Conductivity, pH/ORP & Disinfection

W600 Series Controllers

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.)
- The W600 with amperometric chlorine sensors can be used for reporting chlorine residual measurements in accordance with EPA Method 334.0.
- 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

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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. ±5VDC 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 ±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 ± 0.5% of reading

Measurement Performance

	Range	Resolution	Accuracy
0.01 Cell Contacting Conductivity	0-300 µS/cm	0.01 µS/cm, 0.0001 mS/cm, 0.001 mS/m, 0.0001 S/m, 0.01 ppm	±1% of reading
0.1 Cell Contacting Conductivity	0-3,000 µS/cm	0.1 µS/cm, 0.0001 mS/cm, 0.01 mS/m, 0.0001 S/m, 0.1 ppm	±1% of reading
1.0 Cell Contacting Conductivity	0-30,000 µS/cm	1 µS/cm, 0.001 mS/cm, 0.1 mS/m, 0.0001 S/m, 1 ppm	±1% of reading
10.0 Cell Contacting Conductivity	0-300,000 µS/cm	10 µS/cm, 0.01 mS/cm, 1 mS/m, 0.001 S/m, 10 ppm	±1% of reading
pH	-2 to 16 pH units	0.01 pH units	±0.01% of reading
ORP	-1500 to 1500 mV	0.1 mV	±1 mV
Disinfection sensors	-2000 to 1500 mV	0.1 mV	±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 µS/cm	1 µS/cm, 0.01 mS/cm, 0.1 mS/m, 0.001 S/m, 1 ppm	±1% of reading
	3,000-40,000 µS/cm	1 µS/cm, 0.01 mS/cm, 0.1 mS/m, 0.001 S/m, 1 ppm	±1% of reading
	10,000-150,000 µS/cm	10 µS/cm, 0.1 mS/cm, 1 mS/m, 0.01 S/m, 10 ppm	±1% of reading
	50,000-500,000 µS/cm	10 µS/cm, 0.1 mS/cm, 1 mS/m, 0.01 S/m, 10 ppm	±1% of reading
	200,000-2,000,000 µS/cm	100 µS/cm, 0.1 mS/cm, 1 mS/m, 0.1 S/m, 100 ppm	±1% of reading
Temperature	23 to 500°F (-5 to 260°C)	0.1°F (0.1°C)	±1% of reading within range

Temperature°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

Temperature°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	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

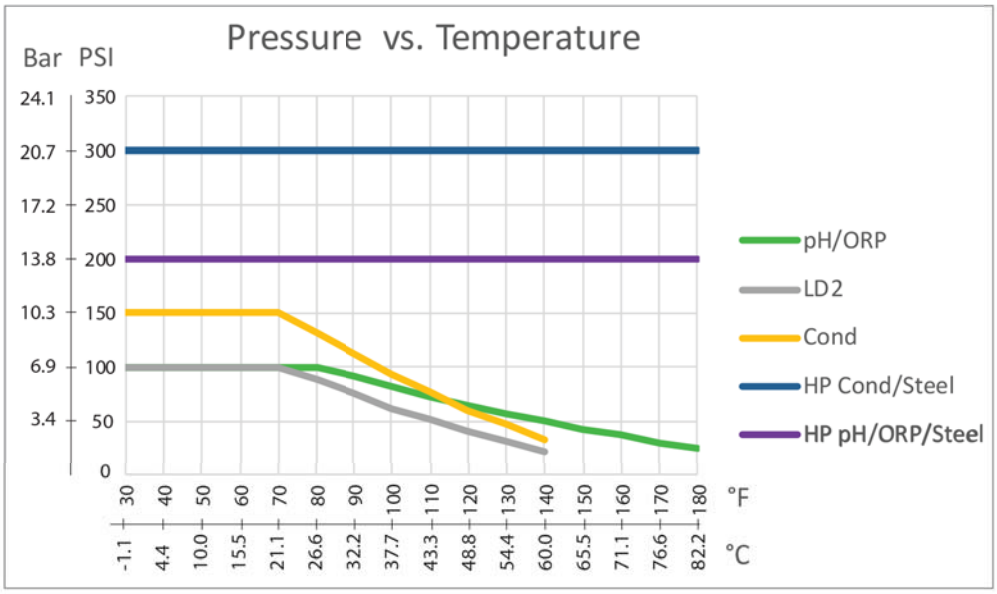
Safety: UL 61010-1:2012, 3rd Edition
CSA C22.2 No.61010-1:2012, 3rd Edition
IEC 61010-1:2010 3rd Edition
EN 61010-1:2010 3rd Edition

