**Description**

The Signet 2551 Magmeter is an insertion-style magnetic flow sensor. The patented sensor design is available in a variety of corrosion-resistant materials to provide long-term reliability and minimal maintenance costs. Wetted material combinations include PP/316 SS, PVDF/Hastelloy-C and PVDF/Titanium. The 2551 installs quickly and securely into a wide selection of flow fittings to deliver accurate flow measurement in pipe sizes ranging from DN15 to DN900 (½ in. to 36 in.).

Signet 2551 Magmeters are available with a frequency output or Digital (S3L) output for use with the Signet 5600 Batch Controller, 8900 Multi-Parameter Controller or 9900 Transmitter, or with a 4 to 20 mA output for a direct input to a PLC, SCADA or telemetry system.

All 2551 Magmeters feature empty pipe detection and LED-assisted diagnostics. The Signet 3-0250 USB to Digital (S3L) set-up tool is available to customize every performance feature in the 2551 to adapt it to the specific application requirements.

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**1. Quick Start Guide**

This manual contains the general installation, wiring and calibration data for the Signet 2551-XX-11 Magmeter with Frequency or Digital (S3L) data output, and for the Signet 2551-XX-12 Magmeter with 4 to 20 mA output. The basic steps are outlined on this page. See each referenced section for detailed information.

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1. **Configure the Hardware**

   **2551-XX-11 ONLY**: Position this Jumper to select Digital (S3L) output or Frequency output. Sec. 5 Pg. 4.

2. **Position the PIPE SIZE jumper** according to your pipe size. Sec. 5 Pg. 4.

3. **Install the Magmeter** into the pipe.

   Use Signet installation fittings ONLY. The installation fitting is critical to Magmeter performance. Sec. 3 Pg. 3.

4. **Connect POWER and OUTPUT wiring**.

   Frequency out: Sec. 8.1 Pg. 6.
   Digital (S3L) out: Sec. 8.2 Pg. 6.
   4 to 20 mA out: Sec. 7 Pg. 5.

**GROUNDING**

Without a good earth ground, the Magmeter may not operate efficiently. Sec. 6 Pg. 5.

5. **Route the wiring** out through the two cable ports.

   Use appropriate hardware to secure the 2551 from moisture intrusion. One Liquid Tight Connector is included. Sec. 5 Pg. 4.
2. Specifications

**General**
Pipe size range: DN15 to DN 900 (0.5 in. to 36 in.)

**Flow Range**
- Minimum: 0.05 m/s (0.15 ft/s)
- Maximum: 10 m/s (33 ft/s)

**Linearity:** ± 1% reading plus 0.01 m/s (0.033 ft/s)
**Repeatability:** ± 0.5% of reading @ 25 °C (77 °F)
**Min. Conductivity:** 20 μS/cm

**Wetted Materials:**
- Sensor body and Electrodes and Grounding ring:
  - P0, -P1, -P2: Polypropylene and 316L SS
  - -T0, -T1, -T2: PVDF and Titanium
  - -V0, -V1,-V2: PVDF and Hastelloy-C
- O-rings: FPM (standard); EPDM, FFPM (optional)

The user is responsible for determining the chemical suitability of these materials for a specific application.

**Electrical**

**Power Requirements**
- 4 to 20 mA: 21.6 to 26.4 VDC, 22.1 mA max.
- Frequency: 5 to 26.4 VDC, 15 mA max.
- Digital (S3L): 5 to 6.5 VDC, 15 mA max.

**Reverse polarity and short circuit protected**

**Current output (4 to 20 mA):**
- Loop Accuracy: 32 μA max. error (25 °C @ 24 VDC)
- Isolation: Low voltage < 48 VAC/DC from electrodes and auxiliary power
- Max cable: 300 m (1000 ft.)
- Error condition: 22.1 mA
- Max. Loop Resistance: 300 Ω
- Compatible with PLC, PC or similar equipment

**Frequency output:**
- Max. Pull-up Voltage: 30 VDC
- Compatible with Signet 5600, 8900, 9900

**Digital (S3L) Output:**
- Serial ASCII, TTL level 9600 bps
- Compatible with Signet 8900, 9900

**Environmental Requirements**
- Case: PBT
- Display: Polyamide

Storage Temperature: -20 to 70 °C (-4 to 158 °F)
Relative Humidity: 0 to 95% (non-condensing)

**Operating Temperature:**
- Ambient: -10 to 70 °C (14 to 158 °F)
- Media: 0 to 85 °C (32 to 185 °F)

Max. operating pressure:
- 10.3 bar @ 25 °C (150 psi @ 77 °F)
- 1.4 bar @ 85 °C (20 psi @ 185 °F)

**Standards and Approvals**
- CE, UL
- NEMA 4X / IP65 Enclosure (with cap installed)
- China RoHS

For more information go to www.gfsignet.com

**Declaration of Conformity according to FCC Part 15**
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and,
2. This device must accept any interference received, including interference that may cause undesired operation.

**Dimensions**

Pipe Range:
- 1/2 to 4 in. -X0 = 58 mm (2.3 in.)
- 5 to 8 in. -X1 = 91 mm (3.6 in.)
- 10 to 36 in. -X2 = 167 mm (6.6 in.)

**Operating Temperature/Pressure**

| °C | °F | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 0  |    | 14.7| 17.5| 20.4| 23.3| 26.2| 29.1| 32.0| 34.9| 37.8| 40.7| 43.6| 46.5| 49.4| 52.3| 55.2| 58.1| 61.0| 63.9| 66.8|
| -20| -4 | 29.4| 32.0| 34.6| 37.2| 39.8| 42.4| 45.0| 47.5| 50.1| 52.7| 55.3| 57.9| 60.5| 63.1| 65.7| 68.3| 70.9| 73.5| 76.1|
| -40| -40| -12.2| -9.4| -6.6| -3.8| -1.0| 0.8 | 4.0 | 7.2 | 10.4| 13.6| 16.8| 19.9| 23.1| 26.3| 29.5| 32.6| 35.8| 38.9| 42.1|

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**SAFETY INSTRUCTIONS**
1. Depressurize and vent system prior to installation or removal.
2. Confirm chemical compatibility before use.
3. Do not exceed maximum temperature/pressure specifications.
4. Wear safety goggles or face shield during installation/service.
5. Do not alter product construction.
6. Disconnect power before attempting any service or wiring.
3. Installation: Pipe fittings

Georg Fischer offers a wide selection of installation fittings that control the position of the Magmeter electrodes in relation to the dimensions of the pipe. You will find a complete list of order numbers for installation fittings in the Calibration Tables on pages 7-10.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic tees</td>
<td>• 0.5 to 2 inch versions</td>
</tr>
<tr>
<td></td>
<td>• MPVC or CPVC</td>
</tr>
<tr>
<td>PVC Glue-on Saddles</td>
<td>• Available in 10 and 12 inch sizes only</td>
</tr>
<tr>
<td></td>
<td>• Cut 2-1/2 inch hole in pipe</td>
</tr>
<tr>
<td></td>
<td>• Weld in place using solvent cement</td>
</tr>
<tr>
<td>PVC Clamp-on Saddles</td>
<td>• 2 to 4 inch, cut 1-7/16 inch hole in pipe</td>
</tr>
<tr>
<td></td>
<td>• 6 to 8 inch, cut 2-1/2 inch hole in pipe</td>
</tr>
<tr>
<td>Iron Strap-on saddles</td>
<td>• 2 to 4 inch, cut 1-7/16 inch hole in pipe</td>
</tr>
<tr>
<td></td>
<td>• Over 4 inch, cut 2-1/8 inch hole in pipe</td>
</tr>
<tr>
<td></td>
<td>• Special order 14 in. to 36 in.</td>
</tr>
<tr>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>Iron, Carbon Steel,</td>
<td>• 0.5 to 2 inch. versions</td>
</tr>
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<td>316 SS Threaded tees</td>
<td>• Mounts on threaded pipe ends</td>
</tr>
<tr>
<td>Carbon steel &amp;</td>
<td>• 2 to 4 inch, cut 1-7/16 inch hole in pipe</td>
</tr>
<tr>
<td>stainless steel</td>
<td>• Over 4 inch, cut 2-1/8 inch hole in pipe</td>
</tr>
<tr>
<td>Weld-on Weldolets</td>
<td>• 1.5 in. to 2 in. PVDF insert</td>
</tr>
</tbody>
</table>

4. Selecting a Location

• The 2551 requires a full pipe and a fully developed turbulent flow profile for accurate measurement.
• If the piping system harbors air pockets or bubbles, take steps to locate the sensor so the air pockets will not contact the electrodes.
• In vertical installations, assemble the 2551 so the conduit ports are facing downward. This prevents condensation inside the conduit from being directed into the 2551 electronics housing.
• Chemical injection systems can temporarily alter the fluid conductivity and cause anomalies in the magmeter measurement.

To avoid this problem, install the magmeter UPSTREAM of the injection point.

Select a location with sufficient distance of straight pipe immediately upstream of the sensor.

Locating the sensor in a trap or where the flow is upward helps to protect the sensor from exposure to air bubbles when the system is in operation.

These configurations are not recommended because it is difficult to keep the pipe full.

In a gravity-flow system, the tank must be designed so the level does not drop below the outlet.

This causes the pipe to draw air in from the tank. If air bubbles pass across the Magmeter electrodes, the output will become erratic.
5. Hardware Configuration

Whether using the 2551-XX-11 (with frequency or Digital (S^3L) output) or the 2551-XX-12 (with 4 to 20 mA output), the wiring terminals located on the inside of the yellow cover are identical. All of the connections from the Magmeter to external equipment (PLC, Datalogger, Chart Recorder, Flow meter, etc.) are made at the large 4-position terminal connector.

When the cover is removed the wiring from the sensor can be seen connected to the smaller terminal block. These connections should always remain connected to prevent inadvertent damage or miswiring.

The terminals on the 2551 Magmeter are designed for conductors from 16 AWG to 22 AWG.

**WARNING!**
If the second conduit port is used, carefully drill the opening. (The plastic is too strong to be punched out.)

- Secure the Magmeter in a vise to prevent damage or injury.
- The plastic inside the port is very thin. Do not allow the drill to penetrate too deeply and damage the Magmeter wiring.

**Important:**

- The directional arrow on the sensor body MUST be pointed DOWNSTREAM for correct operation. (Digital (S^3L) and 4 to 20 mA will not work if flow is against direction of arrow).
- The FLOW arrow decal can be placed directly on the pipe to identify the direction of flow.
- Use a cable gland or a liquid tight connector to seal the cable ports from water intrusion.
- The yellow housing may be reversed to align the conduit ports as required.
- If the Magmeter is installed on a vertical pipe, the conduit ports should be turned to point downward. This will prevent condensation from being channeled into the enclosure.
- Use plumber’s tape or a suitable sealant on cable ports.

### 3-9000.392-1 Liquid tight connector (one supplied)

![Sensor grounding ring](image)

**WARNING!**

Failure to follow these instructions may result in the sensor being ejected from the pipe!

- **DO NOT USE ANY TOOLS ON THE RETAINING CAP. HAND TIGHTEN ONLY.**
- **LUBRICATE O-RINGS WITH A NON-PETROLEUM BASED, VISCOUS LUBRICANT (GREASE) COMPATIBLE WITH THE SYSTEM.**
- **DO NOT USE THREAD SEALANT OR LUBRICANTS ON THE RETAINING CAP OR ON THE PLASTIC FITTING THREADS.**
- **IF LEAKING IS OBSERVED FROM THE RETAINING CAP, IT INDICATES DEFECTIVE OR WORN O-RINGS ON THE SENSOR. DO NOT ATTEMPT TO CORRECT BY FURTHER TIGHTENING.**

**CHEMICAL COMPATIBILITY WARNING**

The retaining nuts of Magmeters are not designed for prolonged contact with aggressive substances. Strong acids, caustic substances and solvents or their vapor may lead to failure of the retaining nut, ejection of the sensor and loss of the process fluid with possibly serious consequences, such as damage to equipment and serious personal injury. Retaining nuts that may have been in contact with such substances, e.g. due to leakage or spilling, must be replaced.

**Lubricate O-rings with a viscous non-petroleum based lubricant (grease) compatible with the system.**

**DO NOT USE thread sealant or lubricants on the fitting threads.**
6. General Installation and Grounding Tips

Sensor conditioning
The Magmeter output signal may be unstable immediately after installation. Allowing the sensor to soak in a full pipe (or in any container of water) for 24 hours will stabilize the performance.

- Very low conductivity fluids may require a longer conditioning period. (The Magmeter will not operate properly in fluids where the conductivity is less than 20 μS/cm.)

Grounding
The 2551 Magmeter is unaffected by moderate levels of electrical noise. However, in some applications it may be necessary to ground portions of the system to eliminate electrical interference. The grounding requirements will vary with each installation.

One or more of the following steps may be applied if the 2551 Magmeter is affected by electrical noise:

1. The ground terminal on the outside of the yellow housing is connected internally to the grounding ring at the tip of the sensor. Connect a wire (14 AWG/2.08 mm² recommended) from this terminal directly to a local Earth ground.

2. Install fluid grounding devices immediately upstream and downstream of the Magmeter. Connect the fluid grounds to the Earth ground terminal on the 2551. Use flanged grounding rings or metal electrodes on plastic pipes, or metal clamps on metal pipes. Fluid grounds must be in direct contact with the fluid, and as near to the Magmeter as possible.

3. The shield from the output cable must be terminated at the remote instrument ONLY. This shield must be connected at only one end!

4. Connect an additional wire (minimum AWG 14/2.08 mm²) from the remote instrument ground to the Magmeter ground terminal.

7. Wiring the 2551-XX-12 Magmeter with 4 to 20 mA Loop Output

The 2551-XX-12 Magmeter is a traditional 2-wire passive 4 to 20 mA loop transmitter.

- External loop power (24 VDC ± 10%) is required. See Ordering Information for power supplies.
- The maximum loop resistance the Magmeter can accommodate is 300 Ω.
- All 2551-XX-12 Magmeters are shipped from the factory with the 4 to 20 mA output scaled for 0 to 5 m/s (0 to 16.4 ft/s). If this operating range is suitable, no adjustments are necessary.
- The Calibration Tables on pages 7-10 list the 20 mA setpoint for each installation fitting. Use this information to program the 4 to 20 mA range of the loop device (PLC, Datalogger, recorder, etc.)
- The 3-0250 USB to Digital (S’L) Configuration/Diagnostic Tool is required to change the operating range.

The 2551 Magmeter

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop - (Ground)</td>
<td>4-20 mA Loop monitor (Maximum 300 Ω)</td>
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</tr>
<tr>
<td>Loop + (24 VDC)</td>
<td>24 VDC ± 10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do not terminate shield at Magmeter

Grounding rings on plastic pipe (Install between flanges) or metal straps on metal pipe
8. Wiring the 3-2551-11 with Frequency or Digital (S³L) output

8.1 Wiring: Frequency output (Compatible with all POWERED Signet Flow instruments.)

- When the blue jumper illustrated here is placed over both pins, the 2551-XX-11 outputs an open collector frequency signal that can be connected to any powered Signet flow meter (models 5600, 8900, 9900).
- 5 VDC power is provided to the 2551 Magmeter by all Signet flow instruments. No additional power is required.
- The frequency output will be displayed as positive flow regardless of the flow direction.

8.2 Wiring: S³L output (Compatible with 8900 Multi-Parameter Controller and 9900 Transmitter only)

- When the blue jumper illustrated here is removed (or placed over one pin for storage) the 2551-XX-11 outputs a Digital (S³L) signal compatible with the Signet 8900 and 9900.
- The 2551 receives 5 VDC power from the 8900 or 9900. No additional power is required.
- The 8900 will display 0 (Zero) flow rate during periods of reverse flow. The 9900 will display negative numbers to indicate reverse flow.
- The maximum cable length from the 2551 to the 8900 or 9900 depends on the 8900 or 9900 configuration. Refer to the 8900 or 9900 manual for complete information.

9. Calibration and Software Configuration

No calibration is necessary to begin using the 2551. The application and performance settings are pre-set to meet the requirements of most applications.

The 2551 application and performance settings can be customized using the Signet 3-0250 USB to Digital (S³L) Configuration/Diagnostic Tool and software. Refer to the Signet 3-0250 USB-to-S³L Configuration/Diagnostic Tool manual for details to adjust the following parameters:

- **4 to 20 mA span**: Factory setting is 0 to 5 m/s. Can be customized to any range.
- **Noise Rejection Filter**: Factory set for 60 Hz. Can be changed to 50 Hz.
- **Low Flow Cutoff**: Factory setting is 0.05 m/s. Can be customized to any velocity.
- **Averaging Time**: Factory setting is 14 seconds. Can be customized from 0.1 seconds to 100 seconds.
- **Sensitivity**: Factory setting is 25% of full scale. Can be customized to any % of full scale.
## 10. Calibration Data: K-factors and Full Scale Current Values

### Plastic Installation Fittings: PVC Tees and Saddles

<table>
<thead>
<tr>
<th>Pipe Size (In.)</th>
<th>Fitting Type</th>
<th>K-Factor Gallons</th>
<th>K-Factor Liters</th>
<th>20 mA= in GPM</th>
<th>20 mA= in LPM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCH 80 PVC-U TEES FOR SCH 80 PVC PIPE</strong></td>
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<tr>
<td>½ MPV8T005</td>
<td>2277.0</td>
<td>601.58</td>
<td>13.1</td>
<td>49.6</td>
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<tr>
<td>¾ MPV8T007</td>
<td>1407.6</td>
<td>371.90</td>
<td>20.97</td>
<td>79.38</td>
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<td>861.17</td>
<td>227.52</td>
<td>34.21</td>
<td>129.5</td>
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<td>50.96</td>
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</table>
### 10. Calibration Data: K-factors and Full Scale Current Values

#### Plastic Installation Fittings for Metric Pipes:
- Polypropylene True Union Tees and Wafers
- PVDF True Union Tees
- PVC True Union Tees

<table>
<thead>
<tr>
<th>Pipe Size (Metric)</th>
<th>Fitting Type</th>
<th>K-Factor Gallons</th>
<th>K-Factor Liters</th>
<th>20 mA= in GPM</th>
<th>20 mA= in LPM</th>
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10. Calibration Data: K-factors and Full Scale Current Values

Metal Installation Fittings:
Carbon Steel Tees and Weld-o-Lets
Stainless Steel Tees and Weld-o-Lets
Galvanized Iron Tees

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### Metal Installation Fittings

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### Metal Installation Fittings:

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<td>10</td>
<td>BR4B100</td>
<td>8.34</td>
<td>2.20</td>
<td>3597.17</td>
<td>13615.29</td>
</tr>
<tr>
<td>12</td>
<td>BR4B120</td>
<td>5.87</td>
<td>1.55</td>
<td>5109.58</td>
<td>19339.76</td>
</tr>
</tbody>
</table>
11. Maintenance

The 2551 Magmeter requires very little maintenance. There are no user-serviceable components in the Magmeter.

- If the fluid contains deposits and solids that may coat the electrodes, a regular cleaning schedule is recommended.
- Do not use abrasive materials on the metal electrodes. Clean with soft cloth and mild detergent only.
- Use a cotton swab and mild detergent to remove deposits on the metal electrodes at the tip of the sensor.

11.1 Environmental Recommendations:
- When used properly, this product presents no inherent danger to the environment.
- Please follow local ordinances when disposing of this or any product with electronic components.

11.2 Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output is erratic and unstable.</td>
<td>Magmeter installed too close to upstream obstruction.</td>
<td>Relocate the magmeter to have straight uninterrupted pipe upstream of the sensor for at least 10 x the pipe diameter.</td>
</tr>
<tr>
<td></td>
<td>Magmeter located in area exposed to air bubbles/pockets.</td>
<td>Eliminate air bubbles in the pipe.</td>
</tr>
<tr>
<td></td>
<td>Magmeter is installed in pipe backwards.</td>
<td>Remove the magmeter and reinstall with the flow direction arrow on the sensor body pointed DOWNSTREAM.</td>
</tr>
<tr>
<td></td>
<td>Electrical noise is interfering with the measurement.</td>
<td>Review the grounding of the magmeter and the pipe. Install adequate Earth ground to allow the Magmeter to operate properly.</td>
</tr>
<tr>
<td></td>
<td>Electrodes are coated with solids.</td>
<td>Carefully clean the electrodes. Refer to sensor manual for details.</td>
</tr>
<tr>
<td></td>
<td>New sensor; metal surface not properly conditioned.</td>
<td>Soak sensor overnight in fluid.</td>
</tr>
<tr>
<td>Output is not 0 when flow is stopped.</td>
<td>Electrodes not adequately conditioned.</td>
<td>Soak sensor overnight in fluid.</td>
</tr>
<tr>
<td></td>
<td>Vibration or other movement in pipe causes magmeter to detect flow.</td>
<td>Increase the Low Flow Cutoff.</td>
</tr>
<tr>
<td></td>
<td>Electrical noise interference.</td>
<td>Modify grounding to protect the Magmeter from interference.</td>
</tr>
<tr>
<td></td>
<td>Defective Magmeter.</td>
<td>Return to factory for service.</td>
</tr>
<tr>
<td>4-20 mA current output is incorrect.</td>
<td>Loop device not scaled same as Magmeter.</td>
<td>Use 3-0250 Setup tool to respan the Magmeter to match Loop device.</td>
</tr>
<tr>
<td></td>
<td>Range Jumper not placed correctly.</td>
<td>Set Range Jumper correctly.</td>
</tr>
<tr>
<td></td>
<td>Defective Magmeter.</td>
<td>Return to factory for service.</td>
</tr>
<tr>
<td>Frequency output is inoperative.</td>
<td>2551 is wrong model.</td>
<td>Frequency/S’3L model: 3-2551-11</td>
</tr>
<tr>
<td>Digital (S’3L) output is inoperative.</td>
<td>Blue jumper not in correct position.</td>
<td>Place blue jumper correctly. (Sec. 5 pg. 4)</td>
</tr>
<tr>
<td>Loop output is inoperative.</td>
<td>Wiring is not correct.</td>
<td>Check wiring, make corrections.</td>
</tr>
<tr>
<td>Output is 22.1 mA</td>
<td>Frequency input to other manufacturer’s flow instrument does not have pull-up resistor.</td>
<td>Install 10 KΩ resistor. (section 8.1, pg. 6)</td>
</tr>
</tbody>
</table>

11.3 Troubleshooting with the RED and BLUE LEDs

- Both Off: The power is off or the sensor is not connected.
- Solid Blue: The power is on, the pipe is full, but there is no flow in the pipe.
- Blinking Blue: Normal operation, blink rate is proportional to the flow rate.
- Alternating Red-Blue: Empty pipe indication (electrodes are not wet).
- Blinking Red: System errors (electrical noise interference).
- Solid Red: Instrument error (defective electronics component).

