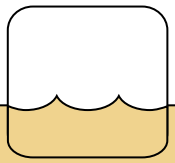
Downloading groundwater level data from Global Water's WL16 Water Level Logger.

CHAPTER 1.

LEVEL AND PRESSURE

Level and Pressure Loggers, Sensors, Alarms, and Controllers

Level and Pressure Notes



How to Set Up a Stream Gauging Station

For continuous flow monitoring of free-flowing open channels, you can use a WL16 Water Level Logger and a Flow Probe (see page 22) to establish a stream gauging station.

Install WL16

If you don't already have a depth to flow equation for your channel, you will have to create one. In the meantime, install your WL16 at your monitoring site to begin collecting water level data. To protect the sensor and the datalogger, you can use a 2" pipe with pre-formed sweeps that conform to the stream bank's contours (the sensor will slide through 45° and 90° sweeps). The pipe may be buried in the bank, secured with rocks, or fastened to the bank with large staples made from concrete reinforcing steel.

Measure Depth and Flow

To create a depth to flow equation, begin by using the Flow Probe to take flow readings at different water levels. To measure flows at various water depths, you will either need to manually manipulate flows (in a controlled setting) or measure flows over time (in an uncontrolled setting). You should measure at a relatively high water level, at a low level, and at several levels in between. The more level/flow datapoints you have, the more accurate your equation will be.

Correlate Depth to Flow

Now you can develop a table reflecting your channel's depth to flow relationship. You can enter this information into a spreadsheet program to calculate a rating equation for your data trend. This rating equation can be applied to level data downloaded from your WL16 to calculate corresponding flow data.

FIND OUT MORE AT WWW.GLOBALW.COM

WL16 Water Level Logger

Submersible Pressure Transducer and Datalogger Combination

Description

Global Water's WL16 Water Level Logger is a datalogger and submersible pressure transducer combination designed for remote monitoring and recording of water level or pressure data. The WL16 can record over 81,000 readings and has four unique recording options: programmable interval (1 second to multiple years), fast (10 samples per second), logarithmic, and exception. Multiple depth ranges are available from 0-3' to 0-500' of water level change. A 25' vented cable is standard, and optional cable lengths are available up to 500' (cable length is measured from the top of the datalogger to the bottom of the sensor).

Rugged Sensor Design

The WL16's submersible pressure transducer has exceptional linearity, very low hysteresis, a highly rugged design, and is automatically compensated for barometric pressure. More information about Global Water's Level Sensor and barometric pressure compensation is available on page 6.

Unique Datalogger

The WL16 datalogger is housed in a weather-resistant cylindrical enclosure, which easily slips inside and rests on top of a standard 2" PVC pipe. The WL16 includes two internal 9 VDC alkaline batteries, which can typically power the unit for one year. The data is safely stored in non-volatile flash memory.

Powerful Software

The WL16 includes Windows™-based Global Logger II software that provides many useful features, such as real-time readout, measurement interval and engineering unit selection, station ID setting, and sensor calibration. The software makes accessing stored data and setting options easy. Data downloaded from the WL16 can easily be opened in any PC spreadsheet program for analysis and graphic presentation. The WL16 also includes Windows™ CE-based PDA software for simple field data collection and Flow Logger Software for flow monitoring (for more information, see the FL16 on page 24). A Bluetooth communication option is available with the purchase of the AK1500, external Bluetooth adapter.

Flexible Options

Two versions of the WL16 are available: one for computers with a RS-232 serial port (WL16S version), and another for computers with a USB communication port (WL16U version). Purchase of either unit includes the appropriate RS-232 or USB cable for communication between the logger and your computer.

In addition, a variety of options are available to best meet the needs of your application:

- The THO Titanium Option includes a rugged titanium housing for the water level sensor. For best performance in marine environments we recommend using the titanium option.
- The WL-INO Inside Well Option allows the entire logger to fit within a 2" well and includes a chain and hook to secure the WL16 to the well top (less than 100' of cable should be used with this option).
- The Pressure Pipe Option houses the sensor in either a 8" PVC (PRPP) or

Applications

Pumping & Slug Tests
Recharge Analysis
Site Investigations
Supply Monitoring

Flood Analyses
Wetlands & Ponds
Stormwater Run-Off
Agricultural Run-Off

Irrigation Canals
Stream & River Gauging
Lakes & Reservoirs
Tidal Fluctuation

WL16 Water Level Logger

stainless steel (PRPM) pipe with ¾" NPT male thread for monitoring pressure in municipal water systems. The sensor is calibrated for pressure with ranges of 30 psi, 60 psi, 100 psi, and 250 psi available. A 10' cable is standard.

- The WL-T Temperature Output Option monitors temperature as well as level data without decreasing the logger's storage capacity. This option supports a temperature range of 0-50° C and accuracy of 1% of reading.

Specifications

Datalogger

Memory	Non-volatile flash memory
Power	Two 9 VDC alkaline batteries (inc.)
Battery Life	Up to 1 year (depending on recording intervals)
Resolution	12 bit
Moisture Protection	Protective coating (helps prevent damage to electronics from condensation)
Temperature	-40° to +185°F (-40° to +85°C)
Humidity	0-95% non-condensing
Storage Capacity	81,759 time/date stamped data-points (including battery voltage)
Recording Rate	High Speed (10 samples per second), Fixed Interval (programmable from 1 second to >1 year), Logarithmic, Exception
Data Overwrite	Select memory wrap or unwrap (unwrap will stop logging once memory is full)
Clock	Synchronizes to user's computer; accuracy of 0.0025% or 1 minute in 1 month; format is m/d/yr and hr/min/sec
Enclosure	1-7/8" dia. x 11-1/2" long (4.8 cm dia. x 29.2 cm long) Stainless steel UV protected PVC, vented for barometric pressure compensation
Weight	1.6 lbs, with battery and 25' cable (0.7 kg)
Communication	WL16S: RS-232 4-pin circular connector WL16U: USB Type B Selectable Baud Rates: 9600, 19200, 28800, 38400, 57600, 115200
Certificates	CE Compliance

Global Logger II Software

Compatibility	Microsoft's Windows™ 98, ME, 2000, NT, XP, and Vista
Features	Tabular Display/Printout; data in standard spreadsheet format (CSV); programmable alarm start and stop times; field calibration and help files included

Features

- Highly accurate water level measurements
- Easy to operate and install
- Four sample modes: timed, 10 times per second, logarithmic, and exception
- User-friendly Windows™ and Windows™ CE-based PDA software included
- USB and serial communication options available
- No need to remove sensor for data collection or battery change
- User-programmable start and stop alarms, engineering units, and field calibration setup
- Automatic barometric pressure and temperature compensation

Cable

Conductors	4 each 22 AWG
Material	Marine grade polyether jacket, polyethylene vent tube, full foil shield
Shield	Aluminum Mylar
Outside Diameter	0.306 inch (0.78 cm)
Length	Standard 25' (up to 500' from factory)

Sensor

See specifications for WL400 Water Level Sensor, pg. 6.

Bluetooth Adapter

Format	Bluetooth 2.0 SPP (Serial Port Protocol)
Baud Rate	Auto Detect up to 115K Baud
Power	9V Alkaline. 20 hrs continuous use
Current	30mA Average
Range	20 ft maximum
Operating Temp	-40° to +185°F (-40° to +85°C)
Compatible Software	Global Logger II version 2.1.5 or higher; Global Logger II PDA software version 2.0.1; Flow Monitor version 2.3.2

Ordering & Options

USB Communications Level Loggers

Order No.	Sensor Range [1]	Cable Length [2]
WL16U-003-025	3'	25'
WL16U-015-025	15'	25'
WL16U-030-050	30'	50'
WL16U-060-100	60'	100'
WL16U-120-150	120'	150'
WL16U-250-300	250'	300'

Serial Communications Level Loggers

Order No.	Sensor Range [1]	Cable Length [2]
WL16S-003-025	3'	25'
WL16S-015-025	15'	25'
WL16S-030-050	30'	50'
WL16S-060-100	60'	100'
WL16S-120-150	120'	150'
WL16S-250-300	250'	300'

Options

Order No.	Description
WLEXC[2]	Extra Sensor Cable (up to 500')
WL16-500	0-500' Sensor Range
THO	Titanium Option
WLINO	Inside Well Option
PRPP [3]	Pressure Pipe Option- PVC
PRPM [3]	Pressure Pipe Option- Stainless Steel
WL-T	Temperature Output Option

Accessories

Order No.	Description
PDAWL16	PDA Package, see page 124
00-897	Locking Well Cap for 2" pipe
AK1500[4]	External Bluetooth Adapter

1) When ordering, specify the sensor range that will cover the maximum water level change for your application. Sensor ranges include: 3', 15', 30', 60', 120', or 250', and a 0-500' range sensor is available with option WL16-500.

