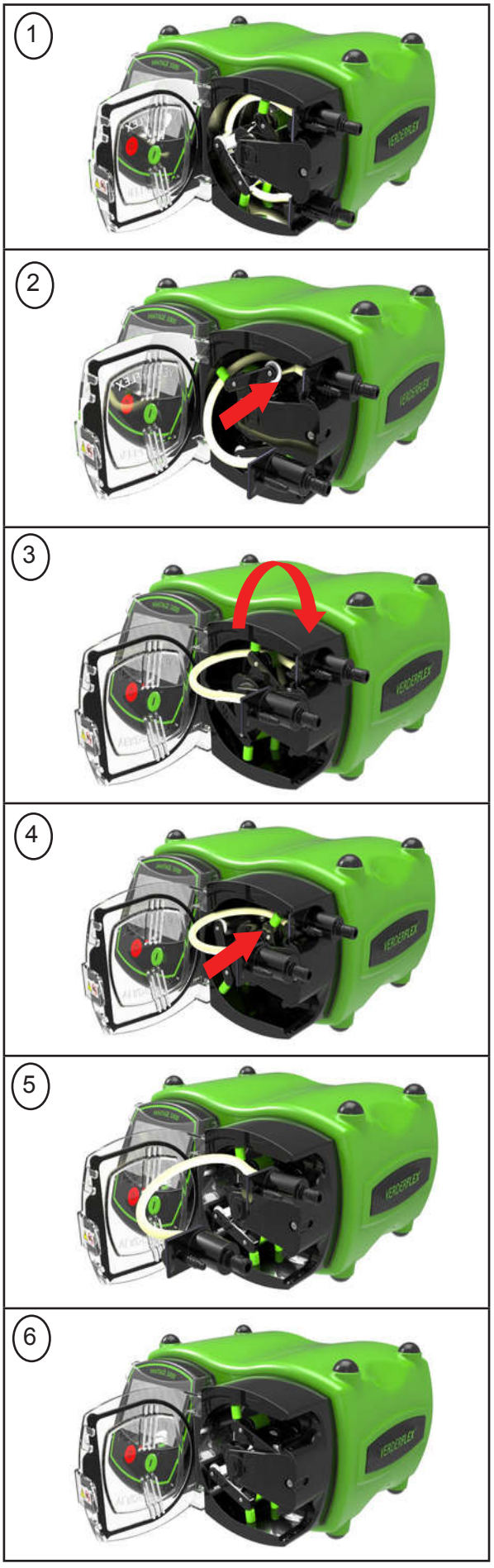


Figure 2 Tube Element Replacement

2.3 Rotor Assembly Replacement

DANGER

- Isolate the pump from the main power supply before opening the pump door or performing any positioning, removal or maintenance operation.

Note

Before removing the rotor assembly, make sure the tube has been correctly removed. (→ 2.1 Continuous Tube), (→ 2.2 Tube Element)

1. Unscrew the M4 bearing strut retaining screw using a screwdriver. (No.2 posidrive)
2. Remove the bearing strut.
3. Remove the rotor assembly by hand.

Note

This may take some effort due to assembly fit.

4. Bearing strut and rotor assembly have been removed.
5. Push replacement rotor into rear pump head bearing.

Note

Ensure the rotor assembly is fully pressed in.

6. Replace the bearing strut and thighten the retaining screw.

Note

The tightening torque value for the retaining is 1.5 Nm.

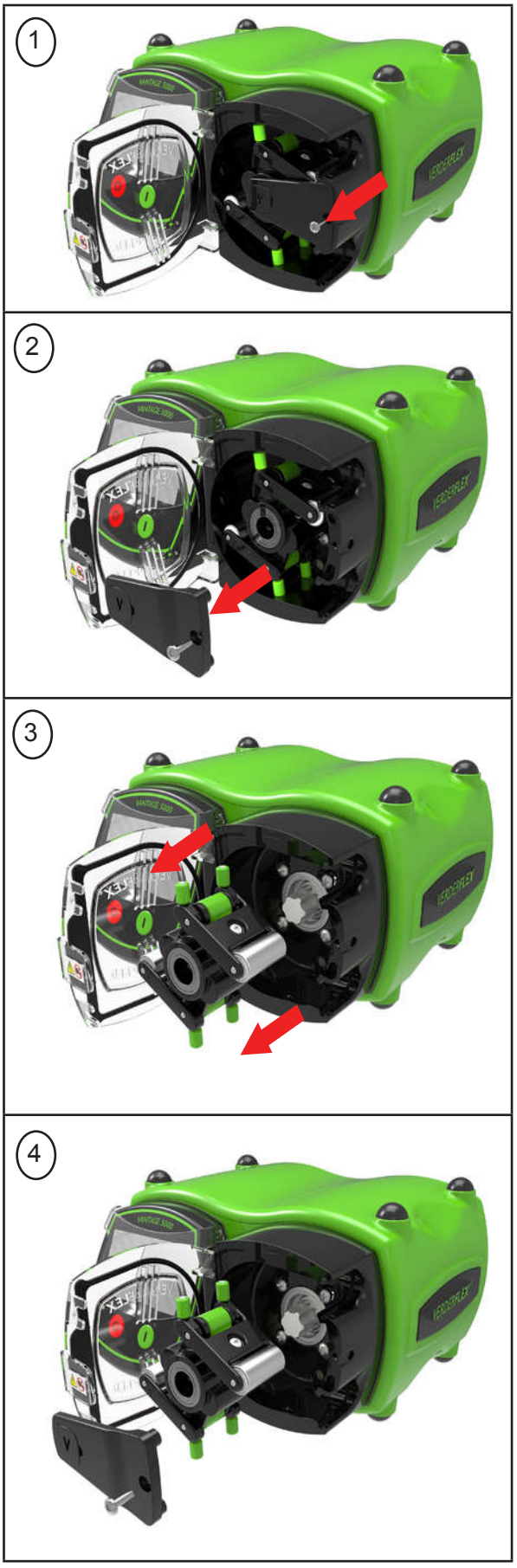


Figure 3 Rotor Assembly Replacement

Appendix C

3 Vantage 5000 Spare Parts List

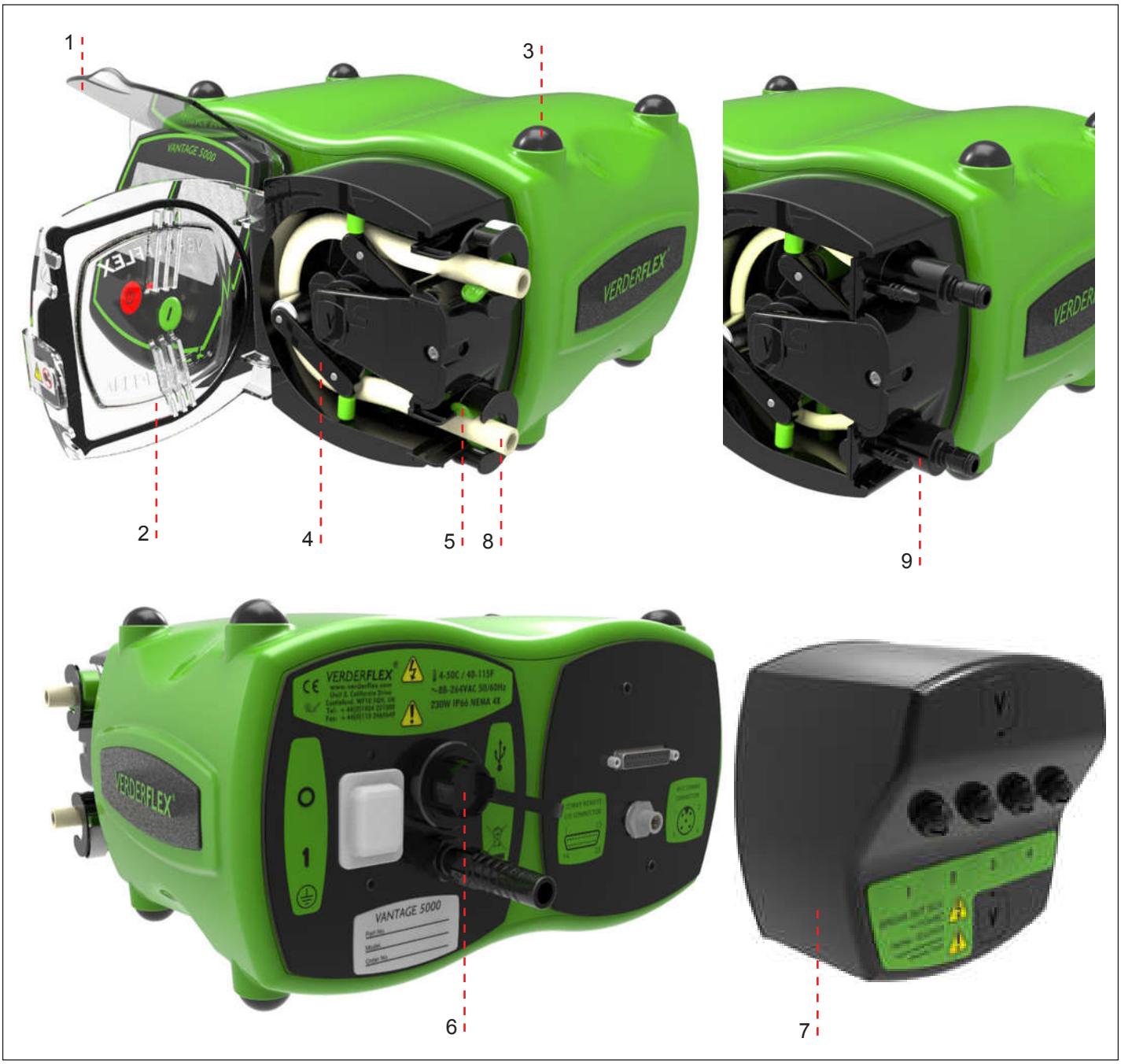


Figure 4 Vantage 5000 Spare Parts List

1	Screen Protector	4	Rotor Assembly	7	Breakout Box
2	Pump Door	5	Tube Clamp*	8	Continuous Tube
3	Standard Feet Pack	6	USB Cover	9	Tube Element

*Only required loose tubing

3.1 Vantage 5000 Spare Parts List

Ref	Item		Part No	QTY	Image
1.	**Screen Protector**		159.5019	1	
2.	**Pump Door (Assembly)**		159.5022	1	
3.	**Standard Feet Pack**		159.5020	8	
3.1	**Stacking Feet Pack**	Optional Stacking Feet for Landscape Orientation	159.5018	4	
4.	**Rotor Assembly**	1.6WT TUBE, Lower Pressure, BLUE code	159.5000	1	
		2.4WT TUBE, Lower Pressure, GREEN code	159.5001	1	
		2.4WT TUBE, Medium Pressure, YELLOW code	159.5002	1	
		2.4WT TUBE, High Pressure, ORANGE code	159.5003	1	
5.	**Tube Clamp**		159.5004	1	
6.	**USB Cover**		159.5021	1	
7.	**Breakout Box**	24 VDC	159.5023	1	
		115 VAC	159.5024	1	

