VERDERFLEX®

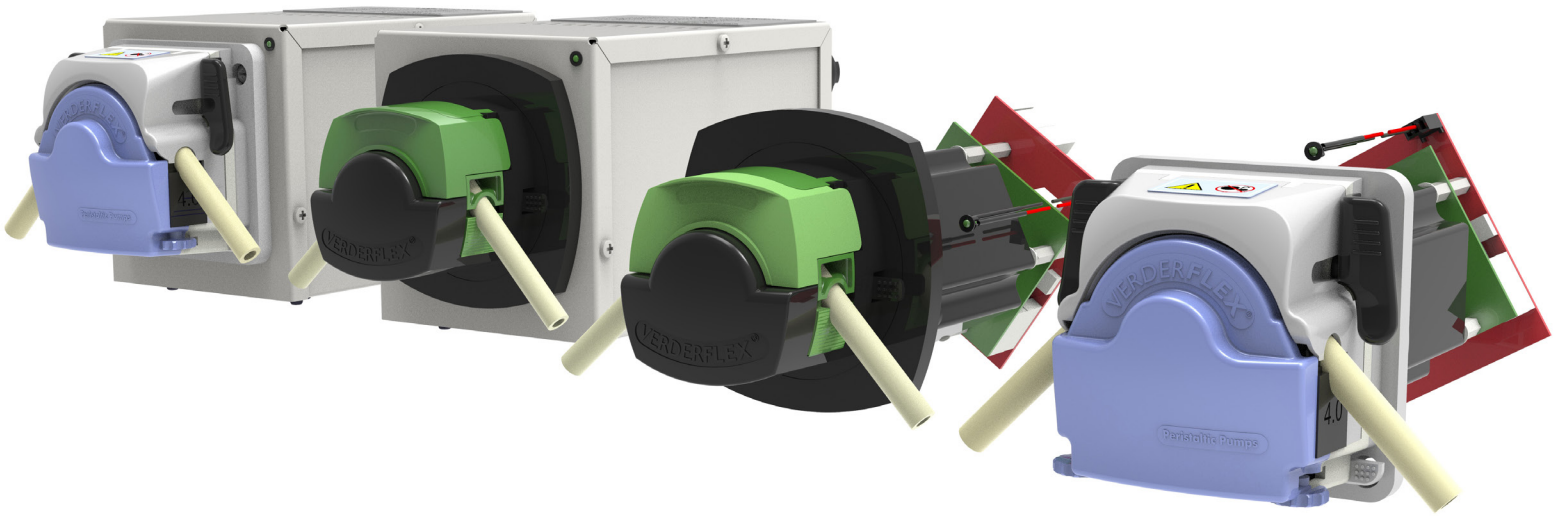
Peristaltic OEM Tube Pump

Operating Manual

Steptronic MKII

Version 2.0v-07/2020

Print-No. 01



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Version 2.0v-07/2020
Print-No. 01

Verderflex Steptronic MKII

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

Table of Contents

1 About this Document

The Verderflex Steptronic MKII 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 familiarisation with the pump and its designed use. This manual will act as a guide for operating the pump. You are advised to follow these guidelines to operate the pump correctly. These operating instructions do not take local regulations into account; the operator must ensure that such regulations are strictly observed by all, including the personnel responsible for installation.

1.1 Target Groups

Target Groups	Duty
Operating Company	▶ Keep this manual available at the operating site of the pump. ▶ Ensure that personnel read and follow the instructions in this manual and any other applicable documents, especially all safety instructions and warnings. ▶ Observe any additional rules and regulations referring to the system.
Qualified personnel, fitter	▶ Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

Table 1 Target Groups

1.2 Warnings and Symbols Used in the Manual

Warning	Risk Level	Consequences of disregard
⚠ DANGER	Immediate risk	Death, serious bodily harm
⚠ WARNING	Potential acute risk	Death, serious bodily harm
⚠ CAUTION	Potential hazardous situation	Potential damage to the pump
Note	For information	Possible incorrect use/maintenance of pump

Table 2 Warnings Used in the Manual

Symbol	Meaning
⚠	Safety warning sign in accordance with DIN 4844 - W9 ▶ 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
☐	Checklist
→	Cross-reference
ⓘ	Information

Table 3 Symbols Used in the Manual

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. (→ *Appendix A*)
- ▶ Adhere to the operating limits.
- ▶ Consult the manufacturer regarding any other use of the pump.
- ▶ Pumps delivered without a motor must be fitted with a motor in accordance with the provisions of EC Machine Directive 2006/42/EC.

Prevention of obvious misuse (examples)

- ▶ Note the operating limits of the pump with regard to temperature, pressure, flow rate and motor speed. (→ *Appendix A*)
- ▶ Do not operate the pump with any inlet/outlet valves 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.

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 it and all associated systems are in good functional condition.
- Only use the pump as intended, fully aware of safety and risk factors involved and 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 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.

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 with the pump.

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

The warranty is void if the customer fails to follow any Instruction, Warning or Caution in this document. Verder has made every effort to illustrate and describe the product 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, refer to terms and conditions.

2.2.3 Obligation of Personnel

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 use them as a fixing point for winches or supports
  - 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, such as the shims and impellers, can be sharp

- Use protective gloves when carrying out any work on the pump

3 Transport, Storage and Disposal

3.1 Transport

Always transport the pump in a horizontal position and ensure that the pump is securely packed in the box.

3.1.1 Unpacking and Inspection on Delivery

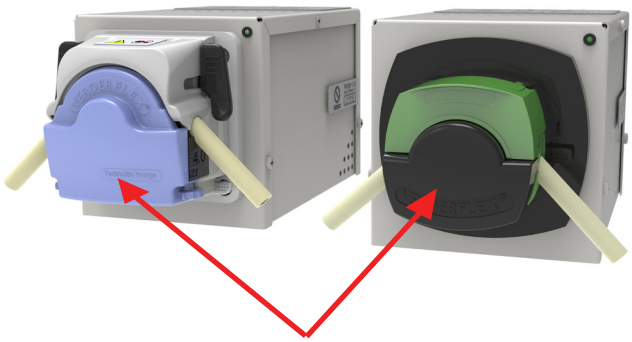
1. Report any transport damage to the manufacturer/ distributor immediately.
2. Retain the packing if any further transport is required.

3.1.2 Lifting

CAUTION

Pump damage caused by lifting

- ▶ Do not lift the pump by the Screen Module or the Pump Head as shown in the following illustration.



Do not lift the pump from the Pump Head

Figure 1 Lifting the pump

3.2 Storage Conditions

Make sure the storage location meets the following conditions:

- Dry, humidity not to exceed 80%, non-condensing
- Out of direct sunlight
- Frost-free; temperature range +18 °C to +65 °C
- Vibration-free
- Dust-free

Tubing should be stored as supplied in their wrapper and should be stored away from direct sunlight and at room temperature.

3.3 Interim Storage After Using the Pump

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

3.4 Interim Storage Before Using the Pump

CAUTION

Pump damage caused by interim storage

- ▶ Allow the pump to reach ambient temperature before use.
- ▶ Please observe the storage recommendations and use-by dates which apply to tubing you may wish to bring into service after storage.

3.5 Disposal

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

WARNING

Risk of poisoning and environmental damage by the pumped liquid

- ▶ 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 in accordance with local regulations.
  - Neutralize residues of pumped liquid in the pump.
- ▶ Dispose of the pump and associated parts in accordance with local regulations.

4 Layout and Function

The medium to be pumped does not come into contact with any moving parts and is totally contained within the tube. A roller passes along the length of the tube, compressing it. This motion forces the contents of the tube directly in front of the roller to move forward along the length of the tube in a ‘positive displacement’ peristaltic movement. In the wake of the roller’s compressing action, the natural elasticity of the tube material causes the tube to recover and regain its round profile. This creates suction pressure which refills the tube.

4.1 Design Details

The Verderflex Steptronic MKII 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.

⚠ WARNING

EMC Compliance

All Steptronic cased pump versions are EMC compliant. In case of Steptronic Panel mounted units, the pump should be enclosed in an earthed metal box when installed and mounted on a metal panel. The box should also have sufficient number of holes for ventilation so that pump units does not overheat. Note that in case these instructions are not followed, the final product may not be EMC compliant.