EMC: IEC 61326-1:2012
EN 61326-1:2013

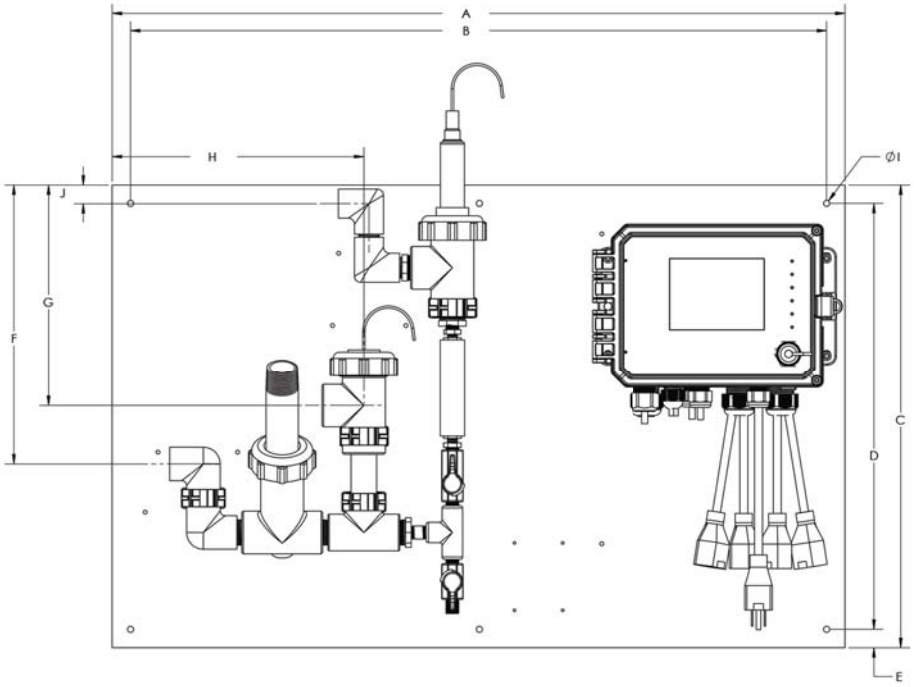
Note: For EN61000-4-6, EN61000-4-3 the controller met performance criteria B. This equipment is suitable for use in establishments other than domestic and those directly connected to a low voltage (100-240 VAC) power supply network which supplies buildings used for domestic purposes.

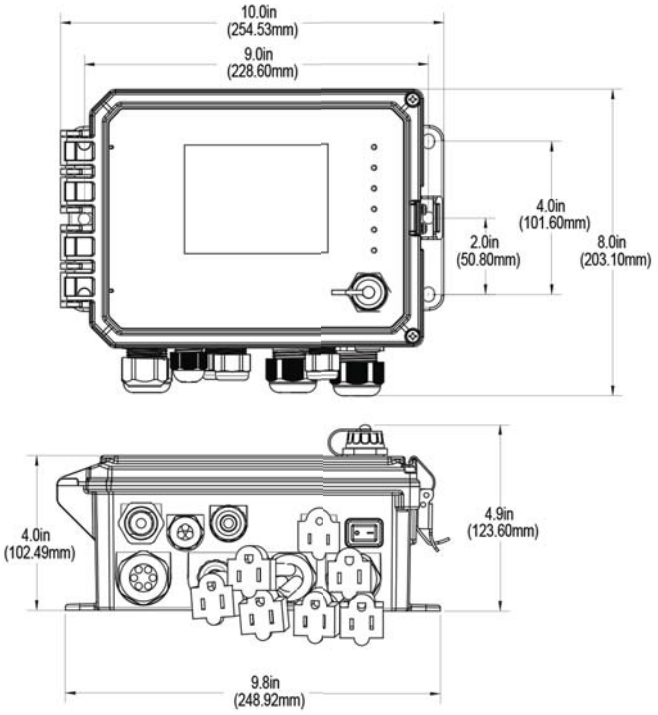
Mechanical (Sensors) (*see graph)

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 (0-7bar)*	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