Table 4 - Spare Parts List

3.2 Vantage 5000 Continuous Tube Options

Material	Wall Thickness (WT) (mm)	Tube Bore (ID) (mm)	Part No	QTY	Image
Verderprene	1.6 Lower Pressure	1.6	150.0603.1	1m Length	
			150.0603.15	15m Pack	
		3.2	150.0620.1	1m Length	
			150.0620.15	15m Pack	
		4.0	150.0643.1	1m Length	
			150.0620.15	15m Pack	
		4.8	150.0604.1	1m Length	
			150.0604.15	15m Pack	
		6.4	150.0605.1	1m Length	
			150.0605.15	15m Pack	
		8.0	150.0606.1	1m Length	
			150.0606.15	15m Pack	
Silicone	1.6 Lower Pressure	1.6	460.0006.1	1m Length	
			460.0006.15	15m Pack	
		3.2	460.0007.1	1m Length	
			460.0007.15	15m Pack	
		4.0	460.0051.1	1m Length	
			460.0051.15	15m Pack	
		4.8	460.0008.1	1m Length	
			460.0008.15	15m Pack	
		6.4	460.0009.1	1m Length	
			460.0009.15	15m Pack	
		8.0	460.0010.1	1m Length	
			460.0010.15	15m Pack	
Tygon R1000	1.6 Lower Pressure	1.6	150.0810.1	1m Length	
		3.2	150.0812.1		
		4.0	150.0814.1		
		4.8	150.0816.1		
Viton	1.6 Lower Pressure	1.6	150.0830.1		
		3.2	150.0832.1		
		4.0	150.0834.1		
		4.8	150.0836.1		

Table 5 - 1.6mm WT Lower Pressure Continuous Tube

Material	Wall Thickness (WT) (mm)	Tube Bore (ID) (mm)	Part No	QTY	Image
Verderprene	2.4 Lower Pressure	3.2	150.0644.1	1m Length	
			150.0644.15	15m Pack	
		4.8	150.0625.1	1m Length	
			150.0625.15	15m Pack	
		6.4	150.0623.1	1m Length	
			150.0623.15	15m Pack	
		8.0	150.0626.1	1m Length	
			150.0626.15	15m Pack	
Silicone	2.4 Lower Pressure	3.2	460.0052.1	1m Length	
			460.0052.15	15m Pack	
		4.8	460.0053.1	1m Length	
			460.0053.15	15m Pack	
		6.4	460.1032.1	1m Length	
			460.1032.15	15m Pack	
		8.0	460.0705.1	1m Length	
			460.0705.15	15m Pack	
Viton	2.4 Lower Pressure	6.4	150.0840.1	1m Length	
		8.0	150.0842.1		

Table 6 - 2.4mm WT Lower Pressure Continuous Tube

3.3 Vantage 5000 Tube Element

1.6 mm WT Lower Pressure Tube Element

Material		Wall Thickness (WT) (mm)	Tube Bore (ID) (mm)	Part No	QTY	Image
Verderprene	Quick Release Connector (QR)	1.6 Lower Pressure	1.6	159.5005	1	
			3.2	159.5006	1	
			4.0	159.5007	1	
			4.8	159.5008	1	
			6.4	159.5009	1	
			8.0	159.5010	1	
	3/4" Mini Tri-clamp Connector (TR)	1.6 Lower Pressure	1.6	159.5025	1	
			3.2	159.5026	1	
			4.0	159.5027	1	
			4.8	159.5028	1	
			6.4	159.5029	1	
			8.0	159.5030	1	

Table 7 - 1.6 mm WT Lower Pressure Tube Element

2.4 mm WT Lower Pressure Tube Element

Material		Wall Thickness (WT) (mm)	Tube Bore (ID) (mm)	Part No	QTY	Image
Verderprene	Quick Release Connector (QR)	2.4 Lower Pressure	3.2	159.5011	1	
			4.8	159.5014	1	
			6.4	159.5015	1	
			8.0	159.5016	1	
			9.6	159.5017	1	
	3/4" Mini Triclamp Connector (TR)	2.4 Lower Pressure	3.2	159.5031	1	
			4.8	159.5034	1	
			6.4	159.5035	1	
			8.0	159.5036	1	
			9.6	159.5037	1	

Table 8 - 2.4 mm WT Lower Pressure Tube Element

2.4 mm WT Medium Pressure Tube Element

Material		Wall Thickness (WT) (mm)	Tube Bore (ID) (mm)	Part No	QTY	Image
Verderprene	Quick Release Connector (QR)	2.4 Medium Pressure 4 bar (60 PSI)	3.2	159.5012	1	
	3/4'' Mini Triclamp Connector (TR)	2.4 Medium Pressure 4 bar (60 PSI)	3.2	159.5032	1	

Table 9 - 2.4 mm WT Medium Pressure Tube Element

2.4 mm WT High Pressure Tube Element

Material		Wall Thickness (WT) (mm)	Tube Bore (ID) (mm)	Part No	QTY	Image
Verderprene	Quick Release Connector	2.4 High Pressure 7 bar (105 PSI)	3.2	159.5013	1	
	3/4'' Mini Triclamp Connector	2.4 High Pressure 7 bar (105 PSI)	3.2	159.5033	1	

Table 10 - 2.4 mm WT High Pressure Tube Element

Appendix D

4 Remote Control Options

4.1 Speed Control Method (local speed control)

4.1.1 HMI

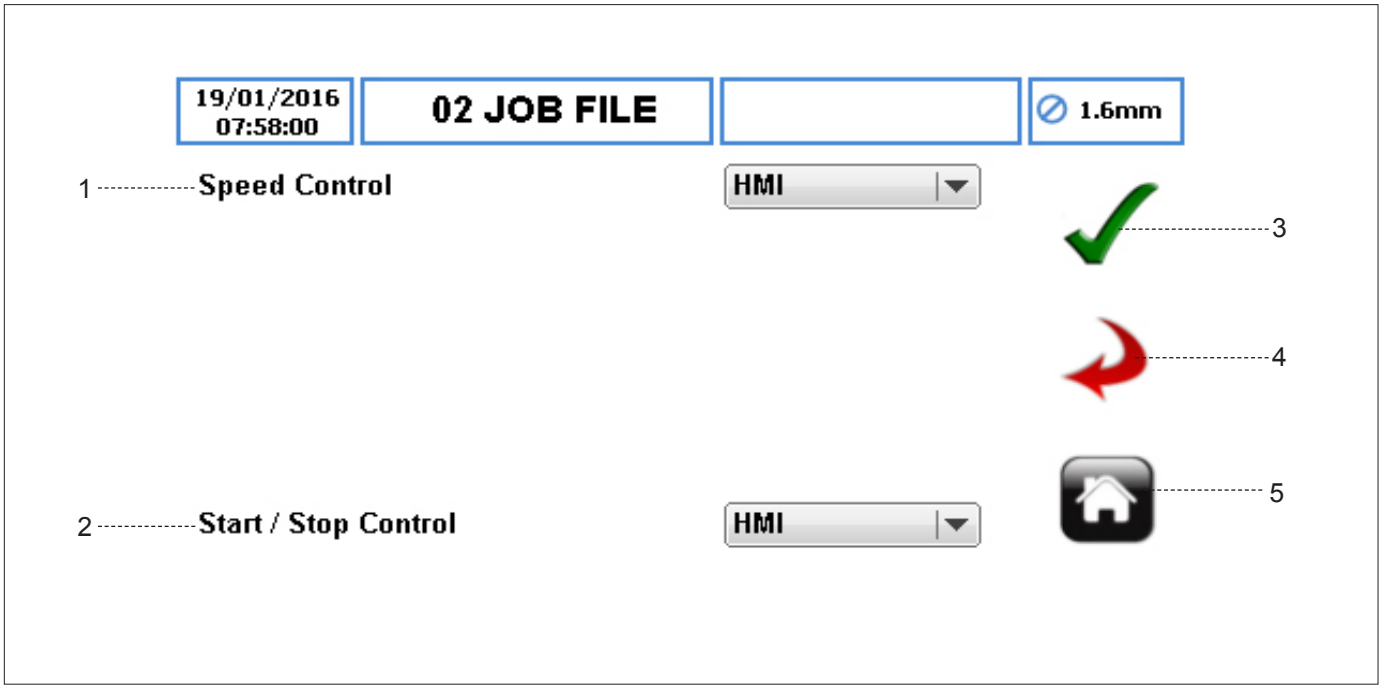


Figure 5 HMI Speed Control

1. SPEED CONTROL – enables the speed functionality via the HMI.
2. START/STOP CONTROL – sets the start/stop control method separately of the speed control.
3. ACCEPT – accepts all changes within the Job File. Changes made on this screen are not saved until this icon is pressed.
4. GO BACK/CANCEL – cancels any changes and return to the Job File Menu. If the user has made changes, there will be a prompt asking the user if the changes should be saved.
5. HOME – returns the user to the Home Screen. If the user has made changes, there will be a prompt asking if the changes should be saved.

4.1.2 4-20mA Speed Control

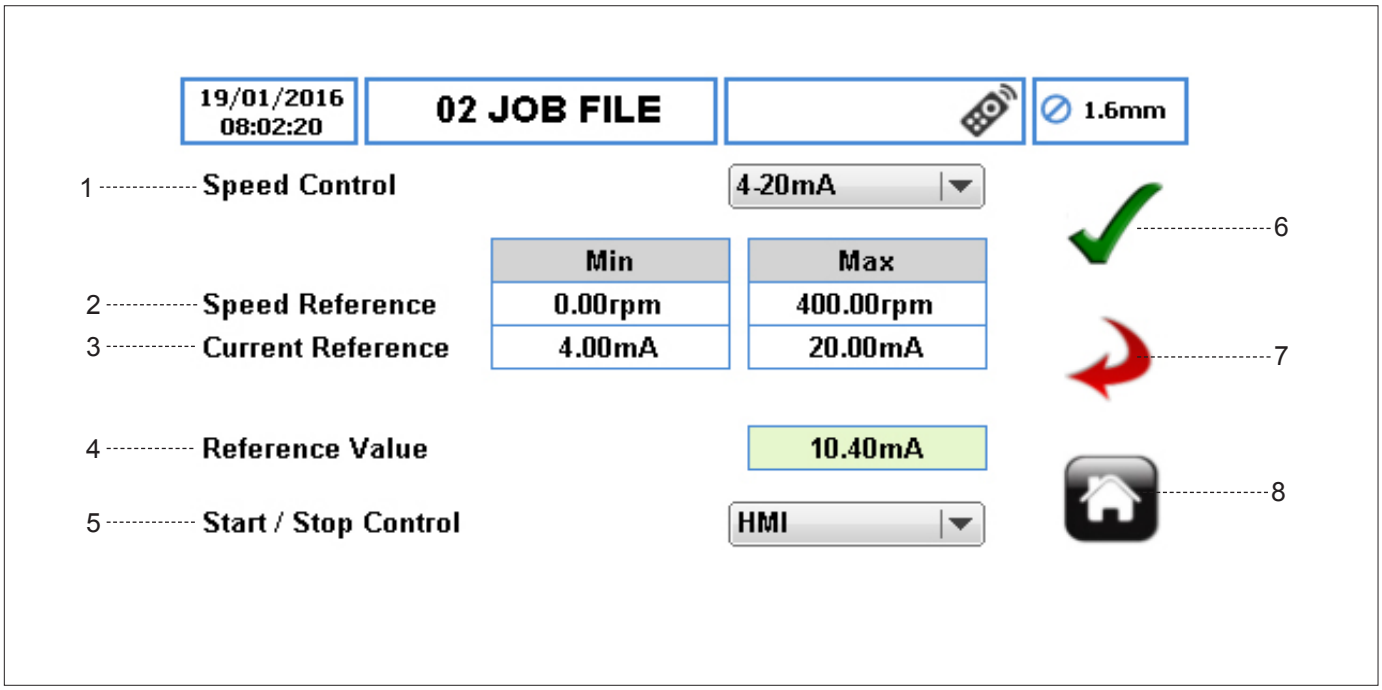


Figure 6 4-20 mA Speed Control

1. SPEED CONTROL – sets the speed control reference via the 4-20mA input pins on the 25WAY REMOTE I/O CONNECTOR (→ Appendix E).
2. SPEED REFERENCE – sets the minimum and maximum pump speed.
3. CURRENT REFERENCE – sets the minimum and maximum current references.