If the 2551 detects an empty pipe:
- Frequency output will be locked to 0 Hz if electrodes are not wet.
- Digital (S’3L) output will be locked to 0 if electrodes are not wet.
- 4 to 20 mA will be locked to 4 mA if electrodes are not wet.
- Blue and red LEDs will blink alternately if electrodes are not wet.

If the 2551 detects REVERSE FLOW:
- Frequency out cannot distinguish reverse flow from forward flow. The output will be the absolute value.
- With Digital (S’3L) output, reverse flow results in 0 flow rate displayed on 8900 or with negative numbers on the 9900.
- 4-20 mA output can be spanned into negative flow range using the 3-0250 USB Setup Tool and software. (See section 9) (example: 4-20 mA = –100 to +100 GPM).
### 12. Ordering Information

<table>
<thead>
<tr>
<th>Sensor Part No.</th>
<th>Sensor Body (Transducer) and electrodes/grounding ring materials - Choose one</th>
<th>Pipe size - Choose one</th>
<th>Display Options - Choose One</th>
<th>Output options - Choose One</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-2551</td>
<td>-P Polypropylene and 316L SS</td>
<td>0 DN15 to DN100 (½ to 4 in.)</td>
<td>-1 No Display</td>
<td>1 Frequency, Digital (S3L)</td>
</tr>
<tr>
<td></td>
<td>-T PVDF and Titanium</td>
<td>1 DN125 to DN200 (5 to 8 in.)</td>
<td></td>
<td>2 4 to 20 mA output</td>
</tr>
<tr>
<td></td>
<td>-V PVDF and Hastelloy C</td>
<td>2 DN250 to DN900 (10 to 36 in.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example Part Number:**

3-2551-P 0 -1 2

### Replacement Parts and Accessories

<table>
<thead>
<tr>
<th>Mfr. Part No.</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1220-0021</td>
<td>198 801 186</td>
<td>O-ring, FPM</td>
</tr>
<tr>
<td>1224-0021</td>
<td>198 820 006</td>
<td>O-ring, EPDM</td>
</tr>
<tr>
<td>1228-0021</td>
<td>198 820 007</td>
<td>O-ring, FFPM</td>
</tr>
<tr>
<td>3-2551-P0-11</td>
<td>159 001 105</td>
<td>Magmeter electronics, no display, frequency or Digital (S3L) output</td>
</tr>
<tr>
<td>3-2551-P0-12</td>
<td>159 001 110</td>
<td>PP/316L SS, DN15 to DN100 (½ to 4 in.) pipe</td>
</tr>
<tr>
<td>3-2551-P1-11</td>
<td>159 001 106</td>
<td>PP/316L SS, DN125 to DN200 (5 to 8 in.) pipe</td>
</tr>
<tr>
<td>3-2551-P1-12</td>
<td>159 001 111</td>
<td>PVDF/Titanium, DN15 to DN100 (½ to 4 in.) pipe</td>
</tr>
<tr>
<td>3-2551-P2-11</td>
<td>159 001 107</td>
<td>PVDF/Titanium, DN125 to DN200 (5 to 8 in.) pipe</td>
</tr>
<tr>
<td>3-2551-P2-12</td>
<td>159 001 112</td>
<td>PVDF/Titanium, DN250 to DN900 (10 to 36 in.) pipe</td>
</tr>
<tr>
<td>3-2551-T0-11</td>
<td>159 001 108</td>
<td>PVDF/Hastelloy-C, DN15 to DN100 (½ to 4 in.) pipe</td>
</tr>
<tr>
<td>3-2551-T0-12</td>
<td>159 001 113</td>
<td>PVDF/Hastelloy-C, DN125 to DN200 (5 to 8 in.) pipe</td>
</tr>
<tr>
<td>3-2551-T1-11</td>
<td>159 001 109</td>
<td>PVDF/Hastelloy-C, DN250 to DN900 (10 to 36 in.) pipe</td>
</tr>
<tr>
<td>3-2551-T1-12</td>
<td>159 001 114</td>
<td>PVDF/Hastelloy-C, DN250 to DN900 (10 to 36 in.) pipe</td>
</tr>
<tr>
<td>3-9000.391</td>
<td>159 001 703</td>
<td>Liquid-tight connector kit, 1 set, ½ in. NPT</td>
</tr>
<tr>
<td>3-8050.390-1</td>
<td>159 001 702</td>
<td>Retaining Nut Replacement Kit, NPT, Valox®</td>
</tr>
<tr>
<td>3-8050.390-3</td>
<td>159 310 116</td>
<td>Retaining Nut Replacement Kit, NPT, PP</td>
</tr>
<tr>
<td>3-8050.390-4</td>
<td>159 310 117</td>
<td>Retaining Nut Replacement Kit, NPT, PVDF</td>
</tr>
<tr>
<td>3-8050.391</td>
<td>159 001 703</td>
<td>Retaining Nut Replacement Kit, NPT, Stainless Steel</td>
</tr>
<tr>
<td>7300-7524</td>
<td>159 000 691</td>
<td>24 VDC Power Supply 7.5 W, 300 mA</td>
</tr>
<tr>
<td>7300-1524</td>
<td>159 000 688</td>
<td>24 VDC Power Supply 15 W, 600 mA</td>
</tr>
<tr>
<td>7300-3024</td>
<td>159 000 689</td>
<td>24 VDC Power Supply 30 W, 1.3 A</td>
</tr>
<tr>
<td>7300-5024</td>
<td>159 000 690</td>
<td>24 VDC Power Supply 50 W, 2.1 A</td>
</tr>
<tr>
<td>7300-1024</td>
<td>159 000 691</td>
<td>24 VDC Power Supply 100 W, 4.2 A</td>
</tr>
<tr>
<td>3-0250</td>
<td>159 001 538</td>
<td>USB to Digital (S3L) Configuration/Diagnostic Tool</td>
</tr>
<tr>
<td>3-8050.390-1</td>
<td>159 001 702</td>
<td>Retaining Nut Replacement Kit, NPT, Valox®</td>
</tr>
<tr>
<td>3-8050.390-3</td>
<td>159 310 116</td>
<td>Retaining Nut Replacement Kit, NPT, PP</td>
</tr>
<tr>
<td>3-8050.390-4</td>
<td>159 310 117</td>
<td>Retaining Nut Replacement Kit, NPT, PVDF</td>
</tr>
<tr>
<td>3-8050.391</td>
<td>159 001 703</td>
<td>Retaining Nut Replacement Kit, NPT, Stainless Steel</td>
</tr>
<tr>
<td>3-9000.392-1</td>
<td>159 000 839</td>
<td>Liquid-tight connector kit, 1 set, ½ in. NPT</td>
</tr>
</tbody>
</table>

+GF+
COMMERCIAL ACU DRIVE™ XS VARIABLE FREQUENCY DRIVE

Save Energy • Save Costs • Save Space • Save Time

INCREASED PUMP PERFORMANCE

The Acu Drive XS VF drive offers built-in intelligence for increased performance in all aquatic pump applications. Specified to save energy, space, costs and time, the Acu Drive XS VF drive is built to be the heart of the pump room. With minimal payback time due to energy savings, the Acu Drive XS VF drive is equipped with a feature that continuously displays the time remaining until the drive pays for itself. Built with powerful standard and optional features specifically designed for energy optimization, the Acu Drive XS VF drive is perfectly matched with the full line of pumps by Pentair Commercial Aquatics™.

STANDARD FEATURES

• High efficiency up to 98%
• Automatic energy optimization
• Built-in DC-link reactors for harmonic suppression—no need for external AC input line reactors
• Integrated disconnects and fusing
• Sensorless control
• Dry-pump and end-of-curve detection
• Two-step ramps (initial ramp)
• Real-time clock
• Overload trip protection
• Outdoor-rated enclosures
• One drive type for the full power range
• Single Phase input - Three Phase output; Three Phase input - Three Phase output drives available
• Extended warranties
The Acu Drive XS VF drive has a Local Control Panel (LCP) that was designed based on user feedback. With a well-structured menu system, the Acu Drive XS VF drive ensures fast commissioning and easy access to its many powerful functions.
The Acu Drive XS Variable Frequency drive helps maximize system reliability with built-in protection against:

- System overloads
- Motor failures
- Motor and drive overheating
- Voltage disturbances
- Power surges
- Loss of phase
- Phase-to-phase and phase-to-ground
- Short circuit
- Ground fault
- Switching on input/output
- Electrical disturbances
- Over voltage
- Over current
- Under voltage
- External fault
- Over temperature

Minimize motor noise and heating with ASFM

- With the Adjustable Switching Frequency Modulation (ASFM) function, the switching frequency is adjusted automatically in relation to the speed of the motor. As speed is reduced, the switching frequency increases to ensure optimally low noise and reduce motor heating
- Input-line protection from extreme running conditions

Short circuit

- The Acu Drive XS VF drive is protected against short circuits by measuring the current in each of the three motor phases. A short circuit between two output phases will shut down the drive as soon as the current exceeds the maximum value

Line disturbances and transients

- To protect itself from AC line voltage disturbances, the drive monitors all three phases and interrupts drive operation in the event of phase loss or imbalance

Voltage sags and surges

- The Acu Drive XS VF drive is designed for a wide range of operating conditions. The 480-volt drive will operate from 342–528VAC. The 230-volt drives will operate on 180–264VAC

Maximum protection features

- Output protection for longer motor life
- Acu Drive XS VF drive incorporates both DC-link reactors and motor output protection as standard design features

Thermal protection for the drive and motor

- The Electronic Thermal Relay (ETR) is an open loop method built into the Acu Drive XS VF drive software to guard against motor overheating, requiring no additional sensors or wiring
- This function is UL recognized (Class 20) as an effective guard against motor thermal overload

The Acu Drive XS VF drive has built-in thermal protection and also accepts thermistor signal input from the motor to create closed-loop thermal protection for the entire system.

Initial final ramp

Initial ramp provides rapid acceleration of pumps to a desired minimum speed, at which time the normal ramp takes over. This prevents damage to thrust bearings and overheating of the pump.

The final ramp decelerates pumps to avoid unintended closure of check values and water hammer.
**COMMERCIAL ACU DRIVE™ XS VARIABLE FREQUENCY DRIVE**

**Acu Drive XS VF drive specifications**

- **General:** Furnish complete Acu Drive XS VFD as specified herein or in the equipment schedule for loads designated to be variable speed.
  - VF drives shall be user-selectable for either constant or variable torque loads.
  - The VFD shall convert incoming fixed frequency three-phase AC power into a variable frequency and voltage for controlling the speed of three-phase AC induction motors.
  - The VFD shall be a six-pulse input design, and the input voltage rectifier shall employ a full-wave diode bridge; VFDs utilizing controlled SCR rectifiers shall not be acceptable.
  - The output waveform shall closely approximate a sine wave.
  - The VFD shall be of a PWM output design utilizing current IGBT inverter technology and voltage vector control of the output PWM waveform.
  - The VFD will produce an output waveform capable of handling maximum motor cable distances of up to 1,000 ft. (unshielded) without tripping or derating.
  - The VFDs shall be user-selectable for either constant or variable torque loads.
  - The VFD shall operate at a lower temperature rise, extending its thermal life.
  - The VFD selected must be able to source the motor's full load nameplate amperage (fundamental RMS) on a continuous basis and be capable of running the motor at its nameplate RPM, voltage, current and slip without having to utilize the service factor of the motor. The VFD shall offer a programmable motor parameter that allows the total number of poles of a motor to be programmed to optimize motor performance.
  - The VFD shall automatically boost the power factor at lower speeds. The VFD will be capable of running either variable or constant torque loads. In either CT or VI mode, the VFD shall be able to provide its full rated output current continuously and 110% of rated current for 60 seconds. An Automatic Energy Optimization (AEO) selection feature shall be provided in the VFD to minimize energy consumption in variable torque applications.
  - The VFD shall offer a motor spinning test that will run the motor at 5 Hz until the OK button is pressed to allow the user to determine if the motor is running in the correct direction. Switching of the input power to the VFD shall be possible without interlocks or damage to the VFD at a minimum interval of two minutes. Switching of power on the output side between the VFD and the motor shall be possible with no limitation or damage to the VFD and shall require no additional interlocks.
  - The VFD shall have temperature-controlled cooling fans for quiet operation, minimized internal losses and greatly increased fan life. The VFD shall provide full torque to the motor, given input voltage fluctuations of up to +10% to -15% of the rated input voltage.
  - Harmonics: The VFD shall be provided with line-side harmonic reduction, as required, to ensure that the current distortion limits, as defined in Table 10.3 of IEEE 519-1992, are met. Harmonic solutions shall be designed to withstand up to 2% line imbalances with the maximum Current Distortion not to exceed 11% at 100% load. Harmonic solutions shall be capable of withstanding up to 2% ambient voltage distortion with the maximum Current Distortion not to exceed 12% at 100% load.
  - Protective Features: The VFD shall have input surge protection utilizing MOVs, spark gaps and Zener diodes to withstand surges of 2.3 times line voltage for 1.3 msc. The VFD shall include circuitry to detect phase imbalance and phase loss on the input side of the VFD. End-of-Pump curve detection shall stop motor when the pump is operating outside of its programmed pump curve. The VFD shall provide flow compensation to reduce energy by adjusting the setpoint to match changes in flow (friction loss). The VFD shall include current sensors on all three-output phases to detect and report phase loss to the motor.
  - Interface Features: The VFD shall provide an alphanumeric backlit display keypad (LCD), which may be remotely mounted using a standard nine-pin cable. The VFD may be operated with the keypad disconnected or removed entirely. The keypad may be disconnected during normal operation without the need to stop the motor or disconnect power to the VFD. The VFD keypad shall offer an INFO key that, when pressed, shall offer the contents of the programming manual for the feature that is currently in the display. The VFD display shall have the ability to display five different parameters about the VFD or load including: current, speed, DC bus voltage, output voltage, input signal in mA or other values from a list of 92 different parameters. A red FAULT light, a yellow WARNING light and a green POWER-ON light shall be provided. These indications shall be visible both on the keypad and on the VFD when the keypad is removed.
  - Two-level password protection shall be provided to prevent unauthorized changes to the programming of the VFD. The VFD shall offer as standard an internal clock. The internal clock can be used for: timed actions, energy meter, trend analysis, date/time stamps on alarms, logged data, preventive maintenance or other uses. There shall be six fully programmable digital inputs for interfacing with the system’s external control and safety interlock circuitry. Two of these inputs shall be programmable as inputs or outputs. The VFD shall have two analog signal inputs: inputs shall be programmable for either 0–10V or 4–20 mA. The run permissive circuit shall also be capable of sending an output signal as a start command to activate external equipment before allowing the VFD to start. The VFD shall be equipped with a standard RS-485 serial communications port and front-of-drive accessible USB port.
  - Adjustments: The VFD shall have an adjustable output switching frequency. The VFD shall have four programmable “skip frequencies” with adjustable bandwidths to prevent the driven equipment from running at a mechanically resonant frequency. The VFD shall include an automatic acceleration and deceleration ramp-time function to prevent nuisance tripping and simplify start-up. The VFD will include a user selectable Reset function, which enables the selection of between 0 and 20 restart attempts after any self-clearing fault condition (undervoltage, overvoltage, current limit, inverter overload and motor overload) or the selection of an infinite number of attempts. The time between attempts shall be adjustable from 0 through 600 seconds. An automatic “on delay” function may be selected from 0 to 120 seconds. The VFD will include a user-selectable Auto-Reset function that enables the VFD to power up in a running condition after a power loss to prevent the need to manually reset and restart the VFD. The VFD shall catch a rotating motor operating either in forward or reverse at up to full speed. The VFD and all required options will be incorporated by the VFD manufacturer into an integrated package, with a single input feed and main disconnect. All enclosures shall be UL listed, and assembled by the VFD manufacturer in an ESO 9001 registered facility. The VFD shall offer the ability to have back-up 24 VDC power to keep control logic powered in the event of a power failure.
  - Service Conditions: Ambient Temperature of the VFD: -10 to 45°C (14 to 113°F) 0 to 95% relative humidity, noncondensing. Elevation to 1,000 meters (3,300 feet) without derating. VF drives shall be rated for line voltage of 225 to 690VAC, 380 to 480VAC or 200 to 240VAC, with +10% to -15% variations. Line frequency variation of ±2% shall be acceptable. No side clearance shall be required for cooling of the units.

**EXECUTION: Submittals:** This specifications lists the minimum VFD performance requirements for this project. Each supplier shall list any exceptions to the specification. If no departures from the specification are identified, the supplier shall be bound by the specification.

- All products shall be CE marked, UL labeled and meet the requirements of UL-508C. To ensure quality and minimize installation failures on the job site, all VFIs shall be completely tested by the manufacturer. The VFD shall operate a dynamometer at full load and speed under elevated temperature conditions. All optional features shall be functionally tested at the factory for proper operation. Factory test documentation shall be available upon request.

- Examination: Contractor to verify that job site conditions for installation meet factory-recommended and code-required conditions for VFD installation prior to start-up, including clearance spacing, temperature, contamination, dust and moisture of the environment. Separate conduit installation of the motor wiring, power wiring and control wiring and installation per the manufacturer’s recommendations shall be verified. The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD shall not be operated while the unit is covered.

- Start-up and Warranty: A factory-authorized service technician shall perform start-up on each drive purchased from supplier. (“Start-up” shall not include installation or termination of either power or control wiring.) The service technician shall perform start-up on up to eight drives per day. Start-up costs provided with the bid shall include time and travel for the estimated number of visits required but shall not be less than at least one half-day with travel. Upon completion, a start-up service report shall be provided. A one-year, on-site warranty shall be provided such that the owner is not responsible for any warranty costs including travel, labor, parts or other costs for a full one-year from the date of installation. An additional warranty of up to six years is offered as an option. The cost of the warranty shall be included in the bid. Technical questions regarding drive installation and functions may be answered by contacting Pentair Technical Support at 800-831-7133, option 2.

- Complete specifications available on request.
SECTION - SWIMMING POOL WATER CHEMISTRY CONTROL

1.01 SUMMARY

A. A PROGRAMMABLE CHEMICAL AUTOMATION SYSTEM shall be supplied for continuous monitoring of water chemistry (ORP, PPM, pH and Temperature), Langelier Saturation Index and temperature and for automatic control of the chemical feeders and heater. The controller shall include a programmable microprocessor with an eight (8)-line display screen and a sixteen (16)-key keyboard for operator access.

B. The system shall be a CHEMTROL® PC2100 PROGRAMMABLE CONTROLLER of current design and model manufactured by SANTA BARBARA CONTROL SYSTEMS of Santa Barbara, California or a technically equal system certified by the specifying agent as capable of providing equal performance for all operating functions.

C. Exceptions to the specifications shall be described in detail together with a list of ten (10) similar operating systems of same model and manufacture, with the name, address and telephone number of operating personnel.

1.02 SPECIFICATIONS

A. WATER CHEMISTRY CONTROL

1. The controller shall automatically activate the appropriate chemical feeders in order to maintain the sanitizer level within +/-0.1 parts per million (PPM) or +/-10 mV (millivolts) of Oxidation-Reduction Potential (ORP) and the pH within +/- 0.1 pH unit of the setpoints selected by the operator. ORP and Sanitizer functions shall include seven-day, level-based chemical saver programs. All setpoint and calibration levels shall be adjustable with a numeric keypad mounted on the front panel of the unit. Controllers with internal switches or calibration adjustments will not be considered equal.

2. The controller shall be capable of actuating all outputs in the following operator-selectable modes: off, manual, automatic and timer cycle. In the automatic mode, the operator shall be able to choose between on/off control with adjustable deadband or proportional feed control with adjustable deadband and progressive control zones.

3. The controller shall include a programmable seven-day shock program with operator selectable ON and OFF times for each day of the week and optional separate chemical feeder relay control.

4. The controller shall include automatic control of a chemical feeder for Automated Chloramine Treatment (A.C.T.).

5. The controller shall have the capability to operate an Ozone generator utilizing an internal spare relay with high ORP lockout.

6. The controller shall continuously calculate and display the Langelier Saturation Index using either sensor data and/or manual input for pH, temperature, total alkalinity and calcium hardness. The resulting calculated water condition shall be displayed on the main screen as either "Scaling", "Corrosive" or "OK".

7. The controller shall be contained in a NEMA Type 4X (rain and splash proof) lockable fiberglass cabinet with an LCD graphic display screen of eight (8) lines of twenty-two (22) alphanumeric characters. The main screen shall display current readings, control modes and operational status for ORP, pH, (PPM, temperature, TDS and flow rate available.) A 16-key touch pad shall be provided for direct access to all the menus and submenus and for entering numerical data. Controllers with smaller displays or displays that require scrolling through menus will not be considered equal. All screens shall have the capability of being displayed at any time in unabbreviated English, French or Spanish and in US / metric units.

8. The controller shall include a safety flow switch to de-energize relay outputs in case of a loss of flow.

9. The controller shall be factory set to water treatment industry standards. The operator shall be able at any time to adjust all programmable functions to preferred settings. The controller shall have a reset mode to reset all or selected functions to the original factory standards.

10. The controller shall have the capability to calibrate all sensor inputs, depending on the accuracy needed, using 1-, 2-, or 3-point calibration to determine respectively the origin, slope and curvature of the calibration curve.

