

Your local Seresco representative:

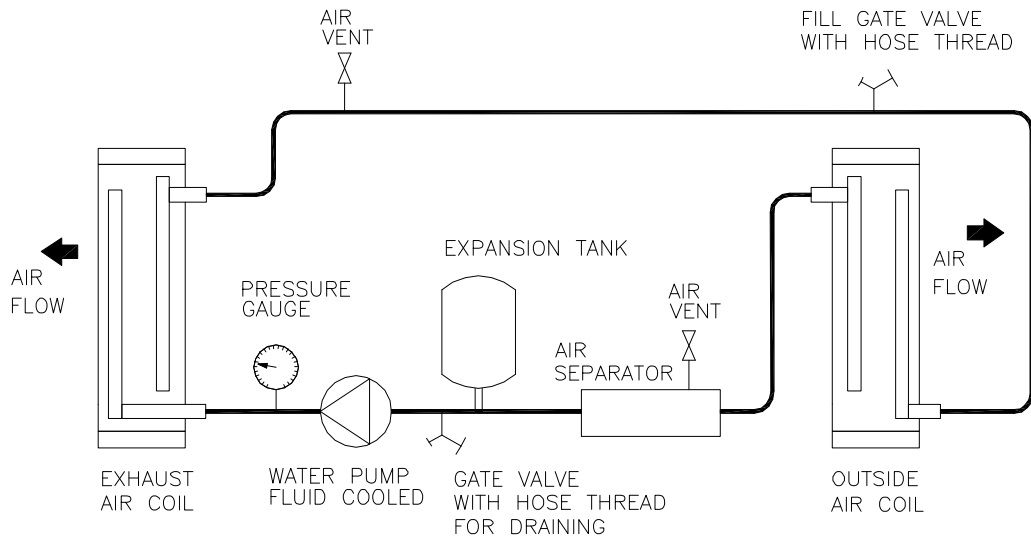
Appendices

Your local Seresco representative:

Heat Recover (Run Around Loop)

The energy a room loses from the exhaust air, as a result of the fresh air requirements, can represent approximately 50 % of the room heating requirements. The Seresco unit captures 50-60 % of this exhaust heat with its heat recovery loop. By doing so it supplies heat to warm the cold OA and can provide generous energy savings to the room and reduce heating costs. During freezing weather conditions the OA can provide much of the dehumidification required and minimizing the time the compressors run offsetting some of the running electrical costs.

Our typical energy recovery loop places two glycol coils one in the outside air intake and the other in the exhaust air-stream. The coils are connected in counter-flow closed loop piping system. The system comprises an inline fluid cooled pump, an air separator, and in some larger systems a pressure tank and pressure gauge. By circulating a glycol mixture, typical 30%, we can extract enough heat from exhaust air stream to preheat the outside air intake to about 50-60% of the room temperature. Extracting more heat from the exhaust air stream is possible but would also lead to possibly freezing of the exhaust air and would require a more complex and costly system of frost prevention. Keeping our effectiveness down to 50-60% reduces initial cost and keeps things simple.



Types of Solutions:

We recommend and typically use ethylene glycol in our systems but local codes or building requirements may specify propylene glycol mixtures. The higher viscosity of propylene means a stronger pump is required or a lower circulating water flow will occur. So it is best to contact the factory if a switch from one glycol to another is preferred.

It is important to use corrosion inhibitors and in the correct amount. When adding the corrosion inhibitor solution please followed the suggested instructions for the required quantity of fluid. Seresco strongly recommended that if the glycol, if not already mixed, it be mixed with distilled water. The final topping up and pressurizing of the system can be done with clean tap water. In municipalities where local tap water has a high mineral content, Seresco strongly advises the use of distill water otherwise "sludging" and premature failure may occur.

1-888-Seresco (737-3726)
For more information visit www.seresco.net



Your local Seresco representative:

Annual testing should be made of the fluid solution to ensure the adequate glycol concentrations and corrosion inhibitor protection. Freeze point and PH test strips are available from your local plumbing supply house. It is important to insure the solution wont freeze in the case of a power failure or that it is not acidic and will prematurely corroding the system.

The glycol mix should be replaced after 5 years or when quality is deem unsatisfactory and cannot be restored.

Filling or Refilling the Glycol Loop:

When filling the system please insure all air has been removed. Air in the system will cause corrosion and improper functioning of the pump. Do not run the pump for any extent time with air in the system it will foam up the glycol and this will make it difficult to remove the air. If this happens pressurize the system with some water to about 15 PSI and let stand overnight. Before restarting vent as much air as possible running the pump for very short burst to move the water and any possible air bubbles around slowly to the vents.

For systems with a pressure tank keep the system under a 10-15 PSI positive pressure to ensure no air get into the system.

If the system is left dry for any period of time electrically disable the pump to avoid it possible coming on without fluid in the system.

Please keep record, near the unit, the type of glycol used; ethylene or propylene, the two types should not be mixed.

Keep careful track of what percentage by volume was used and when it was changed. And the last time it was check.

Fill in this page and keep it with the unit.

Type of Glycol:.....

Glycol Concentration:.....%

Total Volume of Solution:.....Gallons

Amount of inhibitor added:.....

Comments:.....
.....
.....

Technician..... **Company:**.....

Telephone Number:..... **Date:**.....

|

VersaFlo® UPS

Wet Rotor, In-Line,
Single Stage Circulator Pumps



Table of Contents:

	Page #'s
Safety Warning	1
Pre-Installation	1
Installation Procedures	3
Starting the Pump	7
Troubleshooting	10
Winding Resistance	13
Winding Resistance Chart ...	15
Replacing Components	16
Notes	18

SAFETY WARNING

Read This Booklet

This booklet is designed to help a certified installer install, begin operation of and troubleshoot the Grundfos VersaFlo UPS pumps. It should be left with the owner of the pump for future reference and information regarding its operation. Should the owner experience any problems with the pump, a certified professional should be contacted.

Electrical Work

All electrical work should be performed by a qualified electrician in accordance with the latest edition of the National Electrical Code, local codes and regulations.



Shock Hazard

A faulty motor or wiring can cause electrical shock that could be fatal, whether touched directly or conducted through standing water. For this reason, proper grounding of the pump to the power supply's grounding terminal is required for safe installation and operation.

