

VERDERFLEX[®]

Peristaltic OEM Tube Pump

Operating Manual

Steptronic

Version 1.0v-01/2016

Print-No. 01



VERDER
passion for pumps

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

Verderflex Steptronic



The information in this document is essential for the safe operation and servicing of Verderflex[®] Steptronic family of pumps. This document must be read and understood thoroughly prior to installation of unit, electrical connection and commissioning.

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1. About this document

The Verderflex Steptronic range of peristaltic pumps, have been developed according to the latest technology and subject to continuous quality control. These operating instructions are intended to facilitate familiarization with the pump and its designated use. The relevant information will act as a guideline for you in operating the pump; alternative courses of action are also described should you be unable, for any reason, to follow those procedures initially given. You are advised to follow these guidelines to achieve maximum efficiency. These operating instructions Do not take into account local regulations; the operator must ensure that such regulations are strictly observed by all, including the personnel called in for installation.

1.1 Target groups

Target groups	Duty
Operating company	<ul style="list-style-type: none"> ▶ Keep this manual available at the operation site of the equipment, also available for later reference. ▶ Ensure that personnel read and follow the instructions in this manual and the other applicable documents, especially all safety instructions and warnings. ▶ Observe any additional rules and regulations referring to the system.
Qualified personnel, fitter	<ul style="list-style-type: none"> ▶ Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

Table 1 Target groups and their duties

1.2 Warnings and symbols





Warning	Risk Level	Consequences of disregard
	Immediate acute risk	Death, serious bodily harm
	Potential acute risk	Death, serious bodily harm
	Potential hazardous situation	Minor bodily harm
	Potential hazardous situation	Material damage

Table 2 Warnings and consequences of disregarding them



Symbol	Meaning
	Safety warning sign in accordance with DIN 4844 - W9 <ul style="list-style-type: none"> ▶ Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
▶	Instruction
1., 2.,	Multiple-step instructions
√	Precondition
→	Cross-reference
	Information, recommendation

Table 3 Symbols and their meaning

2. Safety



The manufacturer does not accept any liability for damage resulting from disregard of this documentation.

2.1 Intended use

- ▶ Only use the pump to handle compatible fluids as recommended by the manufacturer (→ 11.1 Technical specifications).
- ▶ Adhere to the operating limits.
- ▶ Consult the manufacturer regarding any other use of the pump.

Prevention of obvious misuse (examples)

- ▶ Note the operating limits of the pump with regard to temperature, pressure, flow rate and motor speed (→ 11.1 Technical specifications).
- ▶ Do not operate the pump while the inlet/outlet valve is closed.
- ▶ Only install the pump as recommended in this manual. For example, the following are not allowed:
 - Installing the pump without proper support.
 - Installation in the immediate vicinity of extreme hot or cold sources.
 - Explosive atmosphere

2.2 General safety instructions



Observe the following regulations before carrying out any work.

2.2.1 Product safety

These operating instructions contain fundamental information which must be complied with during installation, operation and maintenance. Therefore this operating manual must be read and understood both by the installing personnel and the responsible trained personnel / operators prior to installation and commissioning, and it must always be kept easily accessible within the operating premises of the machine.

- ▶ Not only must the general safety instructions laid down in this chapter on “Safety” be complied with, but also the safety instructions outlined under specific headings.
- ▶ Operate the pump only if the pumping unit and all associated systems are in good functional condition.
Only use the pumping system as intended, fully aware of safety and risk factors involved,

and in adherence to the instructions in this manual.

- ▶ Keep this manual and all other applicable documents complete, legible and accessible to personnel at all times.
- ▶ Refrain from any procedure or action that would pose a risk to personnel or third parties.
- ▶ In the event of any safety-relevant faults, shut down the pump immediately and have the malfunction corrected by qualified personnel.
- ▶ The installation of the pump, associated pipe work and electrical fittings must comply with the requirements of installation given in this manual and any local national or regional health and safety regulations.

2.2.2 Obligation of the operating company

Safety-conscious operation

- ▶ Ensure that the following safety aspects are observed and monitored:
 - Adherence to intended use
 - Statutory or other safety and accident-prevention regulations
 - Safety regulations governing the handling of hazardous substances if applicable
 - Applicable standards and guidelines in the country where the pump is operated
- ▶ Make personal protective equipment available pertinent to operation of the pump; as required.

Qualified personnel

- ▶ Ensure that all personnel tasked with work on the pump have read and understood this manual and all other applicable documents, including the safety, maintenance and repair information, prior to use or installation of the pump.
- ▶ Organize responsibilities, areas of competence and the supervision of personnel.
- ▶ Have all work carried out by specialist technicians only.
- ▶ Ensure that trainee personnel are under the supervision of specialist technicians, at all times, when working on the pumping system.

Safety equipment

- ▶ Provide the following safety equipment and verify its functionality:
 - For hot, cold and moving parts: safety guarding should be provided by the operating company.
 - For potential build up of electrostatic charge: ensure appropriate grounding if and when required.

Warranty

i The warranty is voided if the customer fails to follow any and all instructions, warnings and cautions in this document. Verder has made every effort to illustrate and describe the product(s) in this document. Such illustrations and descriptions are, however, for the sole purpose of identification and do not express or imply a warranty that the products are merchantable or fit for a particular purpose, or that the products will necessarily conform to the illustration or descriptions.

Obtain the manufacturer's approval prior to carrying out any modifications, repairs or alterations during the warranty period. Only use genuine parts or parts that have been approved by the manufacturer.

For further details regarding warranty, please refer terms and conditions.

2.2.3 Obligation of personnel

i It is imperative that the instructions contained in this manual are complied with by the operating personnel at all times.

- ▶ Pump and associated components:
 - Do not lean or step on them or use as climbing aid
 - Do not use them to support boards, ramps or beams
 - Do not de-ice using gas burners or similar tools
- ▶ Do not remove the safety guarding for hot, cold or moving parts during operation.
- ▶ Reinstall the safety equipment on the pump as required by regulations after any repair / maintenance work on the pump.

2.3 Specific hazards

2.3.1 Hazardous pumped liquids

- ▶ Follow the statutory safety regulations when handling hazardous pumped liquids (e.g. hot, flammable, poisonous or potentially harmful).
- ▶ Use appropriate personal protective equipment when carrying out any work on the pump.

2.3.2 Sharp edges

- ▶ Pump parts can be sharp
 - Use protective gloves when carrying out any work on the pump

3. Layout and function

i Peristaltic OEM tube pump, Verderflex Steptronic, is simple by design in its construction and operation. The medium to be pumped does not come into contact with any moving parts and is totally contained within a tube. A rotor passes along the length of the tube, compressing it. This motion forces the contents of the tube directly in front of the rotor to move forward along the length of the tube in a 'positive displacement', peristaltic movement. In the wake of the rotor's compressing action, the natural elasticity of the tube material forces the tube to open and regain its round profile, creating suction pressure, which recharges the pump.

3.1 Design details

i The Verderflex Steptronic range of tube pumps provide a balanced selection of simple to operate peristaltic pumps. The family offers the customer pump choices that are compact, can have multiple heads, are simple by design, with rapid tube changeovers and 4000:1 turn-down ratio with the stepper drive.

3.2 Name plate

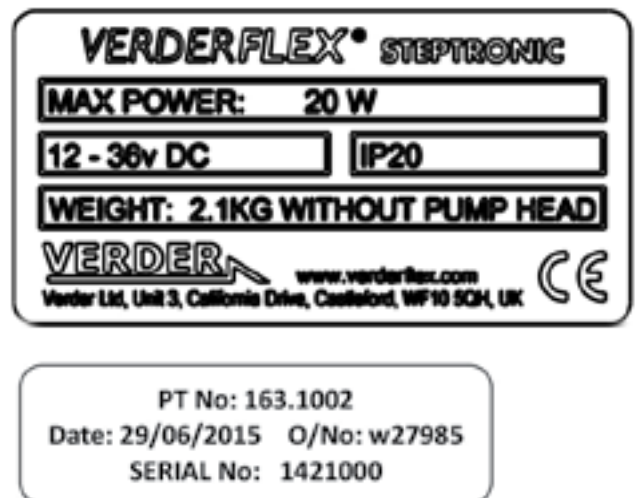


Figure 1 Name Plate

Note: When requesting spares, the model and serial number should always be quoted.

