

# Conductivity, pH/ORP & Disinfection

The W600 series provides reliable, flexible and powerful control for your water treatment program.

## Summary of Key Benefits

- Large touchscreen display with icon based programming makes setup easy
- Universal sensor input provides extraordinary flexibility; the same controller can be used with almost any type of sensor needed
- Combination Sensor Input and Analog Input board that add even more flexibility
- Lead/Lag control of up to 6 relays
- Optional dual analog (4-20 mA) input for Fluorometers or nearly any other process value
- Multiple language support allows simple setup no matter where your business takes you
- Six control outputs allow the controller to be used in more applications
- Economical wall-mount package for easy installation
- On-screen and web page graphing of sensor values and control output status
- Two Virtual Inputs that are calculated from two real inputs (cycles of concentration, % rejection, etc.)
- Complete flexibility in the function of each relay
  - On/Off Setpoint
  - Time Proportional Control
  - Pulse Proportional Control (when purchased with 4-20mA or pulse solid state opto outputs)
  - PID Control (when purchased with 4-20mA or pulse solid state opto outputs)
  - In-Range or Out-of-Range activation
  - Probe wash
  - Timer-based activation
  - Activation based upon the state of a contact closure
  - Timed activation triggered by a Water Contactor or Paddlewheel flow meter's accumulated total flow
  - Activate with another output
  - Activate as a percent of another output's on-time
  - Alarm
  - Spike Set Point
  - For Cooling Tower and Boiler applications:
    - Biocide Timer
    - Boiler blowdown on conductivity using intermittent sampling
- Datalogging
- Emailing Alarm messages, Datalog reports or System Summary reports
- Ethernet option for remote access via the Internet, LAN or Modbus/TCP



# Specifications

## Inputs

### Power

100-240 VAC, 50 or 60 Hz, 7A max Fuse: 6.3 Amp

### Sensor Input Signals (0, 1 or 2 depending on model code)

Contacting Conductivity: 0.01, 0.1, 1.0, or 10.0 cell constant, or

Electrodeless Conductivity (not available on the combination sensor/analog input card) or

Disinfection or

Amplified pH or ORP which requires a preamplified signal. Walchem WEL or WDS series recommended.  $\pm 5\text{VDC}$  power available for external preamps.

Each sensor input card contains a temperature input.

Temperature: 100 or 1000 ohm RTD, 10K or 100K Thermistor

### Analog (4-20 mA) Sensor Input (0, 1, 2 or 4 depending on model code)

2-wire loop powered and self-powered transmitters supported

3-wire and 4-wire transmitters supported

Each dual sensor input board has two channels: Channel 1, 130 ohm input resistance and Channel 2, 280 ohm input resistance. The combination input board has one channel, 280 ohm input resistance.

Available Power: One independent isolated 24 VDC  $\pm 15\%$  supply per channel. 1.5 W maximum for each channel.

2W (83 mA at 24 VDC) total power consumption for all channels (four total channels possible if two dual boards are installed; 2W is equivalent to 2 Little Dipper sensors)

### Digital Input Signals (6):

#### *State-Type Digital Inputs*

Electrical: Optically isolated and providing an electrically isolated 9V power with a nominal 2.3mA current when the digital input switch is closed. Typical response time: < 2 seconds. Devices supported: Any isolated dry contact (i.e. relay, reed switch). Types: Interlock

#### *Low Speed Counter-Type Digital Inputs*

Electrical: Optically isolated and providing an electrically isolated 9V power with a nominal 2.3mA current when the digital input switch is closed, 0-10 Hz, 50 msec minimum width. Devices supported: Any device with isolated open drain, open collector, transistor or reed switch.

Types: Contacting Flowmeter

#### *High Speed Counter-Type Digital Inputs*

Electrical: Optically isolated and providing an electrically isolated 9V power with a nominal 2.3mA current when the digital input switch is closed, 0-500 Hz, 1.00 msec minimum width. Devices supported: Any device with isolated open drain, open collector, transistor or reed switch. Types: Paddlewheel Flowmeter

## Outputs

### Powered Mechanical Relays (0 or 6 model code dependent)

Pre-powered on circuit board switching line voltage

All relays are fused together as one group, total current must not exceed 6A (resistive), 1/8 HP (93W)

### Dry Contact Mechanical Relays (0, 2 or 4 model code dependent)

6 A (resistive), 1/8 HP (93W)

Dry contact relays are not fuse protected.