Note

With the default settings the 4 mA will correspond to 0 rpm and the 20 mA will correspond to 400 rpm. These settings can be reversed (minimum 20 mA and maximum 4 mA).

4. REFERENCE VALUE – indicates the measured current coming into the pump via the 25WAY REMOTE I/O CONNECTOR. It is a read-only value.
5. START/STOP CONTROL – sets the start/stop control separately from the speed control.
6. ACCEPT – accepts all changes within the Job File. Changes made on this screen are not saved until this icon is pressed.
7. GO BACK/CANCEL – cancels any changes and return to the Job File Menu. If the user has made changes, there will be a prompt asking the user if the changes should be saved.
8. HOME – returns the user to the Home Screen. If the user has made changes, there will be a prompt asking if the changes should be saved.

4.1.3 0-10V Speed Control

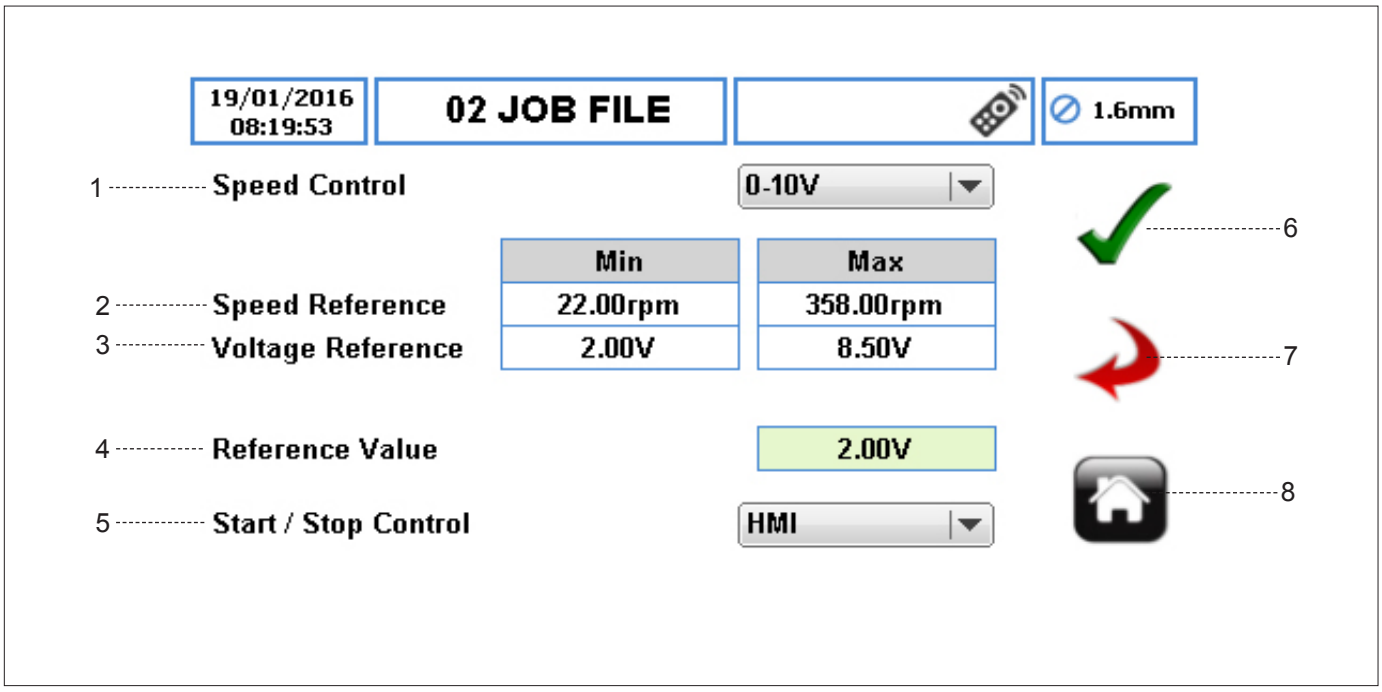


Figure 7 0-10V Speed Control

1. SPEED CONTROL – sets the speed control reference via the 0-10V input pins on the 25WAY REMOTE I/O CONNECTOR (→ Appendix E).
2. SPEED REFERENCE – sets the minimum and maximum pump speed.
3. VOLTAGE REFERENCE – sets the minimum and maximum voltage references.

Note

With the default settings the 0V will correspond to 0 rpm and the 10V will correspond to 400 rpm. These settings can be reversed (minimum 20 mA and maximum 4 mA).

4. REFERENCE VALUE – indicates the measured voltage read into the pump via the 25WAY REMOTE I/O CONNECTOR. It is read-only value.
5. START/STOP CONTROL – sets the start/stop control separately from the speed control.
6. ACCEPT – accepts all changes within the Job File. Changes made on this screen are not saved until this icon is pressed.
7. GO BACK/CANCEL – cancels any changes and return to the Job File Menu. If the user has made changes, there will be a prompt asking the user if the changes should be saved.
8. HOME – returns the user to the Home Screen. If the user has made changes, there will be a prompt asking if the changes should be saved.

4.1.4 Proportional Flow Mode (Tachometer)

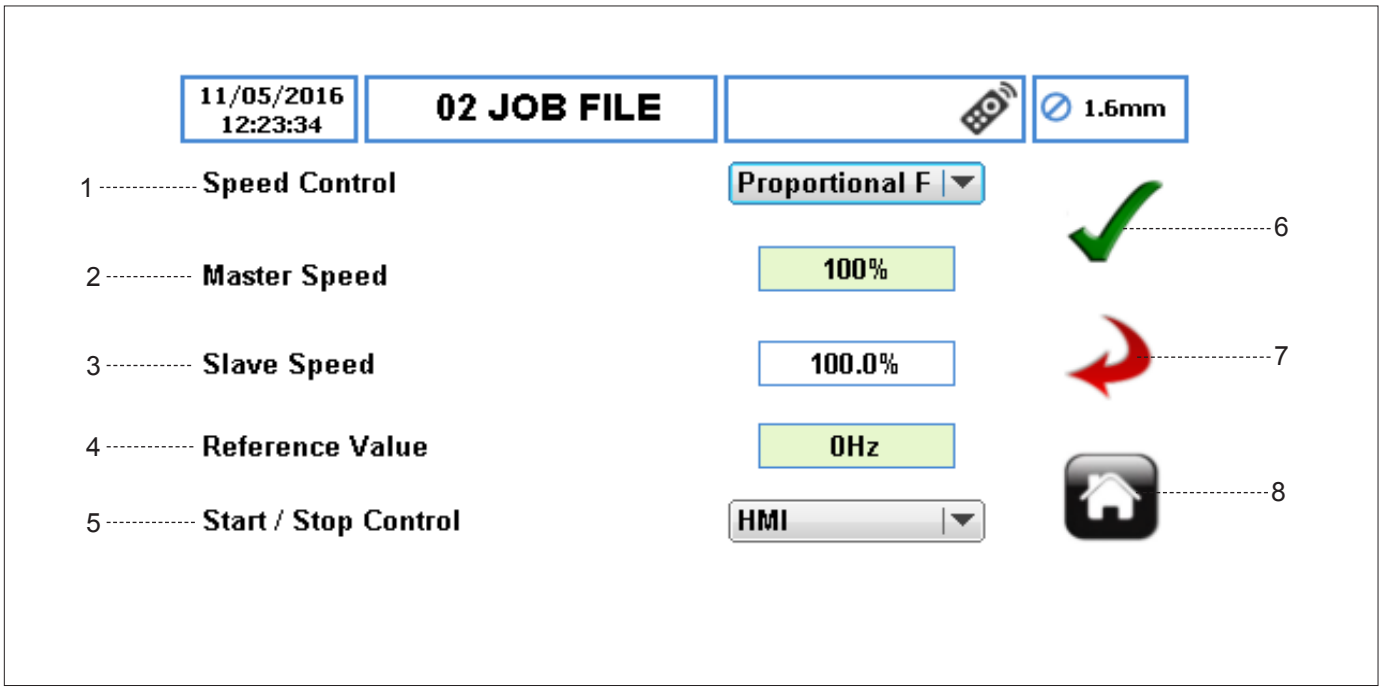


Figure 8 Proportional Flow Mode Speed Control

1. SPEED CONTROL – sets the speed control reference to come via the slave steps input pin on the 25WAY REMOTE I/O CONNECTOR (→ Appendix E).
2. MASTER SPEED – displays the master speed as a percentage of maximum pump speed. It is a ready-only value.
3. SLAVE SPEED – when the box is selected, a keypad will appear where the user can enter the percentage of the master speed.
4. REFERENCE VALUE – indicates the measured reference frequency coming from the master pump. It is a read-only value.
5. START/STOP CONTROL – sets the start/stop control separately from the speed control.
6. ACCEPT – accepts all changes within the Job File. Changes made on this screen are not saved until this icon is pressed.
7. GO BACK/CANCEL – cancels any changes and return to the Job File Menu. If the user has made changes, there will be a prompt asking the user if the changes should be saved.
8. HOME – returns the user to the Home Screen. If the user has made changes, there will be a prompt asking if the changes should be saved.

