SAVE THESE IMPORTANT SAFETY INSTRUCTIONS
ALL ELECTRICAL INSTALLATIONS SHOULD BE PERFORMED BY QUALIFIED ELECTRICIANS

2-SPEED MODELS: DO NOT wire both speeds to run simultaneously. If supply cord is damaged, replace only with original replacement equipment available from authorized dealer.

The pump is to be supplied through a residual current device (RCD) with a rated residual operating current not exceeding 30mA.

Potential risk of fire, electrical shock, or injury to persons if misused.

DO NOT install within an outer enclosure or beneath the skirt of the spa unless so marked.

WARNING: To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

CAUTION: This pump is for use with permanently installed pools and may also be used with hot tubs and spas if so marked. Do not use with storable pools. A permanently installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it may be readily disassembled for storage and reassembled to its original integrity.

PUMP CONNECTIONS INSTALLATION INSTRUCTIONS
LOCATION: Place pump on level surface. Pump must be installed below water surface. Shut off valves should be installed on both the inlet and outlet of the pump for future maintenance. Installation area should be clear of any direct water and have adequate floor drainage. Pump should be protected from excessive moisture.

The inlet and outlet have waterway male union threads. Use waterway tailpiece assemblies for best connection. These unions allow the pump to be removed for service without disturbing the plumbing. HAND TIGHT UNIONS ONLY!

Do not use pipe dope. Use only Teflon tape or other sealing compounds approved for use with plastic. Some pipe dopes not approved for use with plastic will cause stress cracking of plastic parts. New installations often require a plumbing inspection. This inspection is usually conducted using city water pressure. A pressure regulator should be used when preforming this test and should not exceed 40 PSI during the pressure test. The filter and pump are under pressure. Insure that all air is removed during the pressure test. FAILURE TO FOLLOW THESE INSTRUCTIONS EXPLICITLY CAN RESULT IN PERSONAL INJURY.

MOTOR WIRING
1. Before working on any electrical connections be sure that the power is turned off.
2. All wiring must conform to local, state and/or national codes.
3. All wiring must conform to wiring diagram on the motor nameplate or on the back of the terminal cover.
4. Applied voltage must correspond to rated voltage as indicated on marking plate.
5. FOR SAFETY CLASS 1 EQUIPMENT: It is mandatory to connect the pump to the protective conductor (grounding connector) of earth-grounded main power supply.
6. FOR EQUIPOTENTIAL BONDING: It is also possible in addition to use the external terminal on the body to realize an equipotential bonding with other earthed metallic parts.
7. DO NOT ground to a gas supply line.
8. Ground motor prior to connecting electrical power.
9. For disconnection from the supply, a circuit breaker having a contact separation of at least 3mm in all poles must be incorporated in the fixed wiring according to the wiring rules.

Ensure wiring circuit agrees with diagram and leads are securely tight.

STARTING AND PRIMING PUMP
Before turning the power on, be sure that:
1. There is an adequate amount of water in the system.
2. All valves are open to allow water circulation.
3. All connectors and fittings are properly aligned and secured.
4. All electrical connections are proper.

CAUTION: DO NOT RUN THE PUMP WITHOUT WATER. If the pump fails to prime within 30 seconds, turn it off and check for an air lock, clogged plumbing or closed valves. If the pump will not start or prime, see the troubleshooting section in the manual.

MAINTENANCE INSTRUCTIONS
Keep the motor clean. Ensure that the louvered openings are free from debris and obstructions. Over a period of time, the shaft seals may become damaged or worn and must be replaced.

WINTERIZATION - To prevent damage during freezing conditions, disconnect all electrical power. Drain thoroughly and clean out any debris. Protect pump and motor from elements by covering or, if possible, store in a dry, well ventilate room.

For Model Numbers: PF-10-1N22X • PF-20-1N22X • PF-20-2N22X • PF-25-2N22X • PF-30-1N22X

<table>
<thead>
<tr>
<th>MODEL</th>
<th>AMP</th>
<th>VOLTAGE</th>
<th>HMAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF-10-1N22X</td>
<td>5.0</td>
<td>230</td>
<td>13.4</td>
</tr>
<tr>
<td>PF-20-1N22X</td>
<td>8.7</td>
<td>230</td>
<td>16.2</td>
</tr>
<tr>
<td>PF-20-2N22X</td>
<td>9.3</td>
<td>230</td>
<td>16.2 / 5.0</td>
</tr>
<tr>
<td>PF-25-2N22X</td>
<td>10.3</td>
<td>230</td>
<td>16.9 / 5.7</td>
</tr>
<tr>
<td>PF-30-1N22X</td>
<td>12.6</td>
<td>230</td>
<td>19.0</td>
</tr>
</tbody>
</table>