11. The controller shall include programmable high and low alarm levels for all control functions with operator-selectable feed lockout and alarm buzzer options. A Remote Alarm relay shall be included in parallel with alarm buzzer for operator-selectable voltage or dry contact output.
12. The controller shall record and display the elapsed run time for each activation event and a cumulative run time resettable at any time by the operator. The controller shall provide for operator-adjustable event run time limits and total run time alarms for all control functions.

13. The controller shall include a memory storage battery with minimum reserve power for six (6) months.

14. The controller shall include an on-board memory chip for storing of test data on operator-selectable schedules. USB communications port shall be included for on-site downloading of the test data. Test data storage must consist of the following sensor inputs: ORP, pH (PPM, TDS, Temperature and Main flow rate available with optional sensors). The controller shall insert a test data every time power is turned on to indicate power failures. Controllers failing to data log all listed parameters will not be considered equal.

15. The controller shall include an on-screen visual display of all test data logged in memory. Controllers that require the use of external accessories or equipment, such as portable computers or remote access computers, to retrieve or display test data shall not be considered equal.

B. OPTIONS

1. OPTION PPM010: A solid-state PPM SENSOR with a selective membrane shall monitor and display the Free Chlorine concentration in water in ppm or mg/l and shall be used to control the chlorine feed device. The sensor readings must be accurate to 0.01 PPM and be compatible with CYA levels in excess of 20 PPM. PPM values derived from ORP sensor readings shall not be acceptable. The PPM sensor shall not require the use of chemical reagents and/or of a special flow cell for water flow and pressure regulation.

2. OPTION TEMP2: The controller shall include an electronic temperature sensor to monitor and display the water temperature in degrees Fahrenheit or Celsius with adjustable high and low alarms. The controller shall include automatic control of the heater with a seven-day energy saver program.

3. OPTION TDS2: The controller shall include a conductivity/temperature sensor for display of TDS in parts per millions or conductivity in microSiemens/cm. It shall automatically control a water dump valve for automatic purging of saturated water, or injection of a saline solution in for use with salt chlorine generator. The controller shall also monitor and display the water temperature in degrees Fahrenheit or Celsius with adjustable high and low alarms.

4. OPTION FLOW2: The controller shall include an electronic water flow meter for monitoring and displaying the main line water flow and cumulative flow. The operator shall be able to calibrate the flow sensor by entering its K-factor. The controller shall also include a programmable low flow alarm with operator selectable pump lockout and alarm buzzer options.

5. OPTION FCA: The ORP and pH shall be mounted in a see-through flow cell with a clear cover. Optional Temperature and TDS sensors will be mounted on corner Tee inline with see-through flow cell.

6. OPTION SCA: The ORP and pH sensors shall be mounted in a see-through flow cell with a clear cover located inside a lockable fiberglass enclosure with a window. Optional Temperature and TDS sensors will be mounted on corner Tee inline with flow cell.

7. OPTION REM2: The controller shall include a modem for remote operation by PC-compatible computer. A Windows software program shall be supplied with true duplex operation capability representing the actual controller screen display with automatic downloading and visual graphics representation of test data. Controllers using simulation or virtual representation of the display screen shall not be considered equal.

8. OPTION ETHCOM2: The controller shall include an Ethernet / Internet modem for remote operation by PC-compatible computer using Ethernet / Internet network communication. A Windows-based software program shall be supplied with true duplex operation capability representing the actual controller screen display with automatic downloading and visual graphics representation of test data. Controllers using simulation or virtual representation of the display screen shall not be considered equal.

9. OPTION WIRELESS: The controller shall be capable of communication using wireless technology via Wi-Fi, spread spectrum (900MHz) or broadband cellular for remote access and control.

10. OPTION RS485: The controller shall include a communication converter and RS485-based multiplex communication for remote operation by PC-compatible computer linked directly to the controller. A Windows-based software program shall be supplied with true duplex operation capability representing the actual controller screen display with automatic downloading and visual graphics representation of test data. Controllers using simulation or virtual representation of the display screen shall not be considered equal.
10. **OPTION MULTI2:** The controller shall include RS485-based multiplex communication for networking with up to thirty (30) controllers and remote operation through a host controller using options REM, ETHCOM or RS485.

11. **OPTION MODBUS2:** The controller shall include software-based conversion of sensor signals, setpoint, high & low alarms, cumulative run time and total feed time for ORP, pH, PPM, Temperature, TDS, and Flow available with optional sensors, into MODBUS protocol for monitoring on Building Management Systems. The controller shall also allow MODBUS writing for changing control modes and setpoints from Building Management Systems. (Other Protocol options are Lonworks, Bacnet/MSTP, Bacnet/IP, TCP/IP, N2 Bus.)

12. **OPTION 4-20mA:** A six (6)-channel converter board shall be provided to convert the sensor digital signals for ORP, pH, PPM, Temperature or (TDS) and Main Flow into analog 4-20 mA signals for monitoring on Building Management Systems.

C. **WARRANTY**

1. The controller shall be covered by a standard manufacturer warranty of five (5) years. Special extensions of more limited warranties shall not be considered acceptable. All sensors will be covered by a standard one (1) year warranty. Other parts shall be covered by their own manufacturer’s warranty. The controller shall not require a service technician for annual calibration, seasonal start up, or whenever chemicals supplier or type are changed.

2. The manufacturer shall supply a complete instruction, operating and maintenance manual. Check-out of installation, start up, and instruction of operating personnel shall be performed by an authorized and properly trained manufacturer representative.

CHEMTROL_PC2100_spec – 03/2011
The ProMinent® Concept Plus series covers a capacity range of **0.16 to 3.17 GPH (0.6 to 13.5 LPH)** at pressures up to **232 psi (16 bar)**.

Its compact construction and features make it ideal for use in flow proportional or on/off control applications. The Concept Plus mounts easily onto a tank or wall bracket. Adjustment of the pump capacity is via the stroke length in the range of 10-100 % or can be set at 1 of the 4 stroke frequency settings. This gives an adjustment ratio of 40:1.

**Features & Benefits**
- NSF 61/50 approvals
- Low cost opens up opportunities in the most basic applications
- PVDF wetted ends eliminate compatibility concerns
- Integral bleed valve prevents “loss of prime”
- Lowest maintenance costs in its class
- External control via dry contact pulse (1:1)
- Wetted end materials: PP, Acrylic/PVC or PVDF

**Applications**
- Swimming pools
- Spas, fountains and spray pads
- Cooling towers
- Boiler feed applications
- General Chlorination
- Municipal and industrial wastewater
- Water disinfection
- Biocide feed
- “Pump on a drum” applications
Technical data

Capacity Data

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>Capacity at Maximum Back Pressure</th>
<th>mL/stroke</th>
<th>Max. Stroking Rate</th>
<th>Pre-Primed Suction Lift</th>
<th>Tubing Connectors</th>
<th>Shipping Weight (approx.)</th>
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<tr>
<td></td>
<td>psig (bar)</td>
<td>GPH (L/h)</td>
<td>spm</td>
<td>ft. (m)</td>
<td>(in.)</td>
<td>lbs. (kg)</td>
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<tr>
<td>CNPa 1000</td>
<td>145 (10)</td>
<td>0.16 (0.6)</td>
<td>0.07</td>
<td>180</td>
<td>20 (6)</td>
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<tr>
<td>1001</td>
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<td>0.26 (1.0)</td>
<td>0.10</td>
<td>240</td>
<td>20 (6)</td>
<td>1/4&quot; x 3/16&quot;</td>
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<tr>
<td>1002</td>
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<td>0.53 (2.0)</td>
<td>0.19</td>
<td>180</td>
<td>16 (5)</td>
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<tr>
<td>1003</td>
<td>145 (10)</td>
<td>0.71 (2.7)</td>
<td>0.19</td>
<td>240</td>
<td>16 (5)</td>
<td>1/4&quot; x 3/16&quot;</td>
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<tr>
<td>0704</td>
<td>102 (7)</td>
<td>1.17 (4.4)</td>
<td>0.41</td>
<td>180</td>
<td>13 (4)</td>
<td>1/4&quot; x 3/16&quot;</td>
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<tr>
<td>0705</td>
<td>101 (7)</td>
<td>1.37 (5.2)</td>
<td>0.38</td>
<td>240</td>
<td>13 (4)</td>
<td>1/4&quot; x 3/16&quot;</td>
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<tr>
<td>0308</td>
<td>43.5 (3)</td>
<td>3.9 (8.0)</td>
<td>0.79</td>
<td>180</td>
<td>13 (4)</td>
<td>3/8&quot; x 1/4&quot;</td>
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<tr>
<td>0215</td>
<td>29 (1.5)</td>
<td>3.17 (13.5)</td>
<td>1.40</td>
<td>180</td>
<td>5 (1.5)</td>
<td>3/8&quot; x 1/4&quot;</td>
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External pulse contact retrofit available as an option (P/N 1022000)

Identity code pump configuration

<table>
<thead>
<tr>
<th>CNPa</th>
<th>Concept PLUS</th>
<th>Version</th>
<th>Capacity</th>
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</thead>
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<tr>
<td>1000</td>
<td>0.16 gph (0.6 l/h), 145 psi (10 bar)</td>
<td>0704</td>
<td>1.17 gph (4.4 l/h), 102 psi (7 bar)</td>
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<td>1601</td>
<td>0.26 gph (1.0 l/h), 232 psi (16 bar)</td>
<td>0705</td>
<td>1.37 gph (5.2 l/h), 101 psi (7 bar)</td>
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<td>1002</td>
<td>0.53 gph (2.0 l/h), 145 psi (10 bar)</td>
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<td>2.10 gph (8.0 l/h), 43.5 psi (3 bar)</td>
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<tr>
<td>1003</td>
<td>0.71 gph (2.7 l/h), 145 psi (10 bar)</td>
<td>0215</td>
<td>3.17 gph (12 l/h), 29 psi (2 bar)</td>
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</table>

Liquid end material:
- PP: Polypropylene
- NP: Acryllic/PVC
- PV: PVDF

O-rings:
- E: EPDM/PTFE coated, only for PP and NP self-degassing
- B: FPM-B/PTFE coated, only on PP and NP self-degassing
- T: PTFE/PTFE coated

Liquid end version:
- 0: Non-bleed version, no valve spring
- 1: Non-bleed version, with valve spring
- 2: With bleed valve, no valve spring (except 0704 models)
- 3: With bleed valve, with valve spring

Connection:
- 0: Standard according to technical data
- B: Special connection 3/8" x 1/4"

Logo:
- 0: With ProMinent® logo
- 2: Without ProMinent® logo

Power Supply:
- A: 1 ph 230 V 50/60 Hz (Euro plug)
- D: 1 ph 115 V 50/60 Hz (US plug)
- U: 1 ph 230 V 50/60 Hz (US plug) (consult factory for pricing)

Control Option:
- 0: Standard (w/o external control)
- B: Pulse control

Accessories:
- 1: With accessories (foot valve, injection valve, tubing)

Approval:
- 0: CSA
Introducing the most efficient, gas-fired pool heater available!

The new ETi 400 pool heater brings you TitanTough™, Direct-Fire Titanium Heat Exchanger, the toughest ever built. It’s the first exchanger in the industry with titanium ASME-certified construction. And it’s designed to stand up to the harshest water conditions, too! With 96% thermal efficiency, the highest of any pool heater, customers can heat their pool for less and reduce emissions.
ETi™ 400 High Efficiency Gas Heater features include:

- TitanTough™ Heat Exchanger - ASME certified
- Ultra-high thermal efficiency, meaning fast heat-up times at lower energy costs
- Category IV Direct Vent with up to 120 ft length PVC vent capabilities
- Premixed air-fuel mixture technology (PMG) reduces soot and maintenance
- Control panel can be rotated 180 degrees to accommodate left or right water plumbing configurations
- Front or rear gas plumbing connection
- Suitable for high altitude installations
- Ultra quiet operation
- Indoor and outdoor rated

Ordering Information

ETi 400 High Efficiency Gas Heater:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Weight</th>
<th>Dimensions</th>
<th>UPC Number</th>
<th>PIP Program</th>
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<tbody>
<tr>
<td>461113</td>
<td>ETi 400 High Efficiency Gas Heater</td>
<td>379 lbs</td>
<td>39.9” L x 30” W x 45.7” H</td>
<td>788379877248</td>
<td>$50.00 $75.00</td>
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Accessories, Sold Separately:

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<th>Description</th>
<th>Weight</th>
<th>Dimensions</th>
<th>UPC Number</th>
<th>PIP Program</th>
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<tr>
<td>475971</td>
<td>Indoor Direct Air Intake Kit</td>
<td>5 lbs</td>
<td>27.5” L x 10” W x 5.2” H</td>
<td>788379877262</td>
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<tr>
<td>475612</td>
<td>Condensate Neutralizer Kit</td>
<td>8 lbs</td>
<td>26.26” L x 9.13” W x 4” H</td>
<td>788379877255</td>
<td>N/A N/A</td>
</tr>
</tbody>
</table>

To order literature:

w pentairpartners.com  
e pool.literature@pentair.com  
p 1.800.693.0171  
f 1.866.741.4051

Sales Support Literature

ETi 400 High Efficiency Gas Heater literature can be ordered by referencing Part # P1-793.
IntelliComm® II
Interface Adapter
(For use with IntelliFlo® and IntelliPro® pumps)

Installation and User’s Guide

IMPORTANT SAFETY INSTRUCTIONS
READ AND FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS
**Important Notice: Attention Installer:** This manual contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this product. **READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL.**

**WARNING** Before installing the IntelliComm® II Interface adapter, read and follow all warning notices and instructions which are included. Failure to follow safety warnings and instructions can result in severe injury, death, or property damage. Call (800) 831-7133 for additional free copies of these instructions.

**DANGER** Risk of electrical shock or electrocution:
The IntelliComm II Interface adapter must be installed by a qualified electrician, according to the National Electrical Code (including article 680-22) or Canadian Electrical Code (including section 68) and local codes and ordinances. The electrician should also consult the local building department regarding local codes.

Improper installation will create an electrical hazard which could result in death or serious injury to pool users, installers, or others due to electrical shock, and may also cause damage to property.

**Always disconnect power to the pool pump at the circuit breaker before servicing the pump.** Failure to do so could result in death or serious injury to serviceman, pool users or others due to electric shock.

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- Connecting to IntelliComm II Input Program Terminals .................................... 2
- Connecting Power to IntelliComm II ................................................................. 2
- Connecting IntelliComm II to IntelliFlo .............................................................. 3
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**Technical Support:** (800) 831-7133

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10951 West Los Angeles Ave., Moorpark, CA 93021 • (805) 553-5000 • (800) 831-7133

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P/N 521033 - Rev C - 10/16/09
IntelliComm® II interface adapter kit contents

- IntelliComm II Interface Adapter
- Two mounting screws
- Mounting tape
- One Terminal Connector (RS-485 and IntelliComm II power connection)
- Compool RJ12 Adapter
- Four AUX cables (22 AWG)
- Installation and User's Guide (this manual)

IntelliComm II interface adapter overview

The IntelliComm II interface adapter provides automatic control of IntelliFlo®, IntelliFlo VS and IntelliPro® pumps. IntelliComm II is compatible with IntelliTouch®, EasyTouch®, SunTouch®, Compool®, Hayward®, Jandy® and Polaris® EOS control systems. The IntelliComm II Interface adapter provides:

Four input (9-24V DC/AC) program terminals (GPM/RPM 1, 2, 3, and 4) for connection to any available auxiliary relay, valve actuator or controlled output circuit on the automation control system circuit board. Typically, GPM/RPM 1 connects to the output Filter Pump relay terminal plug. You can also connect to the spa, pool electric heater, solar or 2-speed pump output circuit. Each of the four inputs can be used to control the IntelliFlo pump's speed or flow. **Note:** If more than one terminal input is active, the highest input number (GPM/RPM 4) will take priority regardless of the pump setting.

A four screw terminal connector for connection to the RS-485 IntelliFlo communication cable and power source (9-24V DC) from the automation control system circuit board.

**Note:** The IntelliComm II Interface adapter will always use ADDRESS 1 to communicate with the IntelliFlo pump.

**Note:** The IntelliComm II Interface adapter can be used with IntelliTouch®, EasyTouch® and SunTouch® systems, when additional pumps are required beyond the normal system capacity.

**Safety Devices:** All required safety devices, such as the IntelliFlo VS+ SVRS (Safety Vacuum Release System) pump, are unaffected when using the IntelliComm II.

Selecting Flow Rates (GPM) for IntelliFlo VF

The IntelliFlo VF pump can be selected to run at a specific US gallons per minute (GPM), for each external control input:

- **IntelliFlo VF:** 15 - 130 GPM

Selecting Pump Speeds (RPM) for IntelliFlo VS+ SVRS and IntelliPro VS3050

The IntelliFlo VS+ SVRS, IntelliFlo VS 3050 and IntelliPro VS 3050 pump can be selected to run at a specific speed (RPM), for each external control input:

- **IntelliFlo VS+ SVRS:** 1100 - 3450 RPM
- **IntelliFlo VS 3050:** 400 - 3450 RPM
- **IntelliPro VS 3050:** 400 - 3450 RPM
IntelliComm II Interface Adapter Connections

Screw terminal: Connects to the pump via a two pin 50 ft. communication cable (P/N 350122) provided with the pump. Also connects to a 9-24VDC, 200mA power source (automation control system circuit board)

Four (9 - 24V DC/AC) input terminals (GPM / RPM 1, 2, 3, 4):
Each input terminal connects to an output relay or valve terminal on the automation control system circuit board via a two-pin AUX cable.

LED on when power (9-24V DC) is received from automation system.

Connecting to IntelliComm II Input Program Terminals
There are four (two-wire) cables provided in kit for interface connections from the automation control system circuit board, to the four IntelliComm II program (GPM / RPM) input terminal (see page 3). The input terminal cable wires are not polarized. Plugs/wires can be connected in any order.

Connecting IntelliComm II to a Valve Actuator
A Valve Actuator can be connected from the automation control system circuit board to any one of the IntelliComm II input terminals (1-4) by splicing into the valve actuator cable using the provided two-wire input terminal cable (see page 3).

Connecting Power (9-24 VDC) to IntelliComm II
Power to the IntelliComm II requires a 9-24VDC, 200mA power source, which can be supplied from the automation control system circuit board or an AC to DC power adapter. For VDC power connection on Compool, Jandy and Hayward control systems, see pages 4 - 13.

IntelliFlo pump AC connection
If multiple pump speeds are required, the IntelliFlo pump must be wired to a circuit breaker not to a relay.

Note: If the IntelliFlo pump is used in a commercial application or connected to an Emergency Shut-Off switch, the pump must be connected to a relay for proper Emergency Shut-Off operation.

Salt Chlorine System Connections
All Salt Chlorine Generator (SCG) units must be connected to the Filter Pump relay output. If the Filter Pump relay output is being used for the IntelliComm II, then a RYALX can be used if a SCG is present in the system. For more information about using the RYALX see page 7.
Connecting IntelliComm II to IntelliFlo

Connection from IntelliComm II to an IntelliFlo VF or IntelliFlo VS pump is via a 50 ft. RS-485 communication cable (P/N 350122), which is provided with the pump.

Connecting the IntelliFlo Pump to IntelliComm II RS-485 Terminal

Connect the YELLOW and GREEN wire from the IntelliFlo communication cable to the YELLOW and GREEN RS-485 screw terminals on the IntelliComm II interface adapter as shown below.

Note: Connect GPM/RPM 1, 2, 3, and 4 to any control output or auxiliary relay circuit (RELAY 1-4) on the automation circuit board. Typically, GPM/RPM 1 connects to Filter Pump. If more than one terminal input is active, the highest input number (GPM/RPM 4) will take priority regardless of the pump setting.

Note: The black wire must be used. Choosing either the Red or White wire will depend on the direction that the actuator needs to rotate to the spa.
Connecting to a Compool® Control System

Connection from IntelliComm II to a Compool control system utilizes the RJ12 adapter (provided in the kit), and the IntelliFlo RS-485 communication cable (provided with the pump).

**Compool Models Compatible with IntelliComm II (see page 6 and 7)**
Compool CP-3xxx series, CP-2000 and Time Master, CP-1000, CP-2020, Swim Master LX-20, LX-42, CP-2020, LX-100, LX-80 Commercial and CP-100 control systems. Note: IntelliComm II does not support the LX-820 Commercial system.

**Compool Models Compatible with IntelliComm II**
(Using an External 9 VDC 200mA AC Power Adapter)
The following Compool models are compatible with IntelliComm II using an external 9 VDC, 200mA AC power adapter: Compool CP-30, LX-220, LX-40.

**WARNING** Always disconnect AC POWER to the LOAD CENTER at the circuit breaker. Also, disconnect AC power to the PUMP before installing the IntelliComm II interface adapter. Failure to do so could result in death or serious injury to the service person, pool users or others due to electric shock. Read all SAFETY PRECAUTIONS on page i before starting.

**Accessing the Compool Circuit Board**
The Compool control system circuit board is located in the power center. Refer to the Compool control system owner's manual for access information.

**Connecting power to the IntelliComm II from a Compool CP3xxx circuit board (see page 5 and 7)**
1. **Connect RJ12 adapter power wires (9-24V DC/AC):** From the RJ12 adapter, connect the BLACK wire and RED wire to the RS-485 GND (BLACK) and PWR (RED) terminal respectively. **NOTE:** For LX-100: Connect the YELLOW wire from RJ12 to IntelliComm II Red (PWR) screw terminal. **Note:** To avoid circuit board damage, DO NOT connect the RED and YELLOW wires together to Red (PWR) terminal, leave RED UNCONNECTED (see page 6).
2. **Connect RJ12 adapter cable plug to the Compool COM PORT:** Disconnect the Compool control panel RJ12 plug from the Compool circuit board COM Port and connect it to the RJ12 adapter (provided). Connect the RJ12 adapter plug into the COM Port (use black plug for LX-100) on the Compool circuit board (see page 5).
3. **Connecting AUX cables:** Choose the functions you wish to control on the Compool system. Connect the auxiliary cables (provided in kit) from the IntelliComm II input terminals (GPM/RPM 1, 2, 3, 4) to the auxiliary connector on the Compool circuit board. Typically, GPM/RPM 1 input terminal, connects to Compool FILTER PUMP output terminal. Choose the other functions on the Compool board and connect them to GPM/RPM 2, 3, and 4 input terminals.
4. **Connecting IntelliComm II to IntelliFlo:** For IntelliComm II to IntelliFlo wiring information, see page 3.
5. **Mounting the IntelliComm II** (see page 20).
6. **Setting up IntelliFlo speeds and flow rates** (see page 16).
**Note:** Using a RYALX Harness (for Compool CP-38xx Systems): For the Compool SOLAR system, connect the RYALX harness cable plug to the SOLAR socket, then connect the IntelliComm II pump speed plug and the VALVE cable plug to the RYALX board. The RYALX can be used for any output.