4.2 Labelling

4.2.1 Name Plate

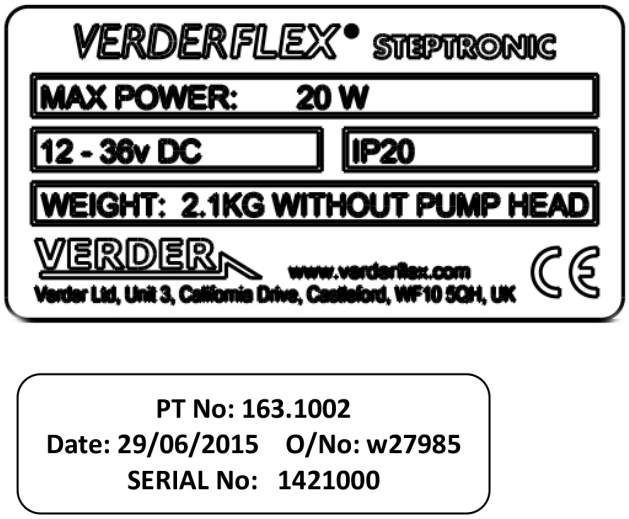


Figure 2 Name Plate

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

4.3 Layout

4.3.1 Steptronic MKII Mini-Load Cased Version

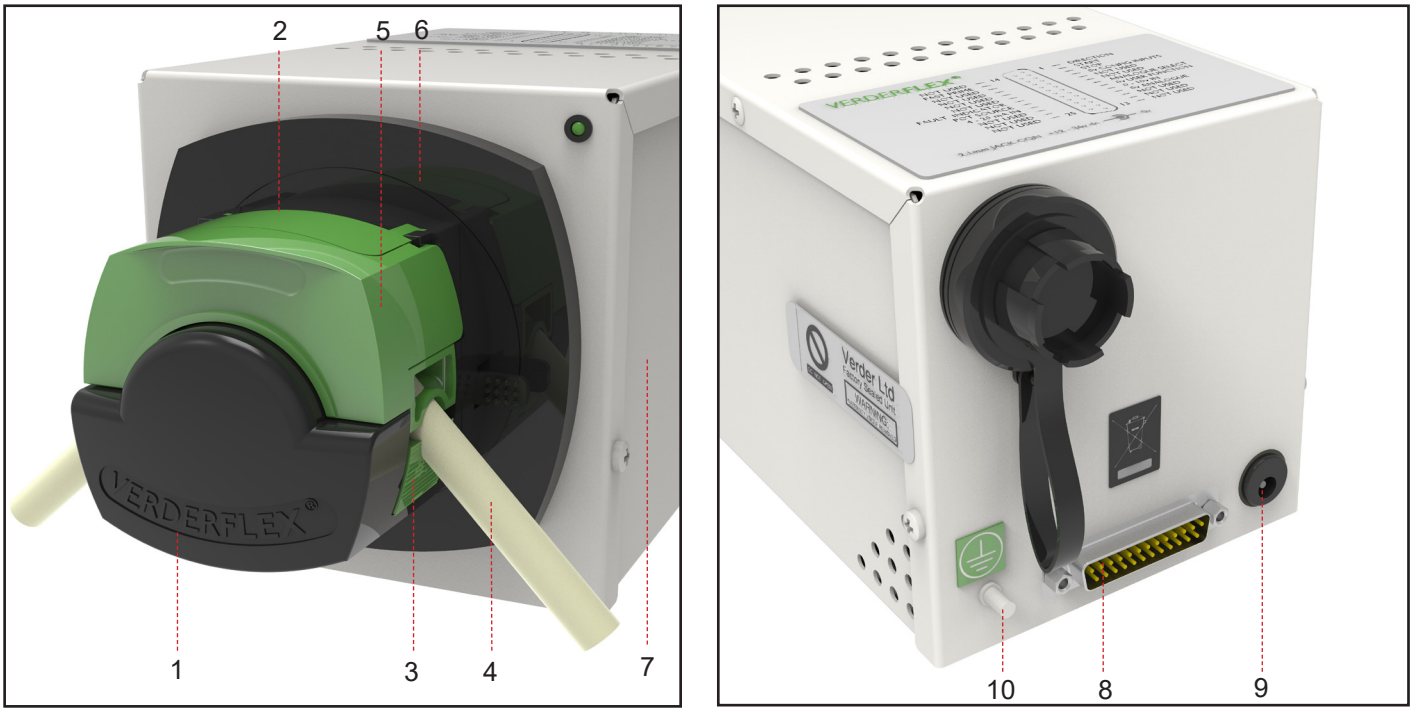


Figure 3 Layout - Steptronic MKII Mini-Load Cased Version

1	Front cover	5	Pump-head release lever	8	25 WAR 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				

4.3.2 Steptronic MKII EZ Cased Version

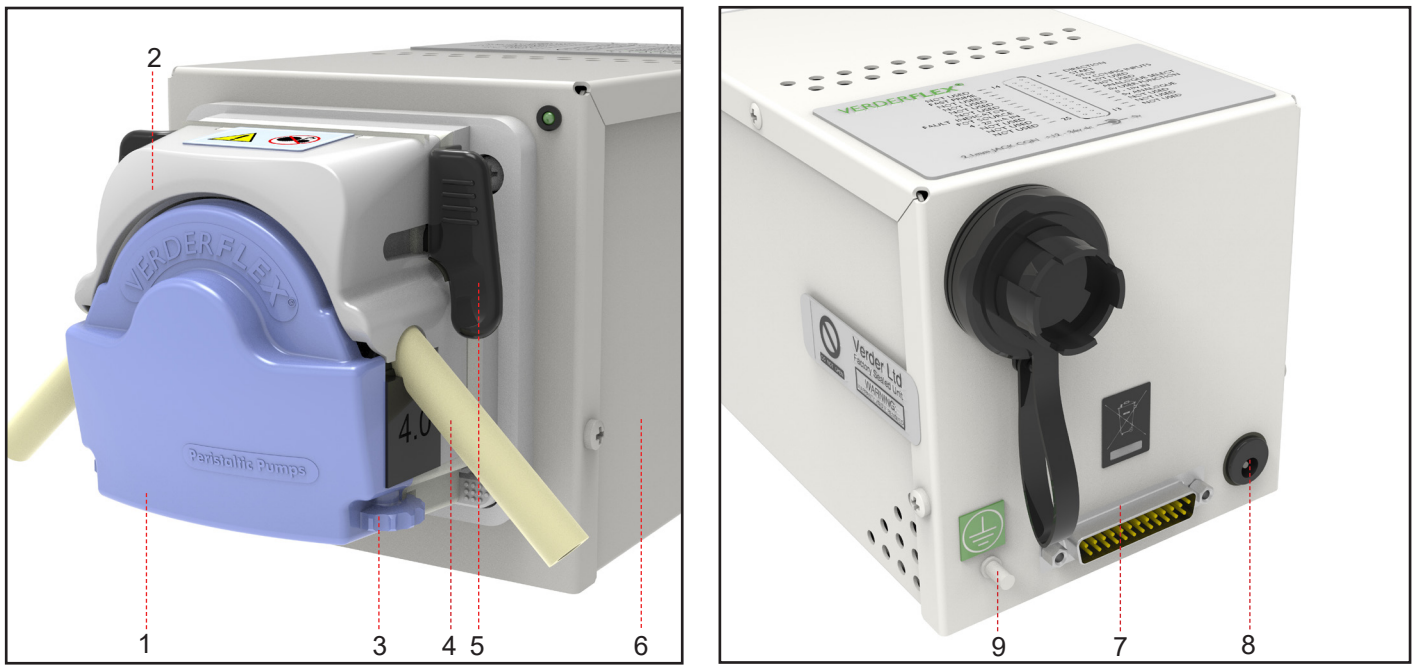


Figure 4 Layout - Steptronic MKII EZ Cased Version

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				

4.3.3 Steptronic MKII Mini-Load Panel Mounted

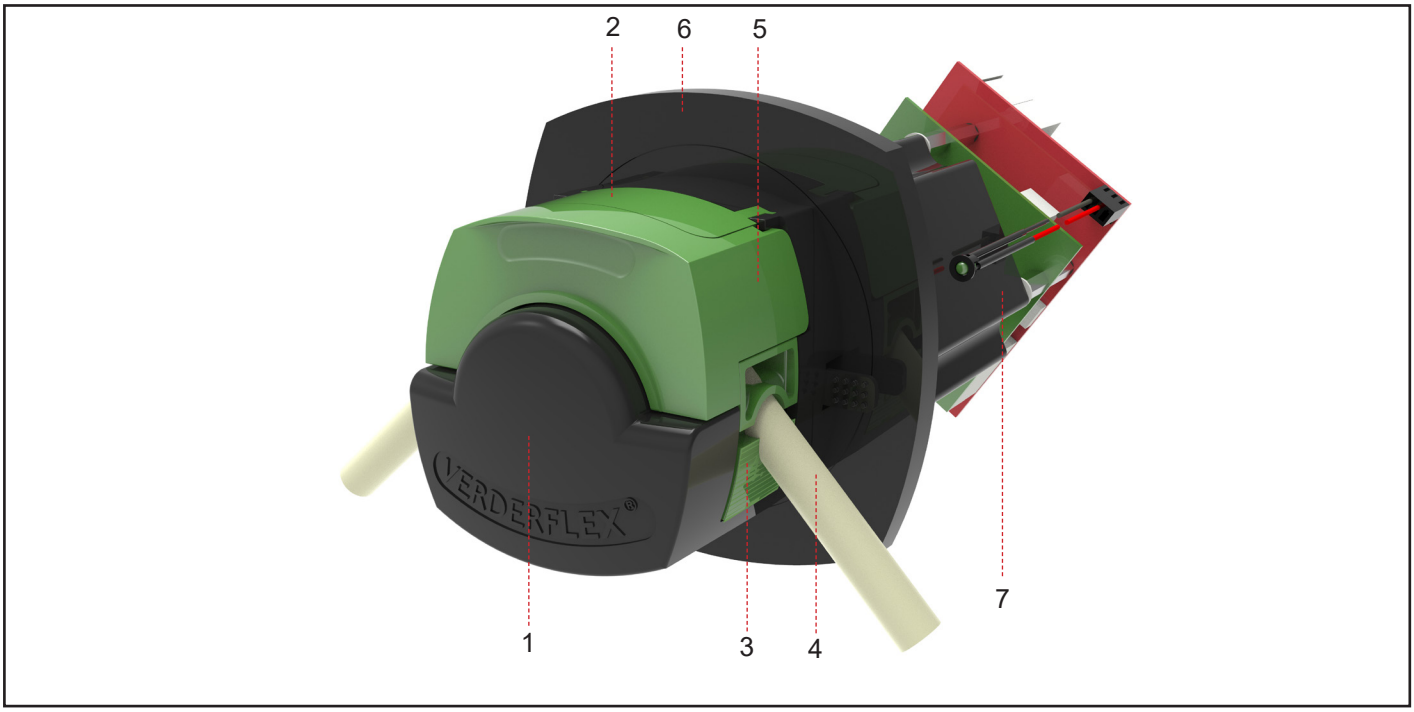


Figure 5 Layout - Steptronic MKII Mini-Load Panel Mounted

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

4.3.4 Steptronic MKII EZ Head Panel Mounted

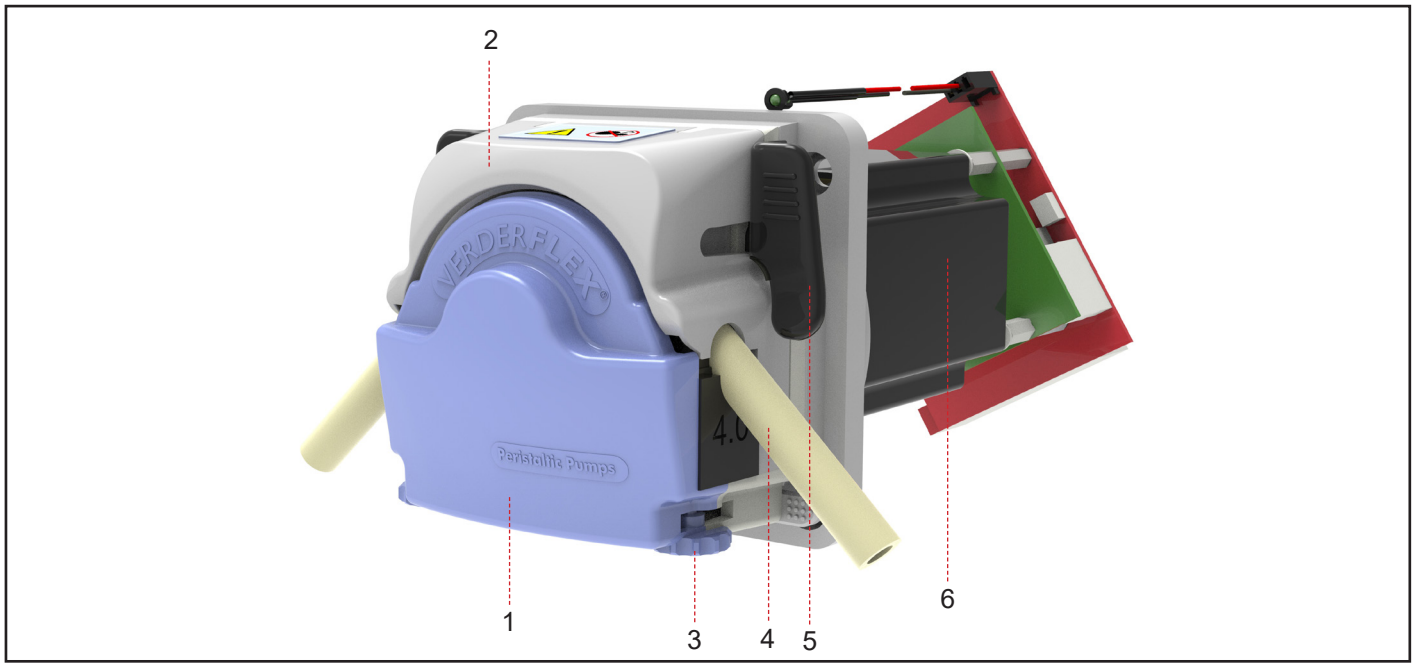


Figure 6 Layout - Steptronic MKII EZ head Panel Mounted

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

4.3.5 Mounting Panel - Dimensional Details

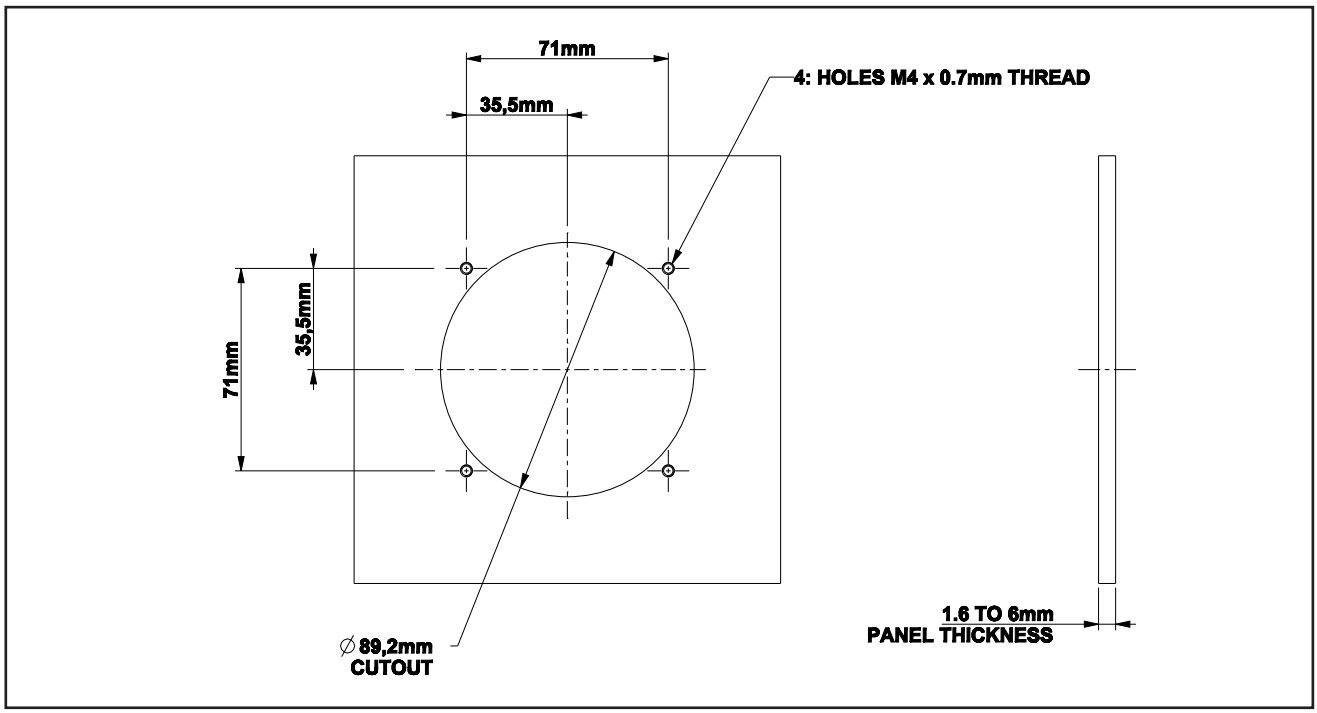


Figure 7 Mounting Panel - Dimensional Details

5 Installation and Connection

CAUTION

Material damage due to unauthorized modification on pump

▶ Unauthorized modification will invalidate the warranty.

5.1 Electrical Installation

CAUTION

Failure to follow safe and proper electrical installation practices may result in pump malfunction or dangerous operation

▶ Make sure the pump is installed correctly.