2) When ordering, specify the cable length. WL16 units include lengths as noted, and additional cable lengths are available with option WLEXC up to 500'.

3) When ordering a Pressure Pipe Option, specify the sensor range: 30 psi, 60 psi, 100 psi, and 250 psi. A 10' cable length is standard.

4) Bluetooth adapter requires serial version of water level logger.

DCX-22 Self-Contained Level Logger

Absolute Pressure and Temperature Combination Logger

Description

The DCX-22 Self-Contained Level Logger is a highly accurate, self-contained, battery powered instrument designed to record water depths and temperature over long periods. The sensor, electronics, and battery are housed in a rugged, double sealed 316 stainless steel tube for long term submersible deployment. The DCX-22 requires no external electrical wires and may be suspended with any suitable and secure cable. When it is time to download the unit's recorded data, you can simply retrieve the DCX-22 from the measurement point and remove the double sealed end cap to access the data port. The DCX-22 is available in two level ranges: the DCX-22-2 measures from 0 to 66.9' (2 bar), and the DCX-22-3 measures from 0 to 100.37' (3 bar). When ordering, select the smallest level range that will cover the maximum expected water level change (this is not necessarily the total depth of water).

Accurate Barometric Pressure Correlation

When using the DCX-22 in shallow water depths where the influence of barometric pressure changes should be considered, we recommend that you place the DCX-22 Baro at the water surface to record the atmospheric pressure. Once the data files are downloaded to your PC, the unit's software quickly and accurately subtracts the barometric pressure values from the water pressure values. The DCX-22 Baro is built to the same high quality standards as the DCX-22 Logger.

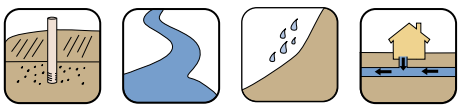
Easy to Use Software

The DCX-22 includes simple and well structured software that is compatible with Windows™ 2000/NT/XP/ME and 9X. The software allows you to configure and read data from the DCX-22. In particular, you can:

- Set the measuring frequency (from once per second to once every 18 hours)
- Measure data in mWC or any other unit
- Program the date and time to start measuring
- Program an event that will activate the logger (such as an absolute or percent change of water level or exceeding or dropping below a certain pressure)
- View online data and battery condition in real time
- Store data about the measuring station
- Export data for spreadsheet use and graphical representation

Due to the modular structure of the software, customer specific data formats can be implemented on request. In addition, a Windows™ CE-based application for accessing data on a PDA is also available upon request. Please contact Global Water to discuss these options.

Applications



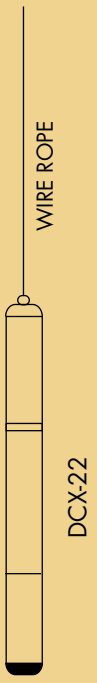
Ideal for groundwater monitoring, stream and river gauging, wetland and estuary monitoring, weirs and flumes, irrigation canals, inflow and infiltration studies, sites with high vandalism opportunity, and more.

DCX-22 Installation Notes

The DCX-22 can be installed within a stilling well pipe that is firmly mounted at the monitoring site. If the stilling well is installed in the ground, make sure the pipe has openings to ensure that water can enter.

To construct your own protective stilling well, you can use PVC schedule 40 electrical conduit, a light grey pipe that has UV protectors and pre-formed "sweeps" or bends that enable the pipe to conform to contours. The pipe can be buried, secured with rocks, or fastened with large staples made from concrete reinforcing steel.

Hang the DCX-22 on a wire rope and submerge the entire DCX-22 datalogger below the lowest expected water level. (When ordering, select the smallest range that will cover the maximum expected water level change.)



To obtain data, pull up the wire rope to remove the logger from the installation pipe. Remove the O-ring sealed end cap to access the data port and connect your laptop to the dataport via a data cable. Now you can access the stored data, read programmed parameters, and reconfigure settings.

FIND OUT MORE AT WWW.GLOBALW.COM

DCX-22 Self-Contained Level Logger

Features

- High measuring accuracy, resolution, and robustness
- Completely self-contained water level datalogger
- Rugged 316 stainless steel body with double o-ring seal
- 10 year battery life
- Up to 28,000 readings in non-volatile memory
- High data security due to the use of a non-volatile memory
- Slim 7/8 inch (22mm) diameter body
- Easy to use Windows™-based software
- Event-controlled recording and interval recording
- Record water level (pressure) and water temperature
- Software-based barometric pressure compensation with DCX-22 Baro

Specifications

Power	Lithium battery 3.6V
Battery Life	10 years @ 1 measurement per hour
Communications	RS-485 digital
Logger to PC	USB (optional RS-232)
Performance	Linearity: 0.05% full scale Level Accuracy: 0.1% full scale (max. 0.2% full scale) Baro Accuracy: 1mbar Long Term Stability: 0.5 mbar Overload: 2 x nominal range
Temperature Compensation	14° to 104°F (-10° to 40°C)
Temperature Measurement Accuracy	1.8°F (1°C)
Recording Interval	1 second to 18 hours
Shortest Measuring Cycle	1x per second
Memory	16,000 or 28,000 data points (depending on storage method)
Body Material	Stainless steel 316L (DIN 1.4435)
O-Ring Material	Viton®
Dimensions	0.87" dia. x 9.84" long (2.2cm dia. x 28cm long)
Sensor Weight	0.78 lb (355g)
Software Compatibility	Windows™ 2000/NT/XP/ME and 9X

Ordering & Options

Level Loggers

Order No.	Sensor Range
DCX-22-2	0 to 32.8 ft (0-10 m) (2 bar)
DCX-22-3	0 to 65.6 ft (0-20 m) (3 bar)

Barometric Pressure Logger

Order No.	Description
DCX-22 Baro	Barometric Pressure Logger

Data Cables*

Order No.	Description
K-104A	USB Communication Cable
K-103A	RS-232 Communication Cable

* Note: A communication cable is required for operation. Datalogging software is included.

You may also like . . .

WL16 Water Level Logger
Submersible pressure transducer and datalogger for recording water level and pressure data.
Page 2

WL400 Water Level Sensor
Highly accurate 4-20 mA output water level sensor for a variety of applications, including those in severe environments.
Page 6

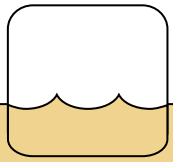
WL450 Level Transmitter
High accuracy level sensor with a 4-20 mA output ideally suited for environmental monitoring applications.
Page 8

"Nothing on earth is so weak and yielding as water, but for breaking down the firm and strong it has no equal."

– Lao-Tsze, Ancient Chinese Philosopher

WL400 Water Level Sensor

Submersible Pressure Transducer for Monitoring Level and Pressure



Barometric Pressure Compensation

Global Water's WL400 Water Level Sensor includes a vented cable to automatically compensate for barometric pressure changes. This type of differential water level monitor measures the water level only, since changes in barometric pressure caused by storms or elevation are the same on both sides of the sensor, automatically canceling each other out.

Stormy weather can produce barometric pressure differences in the range of 25 mbar during a single day. Since one millibar equals one centimeter of water, this equates to almost 10 inches (25.4 cm) of water level error— or an error of over 2.5% for a 30 ft (9.1 m) range sensor. Elevation also influences barometric pressure, with changes of about 35 mbar per 1000 ft increase in elevation, or an error of 1 ft of water level/1000 ft.

Unlike Global Water's differential water level monitors, there are absolute water level monitors, like the DCX-22, that do not use vented cables to automatically compensate for barometric pressure changes. With these instruments, one side of the sensing element is exposed to water while the other side is sealed. In order to correctly interpret data from these devices, an external barometric pressure sensor is required at each site and the elevation for each monitoring site within a system must be determined. This information must be correlated to calculate a site's true water level reading.

The WL400 eliminates these difficulties, allowing you to collect and view data that is automatically compensated for barometric pressure changes.

FIND OUT MORE AT WWW.GLOBALW.COM

Description

Global Water's WL400 Water Level Sensor provides highly accurate water level measurements for a variety of applications, including those in severe environments. The WL400 has a dynamic temperature compensation system, enabling high accuracy measurements over a wide temperature range. The unit is also designed for automatic barometric compensation, described further in the sidebar article on this page.