**Note:** The Spa output plug on the Compool circuit board can be used for direct IntelliComm II connection, instead of splicing into the valve output cable.
Connecting power to the IntelliComm II from a Compool LX100 circuit board

Note: Use a RYALX Harness (P/N RYALX) if the circuit board relay output is in use and the IntelliComm II AUX cable needs to share the socket output.

LX100 Motherboard

IntelliComm II Interface Adapter Installation and User’s Guide
RYALX Harness (P/N RYALX) Accessory
(For use with Compool CP-38xx Systems)

The RYALX harness (y-adapter) allows any one output circuit to operate two relay circuits. For example, to free up an additional connection on the Compool SOLAR system, connect the RYALX harness cable plug to the SOLAR socket, then connect the IntelliComm II pump speed plug and the VALVE cable plug to the RYALX board. The RYALX can be used for any output.

The example connection diagram below shows how to share the Aux Valve Control using solar. The signal to tell solar to turn on, comes from the solar socket located below the HTR socket. Then the AUX VLV control and the speed of the pump now responds to that signal.
Connecting Power to IntelliComm II from Compool Circuit Board

To power the IntelliComm II requires a two wire connection from the Compool circuit board to the IntelliComm II circuit board (as shown below). For Compool to IntelliComm II auxiliary cable connection information, see Connecting AUX cables, on page 4.

**WARNING** Always disconnect AC power to the LOAD CENTER at the circuit breaker. Also, disconnect AC power to the PUMP before installing the IntelliComm II interface adapter. Failure to do so could result in death or serious injury to the service person, pool users or others due to electric shock. Read all SAFETY PRECAUTIONS on page i before starting.
Connecting to a Jandy® AquaLink® RS Control System

Access Jandy control system circuit board
The Jandy control system circuit board is located in the load center. Refer to the Jandy control system owner's manual for access information.

Connect power to the IntelliComm II (9-24 VDC) from Jandy circuit board
1. Connect the GREEN (-) wire and the RED (+) wire from the Jandy RS-485 screw terminal, to the GND and PWR terminal respectively, on the IntelliComm II RS-485 screw terminal (see page 8).

Connect AUX cables
2. Connect the auxiliary cables (provided in kit) from the IntelliComm II input terminals GPM/RPM 1, 2, 3, and 4 to any control output or auxiliary relay circuit on the Jandy circuit board. Typically, GPM/RPM 1 connects to the output Filter Pump relay terminal plug. However, Jandy auxiliary relay circuits can be connected to any of the four input terminals for custom pump speed control. **NOTE: If more than one terminal input is active, the highest input number (GPM/RPM 4) will take priority regardless of the pump setting.**

3. Connect IntelliComm II to IntelliFlo
   For IntelliComm II to IntelliFlo wiring information, see page 3.

4. Mounting the IntelliComm II (see page 20).

5. Setting up IntelliFlo speeds and flow rates (see page 16).
Note: The Spa output plug on the Jandy circuit board can be used for direct IntelliComm II connection, instead of splicing into the valve output cable.

Note: Connect GPM/RPM 1, 2, 3, and 4 to any control output or auxiliary relay circuit (RELAY 1-4) on the Jandy circuit board. Typically, GPM/RPM 1 connects to Filter Pump. **If more than one terminal input is active, the highest input number (GPM/RPM 4) will take priority regardless of the pump setting.**
Connecting to a Hayward® Pro Logic® Control System

The following describes how to connect IntelliComm II to a Hayward Pro Logic® series control system (see page 13 for connection diagram).

**WARNING**
Always disconnect AC power to the LOAD CENTER at the circuit breaker and disconnect AC power to the PUMP before installing the IntelliComm II interface adapter. Failure to do so could result in death or serious injury to the service person, pool users or others due to electric shock. Read all SAFETY PRECAUTIONS on page i before starting.

Access the Hayward Pro Logic Circuit Board
The Hayward control system circuit board is located in the load center. Refer to the Hayward control system owner’s manual for access information.

Connect power to the IntelliComm II (9-24V DC) from Hayward Circuit Board
1. Connect the GREEN (-) wire and the RED (+) wire from the Hayward screw terminal (RS-485), to the GND and PWR terminal respectively, on the IntelliComm II RS-485 screw terminal (see page 13).

Connect AUX cables (Disconnect AC power to the PUMP and Controller)
2. Cut one plug off each of the provided four auxiliary cables. Strip back the ends of the wires.
3. Remove the relay bracket(s) to access relays: In the Hayward load center, remove the two screws securing the upper and lower relay bracket and remove the brackets.
4. Attach wires to the FILTER PUMP relay screws terminals: Loosen the two top relay terminal screws with attached wires. Using the provided auxiliary cable (see step 1), carefully wrap the ends of each wire under the screw terminals. Tighten the screws to secure the wires in place. Wires are not polarized; connect wires to either relay terminal.
5. Repeat Step 3: Splice the cable wires into any control output or auxiliary circuit relay terminals on the Hayward circuit board.
6. Reinstall the relay bracket(s) in the load center and secure with the retaining screws.

7. Connect IntelliComm II to IntelliFlo
   For IntelliComm II to IntelliFlo wiring information, see page 3.
8. Mounting the IntelliComm II (see page 20).
9. Setting up IntelliFlo speeds and flow rates (see page 16).
IntelliComm II to Hayward Pro Logic Control System Connection Diagram

IntelliComm II Interface Adapter Installation and User’s Guide
Connecting to a Polaris® EOS Control System

The following describes how to connect IntelliComm II to a Polaris® EOS control system (see page 15 for connection diagram).

Connecting Power to IntelliComm II from Polaris Circuit Board

To power the IntelliComm II requires a two wire connection from the Polaris circuit board to the IntelliComm II circuit board (as shown on page 15).

| WARNING | Always disconnect AC power to the LOAD CENTER at the circuit breaker and disconnect AC power to the PUMP before installing the IntelliComm II interface adapter. Failure to do so could result in death or serious injury to the service person, pool users or others due to electric shock. Read all SAFETY PRECAUTIONS on page i before starting. |

Access the Polaris Circuit Board

The Polaris control system circuit board is located in the load center. Refer to the Polaris EOS control system owner’s manual for access information.

Connect power to the IntelliComm II (9-24 VDC) from Polaris circuit board

1. Connect the GREEN (-) wire and the RED (+) wire from the Polaris 24 VDC output screw terminal, to the GND and PWR terminal respectively, on the IntelliComm II RS-485 screw terminal (see page 15).

Connecting AUX cables

2. Connect the auxiliary cables (provided in kit) from the IntelliComm II input terminals GPM/RPM 1, 2, 3, and 4 to any control output or auxiliary relay circuit on the Polaris circuit board. Typically, GPM/RPM 1 connects to the output Filter Pump relay terminal plug (HP4). However, Polaris auxiliary relay circuits (HP1 - HP6) can be connected to any of the four input terminals for custom pump speed control. **NOTE:** If more than one terminal input is active, the highest input number (GPM/RPM 4) will take priority regardless of the pump setting.

3. Connect IntelliComm II to IntelliFlo

For IntelliComm II to IntelliFlo wiring information, see page 3.

4. Mounting the IntelliComm II (see page 20).

5. Setting up IntelliFlo speeds and flow rates (see page 16).
**IntelliComm II Interface Adapter Installation and User’s Guide**

To IntelliFlo pump

- **BLK** (GND)
- **YLW**
- **GRN**
- **RED** (9-24 VDC)

Relays:
- **RELAY4**
- **RELAY3**
- **RELAY2**
- **RELAY1**

- **9 - 24V DC/AC**
- **PWR**

From Polaris circuit board

Connect to Polaris circuit board

Choose the function on the Polaris circuit board (HP1-HP8, VLV1 - VLV 6)

**Polaris EOS Control System Load Center**

IntelliComm II Interface Adapter Installation and User’s Guide
Setting up an IntelliFlo VF Pump with IntelliComm II

The IntelliFlo VF pump can operate with all of its stand alone features if desired. For example the pump can run filter cycles, egg timer features 1 and 2 and time of day scheduling of features 3-9. If IntelliComm II sends the pump a command when the pump is running the filter cycle or features 3-9, the IntelliComm II command takes priority regardless of flow rate. **IntelliComm II will not interrupt nor take priority over Features 1 or 2.**

For the IntelliFlo VF to accept a command from the IntelliComm II the pump must be in the “Running” mode. To place the IntelliFlo VF in “Running” mode, press the **Filter mode button**, then press the **Start/Stop button**. The led above the Start/Stop button must be lit for the IntelliFlo VF to accept commands from the IntelliComm II.

The default “Filter” cycle time in the IntelliFlo VF is from 9 AM to 9 PM. Since the IntelliFlo VF must be in the “Filter” mode, running Schedules, (LED above Start/Stop button lit) to accept commands from IntelliComm II, it will run its default filtration schedule first. If you want the pump to only run when it receives commands from IntelliComm II, program its “Filter” mode with the same start and stop times. For example program Cycle 1 in the “Filter” menu to “Start” cycle one at 9 AM and “Stop” cycle one at 9 AM. This will cause the pump to not run its filter cycle. This is done on the IntelliFlo keypad under Menu, Filter. Address 1, is the default address for the IntelliFlo VF. The IntelliComm II will only communicate with address 1. The pump's “Address” setting is the first menu item under “Pool Data”.

**Programming Flows into the IntelliFlo VF**

1. Press the Menu button.
2. Press the down arrow until Ext. Ctrl. (External Control is displayed).
3. Press the Select button to go Ext. Ctrl. (Program 1 is displayed).
4. Press the Select Button (Enabled, Activation is displayed).
5. Press the down arrow. (Program 1, 30 GPM, Set Flow, is displayed. The Program 1 flow rate will run when PRGM 1 is activated on the IntelliComm II control board.
6. To change this flow rate press the “Select” button. The flow rate can be adjusted from 15 gpm to 130 gpm.
7. The cursor will highlight the one’s digit column. Press the left and right arrows to move the cursor and the up and down arrows to change the number.
8. Press the Enter Button to save.
9. Press the down arrow until “Time Delay Stop” is displayed. Time Delay Stop is used to control the pump to run the Program speed for an additional amount of time after the IntelliComm II turns off its run command. This is often used for a heater cool down.
10. Press Select to highlight the cursor, use the left and right arrows to move the cursor and the up and down arrows to change the number.
11. Press Enter to save.
12. Press Escape to Exit. The display shows Program 1. Press the down arrow to get to Program 2 and follow the same instructions to program. For more information about programming the pump, refer to the IntelliFlo VF Installation and User’s Guide (P/N 353850).
Setting up an IntelliFlo VS or IntelliPro VS

The IntelliFlo VS pump Speeds 1, 2, 3 and 4 correspond to Prgm (Program) 1, 2, 3 and 4 on the IntelliComm II circuit board. To program speed one on the IntelliFlo VS, press the “Speed 1” button. Press the Start button. To increase the speed of “Speed 1” press the up arrow button. Each press of the up arrow will increase the RPM by 10 RPM increments. Pressing the down arrow will decrease the RPM by 10 RPM. When the desired speed is found, press and hold down the “Speed 1” button and the new speed will be locked in. This new speed will be the speed that the pump will run when “Prgm 1” is activated on the IntelliComm II. The speed can be adjusted from 400 RPM to 3450 RPM.

Note: If the IntelliFlo VS pump is turned on manually by pressing a Speed button and the Start button, it will run the speed that was pressed and the LED above this button will be illuminated. If it then gets a command to run a speed from the IntelliComm II, it will run the new commanded speed and the LED above the new speed will be illuminated. When the command from the IntelliComm II has stopped, the pump will go back to running the manually pressed speed.

Note: If the IntelliComm II has switched on the IntelliFlo VS and it is running a speed and you manually adjust the pump speed using the speed buttons on the pump, you must then manually switch the pump OFF; this turns off the manually manipulated speed and allows the IntelliComm II to take command and switch the pump back on to run at the commanded speed. If, after manipulating the keypad, the pump is not manually turned off by pressing the Stop button the pump will continue to run after the IntelliComm II command is stopped.

Unlike the VF, the IntelliFlo VS does not have to be in the “Running” mode to accept commands from an IntelliComm II. The power must be on (Green LED lit) on the IntelliComm II to accept commands.

Setting up an IntelliFlo VS+SVRS

The IntelliFlo VS+ SVRS is programmed in a similar way to the IntelliFlo VF. Speeds for each program number are set up under the menu item “Ext. Ctrl.” (External Control).
Programming IntelliFlo VS+ SVRS Speeds

Press the menu button. Press the down arrow until “Ext Ctrl.” is displayed. Follow the instructions as described on page 10 for the IntelliFlo VF (steps 1 through 12). However, there is one difference. The IntelliFlo VS+SVRS does not have any default “Schedules” so it is not necessary to deactivate any schedules so it will only run commands from the IntelliComm II. But, just like the IntelliFlo VF it can be programmed to run scheduled flows and when it gets a command from IntelliComm II to run a program the IntelliComm II program will take priority.

Note: If more than one terminal input is activated on the IntelliComm II the highest number input will take priority, regardless of the pump setting. For example: If program 1 and program 3 are activated on the IntelliComm II The pump will run program 3, regardless of speed, flow or order of activation.

When a command to run is sent from the IntelliComm II to the VS+SVRS the pump’s display will show “Running Prog. 1” and the countdown timer on the IntelliFlo VF display will show 00:01.

CAUTION: When performing maintenance on the system or the pump switch the power to the pump off at the circuit breaker. This will ensure that the pump does not switch on from remote operation or run a schedule.

IntelliFlo Pump Warnings and Alarm Conditions

The IntelliFlo VS-3050 alarms and warnings are indicated by flashing LEDs on the control panel. For example, if a “Drive Temperature” warning occurs, the LED will blink two times, then Off, then blink two times. This sequence is repeated until the condition is cleared.

- **Warning condition:** If a warning condition occurs the pump will be continue to run but at a reduced speed. The Green LED executes a sequence of blinks to indicate which alarm or warning has occurred.
- **Alarm condition:** If an alarm condition occurs the pump will drive stop running. The red LED flashes continuously to indicate the presence of an alarm. The alarm LEDs will reset when the condition clears.
<table>
<thead>
<tr>
<th>Number of times the LED will blink</th>
<th>Alarm</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Drive Temperature Warning</td>
<td>Excessive drive temperature</td>
<td>1. Ensure the motor fan has adequate area for ventilation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Stop motor and allow to cool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Run motor at a higher speed to improve cooling air flow.</td>
</tr>
<tr>
<td>5</td>
<td>Unknown alarm</td>
<td>Electronic failure</td>
<td>1. Cycle power to reset pump.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Replace drive.</td>
</tr>
<tr>
<td>6</td>
<td>Drive Temperature Alarm</td>
<td>Excessive drive temperature</td>
<td>1. Ensure the motor fan has adequate area for ventilation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Run motor at a higher speed to improve cooling air flow.</td>
</tr>
<tr>
<td>7</td>
<td>Power Out Alarm</td>
<td>Supply voltage low</td>
<td>Ensure proper supply voltage.</td>
</tr>
<tr>
<td>8</td>
<td>Over current Alarm</td>
<td>Excessive drive current</td>
<td>1. Examine fluid/mechanical system for source of overload.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. De-energize motor and determine if motor spins freely.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Replace drive.</td>
</tr>
<tr>
<td>9</td>
<td>Over voltage Alarm</td>
<td>Excessive voltage on drive buss</td>
<td>1. Rapid switching between speeds can cause excessive voltages on the drive's DC buss.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Ensure proper supply voltage.</td>
</tr>
</tbody>
</table>

Alarm (RED) and Warning (GREEN) LED sequence
Mounting the IntelliComm II Interface Adapter

The IntelliComm II Interface Adapter cover (3 in. x 2 ¾ in.) can be mounted as follows:

- On the inside back wall of the low voltage compartment in a load center, using the provided adhesive mounting tape.
- On a flat surface using the two mounting screws. Choose a dry covered location within ten (10) feet from the system load center.

Mounting the IntelliComm II Interface Adapter on a flat surface

1. Remove the two cover retaining screws.
2. Carefully separate the front (label) and back cover (two screw holes) with the back support from the circuit board. Be careful not to touch the circuit board components. Hold the circuit board by the edges. Place the circuit board aside.

Drill two mounting screws holes for the back cover

3. Cut out the template on the following page.
4. Position the template on a flat surface. Mark the two screw locations for the mounting holes. Remove the template.
5. Using a ¼ in. drill bit, drill the two mounting holes.
6. Position the back cover over the two mounting screw holes. Secure the back cover with the two mounting screws.

Install the circuit board and front cover

7. Place the circuit board on the back cover standoffs.
8. While holding the circuit board, place front cover (with the back support) over the back cover. Secure the front cover with two retaining screws.
9. The installation is complete.
INTELLIFLO® VARIABLE SPEED
ULTRA ENERGY EFFICIENT PUMP

INSTALLATION AND USER’S GUIDE

IMPORTANT SAFETY INSTRUCTIONS
READ AND FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS
CUSTOMER SERVICE / TECHNICAL SUPPORT

If you have questions about ordering Pentair Aquatic Systems replacement parts, and pool products, please contact:

Customer Service and Technical Support, USA
(8 A.M. to 4:30 P.M. — Eastern/Pacific Times)
Phone: (800) 831-7133
Fax: (800) 284-4151

Web site
Visit www.pentairpool.com or www.staritepool.com for information about Pentair products.*

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IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This is the safety alert symbol. When you see this symbol on your system or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

DANGER

Indicates the risk of death or serious injury.

WARNING

Indicates the risk of minor injury or damage.

CAUTION

Indicates special instructions not related to hazards.

NOTE

Indicates special instructions not related to hazards.

Read and follow all safety instructions in this manual and on equipment. Keep safety labels in good condition; replace if missing or damaged.

This guide contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this equipment after installation or left on or near the pump.

This manual contains important information that will help you in operating and maintaining this product. Please retain it for future reference.

When installing and using this electrical equipment, basic safety precautions should always be followed, include the following:

WARNING

Do not permit children to use this product.

WARNING

RISK OF ELECTRICAL SHOCK. Connect only to a branch circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the circuit is protected by a GFCI.

WARNING

This unit must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using.

CAUTION

This pump is for use with permanent swimming 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 is capable of being readily disassembled for storage and reassembled to its original integrity.

When a limb is sucked or inserted into an opening, suction at a drain or outlet can cause:

Evisceration/Disembowelment: When a person sits on an open pool (particularly a child wading pool) or spa outlet and suction is applied directly to the intestines, causing severe intestinal damage. This hazard is present when the drain cover is missing, broken or the cover flow rating is not high enough for the pump or pumps.

Body Entrapment: When a portion of the body is held against the drain cover trapping the swimmer underwater. This hazard is present when the flow rating of the cover is too small for the pump or pumps.

Limb Entrapment: When a limb is sucked or inserted into an opening resulting in a mechanical bind or swelling. This hazard is present when a drain cover is missing, broken, loose, cracked or not properly secured.

Hair Entrapment: When the hair tangles or knots in the drain cover, trapping the swimmer underwater. This hazard is present when the flow rating of the cover is too small for the pump or pumps.

General Warnings

- Never open the inside of the drive motor enclosure. There is a capacitor bank that holds a 230 VAC charge even when there is no power to the unit.
- The pump is not submersible.
- The pump is capable of high flow rates; use caution when installing and programming to limit pumps performance potential with old or questionable equipment.
- Code requirements for electrical connection differ from country to country, state to state, as well as local municipalities. Install equipment in accordance with the National Electrical Code and all applicable local codes and ordinances.
- Before servicing the pump; switch OFF power to the pump by disconnecting the main circuit to the pump.
- This appliance is not intended for use by persons (including children) of reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

This pump produces high levels of suction and creates a strong vacuum at the main drain at the bottom of the body of water. This suction is so strong that it can trap adults or children under water if they come in close proximity to a drain or a loose or broken drain cover or grate.

The use of unapproved covers or allowing use of the pool or spa when covers are missing, cracked or broken can result in body or limb entrapment, hair entanglement, body entrapment, evisceration and/or death.

The suction at a drain or outlet can cause:

- **Limb Entrapment**: When a limb is sucked or inserted into an opening resulting in a mechanical bind or swelling. This hazard is present when a drain cover is missing, broken, loose, cracked or not properly secured.
- **Hair Entrapment**: When the hair tangles or knots in the drain cover, trapping the swimmer underwater. This hazard is present when the flow rating of the cover is too small for the pump or pumps.
- **Body Entrapment**: When a portion of the body is held against the drain cover trapping the swimmer underwater. This hazard is present when the drain cover is missing, broken or the cover flow rating is not high enough for the pump or pumps.
- **Evisceration/Disembowelment**: When a person sits on an open pool (particularly a child wading pool) or spa outlet and suction is applied directly to the intestines, causing severe intestinal damage. This hazard is present when the drain cover is missing, loose, cracked, or not properly secured.

When installing and using this electrical equipment, basic safety precautions should always be followed, include the following:

**WARNING**

Do not permit children to use this product.

**WARNING**

RISK OF ELECTRICAL SHOCK. Connect only to a branch circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the circuit is protected by a GFCI.

**WARNING**

This unit must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using.

**CAUTION**

This pump is for use with permanent swimming 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 is capable of being readily disassembled for storage and reassembled to its original integrity.