In all installations, the above-ground metal plumbing should be connected to the power supply ground as described in Article 250-80 of the National Electrical Code.

Risque de choc électrique



Un moteur ou un câblage défectueux peuvent causer un choc électrique qui pourrait être fatal, soit par contact direct, soit par conduction à travers de l'eau stagnante. Il faut donc mettre la pompe à la terre sur la borne de mise à la terre de la source d'alimentation afin d'assurer une installation et un fonctionnement sécuritaires.

Pour tous les types d'installations, la plomberie en métal de surface devrait être raccordée à la mise à la terre de la source d'alimentation, tel qu'indiqué à l'Article 250-80 du Code national de l'électricité.

PRE-INSTALLATION CHECKLIST

1. Confirm You Have the Correct Pump

- Read the pump nameplate to make sure it is the one you ordered.
- Compare the pump's nameplate data and its performance curve (for head, GPM, etc.) with the application in which you plan to install it.
- Will the pump do what you expect it to do?

2. Check the Condition of the Pump

The shipping carton your pump came in is specially designed around your pump during production to prevent damage. As a precaution, it should remain in the carton until you are ready to install it. At that point, look at the pump and examine it for any damage that may have occurred during shipping. Examine any other parts of the shipment as well for any visible damage.

3. Verify Electrical Requirements

Verification of the electrical supply should be made to be certain the voltage, phase and frequency match that of the pump motor. The proper operating voltage and other electrical information can be found on the motor nameplate. These motors are designed to run on $\pm 10\%$ of the nameplate-rated voltage. Wiring connection diagrams can be found inside the terminal box cover and later in these Installation and Operating Instructions. If voltage variations are larger than $\pm 10\%$, do not operate the pump.

4. Pumped Liquid Requirements

CAUTION: This pump is intended for use with water only.
Your VersaFlo UPS pump can be used to circulate:

- Potable hot water
- Water for hydronic heating
- Cooling water
- In domestic hot water systems it is advisable to use bronze pumps (VersaFlo UPS model) only for water with a degree of hardness lower than 14 grains per gallon of hardness. For water with a higher degree of hardness, a direct coupled VersaFlo TP pump is recommended.
- If the pump is installed in a heating system, the water should meet the requirements of accepted standards on water quality in heating systems.

The pump is lubricated and cooled by the liquid being pumped. Therefore, the pumped liquid must always be allowed to circulate through the pump. Extended periods without circulation will cause premature wear to the bearings and excessive motor heat. The pumped liquid must also meet the following requirements:

**MINIMUM PUMP
INLET PRESSURE
(During Operation)**

UPS Model	At These Liquid Temps					
	167°F		194°F		230°F	
	75°C		90°C		110°C	
	[psi]	hf	[psi]	hf	[psi]	hf
32-40/4	0.7	1.6	2.2	5.1	21.0	48.5
32-80/2	0.7	1.6	5.1	11.8	23.9	55.2
32-160/2	11.6	26.8	16.0	37.0	34.1	78.8
40-40/4	0.7	1.6	4.4	10.2	23.2	53.6
40-80/4	0.7	1.6	1.5	3.5	18.1	41.8
40-80/2	6.5	15.0	10.9	25.2	29.0	67.0
40-160/2	5.1	11.8	9.4	21.7	27.6	63.8
40-240/2	11.6	26.8	16.0	37.0	34.1	78.8
50-40/4	0.7	1.6	2.9	6.7	21.8	50.4
50-80/4	0.7	1.6	4.4	10.2	23.2	53.6
50-80/2	4.4	10.2	8.7	20.1	26.8	61.9
50-160/2	11.6	26.8	16.0	37.0	34.1	78.8
50-240/2	10.2	23.6	14.5	33.5	32.6	75.3
80-40/4	11.6	26.8	16.0	37.0	34.1	78.8
80-80/4	14.5	33.5	18.9	43.7	37.0	85.5
80-160/2	21.8	50.4	26.1	60.3	43.5	100.5
100-40/4	27.6	63.8	31.9	73.7	50.0	115.5

**LIQUID
TEMPERATURE
RANGE**

Continuously: 14°F (-10°C)
up to 230°F (110°C)
Intermittent: < 284°F (140°C)
for short periods of time.
Domestic Hot Water:
<140°F (60°C)

Installation Procedures



WARNING: Never make any connections in the pump terminal box unless the electrical supply has been switched off.

AVERTISSEMENT: Ne jamais établir de connexions dans la boîte de jonction de la pompe à moins que l'alimentation électrique n'ait été coupée.

1. Electrical Preparation

Terminal Box Position

At the bottom of the stator, closest to the pump housing, there are two drain holes to allow condensed water to escape. The drain holes must point downwards. As they are opposite the terminal box position, the terminal box must point upwards in one of the positions shown in Fig.1. The following terminal box positions apply whether the piping is mounted vertically or horizontally.

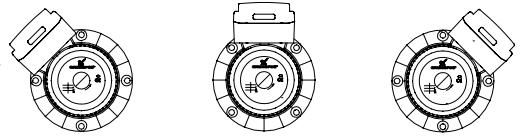


Fig.1

Rotating the Terminal Box

To rotate the terminal box, follow these steps:



WARNING: If the pump is already installed in the system, the system must be drained or the isolating valves on both sides of the pump must be closed before the allen head screws are removed as the pumped liquid may be scalding hot and/or under pressure. Do not start the pump until the system has been filled with liquid and vented.

AVERTISSEMENT: Si la pompe est déjà installée, il faut drainer le système ou fermer les deux robinets d'isolement latéraux de la pompe avant d'enlever les vis à tête hexagonale, car le liquide pompé pourrait être brûlant et/ou sous pression. Ne pas faire fonctionner la pompe jusqu'à ce que le système ait été rempli de liquide et purgé.

1. Remove the four allen screws holding the pump head onto the pump housing
2. Carefully lift the pump head and rotate it so the terminal box is in the desired position. DO NOT locate the terminal box beneath the pump. Make sure the O-ring is properly seated in the pump housing.
3. Replace the pump head onto the pump housing
4. Tighten the allen head screws evenly. Torque to: 8mm 15 ft lbs
10mm 25 ft lbs
5. Check to make sure the rotor turns freely. Do this by removing the the vent plug in the middle of the pump nameplate. Insert a medium size flat-blade screwdriver into the slot at the exposed end of the shaft. Gently turn the shaft. If it does not turn easily, repeat steps 1-4 above.
6. The position of the nameplate can be changed by easing the outer edge of the plate at the cut out with a screwdriver. Turn the nameplate to the required position and push into place.
7. Refer to page 15 for additional instructions.

