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L-200-TL-001 | Rev. 7/96
 PRINTED IN USA

54.0573

Series 200

UMC/UPC
 UMCD/UPCD

Installation and Operating Instructions

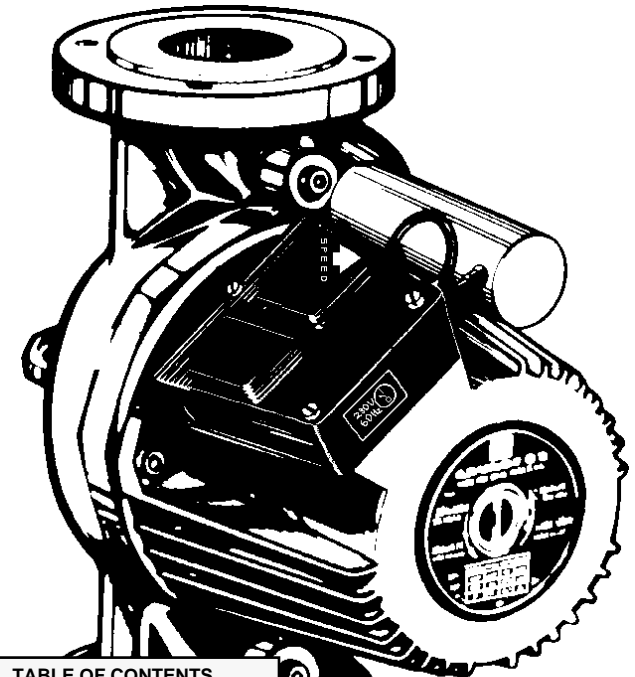
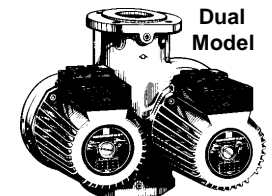


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Dual Model

Please leave these instructions with the owner for future reference.



SAFETY WARNING

Read This Booklet

This booklet is designed to help a certified installer install, begin operation of, and troubleshoot Grundfos Series 200 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.

To ensure you install the pump correctly and also to avoid possible injury due to improper handling of the pump, please read this booklet **BEFORE** attempting any installation.

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.

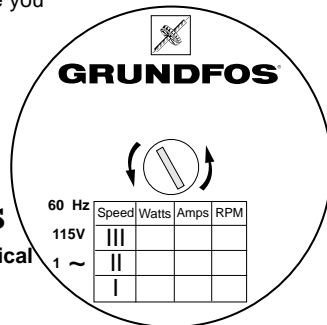
Shock Hazard

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 motor frame to an acceptable grounding point is required for safe installation and operation.

Pre-Installation Checklist

1. Confirm You Have the Right 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. Electrical Requirements

Compare the pump's nameplate data with the electrical supply. Do they match?

3. Check the Condition of the Pump

The Series 200 shipping carton is designed around your pump during production to prevent damage. The pump should remain in the carton until you are ready to install it. At that point, examine the pump for any visible damage that may have occurred during shipping.

Pre-Installation Checklist

4. Pumped Liquid Requirements

Your Series 200 pump can be used to circulate:

- Potable hot water
- Water for hydronic heating
- Clean, thin, non-aggressive and non-explosive liquids without solid particles or fibers.
- Cooling liquids (not containing mineral oil).

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:

Model	MINIMUM PUMP INLET PRESSURE (During Operation)			LIQUID TEMPERATURE RANGE	MAXIMUM LIQUID TEMPERATURES for different Ambient Air Temps	
	At These Liquid Temps				Ambient Air Temp.	Max. Liquid Temp. for closed systems
	167°F 75°C	194°F 90°C	230°F 110°C	Open Systems 60°F - 140°F 15°C - 60°C (domestic hot water) Closed Systems ... 60°F min. 15°C		
UMC 50-40	1.65 ft 0.7 psi	8.0 ft 3.5 psi	36 ft 15.4 psi		104°F 40°C	230°F 110°C
UMC 50-80 65-40 65-80	1.65 ft 0.7 psi	18.0 ft 7.7 psi	44 ft 18.9 psi		122°F 50°C	212°F 100°C
UMC 80-80	12.0 ft 5 psi	28.0 ft 12 psi	64.0 ft 23 psi		140°F 60°C	194°F 90°C
UPC 50-160	12.0 ft 5 psi	28.0 ft 12 psi	54 ft 23.2 psi		150°F 65°C	185°F 85°C
UPC 65-160 80-160	18.1 ft 8 psi	34 ft 14.8 psi	60 ft 25.8 psi		The temperature of the liquid being pumped MUST ALWAYS be greater than the ambient air temperature.	