▶ The pump is supplied with a pre-fitted mains lead which is not a user-replaceable part.
▶ The mains lead may have a fuse fitted (country dependant)
▶ The fuse should be replaced with an identical fuse in the event of the fuse blowing.

5.1.1 Checking the Ambient Conditions

1. Make sure that the operating conditions are corrected. (→ *Appendix A*)
2. Make sure the required ambient conditions are fulfilled. (→ *Appendix A*)

5.1.2 Connecting to Control Signals

DANGER

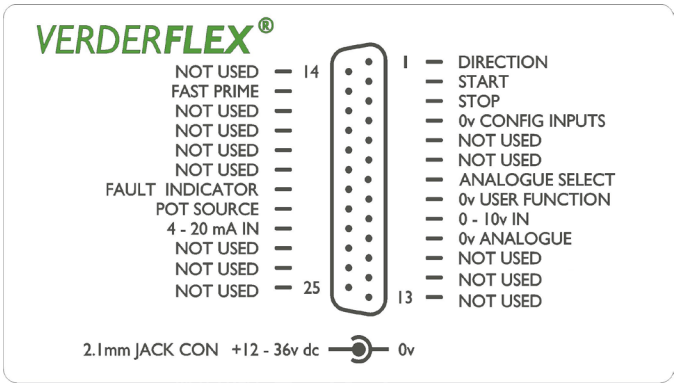
Pump cannot be operated before wiring the D-25 pins connector.

1. The pump cannot be operated before wiring the D-25 cable as per wiring diagram in (→ Figure 8).
2. 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.

5.1.3 Connecting Supply Voltage

1. The Steptronic MKII pump can be supplied with a voltage between 12V-36V D.C.
2. It is important to note that the unit has been optimised to use 24V D.C supply. Using a lower voltage will have an effect on unit output torque and may result in incorrect pump operation.

   For application assistance, please contact your Verderflex representative.



PIN	Description	PIN	Description
1	Direction	14	Not Used
2	Start	15	Fast Prime
3	Stop	16	Not Used
4	0V Config Inputs	17	Not Used
5	Not Used	18	Not Used
6	Not Used	19	Not Used
7	Analogue Select	20	Fault Indicator
8	(0V) User Function	21	Pot Source
9	0-10V Input	22	4-20mA Input
10	(0V) Analogue	23	Not Used
11	Not Used	24	Not Used
12	Not Used	25	Not Used
13	Not Used		

