

**STUART  
PULSE**

# Installation, Operation & Maintenance Instructions

Please leave this instruction booklet with the user as it contains important warranty, maintenance and safety information



**Read this manual carefully before commencing installation.**

This manual covers the following products:

**PULSE (B) (D) ../... (F) ...**

**Please note images are representative only and may not portray your model.**

**PRODUCT DESCRIPTION**

PULSE Circulators are used for the transfer of liquid medium within systems for hot-water heating, air-conditioning and ventilation. They are designed as single or twin variable-speed pumps where the speed is regulated by onboard controller. The pump constantly measures pressure and flow and adjusts the speed according to the set pump mode.

**APPLICATION**

The PULSE is designed for use on HVAC systems and for secondary or potable hot water circulation (PULSE B ../...).

**STORAGE**

If this product is not to be installed immediately on receipt, ensure that it is stored in a dry, frost and vibration free location in its original packaging.

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## WARNINGS:



- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.
- The motor casing can become very hot under normal operating conditions. Care must be taken to ensure it cannot be touched during operation.



- The electrical installation must be carried out in accordance with the current national electrical regulations.
- The electrical installation must be installed by a qualified person.
- Do not run the pump dry.
- System pressure must not exceed 10 bar.
- Before starting work on the electrical supply ensure power supply is isolated.
- DO NOT allow the supply cord to contact hot surfaces, including the motor shell, pump body or pipework. The cord should be safely routed and secured by cable clips.
- This appliance must be earthed via the supply cord, which must be correctly connected to the earth point located in the terminal box.

Please read installation details carefully as they are intended to ensure this product provides long, trouble free service. Failure to install the unit in accordance with the installation instructions will lead to invalidation of the warranty.

# CHECKLIST

**IMPORTANT:** With the pump removed from its packaging check for any damage prior to installation. If any damage is found contact Stuart Turner Ltd within 24 hours of receipt.



Note: This image is for reference only.

Fig. 1

Item	Description	Qty
A	Pump and EPS Cover	1
B	Washers (threaded models only)	2
C	Wiring Kit	1
D	Lubricant Sachet	1

Your product may vary slightly from the picture above.

## 1 PUMPED MEDIUM

- 1.11 Pump medium can be pure water or a mixture of pure water and glycol, which is appropriate for central heating system. Water must meet water quality standard VDI 2035.
- 1.12 The medium must be free from aggressive or explosive additives, free from mixtures of mineral oils and solid or fibrous particles.
- 1.13 The pump should not be used for pumping flammable, explosive media and in an explosive atmosphere.
- 1.14 Permanent magnet rotor inside the pump is prone to accumulating magnetic particles on its surface, which can lead to abrasion of bearings and rotor can or even blocking the rotor. Although the pump is built in a way that the effect of magnetic particles is minimal, failures of bearings, rotor cans and blocked rotors are not a subject of claims.
- 1.15 To improve pump resistance to magnetite we recommend the use of magnetite filter.
- 1.16 Operation outside recommended conditions may shorten pump life and will void the warranty.

## 2 INSTALLATION

### Installation into pipework

The pump must be installed into pipework with its electromotor axis in a horizontal orientation and in one of the allowed positions. Direction arrow on hydraulic housing shows direction of water flow. For the pump to operate with minimal vibrations and noise, it is recommended to install the pump in a section of pipework without bends for at least 5 D (D = rated pipe diameter) from both sides of hydraulic housing.

Pumps with suffix F are designed to be installed with connecting flanges. The connecting flanges are designed so the pump can be installed in PN6 or PN10 nominal pressure pipelines. Due to the combined flange design, washers must be used on the pump side, when installing the pump.

Desired head orientation can be achieved by rotating the pump head according to the hydraulic housing. If the pump is already in the system with medium, it is necessary to first close valves before and after the pump, to rotate the head. Unscrewing the four screws which attach the head to the hydraulic housing makes rotating possible. Before fixing the head back on, pay special attention to the position of seal between hydraulic housing and head of the pump.

