

DL BLACK BOX Controller Series



*Breaking Through the Barriers
of Water Management*



Digital Controllers in Water Treatment Applications

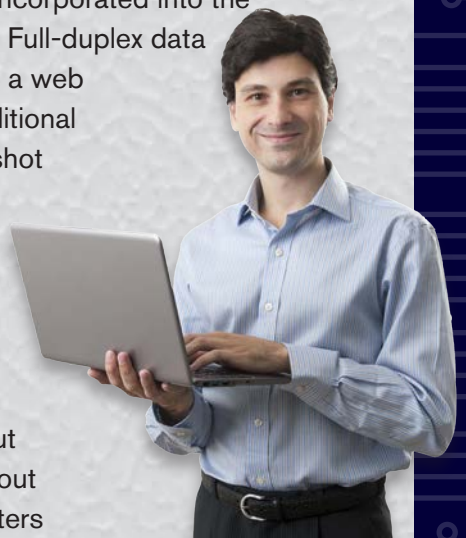
Water treatment management can be a complicated and inefficient process for industrial applications, Saltwater and Freshwater aquariums, agriculture, aquaculture, food processing, pools & spas, hydroponics or anywhere that requires the combination of a number of physical and chemical processes to keep the water environment on application target. Our digital, data logging, IOT based controllers make this management process very easy.

Why Choose the DL Black Box product line of Controllers?

The Black Box “DL” product line of Controllers gives you true total control over pH – ORP – Temp and coming soon EC/TDS and D.O. parameters. These functions are monitored and controlled with ease through the MCU based central command unit. This digital base unit provides the user with heads up alerts and alarms by text and email as well as built in visual references. All of that is incorporated into the Wi-Fi interface giving the user the capability of Full-duplex data interaction from anywhere in the world through a web portal. (These are all IOT based units) An additional feature is the historical data logging and snapshot options. These features provide extensive historical information that can be sliced and diced to provide analytical data as needed.

We Make It Easy to Choose and Easy to Purchase!

Each DL model is complete and ready to be put into service. We have taken all the guesswork out of the buying process. Simply pick the parameters you want to control and that unit is ready to go to work. No modular pricing, no scratching your head trying to figure out what configuration to purchase or probes to get etc. To make the decision even easier, the “DL” Black Box product line was designed from the ground up using the latest in computer, Wi-Fi and Open Source software technology. That’s why every DL unit is so affordable. Compared to any controller used in any application; no other digital controller offers so much value for so little of an investment. See all the basic features on the next page but that is just the beginning of the story. Dig a little deeper into each individual unit specifications and you will discover an extraordinary group of digital controllers. You will also discover the most unique and technologically advanced pH/ ORP/ Temp controller in the world. *(Want a hint “Phase IV” with a release date this fall).*



COMPREHENSIVE DESIGN INCLUDES ALL THESE POPULAR FEATURES

LED Back Lights

on each side give a visual indication when the unit is in normal operation mode (blue), alert mode (yellow), or alarm mode (red).

Large LCD readout

High resolution white type on blue background is easy to read even in bright light. Shows most recent log value, date, time and current reading simultaneously.

"Light" Button

turns off LCD screen and Normal/Alert/Alarm LED backlights to eliminate the distraction at night but unit does not stop logging function or any controlling functions.

Snapshot feature takes "real-time" reading

Manual click of Snapshot button displays pH reading and enters into log without interfering with the selected sampling rate.

Automatic Defective Probe Detection

When probe validation software detects inaccurate reading, display indicates "Defective Probe or Calibration Standard."

Automatic calibration, menu-driven, with 1-point, 2-point, or 3-point calibration

Smaller target areas work best with 1- and 2-point calibration to assure greater accuracy; use 3-point when broader range calculations are expected.



Real Time Data

direct to PC or Mac or phone or tablet through the Wi-Fi on board utilizing the new TI CC3100 SimpleLink Wi-Fi network processor technology & cloud portal. User has "Full-Duplex" data control.

Digital Temp Sensor

Waterproof with a 2 meter (6.5 ft) length
3.5mm connector
±0.5° Celsius accuracy

Position for pH probes

or later the EC/TDS and D.O. Probe – Master base board has built in "GLP" (Ground Loop Preventer) shield which guarantees an accurate measurement without interference and in addition provides the Unit and probes protection from external stray power which extends probe life.