4.2 Start/Stop Control

4.2.1 HMI

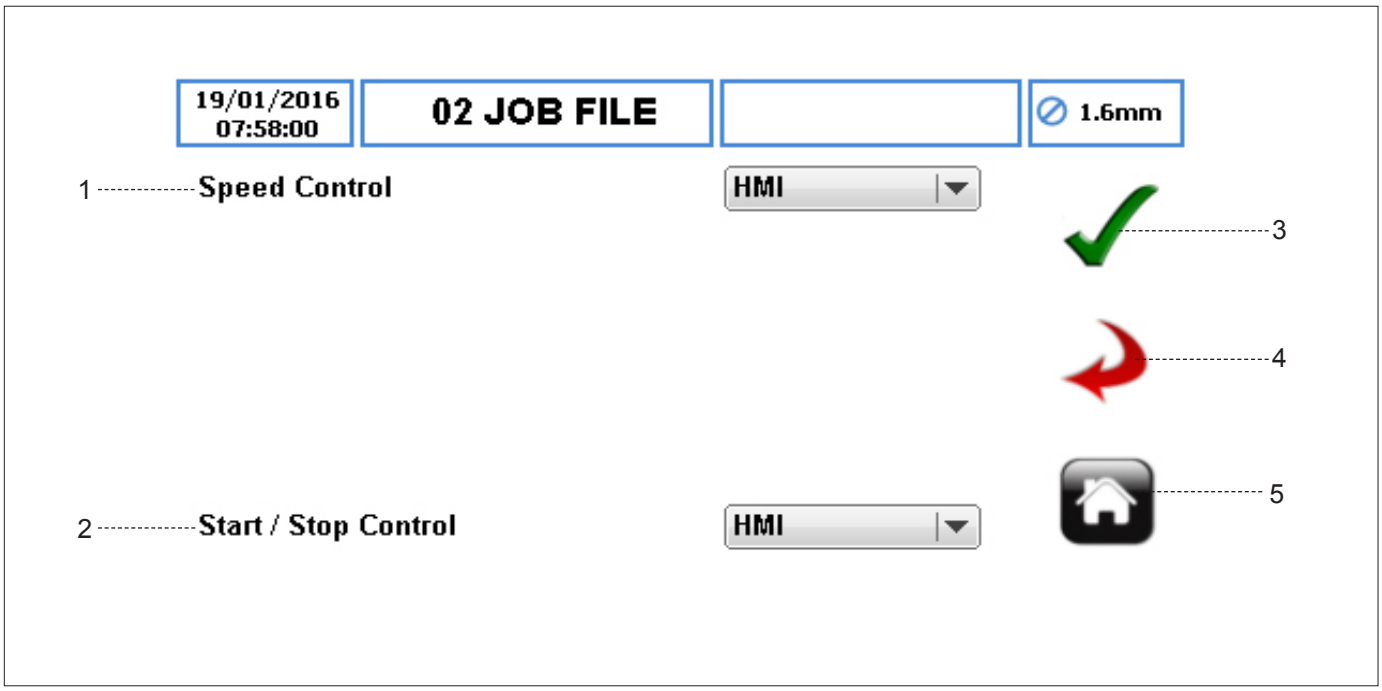


Figure 9 HMI Start/Stop Control

1. SPEED CONTROL – is not applicable.
2. START/STOP CONTROL – enables the start/stop functionality via the HMI.
3. ACCEPT – accepts all changes within the Job File. Changes made on this screen are not saved until this icon is pressed.
4. GO BACK/CANCEL – cancels any changes and return to the Job File Menu. If the user has made changes, there will be a prompt asking the user if the changes should be saved.
5. HOME – returns the user to the Home Screen. If the user has made changes, there will be a prompt asking if the changes should be saved.

4.2.2 25WAY REMOTE I/O CONNECTOR

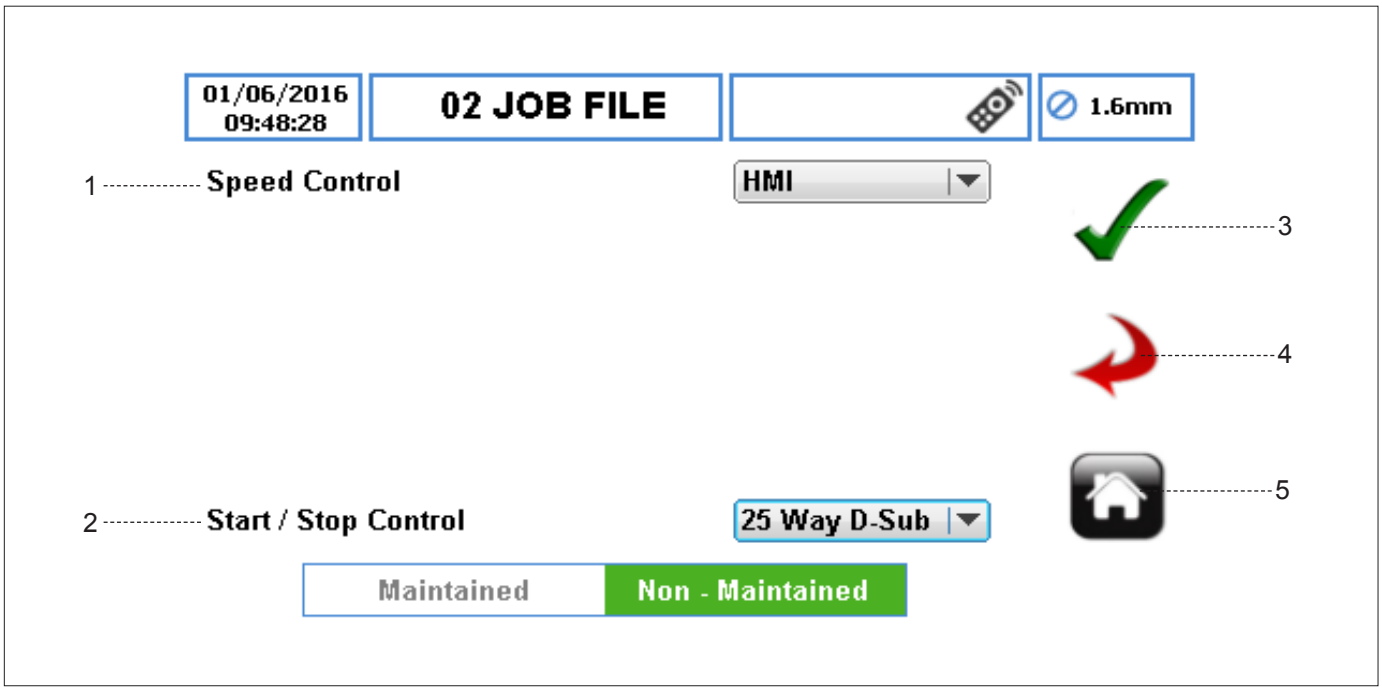


Figure 10 25WAY REMOTE I/O CONNECTOR Start/Stop Control

1. SPEED CONTROL – is not applicable.
2. START/STOP CONTROL – enables the start/stop functionality via the 25WAY REMOTE I/O CONNECTOR (→ Appendix E).
   a. Maintained – when selected, the start signal must be held on to run the pump.

      The pump will stop in maintained mode if an additional stop condition is detected or the start signal is removed.

   b. Non-Maintained – when selected, the start signal can be a momentary pulse to run the pump.

      The pump will only stop in non-maintained mode if an additional stop condition is detected.
3. ACCEPT – accepts all changes within the Job File. Changes made on this screen are not saved until this icon is pressed.
4. GO BACK/CANCEL – cancels any changes and return to the Job File Menu. If the user has made changes, there will be a prompt asking the user if the changes should be saved.
5. HOME – returns the user to the Home Screen. If the user has made changes, there will be a prompt asking if the changes should be saved.

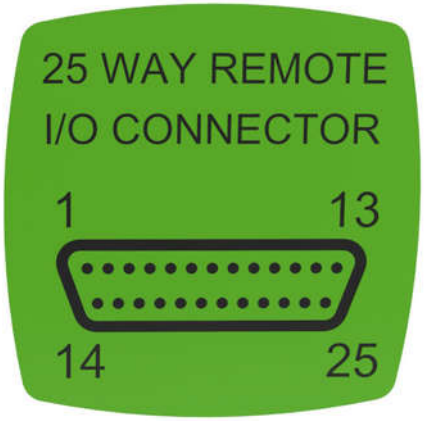
Appendix E

5 25 WAY Remote I/O Connector

5.1 Description of PINs

The PINs on the 25 WAY Remote I/O connector can be grouped into:

1. Power Supply
2. Digital Input Wiring
3. Digital Output Wiring
4. Proportional Flow Mode
5. Analogue Wiring



PIN	Description	PIN	Description
1	Manual/Auto	14	Start
2	Stop	15	Product Source Empty
3	Product Destination Full	16	Direction Input
4	Slave Steps Input	17	Bund Detection
5	Direction Output	18	Master Steps Output
6	Start/Stop Status	19	NC (Not Connected)
7	General Alarm	20	0-10V Output
8	Tube Burst Alarm	21	4-20mA Output
9	4-20mA Input	22	0-10V Input
10	Remote I/O +24V	23	+24V Pump Supply
11	+10V Analogue Supply	24	NC (Not Connected)
12	0V Analogue Supply	25	0V Pump Supply
13	Remote I/O 0V		

Figure 11 25 WAY Remote I/O Connector - Diagram & Description of PINs

5.2 Power Supply

The Vantage 5000 features optically-isolated input/output lines for using the 25 WAY Remote I/O connection. The user has two different options available for supplying the power to the isolated I/O:

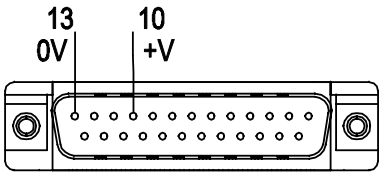
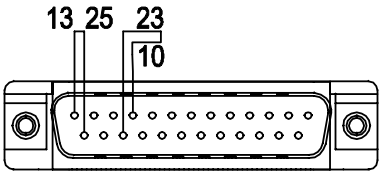
Function	Description	Wiring Diagrams
User provided +24V Pump Supply through pins 13 and 10	- a separate power supply can be fed into pins 13 and 10	
Onboard +24V Pump Supply through pins 23 and 25	- the on-board supply can be used from pins 23 and 25	

Table 11 Power Supply

5.3 Digital Input Wiring

In order to use the digital inputs, the power must be provided to pins 13 and 10 as per (→ 5.2 Power Supply). The digital inputs are activated by connecting the corresponding input pin to ground. These are normally open signals.