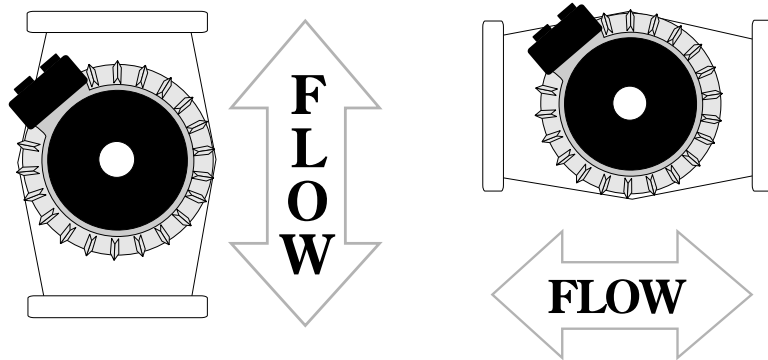
MAXIMUM PUMP INLET PRESSURE: 145 psi (10 bars)

If not, condensation may form on the motor windings, leading to possible motor damage.

1. Electrical Preparation

Terminal Box Position

Before installing the pump, you must determine the most convenient position for the terminal box, which can be rotated in 45° increments.



Due to possible damage to the terminal box components as a result of direct exposure to water, do not position the terminal box directly over the suction or discharge flanges.

Rotating the Terminal Box

To rotate the terminal box, follow these steps:

1. Remove the four Allen screws holding the powerhead onto the pump housing.
2. Carefully lift the powerhead 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 powerhead onto the pump housing.
4. Tighten the Allen head screws evenly. Torque to:

8 mm	15 ft lbs
10 mm	25 ft lbs
5. Check to make sure the motor shaft turns freely. Do this by removing the vent plug in the middle of the nameplate. Insert a small 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. Refer to page 9 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 Piping Line

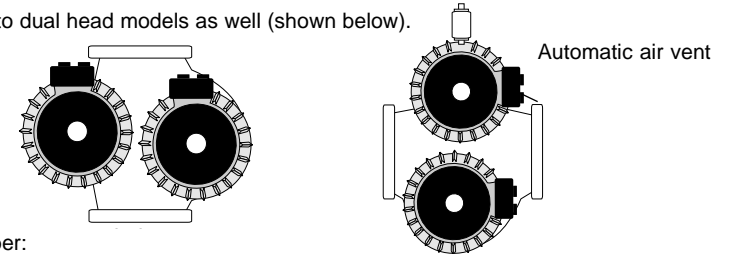
The pump should never be located at the lowest point of the piping system, where dirt and sediment collect. Nor should it be located at the highest point of the piping system, where air accumulates.

Mounting Positions

The arrows on the flanges of the pump indicate the direction of water flow. Although the Series 200 may be installed in either vertical or horizontal piping, **the motor shaft must always remain horizontal**, as shown in the drawings on the previous page.



This applies to dual head models as well (shown below).



Also remember:

- If the pump is mounted in a vertical piping line, it should be installed to pump **upwards**, to avoid the accumulation of trapped air inside the pump.
- When a Series 200 dual model pump is installed in a horizontal piping line, an automatic air vent (as shown above) must always be installed in the pump housing and the pump must always operate at the maximum flow setting (speed 3).
- **Pumps installed outdoors** must be protected by a ventilated, water-tight cover to keep out moisture and dirt.
- When Series 200 dual model pumps are installed in vertical pipes with a downward liquid flow, they must always operate at the maximum flow setting (speed 3).

3. Connect the Pump

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

4. Electrical Hookup

Series 200 pumps are available with either of two basic electrical terminal box configurations:

MULTI-SPEED (3) 1 & 3 phase	or	SINGLE-SPEED 3 phase x 460 Volt
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Refer to the following for specific electrical connection information. Dual head pumps are connected like two single head pumps.