The WL400 consists of a solid state submersible pressure transducer encapsulated in a stainless steel housing. The level sensor has a molded-on waterproof cable. A 25 feet cable is standard, and optional cable lengths are available up to 500 feet. The WL400 has a two-wire 4-20 mA high level output for easy connection to dataloggers, telemetry, monitoring equipment, and displays. Multiple level sensor ranges are available from 0-3 ft to 0-500 ft.

Rugged Sensor Design

The WL400's sensor is fully encapsulated with marine-grade epoxy. The unique wet-wet sensor eliminates vent tube moisture problems, which can cause drift or level sensor failure (as can be the case with other pressure sensors). The level sensor uses a highly flexible silicon diaphragm to interface between water and the sensing element. This silicon diaphragm protects the water level sensor's electronics from moisture and provides exceptional linearity and very low hysteresis. The WL400's design eliminates issues associated with metal foil diaphragms, which tend to crinkle and stretch over time causing drift, linearity, and hysteresis problems.

The pressure sensor is protected by a stainless steel micro-screen cap, which makes fouling with silt, mud, or sludge virtually impossible. The WL400's rugged design is even excellent for saltwater applications including tide level monitoring and floating docks.

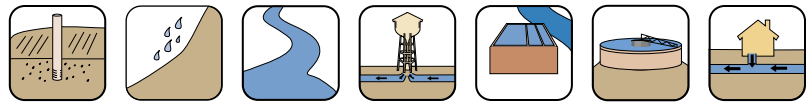
Unique Low Level Range

The 0-3 ft low level range sensor is ideal for measuring shallow flows or small water level changes like those encountered in sewers, storm drains, weirs, and flumes. The 0-3 ft sensor accurately measures small level changes, even when the water's depth is only a few inches deep. Other metal foil-type water level sensors typically have serious problems at low level ranges because of sensor crinkling, stretching, and drifting.

Flexible Output and Power

The WL400 has a two-wire 4-20 mA output signal that is linear with water depth. The output signal can travel up to 3,000 feet from the sensor to the logging device. Common twisted pair or electrical extension cord wire can be spliced to the WL400's vented cable to extend the cable out of water. The 4-20 mA signal may be converted to 0.5 to 2.5 VDC by dropping the current signal across a 125 ohm resistor. The sensor will operate with 8 to 36 VDC, so common 12 VDC battery sys-

Applications



Ideal for groundwater wells, rivers, streams, flumes, weirs, saltwater, tanks, open channels, lift stations, sewers, pipes, and more.

WL400 Water Level Sensor

tems can be used to power the unit.

Versatile Options

A variety of options are available to best meet the needs of your application:

- The THO Titanium Option includes a rugged titanium housing for the water level sensor. For best performance in marine environments we recommend using the titanium option.
- The Pressure Pipe Option houses the sensor in either a 6" PVC (PRPP) or stainless steel (PRPM) pipe with ¾" NPT male thread for logging pressure in municipal water systems. The sensor is calibrated for pressure with ranges of 30 psi, 60 psi, 100 psi, and 250 psi available. A 10' cable is standard.
- The WL-SWO Sewer Flow Option includes a mouse-shaped cover to protect the sensor from fouling and velocity effects in sewer, stormwater, and irrigation pipe flows. The sensor cover is attached to a 4 in x 24 in stainless steel strap for mounting to the bottom of a pipe.
- The WL-T Temperature Output Option monitors temperature as well as level data. This option supports a temperature range of 0-50°C and an accuracy of 1% of reading.
- The FL400-025 Sewer Level Sensor includes a protected 0-3 ft sensor on 25 ft of cable and is ideal for measuring level in sewer or stormwater pipes.
- The VL400-003 Vacuum Level Sensor includes a ¾" male thread and a unique 1 psi sensor designed to measure vacuum

You may also like . . .

PC300 Process Controller
Accurate controller for measuring WL400 level sensors and controlling a variety of external devices.
Page 17

GL500 Dataloggers
Rugged and easy-to-use remote dataloggers to record WL400 data.
Page 122

Features

- High accuracy and reliability
- Completely submersible sensor and cable
- Compact, rugged design for easy installation
- 4-20 mA output sensor compatible with most monitoring equipment
- Vented cable for automatic barometric compensation
- Dynamic temperature compensation system
- Not affected by foam, wind, or rain
- Optional temperature output

Specifications

Sensing Element

Sensor Element	Silicone Diaphragm, Wet/Wet Transducer
Ranges (ft)	0-3, 0-15, 0-30, 0-60, 0-120, 0-250, 0-500
Linearity and Hysteresis	±0.1% full scale
Accuracy	±0.1% full scale at constant temperature, ±0.2% over 35°F to 70°F (1.37° to +85°C) range
Overpressure	Not to exceed 2x full scale range
Resolution	Infinitesimal (analog)
Outputs	4-20 mA or 0.5 to 2.5 VDC across 125 ohms
Supply Voltage	8 to 36 VDC
Current Draw	Same as sensor output
Warm-Up Time	3 seconds recommended
Operating Temp	-40° to +185°F (-40° to +85°C)
Compensation	Uses dynamic temperature compensation 30 to 70°F (-1.1 to 21.1°C), automatic barometric pressure compensation
Weight	1/2 lb (227 g)
Certificates	CE Compliance

Housing

Material	304L stainless steel, stainless steel microscreen with hundreds of holes to prevent fouling, electronics are fully encapsulated in marine grade epoxy, guaranteed not to leak
Size	Up to 13/16 inch dia. X 5-1/2 inch L (2cm dia. X 14 cm L), small enough for a 1 inch well. Titanium option has 1 inch diameter.

Cable

Conductors	4 each 22 AWG
Material	Marine grade polyether jacket, polyethylene vent tube, full foil shield
Outside Diameter	0.306 in (0.78 cm)
Temperature Range	-22° to +185°F (-30° to +85°C)
Length	Standard 25 ft (up to 500 ft from the factory)

Ordering & Options

Level Sensors

Order No.	Sensor Range (Ft) [1]	Cable Length (Ft) [2]
WL400-003-025	3	25
WL400-015-025	15	25
WL400-030-050	30	50
WL400-060-100	60	100
WL400-120-150	120	150
WL400-250-300	250	300
FL400-025	3	25
VL400-003	1 psi	25

1) When ordering, specify the sensor range that will cover the maximum water level change for your application (this is not necessarily the total depth of water). 500 ft sensor range available, please call.

Options

Order No.	Description
WLEXC [2]	Extra Cable (up to 500 ft)
WL400-500	0-500 ft Sensor Range
THO	Titanium Option
PRPP [3]	Pressure Pipe Option- PVC
PRPM [3]	Pressure Pipe Option - Stainless Steel
WLSWO	Sewer Flow Option
WL-T	Temperature Output Option

2) When ordering, specify the cable length. The WL400 includes stated lengths of cable, and additional lengths are available with option WLEXC up to 500 ft (152.4 m).

3) When ordering a Pressure Pipe Option, specify the sensor range: 30 psi, 60 psi, 100 psi. A 10 ft cable length is standard.

WL450 All Stainless Level Transmitter

High Accuracy Submersible Pressure Transducer

Features

- Rugged 316L stainless steel flush-diaphragm sensor
- Highly stable digital temperature compensation
- 16-bit internal digital error correction
- Durable and environmentally neutral Hytrel® cable
- Custom cable lengths and ranges are available

Applications

Ideal for groundwater, streams, rivers, lakes, runoff, drainage basins, irrigation canals, and more.

You may also like . . .

PC300 Process Controller
Accurate controller for measuring WL400 level sensors and controlling a variety of external devices.
Page 17

GL500 Dataloggers
Rugged and easy-to-use remote dataloggers to record WL400 data.
Page 122

Description

The WL450 All Stainless Level Transmitter offers standard features and a level of performance that far exceed those of other comparably priced transmitters. The WL450 features a 316L stainless steel diaphragm, digital temperature compensation, and environmentally neutral Hytrel® cable. These assets enable the unit to provide a high level of performance over a long period of time and a wide range of operating conditions. The WL450 is ideally suited for environmental monitoring applications such as test wells, streams, rivers, and reservoirs.

Standard Units for a Range of Uses

All of our standard WL450 units are set up for 2-wire, 4-20 mA output. They are calibrated for specific ranges in feet of head with an appropriate length of Hytrel® vented cable, including: 0-3 ft range (25 ft cable), 0-15 ft range (25 ft cable), 0-30 ft range (50 ft cable), 0-60 ft range (100 ft cable), 0-120 ft range (150 ft cable), 0-250 ft range (300 ft cable), and 0-500 ft range (510 ft of cable).