Environment around the pump should be dry and illuminated as appropriate and the pump should not be in direct contact with any objects. Pump seals prevent dust and particles from entering as prescribed by IP class. Make sure that the distribution box cover is correctly mounted and that the cable glands are tightened and sealing.

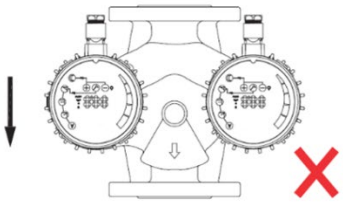
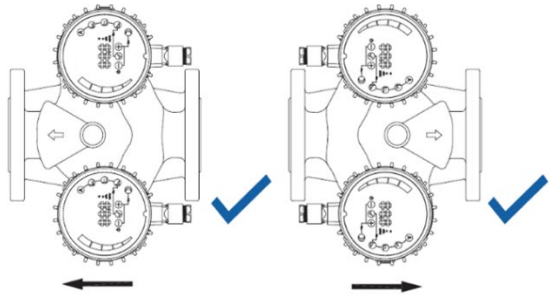
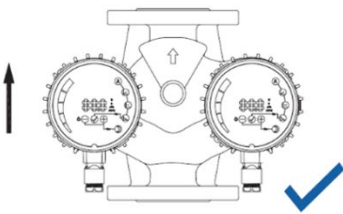
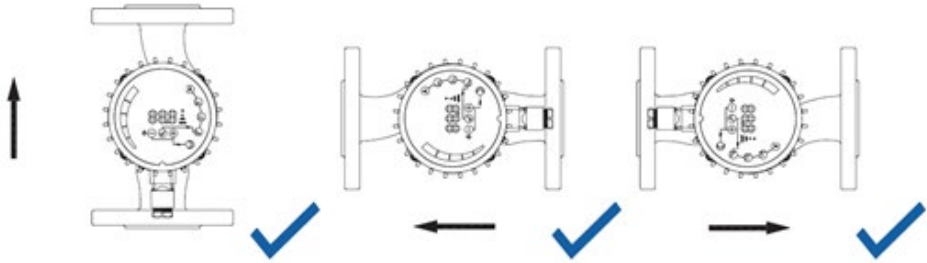
Before first run of the pump, the system must be filled with medium and purged of air. The pump must have pressure on the suction side to operate properly. On the first run it is possible for the pump to make noise until fully primed.



- Improper connections or overload could cause pump shutdown or even permanent damage.



- Pumps might be heavy. Seek assistance if needed.
- Pump must be installed in accordance with correct system design.
- Pump should not be used as a holder during welding/soldering!
- When reassembling, care should be taken to ensure seal fit. Failing that, water could cause damage to the pump's internal parts.
- Drains between pump motor housing and hydraulic housing must be left free (should not be thermally insulated), as it could interfere with cooling and condense drainage.
- Hot medium can cause burns! The motor can also reach temperatures that could cause injury.



### 3. Electrical installation

Electrical connection is done with connector supplied with the pump.

Markings	Descriptions
L	230 VAC, electric power supply
N	
PE	Safety ground

The pump has a built-in over current fuse and protection, temperature protection and basic overvoltage protection. It doesn't need an additional thermal protection switch. Connection leads should be capable of carrying rated power and should be properly fused. Ground lead connection is essential for safety. It should be connected first. Grounding is only meant for pump safety. Pipework should be grounded separately.