**DANGER**

FAILURE TO FOLLOW ALL INSTRUCTIONS AND WARNINGS CAN RESULT IN SERIOUS BODILY INJURY OR DEATH. THIS PUMP SHOULD BE INSTALLED AND SERVICED ONLY BY A QUALIFIED POOL SERVICE PROFESSIONAL. INSTALLERS, POOL OPERATORS AND OWNERS MUST READ THESE WARNINGS AND ALL INSTRUCTIONS IN THE OWNER’S MANUAL BEFORE USING THIS PUMP. THESE WARNINGS AND THE OWNER’S MANUAL MUST BE LEFT WITH THE POOL OWNER.

**DANGER**

SUCTION ENTRAPMENT HAZARD: STAY OFF THE MAIN DRAIN AND AWAY FROM ALL SUCTION OUTLETS!

This is the safety alert symbol. When you see this symbol on your system or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

- **DANGER**
- **WARNING**
- **CAUTION**
- **NOTE**

- **DANGER**

FAILURE TO FOLLOW ALL INSTRUCTIONS AND WARNINGS CAN RESULT IN SERIOUS BODILY INJURY OR DEATH. THIS PUMP SHOULD BE INSTALLED AND SERVICED ONLY BY A QUALIFIED POOL SERVICE PROFESSIONAL. INSTALLERS, POOL OPERATORS AND OWNERS MUST READ THESE WARNINGS AND ALL INSTRUCTIONS IN THE OWNER’S MANUAL BEFORE USING THIS PUMP. THESE WARNINGS AND THE OWNER’S MANUAL MUST BE LEFT WITH THE POOL OWNER.

**DANGER**

SUCTION ENTRAPMENT HAZARD: STAY OFF THE MAIN DRAIN AND AWAY FROM ALL SUCTION OUTLETS!

When installing and using this electrical equipment, basic safety precautions should always be followed, include the following:

**WARNING**

Do not permit children to use this product.

**WARNING**

RISK OF ELECTRICAL SHOCK. Connect only to a branch circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the circuit is protected by a GFCI.

**WARNING**

This unit must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using.

**CAUTION**

This pump is for use with permanent swimming 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 is capable of being readily disassembled for storage and reassembled to its original integrity.
**IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS**

**Mechanical Entrapment:** When jewelry, swimsuit, hair decorations, finger, toe or knuckle is caught in an opening of an outlet or drain cover. This hazard is present when the drain cover is missing, broken, loose, cracked, or not properly secured.

**NOTE:** ALL SUCTION PLUMBING MUST BE INSTALLED IN ACCORDANCE WITH THE LATEST NATIONAL AND LOCAL CODES, STANDARDS AND GUIDELINES.

**WARNING**

**TO MINIMIZE THE RISK OF INJURY DUE TO SUCTION ENTRAPMENT HAZARD:**
- A properly installed and secured ANSI/ASME A112.19.8 approved anti-entrapment suction cover must be used for each drain.
- Each suction cover must be installed at least three (3') feet apart, as measured from the nearest point to nearest point.
- Regularly inspect all covers for cracks, damage and advanced weathering.
- If a cover becomes loose, cracked, damaged, broken or is missing, replace with an appropriate certified cover.
- Replace drain covers as necessary. Drain covers deteriorate over time due to exposure to sunlight and weather.
- Avoid getting hair, limbs or body in close proximity to any suction cover, pool drain or outlet.
- Disable suction outlets or reconfigure into return inlets.

**A clearly labeled emergency shut-off switch for the pump must be in an easily accessible, obvious place. Make sure users know where it is and how to use it in case of emergency.**

The Virginia Graeme Baker (VGB) Pool and Spa Safety Act creates new requirements for owners and operators of commercial swimming pools and spas. Commercial pools or spas constructed on or after December 19, 2008, shall utilize:

(A) A multiple main drain system without isolation capability with suction outlet covers that meet ASME/ANSI A112.19.8a Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs and either:
   (ii) A properly designed and tested suction-limiting vent system or
   (iii) An automatic pump shut-off system.

Commercial pools and spas constructed prior to December 19, 2008, with a single submerged suction outlet shall use a suction outlet cover that meets ASME/ANSI A112.19.8a and either:

(A) A SVRS meeting ASME/ANSI A112.19.17 and/or ASTM F2387, or
(B) A properly designed and tested suction-limiting vent system, or
(C) An automatic pump shut-off system, or
(D) Disabled submerged outlets, or
(E) Suction outlets shall be reconfigured into return inlets.

**Pumps improperly sized or installed or used in applications other than for which the pump was intended can result in severe personal injury or death. These risks may include but not be limited to electric shock, fire, flooding, suction entrapment or severe injury or property damage caused by a structural failure of the pump or other system component.**

**HAZARDOUS PRESSURE: STAND CLEAR OF PUMP AND FILTER DURING START UP**

Circulation systems operate under high pressure. When any part of the circulating system (i.e. locking ring, pump, filter, valves, etc.) is serviced, air can enter the system and become pressurized. Pressurized air can cause the pump housing cover, filter lid, and valves to violently separate which can result in severe personal injury or death. Filter tank lid and strainer cover must be properly secured to prevent violent separation. Stand clear of all circulation system equipment when turning on or starting up pump.

Before servicing equipment, make note of the filter pressure. Be sure that all controls are set to ensure the system cannot inadvertently start during service. Turn off all power to the pump. **IMPORTANT: Place filter manual air relief valve in the open position and wait for all pressure in the system to be relieved.**

Before starting the system, fully open the manual air relief valve and place all system valves in the “open” position to allow water to flow freely from the tank and back to the tank. Stand clear of all equipment and start the pump. **IMPORTANT: Do not close filter manual air relief valve until all pressure has been discharged from the valve and a steady stream of water appears. Observe filter pressure gauge and be sure it is not higher than the pre-service condition.**

**General Installation Information**

- All work must be performed by a qualified service professional, and must conform to all national, state, and local codes.
- Install to provide drainage of compartment for electrical components.
- These instructions contain information for a variety of pump models and therefore some instructions may not apply to a specific model. All models are intended for use in swimming pool applications. The pump will function correctly only if it is properly sized to the specific application and properly installed.

**WARNING**

Observe filter pressure gauge and be sure it is not higher than the pre-service condition. Any increase in pressure may indicate mechanical entrapment or severe injury or property damage caused by a structural failure of the pump or other system component.

The pump can produce high levels of suction within the suction side of the plumbing system. These high levels of suction can pose a risk if a person comes within the close proximity of the suction openings. A person can be seriously injured by this high level of vacuum or may become trapped and drowned. It is absolutely critical that the suction plumbing be installed in accordance with the latest national and local codes for swimming pools.

**SAVE THESE INSTRUCTIONS**

Warning Page P/N 352557  Rev. A 6/15
The IntelliFlo® Variable Speed Pump can be programmed to run at specific speeds and time intervals for maximum operating efficiency and energy conservation for a variety of inground pools.

- The pump can operate from 450 RPM to 3450 RPM with four preset speeds of 750, 1500, 2350 and 3110 RPM
- The pump can be adjusted from the control panel to run at any speed between 450 RPM to 3450 RPM for different applications
- Up to 8 programmable speeds
- Pump control panel alarm LED and error messages warn the user against under and over voltage, high temperature, over current and freeze protection
- Communicates with EasyTouch, IntelliTouch or SunTouch control systems or an IntelliComm communication center via a two-wire RS-485 cable connection
- Self-priming for easy start-up
- Compatible with most cleaning systems, filters, and jet action spas
- UL/CUL/NSF

**Drive Assembly and Control Panel**

The IntelliFlo pump drive assembly consists of an operator control panel and the system electronics that drive the motor. The drive microprocessor controls the motor by changing the frequency of the current it receives together, with changing the voltage to control the rotational speed.

**External Control**

IntelliTouch®, EasyTouch®, SunTouch® Control Systems and IntelliComm® Communication Centers can remotely control the IntelliFlo pump. The pump’s communications address and other functions are accessible from the pump’s control panel.

- RS-485 commincation cable included
- IntelliTouch systems control 8 IntelliFlo pumps using 8 speeds per pump.
- EasyTouch systems control 2 IntelliFlo pumps using 8 speeds per pump.
- SunTouch systems control one IntelliFlo pump using 8 speeds.
- IntelliComm systems control one IntelliFlo pump using the 4 External Control programs.

**Motor Features**

- Permanent Magnet Synchronous Motor (PMSM)
- High efficiency (3450 RPM 92% and 1000 RPM 90%)
- Superior speed control
- Operates at lower temperatures due to high efficiency
- Same technology as deployed in hybrid electric vehicles
- Designed to withstand outdoor environment
- Totally enclosed fan cooled
- Three-phase motor
- 56 Square Flange
- Six-Pole
- Low noise

![IntelliFlo Variable Speed Drive Assembly](image-url)
INSTALLATION

Only a qualified plumbing professional should install the IntelliFlo® Variable Speed Pump. Refer to “Pump Warning And Safety Instructions” on pages ii - iii for additional installation and safety information.

Location
Be sure the pump location meets the following requirements:

Note: Do not install this pump within an outer enclosure or beneath the skirt of a hot tub or spa unless marked accordingly.

1. Install the pump as close to the pool or spa as possible. To reduce friction loss and improve efficiency, use short, direct suction piping returns.
2. Install a minimum of 5 feet (1.52 meters) from the inside wall of the pool and spa. Canadian installations require a minimum of 9.8 feet (3 meters) from pool water level.
3. Install the pump a minimum of 3 feet (.9 meters) from the heater outlet.
4. Do not install the pump more than 10 feet (3 meters) above the water level.
5. Install the pump in a well ventilated location protected from excessive moisture (i.e., rain gutter downspouts, sprinklers, etc.)
6. Install the pump with a rear clearance of at least 3 inches (76.2 mm) so that the motor can be removed easily for maintenance and repair.

Piping
1. For improved pool plumbing, it is recommended to use a larger pipe size. When installing the inlet and outlet fittings (male adaptors), use thread sealant.
2. Piping on the suction side of the pump should be the same or larger than the return line diameter.
3. Plumbing on the suction side of the pump should be as short as possible.
4. For most installations Pentair recommends installing a valve on both the pump suction and return lines so that the pump can be isolated during routine maintenance. However, we also recommend that a valve, elbow or tee installed in the suction line should be no closer to the front of the pump than five (5) times the suction line diameter.
   Example: A 2 inch pipe requires a 10 inch (25.4 cm) straight run in front of the suction inlet of the pump. This will help the pump prime faster and last longer.
   Note: DO NOT install 90° elbows directly into the pump inlet or outlet.

Fittings and Valves
1. Do not install 90° elbows directly into pump inlet.
2. Flooded suction systems should have gate valves installed on suction and discharge pipes for maintenance, however, the suction gate valve should be no closer than five times the suction pipe diameter as described in this section.
3. Use a check valve in the discharge line when using this pump for any application where there is significant height to the plumbing after the pump.
4. Be sure to install check valves when plumbing in parallel with another pump. This helps prevent reverse rotation of the impeller and motor.

Electrical
- Install all equipment in accordance with the National Electrical Code and all applicable local codes and ordinances.
- A means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
Electrical Wiring Installation

To connect the IntelliFlo® Variable Speed Pump to an AC power source:

1. Be sure all electrical breakers and switches are turned off before wiring motor.
2. Be sure that the supply line voltage matches the motor voltage listed on the motor plate (example 230 VAC or 115 VAC). If they do not match, permanent motor damage may occur.
3. For wiring sizes and general guidelines for proper electrical installation, please follow the specifications defined in the National Electric Code and any local codes as required.
4. Use strain relief and be sure all electrical connections are clean and tight.
5. Cut the wires to the appropriate length so they do not overlap or touch when connected.
6. Permanently ground the motor using the green ground wire, as shown below. Use the correct wire size and type specified by National Electrical Code. Make sure the ground wire is connected to an electrical service ground.
7. Bond the motor to the structure in accordance with the National Electrical Code. Use a solid copper bonding conductor not smaller than 8 AWG. Run a wire from the external bonding screw or lug to the bonding structure.
8. Connect the wire from the accessible bonding lug on the motor to all metal parts of the swimming pool, spa, or hot tub structure and to all electrical equipment, metal conduit, and metal piping within 5 feet (1.52 meters) of the inside walls of the swimming pool, spa, or hot tub. For Canada, a 6 AWG or larger solid copper bonding conductor is required.
9. The pump should be permanently connected to either a circuit breaker, 2-pole timer or 2-pole relay. If AC power is supplied by a GFCI circuit breaker, use a dedicated circuit breaker that has no other electrical load electrical loads.
10. IMPORTANT: When connecting the pump to an automation system (IntelliTouch®, EasyTouch®, SunTouch® Control Systems and IntelliComm® Communication Center), continuous power must be supplied to the pump by connecting it directly to the circuit breaker. When using an automation system, be sure that no other lights or appliances are on the same circuit.

Note: When the pump is started and stopped by removing power with a relay or timer, a two-pole device should be used to apply and remove power to both POWER LINE TERMINALS.

Pentair offers 2-Pole 20 Amp GFCI breakers (P/N PA220GF) which offer 6 milliamp personnel protection while meeting 2008 to current NEC Standards for Pool Pumps.

WARNING: RISK OF ELECTRICAL SHOCK OR ELECTROCUTION. This pump must be installed by a licensed or certified electrician or a qualified service professional in accordance with the National Electrical Code and all applicable local codes and ordinances. Improper installation will create an electrical hazard which could result in death or serious injury to users, installers, or others due to electrical shock, and may also cause damage to property.

Always disconnect power to the pump at the circuit breaker before servicing the pump. Failure to do so could result in death or serious injury to service people, users or others due to electric shock.

Read all servicing instructions before working on the pump.
OPERATING THE PUMP

NOTE: Speed 1 is the default filtration speed. When setting up the IntelliFlo® Variable Speed Pump, the user must set the pump’s internal clock and establish an operation schedule by following the steps in this manual. Please refer to user’s guide sections: ‘Set Time’ (page 8) and ‘Set Speeds 1-8 in Schedule Mode’ (page 11) to schedule a time to run the pump.

This pump is shipped with Priming mode ENABLED. Unless the Priming settings are changed in the menu, be aware that the pump will speed up to the maximum speed when the pump is powered on for the first time, and the start/stop button is pressed. To change the maximum speed of the pump, refer to page 9.

Before turning the pump ON, be sure the following conditions are met:
1. Open filter air relief valve.
2. Open valves.
3. Pool return is completely open and clear of any blockages.
4. Water in the pump basket.
5. Stand clear of the filter or other pressurized vessels.

Priming the Pump

Prime the pump before starting the pump for the first time. Remove the lid and fill the basket with water. The pump basket must be filled with water before initial start up or after servicing.

Follow the steps below to prime the pump for start up:

1. Press Start/Stop to stop the pump. Disconnect the pump main power supply and communication cable.
2. Close all gate valves in suction and discharge pipes. Relieve all pressure from the system.
3. Remove the pump lid and locking ring.
4. Fill the pump strainer pot with water.
5. Reassemble the pump lid and locking ring onto the strainer basket. The pump is now ready to prime.
6. Open the filter air relief valve and stand clear of the filter.
7. Connect power to the pump. Be sure green power light is on.
8. Press Start/Stop to start the pump. The pump will enter into priming mode (if enabled) and speed up to the maximum speed set in the pump menu settings.
9. When water comes out of the filter air relief valve, close the valve. The system should now be free of air and recirculating water to and from the pool.
10. Do not allow your pump to run longer than 30 minutes time without developing full flow. If the pump does not prime, check your priming settings on the control panel or see the “Troubleshooting” section on pages 24-25.

Priming Features

The default priming setting is ENABLED. The pump also allows you to set the following from the operator control panel:
• Maximum priming time
• Maximum and Minimum speed
• Priming sensitivity (1-100%)
• Priming delay

Set up instructions on page 14.

CAUTION
Do not add chemicals to the system directly in front of pump suction. Adding undiluted chemicals may damage the pump and will void the warranty.

This is a variable speed pump. Typically the lower speeds are used for filtration and heating. The higher speeds can be used for spa jets, water features, and priming.

CAUTION
DO NOT run the pump dry. If the pump is run dry, the mechanical seal will be damaged and the pump will start leaking. If this occurs, the damaged seal must be replaced. ALWAYS maintain proper water level in your pool (half way up skimmer opening). If the water level falls below the skimmer opening, the pump will draw air through the skimmer, losing the prime and causing the pump to run dry, resulting in a damaged seal. Continued operation in this manner could cause a loss of pressure, resulting in damage to the pump case, impeller and seal and may cause property and personal injury.
Using the Operator Control Panel

Use the operator control panel to start and stop the IntelliFlo® Variable Speed Pump, program, set, and change speeds (RPM), and access pump features and settings.

Controls and LEDs on Key Pad

1. **Speed 1**: Press to select Speed 1 (750 RPM). LED on indicates Speed 1 is active.
2. **Speed 2**: Press to select Speed 2 (1500 RPM). LED on indicates Speed 2 is active.
3. **Speed 3**: Press to select Speed 3 (2350 RPM). LED on indicates Speed 3 is active.
4. **Speed 4**: Press to select Speed 4 (3110 RPM). LED on indicates Speed 4 is active.
5. **Select**: Press to select the currently displayed option on the screen.
6. **Escape**: Goes one step back in menu; exits without saving current setting.
7. **Menu**: Accesses the menu items when and if the pump is stopped.
8. **Enter**: Saves current menu item setting. Press this button to acknowledge alarms and warning alerts.
9. **Arrow buttons**:
   - **Up arrow**: Move one level up in the menu or increase a digit when editing a setting.
   - **Down arrow**: Move one level down in the menu or decrease a digit when editing a setting.
   - **Left arrow**: Move cursor left one digit when editing a setting.
   - **Right arrow**: Move cursor right one digit when editing a setting.
10. **Quick Clean**: Pump ramps up to higher RPM for vacuuming, cleaning, adding chemicals, and after a storm for extra skimmer power. LED light is on when active.
11. **Time Out**: Pump is not running on preset schedule. This can be used to allow newly glued pipe joints time to dry before circulation of water starts. LED is on when active.
12. **Start/Stop button**: To start or stop the pump. When LED is on, the pump is running or in a mode to start automatically.
13. **Reset button**: Reset alarm or alert.
14. **LEDs**:
   - **On**: Green light when pump is powered on.
   - **Warning**: On if warning condition is present.
   - **Alarm**: Red LED on if alarm condition occurs. See “Alerts and Warnings” on page 23.
15. **Control Panel LCD Screen**:
   - **Line 1**: Key icon indicates password protect mode is active. If password protect is not enabled, no key icon is displayed. Also shows current time of day.
   - **Line 2**: Displays current pump speed (RPM).
   - **Line 3**: Countdown time and watts
   - **Line 4**: Current pump status and current feature.
Stopping and Starting the Pump

Starting the Pump
1. Be sure the pump is powered on and the green power LED is on.
2. Select one of the speed buttons, then press the Start/Stop button (LED on) to start the pump. The pump will go into priming mode if priming feature is enabled.

Stopping the Pump
1. Press Start/Stop to stop the pump.
When servicing equipment (filters, heaters, chlorinators etc.), disconnect the communication cable, and switch OFF circuit breaker to remove power from the pump.

Note: The pump can automatically restart if the communication cable is connected.

To Adjust and Save a Pump Speed
1. While the pump is running, press the Up or Down arrow to adjust to desired speed setting.
2. Press and hold down a Speed button (1-4) for three (3) seconds to save speed to the button or press Enter to save the speed.

Operating the Pump at Preset Speeds
The pump is programmed with four default speeds of 750, 1500, 2350 and 3110 RPM. Speed buttons 1-4 are for each of the preset speeds as shown below.
1. Be sure the pump is powered on and the green power LED is on.
2. Press the Speed button (1- 4) corresponding to the desired preset speed and release quickly. The LED above the button will turn on.
3. Press Start/Stop. The pump will quickly change to the selected preset speed.

Pump Operating Modes
The IntelliFlo® Variable Speed Pump can be programmed in three different modes: Manual, Schedule, and Egg Timer.

Speeds 1-4 can be programmed in all three modes. Speeds 5-8 can only be programmed in Schedule mode since there are no buttons on the control panel for Speeds 5-8. The default setting for Speeds 5-8 is “Disabled”.

Control Panel Language
The default language is English.
1. Check that the green power LED is on.
2. Press Menu and press Select to select “Settings”.
3. Use the Up or Down arrows and scroll to “Language”.
4. Press Select. Press Select again to highlight current language in use.
5. Press Enter to select the control panel language. To cancel any changes, press Escape to exit without saving.
6. Press Escape to exit.
Operator Control Panel: Pump Menu Guide

Press MENU button to access menus

SETTINGS

- Pump Address
  - (1-16) Default: ADDRESS 1
- Set Time
  - (hr:mm) Default: 12:00 AM
- Set AM/PM
  - AM/PM
  - 24 hr.
- Temperature Unit
  - Fahrenheit - Default: F°
  - C° Celsius
- Screen Contrast
  - (1-5) Default: 3
- Language
  - English - Default: English
  - Français
  - Español
  - Nederlands
  - Italiano
  - Deutsch
  - Português
- Set Min Speed
  - (450 RPM - 1700 RPM) - Default: 450 RPM
- Set Max Speed
  - (1900 RPM - 3450 RPM) - Default: 3450 RPM
- PASSWORD
  - Disabled/Enabled - Default: Disabled
  - Password Time Out (1 min. - 6 hours) Default: 10 minutes
  - Enter Password (xxxx) Default: 1234

SPEED 1-8

- Speed 1 (1-4)
  - Manual
  - Schedule
  - Set Speed - Default: MANUAL
  - Set Speed
  - Set Start Time
  - Set Stop Time
  - Egg Timer
  - Set Speed
  - Time
  - Disabled/Enabled - Default: Disabled
  - Schedule
  - Set Speed
  - Set Start Time
  - Set Stop Time
- Speed 5 (5-8)

EXT CONTROL

- Program 1
  - Speed - Default: 750 RPM
- Program 2
  - Speed - Default: 1500 RPM
- Program 3
  - Speed - Default: 2350 RPM
- Program 4
  - Speed - Default: 3110 RPM

FEATURES

- Time Out
  - Time Out Duration (1 min. to 10 hrs.) Default: 3 hours
- Quick Clean
  - Set Speed (450 - 3450 RPM) Default: 3450 RPM
  - Time (1 min. to 10 hrs.) Default: 10 minutes

PRIMING

- Disabled/Enabled
  - Default: Enabled
  - MAX PRIMING TIME
    - (1 min. to 30 min.) Default: 11 minutes
  - PRIMED SENSITIVITY
    - (1 - 100%) Default: 1
  - PRIMING DELAY
    - (1 second - 10 minutes) Default: 20 seconds

ANTI FREEZE

- Disabled/Enabled
  - Set Speed (450 RPM - 3450 RPM) Default: 1000 RPM
  - PUMP TEMPERATURE
    - 40° F - 50° F (4.4° C - 10° C) Default: 40° F (4.4° C)
Pump Menu: Settings

Pump Address
The default pump address is #1 and only needs to be changed when there is more than one pump on an automation system. Change the address to allow the automation system to send a command to the correct pump.