Figure 8 25 WAY D-SUB Connector - Diagram & Description of PINs (viewed from the rear of the Steptronic)

5.2 Pump Head Options

Verderflex® Steptronic MKII 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.

1. Mini-Load Head	2. EZ Head
	
NOTE: Mini-Load Heads can be stacked to a Maximum of Two Heads.	**NOTE:** EZ Heads cannot be stacked.

Table 4 Steptronic MKII Pump Head Options

5.2.1 Maximum Speed

The Maximum Speed depends on the head type fitted to the Steptronic MKII at manufacture:

1 Mini-Load Head Maximum Speed = 400 RPM

2 EZ Head Maximum Speed = 250 RPM

5.3 Mini-Load (ML) Head

⚠ DANGER

▶ Isolate power supply from the pump before performing the operations.

⚠ CAUTION

Ensure correctly sized tube clamps are used for the tube being installed (→ 5.4.3 Installing the tube clamp).

5.3.1 Installing the Tube

1. Lift the tube saddle by operating the saddle.
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. Operate the saddle to close the tube saddle assembly onto the tube to assemble it into the working position.

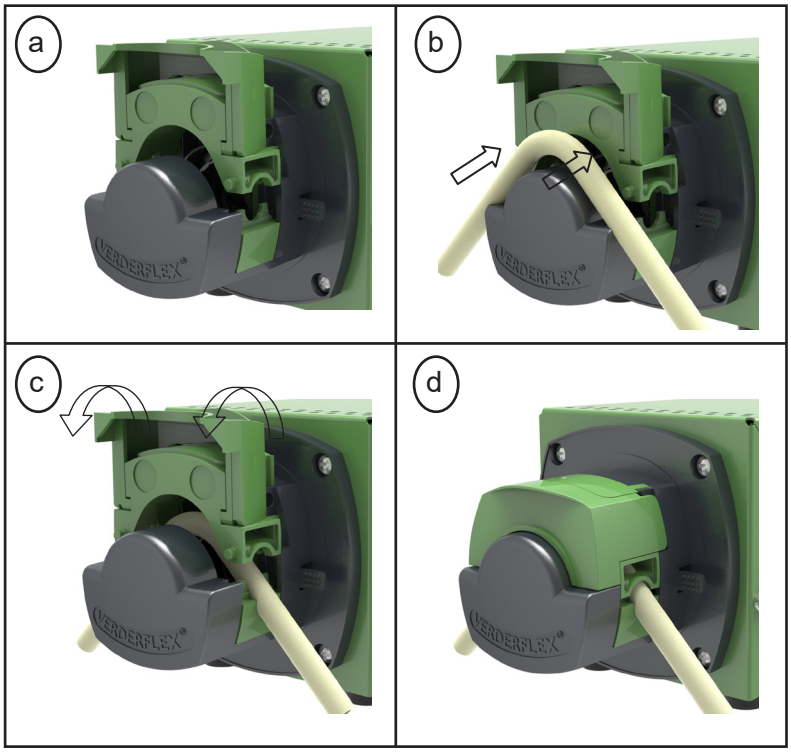


Figure 9 Installing Tube into Mini-Load Head

5.3.2 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.

1. Raise the tube saddle by operating the saddle.
2. Offer the tube clamp horizontal to the pump main body.
3. Rotate the tube clamp. Make sure the spigots to each side of the tube clamp fit in two grooves in the pump head main body.
4. Slide down the tube clamp with the two spigots located in the grooves, until a click is heard as the tube clamp locates in the slot.