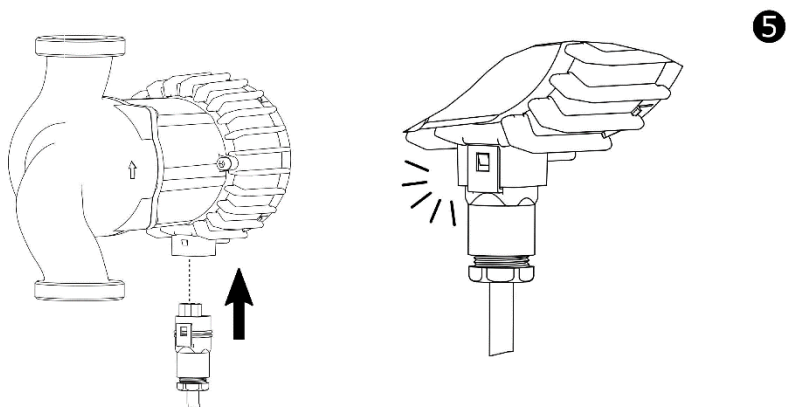
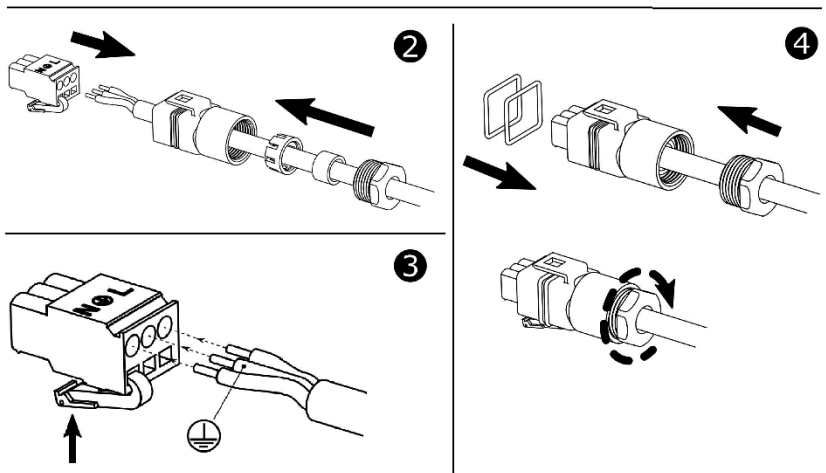
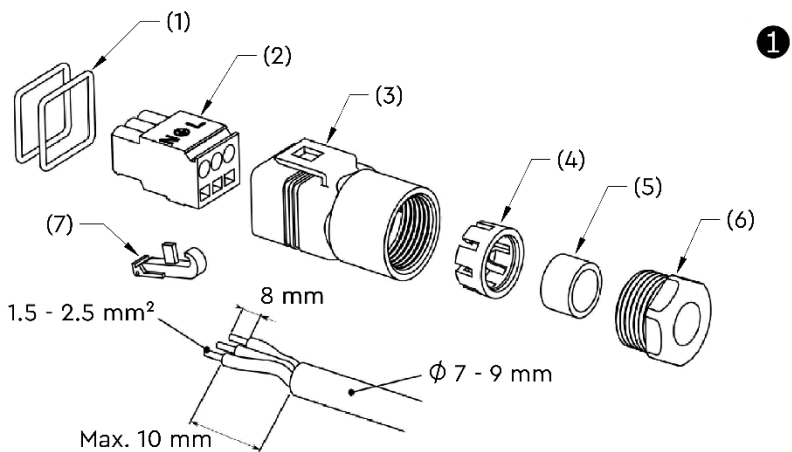


- Connection of the connecting cable must be done in a manner that ensures it is never in contact with the casing of the device, due to the high temperatures of the casing.

Follow steps below to wire up your pump. Ensure items 1 – 7 are included as part of the wiring kit, contact TechAssist if any items are missing.

1. Prepare cable by stripping insulation to the length shown on below.
  - a. Note: Cable diameter range: 7 - 9 mm, cable core range 1.5 – 2.5 mm<sup>2</sup>.
2. Feed prepared cable through cable gland nut (6), gland seal (5), cable clamp (4) and connector housing (3). Do not thread gland nut.
3. Connect prepared cable to terminal block (2). Use the included tool (7) to open the connector clamp jaws. Release the tool once connection is made and gently pull the cord to ensure it is secure.
4. Push the terminal block into the connector housing, install connector seals (1) into corresponding groves on the housing and tighten cable gland nut.
5. Connect wired assembly to pump. Ensure latch is secured through an audible click upon connection.