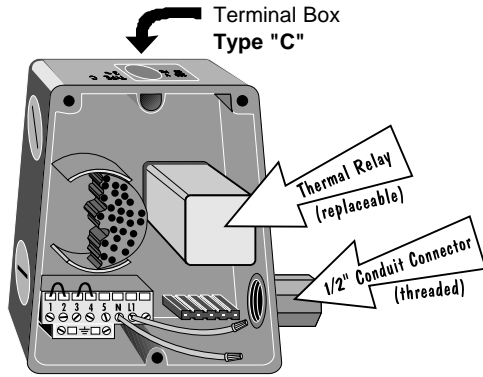
Before making any electrical connections, make sure the power supply to the pump is turned OFF

Installation Procedures

Multi-Speed Pumps (1 & 3 phase)

The Series 200 MULTI-SPEED model pumps are equipped with built-in, automatic resetting, thermal overload protection. The pump is protected at all three speeds. The pump may be connected directly to the electrical supply as shown below for both single and three phase models.

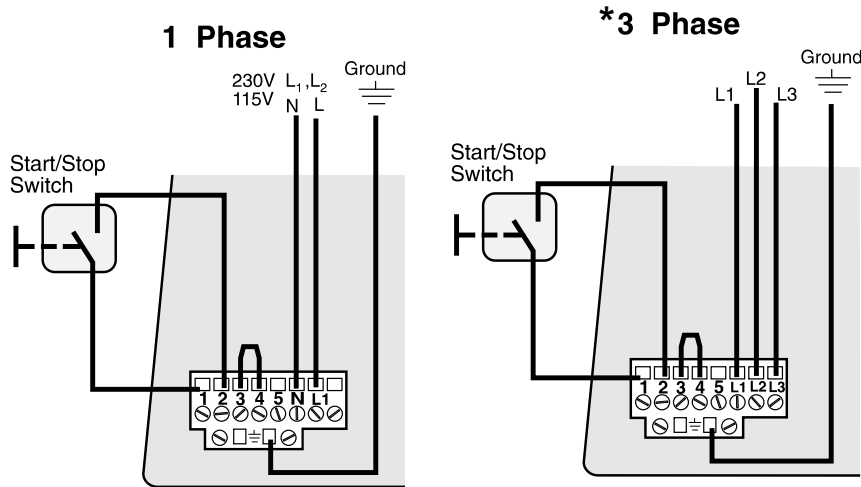
For **Start/Stop** control at the main breaker, the jumper wires at terminals 1 & 2 and 3 & 4 on the terminal block must remain in place. A remote Start/Stop switch may be added as shown below by removing the jumper wire between 1 & 2 on the terminal block.



Electrical Connections

Recommended: Wire nut to terminal block leads.

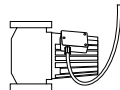
Optional: Remove pre-installed leads and connect directly to terminal block.



* External Motor Protection

It is recommended to install external motor protection on all 3 phase models.

Be sure to put a service loop or drip loop in the conduit line so that water cannot run down the line and into the terminal box



Installation Procedures

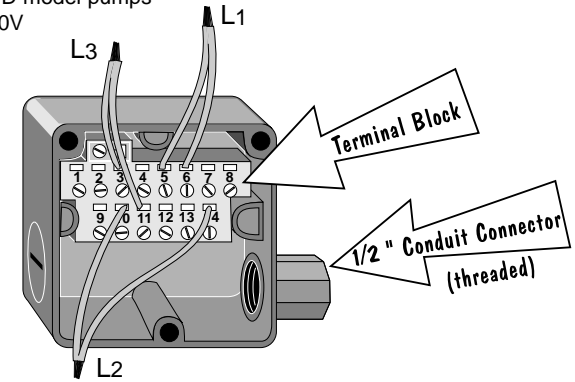
Single Speed Pumps (3 phase x 460V)

The Series 200 SINGLE SPEED model pumps are suitable for a 3 phase x 460V electrical supply only.

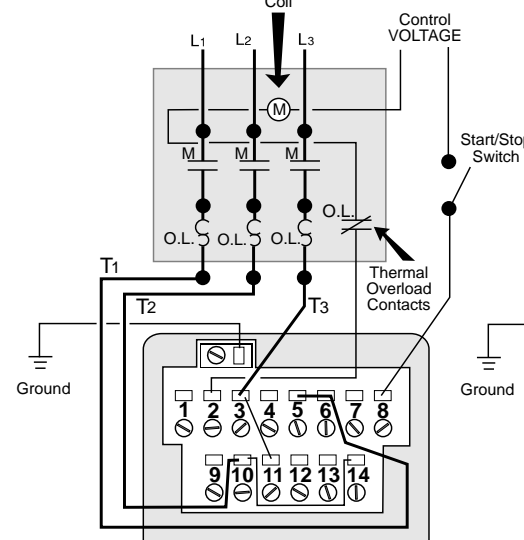
Before making any electrical connections, make sure the power supply to the pump is turned OFF.