Simple Digital Output

The WL450 includes a RS-485 direct to digital output for a modem or other communications network. This avoids the error and complication involved with analog to digital conversion devices. Please contact Global Water for more details about direct to digital applications.

Customize for Your Application

In addition to the standard WL450 ranges and cable lengths, we can customize your WL450 for a small additional fee. Please contact Global Water regarding this option.

Specifications

Sensing Element

Sensor Element	316L stainless steel, flush mounted (titanium available)
Available Ranges (Ft)	0 to 3, 0-15, 0-30, 0-60, 0-120, 0-250, 0-500
Accuracy	Total Error Band ±0.1%, 16 bit digital error correction
Overpressure	Not to exceed 2x full scale range
Operating Temp	14 to 176°F (-10 to 80°C)
Temperature Compensation	Digital over entire operating range
Output	4-20 mA, 2-wire loop powered
Supply Voltage	10 to 28 VDC
Load Resistance	(Ω): mA: < (supply - 8V) / 0.02A
Communication	RS-485

Housing

Wetted Materials	316L stainless steel, polyamide, fluorocarbon
Dimensions	0.825" (21mm) diameter x 3-3/4" (95mm) long
Weight	1Lb (453.6g)

Cable

Material	Hytrel-jacketed, vented & shielded
Outside Diameter	0.23 in (5.8mm)
Temperature Range	-22° to +185°F (-30° to +85°C)
Length	Standard 25 feet (up to 1,000 feet total)

Ordering & Options

All Stainless Level Transmitters

Order No.	Sensor Range (Ft/Head)	Cable Length (Ft)
WL450-003	0 to 3	25
WL450-015	0 to 15	25
WL450-030	0 to 30	50
WL450-060	0 to 60	100
WL450-120	0 to 120	150
WL450-250	0 to 250	300
WL450-500	0 to 500	510
WL450-CUS	Custom Range	Custom Length

Options

Order No.	Description
WL450-EXC	Extra Hytrel® Vented Cable (up to a total of 1000 ft)
WL450-T	Titanium Option

WL430 Sewage Lift Station Level Sensor

Submersible Wastewater Level Sensor

Description

Global Water's WL430 Sewage Lift Station Level Sensor is ideal for measuring level in high solids environments. It is based on over 30 years of design and field service experience. The WL430 has a standard 4-20 mA output for interface with most datalogging and remote monitoring equipment.

"Steel Cage" Design

The WL430 consists of a submersible pressure sensing element encased in a 316L stainless steel housing. The unit's "steel cage" design offers the highest reliability in level measurement for severe high solids environments such as sewage, lift stations, storm canals, wet wells, and slurry tanks. The "steel cage" gives full protection and allows sensing of sewage levels no matter how much debris, mud, or sand builds up.

Barometric Pressure Compensation

The WL430 includes 40 ft of polyurethane shielded and vented cable, and additional cable lengths are available up to 500 ft. The instrument's unique vented cable system allows for barometric pressure differential compensation (described further on page 6), while the unit is protected from the elements with a Gortex® filter encapsulated tip.

Lightning Strike Protection

The WL430 includes an **exclusive lifetime warranty** against lightning strikes. The sensor's electronics are capable of withstanding lightning strikes and meet RCTA/DO 160D for lightning direct effects and surge protection for FAA and MIL-STD test and NASA standard electrical surge requirements. The WL430 is also CSA explosion proof and intrinsically safe if used with a client supplied barrier strip.

Specifications

Electrical

Excitation	8 to 38 VDC
Output	4–20 mA DC
Zero Balance	± 1% full scale output
FSO Setting	± 1% full scale output
Resolution	Infinite (±0.001% full scale output usable)
Response Time	< 5mS
Insulation Resistance	1000 MO @ 50 VDC
Reverse Polarity	Protected
Warm-Up	< 10 mS
Power Supply Effect	± 0.002% full scale output per V input
EMI/RFI	Internal Filtering
Lightning Protected	MOV and dual gas discharge tube; life lightning protection warranty
Short Circuit Protected	Up to 40 VDC

Performance

Static Accuracy	± 0.5% full scale output (BFSL, RSS) (combined effects of non-linearity, hysteresis & repeatability)
Repeatability	± 0.1% full scale output
Temperature Effects	± 1.5% full scale output over comp range (combined effects of Zero & FSO with reference at 70°F (21.1°C))
Long Term Stability	± 0.25% full scale output per year

Mechanical

Pressure Ranges	10 psi (23 ft) or 15 psi (34 ft)
Proof Pressure	2x full scale
Burst Pressure	5x full scale
Materials	316L stainless steel plus cable
Pressure Port	Flush mount per outline
Electrical Connector	½ inch NPT male submersible conduit fitting with 40' of polyurethane cable
Compensated Temp Range	20 to 170°F (-6 to 76°C)
Operating Temp Range	0 to 200°F (-17 to 93°C)
Storage Temp Range	-20 to 250°F (-28 to 121°C)
Dimensions	3 inch dia. x 6 inch long (7.6 cm dia. x 15 cm long)
Weight	Nominal 20 oz (.57 kg)

You may also like . . .

PC300 Process Controller
Accurate controller for measuring WL430 level sensors and controlling a variety of external devices.

Page 17

Features

- UL listed
- Flush clog-free sensor; 316L stainless steel
- Lifetime warranty against lighting strikes
- ± 0.5% full scale output static accuracy
- Vented cable for automatic barometric compensation
- Double-sealed submersible cable exit
- CSA explosion proof and intrinsically safe if used with a client supplied barrier strip

Applications

Ideal for severe high solids environments such as sewage, lift stations, storm canals, wet wells, slurry tanks, and more.

Ordering & Options

Sewage Lift Station Level Sensor

Order No.	Cable Length
WL430-023	23ft (7m)
WL430-034	34ft (10m)

Options

Order No.	Description
WL430CAB*	Extra Sensor Cable, Per Foot (up to 500 ft)

* Add two weeks to shipping time with this option.

WL700 Ultrasonic Level Sensor

Non-Contact Water Level Measurement Device

Features

- Non-contact measurement
- Rugged and fully encapsulated
- 4-20 mA transmitter
- Easy installation, no programming
- Cost effective
- Great for wastewater
- Great for flumes and weirs
- Temperature compensated
- Four ranges: 1 ft, 3 ft, 6 ft, and 35 ft
- For monitoring water level and open channel flow

Applications

Ideal for sewers, wastewater, tanks, flumes, weirs, and more.

> "The cure for anything is salt water– sweat, tears, or the sea."
>
> – Tagore, Bengali poet and novelist

Description

The WL700 Ultrasonic Water Level Sensor uses the latest ultrasonic distance measurement technology for accurate non-contact water level monitoring. The fully encapsulated sensor is temperature compensated and provides an industry standard 4-20 mA output, which corresponds to the distance from the sensor to the water. The unit is rugged, reliable, and completely weatherproof. It is ideal for sewer and wastewater applications.

Sensor Ranges for Every Application

The WL700 is available in four level ranges to meet a wide variety of applications including: 1 ft, 3 ft, 6 ft, and 35 ft . The unique 1' range is ideal for measuring flows in small flumes and weirs. The 3 ft and 6 ft sensors are excellent for measuring streams, tank levels, and open channel flows in larger flumes. The 35 ft sensor is good for measuring deep rivers and lakes.

Easy Installation and Interface

The WL700 is easy to install and mount, requires no programming or calibration, and includes complete instructions. The unit comes with 10 ft (3 m) of cable, and additional cable lengths up to 500 ft (152.4 m) are optional. The unit's simple 3-wire 4-20 mA output is easy to interface with all PLC's, SCADA, and telemetry systems. No maintenance of the instrument is required.

Monitoring and Control Capabilities

The WL700 is compatible and provided optionally with Global Water's FC200 Open Channel Flow Monitor for ultrasonic flow monitoring (page 26). It is also fully compatible with our PC300 Process Controller for water level control (page 17).