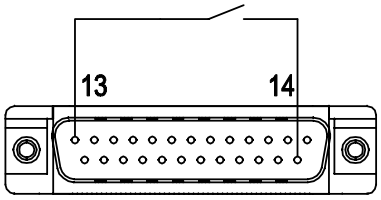
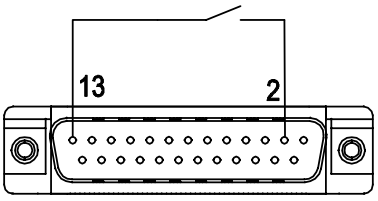
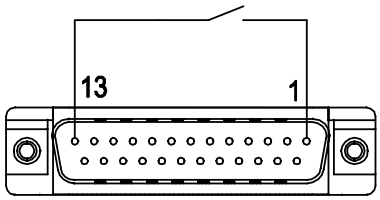
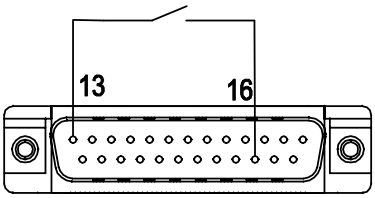
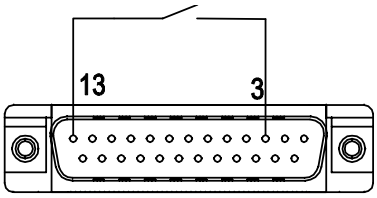
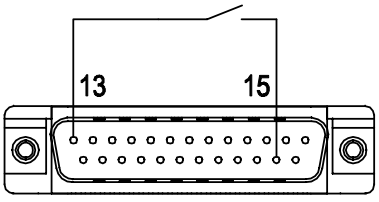
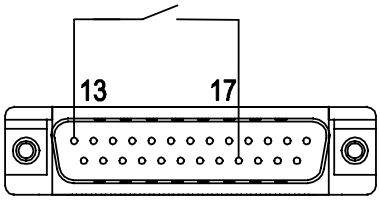
Function	Description	Wiring Diagrams
Start (pin 14)	- will START the pump running. - the STOP signal MUST be closed. - there MUST be no other inhibit errors/signals present. - link pins 14 and 13 (→*Figure 11*). - can be done through a volt-free contact.	
Stop (pin 2)	- will STOP the pump running. - the STOP signal MUST be closed before the pump will respond to a START signal. - link pins 2 and 13 (→*Figure 11).* - can be done through a volt-free contact.	
Manual/Auto (pin 1)	- enables/disables the 25 WAY digital inputs and outputs. - the MANUAL/AUTO signal MUST be closed before the pump will respond to a START signal. - link pins 1 and 13 (→*Figure 11*). - can be done through a volt-free contact.	
Direction Input (pin 16)	- will change the pump direction of operation after the MANUAL/AUTO and STOP signals are closed. - STOP the pump before a direction change will be registered. - when OFF/open, the pump will operate in a clockwise direction. - when ON/closed, the pump will operate in a counter-clockwise direction. - link pins 16 and 13 (→*Figure 11*). - can be done through a volt-free contact.	
Product Destination Full (pin 3)	- will notify the pump that the product destination is full. - will alert the user to the alarm signal through a dialog box. - will raise the GENERAL ALARM signal (pin 7). - link pins 3 and 13 (→*Figure 11*). - can be done through a volt-free contact.	
Product Source Empty (pin 15)	- will notify the pump that the product source is empty. - will alert the user to the alarm signal through a dialog box. - will raise the GENERAL ALARM signal (pin 7). - link the pins 15 and 13 (→*Figure 11*). - can be done through a volt-free contact.	
Bund Detection (pin 17)	- will notify the pump when the bund detects product - will alert the user to the alarm signal through a dialog box. - will raise the GENERAL ALARM signal (pin 7). - link pins 17 and 13 (→*Figure 11*). - can be done through a volt-free contact.	

Table 12 Digital Input Wiring

5.4 Digital Output Wiring

In order to use the digital outputs, the power must be provided to pins 13 and 10 as per (→ 5.2 Power Supply). They are all open collector form.

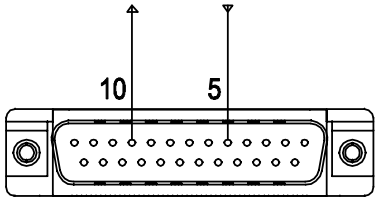
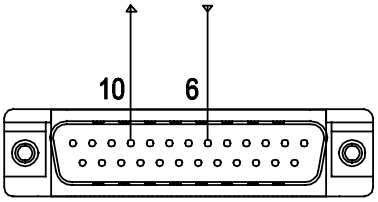
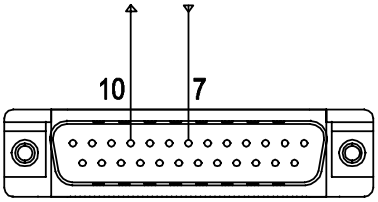
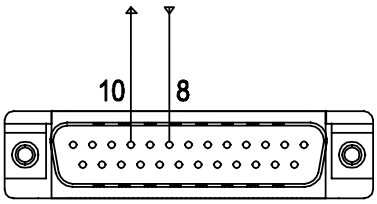
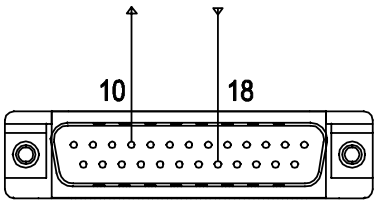
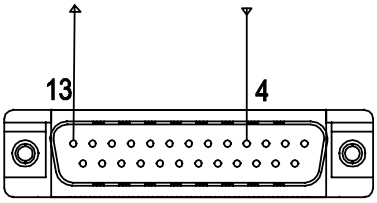
Function	Description	Wiring Diagrams
Direction Output (pin 5)	- will notify the user in which direction the pump is rotating. - when ON, the pump is operating in a clockwise direction. - when OFF, the pump is operating in a counter-clockwise direction. - use pins 10 and 5 to determine in which direction the pump is running. - the maximum current draw for pin 5 is 20 mA.	
Start/Stop Status (pin 6)	- will notify whether the pump is currently rotating. - when ON, the pump is rotating. - when OFF, the pump is not rotating. - use pins 10 and 6 to determine whether the pump is rotating. - the maximum current draw for pin 6 is 20 mA.	
General Alarm (pin 7)	- will notify the user when the pump detects an alarm. - when ON, the pump is in alarm state. - when OFF, the pump is not in an alarm state. - use pins 10 and 7 to determine when the pump is in an alarm state. - the maximum current draw for pin 7 is 20 mA.	
Tube Burst Alarm (pin 8)	- will notify whether the tube burst has been detected. - when ON, the pump has detected a tube burst. - when OFF, the pump has not detected a tube burst. - use pins 10 and 8 to determine whether a tube burst has been detected. - the maximum current draw for pin 8 is 20 mA.	
Master Steps Output (pin 18)	- will notify the user of the pump's rotational speed. - the output is a clock operating between 0-1024Hz, scaled with the pump operating speed. - use pins 10 and 18 to determine what output speed the pump is running. - the maximum current draw for pin 18 is 20 mA. - typically this is linked to the SLAVE STEPS INPUT signal on a second pump to provide a Master/Slave arrangement from a different pump.	
Slave Steps Input (pin 4)	- will control pump speed as a proportion of input signal - the output is a clock operating between 0-1024Hz, scaled with the pump operating speed. - use pins 13 and 4 to drive the slave pump. - typically this is linked to the MASTER STEPS OUTPUT signal from another pump to provide a Master/Slave arrangement from a different pump.	

Table 13 Digital Output Wiring

5.5 Analogue Wiring

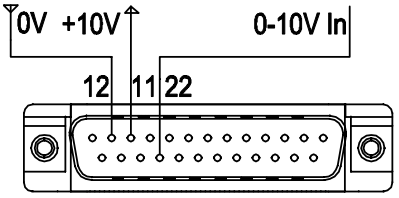
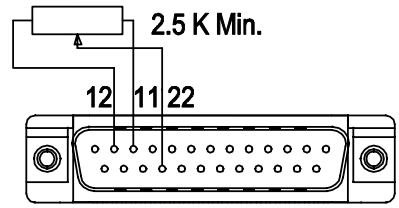
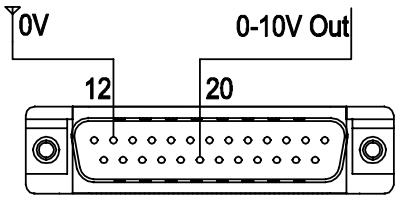
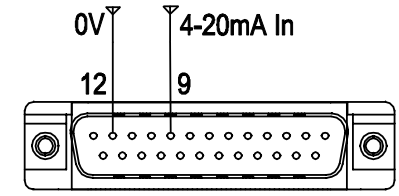
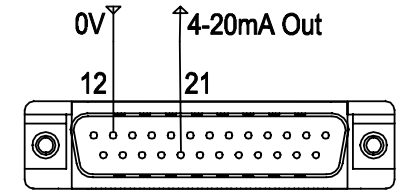
Function	Description	Wiring Diagrams
0-10V Input (pin 22)	- is provided for 0-10V Input speed control. - use the 0-10V INPUT LINE for controlling pump speed operation through pin 22. - +10V Analogue Supply is provided through pin 11. - 0V Analogue Supply is provided through pin 12.	
	Example: 0-10V speed control using a 2.5kΩ potentiometer. A MINIMUM of 2.5kΩ resistor must be used to prevent damage to the pump.	
0-10V Output (pin 20)	- use the 0-10V Output to monitor the rotational speed of the pump. - is provided between pins 20 and 12 - the pump will provide the excitation for a 0-10V Output	
4-20mA Input (pin 9)	- is provided for 4-20mA Input speed control through pin 9. - the 4-20mA loop is provided for analogue ground through pin 12. - this can be scaled in the software. - the 4-20mA has an impedance of 100 Ω. - make sure the loop supply voltage is not too great to damage the pump.	
4-20mA Output (pin 21)	- use the 4-20mA output to monitor the rotational speed of the pump. - output is provided between pins 21 and 12. - the pump will provide the excitation for a 4-20mA output. - will not function correctly with a separate loop voltage supply. - If a 4-20mA output is required to run over a considerable distance/line resistance, a 4-20mA repeater may be required.	

Table 14 Analogue Wiring

Appendix F

6 Breakout Box

The breakout box has been provided to allow the user to make easy connections to all the remote input/output lines on the 25 WAY Remote I/O Connector on the back of the Vantage 5000. For the connector number's function, see *Table 15*.