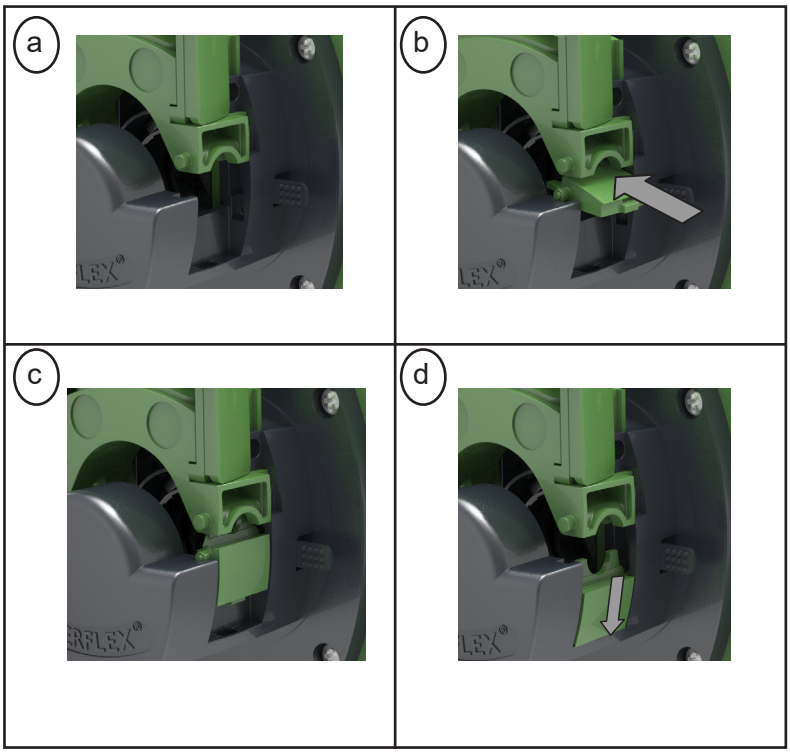


Figure 10 Installing the Tube Clamp for Mini-Load Head

5.3.3 Changing the Tube Clamp

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. Remove the tube clamp, by lifting and rotating in the clamp on each side.
4. The tube clamp is removed.

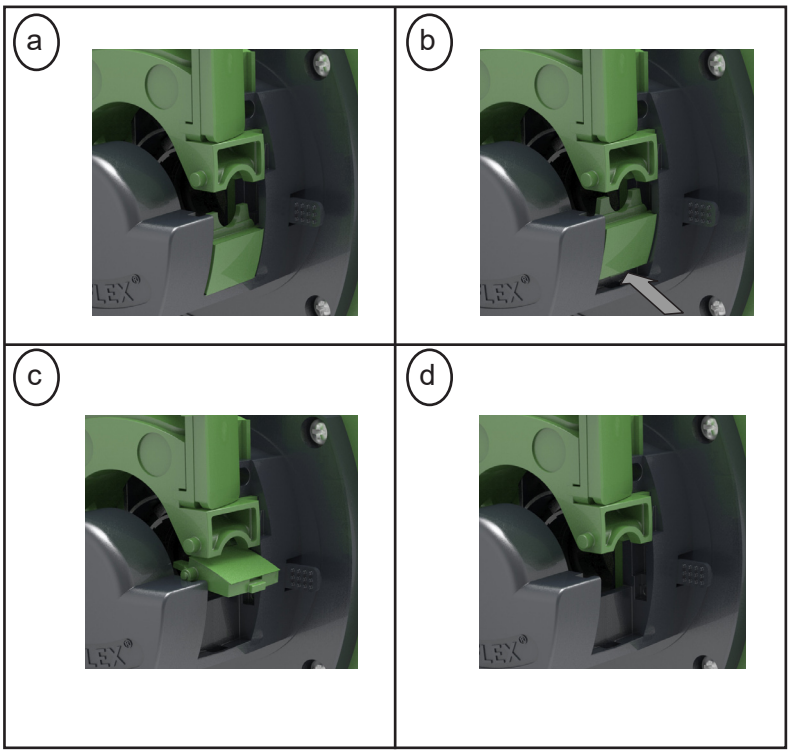


Figure 11 Changing the Tube Clamp for Mini-Load Head

5.3.4 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.
4. Remove by depressing location lever and twisting pump head counter clockwise 45°.

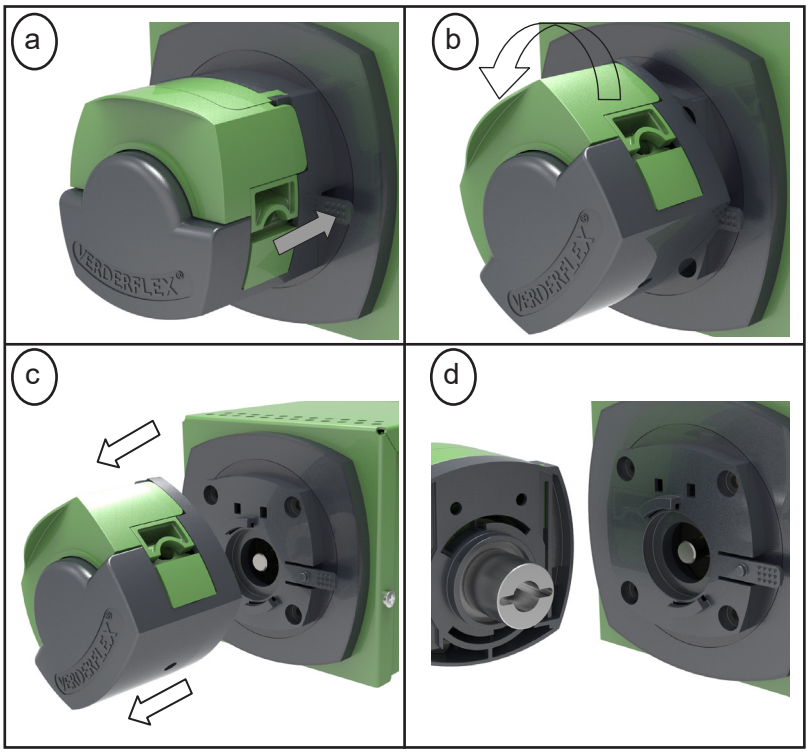


Figure 12 Replacing the Mini-Load Head

5.3.5 Installing a Stackable Mini-Load Pump Head

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 Figure 12 c and d)*.
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°.

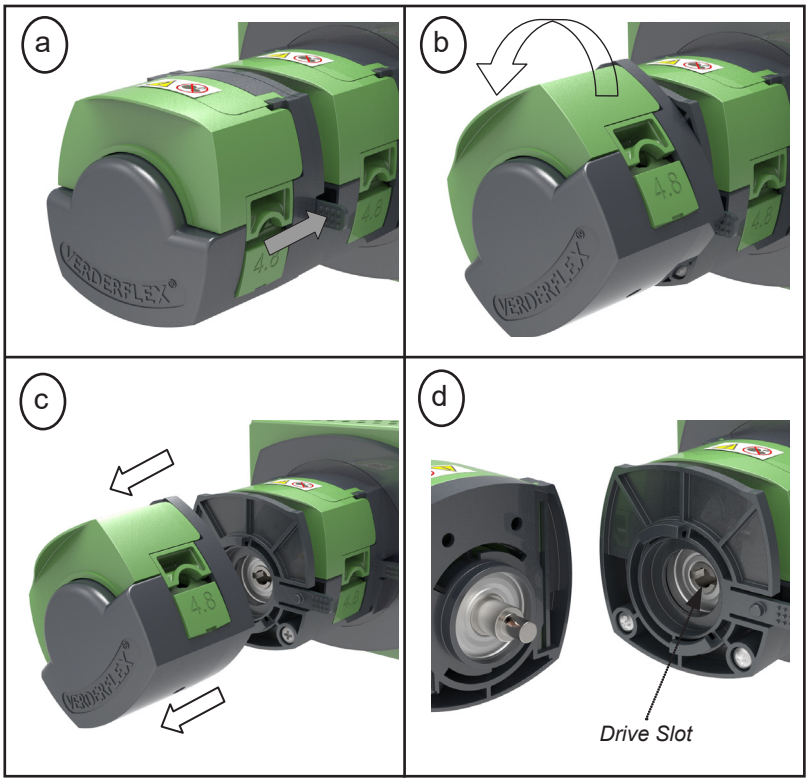


Figure 13 Installing a Stackable ML Pump Head

5.4 EZ head

5.4.1 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 13a, insert the tube over the rollers.
3. Flip the lugs on both sides of the pump head to lock the top section down.
4. Adjust the tube clamp to hold the tube in place and avoid slip.
5. Adjust the tube clamp on both sides of the pump head to the tube diameter.
6. If a tube slip is observed, tighten the tension on the clamps. Alternately, if a reduced flow is observed, reduce the clamp tension.