### Pulse Outputs (0, 2 or 4 model code dependent)

Opto-isolated, solid-state relay, 200mA, 40V DC

VLOWMAX = 0.05V @ 18mA

### 4 - 20 mA (0 or 2 model code dependent)

Internally powered, Fully isolated

600 Ohm max resistive load, Resolution 0.0015% of span

Accuracy  $\pm 0.5\%$  of reading



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## Measurement Performance

|                                   | Range                              | Resolution   | Accuracy                          |
|-----------------------------------|------------------------------------|--|-----------------------------------|
| 0.01 Cell Contacting Conductivity | 0-300 $\mu\text{S/cm}$             | 0.01 $\mu\text{S/cm}$ , 0.0001 mS/cm, 0.001 mS/m, 0.0001 S/m, 0.01 ppm | $\pm 1\%$ of reading              |
| 0.1 Cell Contacting Conductivity  | 0-3,000 $\mu\text{S/cm}$           | 0.1 $\mu\text{S/cm}$ , 0.0001 mS/cm, 0.01 mS/m, 0.0001 S/m, 0.1 ppm    | $\pm 1\%$ of reading              |
| 1.0 Cell Contacting Conductivity  | 0-30,000 $\mu\text{S/cm}$          | 1 $\mu\text{S/cm}$ , 0.001 mS/cm, 0.1 mS/m, 0.0001 S/m, 1 ppm          | $\pm 1\%$ of reading              |
| 10.0 Cell Contacting Conductivity | 0-300,000 $\mu\text{S/cm}$         | 10 $\mu\text{S/cm}$ , 0.01 mS/cm, 1 mS/m, 0.001 S/m, 10 ppm            | $\pm 1\%$ of reading              |
| pH                                | -2 to 16 pH units                  | 0.01 pH units  | $\pm 0.01\%$ of reading           |
| ORP                               | -1500 to 1500 mV                   | 0.1 mV   | $\pm 1$ mV                        |
| Disinfection sensors              | -2000 to 1500 mV                   | 0.1 mV   | $\pm 1$ mV                        |
|                                   | 0 - 2 ppm to 0 - 20,000 ppm        | Varies with range and slope  | Varies with range and slope       |
| Electrodeless Conductivity        | 500 - 12,000 $\mu\text{S/cm}$      | 1 $\mu\text{S/cm}$ , 0.01 mS/cm, 0.1 mS/m, 0.001 S/m, 1 ppm            | $\pm 1\%$ of reading              |
|                                   | 3,000-40,000 $\mu\text{S/cm}$      | 1 $\mu\text{S/cm}$ , 0.01 mS/cm, 0.1 mS/m, 0.001 S/m, 1 ppm            | $\pm 1\%$ of reading              |
|                                   | 10,000-150,000 $\mu\text{S/cm}$    | 10 $\mu\text{S/cm}$ , 0.1 mS/cm, 1 mS/m, 0.01 S/m, 10 ppm              | $\pm 1\%$ of reading              |
|                                   | 50,000-500,000 $\mu\text{S/cm}$    | 10 $\mu\text{S/cm}$ , 0.1 mS/cm, 1 mS/m, 0.01 S/m, 10 ppm              | $\pm 1\%$ of reading              |
|                                   | 200,000-2,000,000 $\mu\text{S/cm}$ | 100 $\mu\text{S/cm}$ , 0.1 mS/cm, 1 mS/m, 0.1 S/m, 100 ppm             | $\pm 1\%$ of reading              |
| Temperature                       | 23 to 500°F (-5 to 260°C)          | 0.1°F (0.1°C)  | $\pm 1\%$ of reading within range |

| Temperature°C | Range Multiplier% | Temperature°C | Range Multiplier% |
|---------------|-------------------|---------------|-------------------|
| 0             | 181.3             | 80            | 43.5              |
| 10            | 139.9             | 90            | 39.2              |
| 15            | 124.2             | 100           | 35.7              |
| 20            | 111.1             | 110           | 32.8              |
| 25            | 100.0             | 120           | 30.4              |
| 30            | 90.6              | 130           | 28.5              |
| 35            | 82.5              | 140           | 26.9              |
| 40            | 75.5              | 150           | 25.5              |
| 50            | 64.3              | 160           | 24.4              |
| 60            | 55.6              | 170           | 23.6              |
| 70            | 48.9              | 180           | 22.9              |

Note: Conductivity ranges above apply at 25°C. At higher temperatures, the range is reduced per the range multiplier chart.