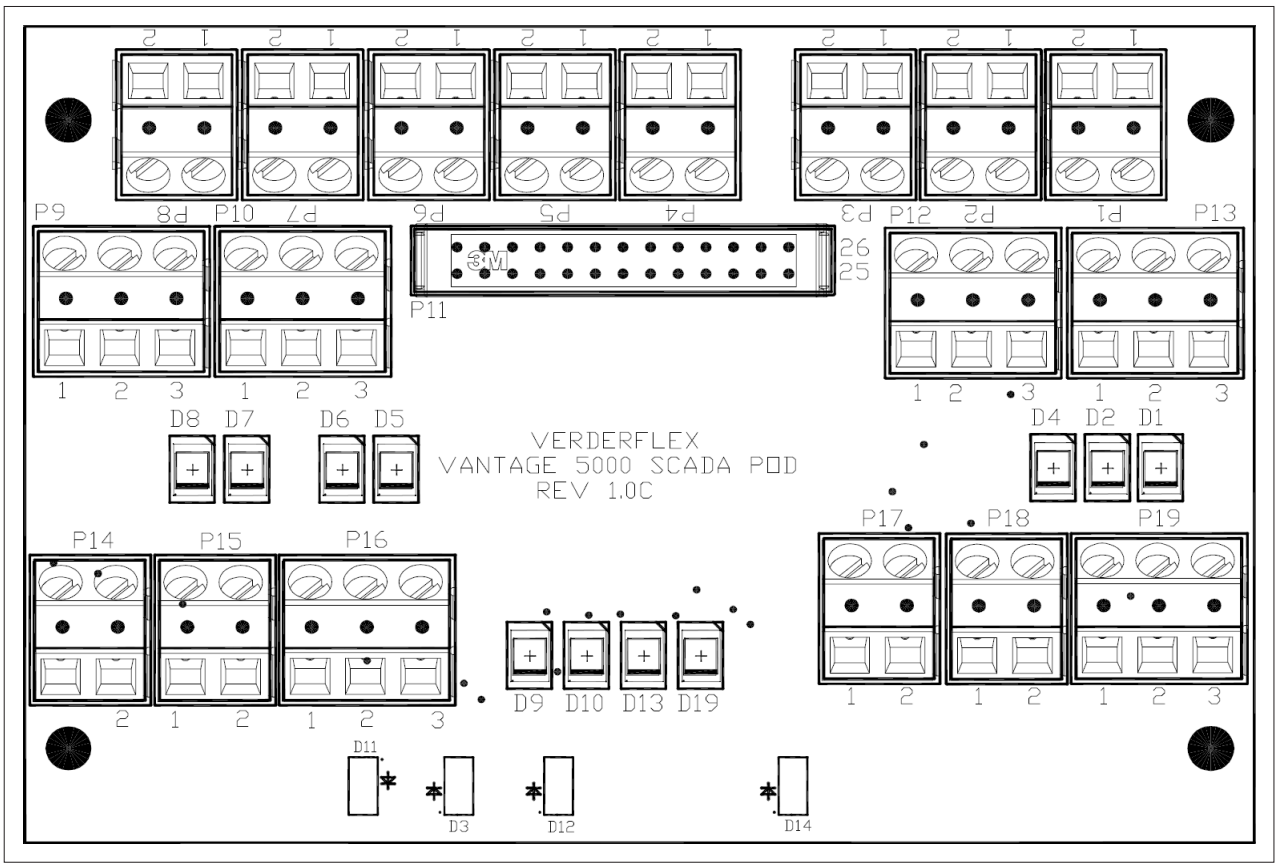


Figure 12 Breakout Box Diagram

Connector Number	Function	Type	Pin number	Signal
P1	START	Input	1	+24V Relay Supply
			2	0V Relay Supply
P2	MANUAL/AUTO	Input	1	+24V Relay Supply
			2	0V Relay Supply
P3	SLAVE STEPS	Input	1	Slave Steps Signal
			2	0V Power Input Rail
P4	BUND DETECT	Input	1	Bund Detect Signal
			2	0V Power Input Rail
P5	PRODUCT DESTINATION FULL	Input	1	Product Destination Full Signal
			2	0V Power Input Rail
P6	PRODUCT SOURCE EMPTY	Input	1	Product Source Empty Signal
			2	0V Power Input Rail
P7	DIRECTION IN	Input	1	+24V Relay Supply
			2	0V Relay Supply
P8	STOP	Input	1	+24V Relay Supply
			2	0V Relay Supply
P9	DIRECTION OUT	Output	1	Normally Closed
			2	Normally Open
			3	Common
P10	START/STOP STATUS	Output	1	Normally Closed
			2	Normally Open
			3	Common
P12	ANALOGUE IN	Input	1	0-10V Input
			2	0V Analogue Ground
			3	4-20mA Input
P13	GENERAL ALARM	Output	1	Normally Closed
			2	Normally Open
			3	Common
P14	EXTERNAL POWER	Power	1	+24V Power Input Rail
			2	0V Power Input Rail
P15	+24V PUMP SUPPLY	Power	1	+24V Pump Power Rail
			2	0V Pump Power Rail
P16	ANALOGUE OUT	Output	1	0-10V Output
			2	0V Analogue Ground
			3	4-20mA Output
P17	MASTER STEPS	Output	1	+24V Power Input Rail
			2	Master Steps Signal
P18	+10V PUMP SUPPLY	Power	1	+10V Pump Power Rail
			2	0V Analogue Ground
P19	TUBE ALARM	Output	1	Normally Closed
			2	Normally Open
			3	Common

Table 15 Description of Connector Numbers

6.1 Installation Instructions

6.2 Functionality

The following table shows the Vantage 5000 features on the 25 WAY Remote I/O Connector that are provided with the breakout box.

6.3 Voltage Supplies

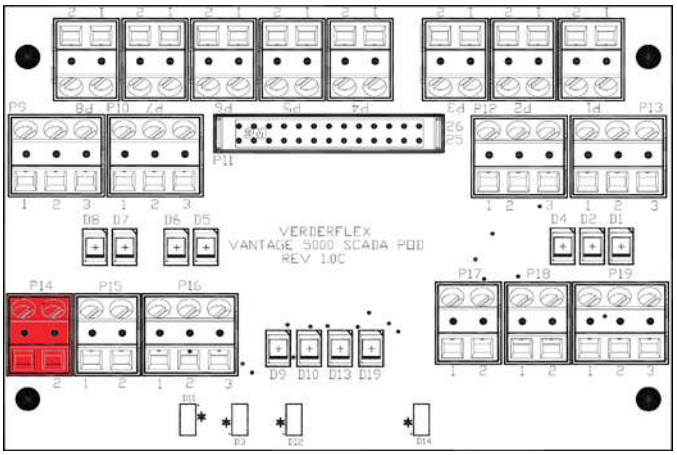
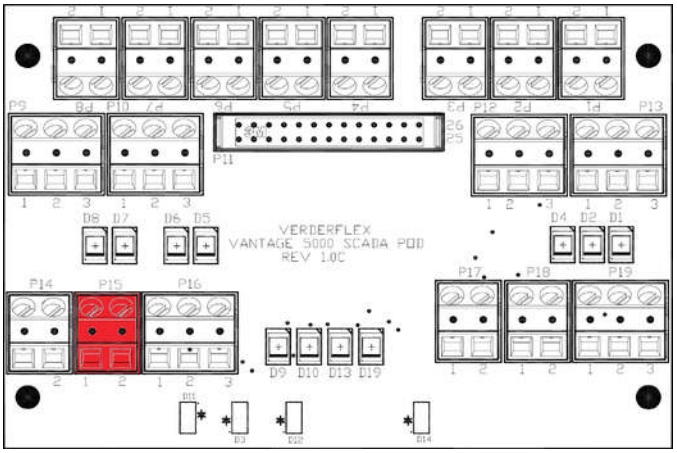
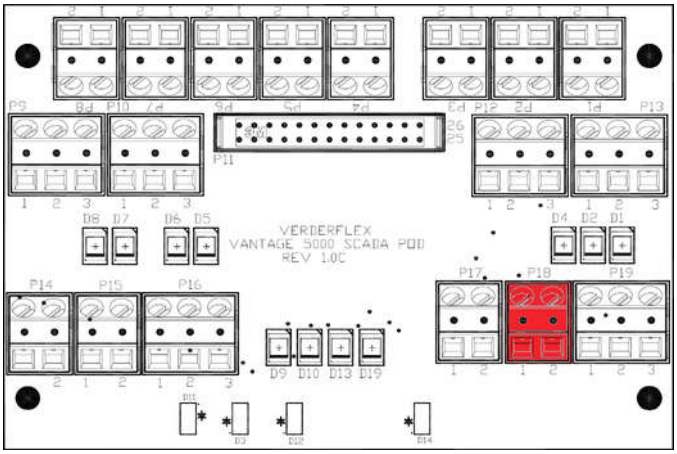
Function	Connector Number	Description	Graphic
+24V Pump Supply (INPUT)	P14	- In order to use the break-out box, a +24V Pump Supply must be connected through P14. This can either be supplied through P15 or from an external supply.	
+24V Pump Supply (OUTPUT)	P15	- is available from the Pump though loads must be restricted to <100mA.	
+10V Pump Supply	P18	- is available from the Pump for Analogue Input Control and this must be restricted to <100mA.	

Table 16 Voltage Supplies

6.4 Applied Voltage Signals

The following signals all require the application of either 24 VDC or 115 VAC (model dependant).

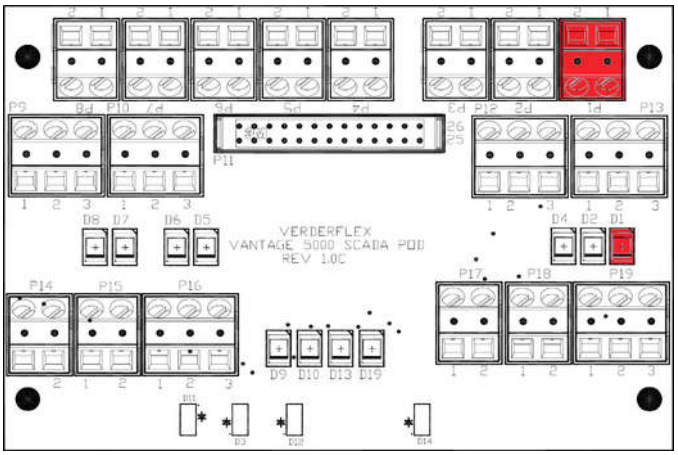
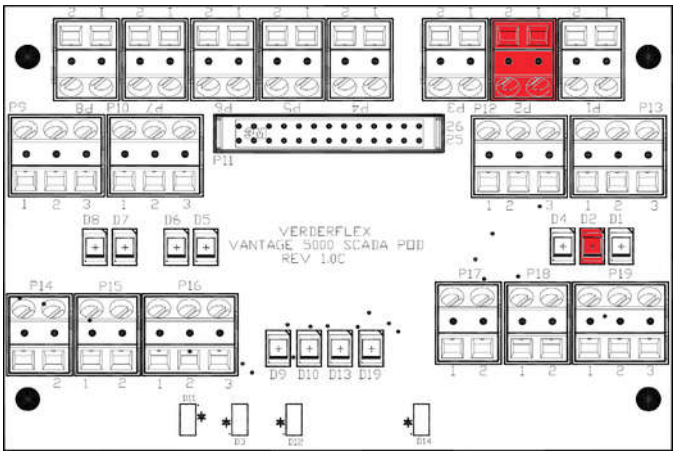
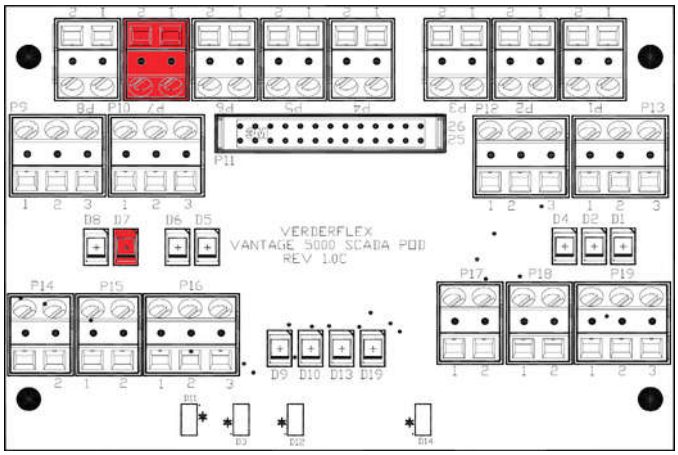
Function	Connector Number	Description	Graphic
Start	P1	- will turn ON the relay and drive the pump start signal which will start the pump. - the signal will respond differently depending on the settings in *Appendix E (5.3 Digital Input Wiring)*. - when the signal is switched ON, the LED D1 will light up.	
MANUAL/ AUTO	P2	- will enable the remote I/O and enable the user to use the remote start/stop functionality. - when the signal is switched ON, the LED D2 will light up.	
DIRECTION IN	P7	- will change the pump direction. - the direction change will only occur when the pump is stopped. - when the signal is switched ON, the LED D7 will light up.	