Specifications

Ranges (Ft)	0.17 to 1.00, 0.67 to 3.00, 0.84 to 6.00, and 1.5 to 35
Input Voltage	18 to 30 VDC
Current Draw	100 mA
Output	4-20 mA (4 mA is minimum water level and 20 mA is maximum water level)
Averaging	15 second running average (to smooth out water turbulence)
Warm-up Time	15 seconds
Resolution	Continuous analog
Operating Temperature Range	1', 3', 6': -40° to +185°F (-40° to +85°C) 35 ft: -40° to +145°F (-40° to +62.8°C)
Temperature Compensation Range	-20° to +120°F (-28° to +48°C)
Accuracy	+0.5% of range, +1.0% of 35 ft range
Beam Angle	12°
Dimensions	1 ft: 1 x 2 x 4 inch rectangular (2.5 x 5.1 x 10.2 cm) 3, 6 ft: 1 inch ID pipe thread x 4 inch long (2.5 cm ID x 10.2 cm long) 35 ft: 2-1/2 inch ID pipe thread x 4 inch long (6.3 cm ID x 10.2 long)
Weight	1.5 lbs (0.68 kg)

Ordering & Options

Ultrasonic Level Sensors

Order No.	Sensor Range (Ft) [1]	Cable Length (Ft) [2]
WL700-01-10	1	10
WL700-03-10	3	10
WL700-06-10	6	10
WL700-35-50	35	50

1) When ordering, specify the sensor range for your application.

Options

Order No.	Description
WQEXC[2]	Extra Sensor Cable, Per Foot (up to 500 ft (152.4 m))

2) When ordering, specify cable length. The WL700 includes stated length of cable, and additional cable lengths are available with WLEXC up to 500 ft (152.4 m).

You may also like . . .

FC200-U Monitor
Ultrasonic open channel flow monitor for flumes and weirs. Page 26

BR100 Boost Regulator
Powers 24 volt sensors in 12 volt systems. Page 128

WL750 Ultrasonic Level Transmitter

Non-Contact Tank Level Measurement Device

Description

The WL750 Ultrasonic Level Transmitter is perfect for short range, non-contact tank level measurements for a variety of liquids and solids. With its narrow 8 degree beam angle and slim 1.38 in (35mm) chemical-resistant process end, the WL750 is designed for accurate level measurements even in relatively small tanks. Purchase of the WL750 includes a 3-bolt 2-3/4 inch flange for use in secure mounting.

Capable Data Display and Transmitter

The WL750 includes an integrated LCD display, user interface, and transmitter unit that provides a local level readout and the ability to send a scalable, 4-20 mA signal to another device. The display/transmitter also features user-programmable settings and an LED alarm light. The WL750's optional power and signal cable assemblies connect to the display unit with a molded on, locking 5-pin plug.

Flexible Signal Cable and Power Options

You can select an optional signal cable assembly that will connect to the WL750 display's 5-pin plug. Choose from 6-foot (2m) (Option WL750-CBL-2) or 16-foot (5m) (Option WL750-CBL-5) cable assemblies. If you would like to create your own longer cable runs, you can simply purchase the unit with just the 5-pin plug. The WL750 will work with up to 3,000 feet of the appropriate signal cable. Please note, either a cable assembly or 5-pin plug is required.

Flexible power options are also available for the WL750, such as the IDEC 24 volt power supply (see Ordering & Options).

Specifications

Electronics

Supply Voltage	18 to 30 VDC
Power Consumption	< 3 watts
Output	4-20 mA, 2 to 10 V across 500 Ohm resistor to 0 V
Switching Values (S1 and S2)	PNP or NPN selectable; 300 mA max load
Hysteresis	Adjustable; position depends on min. or max. setting
Display	Graphical LCD display; back-lit LED signaling lamp
Connection	M 12x1; 5-pole locking plug

Operational

Beam Angle	8 degrees
Accuracy	±0.2% full scale
Linearity Error	< 0.3% full scale
Temperature Error	0.03% °C
Operating Temperature	32 to 158°F (0 to 70°C)
Operating Pressure	Ambient

Environmental

Approval	IP67, CE

Mechanical

Wetted Materials	PET 30% GV, epoxy resin
Housing Materials	Stainless steel, tempered glass
Mounting	3-bolt flange with set screw for adjustment

General

Weight	0.8 lbs (363 g)
Dimensions	4 in dia. x 8.5 in long (10 cm dia. x 21.6 cm long)

Applications

Ideal for wastewater treatment tanks, water treatment tanks, stormwater basins, small tanks, tanks of liquids and solids, and more.

Features

- Integrated display and user interface
- Compact chemical resistant body
- User adjustable limits and alarm points
- Scalable 4-20 mA signal output

Ordering & Options

Ultrasonic Level Transmitters

Order No.	Operating Range
WL750-4	0.66 to 4.3 feet
WL750-8	0.98 to 7.5 feet

Cable Assemblies*

Order No.	Description
WL750-CBL-2	6 feet (2m) Cable & Connector
WL750-CBL-5	16 feet (5m) Cable & Connector
WL750-PLG	5-Pin Locking Plug (no cable)

* A cable assembly or 5-pin plug is a required item.

Accessories

Order No.	Description
PS5R-SC24	IDEC Slim Line 24VDC Power Supply

WL900 Radar Level Transmitter

Non-Contact Level Measurement Device

Features

- Accurate, non-contact measurement
- Works in conditions where ultrasonic is not acceptable
- Pulse radar measurement range 0.83 to 50 ft
- Simple push-button calibration
- Standard 4-20 mA signal output

Description

The WL900 Radar Level Transmitter offers a logical extension to ultrasonic devices. It is suitable for applications that require non-contact liquid level measurement when ultrasonic level measurement is not acceptable.

Variety of Uses

The WL900 is ideal for a variety of water and wastewater applications involving a reflective liquid that has a foaming surface, vapors, or dusty conditions beyond ultrasonic wave capabilities.

State of the Art Radar Technology

The WL900 uses a state of the art radar pulse technology, which provides accurate and reliable level measurements over a wide 10-inch to 50-foot range. The unit's microwave sends out very short pulses, which reflect off a target and are received back by the antenna for processing.

Simple Operation

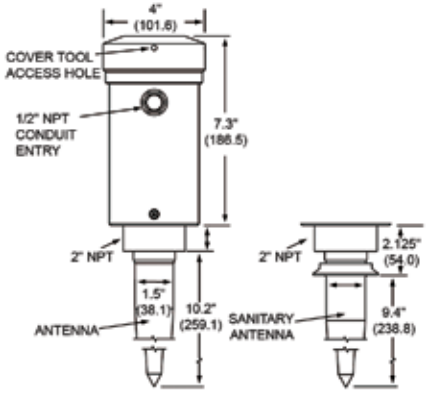
With its single push-button calibration system, the WL900 is easy to set up and maintain. Simply aim the WL900 at your low range level set point and push the button to lock in the setting– then do the same with the high level set point. This may be done before permanent installation by aiming at a wall and using a tape measure to determine your exact range.

Rugged Design

The unit's rugged NEMA 4 (IP65) housing is available in either aluminum or 316L stainless steel for corrosive environments. A standard 2 inch NPT (M) process connection allows for quick and versatile installation. In addition, the unit's polypropylene antenna rod is virtually corrosion proof.

Applications

Ideal for water and wastewater applications where conditions are beyond ultrasonic wave capabilities, such as those involving a reflective liquid that has a foaming surface, vapors, or dusty conditions.



Specifications

Power	AC: 115 VAC, 60 Hz (± 20%), 1.7 VA DC: 12 to 30 VDC, 0.07 Amps max. @ 24 VDC
Outputs	Signal: 4-20 mA, 6.1 µA resolution; 750 ohms (isolated on 4-wire models only) Communication: RS-232
Accuracy	±0.25% of max. target range (in air)
Frequency	6.3 GHz
Transmitter Power	50 µW average
Calibration	Push-button or optional programmable
Antenna	Polypropylene over dielectric rod
Beam Angle	12 degrees
Operating Temperature	-40 to 140°F (-40 to 60°C)
Operating Pressure	150 psi max
Installation Category	Class II
Process Connection	2 inch NPT
Conduit Entry	1/2 inch NPT standard
Housing	Aluminum or 316L stainless steel
Ingress Protection	NEMA 4 (IP65)
Approvals	FCC Part 15 - low-power communication device
Weight	3.6 lbs (1.63 Kg)
Dimensions	4 in dia. x 18 in long (10cm dia. x 45.7cm long) See drawing.

Ordering & Options

Order No.	Power	Enclosure
WL900-AC	115VAC (60Hz), 230VAC (50Hz)	Aluminum
WL900-DC	12 to 30 VDC	Aluminum
WL901-AC	115VAC (60Hz), 230VAC (50Hz)	Stainless Steel
WL901-DC	12 to 30 VDC	Stainless Steel

WL500 Well Level Sounder

Water Detection Unit and Measuring Tape Reel

Description

Global Water's WL500 Well Level Sounder sets a precision standard for well water level measurement. The sounder meets or exceeds federal specification US GGG-T-106E (USA) and EEC CLASS II (Europe) for a guaranteed accuracy of 0.008%.