3.4 Layout – Steptronic Mini-Load Cased Version

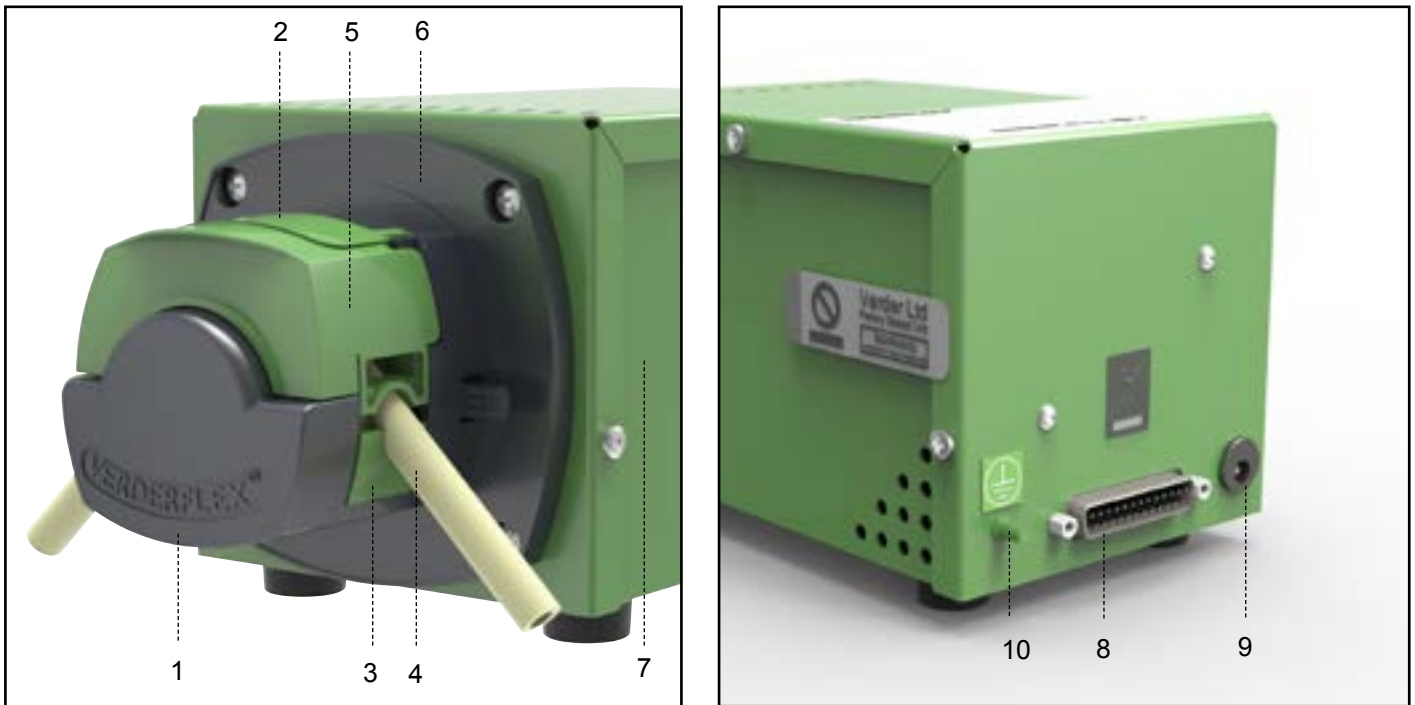


Figure 2 Layout - Steptronic Mini-Load Cased Version

- | | | | | | |
|---|---------------------|---|-------------------------|----|------------------------|
| 1 | Front cover | 5 | Pump-head release lever | 8 | 25 WAY D-SUB Connector |
| 2 | Tube saddle | 6 | Back plate | 9 | Power sockets |
| 3 | Tube clamp assembly | 7 | Pump casing | 10 | Earth connector |
| 4 | Tube element | | | | |

3.5 Layout – Steptronic EZ Cased Version

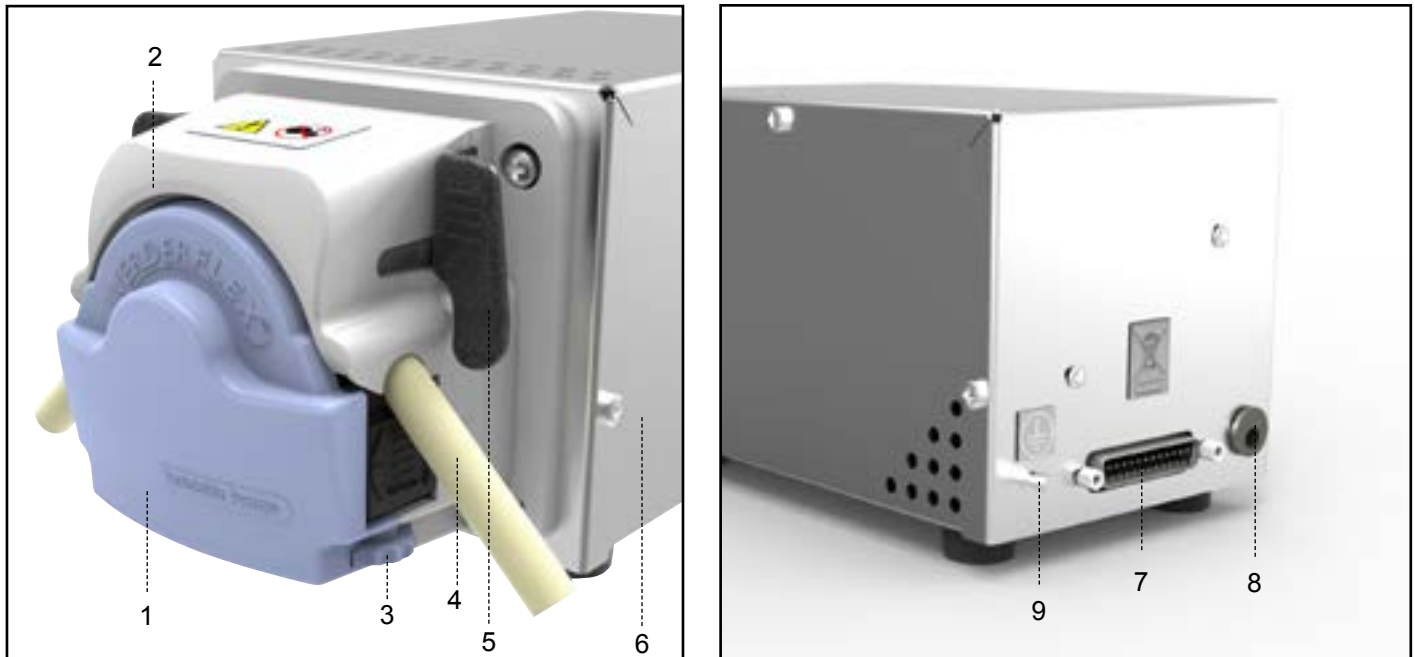


Figure 3 Layout - Steptronic EZ Cased Version

- | | | | | | |
|---|---------------------|---|-------------------------|---|-----------------|
| 1 | Front cover | 5 | Pump-head release lever | 8 | Power socket |
| 2 | Tube saddle | 6 | Pump body | 9 | Earth connector |
| 3 | Tube clamp assembly | 7 | 25 WAY D-SUB Connector | | |
| 4 | Tube element | | | | |

3.6 Layout – Steptronic Mini-Load Panel Mounted

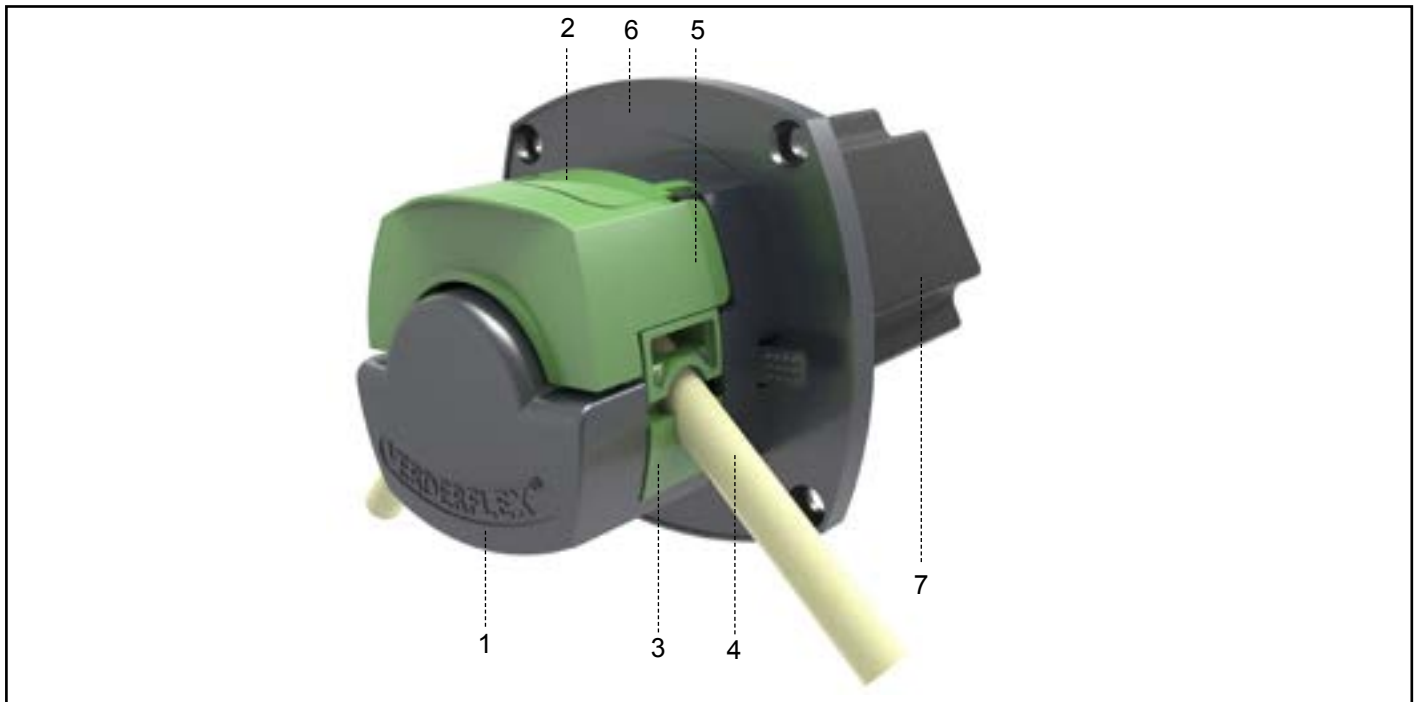


Figure 4 Layout - Steptronic Mini-Load Panel Mounted

- | | | | | | |
|---|---------------------|---|-------------------------|---|---------------|
| 1 | Front cover | 4 | Tube element | 6 | Back plate |
| 2 | Tube saddle | 5 | Pump-head release lever | 7 | Stepper motor |
| 3 | Tube clamp assembly | | | | |