2. Piping Considerations

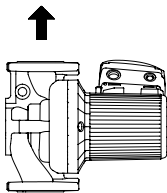
Thoroughly clean and flush all dirt and sediment from the system before attempting to install the pump.

Location in the Piping Line

The pump should never be located at the lowest point of the piping system, where dirt and sediment collect. Nor should it be located at the highest point of the piping system, where air accumulates.

Installation Procedures

Mounting Positions



The arrows on the flanges of the pump indicate the direction of water flow. Although the VersaFlo UPS may be installed in either vertical or horizontal piping, the motor shaft must always remain horizontal, as shown in Fig. 1 of the Terminal Box Position instructions and as shown in Fig. 2 to the left.



Fig.2

Also remember: Pumps installed outdoors must be protected by a ventilated, watertight cover to keep out moisture and dirt.



WARNING: The pump must be positioned so that someone cannot accidentally come into contact with the hot surfaces of the pump.

AVERTISSEMENT: La pompe doit être placée de sorte que personne ne puisse accidentellement toucher ses surfaces chaudes.

3. Connect the Pump

Install the pump into the piping system. Grundfos recommends that pressure gauges be installed in the inlet and discharge flanges or pipes to check pump and system performance.

4. Electrical Connection



The electrical connection and protection should be carried out in accordance with the latest edition of the National Electrical Code, local codes and regulations by a qualified electrician.

WARNING: Never make any connections in the pump terminal box unless the electrical supply has been switched off.

- The pump must be grounded.
- The pump must be connected to an external main power switch.

AVERTISSEMENT: Ne jamais établir de connexions dans la boîte de jonction de la pompe à moins que l'alimentation électrique n'ait été coupée.

- La pompe doit être mise à la terre.
- La pompe doit être raccordée à un interrupteur d'alimentation principale externe.

The operating voltage and frequency are marked on the pump nameplate. Make sure that the motor is suitable for the electrical supply it is being installed to.

The pump should be grounded to protect against indirect contact and a ground fault interrupter can be used as extra protection.

Multi-Speed Pump (1 phase)

All single phase pumps are equipped with built-in, automatic resetting, thermal overload protection. The pump is protected at all three speeds.

Multi-Speed Pump (3 phase)

The pump must be connected to the electrical supply via an external contactor. The contactor must be connected to the built in thermal overload switch terminals T1 and T2 (3x208-230V) or P1 and P2 (3x460V & 575V) to protect the pump against overloading at all three speeds.

OR: If the pump is protected by means of a motor starter, the starter must be set to the current consumption of the pump at the selected speed. The motor starter setting must be changed every time the pump speed is changed. The current consumption at the individual speeds is stated on the pump nameplate.

Installation Procedures

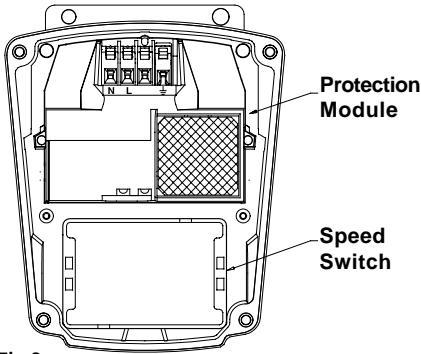


Fig.3

VersFlo UPS 1x115V & 230V Terminal Box:

All VersaFlo UPS single head pumps come with a protection module and a speed switch as shown in Fig.3. All are equipped with built-in, automatic resetting, thermal overload protection. The pump is protected at all three speeds.

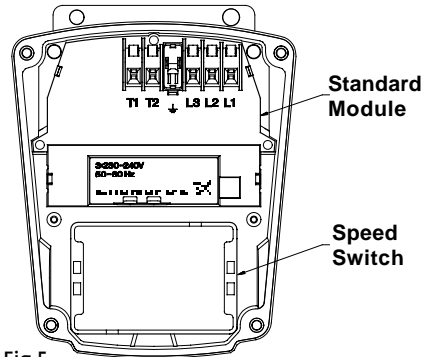


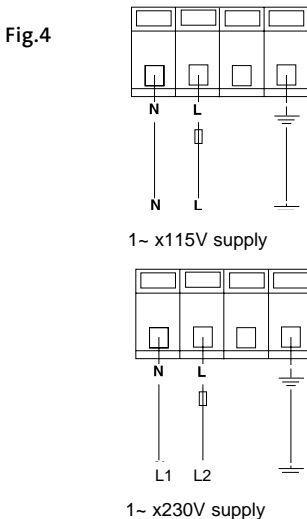
Fig.5

VersFlo UPS 3x208-230V Terminal Box:

All VersaFlo UPS single head pumps come with a standard module and a speed switch as shown in Fig.5. All are equipped with an internal thermal overload switch (terminals T1 & T2, to be connected to an external contactor) to protect the pump at all three speeds.

Wiring Diagrams

Fig.4 shows the electrical connections for a single phase pump with protection module.



Notes:

Provide electrical disconnect and current protection as per local electrical codes.

K = External contactor sized to FL & LR pump current. Auxiliary contacts rated for supply voltage (figure 6 & 9 only).

Wiring Diagrams

Fig.6 shows the electrical connections when using external impulse contacts (momentary contacts) for start/stop push button station.

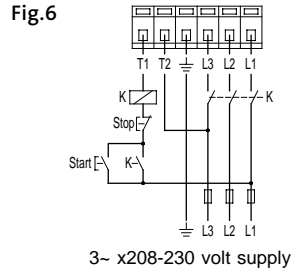
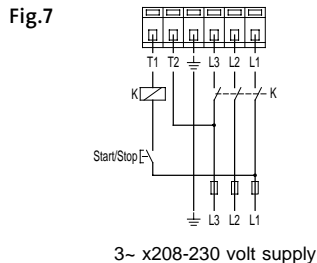


Fig.7 shows the electrical connections when using an external changeover contact (maintained contacts) for start/stop push button station.