## Mechanical (Controller)

|                     |   |
|---------------------|---|
| Enclosure Material  | Polycarbonate   |
| Enclosure Rating    | NEMA 4X (IP65)  |
| Dimensions          | 9.5 x 8 x 4" (241 x 203 x 102 mm)                           |
| Display             | 320 x 240 pixel monochrome backlit display with touchscreen |
| Ambient Temperature | -4 to 131°F (-20 to 55°C)                                   |
| Storage Temperature | -4 to 176°F (-20 to 80°C)                                   |

## Agency Certifications

|         |  |
|---------|--|
| Safety: | UL 61010-1:2012, 3rd Edition           |
|         | CSA C22.2 No.61010-1:2012, 3rd Edition |
|         | IEC 61010-1:2010 3rd Edition           |
|         | EN 61010-1:2010 3rd Edition            |
| EMC:    | IEC 61326-1:2012                       |
|         | EN 61326-1:2013                        |

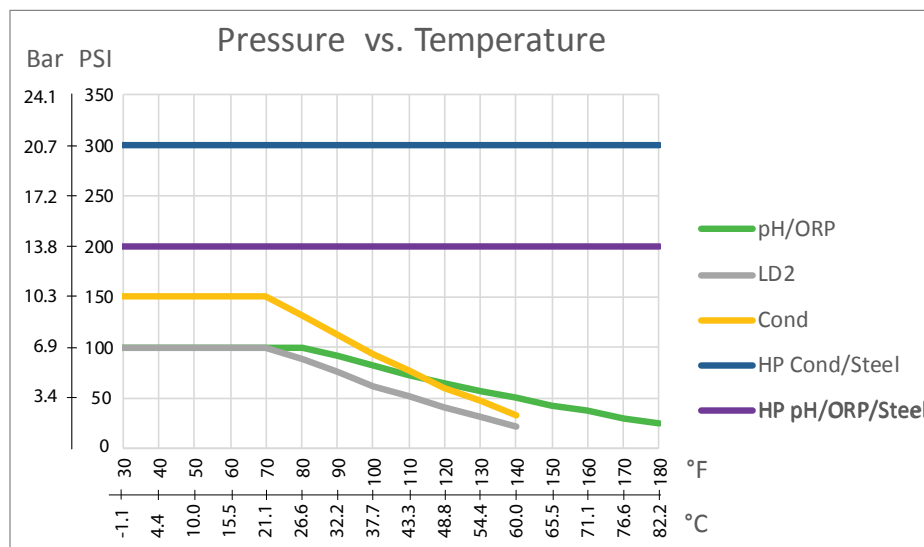


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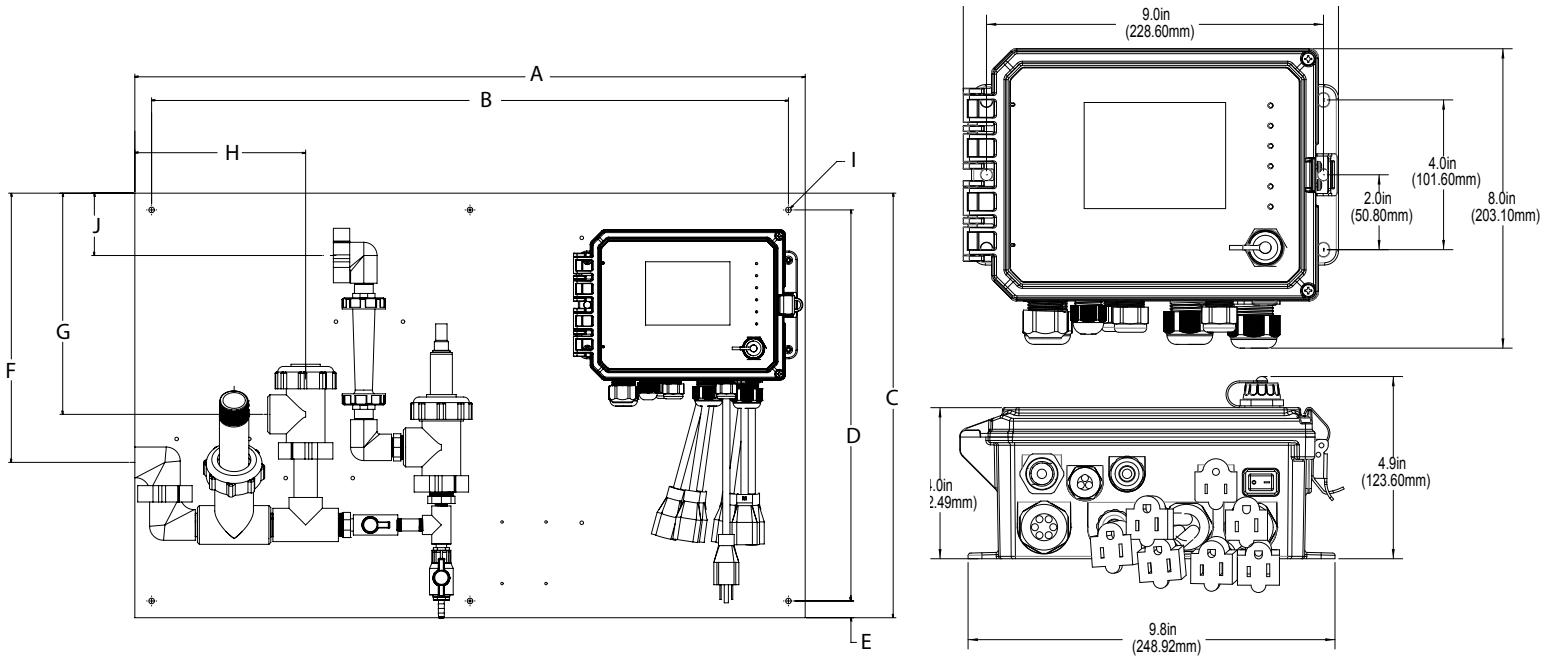
Note: For EN61000-4-6, EN61000-4-3 the controller met performance criteria B. This equipment is suitable for use in establishments other than domestic and those directly connected to a low voltage (100-240 VAC) power supply network which supplies buildings used for domestic purposes.