Reliable Design

The WL500 has a strong NTS-certified polyethylene jacketed measuring tape that will accurately read to 0.01 foot or 1 mm. The tape reels are built of resistant polycarbonate (or, for units with over 400 ft cable, of lighter aluminum). The sounder is battery operated, thus there is no danger of shock from an outside power supply. In addition, the unit includes two conductors that make a separate ground connection unnecessary, so the instrument will function well in both uncased test holes and uncased wells in rock. Water entering the well from casing leaks or perforations will not affect the device's measurements.

The WL500's 5/8 in (16 mm) diameter sensor probe is encased in a full depth-rated stainless steel and Teflon® probe that protects the electronics from water and dust. For ease of cleaning and decontamination of the entire reel and tape, the sounder's electronics module can be removed. The unit's measuring tape has a flat spring steel core that ensures it will hang perfectly straight in large and small diameter wells. This provides unparalleled accuracy and avoids errors typically introduced by flat white tapes, which can easily kink inside a well.

Ideal for Pump and Drawdown Tests

The WL500 uses a shrouded probe with a unique design to prevent bridging and detect the bottom of the well. When the probe assembly makes contact with the surface of the water, a bright LED glows and a beeper sounds on the reel. The sounder detects the bottom of the well using a specially engineered tip that causes the audio alarm to cease when the bottom of the well is reached. The sensitivity adjustment allows you to compensate for different water qualities, preventing false readings in very pure water or high conductivity water. This makes the device ideal for pump and drawdown tests.

Specifications

Table Graduation	1 ft and 0.01 ft intervals or 1 m and 1 mm intervals
Tape Material	Polyethylene
Probe Diameter	5/8 inch (16 mm)
Signal	Audible buzzer and light
Battery	9V battery
Shipping Weight	300 ft (100m) tape = 9 lbs (4kg)
Shipping Size	12 x 14.5 x 8.5 inch (31 x 37 x 22 cm)

You may also like . . .

WL650 Sonic Water Level Meter
Fast, accurate level measurements without the use of down-hole instrumentation.
Page 14

Ordering & Options*

Order No.	Tape Length
WL500-50	50 feet
WL500-100	100 feet
WL500-150	150 feet
WL500-200	200 feet
WL500-300	300 feet
WL500-400	400 feet
WL500-500	500 feet
WL500-15m	15 meters
WL500-30m	30 meters
WL500-50m	50 meters
WL500-60m	60 meters
WL500-100m	100 meters
WL500-120m	120 meters
WL500-150m	150 meters

* Please call us for longer lengths.

Features

- Detect water levels and well bottoms with high precision
- Trouble-free operation in wells with falling water and heavy oil slicks, even if well is not cased
- Polycarbonate sturdy reel
- Corrosion-resistant stainless steel fittings
- Soft grip vinyl frame handle
- Large, ergonomic brake and winding handle
- Water and dust-proof encapsulated electronics
- Strong and accurate NTS certified tape with stainless conductors
- Long lasting flexible link between the tape and probe
- Full depth stainless steel and Teflon® probe
- Self-contained power supply using a standard, small 9V battery
- Audio alert beeper and LED indicate contact with the water

Applications

Ideal for wells with cascading water, wells with heavy oil slicks, high conductivity water, and pump and drawdown tests.

WL650 Sonic Water Level Meter

Polluted Well Level and Depth Measuring Meter

Features

- Accurate water level measurements
- Simple operation
- Obtain measurements in seconds
- Avoid cross-contamination
- No equipment to clean
- Measures around corners
- Works in cased steel or PVC-capped wells, partially cased rock wells, crooked wells, and wells with pipes, wiring, and operating pumps

Applications

Ideal for crooked wells, wells with cascading water, partially cased rock wells, wells with submersible pumps, and capped or uncapped wells.

You may also like . . .

WL16 Water Level Logger
Submersible pressure transducer and datalogger for recording water level and pressure data.
Page 2

WL500 Water Level Sounder
Water detection and measuring tape reel for precision water level measurement.
Page 13

Description

Global Water's WL650 Sonic Water Level Meter is a self-contained, battery operated device that uses sound waves to measure well water level. Fast and accurate measurements are possible in the field without the use of down-hole instrumentation. The WL650 is lightweight, compact, versatile, and easy to operate.

Measure in Difficult Environments

The WL650 allows you to measure water levels in crooked wells, wells with cascading water, partially cased rock wells, wells with submersible pumps, capped or uncapped wells, and wells with pipes and wires inside. In fact, you can even use the device to measure the length of a coiled pipe. As long as obstructions take up no more than half of the bore area, the meter will not suffer any loss of accuracy. The device should only be used on wells under 10 inch in diameter, as the accuracy decreases with larger diameter wells.

Simple Operation

The WL650 is very simple to operate. To begin, select either the "normal" (10-500 feet) or "deep" (up to 1,200 feet) setting on the depth switch. Then, to measure a capped well, simply insert the duct into the 5/8 inch wide access port and push the power-on switch. In a few seconds, the water level reading will appear on the digital display. In the "normal" setting, the sonic water level meter stays activated for 5 seconds or 5 pings. Using the "deep" mode, the water level meter emits 4 pings in 16 seconds. For more measuring time, hold the switch down as long as necessary.

For uncapped wells, use the provided cover plate, which slips onto the measuring duct and provides a seal for up to 6 inches diameter casings. Cover plates for larger diameters can easily be fabricated from plastic or metal sheeting.

Temperature Control

The WL650 includes a temperature control that corrects for the variation in the velocity of sound with the air temperature in the well bore. In order to obtain accurate measurements, the WL650's temperature toggle switch must be set to the average air temperature inside the well casing. The correct temperature setting can be determined using the temperature map and look-up tables provided with the instrument. The selected temperature value is shown on the WL650's display and is retained until changed.

Specifications

Measurement Range	Normal 10-500 ft (3-152 m), Deep 200-1200 ft (61-366 m)
Display Resolution	0.1 ft
Measurement Accuracy	±0.2% of reading. Exclusive of temperature setting errors*
Operating Temperature	30 to 140° F (-1 to 60° C)
Power	8 AA dry cell batteries
Dimensions (LxHxW)	(excluding sonic measuring duct) 7x4x5 in (18x10x13 cm)
Sonic Measuring Duct Dimensions	5/8 in dia. x 2 in long (1.5 cm dia. x 5 cm long)
Weight	3-1/2 lbs (1.5 kg)

* Under certain conditions, accuracy may exceed this limit: when the well casing is discontinuous; when the well casing is highly corroded or rough; when large obstructions (e.g. pipe joints) or wiring exceed half the area of the well casing; or if the well casing is less than 2 inches or greater than 10 inches in diameter.

Ordering & Options

Order No.	Description
WL650	Sonic Water Level Meter
WL610	Case for WL650

WA600 Water Alarm Sensor

High and Low Level Water Detection Device

Description

The WA600-W Water Level Alarm Sensor is a solid state sensor for detecting fluid presence in spill, rising water, or precision level monitoring situations (WA600-W version). The WA600 can also be purchased to trigger an alarm upon contact with air for low water level detection (WA600-A version). The WA600 is rugged and durable and requires minimal maintenance.

Simple Operation

The WA600 includes a pair of stainless steel electrodes that you can position at a desired distance for liquid detection. When fluid is detected, a relay closes in the water level alarm, and the signal can be used to sound an audible alarm or close a switch in a remote monitoring device. After the WA600 comes out of the water, the sensor automatically resets without the need for additional service.

Specifications

Electronics	Solid state, fully encapsulated in epoxy
Electrodes	304 stainless steel
Cable	4 wire shielded; 25 ft length (may be extended to 500 ft)
Input Voltage	12 VDC to 36 VDC
Current Draw	Continuous 5 mA Active 44 mA
Alarm Output	isolated relay Switch closure, switching voltage: 100Vdc max, switching current: 250 mA max, carry current: 400 mA max
Dimensions	1 inch dia. x 5 inch long (2.5 cm dia. x 13 cm long)
Weight	6 oz (170 g)

Ordering & Options

Water Alarm Sensor

Order No.	Alarm on Contact	Cable Length (Ft)
WA600-W	Water	25
WA600-A	Air	25

Options

Order No.	Description
WQEXC	Extra Sensor Cable, Per Foot (up to 500 ft (152.4 m)

Features

- Rugged fluid detection
- Fully submersible
- Available with alarm on water or air contact

Many Uses

The Water Level Alarm can be used in a variety of applications, including surface water monitoring, precision level detection, water level control, high water indication, and submersible marine low level indication.