Installation Procedures

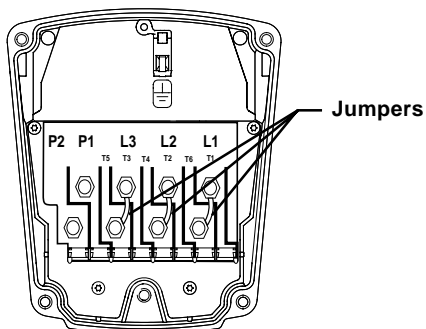


Fig.8

VersaFlo UPS 3x460V & 575V Terminal Box:

All VersaFlo UPS single head pumps with 3 phase x 460V & 575V terminal boxes (Fig.8) come with a special two speed terminal box. The speed is changed by the orientation of the jumpers as shown on page 9. All are equipped with an internal thermal overload switch (terminals P1 & P2) to be connected to external contactor.

Wiring Diagrams

Fig.9 shows the electrical connections when using external **impulse contacts** (momentary contacts) for start/stop push button station.

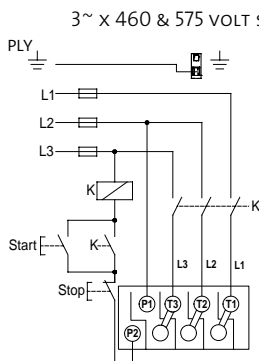


Fig.9

Fig.10 shows the electrical connections when using an external **changeover contact** (maintained contacts) for start/stop push button station.

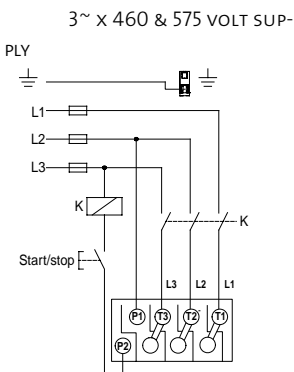


Fig.10

Starting the Pump

1. Vent the Piping System

After the pump has been installed and the electrical connections made, the piping system must be vented. Never operate the pump dry -- the system must first be filled with liquid and vented. Do not vent the piping system through the pump. Instead, follow these steps:

- Fill and pressurize the system with liquid, and vent all trapped air from the piping by suitable means.
- If any isolation valves are used, make sure they are OPEN.



WARNING: If the vent screw is to be loosened, care should be taken to ensure that the escaping scalding hot liquid does not cause personal injury or damage to components (see Fig. 12).

AVERTISSEMENT: S'il faut desserrer la vis de purge, prendre les mesures nécessaires pour que le liquide brûlant qui s'échappe ne cause pas de blessures ou de dommages aux composants (voir la figure 12).

2. Check the Direction of Shaft Rotation

APPLIES TO 460V & 575V 2-SPEED MODELS ONLY

(three speed pumps direction of rotation is checked by fault finding chart, page 10)

- Make sure that the power is OFF.
- Unscrew and remove the vent plug located at the center of the nameplate.
- Insert a small, flat-blade screwdriver into the slot in the end of the motor shaft (see Fig.12). Rotate the shaft with the screwdriver to make sure it does so freely.
- Briefly start and stop the pump and watch to see which direction the shaft rotates. The shaft must rotate in the counterclockwise direction as shown on the nameplate (see Fig.11).
- If the pump shaft is rotating incorrectly, disconnect the power and interchange any two power leads in the terminal box.
- Check once again for proper counterclockwise rotation. When it is rotating correctly, replace the vent plug.



Fig.11

Direction of Rotation

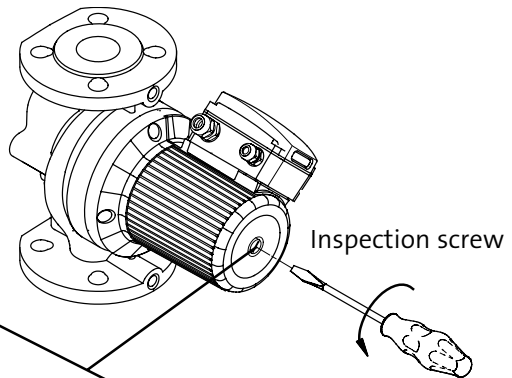


Fig.12 Vent Plug

Starting the Pump

3a. Speed Selection

(three speed, all models except 3 x 460V & 575V)

The speed switch in the terminal box can be turned to three positions. The speed in the three positions appears in the table below (also see Fig.13).

Switch Position	Speed in % of Maximum Speed	
	Single-Phase Pumps	Three-Phase Pumps
1	approx. 60%	approx. 70%
2	approx. 80%	approx. 85%
3	100%	100%

Changing to lower speeds offers considerable reduction in energy consumption and less noise in the system.

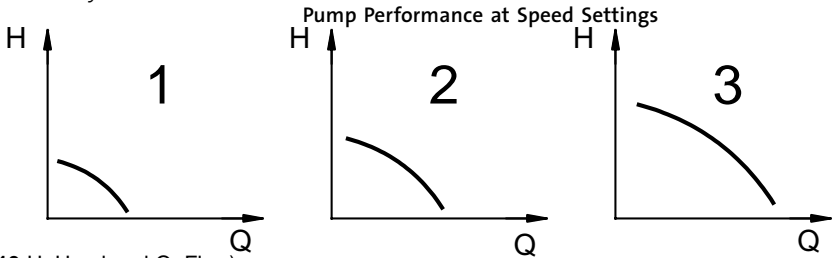


Fig.13 H=Head and Q=Flow)



WARNING: Never make any connections in the pump terminal box unless the electricity supply has been switched off.

AVERTISSEMENT: Ne jamais établir de connexions dans la boîte de jonction de la pompe à moins que l'alimentation électrique n'ait été coupée.

Change the pump performance as follows:

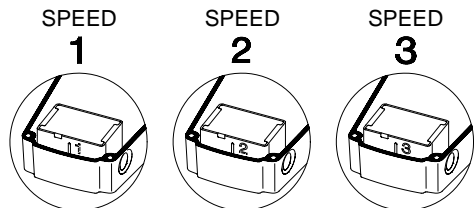
1. Switch off the electrical supply to the pump at the main circuit breaker. The green indicator light in the terminal box must be off.
2. Remove the terminal box cover by loosening the four screws in the cover.
3. Pull out the speed switch module and re-insert it so that the desired speed is visible through the window in the terminal box (see Fig.14)



NOTE: When changing to and from speed 1, the cover of the speed switch module must be removed and fitted on the other side of the switch.