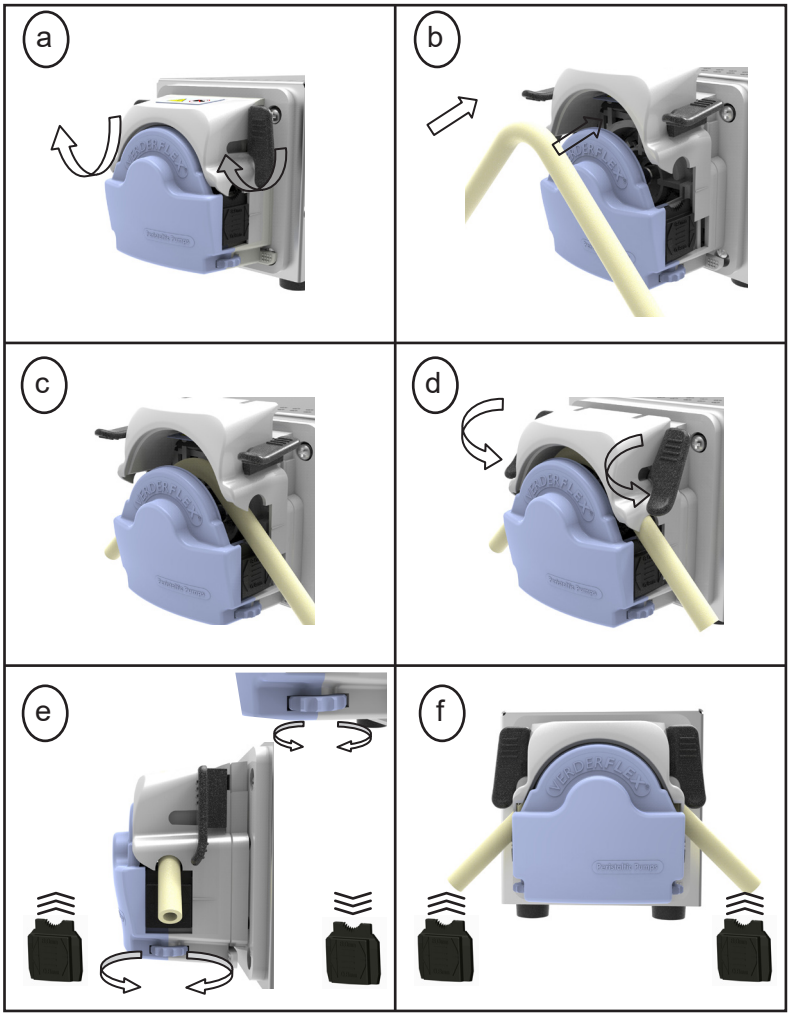


Figure 14 Installing the Tube into EZ head

5.4.2 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°.

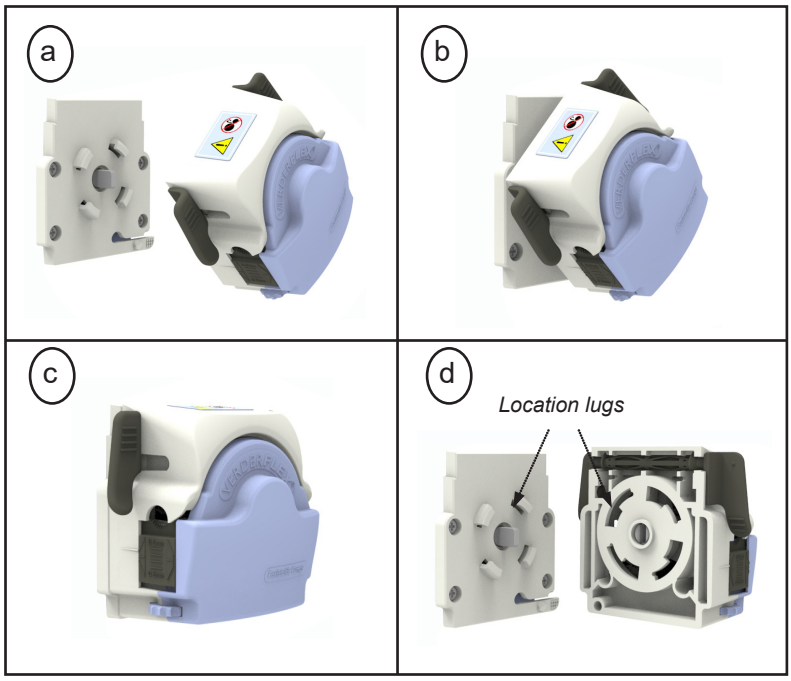


Figure 15 Replacing the EZ head

6 Remote Analogue Control

An external Analogue/Digital control should be used to operate the Verderflex Steptronic MKII 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

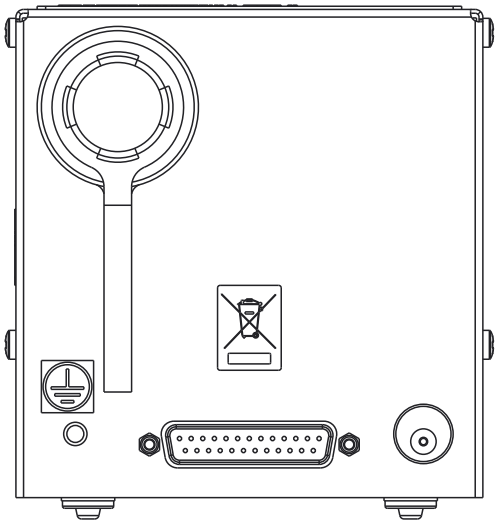


Figure 16 Backplate Layout - Steptronic MKII

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 5 Models & Control Features Available

7 Wiring the 25 WAY D-SUB connector

7.1 Description of PINs

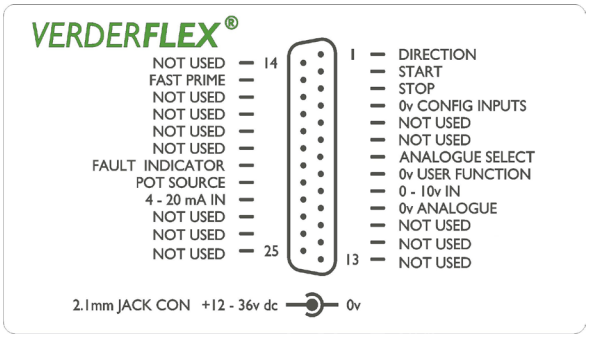
The PINs on the 25 WAY D-SUB connector can be grouped into:

1 External Power Source (→ 7.2 Power Supply)
2 Pump Operation Controls & Fault Indicator (→ 7.3.1 Control Switches and 7.3.2 Analogue Select Switches)
3 Analogue Speed Control (→ 7.4 Analogue Speed Control)

NOTE

NOT USED pins are not electrically isolated and connecting any apparatus to them may cause damage to the unit!

Do not connect any customer equipment to 5, 6, 11, 12, 13, 14, 16, 17, 18, 19, 23, 24, 25 pins. These pins are reserved for features Not Used in this version.