## 4 PUMP SETTINGS

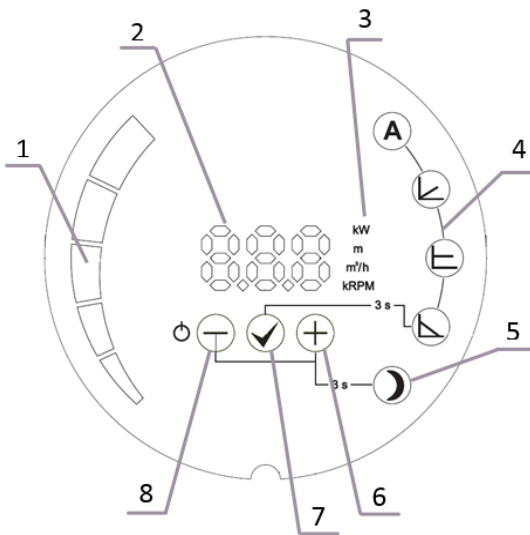
### Control and functions

All STUART PULSE versions have a display panel which the user can control and monitor pump parameters.

### Display panel

With the use of the display panel, you can control and view pump modes, on/off control, pump parameters and errors.

### Operation



- 1) Bar graph display of pump parameters
- 2) Numerical display of values
- 3) Unit display
- 4) Display of the currently selected mode
- 5) Night mode
- 6) ⊕ key
- 7) ⊙ key
- 8) ⊖ key

### Key functions

#### ⊖ Key

Short press:

Used to scroll down through parameters when not changing parameter values, scrolling down function modes when mode selection is selected and decreasing parameter values when adjusting parameters.

Press and hold for:

3 seconds together with ⊕ to switch on night mode,

3 seconds together with ⊙ to lock pumps current operation,

5 seconds to turn the pump off,

5 seconds together with ⊙ and ⊕ keys to restore pump to factory settings.

## ✓ Key

Short press:

To confirm currently selected values of both mode and parameter.

Press and hold for:

3 seconds to trigger mode selection,

3 seconds together with ⊖ to lock pumps current operation,

5 seconds together with ⊖ and ⊕ keys to restore pump to factory settings.

## ⊕ Key

Short press:

Used to scroll up through parameters when not changing parameter values, scrolling up function modes when mode selection is selected and increasing parameters values when adjusting parameters.

Press and hold for:

3 seconds together with ⊖ to switch to night mode,

5 seconds together with ⊖ and ✓ keys to restore pump to factory settings.

## Turning on and off

On first start-up, the pump will operate with factory settings in automatic mode.

With subsequent start-ups, the pump will operate with the last setting(s) selected prior to its shut-down.

To switch the pump off, press and hold the ⊖ key for 5 seconds, until OFF is shown on the display. When the pump is switched off, the numerical display shows OFF.

To turn the pump on, press the ⊖ key briefly.

## Pump modes and parameters

For transition between modes, press and hold the ✓ key for 3 seconds and then select the mode for the pump to operate with ⊕ or ⊖ keys. Confirm selection with the ✓ key.

After confirming the mode, the parameter, which can be set, will automatically be displayed and blink (except for auto mode). If necessary, set the parameter value with ⊕ and ⊖ keys, then confirm the setting with the ✓ key or just press the ✓ key to accept the given parameter.

Scroll through the parameters within a mode with ⊕ and ⊖ keys. Select the parameter that can be adjusted (see individual mode) in the mode with the ✓ key and set the desired value with ⊕ and ⊖ keys. Confirm the selected value with the ✓ key.