Alarm Components

The WA600 complements our robust WA400-AC Strobe and Sounder Alarm (see page 137), which is easy to install anywhere you need a reliable high or low water level alarm. The WA400 alarm features a bright flashing strobe light and loud siren for alarm notification.

Applications

Ideal for water spills, tank levels, tank failure, pump failure, rising water, floods, drainage ponds, surface water monitoring, precision level monitoring, water level control, high water indication, marine low level indication, and more.

You may also like . . .

WA400-AC Alarm

Robust water alarm with strobe and sounder that works with the WA600 for high or low water indication.

Page 137

LevCon Level Controller

Set point controller for monitoring water level and controlling two pumps.

Page 133

WA100 Float Switch

Low-Current Liquid Level Detector

Features

- Easy installation and compact size
- Highly reliable with long service life
- Built in slosh shield reduces false trips
- Use for high level or low level operation

Description

Global Water's WA100 Float Switch is easy to install and fully submersible. It includes 20 ft of 22 AWG PVC jacketed 2-conductor cable. It is also self-weighted, so it can be suspended at the required level in a tank, stilling well, or standpipe without being attached to anything. You can easily adjust the suspension depth to change the point at which the switch actuates. A built-in, removable slosh shield prevents false tripping in turbulent conditions. In addition, the WA100 can easily be changed from NC (normally closed) to NO (normally open) operation so that it may be used for high or low level applications. You can simply remove the float clip and flip the float over to change the function.

The WA100 works well with our WA400 Level Alarm (see page 137).

Specifications

Materials	Stem & extension: Brass Float: Buna-N Slosh shield: PBT Cable: 20 ft AWG 22 w/PVC jacket
Current/ Voltage Ratings	0.14 A (resistive) @ 220 VAC 0.28 A (resistive) @ 110 VAC 0.07 A (resistive) @ 120 VDC 0.28 A (resistive) @ 24 VDC
Operation	NC (normally closed): Closes on low level NO (normally open): Closes on high level
Weight	0.4 lbs (181 g)
Dimensions	1.44 inch dia. x 4 inch long (3.7cm dia. x 10cm long)

Ordering & Options

Order No.	Description
WA100	Liquid Level Float Switch

PG100 Pressure Gauge

Liquid-Filled Pressure Gauge

Features

- Liquid filled for shock protection and long life
- Rugged stainless steel case and acrylic lens
- Dual scale psi and kPa

Description

The PG100 Liquid-Filled Pressure Gauge is a quality pressure gauge that features a stainless steel case, built-in snubber, acrylic lens, and excellent 1.5% of full range accuracy. The PG100's liquid fill provides both shock protection and lubrication for a long, trouble-free service life.

Specifications

Accuracy	±1.5% full scale, BFSL
Dial	Dual scale psi & 100x kPa
Process Connection	¼ inch NPT(M), bottom
Wetted Materials	Brass
Case	304 stainless steel
Lens	Acrylic
Fill Liquid	Glycerin
Weight	0.6 lb (272g)
Dimensions	2-5/8 in dia. x 1in deep (6.7cm dia. x 2.54cm deep)

Ordering & Options

Order No.	Range psi (VAC"HG)
PG100-VAC	VAC 30 inch Hg VAC
PG100-015	15 psi
PG100-030	30 psi
PG100-060	60 psi
PG100-100	100 psi
PG100-160	160 psi
PG100-200	200 psi
PG100-300	300 psi

PG250 Test Gauge

Dual-scale Process Gauge

Features

- 0.5% full scale accuracy
- 316 stainless steel wetted materials
- Large, easy to read dial
- Rugged phenolic case with safety glass lens

Description

Dual Scale Altitude Gauge

Commonly called an "altitude gauge", the PG250 has a large dual scale dial that shows both feet of head (ft WC) and psi. The gauge can be surface-mounted for panel applications. It is filled with glycerin, which absorbs shock, reduces vibration effects, and lubricates the movement to assure long and trouble-free service lives. Since there is a direct correlation between water pressure and water column, altitude gauges are commonly used to determine level readings on water tanks and towers.

Specifications

Accuracy	0.5% full scale
Wetted Materials	316 stainless steel
Case Material	Phenolic body; laminated safety glass lens
Connection	¼ inch NPT(M), bottom
Dial Size	4-1/2 inch (11.4 cm)
Mounting	Stem or surface
Weight	1.6 lb (727 g)
Dimensions	6 in dia. x 3 inch deep (15.2 cm dia. x 7.6 cm deep)

Ordering & Options

PG250 Dual Scale Altitude in psi & ft WC

Order No.	Range psi/ ft WC
PG250-15	15 psi/34.6 ft
PG250-30	30 psi/69.2 ft
PG250-60	60 psi/138.4 ft
PG250-100	100 psi/230.67 ft
PG250-160	160 psi/369.07 ft
PG250-200	200 psi/461.33 ft
PG250-300	300 psi/692 ft

PG300 Pressure Gauge

Digital Pressure Gauge

Features

- High accuracy, ±0.25% full scale
- Robust, laser-welded stainless steel wetted end
- NEMA 4X wash down rated enclosure
- Display in psi, ft of head, or bar

Description

Our highly accurate PG300 Digital Pressure and Altitude Gauge is compact and robust, making it well suited for a variety of pressure and feet of water column applications. The PG300's backlit LCD display is easy to read, and it includes a zero reset button and a pressure unit selection button for measuring psi, ft WC, and bar.

Unlike mechanical gauges, the PG300 allows you to use a much larger range because of its high accuracy and digital readout. For instance, a 100 psi PG300 will work in place of any standard mechanical gauge from 15 psi to 100 psi, so you will only need one or two PG300's to cover all of your pressure or altitude gauge needs.

Specifications

Accuracy	±0.25% full scale, BFSL
Display	LCD, 1/2" high
Units	psi, ft of Head (WC), bar
Process Connection	¼ inch NPT(M), bottom
Wetted Materials	304L & 316L stainless steel
Operating Temp	14 to 140°F (-10 to 60°C)
Power	Standard 9 VDC battery (included)
Weight	0.8 lb (363 g)
Dimensions	2-5/8 in dia. x 1 inch deep (6.7cm dia. x 2.54cm deep)

Ordering & Options

Order No.	Range
PG300-100	0 to 100 psi/0 to 231 ft WC
PG300-300	0 to 300 psi/0 to 693 ft WC

PC300 Level Process Controller

System for Controlling Processes Based on Water Level

Description

Global Water's PC300 Level Process Controller is a highly reliable and accurate measurement and control device for all 2 and 3 wire 4-20 mA level sensors, including Global Water's WL400 Water Level Sensor (see page 6). In addition, the PC300 comes pre-programmed for use with 9 additional sensors and 14 engineering units. The PC300-C can also be custom programmed at the factory to monitor any sensor in any units selected by the customer, including sensors with voltage outputs. Please contact Global Water regarding this option.

Accurate Control

The PC300 includes two separate relays for controlling all types of external devices, including samplers, alarms, mixers, pumps, control valves, floodgates, and telemetry systems. Each relay is independently programmable to trigger on maximum and/or minimum levels in one of three different modes.

Capable Display

The PC300 includes an LCD display that shows the type of sensor that is being monitored, the data reading, and the engineering units. The display also indicates if either of the PC300's two relays have been triggered since last reset, and if so, which relay was triggered and whether the maximum or minimum limit was exceeded.

Easy Installation

The Process Controller is enclosed in a rugged case that can be easily secured to a wall, panel, or different types of mounting hardware. Please note that, while the case is watertight and will resist moisture, Global Water does not recommended mounting the PC300 outdoors without additional protection. For outdoor use, select the FCBAT Environmental Enclosure option, which includes an enclosure, battery, and battery charger.

Datalogging Options

For combined control and datalogging capabilities, you can select the PC300-DS (for serial communication) or the PC300-DU (for USB communication). These options include a process controller and an internal datalogger. (For datalogger specifications, please see the GL500-2-1 on page 123.)