An automatic resetting thermal overload switch is built into the motor. When used in conjunction with an external contactor, this protects the motor from overheating.

The thermal overload switch is connected to terminals 2 and 8 on the terminal block.

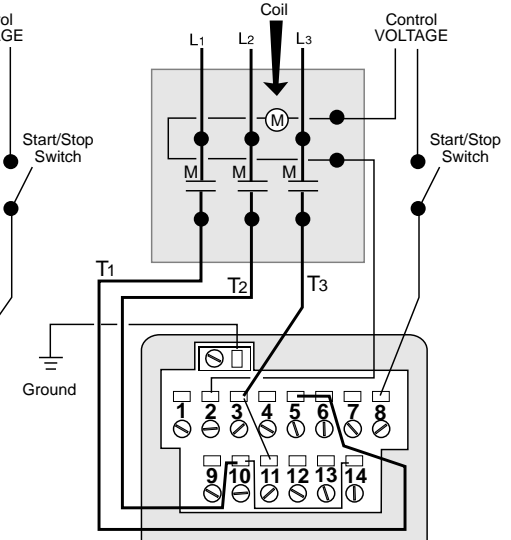


Magnetic Starter 3 Phase



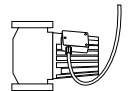
Terminal Box

Magnetic Contactor 3 Phase



Terminal Box

Be sure to put a service loop or drip loop in the conduit line so that water cannot run down the line and into the terminal box



Starting The Pump

1. Vent the Piping System

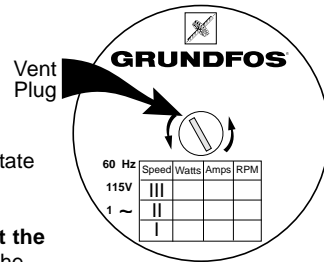
After the pump has been installed and the electrical connections made, the piping system must be vented. **Never operate the pump dry** -- the system must first be filled with liquid and vented. **Do not vent the piping system through the pump.** Instead, follow these steps:

- 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**.

2. Check the Direction of Shaft Rotation

APPLIES TO THREE PHASE MODELS ONLY

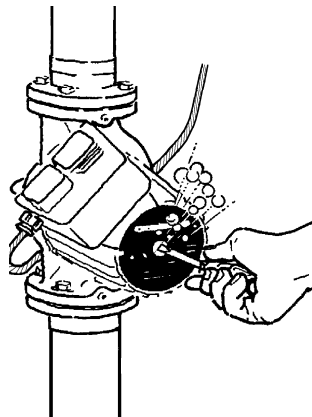
- Make sure that the power is **OFF**.
- Unscrew and remove the vent plug located at the center of the nameplate.
- Insert a small, flat-blade screwdriver into the slot in the end of the motor shaft (see drawing at right). Rotate the shaft with the screwdriver to make sure it does so freely.
- Briefly 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.
- 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.



3. Vent the Pump

After the piping system has been vented of trapped air, vent the pump by following these steps:

- Make sure that the power is **OFF**.
- Remove the vent plug from the end of the motor.
- Allow the air to escape from the pump until liquid begins to come out. If no liquid appears, use a screwdriver to rotate the motor shaft. This will allow the air to escape faster and speed up the venting process.
- When liquid appears, replace and tighten the vent plug.