## Pump operation lock

For locking and unlocking pump current pump mode and parameters, press and hold ⊖ and ✓ keys for 3 seconds. When the pump is locked, it is possible to turn the pump on and off, view parameters and reset the pump to factory settings which also unlocks the pump.

## Resetting pump to factory settings

For resetting the pump to factory settings all three buttons must be held for 5 seconds. The pump will set itself to automatic mode, delete previous height and power settings and unlock the pump operation (if locked).

## Operation

The pump can operate in 5 different modes. Set the pump in the most appropriate mode, depending on the system where the pump operates.

The pump modes:

- 1) Automatic mode (factory default),
- 2) Proportional pressure,
- 3) Constant pressure,
- 4) Constant speed,

### **(A)** Automatic mode

In automatic mode the pump automatically sets the operating pressure, depending on the hydraulic system. By doing so, the pump finds the optimal operating position.

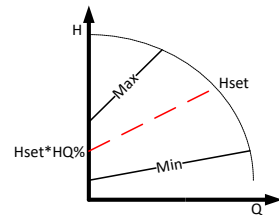
This mode is recommended in most systems.

The parameters cannot be set; they can only be scrolled through.

### **(L)** Proportional pressure

The pump maintains the pressure with relation to the current flow. The pressure is equal to the set pressure (Hset on the drawing) at maximum power; at 0 flow it is equal to HQ% (default 50%, HQ% can be set on the pump display) of the set pressure. In between, the pressure changes linearly, relative to the flow.

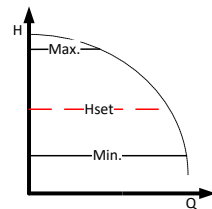
In regulated mode we can only set the pump pressure (Hset on the drawing). We can only scroll through the other parameters.



### **(E)** Constant pressure

The pump maintains the currently set pressure (Hset on the drawing), from 0 flow to maximum power, where the pressure begins to drop.

At constant pressure, we can only set the pressure (Hset on the drawing) which the pump will maintain. We can only scroll through the other parameters.

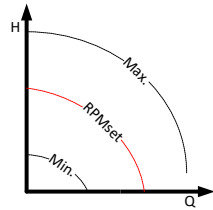




### Constant speed

The pump operates with the currently set speed (RPMset on the drawing).

In the unregulated mode, we can only set the speed at which the pump will operate. We can only scroll through the other parameters.



### Night mode

When the pump is operating in night mode, it automatically switches between the current mode and night mode. Switch occurs based on the temperature of the medium. While in night mode its icon is turned on and the pump operates in chosen mode. If the pump senses drop in temperature of the medium of 15 -20 °C (in time frame of 2 hours), icon starts to blink and the pump switches to night mode. When the temperature of the medium rises, blinking stops and the pump goes back to previously chosen operation mode.

Night mode can only work in compliment to other modes and is not a mode that can run by itself.

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### **Twin pump operation**

Twin pumps have double hydraulic housing with integrated check valve, which automatically operates based on flow, and two separated motors.

### **Alternating operation [default setting]**

One pump is operating while the other one is on standby. Pumps switch their role every 24 hours or when an error occurs on one pump.

### **Backup operation**

One pump operates constantly and the other one is on standby. If an error occurs on the operating pump the one on standby will automatically start working. This mode can be set up by turning off the pump that we wish to be on standby. That is done by holding the ⊖ button for 5 seconds.

### **Parallel operation**

Both pumps work at the same time with the same settings of constant pressure. This mode is used when greater flow than one single pump can output is needed. When the first pump hits its flow limit the second one turns on and compliments the first to reach desired flow. This mode is activated when we set both pumps to constant pressure mode. Night mode is not recommended in this mode of operation.