PIN	Description	PIN	Description
1	Direction	14	Not Used
2	Start	15	Fast Prime
3	Stop	16	Not Used
4	0V Config Inputs	17	Not Used
5	Not Used	18	Not Used
6	Not Used	19	Not Used
7	Analogue Select	20	Fault Indicator
8	(0V) User Function	21	Pot Source
9	0-10V Input	22	4-20mA Input
10	(0V) Analogue	23	Not Used
11	Not Used	24	Not Used
12	Not Used	25	Not Used
13	Not Used		

Figure 17 25 WAY D-SUB Connector - Diagram & Description of PINs (viewed from the rear of the Steptronic)

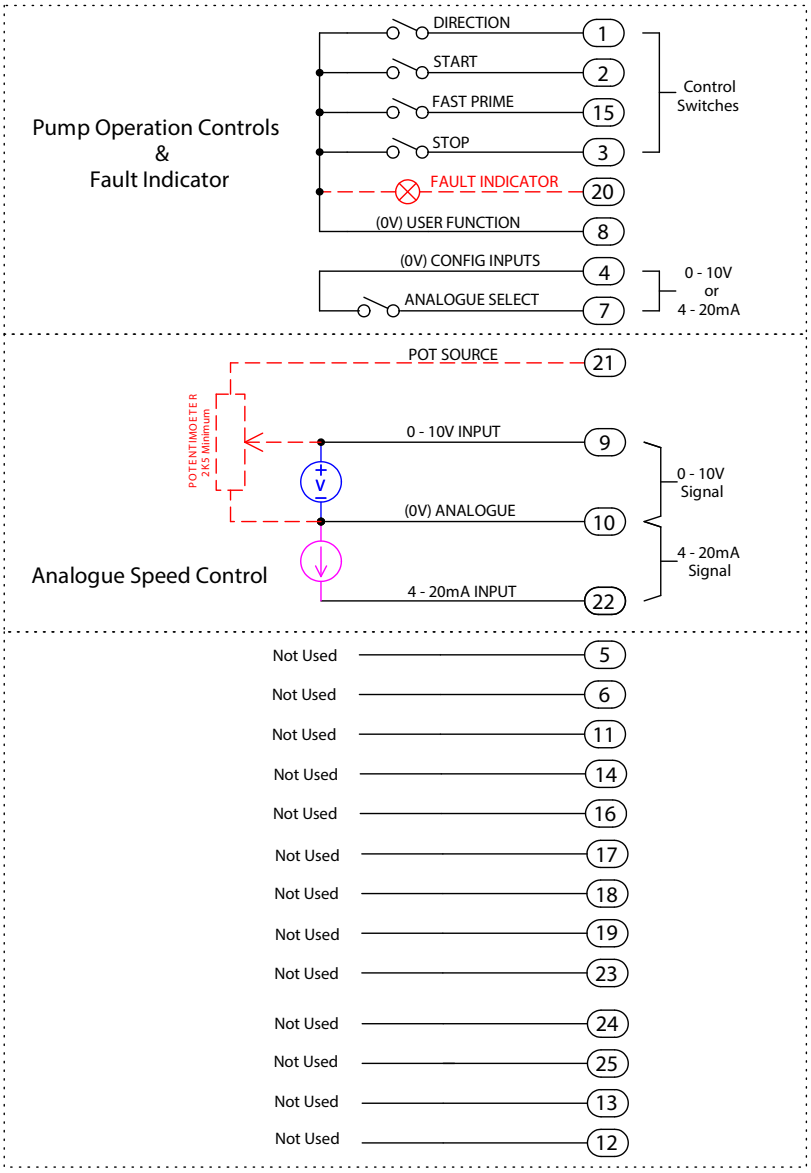


Figure 18 Wiring Diagram - 25 WAY D-SUB Connector

7.2 Power Supply

Function	Description	Wiring Diagrams
Jack Plug Power	- A 2.1mm Jack Plug can be use to supply 12 – 36V DC power to unit. **NOTE:** The pump should be powered only through the Jack Plug.	→ refer to Figure 18 Wiring Diagram - 25 WAY D-SUB Connector

Table 6 Power Supply

7.3 Pump Operation Controls and Fault Indicator

7.3.1 Control Switches

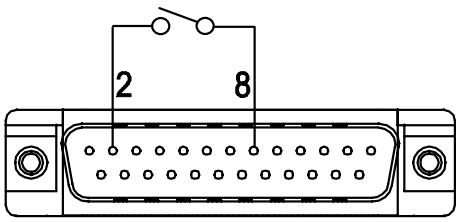
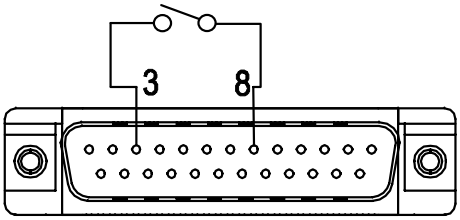
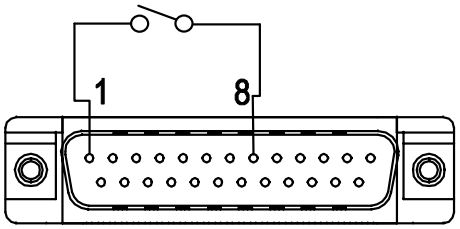
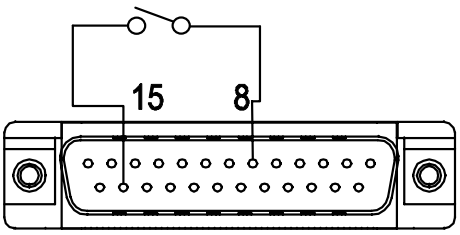
Function	Description	Wiring Diagrams
Start (pin 2)	- Closing the START switch will start the pump running. - The pump will run until the STOP switch is activated. - The flow rate will be determined by the analogue speed control value (→ 7.3.1 Analogue Speed Control). **NOTE:** When the START signal is removed, the pump will use the ramp to slow down. - link pins 2 and 8 (→*as shown in the wiring diagram*) through a volt-free contact.	
Stop (pin3)	- Closing the STOP switch 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 STOP signal must be removed and then the START signal must be toggled. - link pins 3 and 8 (→*as shown in the wiring diagram*) through a volt-free contact.	
Direction (pin1)	- Closing the DIRECTION switch will change the direction of rotation of the pump. - STOP the pump before a direction change will be registered. **NOTE:** Pump direction will only change when the pump is stopped. - link pins 1 and 8 (→*as shown in the wiring diagram*) through a volt-free contact.	
Fast Prime (pin15)	- Closing the FAST PRIME switch will accelerate the pump to the pre-set maximum speed. - STOP the pump before a prime signal will be registered. **NOTE:** The pump will only respond to a PRIME signal when the pump is stopped. - link pins 15 and 8 (→*as shown in the wiring diagram*) through a volt-free contact.	

Table 7 Control Switches

7.3.2 Analogue Select Switches

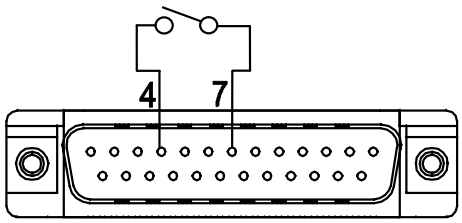
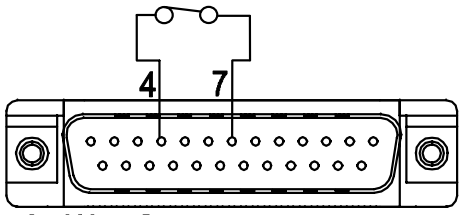
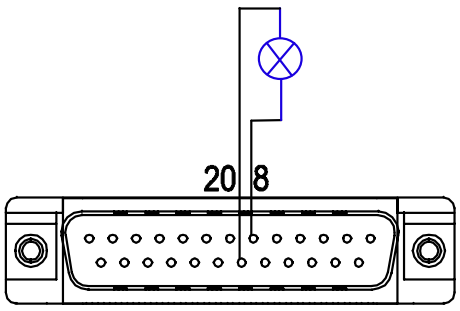
Function	Description	Wiring Diagrams
0-10V	- Switch open = 0-10V	
4-20mA	- Switch closed = 4-20mA	
Fault Indicator (OPTION)	**NOTE:** The selected fault indicator / LED lamp must not draw a current > 40mA when illuminated. - It is recommended that a Fault Indicator is selected and fitted by the user. - It is used to signal a number of fault conditions stated below: • (OCP) Over Current Protection • (PDF) Pre-Driver Fault • (TSD) Thermal Shutdown • (OVL) Over Voltage Lockout If this indicator illuminates a power cycle will be re-quired to clear the fault.	

