

# Conductivity, pH/ORP & Disinfection

## W900 Series Controllers

The W900 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
- Four I/O slots allow complete flexibility in adding additional sensors, analog inputs and analog outputs
- Multiple language support allows simple setup
- Eight relay 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
- Complete flexibility in the function of each relay
  - On/Off Setpoint
  - Time Proportional Control
  - Pulse Proportional Control (when purchased with 4-20 mA or pulse solid state opto outputs)
  - Flow Proportional Control (when purchased with 4-20 mA or pulse solid state opto outputs)
  - PID Control (when purchased with 4-20 mA 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
  - PPM Volume
  - Target PPM
  - 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 for remote access via the Internet, LAN or optional Modbus/TCP



**W A L C H E M**

IWAKI America Inc.

# Specifications

## Inputs

### Power

100-240 VAC, 50 or 60 Hz, 13A max     Fuse: 6.3 Amp

### Sensor Input Signals (0-8 depending on model code)

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

Electrodeless Conductivity 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 (0-24 depending on model code)

2-wire loop powered and self-powered transmitters supported

3-wire and 4-wire transmitters supported

All Channels fully isolated, input and power

Channel 1, 130 ohm input resistance, Channel 2-6, 280 ohm input resistance

Available Power: Isolated 24 VDC  $\pm 15\%$  supply per channel. 1.5 W (62.5 mA maximum for each channel)

### Digital Input Signals (12):

#### *State-Type Digital Inputs*

Electrical: Optically isolated and providing an electrically isolated 12V power with a nominal 2.5 mA 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: DI State

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

Electrical: Optically isolated and providing an electrically isolated 12V power with a nominal 2.5 mA current when the digital input switch is closed, 0-20 Hz, 25 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 12V power with a nominal 2.5 mA current when the digital input switch is closed, 0-500 Hz, 1.0 msec minimum width. Devices supported: Any device with isolated open drain, open collector, transistor or reed switch. Types: Paddlewheel Flowmeter

## Outputs

### Powered Mechanical Relays (0-8 model code dependent)

Pre-powered on circuit board switching line voltage

Four relays are fused together as one group, total current must not exceed 6.3A (resistive), 1/8 HP (93W)

### Dry Contact Mechanical Relays (0-8 model code dependent)

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

Dry contact relays are not fuse protected.

### Pulse Outputs (0-4 model code dependent)

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

VLOWMAX = 0.05V @ 18mA

### 4 - 20 mA (0-16 model code dependent)

Internally powered, 15VDC, Fully isolated

1000 Ohm max resistive load

Resolution 0.0015% of span

Accuracy  $\pm 0.5\%$  of reading



## 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

Temp. °C	Range Multiplier%
0	181.3
10	139.9
15	124.2
20	111.1
25	100.0
30	90.6
35	82.5
40	75.5
50	64.3
60	55.6
70	48.9

Temp. °C	Range Multiplier%
80	43.5
90	39.2
100	35.7
110	32.8
120	30.4
130	28.5
140	26.9
150	25.5
160	24.4
170	23.6
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	12.2W x 13.8H x 5.4D" (310 x 351 x 137 mm)
Display	320 x 240 pixel monochrome backlit display with touchscreen
Ambient Temperature	-4 to 122°F (-20 to 50°C)
Storage Temperature	-4 to 176°F (-20 to 80°C)
Humidity	10 to 90%, non-condensing

## Agency Certifications

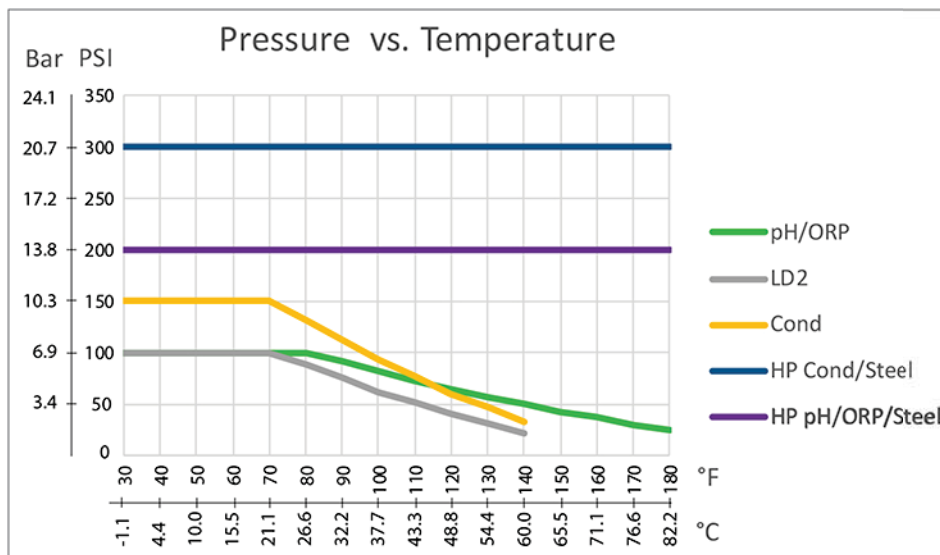
Safety:	UL 61010-1:2012, 3rd Edition
	CSA C22.2 No.61010-1:2012, 3rd Edition
	IEC 61010-1:2010 3rd Edition
	EN 61010-1:2010 3rd Edition
EMC:	IEC 61326-1:2012
	EN 61326-1:2013