## 5 TECHNICAL SPECIFICATION

Pump Model		PULSE (D) (B) ../... (F)
General	Guarantee	2 year
Features	Pump type	Centrifugal
	EEl	0.19 - 0.21
Materials	Pump body	Cast iron (Bronze (B))
	Impeller	Polyether-sulfone
	Bearings	Carbon
	Maximum working pressure	10 bar
	Maximum ambient air temperature	40 °C
	Min / Max water temperature	-10 / +110 °C
Motor	Type	Canned Permanent Magnet Rotor
	Duty rating	Continuous (S1)
Electrical	Power supply / phase / frequency	230 / 1 / 50
	Insulation class	F
	Enclosure protection	IP44

Stuart Turner reserve the right to amend the specification in line with its policy of continuous development of its products.

## 6 TROUBLE SHOOTING & ERROR CODE GUIDE

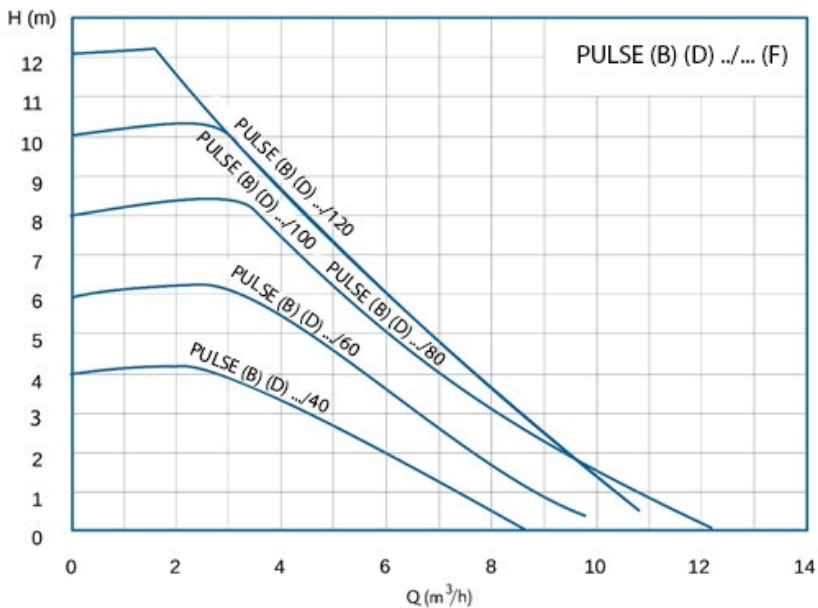
<b>Error code</b>	<b>Description</b>	<b>Probable cause</b>
<b>E1x</b>	<b>Load errors</b>	
<b>E10 (dry)</b>	Low motor load	Low load detected. Pump is running dry.
<b>E11</b>	High motor load	Motor might be faulty or viscous medium is present.
<b>E2x</b>	<b>Protection active</b>	
<b>E22 (hot)</b>	Controller temperature limit	Circuit is too hot and power was reduced to less than 2/3 of rated power.
<b>E23</b>	Controller temperature protection	Circuit is too hot to run, pump stopped
<b>E24</b>	Controller overcurrent	Hardware overcurrent protection triggered.
<b>E25</b>	Overvoltage	Supply voltage is too high
<b>E26</b>	Undervoltage	Supply voltage is too low for proper operation.
<b>E27</b>	PFC Overcurrent	Power correction circuit current cannot be controlled
<b>E3x</b>	<b>Pump errors</b>	
<b>E31</b>	Software motor protection active.	Average motor current was too high, pump load is much higher than expected
<b>E4x</b>	<b>Device specific error codes</b>	
<b>E40</b>	General frequency converter error	Electrical circuitry did not pass self-test.
<b>E42 (LED)</b>	LED faulty	One of the display segment diodes is faulty (open/short)
<b>E43 (con)</b>	Communications failed	Display board does not detect proper connection to main board, but power supply is present
<b>E44</b>	DC link current offset	Voltage on DC link shunt (R34) not in expected range
<b>E45</b>	Motor temperature outside limits	During operation, expected values are - 55 °C..150 °C
<b>E46</b>	Circuit temperature outside limits	During operation, expected values are - 55 °C..150 °C