## Mechanical (Sensors) (\*see graph)

| Sensor  | Pressure   | Temperature   | Materials   | Process Connections                           |
|---|--|---|---|---|
| Electrodeless conductivity                          | 0-150 psi (0-10 bar)*  | CPVC: 32-158°F (0 to 70°C)*<br>PEEK: 32-190°F (0 to 88°C) | CPVC, FKM in-line o-ring<br>PEEK, 316 SS in-line<br>adapter             | 1" NPTM submersion<br>2" NPTM in-line adapter |
| pH  | 0-100 psi (0-7 bar)*   | 50-158°F (10-70°C)*                                       | CPVC, Glass, FKM<br>o-rings, HDPE, Titanium<br>rod, glass-filled PP tee | 1" NPTM submersion<br>3/4" NPTF in-line tee   |
| ORP   | 0-100 psi (0-7bar)*  | 32-158°F (0-70°C)*  |   |   |
| Contacting conductivity<br>(Condensate)             | 0-200 psi (0-14 bar)   | 32-248°F (0-120°C)  | 316SS, PEEK   | 3/4" NPTM                                     |
| Contacting conductivity<br>Graphite (Cooling Tower) | 0-150 psi (0-10 bar)*  | 32-158°F (0-70°C)*  | Graphite, Glass-filled PP,<br>FKM o-ring                                | 3/4" NPTM                                     |
| Contacting conductivity<br>SS (Cooling Tower)       | 0-150 psi (0-10 bar)*  | 32-158°F (0-70°C)*  | 316SS, Glass-filled PP,<br>FKM o-ring                                   | 3/4" NPTM                                     |
| Contacting conductivity<br>(Boiler)                 | 0-250 psi (0-17 bar)   | 32-401°F (0-205°C)  | 316SS, PEEK   | 3/4" NPTM                                     |
| Contacting conductivity<br>(High Pressure Tower)    | 0-300 psi (0-21 bar)*  | 32-158°F (0-70°C)*  | 316SS, PEEK   | 3/4" NPTM                                     |
| pH (High Pressure)                                  | 0-300 psi (0-21 bar)*  | 32-275°F (0-135°C)*                                       | Glass, Polymer, PTFE,<br>316SS, FKM                                     | 1/2" NPTM gland                               |
| ORP (High Pressure)                                 | 0-300 psi (0-21 bar)*  | 32-275°F (0-135°C)*                                       | Platinum, Polymer, PTFE,<br>316SS, FKM                                  | 1/2" NPTM gland                               |
| Free Chlorine/Bromine                               | 0-14.7 psi (0-1 bar)   | 32-113°F (0-45°C)   | PVC, Polycarbonate,<br>silicone rubber, SS,<br>PEEK, FKM, Isoplast      | 1/4" NPTF Inlet<br>3/4" NPTF Outlet           |
| Extended pH Range Free<br>Chlorine/Bromine          | 0-14.7 psi (0-1 bar)   | 32-113°F (0-45°C)   |   |   |
| Total Chlorine                                      | 0-14.7 psi (0-1 bar)   | 32-113°F (0-45°C)   |   |   |
| Chlorine Dioxide                                    | 0-14.7 psi (0-1 bar)   | 32-131°F (0-55°C)   |   |   |
| Ozone   | 0-14.7 psi (0-1 bar)   | 32-131°F (0-55°C)   |   |   |
| Peracetic Acid                                      | 0-14.7 psi (0-1 bar)   | 32-131°F (0-55°C)   |   |   |
| Hydrogen Peroxide                                   | 0-14.7 psi (0-1 bar)   | 32-113°F (0-45°C)   |   |   |
| Flow switch manifold                                | 0-150 psi (0-10 bar) up to 100°F (38°C)*<br>0-50 psi (0-3 bar) at 140°F (60°C) | 32-140°F (0-60°C)*  | GFRPP, PVC, FKM,<br>Isoplast  | 3/4" NPTF                                     |
| Flow switch manifold<br>(High Pressure)             | 0-300 psi (0-21 bar)*  | 32-158°F (0-70°C)*  | Carbon steel, Brass,<br>316SS, FKM                                      | 3/4" NPTF                                     |