Continued on next page

Fig.14



Starting the Pump

Change the pump performance as follows: (continued)

4. Fit the terminal box cover back onto the terminal box and tighten the four screws in the cover.
5. Switch on the electrical supply. Check that the green indicator light is permanently on or flashing.
NOTE: The speed switch module must never be used as an on/off switch.

3b. Speed Selection (two speed, 3 x 460V & 575V)

The speed setting in the terminal box (see Fig.13) can be changed to two positions. The speed in the two positions appears in the table below (also see Fig.13 on page 8).

Speed Step	Speed in % of Maximum Speed
1	approx. 75%
2	100%



WARNING: Never make any connections in the pump terminal box unless the electrical supply has been switched off.

AVERTISSEMENT: Ne jamais établir de connexions dans la boîte de jonction de la pompe à moins que l'alimentation électrique n'ait été coupée.

Change the pump performance as follows:

The speed is changed by the position of the bridges in the terminals. The bridges are fitted according to:

- Figure 15 for speed 1 - Low speed
- Figure 16 for speed 2 - High speed

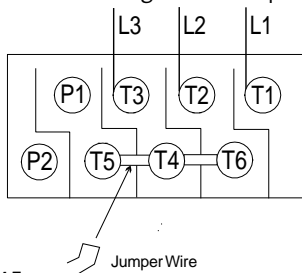


Fig.15

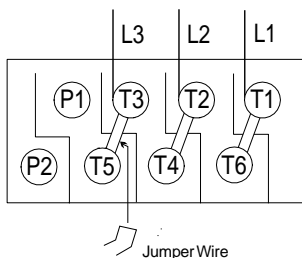


Fig.16

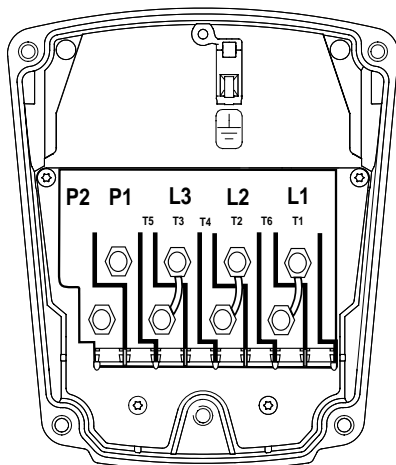


Fig.17

Troubleshooting

1. Fault Finding Chart

WARNING: Before removing the terminal box cover, make sure that the electrical supply has been switched off and that it cannot be accidentally switched on.



WARNING: The pumped liquid may be scalding hot and under high pressure. Before any removal or dismantling of the pump, the system must be drained or the isolating valves on both sides of the pump must be closed.

AVERTISSEMENT: Avant de retirer le couvercle de la boîte de jonction, s'assurer que l'alimentation électrique a été coupée et ne peut être rétablie accidentellement.

AVERTISSEMENT: Le liquide pompé peut être brûlant et sous haute pression. Avant de retirer ou de démonter la pompe, il faut drainer le système ou fermer les deux robinets d'isolement latéraux de la pompe.

Single-Head Pumps with Standard or Protection Module

Fault	Cause	Remedy
The pump does not run. None of the indicator lights are on.	One fuse in the installation is blown. External circuit breaker is switched off. Current/Voltage operated ground fault interrupter has tripped. The pump's internal thermal overload switch has cut out (Standard module only).	Replace the fuse. Switch the circuit breaker on. Repair the insulation defects and reset the circuit breaker. Check that the liquid temperature falls within the specified range. With external on/off changeover contact : The pump will restart automatically when it has cooled to the normal temperature. With external on/off impulse contacts : The pump can be restarted when it has cooled to normal temperature.
The pump does not run. The green indicator light is on.	Rotor blocked, but the pump hasn't been cut out by the thermal overload switch. The speed switch module has not been fitted.	Switch off the electricity supply and clean/repair the pump. Switch off the electricity supply at the external circuit breaker and fit the speed switch module into position.
Three-Phase Pumps Only: The pump is running. The red and green indicator lights are on.	The pump is running with the wrong direction of rotation.	Switch off the electricity supply at the external circuit breaker and interchange any two phases (leads) in the pump terminal box.
Noise in the system. The green indicator light is on.	Air in the system. The pump flow is too high. The pressure is too high.	Vent the system. Reduce the pump performance. Reduce the pump performance.
Noise in the pump. The green indicator light is on.	Air in the pump. The inlet pressure is too low.	Vent the pump. Increase the inlet pressure and/or check the air volume in the expansion tank (if installed).
Insufficient heat in some places in the heating system.	The pump performance is too low.	Increase the pump performance, if possible, or replace the pump with a pump with higher flow.
Single phase pumps with protection module (only). The Pump does not run. The red indicator light is on. The green indicator light is off.	The pump has been cut out by the thermal overload switch due to high liquid temperature or blocked rotor. The speed switch module has not been fitted.	Check that the liquid temperature falls within the specified range. The pump will restart automatically when it has cooled to normal temperature. Note: If the thermal overload switch has cut out the pump three times within a short period, the pump must be restarted manually by switching off the electrical supply. Switch off the electrical supply by means of the external mains switch and fit the speed switch module.

Preliminary Checks

Supply Voltage

To check the voltage being supplied to the motor, use a voltmeter. **Be careful, since power is still being supplied to the pump.** Do not touch the voltmeter leads together while they are in contact with the power lines.

Three Phase Motors

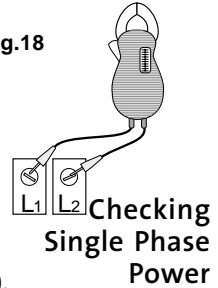
Touch a voltmeter lead to:

- Power leads L1 and L2
 - Power leads L2 and L3
 - Power leads L3 and L1
- } *These tests should give a reading of full line voltage.*

Single Phase Motors

Touch one voltmeter lead to each of the lines supplying power to the pump L1 and L2, (or L1 and N for 115V circuits).