Specifications

Power	90-240 AC or 12VDC 60mA DC normal, 150mA maximum 120µA average during sleep mode
Sensor Reading	5 digits + decimal point
Analog Sensor Input	4-20 mA, , 0-1V, or 0-5V
Input Resolution	0.005mA, 0.24mV, or 1.2mV
Relay Contacts	Voltage: 30VDC Current: 5A/30VDC Max Capacity: 150W Relay 1, 2nd Output: NPN to ground, 1.0 Kohm pull-up resistor Relay 2, 2nd Output: NPN to ground, open-collector
Analog Output	4mA minimum, 20mA maximum Resolution: 0.005mA

Sensor Types/Units	Water Level (feet/meters), Temperature (°F/°C), pH (no units), Dissolved Oxygen (%), Turbidity (NTU/ppm), Conductivity (µS), Wind Speed (mph/kph), Wind Direction (°), Soil Moisture (%), custom sensor (any of the above, mA, mV or custom programmed units)
Sensor Data Ranges	0.000 to 60,000 (60000 in the display with 4 different decimal point positions)
Relay Time Ranges	1-60,000 seconds (16.7 hours) Resolution: 1 second increments
Sleep Time Range	1 to 240 minutes (4 hours) Resolution: 1 minute increments
Operating Temp	32 to 122 °F (0 to 50 °C)
Storage Temp	-4 to 158 °F (-20 to 70 °C)
Enclosure (WxHxD)	4.7 x 7.9 x 2.9 inch (12 x 20 x 7.5 cm), Nema 4z
Weight	31 oz (879 g)

Features

- Control a variety of external devices based on water level
- Digital LCD screen
- Easy to use four button interface with user selectable sensor types
- 4-20 mA analog output for recorders or displays
- Two independent isolated output relays and corresponding open-collector outputs
- Water resistant enclosure

Ordering & Options

Process Controllers

Order No.	Description
PC300	Process Controller
PC300-DS	Process Controller with Serial Datalogger
PC300-DU	Process Controller with USB Datalogger
PC300-C	Custom Controller

Accessories

Order No.	Description
WL400	Water Level Sensor, see page 6
FCBAT	Environmental Enclosure, Battery, and Battery Charger

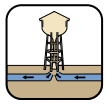
PL200-G Pressure Logger

System or Building Water Pressure Gauge with Garden Hose Connection

Features

- Rugged and easy to use
- Records over 81,000 pressure readings
- Standard garden hose pressure connection
- Fast 10 per second recording mode to catch spikes and dips
- Includes user-friendly Windows™ software
- Battery operated
- Water-resistant enclosure

Applications



Ideal for verifying low water pressure complaints, locating water pressure spikes, providing data for water system modeling, and more.

Description

Global Water's PL200-G Water Pressure Datalogger makes it easy for you to verify low water pressure complaints, locate water pressure spikes, and even provide data for water distribution system modeling. With its standard ¾ inch garden hose connection and compact, water-resistant enclosure, you can use the PL200-G to record water pressure data just about anywhere.

Flexible Datalogging

The unit's massive memory buffer will store over 81,000 readings, with user-defined intervals from 1 per second to more than 1 per year. You can easily capture momentary pressure spikes and dips with the PL200-G's fast, 10 water pressure samples per second sampling mode. You can also use the unit's programmable start and stop alarm times to synchronize multiple PL200-G's to start at the same time, delay starting until a preset time, or limit the number of recordings during a day.

Smart Power

The unit operates on two standard 9 volt batteries, which it monitors so you will not be caught off guard with dead batteries. Data is stored in non-volatile flash memory so your water pressure data will be safe.

Capable Software

The PL200-G is equipped with a standard USB data port and includes our user friendly Global Logger II Windows™ software, which allows for easy setup, calibration, upload, and data transfer to a spreadsheet program on your laptop or desktop PC. The Global Logger II software also has online help files that are easily accessed using drop down menus and links so that you can

Specifications

Pressure Logger

Pressure Range	0-200 psi, 300 psi overpressure
Pressure Connection	Standard ¾ inch garden hose thread
Accuracy	± 1.0% full scale
Memory	Non-volatile flash memory
Power.	Two 9VDC alkaline batteries standard; 8 VDC min. to 24.0 VDC absolute maximum Standby Current: 65µA typical Logging Current: 5mA typical + sensor current
Sample Modes	Fixed Interval: Programmable from 1 sec to >1 year High Speed: 10 samples/sec Logarithmic: Approximation Exception: Log only on programmed deviation from previous reading
Storage Capacity	81,759 recordings of two analog inputs, battery voltage monitor, pulse channel, and date/time stamp
Data Overwrite	Select memory wrap or unwrap (unwrap will stop logging data once memory is full)
Communications	USB Type B
Selectable Baud Rates	9600, 19200, 28800, 38400, 57600, 115200
Clock	Synchronizes to the time and date of user's computer
Operating Temperature	-40° to +85°F (-40° to +85°C) (batteries may not apply)
Weight	0.8 lb (363 g)
Dimensions (Enclosure)	3-1/8 x 3-1/8 x 2-1/8 inches (7.9 x 7.9 x 5.4 cm)

Global Logger II Software

Compatibility	Microsoft's Windows™ 98, ME, 2000, NT, XP, and Vista
Features	Tabular display/printout Data in standard spreadsheet format (CSV) Programmable alarm start and stop times Field calibration software included

Ordering & Options

Order No.	Description
PL200-G	Garden Hose Pressure Logger

PL200-H Hydrant Water Pressure Logger

Water Distribution System Pressure Recorder with Standard Hydrant Connection

Description

The Global Water PL200-H-1 Hydrant Pressure Logger is an easy to use water pressure data logger that will assist you to quickly identify and locate distribution pressure problems as well as a wealth of system modeling data. The PL200-H-1 ez-connect adapter system allows you to connect directly to a standard 2 1/2 inch NST(NH) fire hydrant port, or easily adapt to other hose threads and special "city" threads." Designed to resemble a regular hydrant cap, the PL200-H-1 is less likely to be stolen or vandalized by casual passers by. The massive memory buffer will store over 81,000 pressure readings with user defined intervals from 1 per second to more than 1 per year. Plus, the PL200-H-1's fast, 10 samples per second sampling mode can capture momentary events like pressure spikes and water hammer.

(Note: Fast recording will reduce battery life.) Programmable start and stop alarm times makes it possible to synchronize multiple loggers to start simultaneously, delay start until a preset time, or limit the number of recordings during a given time period.

Software

The PL200-H-1 is equipped with a standard USB data port and includes our user friendly Global Logger II Windows software, which allows for easy setup, calibration, upload, and data transfer to a spreadsheet program on your laptop or desktop PC. The Global Logger II Windows software also has online help files that are easily accessed using drop down menus and links to quickly find the answers to your questions.

Features

- Rugged and easy to use
- Records over 81,000 pressure readings
- Versatile ez-connector adapts to most thread sizes
- Fast 10X/second mode to catch pressure spikes
- * USB port works with any desktop or laptop PC
- Includes user friendly Windows™ software

Specifications

Hydrant Pressure Logger

Pressure Range	0-200 psi, 300 psi overpressure
Pressure Connection	Standard 2 1/2 inch BSPP (British Standard Pipe Parallel) threads
Accuracy	± 1.0% FS
Sample Modes	Fixed Interval: Programmable from 1 sec. to >1 year High Speed: 10 samples per second Exception: Log only on programmed deviation from previous reading
Storage Capacity	81,759 recordings of pressure and battery voltage, date/time stamped
Communications	USB Type B
Power	3.6 volt lithium AA (apprx. 1 year battery life or 2 million samples)
Operating Temp	-40 to +185°F (-40 to +85°C)
Enclosure	Machined anodized aluminum fitting, polycarbonate electronics housing
Weight	1.8 lbs (0.9 kg)
Dimensions	3.9 in dia. x 3.1 in tall (9.9 cm dia. x 7.9 cm tall)

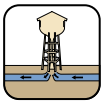
Global Logger II Software

Compatibility	Microsoft's Windows™ 98, ME, 2000, NT, XP, and Vista
Features	Tabular display/printout Data in standard spreadsheet format (CSV) Programmable alarm start and stop times Field calibration software included

Ordering & Options

Order No.	Description
PL200-H-2	Pressure logger with 2 1/2 inch NHT F-F adapter
PL200-H-1	Pressure logger without hydrant adapter
01-826	2 1/2 inch NHT-F x 2 1/2 inch BSP-F Adaptor
01-827	Spanner Wrench for 3.9 inch outside diameter
PL200-H-LK	Pressure logger hydrant lock
01-678	Replacement 3.6v Battery

Applications



Ideal for identifying pressure problems in water distribution systems, obtaining system modeling data, and more.