# Dimensions



## Panel Mounted Flow Switch Manifold Dimensions

| W600   | A                 | B              | C               | D               | E              | F               | G            | H             | I                   | J               |
|--|-------------------|----------------|-----------------|-----------------|----------------|-----------------|--------------|---------------|---------------------|-----------------|
| Tolerances:  | +/- 0.1" (2.5 mm) |                |                 |                 |                | +/- 0.3" (8 mm) |              |               | +/- 0.01" (0.25 mm) | +/- 0.3" (8 mm) |
| W600-CT-BN/FN  | 13" (330 mm)      | 12" (305 mm)   | 11.75" (298 mm) | 10.75" (273 mm) | 0.5" (12.7 mm) | 7" (178 mm)     | 2" (51 mm)   | 1.5" (38 mm)  | 0.25" (6.35 mm)     |                 |
| WCT600-CT-BA, BB, BC, BD, BH, BI, BJ, BK, FA, FB, FC, FD, FH, FI, FJ | 22.5" (571 mm)    | 21.5" (546 mm) | 11.75" (298 mm) | 10.75" (273 mm) | 0.5" (12.7 mm) | 4" (102 mm)     | 1.5" (38 mm) | 11" (279 mm)  |                     |                 |
| W600-CT-DN   | 22.5" (571 mm)    | 21.5" (546 mm) | 11.75" (298 mm) | 10.75" (273 mm) | 0.5" (12.7 mm) | 7" (178 mm)     | 7" (178 mm)  | 10" (254 mm)  |                     |                 |
| W600-CT-DE/DF  | 22.5" (571 mm)    | 21.5" (546 mm) | 11.75" (298 mm) | 10.75" (273 mm) | 0.5" (12.7 mm) | 4" (102 mm)     | 2" (51 mm)   | 110" (254 mm) |                     |                 |
| W600-CT-HN   | 24" (610 mm)      | 22.5" (571 mm) | 19" (483 mm)    | 17.5" (445 mm)  | 0.75" (19 mm)  | 14" (356 mm)    | 6" (152 mm)  | 3" (76 mm)    |                     |                 |
| WCT600-CT-HA, HB, HC, HD, HH, HI, HJ, HK                             | 24" (610 mm)      | 22.5" (571 mm) | 19" (483 mm)    | 17.5" (445 mm)  | 0.75" (19 mm)  | 11" (279 mm)    | 6" (152 mm)  | 3" (76 mm)    |                     |                 |
| W600-PH-PN/PX  | 22.5" (571 mm)    | 21.5" (546 mm) | 11.75" (298 mm) | 10.75" (273 mm) | 0.5" (12.7 mm) | 4" (102 mm)     | 1.5" (38 mm) | 11" (279 mm)  |                     |                 |
| W600-PH-QN/QX  | 22.5" (571 mm)    | 21.5" (546 mm) | 11.75" (298 mm) | 10.75" (273 mm) | 0.5" (12.7 mm) | 7" (178 mm)     | 4" (102 mm)  | 1.5" (38 mm)  |                     |                 |
| W600-DS-PN   | 24" (610 mm)      | 22.5" (571 mm) | 19" (483 mm)    | 17.5" (445 mm)  | 0.75" (19 mm)  | 15" (381 mm)    | 10" (254 mm) | 1.5" (38 mm)  |                     | 3" (76 mm)      |
| W600-DS-PX   | 24" (610 mm)      | 22.5" (571 mm) | 19" (483 mm)    | 17.5" (445 mm)  | 0.75" (19 mm)  | 12" (305 mm)    | 10" (254 mm) | 8" (203 mm)   |                     | 3" (76 mm)      |



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