Fig.18



Evaluation

When the motor is under load, the voltage should be within 10% (+ or -) of the nameplate voltage. Any variation larger than this may indicate a poor electrical supply and can cause damage to the motor windings. The motor should not be operated under these conditions. Contact your power supplier to correct the problem or change the motor to one requiring the voltage you are receiving.

Current Measurement

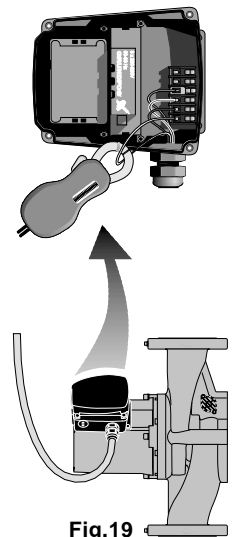
To check the current, use an ammeter. To do so, follow these steps:

1. Make sure the pump is operating
2. Set the ammeter to the proper scale.
3. Place the tongs of the ammeter around the leg to be measured.
4. Compare the results with the amp draw information on the motor nameplate.
5. Repeat for the other legs.

Evaluation

If the current draw exceeds the listed nameplate amps, or if the current imbalance is greater than 5% between each leg on three phase units, then check the following:

- The voltage supplied to the pump maybe too high or too low.
- The contacts on the motor starter may be burned.
- The terminals in the starter or terminal box may be loose.
- There may be a winding defect. Check the winding and insulation resistance
- The motor windings may be shorted or grounded.



Insulation Resistance (lead-to-ground)

To check the insulation resistance (lead-to-ground) of the motor and leads, a megohmmeter is required.

1. Turn the **POWER OFF**.
2. Disconnect all electrical leads to the motor.
3. Set the scale selector on the megohmmeter to R x 100K, touch its leads together, and adjust the indicator to zero.
4. Touch the leads of the megohmmeter individually to each of the motor leads and to ground (i.e. L1 to ground; L2 to ground, etc.).

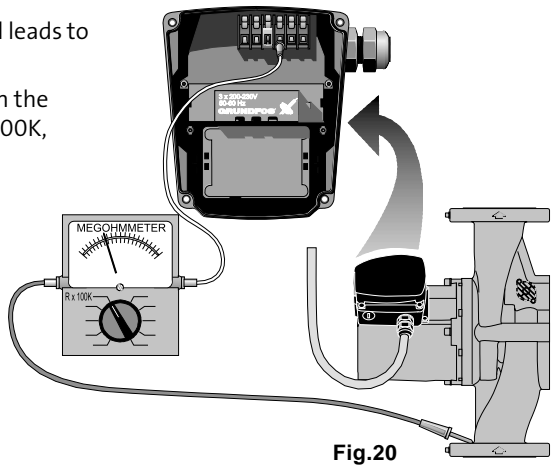


Fig.20

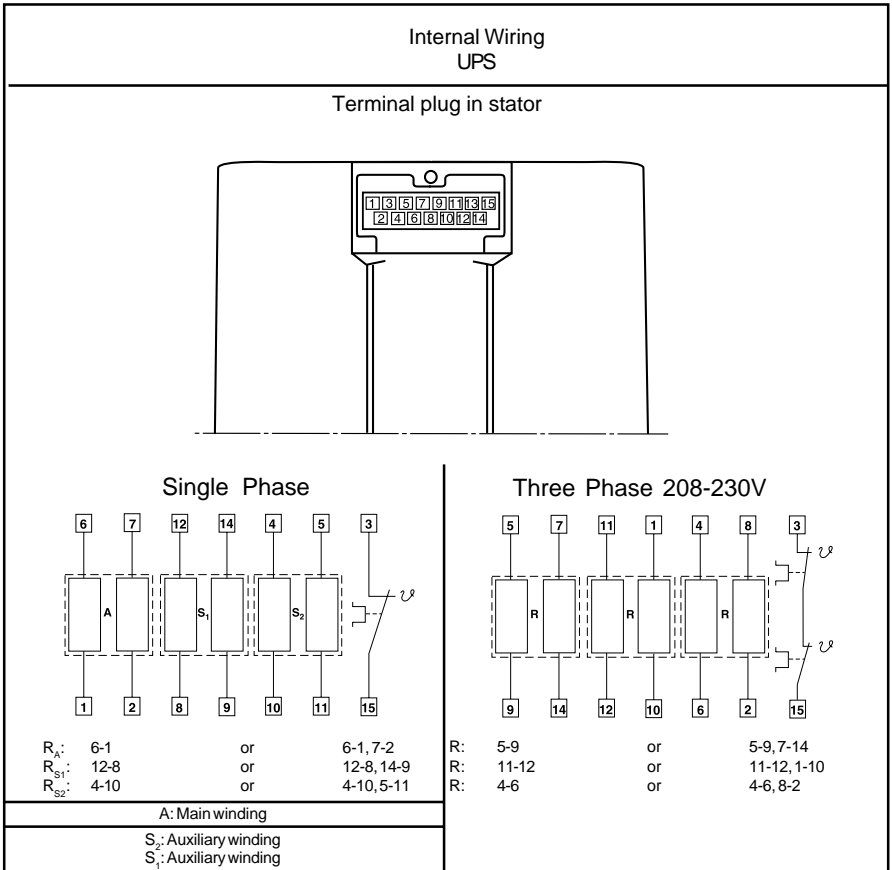
Evaluation: The resistance values for new motors must exceed 1,000,000 ohms. If they do not, replace the motor.