Starting The Pump

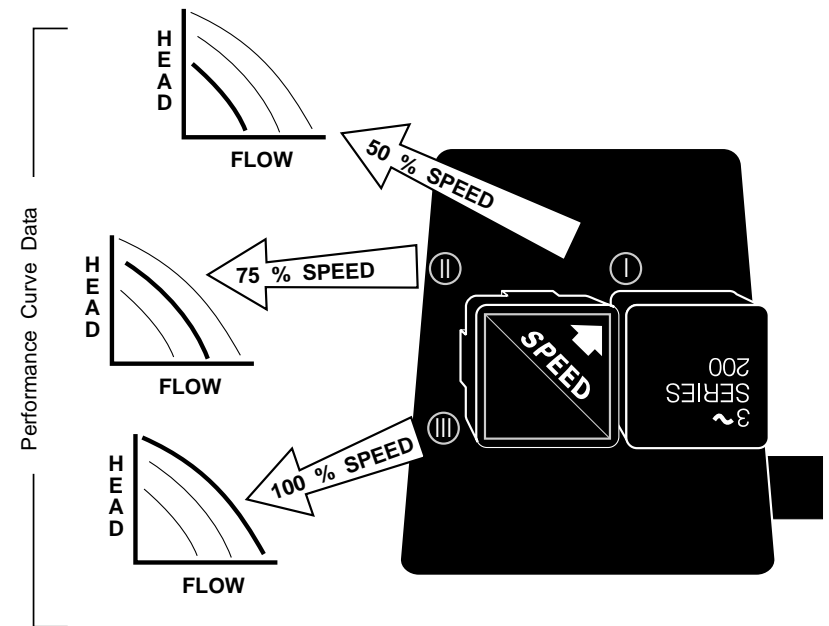
4. Speed Control

APPLIES TO MULTI-SPEED PUMP MODELS ONLY

All single phase model pumps and three phase 208 V and 230V pumps are equipped with the Grundfos 3-speed motor. Three phase 460V models are single speed (speed 3) only.

Speed Selector

The motor's speed is manually controlled by changing the position of the speed selector on the outside of the terminal box.



Changing Speeds

To change the motor's speed, first **TURN OFF POWER TO THE PUMP**. Then pull straight out on the speed selector, rotate it to the desired speed, and press it back into place.

5. System Cleaning

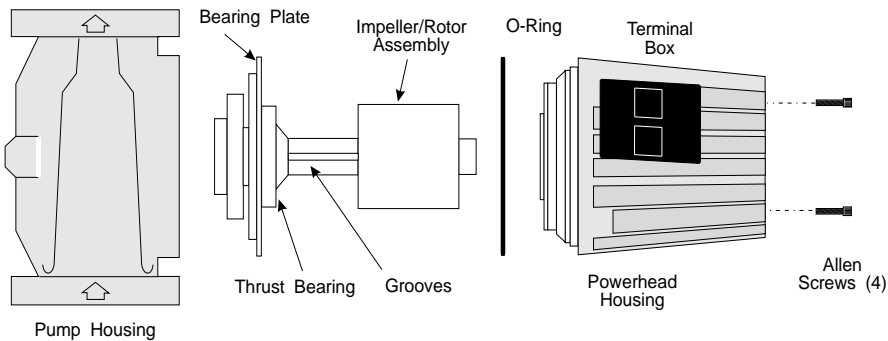
Within some pumping applications, deposits of calcium, lime or minerals may accumulate in the motor rotor area and on bearing surfaces. This can lead to a locked rotor condition. Cleaning of the rotor and bearing surfaces will prevent motor failure from overload (refer to Page 9, Powerhead Removal). Simply use soapy water and clean cloth to remove residue from the rotor, shaft journals, inside of the rotor chamber and bearings. **NO LUBRICATION** is required.

Replacing Components

Replacing the Powerhead

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 powerhead housing to the pump housing.
6. Remove the powerhead from the pump housing.
7. Clean the machined surfaces in the pump housing of any foreign material.



Installation

1. Carefully remove the new powerhead assembly from its packaging. Separate the impeller/rotor assembly from the new powerhead.
2. Examine the bearing faces for damage that may have occurred during shipment.
3. Check to make sure the thrust bearing drive tabs are properly engaged with the machined grooves in the shaft. Slide the thrust bearing toward the rotor until it stops.
4. 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.
5. Make sure that the impeller/rotor assembly can rotate freely.
6. Place the O-Ring over the rotor and locate it into the inner diameter of the pump housing.
7. Carefully place the powerhead housing over the rotor and rotate it so the terminal box is in the position you wish (see page 3 for positioning).
8. Make sure the powerhead housing is properly seated on the pump housing. **Do not force the two together** -- if there is binding, disassemble them and repeat steps 6-8. Tighten the Allen screws evenly to secure the powerhead. Torque to 15 ft lbs for 8 mm screws, 25 ft lbs for 10 mm screws.
9. Check to make sure the motor shaft turns freely, as explained in step 5 on page 3 (under "Rotating the Terminal Box") .

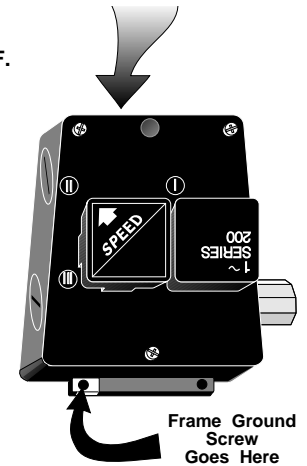
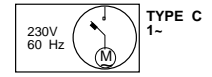
Replacing Components

Replacing the Terminal Box

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.