Use this setting if your pump is connected via the RS-485 COM port to an IntelliTouch®, EasyTouch®, SunTouch® Control System or IntelliComm® Communication Center. For EasyTouch, SunTouch or IntelliComm systems, the pump only communicates with address #1. The pump address can be set from 1-16. The IntelliTouch system can communicate to only four (1-4) pumps.

Note: IntelliFlo® Variable Speed Pumps cannot be connected in series with other pumps.

1. Be sure the green power LED is on and the pump is stopped.
2. Press Menu.
3. Press Select for “Settings”. Press Select again to select “Pump Address”.
4. To change the pump address, press Select.
5. Press Up or Down arrows to change the address number from 1-16.
6. Press Enter to save. To cancel any changes, press Escape to exit without saving.
7. Press Escape to exit.

Set Time
The time controls all scheduled times, functions, and programmed cycles and stores the correct time for up to 96 hours after power is turned off. Reset if the power is off longer than 96 hours.

1. Check that the green power LED is on.
2. Press Menu.
3. Press Select to select “Settings”.
4. Use the Up or Down arrows to scroll to “Set Time” and press Select.
5. Press Select again and use Up or Down arrows to set the time.
   Note: To change AM/PM, increase or decrease numbers until the desired time is displayed.
6. Press Enter to save. To cancel any changes, press Escape to exit without saving.
7. Press Escape to exit.

Set AM/PM or 24 Clock
To change the time from a 12 hour clock (AM/PM) to a 24 hour clock:
1. Press Menu.
2. Press Select to select “Settings”.
3. Use the Up or Down arrows to scroll to “AM/PM.”
4. Press Select to change the setting.
5. Press Up or Down arrows to choose between 24 hr. and AM/PM.
6. Press Enter to save. To cancel any changes, press Escape to exit without saving.
7. Press Escape to exit.

Set Temperature Unit
The default setting is Fahrenheit (°F). The pump can be set to either Celsius (°C) or Fahrenheit (°F). The Anti Freeze protection feature (see page 16) can be set to either Fahrenheit or Celsius.

1. Check that the green power LED is on.
2. Press Menu.
3. Press Select to select “Settings”.
4. Use the Up or Down arrows to scroll to “Temperature Units” menu item. Press Select.
5. Use Up or Down arrows to choose Celsius (°C) or Fahrenheit (°F).
6. Press Enter to save. To cancel any changes, press Escape to exit without saving.
7. Press Escape to exit.

Set Screen Contrast
The default setting for the LCD screen is 3. Screen contrast levels can be adjusted from 1 to 5 units for low or high lighting conditions.

1. Check that the green power LED is on.
2. Press Menu.
3. Press Select to select “Settings”.
4. Use the Up or Down arrow to scroll to “Contrast Level”.
5. Press Select. Screen will show current contrast setting number.
6. Press Select to change the setting and use Up or Down to change number.
7. Press Enter to save. To cancel any changes, press Escape to exit without saving.
8. Press the Escape button to exit.
Set Maximum Speed (RPM)
The maximum speed can be set from 1900 RPM to 3450 RPM (default is 3450). Use this setting to set the maximum running speed of the IntelliFlo® Variable Speed Pump.

When the pump is set to Priming “Enabled”, the pump will speed up to and run at this speed to prime. A service professional must set the Maximum Speed of the pump to not exceed the maximum flow rate of the system on which it will operate.

1. Check that the green power LED is on.
2. Press the Menu button. “Settings” is displayed.
3. Press the Select button. “Pump Address” is displayed.
4. Use the Up or Down arrow button to scroll to “Language”.
5. Press the Select button to access the language menu.
6. Press Select to highlight current Language in use.
7. Press the Enter button to select the desired language for the control panel. To cancel any changes, press the Escape button to exit edit mode without saving.
8. Press the Escape button to exit.

Password Protection
The default setting for password protection is disabled. When this feature is enabled, the pump display will prompt for the password before allowing access to the control panel and buttons.

The entered password is any combination of four (4) digits.
- Password protection can always be turned off by pressing Start/Stop.
- Password protection cannot be turned back on with Start/Stop while running in manual mode.
- Pressing Start/Stop when the pump is off will return it back to the Running Cycles Mode and run at the next scheduled run time. If the present time is within the scheduled run time, the pump will run the scheduled speed.
- All functions including programming are disabled in Password Protection Mode.
- Screen will read “Enter Password” if any button other than the Start/Stop button is pressed.
- Key icon displayed in the upper left side of the screen when Password Protection is on.

Set Minimum Speed (RPM)
The minimum pump speed can be set from 450 RPM to 1700 RPM. The default setting is 450 RPM.
1. Check that the green power LED is on.
2. Press Menu.
3. Press Select to select “Settings”.
4. Use the Up or Down arrows to scroll to “Set Min Speed”.
5. Press Select to change the setting. The cursor will appear in the first number column.
6. Press the Up or Down arrows to change the minimum speed setting from 450 to 1700 RPM.
7. Press Enter to save. To cancel, press Escape to exit edit mode without saving.
8. Press Escape to exit.
Setting Password

1. Check that the green power LED is on.
2. Press Menu. Press Select to select “Settings”.
3. Use the Up or Down arrow to scroll to “Password”.
4. Press Select. The default setting is “Disabled”.
5. Press Up or Down arrow to change the setting to “Enabled” and press Enter to save.
6. Press the Down arrow. “Password Timeout” is displayed.
7. The factory default time is 10 minutes. This means the IntelliFlo® Variable Speed Pump will go into Password Protection mode 10 minutes after the last control panel key is pressed.
8. Press Select to change time setting from 1 minute to 6 hours and press Enter to save.
9. Press Down arrow and then press Select on “Enter Password” to change the setting.
10. Press the Left or Right arrows to move cursor and press Up or Down arrow to change password number to desired setting.
11. Press Enter to save. To cancel any changes, press Escape to exit without saving.

Entering Password

1. Press any button (besides the speed button) to prompt the screen for a password.
2. To enter password, use the Left and Right arrows to move the cursor and the Up and Down arrow button to scroll through the digit then press Enter to confirm.
Pump Operating Modes

The IntelliFlo® Variable Speed Pump can be programmed in three different modes:

- **Manual, Schedule, and Egg Timer.** Speeds 1-4 can be programmed in all three modes. Speeds 5-8 can only be programmed in Schedule mode since there are no buttons on the control panel for Speeds 5-8. The default setting for Speeds 5-8 is “Disabled”.

**Manual**
Assigns a speed to one of the four Speed buttons on the control panel. This mode can only be used for speeds 1-4.
To operate in Manual mode, press one of the four speed buttons and then press the Start/Stop button. The pump will run the assigned speed for that speed button.

**Egg Timer**
Speeds 1-4 can be programmed to run for a duration of time once a speed button is pressed.
To operate in Egg Timer mode, press a speed button and then press Start/Stop. The pump will run that speed for the set amount of time and then turn off.

**Schedule**
Program speeds 1-8 start and stop at a specific time during a 24 hour period. Speeds programmed in Schedule mode will override any manually selected speed (speeds set by manually pressing any of the speed buttons on the control panel).

Set Speeds in Manual or Egg Timer Mode (Speeds 1-4 Only)

1. Press Menu.
2. Use Up or Down arrows to scroll to “Speed 1-8”, then press Select.
3. Use Up or Down arrows to find the speed (1-4) you wish to program.
4. Press Select. Speeds 1-4 default setting is Manual. To set a speed in Manual mode, press the Down arrow (“Set Speed” will display) and press Select to change. Use the Up or Down arrow to adjust speed.
5. Press Enter to save the new speed setting. Continue below to Step 6 to set a speed in Egg Timer mode.
8. Press Select and use arrow keys to adjust time.
9. Press Enter to save the new time setting.
Pump Menu: Speeds 1-8

Set Speeds 1-8 in Schedule Mode

In Schedule mode, Speeds 1-8 can be programmed to run a certain speed at a certain time of day. To run a scheduled speed, press Start/Stop. The screen will display “Running Schedules” when it is ready to run a scheduled speed. If Start/Stop is pressed while a scheduled speed is running, “Running Speed _” will be displayed (see far right image).

1. Press Menu.
2. Use Up or Down arrows to scroll to “Speed 1-8”, then press Select.
3. Use Up or Down arrows and press Select for the speed you wish to set and schedule.
4. Press Select (display will be highlighted) and scroll to “Schedule”.
5. Press Enter.
6. Press Down arrow (“Set Speed” will display) and press Select to change. Use the Up or Down arrow to adjust speed.
7. Press Enter to save the new speed.
8. Press the Down arrow again, “Set Start Time” will display. Press Select - the cursor will highlight the minute column.
9. Use the Up or Down arrow to change the time and the Left or Right arrow to move cursor from minutes to hours.
10. Press Enter to save the new start time setting.
11. Press Down arrow - “Set Stop Time” will display. Press Select. Repeat Steps 8-9 to set stop time.
12. Press Enter to save the new stop time setting.
13. Press Start/Stop.

The IntelliFlo® Variable Speed Pump will prime and begin to run the programmed schedule at the specified start time.

When running in Schedule or Egg Timer mode, the countdown time (T 00:01) showing the hours and minutes remaining is displayed.

Programming Schedule for Constant Run

A speed cannot be programmed with the same start and stop times. To run a speed without stopping, set the Start time one minute after the stop time.

Example: A single speed will run non-stop if programmed with a Start Time of 8:00 AM and a Stop time of 7:59 AM.

Note: The pump will not run the scheduled speeds until the Start/Stop button is pressed (LED on) to place the pump in Schedule mode.

Note: When two speeds are scheduled during the same run time the pump will run the higher RPM Speed regardless of Speed # in use.

Note: The most recent command, Manual or Schedule, takes priority regardless of speed number RPM.

Pump Menu: External Control

External Control

This function is for programming speeds that will run when the IntelliComm® Communication Center sends it a command. For example, Terminal 3 and 4 in the IntelliComm system will correspond to External Control Program #1. (5 and 6 to Ext Ctrl #2).

Use the External Control feature to program the IntelliComm system power center.

To access the External Control menu:

1. Check that the green power LED is on.
2. Press the Menu button.
3. Use Up or Down arrow to scroll to “Ext. Ctrl.”.
4. Press Select. “Program 1” is displayed.
5. Press Select. “750 RPM” is displayed.
6. Press Select. The “RPM” number will highlight.
7. Press Up or Down arrow to change the RPM setting.
8. Press Enter to save the setting.

10. Use Up or Down arrow to scroll to “Program 2”.
11. Repeat Steps 5 through 9 to set Program 2, 3, and 4.

Note: To cancel any changes, press the Escape button to exit without saving.

Note: The countdown time (T 00:01) showing the hours and minutes remaining is displayed.
Pump Menu: Features

Quick Clean

**NOTE:** Quick Clean is the only high-speed override feature of the IntelliFlo® Variable Speed Pump.

This feature can be used to ramp the pump up to a higher RPM for vacuuming, cleaning, adding chemicals, after a storm for extra skimming capability.

Press the Quick Clean button (LED on) and then Start/Stop to start. When the Quick Clean cycle is over, the pump will resume regular schedules and be in “Running Schedule” mode.

**To access the Quick Clean menu:**
1. Check that the green power LED is on.
2. Press Menu.
3. Use Up or Down arrows to scroll to “Features”, then press Select.
4. Press the Down arrow and press Select for “Quick Clean”.
5. Press Select to choose “Set Speed”.
6. Press Select to highlight the “RPM” column and change the speed.
7. Use Up or Down arrows to change the speed.
8. Press Enter to save the speed.
9. Press Escape to exit the menu.

Time Out

This feature can be used to allow newly glued pipe joints time to dry before circulation of the pool water resumes. **The Time Out feature keeps the pump from running it’s programmed speeds.**

Once Time Out is finished, the pump will be in “Running Schedule” mode, the Start/Stop LED will be lit and ready to turn on at the next scheduled run time.

**To access the Time Out menu:**
1. Check that the green power LED is on.
2. Press Menu.
3. Use Up or Down arrows to scroll to “Features”, then press Select.
4. Press Select to choose “Timeout”.
5. Then press Select again to choose “Timeout Duration”.
6. Press Select to change the time. The cursor will highlight the minutes column.
7. Press the Left arrow to move cursor to the hours column. Time out can be set from 1 minute to 10 hours.
8. Press Enter to save the setting.
   **Note:** To cancel any changes, press Escape to exit without saving.
9. Press Escape to exit the menu.

Pump Menu: Priming

The default setting for Priming is ENABLED. This setting allows the pump to automatically detect if it is primed for startup.

The priming feature ramps the pump to 1800 RPM and pauses for three (3) seconds. If there is sufficient water flow in the pump basket, the pump will go out of priming mode and run its commanded speed.

If the water flow is not sufficient, the pump will ramp to the “Max Speed” setting and remain for the priming delay time (default 20 seconds). If there is sufficient water flow in the pump basket at this time, it will go out of priming mode and ramp to the commanded speed.

If there is still insufficient flow in the pump basket, the pump will try to prime at the “Maximum Speed” for the amount of time set up in the “Maximum Priming Time” menu.

**Continue onto the next page for Priming Features**
Setting Priming Features

1. Press **Menu**.
2. Use **Down** arrow to scroll to “Priming” and press **Select**.
3. The factory default is set to priming “Enabled”. To disable, press **Select**.
4. Press **Enter** if you have changed the setting - this will save the selection.
5. Press the **Down** arrow - the screen will read “Max Priming Time”.
6. To change from factory default, press **Select**. The cursor will highlight.
7. Use the **Up** or **Down** arrows to change the time from 1 minute to 30 minutes.
8. Press **Enter** to save.
9. Press the **Down** arrow - the screen will read “Primed Sensitivity”. Default is “1”.
10. Press **Select** to change the priming sensitivity. The cursor will highlight the number.
11. Use the **Up** or **Down** arrows to change from 1% to 100%. Increasing the number makes the Priming less sensitive.
12. Press **Enter** to save.
13. Press the **Down** arrow - the screen will read “Priming Delay”. Default is 20 seconds.
14. Press **Select** to change the priming delay time.
15. Use the **Up** or **Down** arrows to change from 1 second to 10 minutes.
   **Caution:** Increasing the time causes the pump to stay in the priming mode longer.
16. Press **Enter** to save the setting.
17. Press **Escape** to exit.
Disabling Priming with an Automation System

When the IntelliFlo® Variable Speed Pump is connected to an automation control system, (IntelliTouch®, EasyTouch® or SunTouch® Control Systems), the priming feature on the pump cannot be disabled by the external automation control system only. It must also be disabled on the pump itself.

If priming is enabled on start up, the pump responds to its internal settings before responding to commands from an automation control system.

If the pump is connected to an automation control system and priming is not desired, disable the priming feature on both the pump and the automation control system.

To disable priming with an automation system:

1. Disable the priming feature on the automation control system at the load center or using an IntelliTouch or EasyTouch system remote. (Refer to the automation control system user’s guide for additional information).
2. Temporarily disconnect the RS-485 communication cable.
3. Open the lid to the control panel to disable priming on the pump. Press Menu, use the arrow buttons to scroll and select “Priming”, then select “Disabled” (the factory default is set to “Enabled”). Press Enter to save the setting. Press Escape to exit the menu.
4. Once priming is disabled, reinstall the RS-485 communication cable.
The sensor for Anti Freeze is in the drive, on top of the motor. This feature allows you to set a speed (450 RPM - 3450 RPM) that runs when the IntelliFlo® Variable Speed Pump goes into anti freeze mode. The temperature level that you wish anti freeze mode to start can also be set.

**IMPORTANT NOTE:** This feature is for protection of the pump. Do not depend on the anti freeze feature for freeze protection of the pool. Certain situations could cause the pump to sense a different temperature than actual air temperature.

Your automation systems air temperature sensor should be used to sense actual temperature. For example, if the pump is located indoors, the temperature of the room does not indicate the outdoor temperature. The pump does not sense the water temperature.

**To access the Anti Freeze menu:**
1. Check that the green power LED is on.
2. Press **Menu**.
3. Use the **Down** arrow to scroll to “Anti Freeze” and press **Select**.
4. The factory default for Anti Freeze is “Enabled”. To disable Anti Freeze, press **Select** to highlight “Enabled”.
5. Press the **Up** arrow - “Disabled” is displayed.
6. Press **Enter** to save.

**To Set Anti Freeze Speed and Pump Temperature:**
1. With Anti Freeze displayed on the screen, press the **Down** arrow - “Set Speed” is displayed. The factory default is 1000 RPM.
2. Press **Select** to change the speed. The cursor will highlight the first column (ones).
3. Use the **Up** or **Down** arrows to set speed (450 - 3450 RPM).
4. Press **Enter** to save the speed.
5. Press the **Down** arrow to Pump Temperature (the temperature the pump will activate AntiFreeze, default is 40° F/4.4° C).
6. Press **Select** to change the setting. The cursor will highlight the first column. Can be set 40° F to 50° F (4.4° C - 10° C).
7. Press **Enter** to save the temperature setting.

**Note:** To cancel any changes, press **Escape** to exit without saving.

8. Press **Escape** to exit.
External Control with IntelliComm® Communication Center

Use the RS-485 communications cable to remotely control the Intelliflo® Variable Speed Pump from an IntelliComm communication center. The IntelliComm system provides four (4) pairs of input terminal connections. These inputs are actuated by either 15 - 240 VAC or 15 - 100 VDC. Use the device inputs, to control the programmed pump speeds.

**Note:** For the pump to accept commands from the IntelliComm system, the pump must be in the “Running Schedules” mode (LED above Start/Stop button is on). If more than one input is active, the highest number will be communicated to the pump. The IntelliComm system will always communicate to pump using ADDRESS #1.

**Program Number Priority**

If programs 1 and 2 are activated, program 2 will run, regardless of the assigned speed (RPM). The higher program number will always take priority.

Refer back to page 12 for instructions for setting up Programs in the External Control menu.

External Control is for programming speeds that will run when the IntelliComm communication center controller sends it a command.

For example, Terminal 3 and 4 in IntelliComm system will correspond to External Control Program #1. (5 and 6 to Ext Ctrl #2). Use the External Control feature to program the IntelliComm communication center.

### Wiring Terminal Descriptions for IntelliComm Communication Center

<table>
<thead>
<tr>
<th>Terminal Number</th>
<th>Terminal Name</th>
<th>Voltage</th>
<th>Max. Current</th>
<th>Phase Type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Power Supply</td>
<td>100 - 240 VAC</td>
<td>100 mA</td>
<td>1 Input</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>3-4</td>
<td>Program 1</td>
<td>15 - 240 VAC or 15 - 100 VDC</td>
<td>1 mA</td>
<td>1 Input</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>5-6</td>
<td>Program 2</td>
<td>15 - 240 VAC or 15 - 100 VDC</td>
<td>1 mA</td>
<td>1 Input</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>7-8</td>
<td>Program 3</td>
<td>15 - 240 VAC or 15 - 100 VDC</td>
<td>1 mA</td>
<td>1 Input</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>9-10</td>
<td>Program 4</td>
<td>15 - 240 VAC or 15 - 100 VDC</td>
<td>1 mA</td>
<td>1 Input</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>11-12</td>
<td>RS-485</td>
<td>-5 to +5 VDC</td>
<td>5 mA</td>
<td>1 Output</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>- Data: Yellow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Data: Green</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connecting to EasyTouch® and IntelliTouch® Control Systems

The pump can be controlled by an EasyTouch or IntelliTouch system via the RS-485 communication cable. The EasyTouch and/or IntelliTouch control system starts, stops and controls the speed of the pump.

EasyTouch and/or IntelliTouch systems rewrite the pump memory when a command is given. This can take several seconds and can cause a delay until the pump physically responds.

The pump control panel is disabled when communicating with an EasyTouch and/or IntelliTouch system. **The EasyTouch and/or IntelliTouch system will not start communicating with the pump until the pump is assigned to a circuit.** The default pump address is “1” (only address for EasyTouch system).

See page 8 for details about how to check and or set the pump address. For more information, refer to the IntelliTouch (P/N 520100) or EasyTouch automation system User’s Guide (P/N 520584).

To connect the IntelliFlo® Variable Speed Pump communication cable to EasyTouch® or IntelliTouch® Control System load center:

1. Switch the main power off to the load center.
2. Unlatch the two enclosure door spring latch, and open the door.
3. Remove the two retaining screws securing the high voltage cover panel, and remove it from the enclosure.
4. Loosen the two access screws securing the control panel.
5. Lower down the hinged control panel to access the EasyTouch or IntelliTouch control system circuit board.
6. Route the communication cable into the plastic grommet (located on the lower left side of the load center), up through the low voltage raceway to the EasyTouch or IntelliTouch system circuit board.
7. Strip back the cable conductors 6 mm (1/4”). Insert the two wires into the COM port screw terminals on the EasyTouch and/or IntelliTouch system circuit board. Secure the wires with the screws.
8. **EasyTouch COM port (J20):** Connect the GREEN (#2) and YELLOW (#3) wires to the COM port (J20) screw terminals (#2 and #3). Be sure to match the color coding of the wires; YELLOW to YELLOW and GREEN to GREEN. The Red wire is not connected. Secure the wires with the screws.