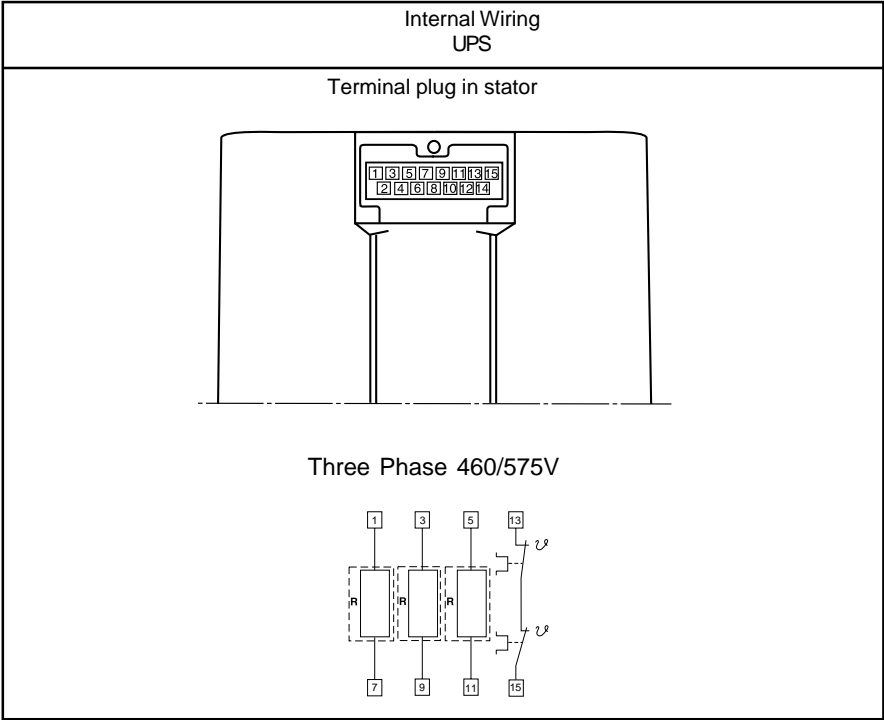
Winding Resistance (line to line)

To check the winding resistance of the motor windings, a megohmmeter is required.

1. Turn the power off
2. Disconnect all electrical leads to the motor.
3. Set the scale on the megohmmeter to Rx1, touch its leads together and adjust the indicator to zero.
4. Using the charts below for reference, touch the leads of the megohmmeter to the appropriate pair of connectors. Check all pairs that are present and write down and label (R_A , R_{S1} , R_{S2} , R) all readings.
5. Compare your readings to the matching model, phase and voltage on the chart on page 15.

Evaluation : The resistance values must fall within the tolerances listed on the next page. If they do not, replace the motor.





Winding Resistance Chart

60 HZ		USA			
UPS					
Pump Type	Voltage	R	[Ω] 20°C - 50°C		
			RA	RS1	RS2
UPS 32-40/4	1 x 115 V		17.8 - 23.2	3.95 - 5.20	9.40 - 12.4
	1 x 230 V		70.0 - 91.5	17.0 - 22.2	39.5 - 52.0
	3 x 208 - 230 V	180 - 236			
	3 x 460 V	360 - 470			
UPS 32-80/2	1 x 115 V		9.55 - 12.6	3.05 - 4.00	6.70 - 8.80
	1 x 230 V		19.4 - 25.5	5.45 - 7.10	12.6 - 16.4
	3 x 208 - 230 V	44.0 - 57.5			
	3 x 460 V	83.5 - 110			
UPS 32-160/2	1 x 115 V		4.15 - 5.45	1.20 - 1.56	2.65 - 3.50
	1 x 230 V		8.30 - 10.8	2.20 - 2.90	5.05 - 6.65
	3 x 208 - 230 V	26.0 - 34.0			
	3 x 460 V	53.5 - 70.0			
UPS 40-40/4	1 x 115 V		11.4 - 15.0	2.95 - 3.85	5.60 - 7.35
	1 x 230 V		50.5 - 66.5	14.0 - 18.4	25.5 - 34.0
	3 x 208 - 230 V	118 - 154			
	3 x 460 V	234 - 310			
UPS 40-80/2	1 x 115 V		5.60 - 7.35	1.84 - 2.42	4.50 - 5.90
	1 x 230 V		11.0 - 14.4	3.95 - 5.20	8.55 - 11.2
	3 x 208 - 230 V	32.0 - 42.0			
	3 x 460 V	64.0 - 84.0			
UPS 40-80/4	1 x 115 V		4.15 - 5.45	1.94 - 2.55	3.30 - 4.35
	1 x 230 V		8.10 - 10.6	3.05 - 4.00	4.60 - 6.05
	3 x 208 - 230 V	46.5 - 61.0			
	3 x 460 V	90.5 - 118			
UPS 40-160/2	1 x 115 V		2.85 - 3.75	1.10 - 1.44	1.94 - 2.55
	1 x 230 V		5.60 - 7.35	2.02 - 2.66	3.75 - 4.95
	3 x 208 - 230 V	22.8 - 30.0			
	3 x 460 V	45.5 - 59.5			
UPS 40-240/2	1 x 230 V		6.80 - 8.95	2.02 - 2.65	3.70 - 4.85
	3 x 208 - 230 V	11.0 - 14.4			
	3 x 460 V	22.0 - 29.0			
	3 x 575 V	35.0 - 45.5			
UPS 50-40/4	1 x 115 V		6.55 - 8.55	2.12 - 2.80	4.30 - 5.65
	1 x 230 V		25.0 - 33.0	8.30 - 10.8	15.0 - 19.8
	3 x 208 - 230 V	57.5 - 75.0			
	3 x 460 V	114 - 148			
UPS 50-80/2	1 x 115 V		4.15 - 5.45	1.20 - 1.56	2.65 - 3.50
	1 x 230 V		8.30 - 10.80	2.20 - 2.90	5.05 - 6.65
	3 x 208 - 230 V	26.0 - 34.0			
	3 x 460 V	33.5 - 70.0			
UPS 50-80/4	1 x 115 V		2.75 - 3.60	1.74 - 2.30	2.85 - 3.75
	1 x 230 V		5.50 - 7.25	2.65 - 3.50	4.95 - 6.50
	3 x 208 - 230 V	37.0 - 49.0			
	3 x 460 V	79.0 - 104			
UPS 50-160/2	1 x 230 V		6.80 - 8.95	2.02 - 2.65	3.70 - 4.85
	3 x 208 - 230 V	12.4 - 16.2			
	3 x 460 V	24.2 - 31.5			
	3 x 575 V	37.5 - 49.5			
UPS 50-240/2	3 x 208 - 230 V	7.80 - 10.2			
	3 x 460 V	15.6 - 20.6			
	3 x 575 V	25.0 - 33.0			
UPS 80-40/4	3 x 208 - 230 V	46.5 - 61.0			
	3 x 460 V	90.5 - 118			
	3 x 575 V	164 - 216			
UPS 80-80/4	3 x 208 - 230 V	23.6 - 31.0			
UPS 80-160/2	3 x 208 - 230 V	7.80 - 10.2			
	3 x 460 V	15.6 - 20.6			
	3 x 575 V	25.0 - 33.0			
UPS 100-40/4	3 x 208 - 230 V	27.5 - 36.0			
	3 x 460 V	54.5 - 71.5			
	3 x 575 V	86.0 - 114			