<b>E47</b>	Voltage reference outside limits.	Comparison between internal references does not match
<b>E48</b>	15V outside limits	15V power supply is not 15V.
<b>E49</b>	Test SW	SW has to be reprogramed.
<b>E5x</b>	Motor error codes	
<b>E51</b>	Motor parameters out of range	Motor does not behave as expected
<b>E52</b>	Thermal protection active	Motor temperature is too hot to operate.
<b>E53</b>	Pump is non-responsive	Turn power on and off.
	Pump doesn't work	Check electrical installation and fuse.

- a. **Environment Protection:** Your appliance contains valuable materials which can be recovered or recycled.  
At the end of the products' useful life, please leave it at an appropriate local civic waste collection point.

## 7 CURVE



## 10 THE WARRANTY

Congratulations on purchasing a Stuart Turner pump.

PULSE (D) (B) ../... (F)

2-year warranty

We are confident this pump will provide many years of trouble-free service as all our products are manufactured to the very highest standard.

All Circulators are warranted to be free from defects in materials or workmanship for the period of the warranty.

Within the warranty period we will repair, free of charge, any defects in the pump resulting from faults in material or workmanship, repairing or exchanging the whole unit as we may reasonably decide.

Not covered by this warranty: Damage arising from incorrect installation, improper use, unauthorised repair, normal wear and tear and defects which have a negligible effect on the value or operation of the pump.

Reasonable evidence must be supplied that the product has been purchased within the warranty term prior to the date of claim (such as proof of purchase or the pump serial number).

This warranty is in addition to your statutory rights as a consumer. If you are in any doubt as to these rights, please contact your local Trading Standards Department.

Ensure the product you have purchased is correct for your region to avoid invalidating the warranty.

In the event of a claim please telephone '**TechAssist**' or return the pump and flexible hoses with the accessories removed e.g pipes etc. If you have any doubt about removing a pump, please consult a professional.

**+44 (0) 800 31 969 80**

Proof of purchase should accompany the returned unit to avoid delay in investigation and dealing with your claim.

You should obtain appropriate insurance cover for any loss or damage which is not covered by Stuart Turner Ltd in this provision.

Please record here for your records.

TYPE NO.	SERIAL NO.	DATE PURCHASED
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**DECLARATION OF CONFORMITY**

**Machinery Directive - 2006/42/EC**

BS EN 12100, BS EN 809

**Low Voltage Directive - 2014/35/EU**

BS EN 60335-1, BS EN 60335-2-51

**EMC Directive - 2014/30/EU**

BS EN 55014-1, BS EN 55014-2, BS EN 61000-3-2, BS EN 61000-3-3,  
BS EN 61000-4-2, BS EN 61000-4-3, BS EN 61000-4-4, BS EN 61000-4-5, BS EN 61000-4-6,  
BS EN 61000-4-11

**Eco Design Directive - 2009/125/EC**

BS EN 16297 - 1:2012

Circulators: Commission Regulation No 641/2009 – BS EN 16297 - 2:2012

**EMF Directive - 1999/519/EC**

BS EN 62233

**RoHs Directive - 2011/65/EU**

**WEEE Directive - 2012/19/EU**

IT IS HEREBY CERTIFIED THAT THE STUART ELECTRIC MOTOR DRIVEN PUMP AS SERIAL NUMBER BELOW, COMPLIES WITH THE ESSENTIAL REQUIREMENTS OF THE ABOVE E.E.C. DIRECTIVES.



RESPONSIBLE PERSON  
AND MANUFACTURER

STUART TURNER LIMITED  
HENLEY-ON-THAMES, OXFORDSHIRE  
RG9 2AD ENGLAND.

Signed .....Engineering Manager

Stuart Turner are an approved company to BS EN ISO 9001:2015



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