Table 17 Applied Voltage Signals

6.5 'Volt-free' Signals

The following signals do not require the application of any voltage. Pins 1 and 2 need to be linked together to switch the corresponding functionality. This could be done either through a mechanical switch, a relay or some other volt-free device.

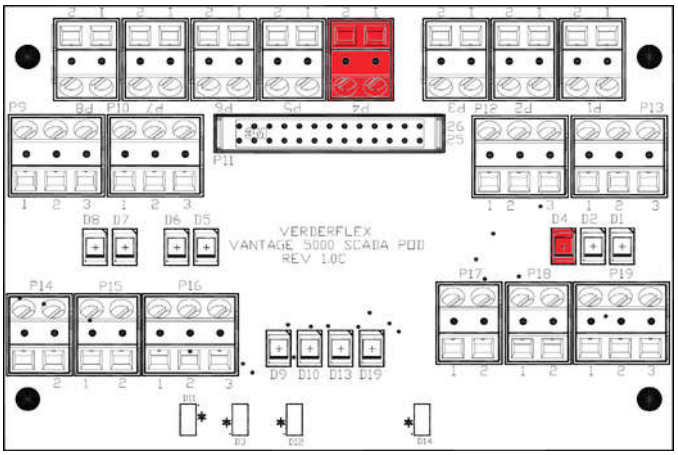
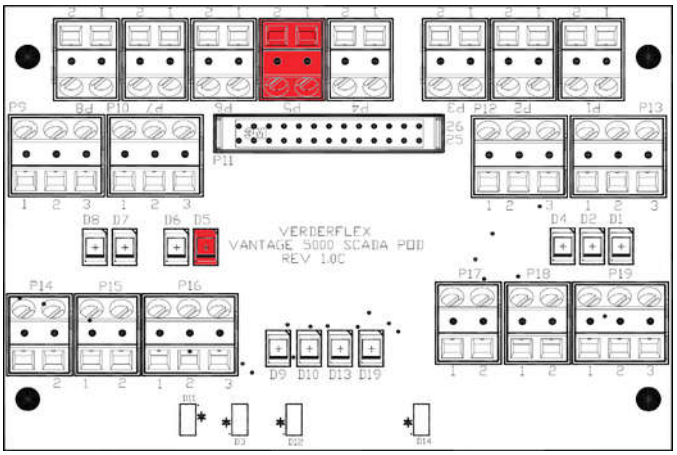
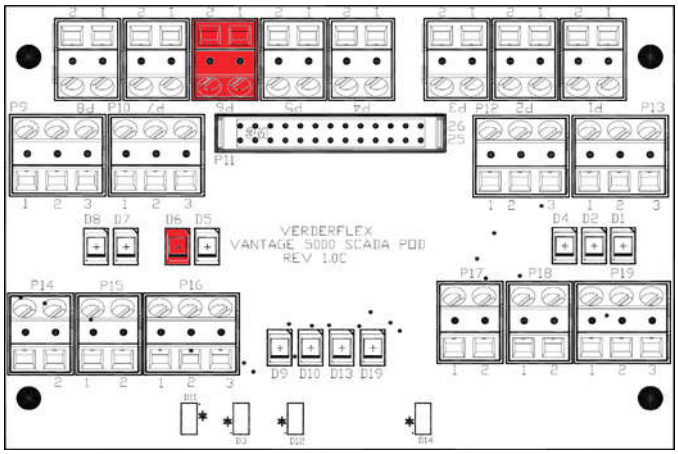
Function	Connector Number	Description	Graphic
Bund Detect	P4	- when pins 1 and 2 are shorted together on P4, the pump will respond to a bund detection event and stop the pump. - when the signal is switched ON, the LED D4 will light up.	
Product Destination Full	P5	- when pins 1 and 2 are shorted together on P5, the pump will respond to a product destination full detection event and stop the pump. - when the signal is switched ON, the LED D5 will light up.	
Product Source Empty	P6	- when pins 1 and 2 are shorted together on P6, the pump will respond to a product source empty detection event and stop the pump. - when the signal is switched ON, the LED D6 will light up.	

Table 18 'Volt-free' Signals

6.6 Output Signals

There are a number of “volt-free” outputs provided on the breakout box for the user to wire into.

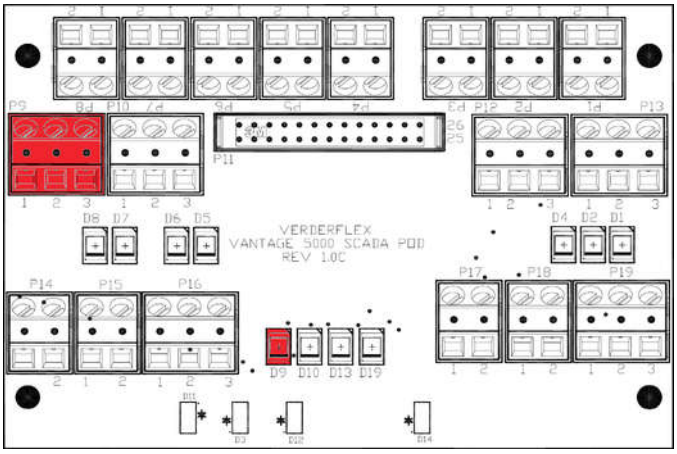
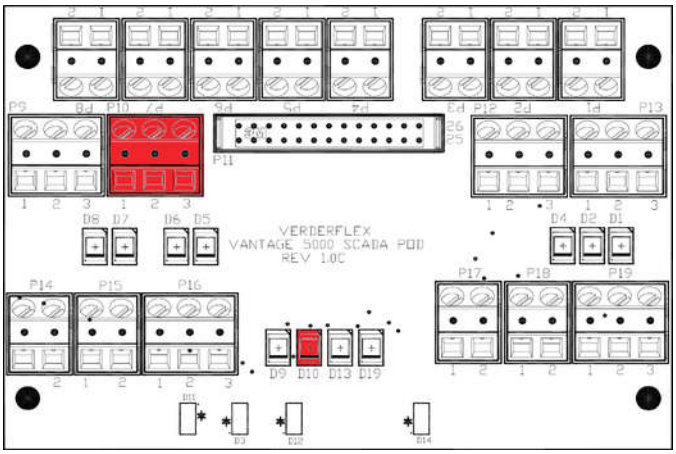
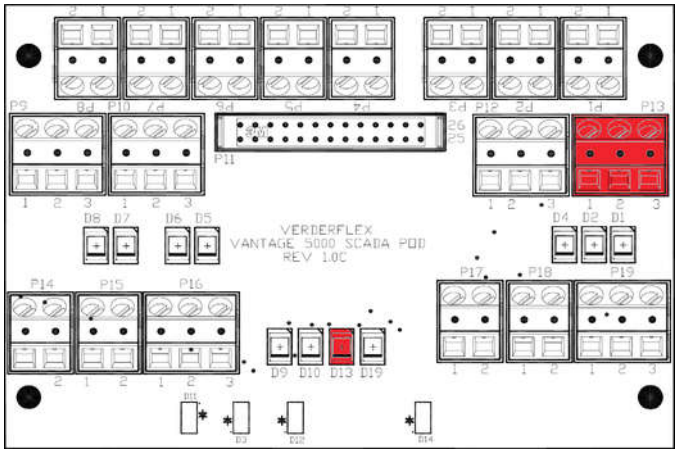
Function	Connector Number	Description	Graphic
Direction Out	P9	- will indicate in which direction the pump is currently rotating. - will respond to the direction IN signal and if anti-drip is used. - when the signal is switched ON, the LED D9 will light up.	
Start/Stop	P10	- will indicates when the pump is pumping. - when the signal is switched ON, the LED D10 will light up.	
General Alarm	P13	- will notify the user when the pump detects an alarm (e.g. Bund detection has occurred) - when the signal is switched ON, the LED D13 will light up.	

Table 19 Output Signals

6.6 Output Signals *(Continued)*

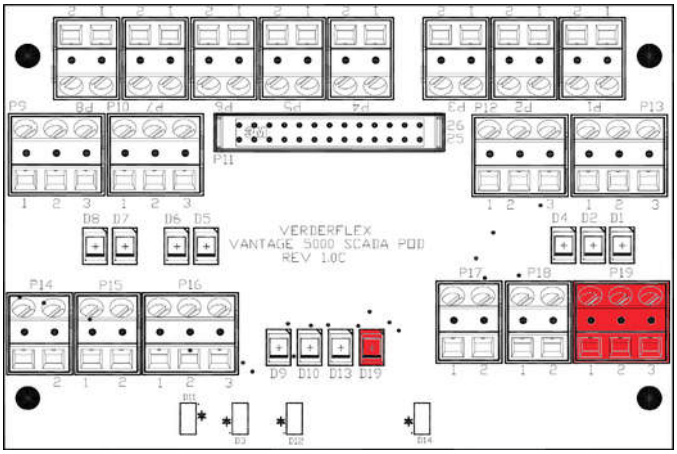
Function	Connector Number	Description	Graphic
Tube Alarm	P19	- will notify whether the tube burst has been detected. - when the signal is switched ON, the LED D19 will light up.	