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





## Model Code

W	CT	900P	AADE	W	M	S	ANNNN
Label	Base	Relays/Wiring	I/O Module#1-4	WiFi	Protocol	Sensor Mounting	Sensors #1-5
W	IN	900P	AADE	W	M	S	ANNNN
Label	Base	Relays/Wiring	I/O Module#1-4	WiFi	Protocol	Sensor Mounting	Sensors #1-5
W	BL	900P	AADE	W	M	ANNNNN	
Label	Base	Relays/Wiring	I/O Module#1-4	WiFi	Protocol	Sensors #1-6	

### LABEL

W	Walchem
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### BASE

CT	Cooling Tower
BL	Boiler
IN	pH, Disinfection, Conductivity

### RELAYS/WIRING

<b>8 powered relays</b>	
900H	Hardwired
900P	Prewired with USA power cord and 8 pigtails
900D	Prewired with DIN power cord, no pigtails
900B	Prewired with Brazilian power cord, no pigtails
<b>7 powered 1 dry relays</b>	
910H	Hardwired
910P	Prewired with USA power cord and 7 pigtails
910D	Prewired with DIN power cord, no pigtails
910B	Prewired with Brazilian power cord, no pigtails
<b>2 opto 6 dry relays</b>	
920H	Hardwired
920P	Prewired with USA power cord and two 20 ft. pulse cables
920D	Prewired with DIN power cord, no pigtails
920B	Prewired with Brazilian power cord, no pigtails
<b>4 powered 4 dry relays</b>	
930H	Hardwired
930P	Prewired with USA power cord and 4 pigtails
930D	Prewired with DIN power cord, no pigtails
930B	Prewired with Brazilian power cord, no pigtails
<b>4 opto 4 dry relays</b>	
940H	Hardwired
940P	Prewired with USA power cord and four 20 ft. pulse cables
940D	Prewired with DIN power cord, no pigtails
940B	Prewired with Brazilian power cord, no pigtails
<b>4 opto 4 powered relays</b>	
950H	Hardwired
950P	Prewired with USA power cord, 4 pigtails and four 20 ft. pulse cables
950D	Prewired with DIN power cord, no pigtails
950B	Prewired with Brazilian power cord, no pigtails
<b>2 opto 6 powered relays</b>	
960H	Hardwired
960P	Prewired with USA power cord, 6 pigtails, two 20 ft. pulse cables
960D	Prewired with DIN power cord, no pigtails
960B	Prewired with Brazilian power cord, no pigtails
<b>8 dry relays</b>	
970H	Hardwired
970P	Prewired with USA power cord, no pigtails
970D	Prewired with DIN power cord, no pigtails
970B	Prewired with Brazilian power cord, no pigtails

### I/O MODULES #1-4 (must be in alphabetical order)

N	No input output module
A	Dual Sensor Inputs
B	Dual Analog Inputs
C	Four Analog Inputs
D	Six Analog Inputs
E	Dual Analog Inputs + Four Analog Outputs
F	Dual Analog Outputs
G	Four Analog Outputs
H	Corrosion (Future)

### WIFI (Future)

N	None
W	WiFi

### COMMUNICATIONS PROTOCOL

N	None
M	Modbus TCP

### SENSOR MOUNTING

N	None
S	Submersion
I	Inline
L	Loose flow switch manifold
P	Flow switch manifold on panel
F	Loose high pressure flow switch manifold
H	High Pressure flow switch manifold on panel*
S	Submersion
I	Inline
L	Loose flow switch manifold
P	Flow switch manifold on panel

### SENSORS #1-5 (must be in alphabetical order)

N	None
A	Graphite/PP cooling tower contacting conductivity
B	316SS/PP cooling tower contacting conductivity
C	Cooling tower, electrodeless conductivity
D	High pressure conductivity
E	Makeup conductivity
F	Flat pH
G	High pressure pH
H	Rod ORP
I	Flat ORP
J	High pressure ORP
K	Chlorine**
L	CIO <sub>2</sub> **
M	Little Dipper**
P	Pyxis PTSA**
A	External Preamp
B	Flat pH with ATC
C	Disinfection, no sensor
D	PEEK electrodeless
E	CPVC electrodeless
F	CCCond, K=1.0, 100psi
G	CCCond, K=0.1, 100psi
H	CCCond, K=10, 100psi
I	CCCond, K=0.01, 100psi
J	CCCond, K=1.0, 200psi
K	CCCond, K=0.1, 200psi
L	CCCond, K=10, 200psi
M	CCCond, K=0.01, 200psi