3.7 Layout – Steptronic EZ head Panel Mounted

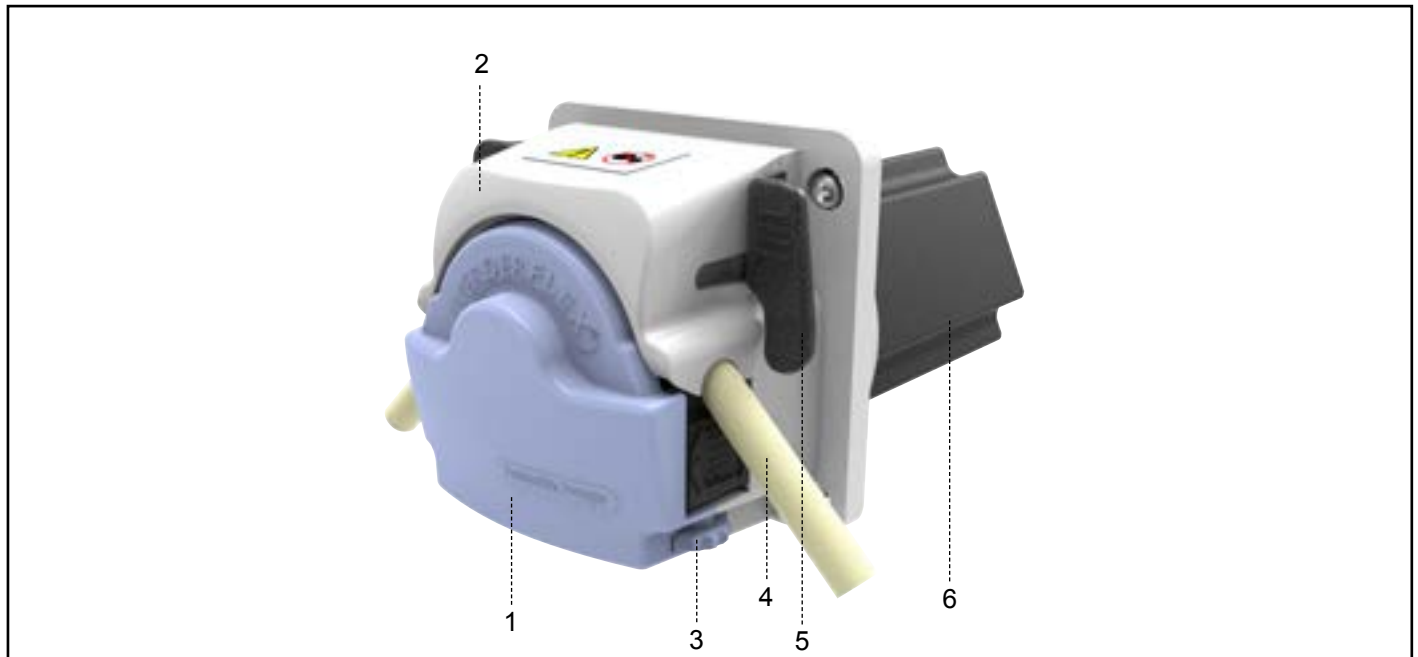


Figure 5 Layout - Steptronic EZ head Panel Mounted

- | | | | |
|---|---------------------|---|-------------------------|
| 1 | Front cover | 4 | Tube element |
| 2 | Tube saddle | 5 | Pump-head release lever |
| 3 | Tube clamp assembly | 6 | Stepper drive |

3.8 Mounting Panel - Dimensional Details

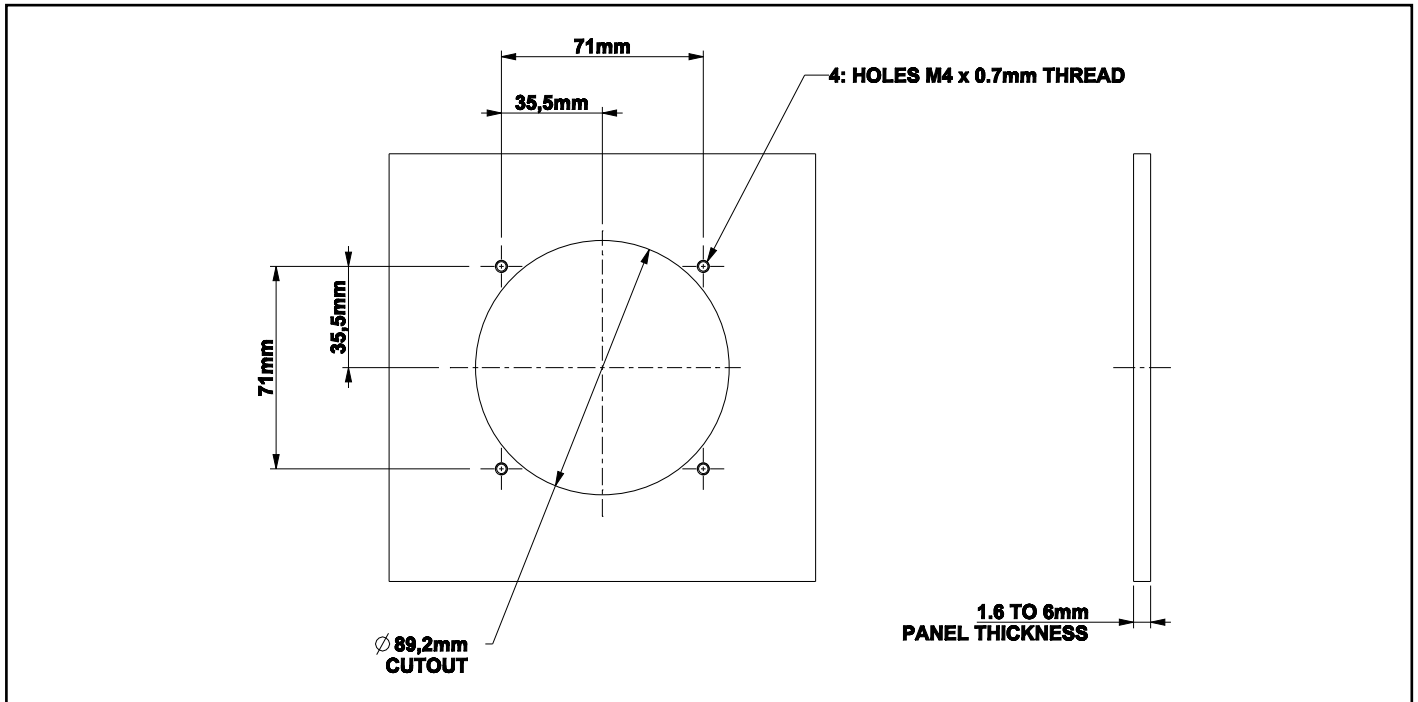



Figure 6 Mounting Panel - Dimensional Details

4. Transport, storage and disposal


4.1 Transport

 Always transport the unit in an upright position and ensure that the unit is securely packed in the box.


4.1.1 Unpacking and inspection on delivery

1. Unpack the pump/pump unit upon delivery and inspect it for transport damage.
2. Report any transport damage to the manufacturer/distributor immediately.
3. Retain the packing if any further transport is required.
4. Dispose all packaging material according to local regulations.

4.2 Treatment for storage


 The unit should be stored in a dry, dust free environment not exceeding 60°C.

4.3 Interim storage before installation

 Make sure the storage room meets the following conditions:

- Dry, humidity not to exceed 80%
- Out of direct sunlight
- Frost-free; temperature range 0 to 40°C
- Vibration-free; minimize
- Dust-free; minimize

4.4 Disposal

 With prolonged use, pump parts can get contaminated by pumped liquids to such an extent that cleaning may be insufficient.



WARNING

Risk of poisoning and environmental damage by the pumped liquid or oil!

- ▶ Use suitable personal protective equipment when carrying out any work on the pump.
- ▶ Prior to disposal of the pump:
 - Collect and dispose of any leaking pumped liquid or oil in accordance with local regulations.
 - Neutralize residues of pumped liquid in the pump.
- ▶ Dispose of the pump unit and associated parts in accordance with statutory regulations.

5. Installation and connection

NOTE

Material damage due to unauthorized modification on pump unit!

- ▶ Do not make any structural modifications to the pump unit or pump casing
- ▶ Do not carry out any welding work on the pump unit or pump casing


5.1 Preparing for installation

5.1.1 Checking the ambient conditions

1. Make sure that the operating conditions are complied with (→ 11.1 Technical specifications)
2. Make sure the required ambient conditions are fulfilled (→ 11.1.2 Ambient conditions)


5.2 Installing the Steptronic

5.2.1 Key features

 Robust design with thick wall tube for suction and pressure handling.

1. Flow rates up to 380 ml/min (6.02 US GPH) with Mini-load head; 1,310 ml/min (20.76 US GPH) with EZ-load head
2. Pressures up to 2 Bar (29 PSI) depending on tube material
3. Turndown ratio is 4096:1

5.2.2 Description of the Pump Head

 The pump head comprises three main parts:

1. The rotor with rollers which is responsible for the peristaltic action of the pump
2. The main body, which carries the rotor and tube saddle / tube clamp arrangement.
3. The tube saddle, this is moveable to permit easy tube installation.

5.3 Types of pump head

i Verderflex® Steptronic range of pumps are available with the new mini-load pump head (which is also available as an OEM pump head), as well as the EZ head featured on the Verderflex Vantage 3000 tube pump providing greater flow rates.