Table 19 Output Signals (continued)

6.5 Analogue signals

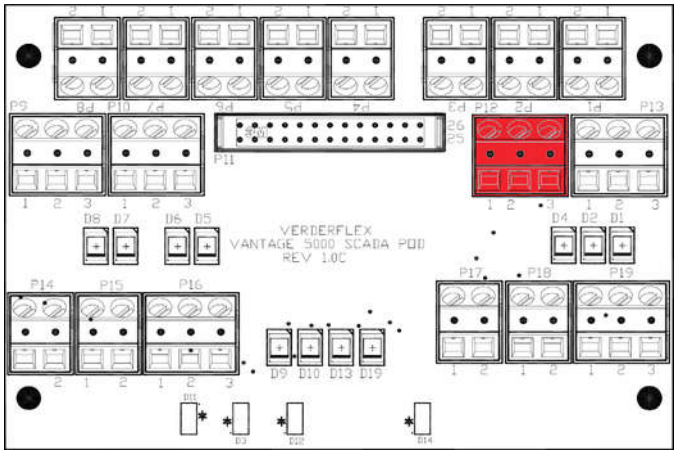
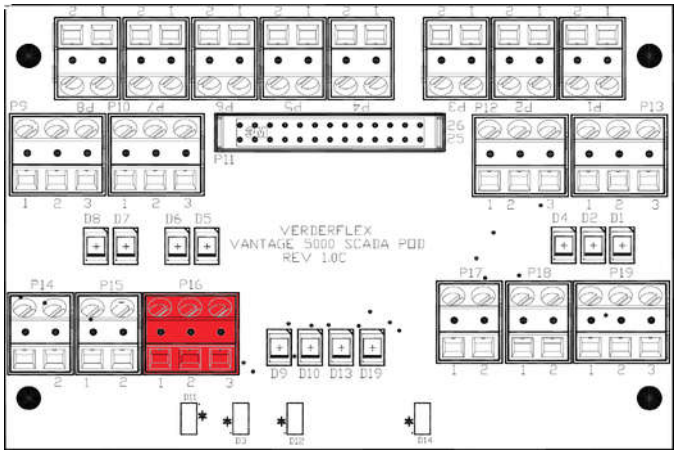
Function	Connector Number	Description	Graphic
Analogue Input	P12	- the pump will accept either 0-10V or 4-20mA signals, with **pin 2** as the 0V analogue rail. - the analogue common should be kept separate to the 0V analogue rail.	
Analogue Output	P16	- the pump will accept either 0-10V or 4-20mA signals, with **pin 2** as the analogue common. - the analogue common should be kept separate to the 0V analogue rail.	

Table 20 Analogue Signals

Appendix G

7 Error, Warning, Event Codes and Descriptions

Code	Type of Error	Description
100	Error	General Error Detected
101	DoorOpenRunning	Door Has Been Opened Whilst Pump is Running
102	DoorOpenStopped	Door Has Been Opened When Pump is Stopped
103	TubeBurst	Tube Burst Has Been Detected
104	MotorAlarm	Motor Alarm Has Been Triggered - Generally a Stall Event
105	SourceEmpty	Source Empty Alarm Has Been Triggered
106	DestinationFull	Destination Full Alarm Has Been Triggered
107	EmptyBund	Bund Full Detection Has Been Triggered
109	PowerFail	Power Failure Has Been Detected
110	OverTemperature	Pump Has Detected an Over Temperature
111	CommunicationError	General Communications Error

Table 21 Error codes and description

Code	Type of Warning	Description
200	Warning	General Warning Detected
201	DoorOpenRunning	Door Has Been Opened Whilst Pump is Running
202	DoorOpenStopped	Door Has Been Opened When Pump is Stopped
203	TubeBurst	Tube Burst Has Been Detected
204	MotorAlarm	Motor Alarm Bas Been Triggered - Generally a Stall Event
205	SourceEmpty	Source Empty Alarm Has Been Triggered
206	DestinationFull	Destination Full Alarm Has Been Triggered
207	EmptyBund	Bund Full Detection Has Been Triggered
209	PowerFail	Power Failure Has Been Detected
210	OverTemperature	Pump Has Detected an Over Temperature
211	CommunicationError	General Communications Error

Table 22 Warning codes and description

Code	Type of Event	Description
301	SystemPowerLoss	System Power Loss Detected
302	SystemBoot	System Has Booted
303	Login	User Has\Logged in Successfully
304	UnsuccessfulLogin	User Has Not Logged in Successfully
305	LoginWithoutPasscode	User Has Logged in Without a Passcode
306	TubeLifeLow	Control Interval Alarm Has Triggered
308	PumpStart	Pump Has Started Running
309	PumpAntiDripStart	Pump Anti-Drip Has Started
310	PumpStop	Pump Has Stopped Running
311	ImportSettings	Pump Settings Have Been Imported
312	ImportJobs	All Job Files Have Been Imported
313	ImportSingleJob	One Job File Has Been Imported
314	ExportSettings	Pump Settings Have Been Exported
315	ExportJobs	All Job Files Have Been Exported
316	ExportSingleJob	One Job File Has Been Exported
317	ExportEvents	Event Log Has Been Exported
318	AutoRestart	Pump Has Auto-Restarted After a Power Loss
319	PumpCalibration	Pump Has Been Calibrated
320	JobCopy	Job File Has Been Copied
321	JobDelete	Job File Has Been Cleared
322	JobActivate	Job File Has Been Activated
323	JobEdited	Job File Has Been Edited
324	ControlMaintainedModeChanged	Remote Start/Stop Control Mode Maintained Option Has Been Changed
325	ControlSpeedModeChanged	Remote Speed Control Mode Has Been Changed
326	ControlStartStopModeChanged	Remote Start/Stop Control Mode Has Been Changed
327	ControlParameterChanged	Remote Speed Control Mode Has Had Parameters Changed
328	PasscodeSystemEnabled	Passcode System Has Been Enabled
329	PasscodeSystemDisabled	Passcode System Has Been Disabled
330	PasscodeSupervisorRequestChanged	Passcode Supervisor Passcodes Option Has Been Changed
331	PasscodeOperatorRequestChanged	Passcode Operator Passcodoes Option Has Been Changed
332	PasscodeUserNameChanged	User Name Has Been Changed in Passcode System
333	PasscodePINChanged	User Passcode Has Been Changed
334	PasscodeAccessLevelChanged	User Access Level Has Been Changed
335	SettingsDateChanged	Pump Date Has Been Changed
336	SettingsTimeChanged	Pump Time Has Been Changed
338	SettingsLanguageChanged	Pump Language Has Been Changed
339	SettingsFactoryReset	Pump Has Been Factory Reset

Table 23 Event codes and description

Appendix H

8 Formatting the USB drive

The USB update procedure is detailed as follows:

1. Software can only be updated using a FAT32 formatted USB flash drive. If the drive is already formatted to FAT32, the user can skip to *step 9*.
2. To verify if the drive is formatted using FAT32, insert the memory stick into a Windows PC.
3. Open the 'Computer' folder and highlight the memory stick.

Note: If using Windows 7, the file system will be displayed as per *Figure 13*. If the file system is not displayed, right-click on the USB drive and select 'Properties'.

4. When 'Properties' has been selected the window will be opened as shown in *Figure 14*.
5. If the file system is not FAT32, the user will need to format the USB drive.

⚠ WARNING

Formatting will destroy all data!

Do not perform unless you do not need the data on the drive.

6. To format, close the properties page.
7. Right-click on the drive and select the option marked 'Format'. The window will open as per *Figure 15*.
8. Ensure the "File system" reads "FAT32", then the user can press the 'Start' button.
9. Once formatting is complete, copy the firmware file to the roote path on the drive.

Note

If the USB drive is added as drive 'G', the firmware path would be '*G:\Jupiter.bin*'.

10. Make sure firmware file is named ***'Jupiter.bin'***. Any other name will result in the pump not updating (e.g ***'Jupiter.bin.bin')***.
11. Safely remove USB stick from computer.

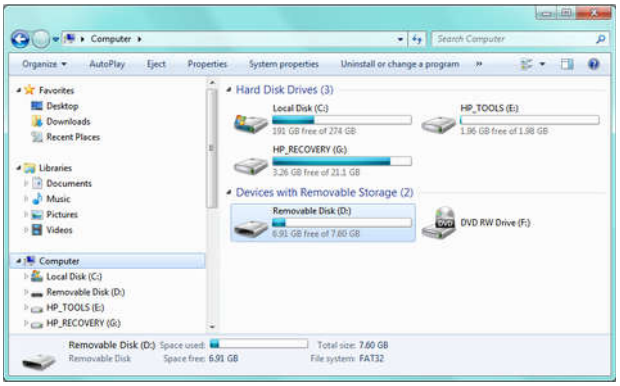


Figure 13 'Computer' Folder Opened

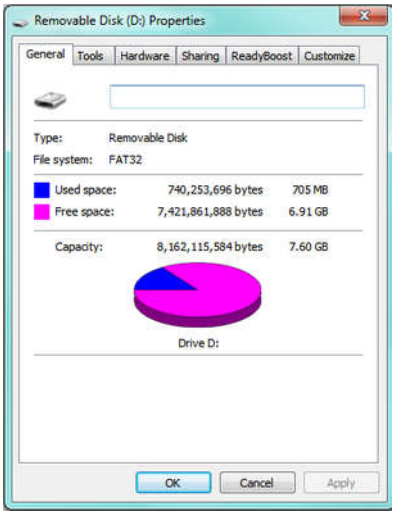


Figure 14 Properties of the USB Drive

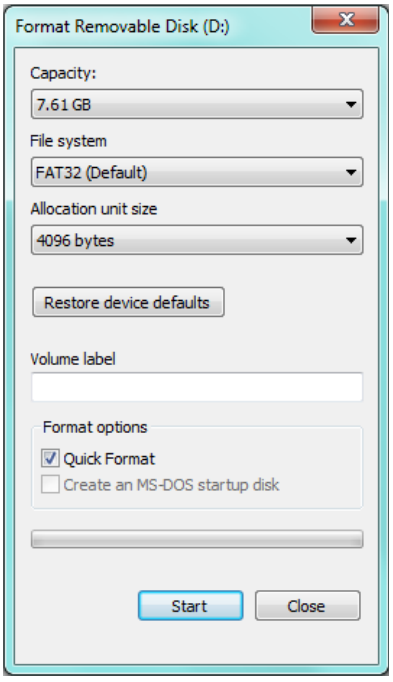


Figure 15 Format the USB Drive

Appendix I

9 Standards

Item	EC Harmonised Standards / Other Standards	Title
1	BS EN 60204-1	Safety of Machinery - Electrical Equipment of Machines
2	BS EN 61010-1 + A2 Category 2, Pollution degree 2	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use
3	BS EN 809	Pumps and Pump Units for Liquids - Common Safety Requirements
4	BS EN 61000-4-2, called by BS EN 61000-6-1	ESD Immunity
5	BS EN 61000-4-3, called by BS EN 61000-6-1	Radiated Immunity
6	BS EN 61000-4-4, called by BS EN 61000-6-1	Fast Transient Burst
7	BS EN 61000-4-5, called by BS EN 61000-6-1	Surge Immunity
8	BS EN 61000-4-6, called by BS EN 61000-6-1	Conducted RF Immunity
9	BS EN 61000-4-11, called by BS EN 61000-6-1	Voltage Dips and Interruptions
10	ANSI C63.4-2009, called by 47CFR15 part 15	Federal Communications Commission (FCC)
11	BS EN 55016-2-3, called by BS EN 61000-6-3 + A1	Radiated Emissions
12	BS EN 55016-2-1, called by BS EN 61000-6-3 + A1	Conducted Emissions
13	BS EN 61000-3-2, called by BS EN 61000-6-3 + A1	Harmonic Emissions
14	BS EN 61000-3-3, called by BS EN 61000-6-3 + A1	Flicker
15	UL 61010A-1	UL Standard for Safety Electrical Equipment for Laboratory Use
16	CAN/CSA-C22.2 No 61010-1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use
17	NEMA 4X to NEMA 250 (indoor use)	Enclosures for Electrical Equipment (1000 Volts Maximum) NEMA 250-2014

Table 24 Standards