Replacing Components

Replacing the Pump Head Removal

1. Disconnect or TURN OFF the power supply.
2. Close any isolation valves on either side of the pump to avoid draining the system of liquid.
3. Disconnect the electrical leads from the terminal box.
4. Disconnect and remove the conduit from the terminal box.
5. Loosen and remove the four allen screws (8 or 10 mm) which connect the pump head housing to the pump housing.
6. Remove the pump head from the pump housing.
7. Clean the machined surfaces in the pump housing of any foreign material.

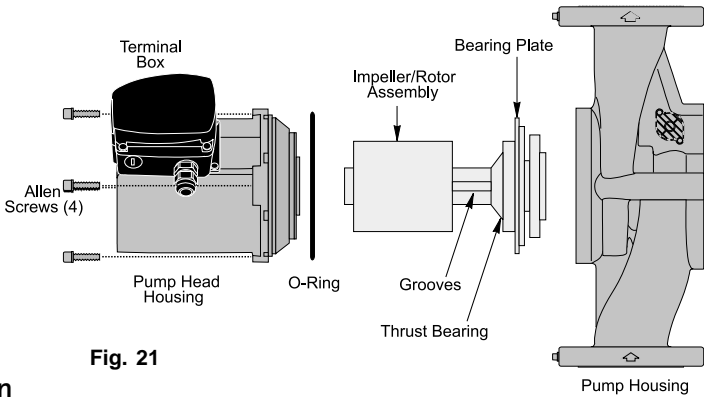


Fig. 21

Installation

1. Carefully remove the new pump head assembly from its packaging. Separate the impeller/rotor assembly from the new pump head.
2. While holding the thrust bearing, carefully place the impeller/rotor assembly into the pump housing. The bearing plate should fit snugly into the lowest machined surface in the pump housing.
3. Make sure that the impeller/rotor assembly can rotate freely.
4. Place the O-Ring over the rotor and locate it into the inner diameter of the pump housing.
5. Carefully place the pumphead housing over the rotor and rotate it so the terminal box is in the position you wish (see page 3 for positioning).
6. Make sure the pump head housing is properly seated on the pump housing. Do not force the two together -- if there is binding, disassemble them and repeat steps 2-6. Tighten the allen screws evenly to secure the pump head. Torque to:
8mm 15 ft lbs
10mm 25 ft lbs
7. Check to make sure the motor shaft turns freely, as explained in step 5 on page 3 (under "Rotating the Terminal Box").

Replacing Components

Replacing the Terminal Box or Capacitor

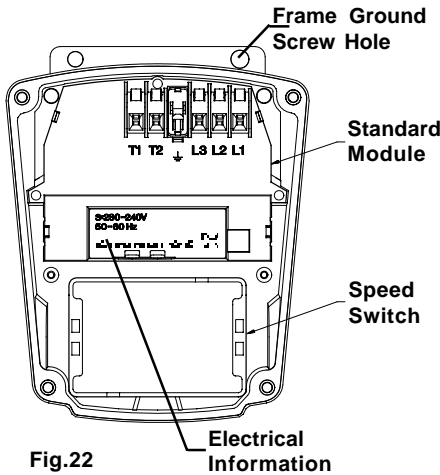


Fig.22

If the terminal box is replaced, make certain the electrical information listed on the new box matches the information listed on the old box, and that it is compatible with the pump and incoming electrical supply.

For all terminal boxes, it is very important to tightly secure the frame grounding screw through the terminal box, so that a proper connection between the terminal box and motor is made.

- 1. Before replacing the terminal box or capacitor, make sure the power is OFF.
- 2. Remove the terminal box cover by completely loosening all four torx/standard screws.
- 3. Remove the speed switch (noting its position) by pulling firmly and evenly on both sides of it. (Not for 460/575 V)
- a.4. (Capacitor replacement, single-phase only) Disconnect the two connector clips from the capacitor and unscrew the complete plastic strain relief nut. Remove capacitor wire and strain relief.
- a.5. Screw in new complete strain relief nut and connect new clip connectors. Pull excess sheathed cable out of terminal box, being sure to leave at least $\frac{1}{8}$ " of sheath inside of terminal box.
- b.4. (Terminal box replacement, single-phase and three-phase) Disconnect all wiring, remove the three phillips-head screws holding the terminal box in place and remove the terminal box by pulling firmly and evenly on both side.
- b.5. Check that the clear rubber gasket is in place around the terminal box connector stem, carefully press the terminal box into the stator socket, replace the three phillips-head terminal box screws and replace wiring.
- 6. Replace the speed switch to its proper position, making sure to push it all the way in. (Not for 460/575V)
- 7. Replace the terminal box cover and tighten all four torx/standard screws.
- 8. Switch on electrical power supply. The pump is now ready for operation.

LIMITED WARRANTY

Products manufactured by (GRUNDFOS) GRUNDFOS PUMPS CORPORATION are warranted to the original user only to be free of defects in material and workmanship for a period of 18 months from date of installation, but not more than 24 months from date of manufacture. GRUNDFOS' liability under this warranty shall be limited to repairing or replacing at GRUNDFOS' option, without charge, F.O.B. GRUNDFOS' factory or authorized service station, any product of GRUNDFOS' manufacture. GRUNDFOS will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by GRUNDFOS are subject to the warranty provided by the manufacturer of said products and not by GRUNDFOS' warranty. GRUNDFOS will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with GRUNDFOS' printed installation and operating instructions.

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of GRUNDFOS' products from which it was purchased together with proof of purchase and installation date, failure date, and supporting installation data. Unless otherwise provided, the distributor or dealer will contact GRUNDFOS or an authorized service station for instructions. Any defective product to be returned to GRUNDFOS or a service station must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Material Authorization must be included if so instructed.

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