Before replacing the terminal box, make sure the power is **OFF**.

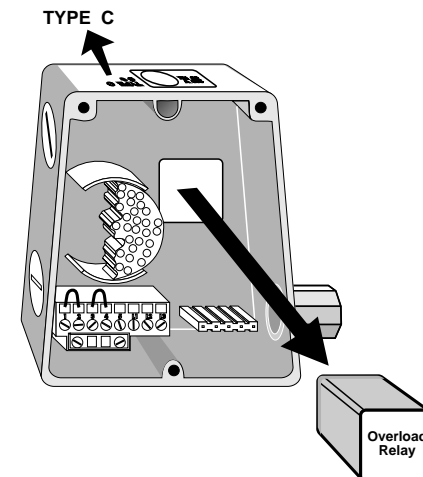
For both the SINGLE-SPEED (460V) and MULTI-SPEED terminal boxes, it is very important to tightly secure the frame grounding screw through the terminal box, so that a proper connection between the terminal box and motor is made.



Replacing the Overload Relay

APPLIES TO TYPE C TERMINAL BOXES ONLY

The overload relay provided with Series 200 Multi-Speed model pumps is removeable and replaceable. Before doing so, make sure the power is **OFF**. Also, before completing the installation, make sure the electrical information on the new overload relay matches that on the one you are replacing.



Parts List

Replacement Powerheads (w/Terminal Box)

Model	PH	Voltage	Cast Iron/Closed System Part Number	Bronze/Open System Part Number
UMC50-40	1	115	54552489	54562489
	1	230	54552488	54562488
UMC65-40	1	115	54652489	54662489
UMC50-80	1	115	56552889	56562889
	1	230	56552888	56562888
	3	208	55552875	55562875
	3	230	55552877	55562877
	3	460	55552876	55562876
UMC65-80	1	115	56652889	56662889
	1	230	56652888	56662888
	3	208	56652875	56662875
	3	230	56652877	56662877
	3	460	56652876	56662876
UMC80-80	1	115	56852889	56862889
	1	230	56852888	56862888
	3	208	56852875	56862875
	3	230	56852877	56862877
	3	460	56852876	56862876
UPC50-160	1	115	55553639	55563639
	1	230	55553638	55563638
	3	208	55553625	55563625
	3	230	55553627	55563627
	3	460	55553626	55563626
UPC65-160	1	230	56653638	56663638
	3	208	56653625	56663625
	3	230	56653627	56663627
	3	460	56653626	56663626
UPC80-160	3	208	56853625	56863625
	3	230	56853627	56863627
	3	460	56853626	56863626

Replacement Capacitors (Single Phase Only)

Model	Voltage	Description	Part Number
UMC50-40	115	40mf/280V	545294
	230	10mf/400V	540950
UMC65-40	115	60mf/240V	545295
UMC50-80	115	50mf/240V	555064
	230	12mf/400V	540951
UMC65-80	115	60mf/240V	545295
	230	14mf/400V	540952
UMC80-80	115	80mf/240V	555067
	230	20mf/400V	540953
UPC50-160	115	80mf/240V	555067
	230	20mf/400V	540953
UPC65-160	230	30mf/400V	540954

Parts List

Packaged Flange Sets (Cast Iron)*

Model	Description	Part Number
UMC/UPC50	2" ANSI, 125# Threaded	549601
UMC/UPC65	2.5" ANSI, 125# Threaded	559601
UMC/UPC80	3" ANSI, 125# Threaded	569601

* Use for both single and dual power head models

Packaged Flange Sets (Bronze)

Model	Description	Part Number
UMC/UPC50	2" ANSI, 150# Threaded	549611
UMC/UPC65	2.5" ANSI, 150# Threaded	559611
UMC/UPC80	3" ANSI, 150# Threaded	569611

Replacement Terminal Boxes*

Phase x Volt	Part Number
1 x 115V	546217
1 x 230V	546215
3 x 208V	546216
3 x 230V	546214
3 x 460V	546219
3 x 208/230V**	546218

* Does not include Terminal Box Gasket

** For UPC80-160, 3 x 208V and 3 x 230V models only

Replacement Relays

Phase x Volt	Part Number
1 x 115V	545950
1 x 230V	546033
3 x 208V	545951
3 x 230V	546034
3 x 460V	Relay not required
3 x 208/230V	Relay not serviceable

Replacement Gaskets, O-Rings & Vent Plugs

Description	Part Number
Volute O-Ring (UMC50-40/65-40)	ID2160
Volute O-Ring (all other models)	ID2038
Terminal Box Gasket	540562
Vent Plug w/ O-Ring	546171

Preliminary Checks

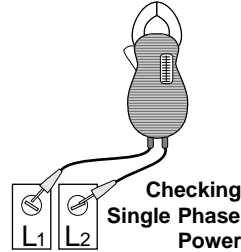
Supply Voltage

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).