	
<p>1. Mini-Load Head</p>	<p>2. EZ Head</p>

Table 4 Steptronic Pump Head Options

5.4 Mini-Load (ML) Head

5.4.1 Key features

Easy tube change, dual pump head option with Verderprene, Silicone, Viton® or Tygon® tubing.

- Flow rates up to 380 ml/min ((6.02 US GPH) (with single pump head)
- Pressures up to 2 Bar (29 PSI) depending on tube material
- Maximum speed 409.6 rpm (with single head)
- Typically used in frequent tube change applications

5.4.2 Installing the tube

1. Lift the tube saddle by operating the saddle (→ Figure 7 Installing Tube into Mini-Load Head)
2. Place the tube into gap between the rollers at the tube saddle.
3. Check the tube is aligned with the gap in the tube clamps and tube saddle so the tube is held correctly and not damaged.
4. Ensure correctly sized tube clamps are used for the tube being installed (→ 5.4.3 Installing the tube clamp).
5. Operate the saddle to close the tube saddle assembly onto the tube to assemble it into the working position.

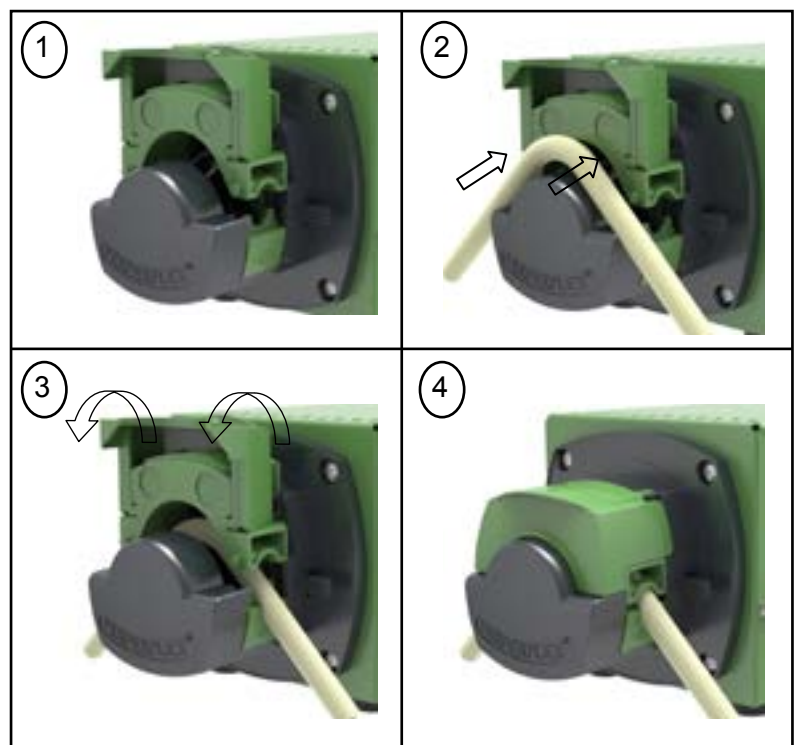



Figure 7 Installing Tube into Mini-Load Head

5.4.3 Installing the tube clamp

 The tube clamps for the Mini-Load are a fixed size design, for each of the 4 tube sizes it is designed to operate with.

To insert the tube clamps:

1. Raise the tube saddle by operating the saddle.
2. Offer the tube clamp horizontal to the pump main body (→ Figure 8 Installing Tube Clamp for Mini-Load Head) note the spigots to each side of the tube clamp, they are designed to fit in two grooves in the pump head main body.
3. Rotate the tube clamp slide down with the two spigots located in the grooves, until a click is heard as the tube clamp locates in the slot.

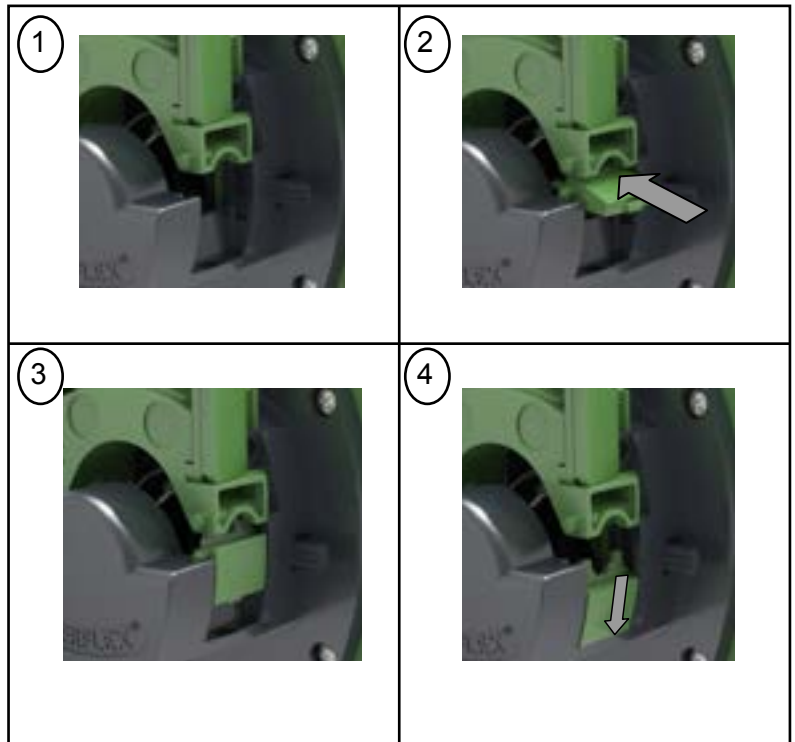


Figure 8 Installing the Tube Clamp for Mini-Load Head

5.4.4 Changing the tube clamp

To change the tube clamps:

1. Gently insert a small flat blade screw driver (max size 5mm) into the gap at the base of the tube clamp.
2. Rotate the screwdriver to overcome the slot.
3. Ensure the tube is aligned with the gap in the tube clamps and tube saddle so the tube is held correctly and not damaged.
4. Remove the tube clamp, by lifting and rotating in the clamp on each side.

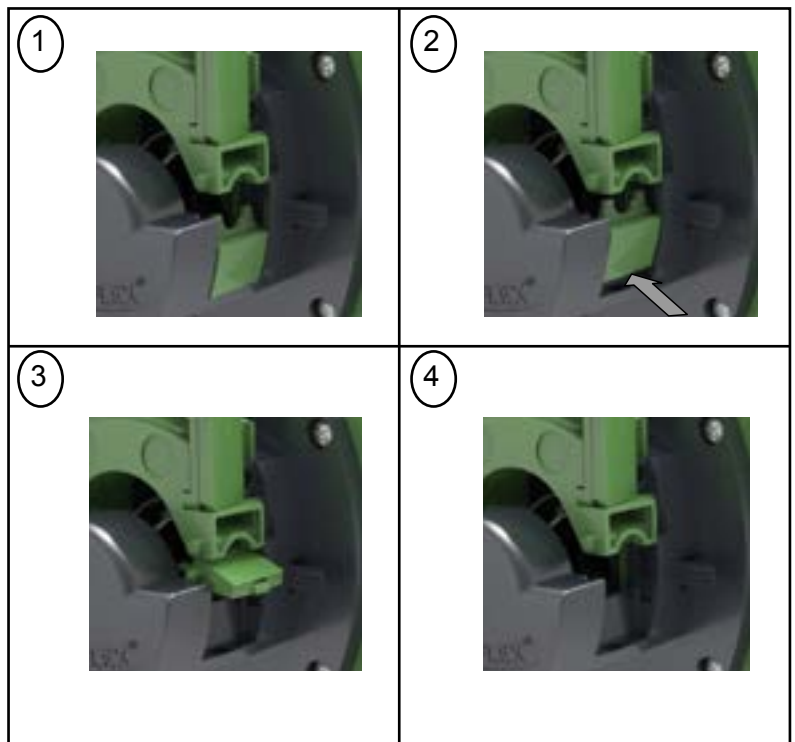


Figure 9 Changing the Tube Clamp for Mini-Load Head

5.4.5 Replacing the pump head

1. Remove the pump head by pressing location lever and twisting pump head counter clockwise 45°.
2. Offer the new pump head to the back plate at an angle locating the motor shaft to the rotor shaft within the pump head backplate at approx 45° to vertical, locating the lugs in the housing.
3. Push and twist until location lever clicks into position.
3. Remove by depressing location lever and twisting pump head counter clockwise 45°.

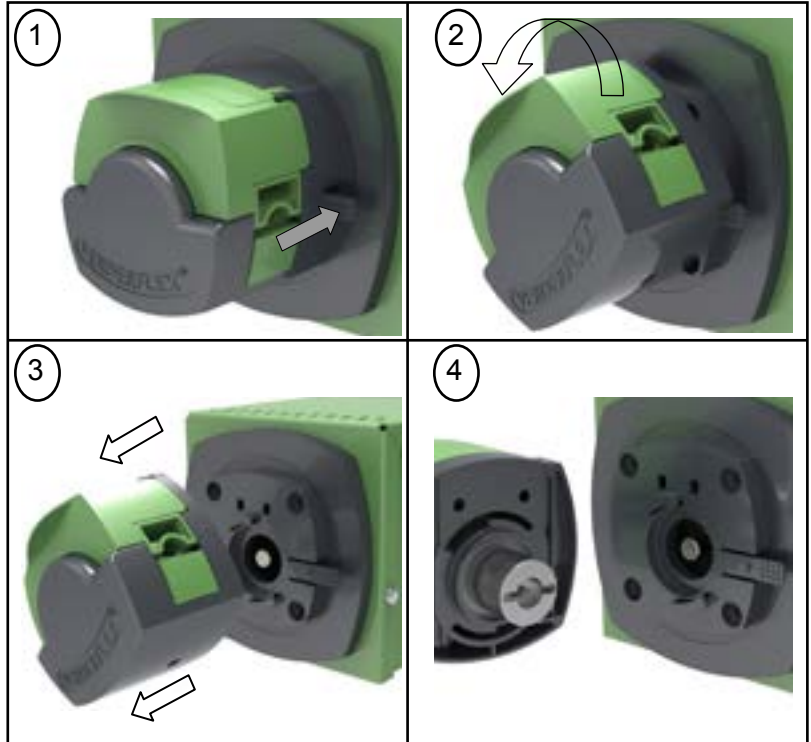


Figure 10 Replacing the Mini-Load Head

5.4.6 Installing a Stackable ML-pump head

i Installing a stackable ML pump head is very similar to the procedure of fixing a standard pump head.