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)	
W600-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)		
W600-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	22.5" (571 mm)	21.5" (546 mm)	11.75" (298 mm)	10.75" (273 mm)	0.5" (12.7 mm)	11" (279 mm)	7.5" (191 mm)	3" (76 mm)		0" (0 mm)
W600-DS-PX	24" (610 mm)	22.5" (571 mm)	19" (483 mm)	17.5" (445 mm)	0.75" (19 mm)	11.5" (292 mm)	9" (229 mm)	10" (254 mm)		0.75" (19 mm)

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Ordering Information

WCT
WBL
WPH
WDS
WCN

Example: WCT600PCSNE- BI

RELAYS/WIRING	INPUT CARDS	ANALOG OUTPUTS	ETHERNET	-	SENSORS
WCT600P	CS	N	E		- BI

RELAYS/WIRING

6 powered relays		
	600H	Hardwired
	600P	Prewired with USA cords and pigtails
	600D	Prewired with DIN power cord, no pigtails
2 powered 4 dry relays		
	610H	Hardwired
	610P	Prewired with USA cord and 2 pigtails
	610D	Prewired with DIN power cord, no pigtails
2 opto 4 dry relays		
	620H	Hardwired
	620P	Prewired with USA cord and two 20 ft. pulse cables
	620D	Prewired with DIN power cord, no pigtails
4 opto 2 dry relays		
	640H	Hardwired
	640P	Prewired with USA cord and four 20 ft. pulse cables
	640D	Prewired with DIN power cord, no pigtails

INPUT CARDS

NN	No sensor input cards
SN	One sensor input card
SS	Two sensor input cards
CS	One sensor input card & one combination sensor/analog input card
CN	One combination sensor/analog input card
CA	One combination sensor/analog input card & one dual analog input card
CC	Two combination sensor/analog cards
AN	One dual analog input card
AA	Two dual analog input cards
SA	One sensor input card and one dual analog input card

ANALOG OUTPUTS

N	No analog outputs
A	One dual isolated analog output card

ETHERNET

N	No Ethernet
E	Ethernet card
M	Ethernet card with Modbus/TCP

WBL BOILER SENSORS

		Type of Input card required
NN	No sensor	
AN	Boiler sensor with ATC, K=1.0, 250 psi, 20 ft. cable	S or C
BN	Boiler sensor without ATC, K=1.0, 250 psi, 20 ft. cable	S or C
CN	Condensate sensor with ATC, K=0.1, 200 psi, 10 ft. cable	S or C
DN	Boiler sensor with ATC, K=10, 250 psi, 20 ft. cable	S or C
AA	Two boiler sensors, with ATC, K=1.0, 250 psi, 20 ft. cables	SS or CS or CC
BB	Two boiler sensor without ATC, K=1.0, 250 psi, 20 ft. cables	SS or CS or CC
CC	Two condensate sensors with ATC, K=0.1, 200 psi, 10 ft. cables	SS or CS or CC
DD	Two Boiler sensors with ATC, K=10, 250 psi, 20 ft. cables	SS or CS or CC
AB	Boiler sensor with ATC, K=1.0 and boiler sensor without ATC, K=1.0, 250 psi, 20 ft. cables	SS or CS or CC
AC	Boiler sensor with ATC, K=1.0 20 ft.cable and Condensate sensor with ATC, K=0.1, 250 psi, 10 ft. cable	SS or CS or CC
AD	Boiler sensor with ATC, K=1.0 and Boiler sensor with ATC, K=10, 250 psi, 20 ft. cables	SS or CS or CC
BC	Boiler sensor without ATC, 20 ft. and condensate sensor with ATC, 10 ft. cable	SS or CS or CC
BD	Boiler sensor without ATC and Boiler sensor with ATC, K=10, 250 psi, 20 ft. cables	SS or CS or CC
CD	Condensate sensor with ATC, 10 ft. cable and Boiler sensor with ATC, K=10, 250 psi, 20 ft. cable	SS or CS or CC

WDS DISINFECTION SENSORS

NN	No sensors or flow switch manifold	
PN	Single DIS manifold on panel*	S or C
PX	DIS manifold plus pH/ORP/cooling tower cond tee on panel**	SS or CS or CC
FN	Single DIS flow cell/cable, no sensor*	S or C
FF	Two DIS flow cell/cable, no sensors*	SS or CS or CC

*Order disinfection sensor(s) separately
**Order disinfection sensor and WEL electrode and preamplifier housing or cooling tower conductivity sensor separately