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

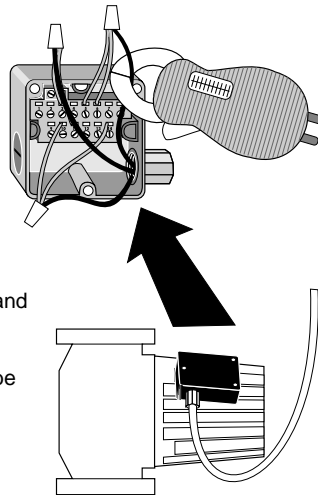
To check the current, use an ammeter. To do so, follow these steps:

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.
- The pump may be damaged in some way and may be causing a motor overload.
- A voltage supply or balance problem may exist.

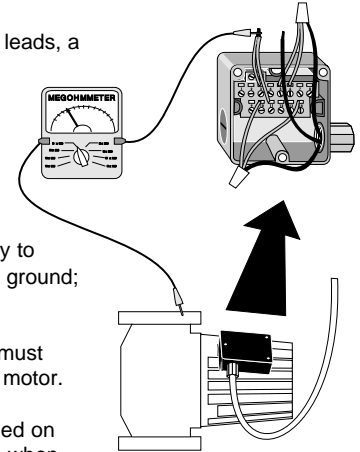


Insulation Resistance (lead-to-ground)

APPLIES TO THREE PHASE 460 V MODELS ONLY

To check the insulation resistance 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.):



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

Note: Insulation resistance tests cannot be performed on multi-speed models, since the overload relay opens when power is disconnected.

Diagnosing Specific Problems

If The Pump... It May Be Caused By...

Check This By..

Correct It By...

Does Not Run	1. No power at motor	Check for voltage at terminal box	If no voltage at motor, check feeder panel for tripped circuits
	2. Fuses are blown or circuit breakers are tripped.	Remove fuses and check for continuity with an ohmmeter.	Replace blown fuses or reset circuit breaker. If new fuses blow or circuit breaker trips, the terminal box wiring must be checked.
	3. Defective controls	Check all safety and pressure switches for operation. Inspect contact in control devices.	Replace worn or defective parts.
	4. Motor is defective (3 x 460V only)	Turn off power. Disconnect the wiring. Measure the lead-to-lead resistance with an ohmmeter (set at R1). Measure lead-to-ground values with a megohmmeter (R100K). Record the measured values.	If the motor windings are open or grounded, replace the motor.
	5. (On 1- phase pumps) Defective capacitor	Turn off the power, then discharge the capacitor. Disconnect the leads and check them with an ohmmeter (R100K).	When the meter is connected, the needle should jump toward "0" ohms and slowly drift back to infinity. Replace capacitor if defective.
	6. Locked rotor due to deposits	Turn off power—clean powerhead (see Page 9).	
	7. Steam pressure in rotor chamber causing locked rotor	Remove vent plug and vent pump properly (see Page 7).	
Pump Runs, But At A Reduced Capacity	1. Wrong rotation (3 phase only)	Check for proper electrical connections in terminal box.	Correct wiring and change leads as required.
	2. Leak in discharge piping or valve	Examine system for leaks.	Repair leaks.
	3. Clogged strainer	Remove screen and inspect.	Clean, repair, rinse out screen and re-install.
	4. Worn pump	Install pressure gauge, start the pump, gradually close the discharge valve and read pressure at shut-off.	Refer to the specific pump curve for shut-off head for that pump model. If head is close to curve, pump is probably OK. If not, remove pump and inspect.
	5. Foreign material lodged in impeller.	Shut isolation valves. Drain the pump. Remove the powerhead housing allen screws and remove the impeller/rotor assembly.	Inspect impeller for foreign material. Remove and reassemble pump. Check to insure the O-ring between the powerhead housing and pump housing is not damaged during reassembly.
	6. Deposits in rotor chamber	Turn off power—clean powerhead (see Page 9).	
Fuses Blow or Circuit Breakers Trip	1. High or low voltage	Check voltage at the starter panel or terminal box.	If not within + or - 5%, check wire size and length of run to pump panel.
	2. 3-phase current imbalance.	Check the voltage on each lead.	Must be within +10% or - 10%. If not, contact the power company.
	3. Terminal box wiring	Check that actual wiring matches wiring diagram. Check for loose or broken wires or terminals.	Correct as required.
	4. (On 1- phase pumps) Defective capacitor	Turn off the power, then discharge the capacitor. Disconnect leads and check with an ohmmeter (R100K)	When the meter is connected, the needle should jump towards "0" ohms and slowly drift back to infinity. Replace capacitor, if defective.
	5. Locked rotor	Turn off power—clean powerhead (see Page 9).	
	6. System wiring too long or wrong size	Refer to N.E.C. Manual for guidelines.	