Note: The two pump heads of a stacked assembly will be factory assembled and configured as such.

1. Before assembling, please observe slot in the end of the “rear” stack head assembly and the pin front assembly drive shaft (see enlarged view 3, 4 in fig.11).
2. Align the pin and slot, offer pump head to bac plate at an angle locating motor shaft and rotor shaft with pump head at approximately 45° to vertical, locating back plate lugs in housing.
3. Push and twist until location lever clicks into position.
4. Remove by pressing location lever and twisting pump head counter clockwise 45°.

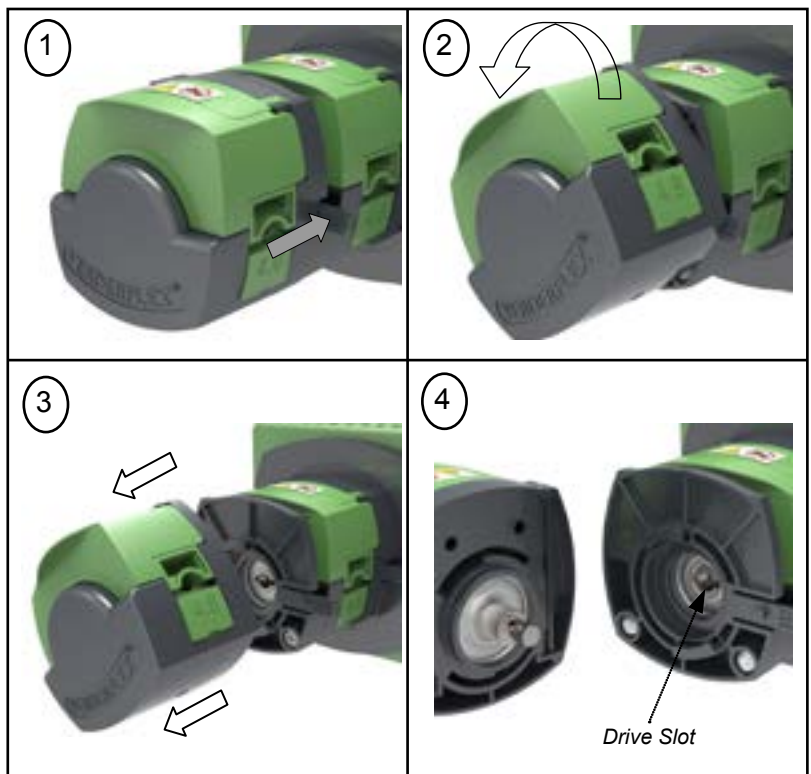


Figure 11 Installing a Stackable ML Pump Head

5.5 EZ head

5.5.1 Key features

Easy tube change system, stackable multi head options with Verderprene, Silicone, Viton® or Tygon® tubing.

- Flow rates up to 1,310 ml/min (20.8 US GPH) (with single pump head)
- Pressures up to 2 Bar (29 PSI) depending on tube material
- Maximum speed 250rpm (with single pump head)
- Typically used in frequent tube change applications

5.5.2 Installing the tube

1. Flip the lugs on both sides of the pump head to lift the top section
2. Once the head is lifted as shown in figure, insert the tube over the rollers.
3. Flip the lugs on both sides of the pump head to lock the top section down.
 - Adjust the tube clamp to hold the tube in place and avoid slip
 - Adjust the tube clamp on both sides of the pump head to the tube diameter.
 - If a tube slip is observed, tighten the tension on the clamps
 - Alternately, if a reduced flow is observed, reduce the clamp tension.

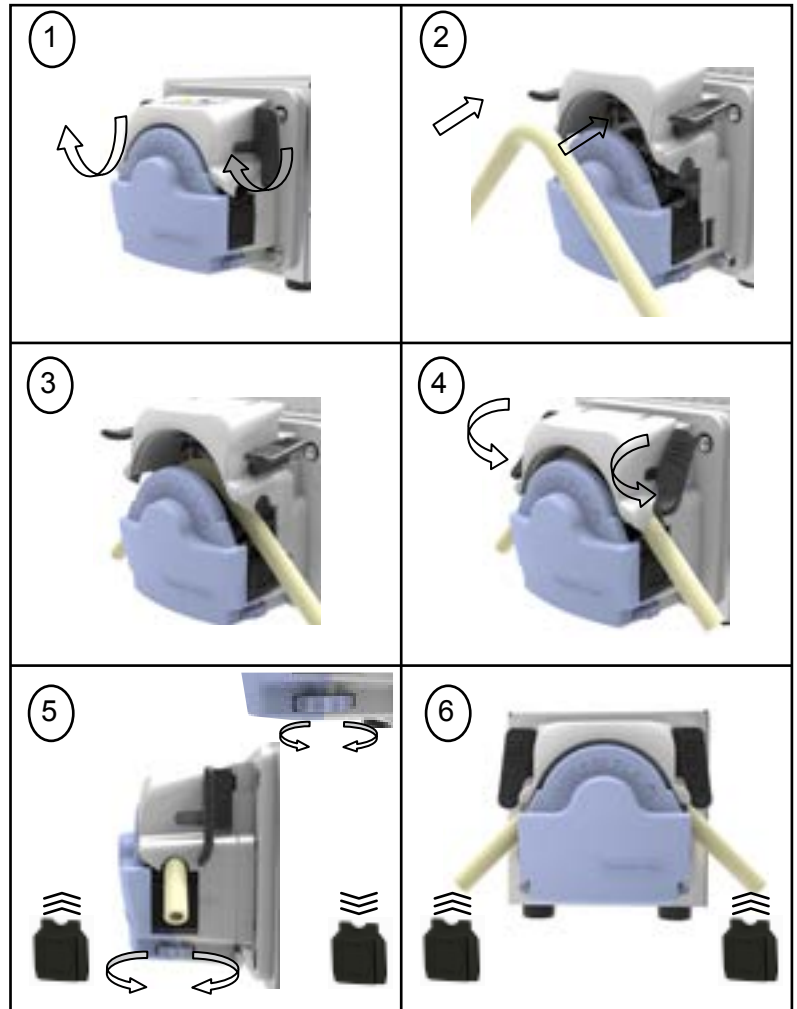


Figure 12 Installing the tube into EZ head

5.5.3 Replacing the pump head

1. Offer pump head to backplate at angle locating drive shaft and rotor shaft with pump head at approx 45° to vertical, locating backplate lugs in housing.
2. Push and twist until location lever clicks into position.
3. Remove by depressing location lever and twisting pump head counter clockwise 45°.

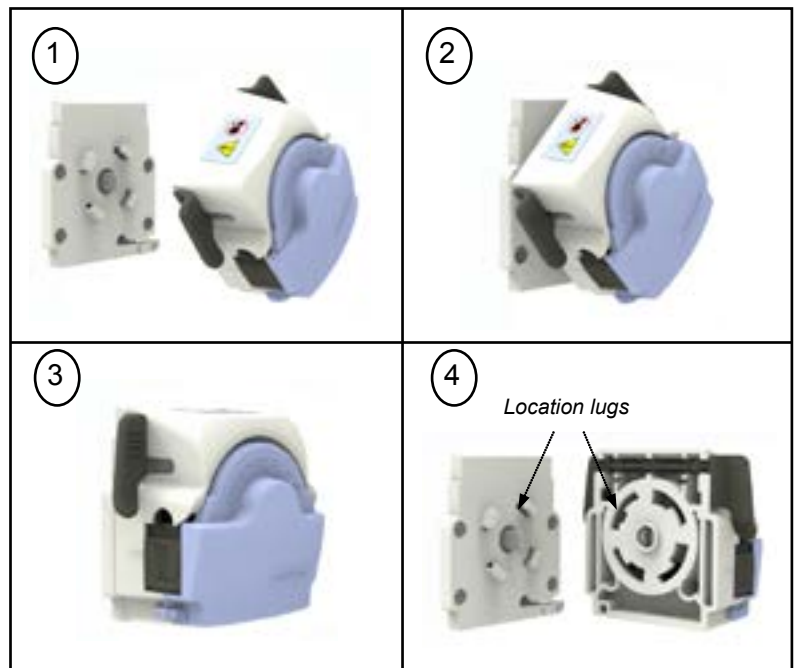



Figure 13 Replacing the EZ head

5.5.4 Installing the ES-stackable pump head

 A pump head can be stacked over a similar stackable head as demonstrated in table 6.

1. Attach the stackable head on to the backplate (→ 5.5.3 Replacing the pump head)
2. Offer the pump head over the stackable head locating the drive shaft and pump shaft with pump head at approx 45° to vertical, locating lugs in the housing.
3. Push and twist unit location lever clicks into position.
4. Remove by depressing location lever on the stackable head and twisting pump head counter clockwise 45°.