Table 8 Analogue Select Switches

7.4 Analogue Speed Control

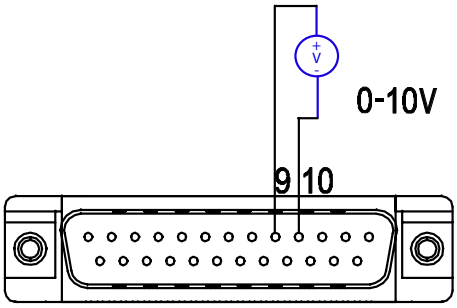
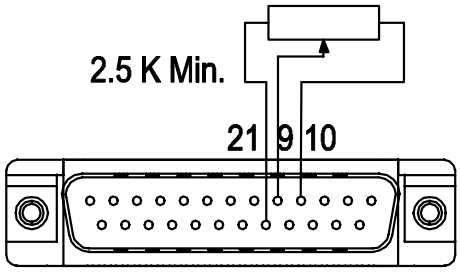
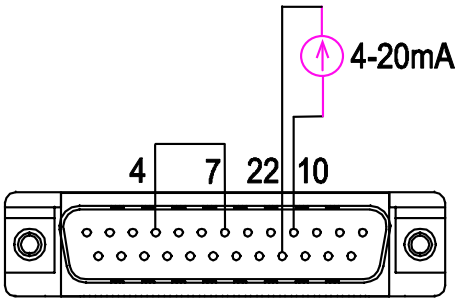
Function	Description	Wiring Diagrams
0-10V Input (pin 9)	- Speed control is achieved by using a 0-10V Input signal between pins 9 and 10 (→*as shown in the wiring diagram*) **NOTE:** When using the 0 – 10V the Analogue Select switch *MUST BE OPEN*.	
Potentiometer (OPTION)	- There is an option to fit a Potentiometer (2k5 Minimum Value) as shown in the adjacent diagram. **NOTE:** When using the potentiometer the Analogue Select switch *MUST BE OPEN*. When using the potentiometer only 50% of maximum speed will be available. When using a Potentiometer the Supply Voltage must not exceed 30V DC.	
4-20mA Input (pin 22)	- Speed control is achieved by using a 4 – 20mA Input signal between pins 22 and 10 (→*as shown in the wiring diagram*) - Ensure a link or switch is used to connect pins 4&7 as shown in the adjacent diagram. **NOTE:** When using the 4 – 20mA the Analogue Select switch *MUST BE CLOSED*.	

Table 9 Analogue Speed Control

7.5 Factory Configuration of Operating Parameters

The following parameters can be factory set as per customer requirements:

1. Minimum speed limit
2. Maximum speed limit
3. Ramp up time
4. Ramp down time

Please contact Verder Ltd. to have these parameters factory set in your pump unit. Please ensure the above requirements are detailed in the Purchase Order. If above parameters are not specified, the pumps will be setup using standard pump parameters listed in Appendix A, section 1.1

8 Inspection, Maintenance and Repairs

DANGER

Risk of injury due to running pump!

- Do not carry out any repair/maintenance work on a pump in operation.
- Follow the safety procedures for handling the product being pumped. If the tube has ruptured, the pump head and rotor assembly may be contaminated and/or the pump head may be pressurized.
- Decontaminate before handling as per local safety regulations.
- Appropriate measures must be taken to relieve any pressure build up.

Risk of electrocution!

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

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 periodic inspections and cleaning; these may be more frequent in dusty, humid and/or hot conditions.

The 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.

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	– Before pump start up – Daily visual inspection – Scheduled intervals during operation	▶ 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	– Daily visual inspection – Scheduled intervals during operation	▶ Check pump for damage. Replace worn components.
Replace tube element	– After inspection when required – When flow has dropped by 25% of original value – When the tube is burst/damaged	▶ Replace tube *(→ 5.3.1 and 5.4.1)*
Check pump head and rotor assembly	– Annually – On replacing the tube	▶ Worn and damaged surfaces give rise to premature tube failure ▶ Replace worn components. ▶ Check bearing play and function.

Table 10 Maintenance Schedule

8.3 Repairs

There are no user serviceable parts inside the pump.
Repairs can only be carried out by the manufacturer or authorised service centre.

8.3.1 Returning the Pump to the Service Centre

- ▶ Completely emptied and decontaminated.
- ▶ Pump cooled down.
- ▶ Tube removed.

Obtain prior authorisation and returns advice number (for tracking purposes) before return of the pump.

- ▶ Enclose a completed return of goods form when returning pumps or components to the manufacturer.

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 Troubleshooting

9.1 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 solution 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
	Tube wall thickness does not match the specifications of the tube clamp used.	Purchase appropriate tube clamp or change wall thickness
	Discharge pressure too high, causing excessive backflow.	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 11 Pump Troubleshooting List

10 List of Figures and Tables

10.1 List of Figures

10.2 List of Tables

11 Declaration of Conformity

EC declaration of conformity according to machine directive, appendix II A

We,
VERDER Ltd., Unit 3 California Drive, Castleford
hereby declare that the following machine adheres to the relevant EC directives detailed below

Designation **Verderflex Steptronic MKII**

EC directives:

- Machine Directive (2006/42/EC)
- Low-voltage directive (2014/35/EU)
- EMC directive (2014/30/EU)

Manufacturer	VERDER Ltd. Unit 3 California Drive Castleford WF10 5QH UK	
Date: 01/07/2020	**Company stamp / signature:** **Anthony Beckwith** *Head of Development/Construction*	**Company stamp / signature:** **Paul Storr** *Head of Quality*

Table 12 Declaration of Conformity

12 Declaration of Incorporation

Description	Verderflex Steptronic MKII
Incorporation	VERDER Ltd., declares that if the pump is to be installed into a machine or is to be assembled with other machines for installations in accordance with the Machinery Directive (2006/42/EC), it shall not be put into service until the relevant machinery has been declared in conformity.
Standards	VERDER Ltd., declares the following harmonised standards have been applied and fulfilled: • Safety of Machinery (BS EN ISO 12100) • Safety of Machinery – Electrical Equipment of Machines (BS EN 60204-1) We hereby declare the technical documentation is compiled in accordance with Annex VII(B) of the Directive.

Manufacturer	VERDER Ltd. Unit 3 California Drive Castleford WF10 5QH UK	
Date: 01/07/2020	**Company stamp / signature:**  **Anthony Beckwith** *Head of Development/Construction*	**Company stamp / signature:**  **Paul Storr** *Head of Quality*

Table 13 Declaration of Incorporation

Appendix A

1 Pump Specifications

1.1 Specification Ratings

Size	Value
Operating temperature	-5 °C to +45 °C (41°F to 113 °F)
Humidity (non-condensing)	Up to 30°C ≈ 80 % RH +30°C to +45°C ≤ 30% RH
Storage temperature	+18 °C to +65 °C (64°F to 149 °F)
Humidity (non-condensing)	long—term ≤ 80 %
Maximum altitude	Setup height above sea level ≤ 1000 m (3000 ft)
IP Rating Standard Cased Version: Open Frame Version:	 IP31 IP00
dB rating	50dB(A) @ 1.0m
Max. delivery pressure	2 bar
Mini-Load Head Maximum Speed[1)] EZ Head Maximum Speed[1)]	400 rpm 250 rpm
Dimensions	Refer datasheet for models

Table 1 Specification Ratings

[1)]When using the potentiometer only 50% of maximum speed will be available.

1.2 Power Supply

Power Supply	Value
Motor supply operating voltage range: Minimum Nominal Maximum	 12V DC[2)] 24V DC 36V DC
Control circuit operating voltage range: Minimum Maximum	 12V DC 36V DC
Drive Power supply:	40VA 5VA Linear

Table 2 Power Supply

[2)]Minimum of 12V can only be used in single head configurations for Mini-load head. Minimum of 12V not suitable for EZ head.

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