WCN CONDUCTIVITY SENSORS

NN	No sensors or flow switch manifold*	S or C for each sensor to be used

*Order conductivity sensor separately

WPH pH/ORP SENSORS

		Type of Input card required
NN	No sensors or flow switch manifold	
PN	Single low pressure manifold on panel**	S or C
QN	Single high pressure manifold on panel with 190783*	S or C
PX	Dual low pressure manifold on panel**	SS or CS or CC
QX	Dual high pressure manifold on panel with two 190783*	SS or CS or CC

*Order 102029 pH and/or 102963 ORP electrodes separately
**Order WEL electrode(s) and preamplifier housing(s) separately

WCT COOLING TOWER SENSORS

			Type of Input card required
NN		No sensor	
AN		Inline graphite contacting conductivity	S or C
BN		Graphite contacting conductivity + Flow Switch manifold on panel	S or C
CN		High pressure contacting conductivity	S or C
DN		High pressure contacting conductivity + Flow Switch manifold on panel	S or C
EN		Inline 316SS contacting conductivity	S or C
FN		316SS contacting conductivity + Flow Switch manifold on panel	S or C
GN		Inline electrodeless conductivity	S
HN		Electrodeless conductivity + Flow Switch manifold on panel	S
Graphite contacting conductivity + Flow Switch manifold on panel			
	BA	+ Flat pH Cartridge no ATC	SS, CS or CC
	BB	+ Rod ORP Cartridge no ATC	SS, CS or CC
	BC	+ Flat ORP Cartridge no ATC	SS, CS or CC
	BD	+ Little Dipper	SA or C
	BH	+ Flat pH Cartridge no ATC + Little Dipper	CS or CC
	BI	+ Rod ORP Cartridge no ATC + Little Dipper	CS or CC
	BJ	+ Flat ORP Cartridge no ATC + Little Dipper	CS or CC
	BK	+ Little Dipper with Makeup graphite conductivity with threaded adapter	CS or CC
	BQ	+ Pyxis	SA or C
	BR	+ WEL-PHF no ATC + Pyxis	CS or CC
	BS	+ WEL-MVR no ATC + Pyxis	CS or CC
	BT	+ WEL-MVF no ATC + Pyxis	CS or CC
	BU	+ Pyxis with Makeup graphite conductivity with threaded adapter	CS or CC
316SS contacting conductivity + Flow Switch manifold on panel			
	FA	+ Flat pH Cartridge no ATC	SS, CS or CC
	FB	+ Rod ORP Cartridge no ATC	SS, CS or CC
	FC	+ Flat ORP Cartridge no ATC	SS, CS or CC
	FD	+ Little Dipper	SA or C
	FH	+ Flat pH Cartridge no ATC + Little Dipper	CS or CC
	FI	+ Rod ORP Cartridge no ATC + Little Dipper	CS or CC
	FJ	+ Flat ORP Cartridge no ATC + Little Dipper	CS or CC
	FQ	+ Pyxis	SA or C
	FR	+ WEL-PHF no ATC + Pyxis	CS or CC
	FS	+ WEL-MVR no ATC + Pyxis	CS or CC
	FT	+ WEL-MVF no ATC + Pyxis	CS or CC
High pressure contacting conductivity + Flow Switch manifold on panel			
	DE	+ pH &190783	SS, CS or CC
	DF	+ ORP & 190783	SS, CS or CC
Electrodeless conductivity + Flow Switch manifold on panel			
	HA	+ Flat pH Cartridge no ATC	SS or CS
	HB	+ Rod ORP Cartridge no ATC	SS or CS
	HC	+ Flat ORP Cartridge no ATC	SS or CS
	HD	+ Little Dipper	SA or CS
	HH	+ Flat pH Cartridge no ATC + Little Dipper	CS
	HI	+ Rod ORP Cartridge no ATC + Little Dipper	CS
	HJ	+ Flat ORP Cartridge no ATC + Little Dipper	CS
	HK	+ Little Dipper with Makeup graphite conductivity with threaded adapter	CS
	HQ	+ Pyxis	SA or CS
	HR	+ WEL-PHF no ATC + Pyxis	CS
	HS	+ WEL-MVR no ATC + Pyxis	CS
	HT	+ WEL-MVF no ATC + Pyxis	CS
	HU	+ Pyxis with Makeup graphite conductivity with threaded adapter	CS

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