**Note:** Multiple wires may be inserted into a single screw terminal.

9. Close the control panel into its original position and secure it with the two screws.
10. Install the high voltage cover panel and secure it with the two retaining screws.
11. Close the load center front door. Fasten the spring latch.
12. Switch the power on to the load center.

---

**Diagram:**

- Control Panel Access Screw
- Control Panel Access Screw
- Retaining Screws (for High Voltage Cover Panel)
- Front Door
- High Voltage Cover Panel
- Grommet (to Low Voltage Raceway)
- EasyTouch and/or IntelliTouch Control System Load Center
- EasyTouch Control System Circuit Board
- Indoor Control Panel
- IntelliChlor
- IntelliFlo
- RF Transceiver

**Diagram:**

- EasyTouch COMPORT (J20)
- EasyTouch Control System Circuit Board
- IntelliTouch Personality Board COM PORT (J7/J8)
Connecting the Pump to a SunTouch® Control System

The IntelliFlo® Variable Speed Pump can be controlled by a SunTouch system via the RS-485 communication cable.

To connect the pump RS-485 communication cable to the SunTouch control system circuit board:

1. Unlatch the front door of the SunTouch system power center and open the door.
2. Loosen the retaining screw on front panel. Open the hinged front panel to access the electronics compartment.
3. Route the two conductor cable up through the power center grommet opening located on the left side, and up through the low voltage raceway to the motherboard.
4. Strip back the cable conductors 6 mm (1/4”). Insert the wires into the screw terminals (provided). Secure the wires with the screws. Be sure to match the color coding of the wires; YELLOW to YELLOW and GREEN to GREEN.
5. Insert the connector on the COMPORT (J11) screw terminal on the SunTouch system circuit board.
6. Close the control panel and secure it with the retaining screw.
7. Close the front door. Fasten the spring latch.

WARNING: Switch OFF main system power to the SunTouch system power center before making any connections.

SunTouch Control System Circuit Board
MAINTENANCE

WARNING
DO NOT open the strainer pot if IntelliFlo® Variable Speed Pump fails to prime or if pump has been operating without water in the strainer pot. Pumps operated in these circumstances may experience a build up of vapor pressure and may contain scalding hot water. Opening the pump may cause serious personal injury. In order to avoid the possibility of personal injury, make sure the suction and discharge valves are open and strainer pot temperature is cool to touch, then open with extreme caution.

To prevent damage to the pump and for proper operation of the system, clean pump strainer and skimmer baskets regularly.

Pump Strainer Basket
The strainer basket (or 'strainer pot'), is located in front of the pump housing. The strainer basket must be kept clean and free of debris. Inspect basket through the lid on the top of the housing. Be sure to visually inspect the strainer basket at least once a week. Dirty strainer baskets reduce filter and heater efficiency and put abnormal stress on the pump motor.

Cleaning the Pump Strainer Basket
1. Press Start/Stop button on the pump and turn off the pump at the circuit breaker. Disconnect communication cable from pump.
2. Relieve pressure in the system.
3. Turn the lid and clamp counter-clockwise and remove from the pump.
4. Remove debris and rinse out the basket. Replace the basket if it is cracked.
5. Put the basket back into the housing. Be sure to align the notch in the bottom of the basket with the rib in the bottom of the volute.
6. Fill the pump pot and volute up to the inlet port with water.
7. Clean the lid and clamp, O-ring, and sealing surface of the pump pot.
   Note: It is important to keep the lid O-ring clean and well lubricated.
8. Reinstall the lid by placing the clamp and lid on the pot. Be sure the lid O-ring is properly placed. Seat the clamp and lid on the pump then turn clockwise until the locking ring handles are horizontal.
9. Turn the power “ON” at the circuit breaker. Reconnect communication cable from pump.
10. Open the manual air relief valve on the top of the filter. Stand clear of the filter.
11. Wait until all pressure is relieved. Start the pump.
12. Bleed air from the filter until a steady stream of water comes out of the filter air relief valve. Close the manual air relief valve.

WARNING
THIS SYSTEM OPERATES UNDER HIGH PRESSURE. When any part of the circulating system (e.g., Lock Ring, Pump, Filter, Valves, etc.) is serviced, air can enter the system and become pressurized. Pressurized air can cause the lid to separate which can result in serious injury, death, or property damage. To avoid this potential hazard, follow above instructions.

Winterizing
To protect the pump electronics from freeze damage, the pump will switch on to generate internal heat as the temperature drops below freezing. The Anti Freeze feature on the pump is not intended to protect the system plumbing from freezing.

• In mild climate areas, when temporary freezing conditions may occur, run your filtering equipment all night to prevent freezing.
• You are responsible for determining when freezing conditions may occur. If freezing conditions are expected, take the following steps to reduce the risk of freeze damage. Freeze damage is not covered under warranty.

To prevent freeze damage, follow the procedures below:
1. Shut off electrical power for the pump at the circuit breaker.
2. Drain the water out of the pump housing by removing the two thumb-twist drain plugs from the housing. Store the plugs in the pump basket.
3. Cover the motor to protect it from severe rain, snow and ice.

Note: Do not wrap motor with plastic or other air tight materials during winter storage. The motor may be covered during a storm, winter storage, etc., but never when operating or expecting operation.
To remove and repair the motor subassembly, follow the steps below:

1. Turn off the pump circuit breaker at the main panel.
2. Disconnect the RS-485 communication cable from the pump (if connected to pump).
3. Drain the pump by removing the drain plugs. No tools are required.
4. Remove (3) Phillips head screws from the top of the device located under the key pad cover.
5. Remove the drive by lifting upward to pull off the motor.
6. Use the 9/16 inch wrenches to remove the six bolts that hold the housing (strainer pot/volute) to the rear subassembly.
7. Gently pull the two pump halves apart, removing the rear subassembly.
8. Use a 3/32 inch Allen head wrench to loosen the two holding screws located on the diffuser.
9. Hold the impeller securely in place and remove the impeller lock screw by using a Phillips head screwdriver. The screw is a left-handed thread and loosens in a clockwise direction.
10. Use a 1/4 inch flat blade screwdriver to hold the motor shaft. The motor shaft has a slot on the end which is accessible through the center of the fan cover.

**Note:** If the torque is too high to hold the screwdriver by hand then an adjustable wrench may be used to hold the screwdriver shaft in place. Use locking pliers instead if your screwdriver has a round shaft.

11. To unscrew the impeller from the shaft, twist the impeller counterclockwise.
12. Remove the four bolts from the seal plate to the motor, using a 9/16 inch wrench.
13. Place the seal plate face down on a flat surface and tap out the carbon spring seat.

**Motor Care**

**Protect from heat**
1. Shade the motor from the sun.
2. Any enclosure must be well ventilated to prevent overheating.
3. Provide ample cross ventilation.

**Protect against dirt**
1. Protect from any foreign matter.
2. Do not store (or spill) chemicals on or near the motor.
3. Avoid sweeping or stirring up dust near the motor while it is operating.
4. If a motor has been damaged by dirt it may void the motor warranty.
5. Clean the lid and clamp, O-ring, and sealing surface of the pump pot.

**Protect against moisture**
1. Protect from continuous splashing or continuous sprayed water.
2. Protect from extreme weather such as flooding.
3. If motor internals have become wet - let it dry before operating. Do not allow the pump to operate if it has been flooded.
4. If a motor has been damaged by water it may void the motor warranty.

**Shaft Seal Replacement**
The Shaft Seal consists primarily of two parts, a rotating ceramic seal housed in the impeller and a stationary spring seal in the sealplate. The pump requires little or no service other than reasonable care, however, a shaft seal may occasionally become damaged and must be replaced.

**Note:** The polished and lapped faces of the seal could be damaged if not handled with care.
Pump Reassembly

1. When installing the replacement shaft seal, use silicone sealant on the metal portion before pressing into the seal plate as shown. **Note:** Use extreme care when applying sealant. Be sure no sealant contacts the seal plate surface or the ceramic seal. Allow sealant to cure overnight before reassembling.

2. Before installing the rotating portion of the seal into the impeller, be sure the impeller is clean. Use a light density soap and water to lubricate the inside of the seal. Press the seal into the impeller with your thumbs and wipe off the ceramic and carbon faces with a clean cloth.

3. Remount the seal plate to the motor.

4. Grease the motor shaft thread and screw impeller onto the motor shaft.

5. Screw in the impeller lock screw (counterclockwise to tighten).

6. Remount the diffuser onto the seal plate. Be sure the plastic pins and holding screw inserts are aligned.

7. Grease the diffuser o-ring and seal plate gasket prior to reassembly.

8. Assemble the motor subassembly to the pump housing by using the two (2) through bolts for proper alignment. Do not tighten the through bolts until all six (6) bolts are in place and finger tightened.

**Note:** Ensure that the seal plate gasket is properly seated inside of the pump assembly. The seal gasket can be pinched between the seal plate and the pump housing while tightening these six screws, preventing a proper seal and producing a slow leak when the pump is restarted.

9. Reinstall the drive onto the top of the motor.

10. Fill the Intelliflo® Variable Speed Pump with water.

11. Reinstall the pump lid and plastic clamp. See “Cleaning the Pump Strainer Basket” on page 20 for details.

12. Reconnect the RS-485 communication cable to the pump.

13. Prime the pump; refer to “Priming the Pump” on page 4.

Drive Assembly Removal and Installation

**WARNING**
To avoid dangerous or fatal electrical shock hazard, switch OFF power to motor before working on pump or motor.

**CAUTION**
To avoid electrical hazard, do not remove the four tamper proof screws from the motor assembly.

To remove the drive and control panel from the motor assembly:

1. Be sure all electrical breakers and switches are turned off before removing the drive.

2. Disconnect the RS-485 communication cable from the pump.

3. Open the keypad cover.

4. Remove the three Phillips head screws securing the drive to the motor assembly as shown on the next page.

5. Lift up the drive assembly and remove it from the motor adapter located on top of the motor assembly.

**Note:** Be careful not to remove the gasket and orange post caps located between the drive and motor. The gasket is critical in keeping moisture out of the drive and motor and should be replaced if damaged. Do not reassemble with a damaged or missing gasket or post-caps.

Continue onto next page
Alerts and Warnings

The INTELLIFLO® Variable Speed Pump displays all alarms and warnings on the control panel display. When an alarm or warning condition exists, the corresponding light will be lit on the display.

All control panel buttons are disabled until the alarm or warning is acknowledged with the Enter button. Press the Reset button to clear the alarm once the fault condition has been resolved.

Note: The pump will not start if the impeller is rotating.

Power Out Failure

The incoming supply voltage is less than 170 VAC. The drive faults to protect itself from over current. The drive contains capacitors that keep it powered up long enough to save the current run parameters. If power is restored during this process, approximately 20 seconds, the drive will not restart until completed.

Priming Error

If the pump is not defined as primed within the “Max Priming Time” it will stop and generate a “Priming Alarm” for 10 minutes, then attempt to prime again. The “Max Priming Time” is set by the user on the priming menu as discussed on page 13. If the pump cannot prime within five attempts it will generate a permanent alarm that must be manually reset.

Overheat Alert

If the drive temperature gets above 54.4°C (130°F) the pump will slowly reduce speed until the over temperature condition clears.

Anti-Freezing

When active, the motor will run at the preset RPM until the drive temperature increases above the minimum. The pump’s internal antifreeze protection is disabled when connected to an automation system. Freeze protection is provided by selecting YES at the ON WITH FREEZE portion of the circuit function menu in the IntelliTouch® control system. To re-enable the internal antifreeze protection, the power to the drive must be cycled off then back on. Important: See explanation of Anti-Freeze mode on page 16.

Over Current

Indicated that the drive is overloaded or the motor has an electrical problem. The drive will restart 20 seconds after the over current condition clears.

Over Voltage

Indicates excessive supply voltage or an external water source is causing the pump and motor to rotate thereby generating an excessive voltage on the drives internal DC buss. The drive will restart 20 seconds after the over voltage condition clears.

Drive Assembly Removal and Installation

To install the drive assembly onto the motor assembly:

1. Be sure all electrical breakers and switches are turned off before installing the drive.
2. Be sure that the gasket between the drive and motor is in place. It is critical in keeping moisture out of the drive and motor. Replace the gasket if damaged. Do not reassemble with a damaged or missing gasket.
3. Verify that the three (3) orange motor post caps are in position before placing the drive on the motor assembly.
4. Align the drive assembly with the motor adapter and seat the drive on the motor assembly.
5. Secure and tighten the drive assembly with the three Phillips head screws.

---

**WARNING**

FIRE and BURN HAZARD - The pump motor may run at a high temperatures. To reduce the risk of fire, do not allow leaves, debris, or foreign matter to collect around the pump motor. To avoid burns when handling the motor, shut off the motor and allow it to cool for 20 minutes before servicing. The pump provides an automatic internal cutoff switch to protect the motor from heat damage during operation.
## TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump failure.</strong></td>
<td>Pump will not prime - Air leak in suction. PRIME ERROR may be displayed.</td>
<td>Check suction piping and valve glands on any suction gate valves. Secure lid on pump strainer pot and be sure lid gasket is in place. Check water level to be sure skimmer is not drawing air.</td>
</tr>
<tr>
<td>(For alert display messages, refer to Alerts and Warnings on page 23).</td>
<td>Pump will not prime - Not enough water.</td>
<td>Be sure the suction lines, pump, strainer, and pump volute are full of water.</td>
</tr>
<tr>
<td></td>
<td>Pump does not come out of prime.</td>
<td>Adjust prime sensitivity to a higher setting (default setting is 1%).</td>
</tr>
<tr>
<td></td>
<td>Pump stainer gasket is clogged.</td>
<td>Clean pump strainer pot.</td>
</tr>
<tr>
<td></td>
<td>Pump strainer gasket is defective.</td>
<td>Replace gasket.</td>
</tr>
<tr>
<td><strong>Reduced capacity and/or head.</strong></td>
<td>Air pockets or leaks in suction line. PRIME ERROR may be displayed.</td>
<td>Check suction piping and valve glands on any suction gate valves.</td>
</tr>
<tr>
<td>(For alert display messages, refer to Alerts and Warnings on page 23).</td>
<td>Clogged impeller.</td>
<td>Turn off electrical power to the pump.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remove the (6) bolts that holds the housing (strainer pot/volute) to seal plate. Slide the motor and seal plate away from the volute.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clean debris from impeller. If debris cannot be removed, complete the following steps:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Remove diffuser and o-ring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Remove left hand thread anti-spin bolt and o-ring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Remove, clean and reinstall impeller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Reinstall anti-spin bolt and o-ring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reinstall diffuser, and o-ring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reinstall motor and seal plate into volute.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reinstall clamp band around seal plate and volute and tighten securely.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clean suction trap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clean pump strainer pot</td>
</tr>
<tr>
<td><strong>Pump trips and restarts constantly.</strong></td>
<td>Air in system.</td>
<td>Bleed air from filter. Be sure air bubbles are not visible coming into pump pot.</td>
</tr>
<tr>
<td></td>
<td>Suction lift above design limits.</td>
<td>Insert vacuum gauge into pump port connection port.</td>
</tr>
<tr>
<td></td>
<td>Blocked suction / Blocked discharge</td>
<td>Confirm vacuum level is 25 in. mercury (hg) or less.</td>
</tr>
<tr>
<td></td>
<td>System flow too high. System changing flow too quickly. In floor cleaning system issues.</td>
<td>Stop pump and clear blockage.</td>
</tr>
<tr>
<td></td>
<td>Priming not enabled.</td>
<td>Reduce system flow. Change speed. Reduce water flow. In floor cleaning systems must be designed with balanced hydraulic losses on all legs.</td>
</tr>
<tr>
<td></td>
<td>Issues related to other equipment, such as Heat Pumps and Heaters with internal valves that vibrate.</td>
<td>Enable priming from the “PRIMING” menu.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lowering ramp speed below 200 RPM may resolve the issue or addition of external manual valve controls, may resolve issue.</td>
</tr>
</tbody>
</table>
## Troubleshooting, Continued

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inadequate circulation.</strong></td>
<td>Filter or pump basket dirty.</td>
<td>Check trap basket; if plugged, turn pump off and clean basket.</td>
</tr>
<tr>
<td>(For alert display messages, refer to Alerts and Warnings on page 23).</td>
<td>Suction/discharge piping is too small.</td>
<td>Check and clean pool filter.</td>
</tr>
<tr>
<td></td>
<td>Speed is set too slow for proper filtration cycle.</td>
<td>Increase piping size.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase filtration run time</td>
</tr>
<tr>
<td><strong>Electrical problem.</strong></td>
<td>Could appear as a “Low Voltage” alarm. PRIME ERROR may be displayed.</td>
<td>Check voltage at motor terminals and at panel while pump is running. If low, see wiring instructions or consult power company.</td>
</tr>
<tr>
<td>(For alert display messages, refer to Alerts and Warnings on page 23).</td>
<td>Could appear as “Over Heat” alert. PRIME ERROR may be displayed.</td>
<td>Check for loose connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check line voltage; if less than 90% or more than 110% of rated voltage consult a licensed electrician.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase ventilation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduce ambient temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tighten any loose wiring connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motor internal terminal overload protector is open.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motor runs too hot. Turn power to motor off.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for proper voltage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for proper impeller or impeller rubbing.</td>
</tr>
<tr>
<td><strong>Mechanical Troubles and Noise.</strong></td>
<td>The pump motor is running but with loud noise.</td>
<td>If suction and discharge piping are not adequately supported, pump assembly will be strained. Do not mount pump on a wooden platform! Securely mount on concrete platform for quietest performance.</td>
</tr>
<tr>
<td></td>
<td>Foreign matter (gravel, metal, etc.) in pump impeller.</td>
<td>Disassemble pump, clean impeller, follow pump service instructions for reassembly.</td>
</tr>
<tr>
<td></td>
<td>Cavitation.</td>
<td>Improve suction conditions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase pipe size.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decrease number of fittings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase discharge pressure.</td>
</tr>
<tr>
<td><strong>Pump does not respond to IntelliTouch, EasyTouch, SunTouch, IntelliComm system commands.</strong></td>
<td>Improper automation setup.</td>
<td>1. Be sure that the communication cable is connected at both ends.</td>
</tr>
<tr>
<td></td>
<td>Communication network inoperative.</td>
<td>2. Check that the pump local address matches with the address used in the IntelliTouch control system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Check that the pump has been assigned a circuit name on the IntelliTouch control system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Ensure that the pump display says “DISPLAY NOT ACTIVE”. A defective device on the network can inhibit the proper operation of other network device. Devices should be disconnected sequentially until the network starts working.</td>
</tr>
</tbody>
</table>
### REPLACEMENT PARTS

**IntelliFlo® Variable Speed Pump Replacement Parts (Almond Colored Pumps)**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>070387</td>
<td>BASKET AQ &amp; WF</td>
</tr>
<tr>
<td>2</td>
<td>070429</td>
<td>BOLT HEX HD, 2-56x0.875 s/s, (QTY 4)</td>
</tr>
<tr>
<td>3</td>
<td>070430</td>
<td>BOLT 3/8 - 16 X 1¼ HEX CAP 18-8 s/s, (QTY 4)</td>
</tr>
<tr>
<td>4</td>
<td>070431</td>
<td>BOLT 3/8 - 16 X 2 HEX CAP 18-8 s/s, (QTY 2)</td>
</tr>
<tr>
<td>5</td>
<td>070927</td>
<td>FOOT WF - PUMP MOTOR SUPPORT</td>
</tr>
<tr>
<td>6</td>
<td>070929</td>
<td>FOOT INSERT WF PUMP</td>
</tr>
<tr>
<td>7</td>
<td>071131</td>
<td>PLUG DRAIN WFE (ALMOND) (QTY 2)</td>
</tr>
<tr>
<td>8</td>
<td>071403</td>
<td>NUT 3/8 - 16 BRASS NICKEL PLATED, (QTY 2)</td>
</tr>
<tr>
<td>9</td>
<td>071406</td>
<td>NUT ¼ - 20 HEX s/s (QTY 2)</td>
</tr>
<tr>
<td>10</td>
<td>355227</td>
<td>O-RING 238, 3.484x0.139, Buna-N 70</td>
</tr>
<tr>
<td>11</td>
<td>071652</td>
<td>SCREW ¼-20 X 1 LH PHILLIPS PAN MS 18-8 s/s</td>
</tr>
<tr>
<td>12</td>
<td>071657</td>
<td>SCREW ¼ - 20 X 1 in. HEX CAP 18-8 s/s, (QTY 3)</td>
</tr>
<tr>
<td>13</td>
<td>071660</td>
<td>SCREW SET 4-40 X 1-1/8 WFE SCKT CAP 18-8 s/s (QTY 2)</td>
</tr>
<tr>
<td>14</td>
<td>072183</td>
<td>WASHER FLAT ¼ X 5/8 20 GA THICK 18-8 s/s (QTY 2)</td>
</tr>
<tr>
<td>15</td>
<td>072184</td>
<td>WASHER 3/8 ID X 7/8 OD .05 THICK 18-8 s/s, (QTY 6)</td>
</tr>
<tr>
<td>16</td>
<td>072928</td>
<td>DIFFUSER ASSEMBLY WFE 12</td>
</tr>
<tr>
<td>17</td>
<td>073131</td>
<td>IMPELLER WFE 12 1000 SER</td>
</tr>
<tr>
<td>18</td>
<td>075713</td>
<td>RUBBER WASHER WFE PUMP</td>
</tr>
<tr>
<td>19</td>
<td>192115</td>
<td>O-RING 112, 0.487x0.103 Buna-N 70 (QTY 2)</td>
</tr>
<tr>
<td>20</td>
<td>350013</td>
<td>O-RING LID CH/WF 2-436</td>
</tr>
<tr>
<td>21</td>
<td>350015</td>
<td>HOUSING WFE (ALMOND)</td>
</tr>
</tbody>
</table>