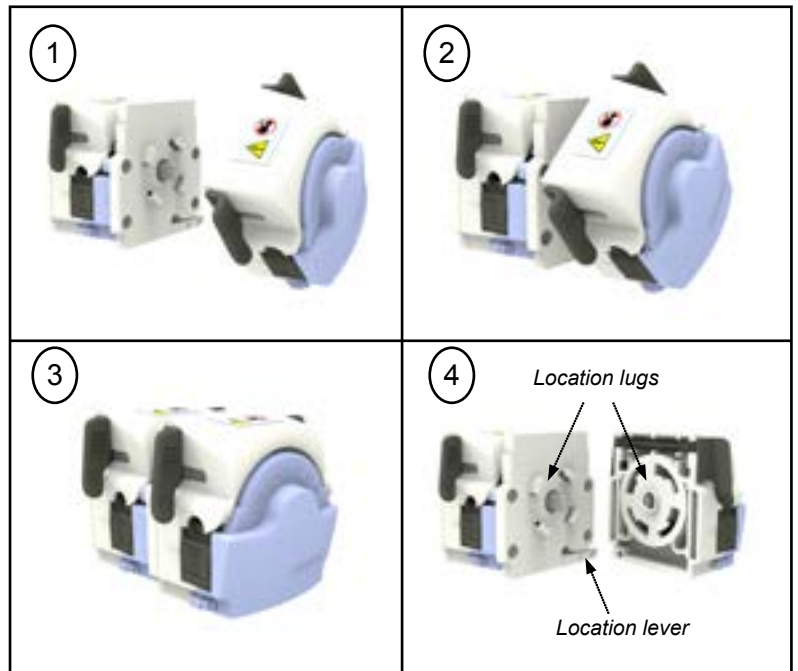


Figure 14 Stacking – ES head

5.6 Electrical connection

5.6.1 Connecting to Control Signals

NOTE

Pump cannot be operated before wiring the D-25 pins connector

- ▶ Pump cannot be operated before wiring the D-25 cable as per wiring diagram in (→ Figure 18).
- ▶ The pump should be connected to external 0-10V or 4-20 mA control signal through the D-25 ribbon cable (for panel mounted versions) or the D-25 pins connector (for cased version) before operation.

5.6.2 Connecting Supply Voltage

The Steptronic Unit can be supplied with a voltage between 12V-36V D.C.

It is important to note that the unit has been optimised to use 24V D.C supply. Using a lower voltage will have an affect on unit output torque and may result in incorrect pump operation.

For application assistance, please contact your Verderflex representative.

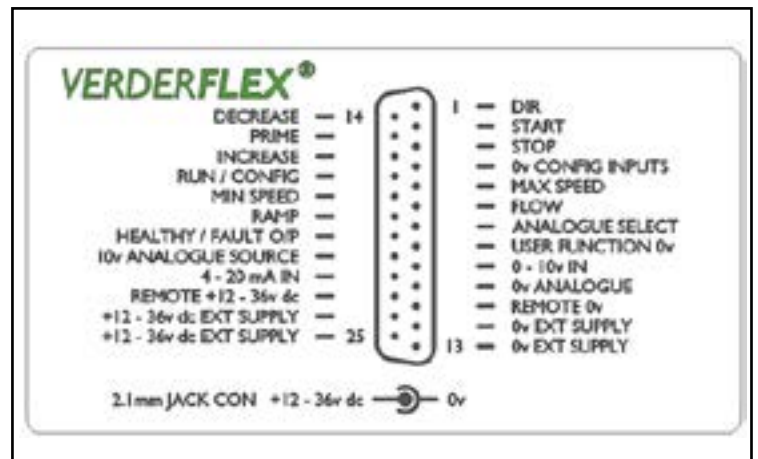


Figure 15 Diagram - 25 WAY D-SUB PINs connector

PIN	Description	PIN	Description
1	Direction	14	Speed decrease
2	Start	15	Fast prime
3	Stop	16	Speed Increase
4	0v Config inputs	17	Select Run / Config. mode
5	Configure Maximum speed	18	Configure Minimum speed
6	Flow scaling select	19	Configure RAMP speed
7	Analogue select (switch between 0-10V or 4-20 mA)	20	Healthy / Fault indicator
8	User function 0v	21	10V Analogue source
9	0-10V IN	22	4 - 20 mA IN
10	0v Analogue	23	Remote power 12 - 36V
11	Remote power return (0v)	24	12 - 36V dc External Supply
12	0v External supply (earth)	25	12 - 36V dc External Supply
13	0v External supply (earth)		

Table 5 Description - 25 WAY D-SUB PINs connector

6. Remote Analogue Control

An external Analogue/Digital control should be used to operate the Verderflex Steptronic range. Pump cannot be operated before wiring the D-25 pins connector.

6.1 Types of Analogue remote control:

- 0 - 10V D.C
- 4 – 20 mA

6.2 Layout of Back Plate

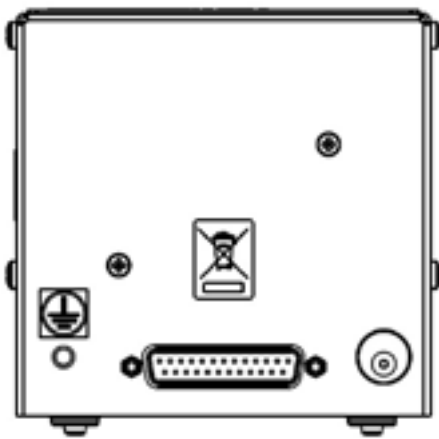


Figure 16 Backplate - Standard
(without Configuration port)

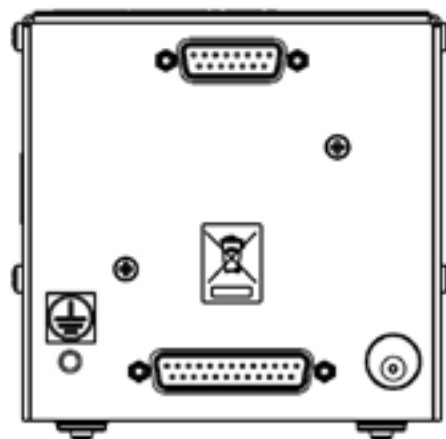


Figure 17 Backplate - With HMI
(port for configuration)

Model	Analogue Control	
	0-10V d.c	4-20mA
Panel mount Mini-load	✓	✓
Panel mount EZ head	✓	✓
Cased 25 WAY D-SUB	✓	✓
Case 25 WAY D-SUB with HMI connection	✓	✓

Table 6 Models & Control features available

7. Wiring the 25 WAY D-SUB connector

7.1 Description of PINs:

The PINs on the 25 WAY D-SUB connector can be grouped into:

1. Pump operation controls
2. Configuration PINs (for factory configuration)
3. Fault indicator
4. Power source
5. Remote external optional power source

7.2 User Controls

Control features available with the Analogue 4-20mA / 0-10V are:

1. Start/ Run
2. Stop
3. Direction of rotation
4. Prime pump
5. Speed control
6. Healthy / Fault indicator

Note: It is possible to use isolated supplies for the 24V switching inputs. The Steptronic unit will have been pre-configured to allow for this if necessary.

Pin 23 and 11 provides external excitation to optical isolation. If jumpers J9/J10 links are removed then a separate supply will need to be provided to use the 24V switching inputs. The board will also need a separate supply provided through PCB J1.

Pins 24 and 25 both provide positive power supply from the board. Pins 12 and 13 both supply ground from the board.

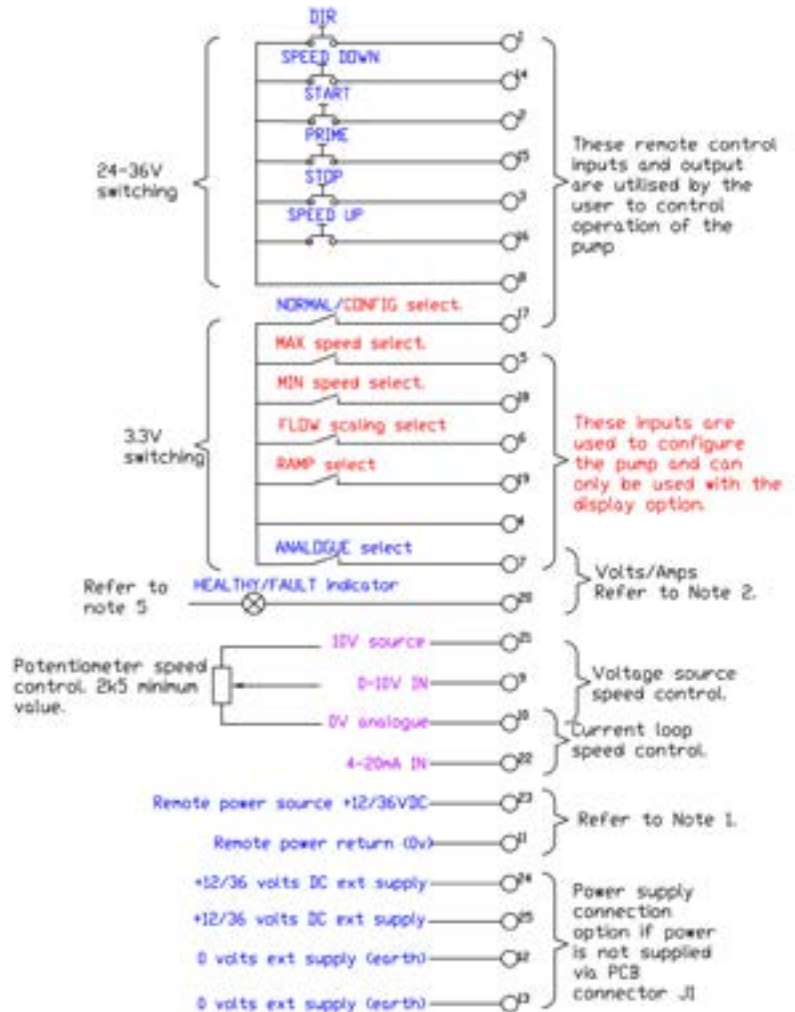


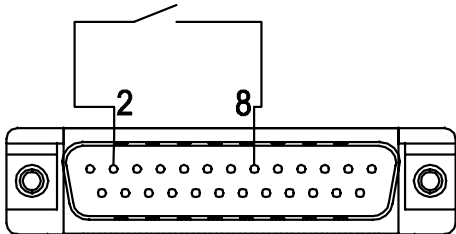
Figure 18 Wiring Diagram - 25 WAY D-SUB Connector