ENSURE WIRING CIRCUIT AGREES WITH DIAGRAM AND LEADS ARE SECURELY TIGHT.
TROUBLESHOOTING

MOTOR WON'T START:
- CHECK VOLTAGE AT TERMINALS WITH VOLTMETER.
  - FUSE/BREAKER TRIPPED: REPLACE FUSE/RESET BREAKER.
  - EFFECTIVE EXTERNAL SWITCH: RESET OFL. CHECK SWITCH SETTINGS AND CONNECTIONS.
  - INEFFECTIVE OR LOOSE CONNECTIONS: CALL ELECTRICIAN.
  - THERMAL PROTECTOR TRIPPED: INSURE WIRING CIRCUIT AGREES WITH DIAGRAM AND LEADS ARE TIGHT.
  - WINDING SWITCH OR CAPACITOR FAILURE: ALLOW MOTOR TO COOL AND RESTART.
  - SEIZED OR TIGHT MOTOR: TAKE APART PUMP, TURN MOTOR BY HAND. SEE AN AUTHORIZED MOTOR SERVICE CENTER.
  - WINDING SWITCH OR CAPACITOR FAILURE: SEE AN AUTHORIZED MOTOR SERVICE CENTER.

IF PROPER VOLTAGE:
- TIGHT PUMP: TIGHTEN PUMP.
- SEIZED OR TIGHT MOTOR: SEE AN AUTHORIZED MOTOR SERVICE CENTER.
- WINDING SWITCH OR CAPACITOR FAILURE: SEE AN AUTHORIZED MOTOR SERVICE CENTER.

IF Ø VOLTS:
- FUSE/BREAKER TRIPPED: REPLACE FUSE/RESET BREAKER.
- CALL ELECTRICIAN.
- INDIKEAN: INSURE WIRING CIRCUIT AGREES WITH DIAGRAM AND LEADS ARE TIGHT.
- THERMAL PROTECTOR TRIPPED: ALLOW MOTOR TO COOL AND RESTART.
- WINDING SWITCH OR CAPACITOR FAILURE: SEE AN AUTHORIZED MOTOR SERVICE CENTER.
- SEIZED OR TIGHT MOTOR: TAKE APART PUMP, TURN MOTOR BY HAND. SEE AN AUTHORIZED MOTOR SERVICE CENTER.
- WINDING SWITCH OR CAPACITOR FAILURE: SEE AN AUTHORIZED MOTOR SERVICE CENTER.

MOTOR WONS'T START:
- CHECK VOLTAGE AT TERMINAL WITH VOLTMETER.
  - IF VOLTAGE IS NOT WITHIN 10% OF NAMEPLATE: CALL ELECTRICIAN.
  - IF PROPER VOLTAGE:
    - TIGHT PUMP: TIGHTEN PUMP.
    - SEIZED OR TIGHT MOTOR: SEE AN AUTHORIZED MOTOR SERVICE CENTER.
    - WINDING SWITCH OR CAPACITOR FAILURE: SEE AN AUTHORIZED MOTOR SERVICE CENTER.

MOTOR IS NOISY:
- CHECK TO SEE THAT MOUNTING IS SECURE.
- BENT SHAFT: DISASSEMBLE PUMP AND RUN MOTOR SLOWLY TO DETERMINE WHETHER MOTOR NOISE IS ACCEPTABLE.
- LOOSE MOUNTING: TIGHTEN MOUNTING.
- TIGHT MOUNTING: SEE AN AUTHORIZED MOTOR SERVICE CENTER.
- BEARING NOISE OR MOTOR RUB: SEE AN AUTHORIZED MOTOR SERVICE CENTER.

MOTOR RUNS, THEN STOPS:
- CHECK FOR MOTOR OVERLOAD BY CHECKING AMP DRAIN AT MOTOR TERMINAL WITH AMP METER. AMP DRAIN SHOULD BE WITHIN 10% OF NAMEPLATE.
  - IF MOTOR IS NOT OVERLOADED: IF MOTOR IS OVERLOADED:
    - TRIPED BREAKER: RESET BREAKER.
    - INADEQUATE VENTILATION: INCREASE VENTILATION.
    - INCORRECT LINE VOLTAGE: CHECK VOLTAGE. IF INRECT, CALL AN ELECTRICIAN.
    - INCORRECT WIRING: INSURE THAT WIRING CIRCUIT AND WIRING DIAGRAM ARE THE SAME.

PUMP RUNS, NO FLOW:
- CHECK SHUT OFF VALVES:
  - VAUES CLOSED: OPEN VALVES.
  - CHECK TO SEE THAT PUMP IS BELOW WATER LEVEL:
  - PUMP ABOVE WATER LEVEL: REPLACE PUMP BELOW WATER LEVEL.
  - CHECK SHUT OFF VALVES:
  - AIR LOCK: REMOVE DRAIN PLUG UNTIL WATER FLOWS FROM PUMP. REPLACE DRAIN PLUG AND START PUMP.

PUMP RUNS, NOT ENOUGH FLOW:
- VISIBL AIR BUBBLES IN RETURN LINE:
  - LOW IN SUCTION PLUMBING: REPLUMB PUMP BELOW WATER LEVEL.
  - CHECK TO SEE THAT VALVES ARE COMPLETED OPEN:
  - PARTIALLY CLOSED VALVES: OPEN VALVES.
  - CHECK FILTER PRESSURE GAUGE:
  - DIRTY IMPELLER OR FILTER: CLEAN FILTER OR IMPELLER.