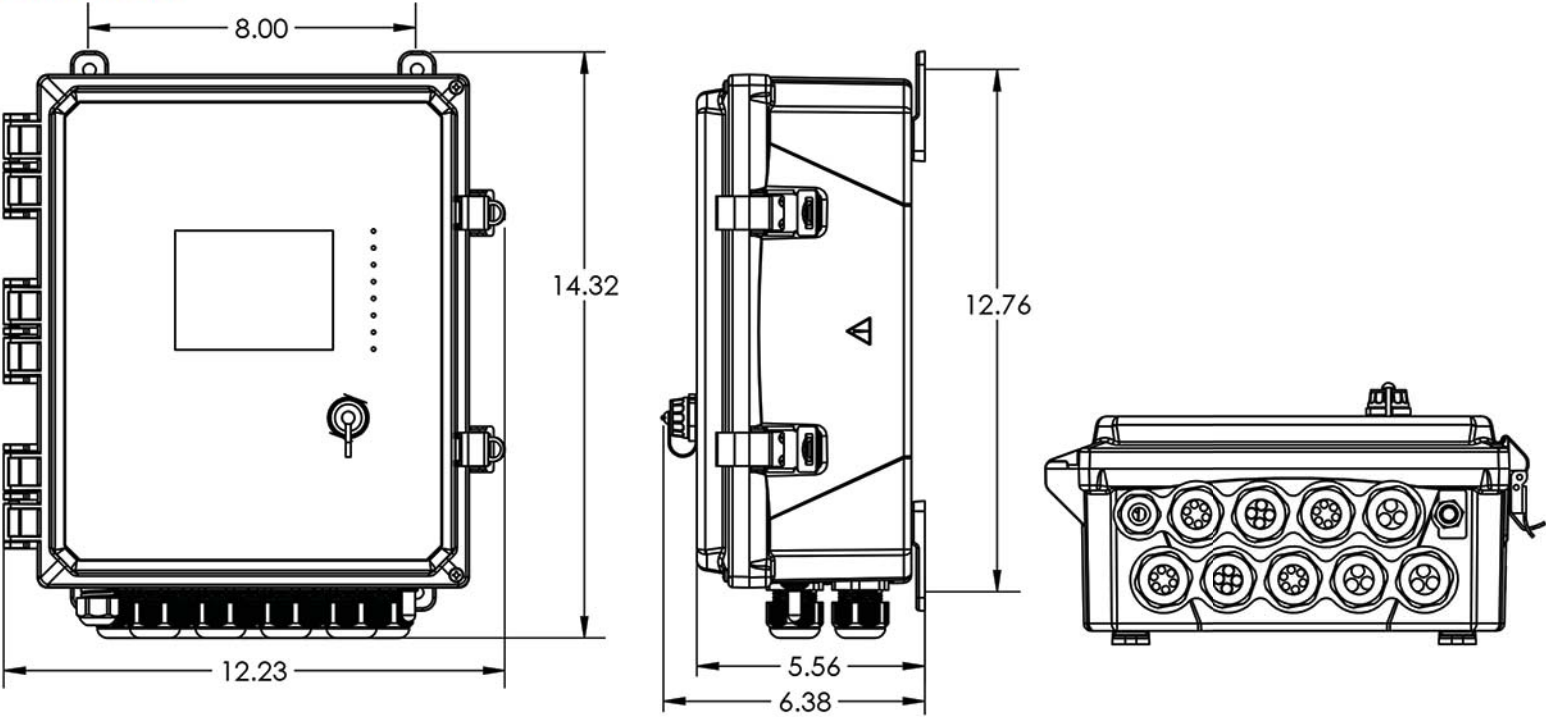
\* If a high pressure manifold is selected, only Hi P sensors and Makeup available.

\*\* Dipper, Pyxis, Chlorine, CIO<sub>2</sub> sensors NOT available with Submersion mounting.

### SENSORS #1-6 (must be in alphabetical order)

N	None
A	Boiler sensor with ATC, 250 psi, K=1.0, 20ft.cable
B	Boiler sensor no ATC, 250 psi, K=1.0, 20ft.cable
C	Condensate sensor with ATC, 200 psi, K=0.1, 10ft.cable
D	Boiler sensor with ATC, 250 psi, K=10, 20ft.cable

Dimensions



**W A L C H E M**

IWAKI America Inc.

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