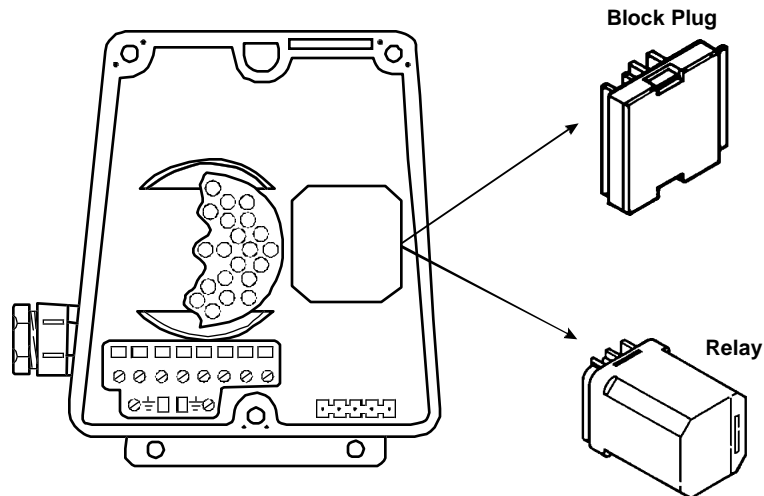
Additional Information

MINIMUM PUMP INLET PRESSURE TABLE

Model	At These Liquid Temps		
	167°F 75°C	194°F 90°C	230°F 110°C
UMC 40-40	1.65 ft. 0.7 psi	10 ft. 4.2 psi	51 ft. 21.6 psi
UPC 40-80	8.5 ft. 3.5 psi	20 ft. 8.5 psi	61 ft. 25.8 psi
UPC 40-140	15 ft. 6.3 psi	27 ft. 11.2 psi	63 ft. 26.5 psi

Terminal Box with Block Plug Electrical Connection

The Electrical connection and protection should be carried out in accordance with local regulations. Never make any connections in the pump terminal box unless the electricity supply has been switched off. The pump must be connected to ground. The pump must be connected to an external main switch. The operating voltage and frequency are made on the pump nameplate. Please make sure that the motor is suitable for the electricity supply on which it will be used. On three-phase pumps, the direction of rotation must be checked. The terminal box incorporates a block plug or a relay. The block plug and the relay are interchangeable, see figure below.



The stator incorporates a thermal switch. The C terminal box incorporates a block plug or a relay. These are replaceable and interchangeable.

The pump must be connected to the electricity supply via an external contactor. The contactor coil is connected to the thermal switch incorporated in the pump, terminals 2 and 3. The pump is then protected against overloading at all three speeds. Twin head pumps are connected like two single head pumps.

At the end of these instructions, Figure A shows the internal connections and Figure B shows possible electrical connections.

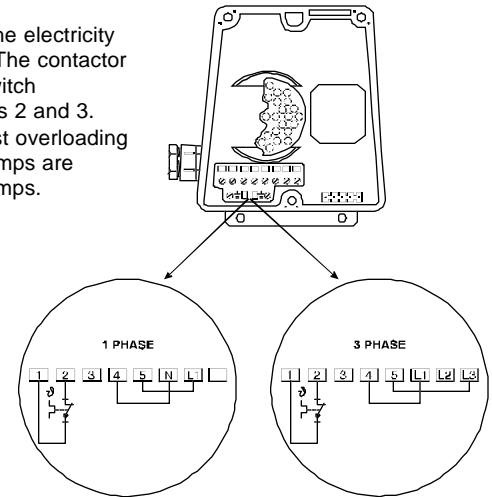


Figure A

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

Figure B