Note:

1. Remote control power source can be selected by J9&J10 links. If the links are connected, then the remote control inputs and the fault output are controlled by the same power supply that is fed via PCB J1 or D-SUB 25 WAY pins 12/13 & 24/25 (local). If the J9/J10 links are removed, then a separate power source (12-36 Vdc) for the remote control inputs and fault output can be connected to 25W D-SUB pins 11 & 23 (Remote). Both J9 and J10 links must be connected or disconnected. Irreparable damage will occur if a remote source is used with the links engaged.
2. In Analogue speed control mode, A closed connection between pins 4&7 permits speed control via 4-20mA current loop. Maximum safe current draw is 27mA. An open connection permits speed control via 0-10V. Maximum input must not exceed 13.0V.
3. Refer to product data plate for configured Speed settings of fixed speed digital control models.
4. Fault output is normally high when healthy and switches low when in fault. If 'Remote Power source' is used, (J9&J10 links removed) then connect one side of the indicator to the '+ Remote Power source (pin23)' and the return side to pin 20. If 'Local Power' is used, (J9&J10 links connected) then connect one side of the indicator to '+ Local Power (Pin24/25)' and the return side to pin 20.

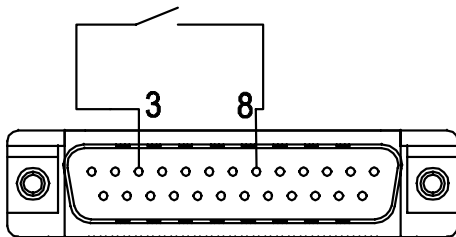
7.2.1 Starting the pump

A volt-free connection between pins 2 and 8 will start the pump. The flow rate will be determined by the analogue speed control value (see Speed control section). The start signal operates as a Normally Open signal and removal of the start signal will stop the pump. When the start signal is removed, the pump will use the ramp to slow down.



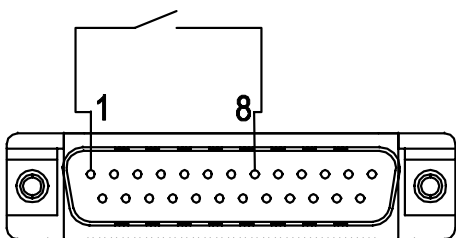
7.2.2 Stopping the pump

A volt-free connection between pins 3 and 8 will stop the pump. The pump will stop regardless of the state of the START signal. To restart the pump after using the STOP signal, the START signal must be toggled.



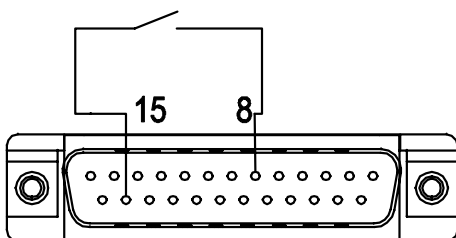
7.2.3 Direction of rotation

A volt-free connection between pins 1 and 8 will change the direction of rotation of the pump. Pump direction will only change when the pump is stopped.



7.2.4 Prime Pump

A volt-free connection between pins 15 and 8 will accelerate the pump to the pre-set maximum speed. The pump will only respond to a PRIME signal when the pump is stopped.

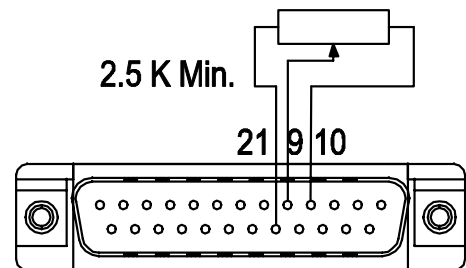
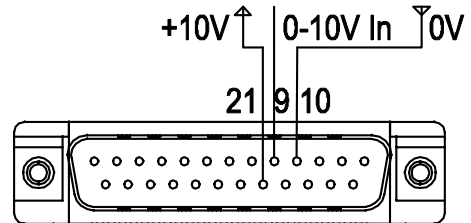


7.2.5 Speed Control - 0 to 10 V

Pump speed can be modified by using a 0-10V signal between pins 9 and 10. If no 10V supply is available, pin 21 can be used to provide a 10V supply.

Pin 10 must only be used for supplying 0V for analogue pins. Below is an example of 0-10V control with a 2.5K Ohm potentiometer.

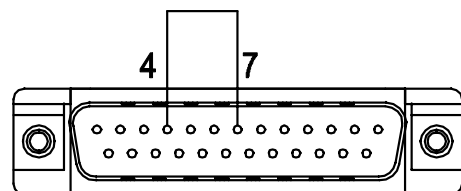
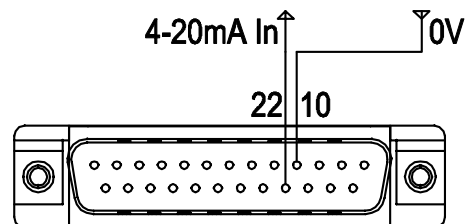
If using a supply voltage > 30V, the 10V supply rail will not function correctly. The installer will need to source a suitable external 10V feed to use analogue control with supply voltages > 30V.



7.2.6 Speed Control - 4 to 20 mA

Pump speed can be modified by using a 4-20mA signal between pins 22 and 10. In order to use the 4-20mA connection, pins 4 and 7 need to be linked together.

Maximum current draw is 27mA.



7.2.7 Healthy / Fault Indicator

This logical output is high (OFF) when the pump is healthy and logic low (ON) when in fault. The fault signal is grounded through pin 11.

7.3 Getting Started with 25 WAY D-SUB Connector

If the user wishes to test the pump to verify operation, the following steps should be taken:

1. Ensure jumpers J9/J10 are fitted.
2. Provide the board with a 24V supply through PCB J1.
3. Supply a 0-10 Volt signal to pin 9 (0-10V in).
4. Close the start signal as detailed above.
5. Pump will start spinning.

7.4 Factory Configuration of operating parameters

To configure the variable parameters of Steptronic, a configuration display unit is required to set and view the parameter values. Steptronic can be configured when the mode is switched from RUN to Configure: (Pin 17, 25w D-sub)

When the configuration display is connected, the display will show:

- A) Stopped/ Running
- B) Speed demand (RPM)
- C) Flow rate (mL/Min)

Only when the pump is stopped will switching this input low change the pump from Run to Configuration mode. The display will confirm this action by displaying (PROG).

7.4.1 Selection of Analogue mode:

(Pin 7, 25w D-sub)

Switching this input logically low will change the Analogue speed control input from 0-10V to 4-20mA. Analogue speed control is only available when the pump is configured to Analogue speed control mode.

7.4.2 Maximum speed:

Switching this input low allows the Maximum speed setting of the pump to be configured. The display will show (MAX) and the current set maximum speed value in RPM.

Switch the User "Speed up" (Pin 16, 25w D-sub) or "Speed down" (Pin 14, 25w D-sub) inputs to change the value of Max speed.

The maximum value allowed is 409.6RPM and the minimum value of Max speed will always be at least 2RPM higher than the set Min speed value.

Switch the Max speed input back to logical high to record the set value and return the display back to (PROG).

7.4.3 Minimum speed:

Switching this input low allows the Minimum speed setting of the pump to be configured. The display will show (MIN) and the current set minimum speed value in RPM.

Switch the User "Speed up" (Pin 16, 25w D-sub) or "Speed down" (Pin 14, 25w D-sub) inputs to change the value of Min speed.

The minimum value allowed is 0.000RPM and the maximum value of Min speed will always be at least 2RPM lower than the set Max speed value.

Switch the Min speed input back to logical high to record the set value and return the display back to (PROG).

7.4.4 Flow

(Pin 6, 25w D-sub)

Switching this input low allows the Flow rate of the display to be calibrated to show a flow rate that is relative and synchronous with the pump speed.

The display will show (FLOW) + XXX.XmL/Min + "The set speed" (RPM).

Assuming that calibration has been measured at the set RPM, the flow-rate can now be changed to match the measured value.

To change the set value: - Switch the User "Speed up" (Pin 16, 25w D-sub) or "Speed down" (Pin 14, 25w D-sub) inputs to change the value of flow.

Switch the Flow input back to logical high to record the set value and return the display back to (PROG).

The displayed flow-rate will now be relative and synchronous with changes in RPM.

7.4.5 Ramp

(Pin 19, 25w D-sub)

Switching this input low allows the pumps acceleration / deceleration value to be set. The display will show (RAMP) + X seconds. Acceleration and decelerations values are identical and cannot be separated.

The minimum value of Ramp is 1 second.

The maximum value of Ramp is 5 seconds.

Ramp rate value is relative to the entire span range of the pump (0.000RPM – 409.6RPM).