### Additional Notes:

- 355267 Union Kit: Includes two complete unions for one pump (not included with the pump)
- 350601 Drive Control Cover Assy. Kit: Almond (contains drive Variable Speed, drive lid screws orange spacer caps) - (Items 22, 23)
- 350612 Hardware/gasket Assy. Kit: Includes 3 screws, 3 spacer caps and drive gasket
- 357149 Almond Housing/Seal Plate Replacement Kit: Items 1, 7 (QTY 2), 19 (QTY 2), 20, 29, 30, 31, 34, 35

Note: (*) Not serviceable parts.
Pump Dimensions

Pump Performance Curves

Electrical Specifications
Circuit Protection: Two-pole 20 AMP device at the Electrical Panel.
Input: 230 VAC, 50/60 Hz, 3200 Watts, 1 phase
Press MENU button to access menus

| SETTINGS | Pump Address | (1-16) Default: ADDRESS 1 |
|          | Set Time     | (hr:mm) Default: 12:00 AM |
|          | Set AM/PM    | AM/PM 24 hr. |
|          | Temperature Unit | Fahrenheit - Default: F° C° Celsius |
|          | Screen Contrast | (1-5) Default 3 |
|          | Language     | English - Default: English Español Français Nederlands Italiano Deutsch Português |
|          | Set Min Speed | (450 RPM - 1700 RPM) - Default: 450 RPM |
|          | Set Max Speed | (1900 RPM - 3450 RPM) - Default: 3450 RPM |
|          | PASSWORD     | Disabled/Enabled - Default: Disabled Password Time Out (1 min. - 6 hours) Default: 10 minutes Enter Password (xxxx) Default: 1234 |

| SPEED 1-8 | Speed 1 (1-4) | Manual Schedule | Set Speed - Default: MANUAL Set Speed Set Start Time Set Stop Time Egg Timer Set Speed Time Speed 5 (5-8) | Set Min Speed | Set Max Speed |
|           |              | Disables/Enabled | Default: Disabled Schedule | Set Speed Schedule | Set Speed Set Start Time Set Stop Time |

| EXT CONTROL | Program 1 | Speed - Default: 750 RPM |
|             | Program 2 | Speed - Default: 1500 RPM |
|             | Program 3 | Speed - Default: 2350 RPM |
|             | Program 4 | Speed - Default: 3110 RPM |

| FEATURES | Time Out | Time Out Duration (1 min. to 10 hrs.) Default: 3 hours |
|          | Quick Clean | Set Speed (450 - 3450 RPM) Default: 3450 RPM Time (1 min. to 10 hrs.) Default: 10 minutes |

| PRIMING | DISABLED/ENABLED | Default: Enabled |
|         | MAX PRIMING TIME | (1 min. to 30 min.) Default: 11 minutes |
|         | PRIMED SENSITIVITY | (1 - 100%) Default: 1 |
|         | PRIMING DELAY | (1 second - 10 minutes) Default: 20 seconds |

| ANTI FREEZE | DISABLED/ENABLED | Default: Enabled |
|             | SET SPEED | Set Speed (450 RPM - 3450 RPM) Default: 1000 RPM |
|             | PUMP TEMPERATURE | 40° F - 50° F (4.4° C - 10° C) Default: 40° F (4.4° C) |
INTELLIFLOXF® VARIABLE SPEED
ULTRA HIGH PERFORMANCE PUMP (CONT’D)

Dimensions and Performance*

![Graph showing performance and dimensions](image)

**Pump Dimensions**

- **Height to 1/2" NPT Conduit Receptacle:** 6.5 in (166 mm)
- **Height:** 6.6 in (168 mm)
- **Anchor Bolt Mounting Locations:**
  - 10.2 in (258 mm)
  - 10.4 in (263 mm)
  - 4.4 in (113 mm)

*See page 500 for replacement parts.*
Chemical Automation is now recognized as a must for many applications such as swimming pools, spas, cooling towers and industrial water treatment. With its advanced microprocessor-based technology, the CHEMTROL® PC2100 Programmable Controller introduces a new standard of sophistication in automated control of sanitizers (chlorine or bromine), oxidizers and pH.

**STANDARD FEATURES**
- Large 8-line LCD DISPLAY for easy operation,
- ORP CONTROL of sanitizer and/or oxidizer activity,
- pH CONTROL with choice of acid or base feed,
- Programmable SHOCK TREATMENT and CHEMICAL SAVINGS cycles,
- LANGLEYER SATURATION INDEX for water balance,
- AUTOMATIC DATA LOGGING for up to 999 tests,
- USB and Micro SD ports for program updates and data logging,
- Safety FLOW SWITCH,
- FULL SCREEN MENUS in English, French or Spanish,
- Screen displays in US or METRIC UNITS,
- COMPATIBLE with all COMMON SANITIZERS AND OXIDIZERS.

**OPTIONS**
- FREE CHLORINE SENSOR with direct readings in PPM or mg/l,
- FLOW CELL assembly with clear cover and 3 valves,
- Programmable HEATER control,
- CONDUCTIVITY or TOTAL DISSOLVED SOLIDS (TDS) control,
- 4-20 mA Outputs for BMS or PLC control,
- REMOTE COMPUTER OPERATION and GRAPHIC DATA DISPLAY under Windows™.

**SIMPLE AND RELIABLE**
The CHEMTROL® PC2100 is a user-friendly and reliable controller that is easy to install and operate. All menus are displayed in clear language in English, French or Spanish with choice of US or metric units. Every unit is supplied with a comprehensive operation manual plus on-site start-up and training by a Qualified Dealer and a FIVE-YEAR electronics warranty.

**EXTENDED TECHNICAL SUPPORT**
The cost and frustration of service calls and downtimes are greatly reduced with two proprietary features of the CHEMTROL® PC2100:
- the patented Probe Alert Safeguard* constantly monitors the response of the ORP and pH probes and alerts the operator in case of probe failure,
- the CHEMCOM Program for Windows™ allows immediate technical support from our Service Department or from a Qualified Dealer by remote computer with true duplex operation.

Technical support from CHEMTROL® is based on our experience with over 30,000 installations worldwide. It is also available by toll-free phone, by fax or by e-mail.

* U.S. Patent 5,895,565

Visit our Web Site at www.sbcontrol.com or call today for a free demo CD.
**POOL/SPA INSTALLATION**

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORP CONTROL</td>
<td>200-999 mV</td>
</tr>
<tr>
<td>pH CONTROL</td>
<td>0-14</td>
</tr>
<tr>
<td>PPM CONTROL (Optional)</td>
<td>0.1 to 10 or 0.2 to 2 ppm or mg/l</td>
</tr>
<tr>
<td>CONDUCTIVITY MONITORING</td>
<td>0-20,000 µS/cm or ppm</td>
</tr>
<tr>
<td>TEMPERATURE READOUT</td>
<td>0 to 140 F (-18 to 60°C)</td>
</tr>
<tr>
<td>LANGEILER INDEX</td>
<td>Calculated from pH, Temp, Total Alkalinity</td>
</tr>
<tr>
<td></td>
<td>and Calcium Hardness</td>
</tr>
<tr>
<td></td>
<td>Water Balance display</td>
</tr>
<tr>
<td>SENSOR CALIBRATION</td>
<td>Off, Manual, Automatic, Timer</td>
</tr>
<tr>
<td>CONTROL MODES</td>
<td>CONTROL MODES</td>
</tr>
<tr>
<td></td>
<td>Off, Manual, Automatic, Timer</td>
</tr>
<tr>
<td></td>
<td>ON/OFF or Proportional Feed</td>
</tr>
<tr>
<td>DATA LOGGING</td>
<td>On-board memory for up to 999 tests</td>
</tr>
<tr>
<td></td>
<td>USB port for catalog download</td>
</tr>
<tr>
<td>ALARMS</td>
<td>High / Low out-of-range</td>
</tr>
<tr>
<td></td>
<td>Run time and overfeed</td>
</tr>
<tr>
<td></td>
<td>Patented Probe Alert* Safeguard</td>
</tr>
<tr>
<td></td>
<td>Visual, audio and external alarms</td>
</tr>
<tr>
<td>REMOTE OPERATION</td>
<td>Data communication modem</td>
</tr>
<tr>
<td></td>
<td>CHEMCOM™, remote software and</td>
</tr>
<tr>
<td></td>
<td>graphical display under Windows™</td>
</tr>
<tr>
<td>MULTIPLEXING</td>
<td>RS485 port for multiple connections</td>
</tr>
<tr>
<td>MECHANICAL</td>
<td>6x9x11 in. (15x23 x 29 cm) cabinet</td>
</tr>
<tr>
<td>ELECTRICAL</td>
<td>10 A / 110 or 230 V with selector switch</td>
</tr>
<tr>
<td>WARRANTY</td>
<td>5-year electronics</td>
</tr>
<tr>
<td></td>
<td>1-year sensors</td>
</tr>
<tr>
<td>SHIPPING</td>
<td>16 x 16 x 12 in. (41X41X31 cm) carton</td>
</tr>
<tr>
<td></td>
<td>16 lbs (7 kg)</td>
</tr>
</tbody>
</table>

**MODEL SELECTION**

**STANDARD FEATURES**

- ORP CONTROL
- pH CONTROL
- SAFETY FLOW SWITCH
- LANGEILER SATURATION INDEX
- AUTOMATIC DATA LOGGING
- REMOTE ALARM
- USB and MICRO SD PORTS

**OPTIONS**

- FLOW CELL ASSEMBLY
- PPM SENSOR FOR FREE CHLORINE
- PPM SANITIZER CONTROL
- HEATER CONTROL
- CONDUCTIVITY/TDS CONTROL
- AUTO FILL FOR SALT GENERATORS
- REMOTE COMPUTER OPERATION
- RS485 FOR MULTIPLEXING
- 4-20 mA OUTPUTS FOR BMS/PLC

**REPRESENTED BY:**
INTELLIFLO® I1
VARIABLE SPEED PUMP (CONT’D)

Dimensions and Performance

FACTORY DEFAULT SPEEDS
SPEED 4: 3110 RPM
SPEED 3: 2350 RPM
SPEED 2: 1500 RPM
SPEED 1: 750 RPM

CURVE SPEED
A 3450 RPM
B 3250 RPM
C 2850 RPM
D 2650 RPM
E 2550 RPM
F 2450 RPM
G 2250 RPM
H 2050 RPM
I 1850 RPM
J 1725 RPM
K 1250 RPM
L 1050 RPM
M 850 RPM
N 650 RPM
O 450 RPM

See page 534 for replacement parts.
ChlorKing® commercial saline chlorinators are leading the way to better, safer water. Their unique, forward-thinking design converts your pool into the mineral spa water you have always dreamed of. ChlorKing salt systems eliminate the costs, risks and smell associated with shipping and storing traditional chlorine. And they pay for themselves through lower cost of operation and a longer lasting system. ChlorKing’s patented single cell technology ensures the need for only one system for your commercial pool or spa.

The CHLOR 25
The ChlorKing® CHLOR 25 salt chlorinator is mounted onto any wall surface in the pump room and is plumbed into the existing pool circulation system. A mild saline solution of between 3,500 – 5,000ppm salt is introduced to the pool and flows through the cell to create hypochlorous acid. The ChlorKing® CHLOR 25 is a single cell and is plumbed in a bypass for easy installation.

Main Features
- Patented single cell technology
- 4mm plate spacing designed for commercial pools
- Self cleaning (reverse polarity)
- 15,000 hour cell
- Clear reaction chamber for easy viewing
- Bypass installation with 1 1/2" plumbing
- Only 20gpm flow required
- Automatic salinity control
- Industrial water cooled power supply
- Designed, manufactured and supported in the U.S.A

 Specifications - CHLOR 25
- Certifications achieved
  - NSF-50
  - UL-1081
- Electrode stacks
  - 1-25 lb, 15,000 hr reverse polarity in clear housing
- Electrical specifications
  - Max primary amps – (20)
  - Voltage / Hz – (208-240v 60Hz single phase)
  - GFCI breaker required – (30 amp)
- Power supply
  - Water cooled with no fans
- Operating temperature
  - 35°F (2°C) to 115°F (46°C) air temperature
  - 59°F (15°C) to 104°F (40°C) water temperature
- Plumbing / flow gpm
  - 1 1/2" inlet and outlet
  - 20 gpm (flow required)
  - 50 psi (max pressure)
- Dimensions
  - 45”W x 12”H (power supply)
  - 13”W x 28”H (Cell housing)
- Salt concentration & display
  - 3,500 - 5,000ppm required
  - Digital toroidal salt display
- Equivalent chlorine production
  - 25 lbs / 24 hours
- Bonding and grounding
  - Bonding lugs and grounding Ts included
  - Bonding and grounding of this system is essential
  - Bonding and grounding of all equipment in the pump room is required.

Order Information
- Product code: CHLOR 25H
ChlorKing pioneered on-site chlorine generating technology in the 1970’s. Realizing the potential for swimming pools and commercial applications, the company began generating “ultimate water” with simple, yet highly advanced technology. Today, ChlorKing® leads the way in commercial saline chlorination and is consistently seeking new frontiers in sanitizing solutions including ultraviolet light technology and their NEX-GEN® pH onsite chlorine generators. These environmentally friendly solutions are changing the way we treat H₂O.

Salt Chlorination Systems • Ultraviolet Light Systems • Mixed Oxidant Systems

ChlorKing Inc. 6767 Peachtree Industrial Blvd Norcross GA 30092 sales@chlorking.com 800.536.8180 chlorking.com
ChlorKing® commercial saline chlorinators are leading the way to better, safer water. Their unique, forward-thinking design converts your pool into the mineral spa water you have always dreamed of. ChlorKing salt systems eliminate the costs, risks and smell associated with shipping and storing traditional chlorine. And they pay for themselves through lower cost of operation and a longer lasting system. ChlorKing’s patented single cell technology ensures the need for only one system for your commercial pool or spa.

**The CHLOR 25SM**
The ChlorKing® CHLOR 25SM salt chlorinator is mounted onto any wall surface in the pump room and is plumbed into the existing pool circulation system. A mild saline solution of between 3,500 – 5,000ppm salt is introduced to the pool and flows through the cell to create hypochlorous acid. The ChlorKing® CHLOR 25SM is a single cell and is plumbed in a bypass for easy installation.

**Main Features**
- Patented single cell technology
- 4mm plate spacing designed for commercial pools
- Self cleaning (reverse polarity) or forward polarity
- 15,000 hour cell
- Clear reaction chamber for easy viewing
- Bypass installation with 1” plumbing
- Only 20gpm flow required
- Automatic salinity control
- Industrial switch-mode water cooled power supply
- Designed, manufactured and supported in the U.S.A

**Specifications - CHLOR 25SM**
- Certifications achieved
  - NSF-50 - pending
  - UL-1081
- Electrode stacks
  - 1-25 lb, 15,000 hr in clear housing
- Electrical specifications
  - Max primary amps – (15 @ 208v)
  - Voltage / Hz – (208-240v 50/60Hz single phase)
  - GFCI breaker required – (30 amp)
- Power supply
  - Water cooled
- Operating temperature
  - 35°F (2°C) to 115°F (46°C) air temperature
  - 59°F (15°C) to 104°F (40°C) water temperature
- Plumbing / flow gpm
  - 1 1/2” inlet and outlet
  - 20 gpm (flow required)
  - 50 psi (max pressure)
- Dimensions
  - 20”W x 20”H (Power supply)
  - 13”W x 28”H (Cell housing)
- Salt concentration & display
  - 3,500 - 5,000ppm required
  - Digital toroidal salt display
- Equivalent chlorine production
  - 25 lbs / 24 hours
- Bonding and grounding
  - Bonding lugs and grounding Ts included
  - Bonding and grounding of this system is essential
  - Bonding and grounding of all equipment in the pump room is required.

**Order Information**
- Product code: CHLOR 25SM - Reverse polarity
  - CHLOR 25CSM - Forward polarity
ChlorKing pioneered on-site chlorine generating technology in the 1970’s. Realizing the potential for swimming pools and commercial applications, the company began generating “ultimate water” with simple, yet highly advanced technology. Today, ChlorKing® leads the way in commercial saline chlorination and is consistently seeking new frontiers in sanitizing solutions including ultraviolet light technology and their NEX-GEN® pH onsite chlorine generators. These environmentally friendly solutions are changing the way we treat H₂O.
ChlorKing® commercial saline chlorinators are leading the way to better, safer water. Their unique, forward-thinking design converts your pool into the mineral spa water you have always dreamed of. ChlorKing salt systems eliminate the costs, risks and smell associated with shipping and storing traditional chlorine. And they pay for themselves through lower cost of operation and a longer lasting system. ChlorKing’s patented single cell technology ensures the need for only one system for your commercial pool or spa.

The CHLOR 40
The ChlorKing® CHLOR 40 salt chlorinator is mounted onto any wall surface in the pump room and is plumbed into the existing pool circulation system. A mild saline solution of between 3,500 – 5,000ppm salt is introduced to the pool and flows through the cell to create hypochlorous acid. The ChlorKing® CHLOR 40 is a dual cell and is plumbed in a bypass for easy installation.

Main Features
- Patented single cell technology
- 4mm plate spacing designed for commercial pools
- Self cleaning (reverse polarity)
- 15,000 hour cells
- Clear reaction chamber for easy viewing
- Bypass installation with 1 1/2” plumbing per cell
- Only 20gpm flow required per cell
- Automatic salinity control
- Industrial water cooled power supply
- Designed, manufactured and supported in the U.S.A.

Specifications - CHLOR 40
- Certifications achieved
  - NSF-50
  - UL-1081
- Electrode stacks
  - 2-20 lb, 15,000 hr reverse polarity in clear housings
- Electrical specifications
  - Max primary amps – (32)
  - Voltage / Hz – (208-240v 60Hz single phase)
  - GFCI breaker required – (60 amp)
- Power supply
  - Water cooled with no fans
- Operating temperature
  - 35°F (2°C) to 115°F (46°C) air temperature
  - 59°F (15°C) to 104°F (40°C) water temperature
- Plumbing / flow gpm
  - 1 1/2” inlet and outlet
  - 20 gpm (flow required per cell)
  - 50 psi (max pressure per cell)
- Dimensions
  - 45”W x 12”H (power supply)
  - 13”W x 28”H (Cell housing) x 2
- Salt concentration & display
  - 3,500 - 5,000ppm required
  - Digital toroidal salt display
- Equivalent chlorine production
  - 40 lbs / 24 hours
- Bonding and grounding
  - Bonding lugs and grounding Ts included
  - Bonding and grounding of this system is essential
  - Bonding and grounding of all equipment in the pump room is required.

Order Information
- Product code: CHLOR 40H
ChlorKing pioneered on-site chlorine generating technology in the 1970's. Realizing the potential for swimming pools and commercial applications, the company began generating “ultimate water” with simple, yet highly advanced technology. Today, ChlorKing® leads the way in commercial saline chlorination and is consistently seeking new frontiers in sanitizing solutions including ultraviolet light technology and their NEX-GEN® pH onsite chlorine generators. These environmentally friendly solutions are changing the way we treat H2O.
The TEK Energy management System is a powerful cloud based Pool Energy Management System that enables to control / monitor all aspects of the pool from a smart device.

**Control**
- Set / adjust pool’s pump speed
- Set / adjust pool temperature
- Set daily, weekly, monthly pump schedules to save energy and meet the pool’s changing needs
- Set boilers in a lead lag fashion

**Monitoring**
- Continuous monitoring of Pool’s Chlorine, PH, and TDS levels as well as chemical levels in acid and Chlorine tanks.
- Pool temperature, boiler loop temperature, and boiler activity
- Flow rates in all important loops like main filter loop and boiler loop & makeup water
- Make up water consumption, and boiler BTU metering
Online monitoring Dashboard

Custom dashboard keeps the operator informed and in control over pool

Automated reports

Automated periodic reports via email keeps all parties informed as for pool energy use and general conditions

Easy to Use Analytical Tools

Quick analytical tool allows an easy trouble shooting and verification of pool conditions

Easy Scheduling Module

Easy scheduling module allows for pump speeds, pool light and boiler scheduling to meet pools changing needs

Download Pool Data from Anywhere

Data-logs parameters in 1 min to one hour intervals. Data is kept on the cloud for future analysis or confirmation for health department inspection or product warranty verification
### Specifications

**Specifications**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>20” x 20” x 9”</td>
</tr>
<tr>
<td>Enclosure</td>
<td>NEMA4 rated metal</td>
</tr>
<tr>
<td>Power requirement</td>
<td>120VAC/ 240VAC 6 Amp 60 or 50 Hz</td>
</tr>
<tr>
<td>Operating Ambient temp:</td>
<td>32-120F</td>
</tr>
<tr>
<td>Operating Humidity range:</td>
<td>0 to 95% RH (non-condensing)</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Indoor use</td>
</tr>
</tbody>
</table>

**14 Inputs**

- Analog – 0-30V, 0-30mA, pulse, resistance
- Digital – dry contact
- Temp – 10K, 100K, RTD

**Additional Inputs**

- 12 MicroLAN temp sensors

**14 Outputs**

- Two C form relays - 50V/ 2A
- 8 Dry contacts - 230VAC 3 Amp
- 4 Analog - 4-20mA or 0-10V

**Network Capacity:**

- Chanel 1 and two ModBus

**Network**

- Standard Ethernet TP 10/100 RJ45, WiFi or GSM/3G

**Modbus**

- RS485 @19200bps, Modbus RTU master

**Display**

- 6 lines LCD display

**Data Logging**

- Individual log interval inputs 5sec

**Input triggers**

- Up to 4 alarms / input with up to 4 actions (send message, control output)

**Schedule**

- Up to 20 schedules

**Timers**

- Up to 20 timers hourly, daily or monthly

**Logic**

- Virtually unlimited

**Weight**

- 50 lbs

**Certification**

- UL

### Controls

Control multiple circuits, pumps, VFD’s, Servo valves, flow, boilers, solar system, valves Pool lights using analog or digital output

### Monitor & Log

Pumps speed, pressure, flow, boiler operation & BTU metering , ORP, PH, TDS, chemical tanks fluid level, gas & electric metering and any device with analog or digital output

### Automation

VFD Pump control, Boilers control with lead/lag option, and motorized valves

### Applications

Commercial pools and commercial pools solar thermal systems