Includes North American

and all other International power plugs as standard – no need for a converter.

Utilizes any capacity SD card; full (standard), mini and micro with adapters

If power supply is interrupted, SD card retains all logged data.

2 Meter (7ft) RJ45 Communication Cable

to power bar which is standard with all controllers. Power bar can be positioned up to 15 meters (50ft). The RJ45 plug has back feed power lockout for unit protection.



INDIVIDUAL UNIT SPECIFICATIONS

DL122 - PH / TEMPERAUTRE / TIMER - CONTROLLER

SPECIFICATIONS

Range	.001 pH to 14.000 pH
Resolution - User Select	Tenths (0.1 pH) - hundreths (0.01 pH) - Thousands (0.001) pH
Accuracy @ 77°F	0.02 pH
Set Point Range	Full pH scale 0.01 pH to 14.00 pH
Activation Parameter	User Select above or below activation set point
Visual Alert/Alarm	LED backlight blue = normal; yellow = alarm; red = alert
Probe Protection	On Master Board GLP chipset (Ground Loop Preventor)
Circuit Board Protection	On Master Board RJ45 Backfeed Prevention Chipset
Operational Environment	15°F to 180°F : (-10°C to 85°C)
Temperature Accuracy	0.5°F
Power Supply	International Plug Set - No converter needed
pH Electrode	MA911B/2
RJ-45 Cable	7 foot RG45 provided -- Optional up to 50 feet
Controller Power Box	1 plug for pH dosing or CO2 solenoid control & 1 plug for Timer Set in software

DL510 - ORP / TEMPERAUTRE / TIMER - CONTROLLER

SPECIFICATIONS

Range	Full -1000 to +1000 mV
Resolution - User Select	1 mV
Accuracy @ 77°F	5 mV
Set Point Range	Full ORP scale -1000 mV to +1000 mV
Activation Parameter	User Select above or below activation set point
Visual Alert/Alarm	LED backlight blue = normal; yellow = alarm; red = alert
Probe Protection	On Master Board GLP chipset (Ground Loop Preventor)
Circuit Board Protection	On Master Board RJ45 Backfeed Prevention Chipset
Operational Environment	15°F to 180°F : (-10°C to 85°C)
Temperature Accuracy	0.5°F
Power Supply	International Plug Set - No converter needed
ORP Electrode	MA921B/2
RJ-45 Cable	7 foot RG45 provided -- Optional up to 50 feet
Controller Power Box	1 plug for ORP dosing or Ozone & 1 plug for Timer Set in software

DL125 - PH / ORP / TEMPERAUTRE - CONTROLLER

SPECIFICATIONS

Range pH	0.01 pH to 14.00 pH
Range ORP	0 to 1000 mV
pH Resolution - User Select	Tenths (0.1 pH) - hundreths (0.01 pH) - Thousands (0.001) pH
ORP Resolution - Fixed	1 mV
Accuracy @ 77°F	pH 0.02 pH and 5 mV
pH & ORP Set Point Range	Full pH Scales 0.00 to 14.00 -- Full ORP scale -1000 mV to +1000 mV
Activation Parameter	User Select above or below activation set point
Visual Alert/Alarm	LED backlight blue = normal; yellow = alarm; red = alert -- (pH only)
Probe Protection	On Master Board GLP chipset (Ground Loop Preventor)
Circuit Board Protection	On Master Board RJ45 Backfeed Prevention Chipset
Operational Environment	15°F to 180°F : (-10°C to 85°C)
Temperature Accuracy	0.5°F
Power Supply	International Plug Set - No converter needed
pH Electrode / ORP Electrode	MA911B/2 / MA921B/2
RJ-45 Cable	7 foot RG45 provided -- Optional up to 50 feet
Controller Power Box	1 plug for pH dosing or CO2 solenoid control & 1 plug for ORP dosing or Ozone