If the span range is reduced, then the Ramp timing is also reduced accordingly.

To change the set value: - Switch the User "Speed up" (Pin 16, 25w D-sub) or "Speed down" (Pin 14, 25w D-sub) inputs to change the value of ramp.

Switch the "Ramp" input back to logical high to record the set value and return the display back to (PROG).

7.4.6 Logical low:

Is the connection of a configuration input to an internal digital zero volts DC (Pin 4, 25w D-sub). This point of connection must be used to switch all configuration inputs.


7.4.7 Error displayed:

If more than one configuration input has been accidentally selected the display will report "ERROR" to demonstrate the fact. Find and remove the erroneous input to restore normal operation.

For example: Config (prog) + Flow + Ramp= ERROR.


8 Inspection, Maintenance and Repairs

8.1 Inspections

 The inspection intervals depend on the pump operating cycle.

1. Check at appropriate intervals:
 - Normal operating conditions unchanged
2. For trouble-free operation, always ensure the following:
 - No leaks
 - No unusual running noises or vibrations
 - Tube in position

8.2 Maintenance

 These pumps are generally maintenance free and any work should normally be limited to inspections; these may be more frequent in dust and/or hot condition.

Pump motor is lubricated for life and should not require attention. Rotor rollers are self-lubricated. Pump tubing will not last forever; establish suitable tube replacement schedule to prevent inconvenient tube failure.

The pump casing in the cased steptronic version contains no user serviceable parts and is factory sealed to confirm integrity. Pump warranty will be invalidated if the seal is broken.

 **DANGER**

Risk of injury due to running pump or hot parts!

- ▶ Do not carry out any repair/maintenance work on a pump in operation.
- ▶ Allow the pump to cool down completely before starting any repair work.

 **DANGER**

Risk of electrocution!

- ▶ Have all electrical work carried out only by qualified electricians.

8.2.1 Cleaning the pump

NOTE

High water pressure or spray water can damage motors!

- ▶ Do not clean motors with water
 1. Clean large-scale grime from the pump head.
 2. Rinse the tube carefully to remove chemicals

8.2.2 Maintenance schedule

Task	Frequency	Action
Check pump for leaks and damage	<ul style="list-style-type: none"> – Before pump start up – Daily visual inspection – Scheduled intervals during operation 	<ul style="list-style-type: none"> ▶ Repair leaks and damage before operating the pump ▶ Replace components as necessary. ▶ Clean up any spillage.
Check pump for unusual temperatures or noise in operation	<ul style="list-style-type: none"> – Daily visual inspection – Scheduled intervals during operation 	<ul style="list-style-type: none"> ▶ Check pump and motor for damage. Replace worn components.
Replace tube element	<ul style="list-style-type: none"> – After inspection when required – When flow has dropped by 25% of original value – When the tube is burst/damaged 	<ul style="list-style-type: none"> ▶ Replace tube (→ 5.4.2 & 5.5.2)
Check pump housing and rotor internally	<ul style="list-style-type: none"> – Annually – On replacing the tube 	<ul style="list-style-type: none"> ▶ Worn and damaged surfaces give rise to premature tube failure ▶ Replace worn components. ▶ Check bearing play and function.

Table 7 Maintenance schedule

8.3 Repairs



DANGER

Risk of death due to electric shock!

- ▶ Have all electrical work carried out by qualified electrician only

8.3.1 Preparations for dismounting

- ✓ Pump completely emptied, flushed and decontaminated
- ✓ Electrical connections disconnected
- ✓ Pump cooled down
- ✓ Auxiliary systems shut down, depressurized and emptied



WARNING

Risk of injury while removing the pump components!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Observe manufacturer's instructions (e.g. for Motor...)

8.3.2 Returning the pump to the manufacturer

- ✓ Completely emptied and decontaminated.
- ✓ Pump cooled down
- ✓ Tube removed (→ 5.4.2 & 5.5.2)

Obtain prior authorisation before repair or return of the pump.

- ▶ Enclose a completed document of compliance when returning pumps or components to the manufacturer

Repairs	Measure for return
...at the customer's premises	<ul style="list-style-type: none"> – Return the defective component to the manufacturer. – Decontaminate if necessary.
...at the manufacturer's premises	<ul style="list-style-type: none"> – Flush the pump and decontaminate it if it was used for hazardous pumped liquids.
...at the manufacturer's premises for warranty repairs	<ul style="list-style-type: none"> – Only in the event of hazardous pumped liquid, flush and decontaminate the pump

Table 8 Measures for return

8.3.3 Rebuild / Repair



Reinstall the components, in accordance with the marks applied.

NOTE

Material damage due to unsuitable components!

- ▶ Always replace lost or damaged parts with genuine Verderflex spares.
1. Observe the following during the installation:
 - Replace worn parts with genuine spare parts.
 2. Clean all parts.
 3. Reassemble the pump (→ refer sectional drawing).
 4. Install the pump in the system (→ 5 Installation and connection)

8.4 Ordering spare parts



For trouble-free replacement in the event of faults, we recommend keeping spare parts available on site.

- ▶ The following information is mandatory when ordering spare parts (→ Name plate):
 - Pump model
 - Year of manufacture
 - Part number / Description of part required
 - Serial number
 - Quantity

9. Storing pumps and tubes



We recommend certain pre-storage actions and precautions be taken whilst pumps and their components are not in use.

Similarly, tubes and spares may be held in stock to service working pumps and their recommended storage conditions are advised.

9.1 Pre-Storage Actions

- The tube should be removed from the pump
- The pump casing should be washed out allowed to dry and any external build up of product removed.

9.2 Storage Conditions

- Pumps should be stored in a dry environment, out of direct sunlight. Depending on these conditions, it may be advisable to place a moisture absorbing product, such as Silica gel, inside the pump's casing whilst the pump is stored.
- Tubes should be stored as supplied in their wrapper and should be stored away from direct sunlight and at room temperature.

10. Troubleshooting

10.1 Pump malfunctions

If malfunctions occur which are not specified in the following table or cannot be traced back to the specified causes, please consult the manufacturer.

Possible malfunctions are identified and respective cause and remedy are listed in the table.

Problem	Cause	Solution	
Low Flow / low discharge pressure	Ratio of inner diameter / wall thickness too large for the application (tube too 'soft')	Use thicker wall thickness tube with the same inner diameter. This may require a different tube clamp or pump	
		Run Pump slower with larger inner diameter tube	
	Viscosity too high	Run the pump slower	
	Suction lift too high, resulting in tube not fully returning to fully round		Use thicker wall thickness tube with the same inner diameter. This may require a different tube clamp or pump.
			Use a bigger pump running slower
	Wall thickness does not match the specifications of the tube clamp used.	Purchase appropriate tube clamp or change wall thickness	
	Discharge pressure too high	Poor flow is caused by excessive backflow, reduce discharge pressure	
Using non-standard tubing	Use Verderflex approved genuine tubing		
Tube walks through pump head	Tube outer diameter too small for the pump head used	Adjust tube clamp tension / check tube clamp installed	
		Use tube with correct outer diameter.	

Table 9 Pump troubleshooting list

11. Appendix

11.1 Technical Specifications

11.1.1 Pump Specifications

Size	Value
Max. delivery pressure	2 bar
IP Rating Standard Cased Version: Open Frame Version: Optional IP66 Casing:	IP31 IP00 IP66
Max. configurable speed Min. configurable speed	409.6 rpm 0 rpm
Dimensions	Refer datasheet for models
Typical audible noise level (No pump head)	50dBA @1meter

Table 10 Pump Specifications– Steptronic @ 24V D.C Supply

11.1.2 Ambient conditions

Operation under any other ambient condition would require approval from the manufacturer

Operating conditions

- Ambient temperature -5 °C to +45 °C
- Up to 30°C: 80% RH (Non condensing).
30°C - 45°C reducing linearly to 30% RH (Non condensing)
- Setup height above sea level ≤ 1000m / 3000 ft above sea level

Storage conditions

- Ambient temperature +18 °C to +65 °C
- Relative humidity – long—term ≤ 80 %

Maximum Motor Temperature Rise: 80°C

11.1.3 Power Supply

Motor supply operating voltage range:

- Minimum 12V DC*
* Minimum of 12V can only be used in single head configurations for Mini-load head.
Minimum of 12V not suitable for EZ head.
- Nominal 24V DC
- Maximum 36V DC

Control circuit operating voltage range

- Minimum 12V DC
- Maximum 36V DC

Drive Power supply:

- 40VA (SMPS)
- 35VA Linear

11.1.4 Tube Variants



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
Tygon	Chemical fluids tubing
Viton	Aggressive chemical tubing

Table 11 Verderflex Tube variants

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13 Declaration of conformity according to EC Machine Directive



<p>EC declaration of conformity according to machine directive, appendix II A</p> <p>We, VERDER Ltd., Unit 3 California Drive, Castleford hereby declare that the following machine adheres to the relevant EC directives detailed below</p> <p>Designation Verderflex Steptronic</p> <p>EC directives:</p> <ul style="list-style-type: none"> • Machine Directive (2006/42/EC) • Low-voltage directive (2006/95/EC) • EMC directive (2004/108/EC) 		
<p>Responsible for the documentation</p>	<p>VERDER Ltd. Unit 3 California Drive Castleford WF10 5QH UK</p>	
<p>Date: 01/ 01/ 2016</p>	<p>Company stamp / signature:</p>  <p>David Sampson <i>Head of Development/Construction</i></p>	<p>Company stamp / signature:</p>  <p>David Hoyland <i>Head of Quality</i></p>

Table 12 Declaration of conformity according to EC Machine Directive