INDIVIDUAL UNIT SPECIFICATIONS CONTINUED

PHASE IV - pH / ORP / TEMPERAUTRE / WIRELESS PROBE INTERFACE - CONTROLLER	
SPECIFICATIONS	
Range pH	0.01 pH to 14.00 pH
Range ORP	0 to 1000 mV
pH Resolution - User Select	Tenths (0.1 pH) - hundredths (0.01 pH) - Thousands (0.001) pH
ORP Resolution - Fixed	1 mV
Accuracy @ 77°F	pH 0.02 pH and 5 mV
pH & ORP Set Point Range	Full pH Scales 0.00 to 14.00 -- Full ORP scale -1000 mV to +1000 mV
Activation Parameter	User Select above or below activation set point
Visual Alert/Alarm	LED backlight blue = normal; yellow = alarm; red = alert -- (pH only)
Probe Protection	On Master Board GLP chipset (Ground Loop Preventor)
Circuit Board Protection	On Master Board RJ45 Backfeed Prevention Chipset
Operational Environment	15°F to 180°F : (-10°C to 85°C)
Temperature Accuracy	0.5°F
Power Supply	International Plug Set - No converter needed - 110v/220v ACTO 9v DC
pH Electrode / ORP Electrode	MA911B/2 / MA921B/2
RJ-45 Cable	Not Available -- Controller Power Box is Wireless Remote
Controller Power Box - Wireless	1 plug for pH dosing or CO2 solenoid control & 1 plug for ORP dosing or Ozone

** UNIQUE SPECIFICATIONS FOR JUST THE PHASE IV CONTROLLER **

Offered only with the Milwaukee Instruments DL - Phase IV pH / ORP / Temp. Controller
**Wireless probe/power Interface box can be positioned up to 2000 feet (½ mile)
 (600 meters) from Phase IV -- DL-Black Box command base**

GENERAL SPECIFICATIONS FOR ALL THE CONTROLLERS

User select PH and/or ORP on/off control value points with full PH range available at 00.0 (tenths) & ORP mV to 1000 mV with built-in on/off delay of 00.05 +/- ph & 10mV +/- to prevent rapid on/off activation fluctuations.

User select "PH and/or ORP High" & "PH and/or ORP Low" Emergency notification value points in 00.0 (tenths) pH or 10mV -- User select by menu in portal the "Danger - Reached High PH or ORP" & "Danger - Reached Low PH or ORP" Emergency value points notification to be sent to designated recipient via e-mail and / or text address also set up in user web portal.

Visual light on box of Normal (blue back light) – Alert (yellow back light) – Alarm (red back light)

CENTRAL COMMAND UNIT SPECIFICATIONS

CONTROLLER INTERNAL HARDWARE SPECIFICATIONS	
Microcontroller	Atmel SAM3X8E ARM Cortex-M3 CPU
Operating Voltage	3.3 volts
Clock Speed	84 MHz clock
S Ram	96 KBytes of SRAM (two banks: 64KB and 32KB)
Flash Memory	512 KB
Data Retention	100 years at 25 C
Wi-Fi Interface	Texas Instruments CC3100Boost "SimpleLink" - Wi-Fi Internet on a Chip technology
Station and Access Point	802.11 b/g/n Roles with Integrated Radio, Baseband, and MAC
TCP/IP	Embedded TCP/IP stack - 8 simultaneous TCP or UDP Sockets
Internet protocol	mDNS, DNS, SSL/TLS + web server (HTTP).
Embedded hardware	crypto engine for TLS/SSL internet security
Flexible connection	access point mode, WPS and SmartConfig™ technology
Main Board	
Circuit Board Protection	RJ45 Back Feed Protection with Short Circuit Protection
GLP (Ground Loop Prevention)	Dual Ground Loop Prevention Circuit and Chipset
Input Power Supply	7v to 12v DC Recommended --- International Plug Set - No Converter needed
Input Min. & Max	6 volts to 20 volts DC
Logic Load Shifter	Provides Higher LCD Screen Resolution and Fast Response Time

POWER CONTROLLER BOX SPECIFICATIONS



Controller Power Max Capacity @ 110 volt or 220 volt 10 amps / 1000 watts
Relay Response Time is 20ms
Free Wheeling Diode Protection
Universal Plug -- no converter necessary
Blue LED Light on indicate Plug is active and Power is on
One of the Plug Would serve as timer plug in place of pH or ORP - depending on model
Communication to Master Controller through RJ45 up to a Max distance of 50 Feet

Black Box Manufactured/Assembled in the USA by:

