



Monitoring stormwater runoff with a custom Global Water sampling system.

CHAPTER 3. SAMPLING

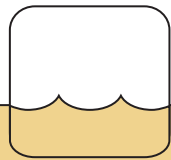
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Setting Up the WS700-750

To set up your WS700 or WS750 sampler, first set the sampler's state of the art controller to take time or flow-weighted composite samples and/or full-bottle discrete samples.

A composite sample is a series of small samples put into the same bottle. Composite samples show an average sample over time. You can take a composite sample with the WS700-750 by setting the 'Interval' control to the desired time between samples, and the 'Size' control to the desired sample size.

A discrete sample is a single sample put into a single bottle. Discrete samples show a sample at one point in time. Using the WS700-750, you can take discrete samples by setting the 'Sample Size' control to 'Full.' Once started, the pump will continue to run until a single bottle is full.

Once the sampler's controller is set for your purposes, you can now install the sampler at your sampling site. The sampler should be installed upright and adjacent to the water source. Locate the unit above the expected water level to ensure reliable service. To secure the sampler from vandalism or strong winds, you can do one of the following:

- Mount the sampler on a post and lock it closed
- Lock the sampler and chain its handles to a solid structure
- Enclose and lock the sampler inside a steel electrical box

Place the pickup hose within the water source. The pickup strainer should be submerged under water and situated to avoid contact with the bottom.

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WS700-750 Water Samplers

Combined Composite/Discrete Samplers for a Range of Sampling Requirements

Description

Global Water's WS700 single-bottle and WS750 dual-bottle samplers combine all of the features you need to meet a wide variety of sampling requirements, including those for stormwater, rivers and streams, industrial discharge, water and wastewater treatment, and wastewater collection.

Powerful Operation

The WS700-750's state of the art controller gives you power over your sampling process. With the sample size control, you can adjust the WS700-750 to take one of 15 individual time-weighted composite sample sizes, from 50 ml to 2 liters. You can also set the size control to the full-bottle discrete setting for full-bottle grab samples. The sample interval control allows you set the time between individual composite samples to one of 15 time settings, from 5 minutes to 12 hours, or you can enable the external trigger mode. A start delay timer allows you to start multiple samplers in the field at the same time, or to delay drawing a sample after a triggering event so that your sample better represents the water source. An automatic 15-second backflush cycle clears any debris from the strainer and empties the water from the hose so the next sample is not contaminated. The sample bottle is equipped with a float switch that automatically turns off the peristaltic sampling pump if the water bottle becomes full. The sampler's 5 AH rechargeable battery will power the unit for several months or through several sampling events.

Unique Independent Pump Operation

A unique feature of the WS750 model is the ability to set the sampling mode for each

pump and bottle individually. This allows you to take a time-weighted composite sample *and* a discrete (grab) sample *at the same time*. Or you can take two individual time-weighted composite samples with different size settings for each pump.

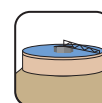
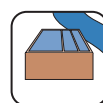
Useful Inputs and Outputs

Both the WS700 and WS750 include trigger inputs for each pump and bottle so you can control sample collection from an external closed contact switch like a water level sensor, rain gauge sensor, or external process controller. You can use a 4-20 mA sensor to trigger sample collection with a 4-20 mA to Pulse Converters (see the RG750 and RG755 in the Accessories table). Pulse outputs for each bottle are also provided for tracking sample collection information via a GL500 Datalogger (see page 118) or other monitoring device.

Range of Features and Options

The WS700 and WS750 samplers are housed in rugged, weatherproof enclosures with handles on top and one side for easy portability. Both units include 15' of reinforced sampling hose with an intake strainer for each pump, a 1 gallon (WS750) or 2.5 gallon (WS700) polybottle for each pump, and a rechargeable battery and charger. Our optional WS700-IBO Ice Bag Option includes an insulated ice pack for the bottle so you can maintain the integrity of your sample. For stormwater sampling, add the WSSWK Stormwater Kit, which includes our Rain Sensor, Flow Sensor, and Auto-drain Rain Gauge all in one package.

Applications



Ideal for sampling in stormwater, rivers, streams, water treatment facilities, industrial discharge, wastewater collection, wastewater treatment, and more.

WS700-750 Water Samplers

Features

- Ideal for wastewater, industrial, and environmental sampling
- Easy to use, state of the art controller
- Does composite or discrete sampling, or both at the same time (WS750)
- Output provided for use with optional datalogger
- Automatic backflush clears pickup strainer and hose
- Lightweight and easy to carry
- Rugged construction for harsh environments



The WS700 single bottle sampler allows you to take a time or flow (with optional flow monitor) weighted composite sample or a discrete (grab) sample.

The WS750 dual bottle sampler allows you to take a time or flow (with optional flow monitor) weighted composite sample and a discrete (grab) sample at the same time.

Specifications

Operating Temperature	0° to +70°C
Materials	Enclosure: Expanded UV protected PVC Bottle: 2.5 gallon Polyethylene (WS700), two 1 gallon Polyethylene (WS750) Pickup Hose: 15' reinforced PVC 1/4" ID polyethylene flexible tubing section with intake strainer Pump Tubing: Norprene® 1/4" ID, 7/16" OD
Sample Pump	Flow Rate: 1000 ml per minute at a 4 foot head Type: Peristaltic Maximum Lift: ~20 feet
Battery	Rechargeable 5 AH Gel Cell
Battery Life	WS700: ~1 hour continuous pumping under load WS750: ~½ hour continuous pumping under load Standby: 3 months while still retaining enough power to run the pump to capacity is required
Start Delay	16 time settings from 0 to 12 hours
Composite Interval	15 time settings from 5 min. to 12 hours plus an external trigger mode setting
Sample Size	15 composite sample sizes from 50ml to 2 liters plus a full bottle discrete setting (approximate sizes at 4 foot head)
External Trigger Input(s)	250mS minimum pulse width switch closure or 4 to 24VDC
Pulse Output(s)	5VDC one-second pulse, 1000ohm output impedance
Bottle Switch Input(s)	Switch closure input, float switch in bottle
Rain & Water Sensors	Optional moisture sensors or switch closure inputs

Internal Fuse	10A Slow-Blow
Certificates	CE Compliance
Dimensions	22"H X 17"W X 9"D (56 x 43 x 23 cm)
Weight	WS700: 20 lbs/9 kg (shipping weight 22 lbs/10 kg) WS750: 22 lbs/10 kg (shipping weight 24 lbs/11 kg)

Ordering & Options

Samplers

Order No.	Bottles	Inputs	Outputs	Price
WS750	2	2	2	\$1,210.00
WS700	1	1	1	1,150.00

Options

Order No.	Description	Price
WS700-IBO	WS700 Sampler with Ice Bag Option	\$1,150.00
WS500	10 Gallon Composite Sampler	1,340.00

Accessories

Order No.	Description	Price
WSSWK	Stormwater Kit	\$205.00
O1-342	Quick Release Pump Head	225.00
SMPLAC	AC-Powered Battery Option for Continuous Usage	53.00
BC100	Smart Battery Charger, see page 128	105.00
GL500-7-2	9-Channel Datalogger	625.00
GL500-2-1	3-Channel Datalogger	310.00
RG750 ¹	4-20 mA to Pulse Converter Module (one pulse per 15 min at 20mA)	475.00
RG755 ¹	4-20 mA to Pulse Converter Module (one pulse per 30 min at 20mA)	475.00

1) Specify unit conversion at time of order.

Replacement Parts

Order No.	Description	Price
00-010	Spare 12V Gel Cell Battery	\$30.00
FE0400	Battery Charger	18.00
00-418	1-Gallon Plastic Bottle (WS750)	15.00
00-419	2.5-Gallon Plastic Bottle (WS700)	12.00
00-835 ²	1-Gallon Glass Bottle	20.00
CA0200	WS700 Bottle Cap with Float Switch	33.00
CB0200	WS750 Bottle Cap with Float Switch	33.00
CA0300	Stainless Steel Suction Strainer	53.00
00-546	Suction Hose, per foot	1.50/ft
00-744	Peristaltic Pump Tubing, per foot	5.25/ft

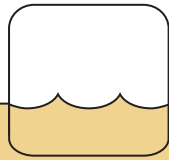
2) Only one glass bottle will fit in the sampler case without removing battery.

You may also like . . .



Global Logger
Multichannel datalogger for recording sampler collection data.

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Sample Types

Two types of wastewater sampling techniques are used in monitoring compliance with the National Pollutant Discharge Elimination System (NPDES): grab and composite. The following describes these two sample types. For some monitoring procedures, the USEPA 40 CFR Part 136 specifies the appropriate sampling type, and for many others, the specific NPDES permit will specify a sample type. Additional information can be found in the USEPA's *NPDES Compliance Inspection Manual*.

Grab Samples

Grab samples are individual samples collected over a period of time (not exceeding 15 minutes). These samples represent conditions at the time the sample is collected. The volume of the sample will depend on the type and number of analyses being performed. The collection of a grab sample is appropriate when:

- Effluent does not discharge on a continual basis
- Instantaneous concentrations are required at a specific time
- A variable sample volume is required
- Composite samples need to be corroborated
- Parameters must be sampled that do not composite well

Composite Samples

Composite samples are collected over time, either by continuous sampling or by mixing discrete samples. These samples represent the average characteristics of the waste stream during the compositing period. Composite samples are used when:

Continued on Page 48 . . .

FSS Flow Sampling System

Sampling Package for Stream, Stormwater, Wastewater, and Industrial Flows

Description

Global Water's FSS Flow Sampling System is a unique water monitoring package that includes an easy to use lightweight composite/discrete water sampler, an open channel flow monitor with dual displays and outputs, and a data recorder that is both Windows™ and Windows™ CE compatible. The FSS is a portable package that can easily be set up to take samples based on flow rates, making it ideal for stream, stormwater, wastewater, or industrial flow monitoring and recording.

Range of Versions

We offer a range of FSS versions to help you meet your monitoring needs: the standard version (FSS-STD), which includes the sampler unit, with the flow monitor and a 9-channel serial/USB datalogger in a separate enclosure; the light version (FSS-LTS), which includes the sampler and a flow monitor with a built in 2-channel serial datalogger in a separate enclosure; the integrated version (FSS-INT), which includes the sampler, a 9-channel serial/USB datalogger, and a small flow monitor (without a totalizer display) within a single enclosure; and a custom version (FSS-C), which is fully customizable.

Rugged Composite/Discrete Water Sampler

The FSS's composite/discrete water sampler is enclosed in a rugged rainproof enclosure, but it is lightweight enough that it can be suspended in a manhole for wastewater or stormwater sampling. The sampler includes a 2.5-gallon polyethylene sample bottle, a peristaltic sampling pump, a pickup hose, a circuit board controller, a rechargeable gel cell battery, and a battery charger. With the unit's water sample size control, you can take individual time-weighted composite samples or full-bottle discrete grab samples. The water sample interval control allows

you set the time between individual composite samples or enable the external trigger mode for flow proportional sampling. Please see the WS700 Composite Sampler on page 44 for additional information about this component.

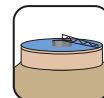
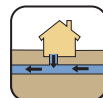
Accurate Open Channel Flow Monitor

The FSS's open channel flow monitor is reliable and accurate for measuring and totalizing open channel flows for all flumes and weirs, as well as any gravity-type open-channel flow. The flow monitor is pre-programmed with over 20 different flume and weir characteristics and, with the FSS-C version, we can custom program the unit for your unique application. The unit measures water depth with Global Water's highly accurate pressure transducer and instantly calculates (for display and output) water flow and totalizer values for any depth-to-flow relationship in any engineering units (the FSS-INT version does not include a totalizer display). Please see the FC200 Open Channel Flow Monitor on page 26 for additional information about this component.

Smart Flow Data Recorder

The FSS's flow data recorder includes Windows™-based Global Logger II software, which provides many useful features and makes accessing stored data and setting options easy. The data recorder also includes Windows™ CE-based PDA software for simple field data collection. The FSS-STD and FSS-INT feature a data recorder with 7 analog channels, 2 pulse channels, and USB and serial communication ports. The FSS-LT features a recorder with serial communication port that monitors flow and total flow. Please see the 9-channel GL500 on page 118 and the 3-channel GL500 on page 119 for additional information.

Applications



Ideal for flow sampling and recording at flumes, weirs, inflow and infiltration studies, storm and waste collection systems, sewer and drainage pipes, and more.

FSS Flow Sampling System



(Custom two-bottle version shown.)

Specifications

Composite Water Sampler

Please see specifications for the WS700 on page 45.

Flow Monitor

Rate Display	5 digit + decimal place, LCD
Totalizer Display	6 digit, LCD (FSS-STD and FSS-LTS only)
Accuracy	Pressure Transducer: $\pm 0.2\%$ full scale Flow Monitor: $\pm 0.01\%$ + the depth flow table error
Flow Units	cfs, gpm, m ³ , mgd
Totalizer	Related to flow units (FSS-STD and FSS-LTS only)
Relay Contacts	Voltage: 30 VDC Current: 5A/30 VDC Max. Capacity: 150 W Relay 1, Pulse Output: NPN to ground, 1.0Kohm pull-up resistor (connected to sampler) (FSS-STD and FSS-LTS) Relay 2, Pulse Output: NPN to ground, open-collector (connected to datalogger and tied to totalizer scaler) (FSS-STD and FSS-LTS)
Analog Output	4mA minimum, 20mA maximum (flow reading), resolution= 0.005mA
Enclosure	NEMA 4X (IP67)
Power	FSS-STD and FSS-LTS: Independent 12VDC rechargeable battery FSS-INT: Uses the sampler's 12VDC rechargeable battery 60mA DC normal, 100 mA maximum 120 μ A during sleep mode
Pre-Defined Tables	Parshall: 1", 2", 3", 6", 9", 12" Palmer-Bowlus (4D): 4", 6", 8", 10", 12", 15" Weir: 45° V notch, 90° V notch, 1' rectangular, 2' rectangular H Flume: 0.4HS, 0.6HS, 0.5H, 0.75H, 1.0H, 1.5H, 2.0H Trapezoidal: 60°
Custom Table	Provide Global Water with a depth-to-flow equation or look up table at time of order (allow for longer lead times)

Flow Data Recorder

Memory	Non-volatile flash memory
Power	FSS-STD and FSS-LTS: Independent 12VDC rechargeable battery FSS-INT: Uses sampler's 12VDC rechargeable battery Standby Current: 70 μ A typical Logging Current: 5mA typical + sensor current
Analog Sensor Inputs	Type: 4-20 mA Resolution: 12-bit, 4096 Steps Sensor Warm-up Time: Programmable, 0-60 sec FSS-STD and FSS-INT: 6 input channels + flow rate + battery voltage monitor FSS-LTS: flow rate and battery voltage monitor
Digital Inputs	Maximum Input Voltage: 24VDC Maximum Frequency: 100Hz Minimum Pulse Width: 2mS Maximum Count: 65,535 (16-bit) FSS-STD and FSS-INT: Sample event + total flow FSS-LTS: 1 input channel connected to totalizer

Features

- Scalable flow proportional sample triggering ideal for environmental, wastewater, and industrial flow sampling
- The easiest and most reliable method for collecting water samples
- Rugged construction for harsh environments, yet lightweight and easy to carry
- Over 20 pre-programmed flume and weir tables for ease of use and flexibility
- Peristaltic pump prevents sample contamination
- Windows™/Windows™ CE compatible

Sample Modes	Fixed interval programmable from 1 sec to >1 yr High speed 10 samples per second Logarithmic sample rate (approximation) Exception (log only on deviation from previous reading)
Storage Capacity	FSS-STD and FSS-INT: 40,879 recordings for all inputs plus time stamp FSS-LTS: 81,759 recordings for all inputs plus time stamp
Data Overwrite	Select memory wrap or unwrap (unwrap will stop logging once memory is full)
Communication Ports	FSS-STD and FSS-INT: RS-232 DB9 or USB Type B FSS-LTS: RS-232 4-pin circular connector
Selectable Baud Rates	9600, 19200, 28800, 38400, 57600, 115200
Clock	Synchronizes to user's computer
Operating Temperature	Industrial, -40°C to +85°C (battery may not apply)
Enclosure	Expanded UV protected PVC

Size & Weight

FSS-STD (2 enclosures)	Sampler: 22"H x 17"W x 9"D (56 x 43 x 23 cm), 20 lbs (9 kg) Flow Logger: 14.5"H x 10"W x 6"D (17 x 25 x 15 cm), 14.1 lbs (6.4 kg)
FSS-LTS (2 enclosures)	Sampler: 22"H x 17"W x 9"D (56 x 43 x 23 cm), 20 lbs Flow Logger: 14.5"H x 10"W x 6"D (17 x 25 x 15 cm), 13.1 lbs (5.9 kg)
FSS-INT (1 enclosure)	Dimensions: 22"H x 17"W x 9"D (56 x 43 x 23 cm) Weight: 22 lbs (10 kg)

Ordering & Options

Flow Sampling Systems¹

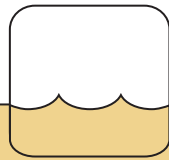
Order No.	Description	Price
FSS-STD ²	Standard Flow Sampling System	\$3,425.00
FSS-LTS ³	Light Flow Sampling System	3,040.00
FSS-INT ⁴	Integrated Flow Sampling System	2,685.00
FSS-C ⁵	Custom Flow Sampling System	Call Us

- 1) Please specify flume/weir type when placing order.
- 2) The FSS-STD includes a sampler and external flow monitor and datalogger.
- 3) The FSS-LTS includes the sampler and a flow monitor with a built in 2-channel serial datalogger in a separate enclosure.
- 4) The FSS-INT includes the sampler with an internal version of the flow monitor and datalogger.
- 5) Please contact Global Water with a depth to flow equation or lookup table when placing order and allow for longer lead times.

Accessories & Parts

Order No.	Description	Price
PDAWL16	PDA Package	\$675.00
00-010	Spare 12V Gel Cell Battery	30.00
FE0400	Battery Charger	18.00
00-419	2.5-Gallon Plastic Bottle	12.00
00-835 ⁶	1-Gallon Glass Bottle	20.00
CB0200	Bottle Cap with Float Switch	33.00
CA0300	Stainless Steel Suction Strainer	53.00
00-546	Suction Hose, per foot	1.50/ft
00-744	Peristaltic Pump Tubing, per foot	5.25/ft

- 6) Note: Only one glass bottle will fit in sampler case without removing battery.



... Continued from Page 46

- Average pollutant concentration during the compositing period is determined
- Mass per unit time loadings are calculated
- Wastewater characteristics are highly variable.

Various methods for compositing samples are available, and samples can be collected either manually or with automatic samplers. A permit may specify which type of method to use. Compositing methods include:

Time-Based

This method requires discrete samples be collected in one container at constant time intervals. This method is appropriate when the flow of the sampled stream is constant (flow rate does not vary more than ± 10 percent of the average flow rate).

Flow-Proportional

This sample type includes two methods: one method collects a constant sample volume at varying time intervals proportional to stream flow, and the other collects the sample by increasing the volume of each sample as the flow increases while maintaining a constant time interval between samples.

Sequential

This method requires discrete samples collected in individual containers at constant time intervals or discharge increments. The discrete samples can then be manually flow-proportioned to form the composite sample.

Continuous

This sample is collected continuously from the waste stream. The sample may be of constant volume, or the volume may vary in proportion to the flow rate of the waste stream.

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WQS Water Quality Sampling System

Parameter-Based Sampling Package

Description

Global Water's WQS Water Quality Sampling System is a unique portable water quality sampling package that includes an easy to use, lightweight composite/discrete water sampler, a water quality process controller with dual relay outputs, and a data recorder that is Windows™ and Windows™ CE compatible. The WQS can easily be set up to take samples based on sensor parameters, making it ideal for locating water quality trouble areas in wastewater, industrial, or stormwater systems, or for triggering samples based on water level or weather factors.

Range of Versions

We offer a range of WQS versions to help you meet your monitoring needs: the standard version (WQS-STD), which includes the sampler unit, with the controller and a 9-channel serial/USB datalogger in a separate enclosure; the light versions (WQS-LTS and WQS-LTU), which includes the sampler and a controller with a built in 2-channel serial or USB datalogger in a separate enclosure; and the integrated version (WQS-INT), which includes the sampler, a 9-channel serial/USB datalogger, and a controller within a single enclosure.

Powerful System Controller

The WQS's controller includes an LCD display that shows the type of sensor being monitored, the data reading, and the engineering units. The display also indicates if either relay has been triggered since last reset, which relay was triggered, and whether the maximum or minimum limit was exceeded. Two separate relays are provided: one is used to trigger the WQS's sampler, and the other can be used to control a variety of external devices including 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. Please see the PC300 Process Controller on page 132 for additional information about this component.

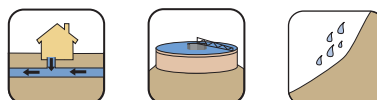
Rugged Composite/Discrete Water Sampler

The WQS's lightweight composite/discrete water sampler is enclosed in a rugged rainproof enclosure. The sampler includes a 2.5-gallon polyethylene sample bottle, a peristaltic sampling pump, a pickup hose, a circuit board controller, a rechargeable gel cell battery, and a battery charger. Additional options (shown for the WS700-750 on page 44) are available. With the unit's water sample size control, you can take individual time-weighted composite samples or full-bottle discrete grab samples. Please see the WS700 Composite Sampler on page 44 for additional information about this component.

Smart Water Quality Data Recorder

The WQS's water quality data recorder includes Windows™-based Global Logger II software, which 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. The data recorder also includes Windows™ CE-based PDA software for simple field data collection. The WQS-STD and WQS-INT feature a data recorder with 7 analog channels, 2 pulse channels, and USB and serial communication ports. The WQS-LTS and WQS-LTU features a recorder with one analog channel, one pulse channel, and either a serial (LTS) or USB (LTU) communication port. Please see the 9-channel GL500 on page 118 and the 3-channel GL500 on page 119 for additional information.

Applications



Ideal for locating water quality trouble areas in wastewater, industrial, or stormwater systems, or for triggering samples based on water level, water quality, or weather parameters.

WQS Water Quality Sampling System



(Custom two-bottle version shown.)

Specifications

Composite Water Sampler

Please see specifications for the WS700 on page 45.

Process Controller

Sensor Display	5 digit LCD
Accuracy	0.1% full scale + 0.005mA + sensor error
Analog Sensor Input	4-20 mA, 0-5V, 01V jumper selectable
Input Resolution	.005mA or 1.2mV
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)
Relay Contacts	Voltage: 30VDC Current: 5A/30VDC Max Capacity: 150W Relay 1 (All), Pulse Output: NPN to Ground, 1.0Kohm pull-up resistor (connected to sampler) (WQS-STD, WQS-LTS, and WQS-LTU only) Relay 2 (All), Pulse Output: NPN to Ground, Open-collector (WQS-STD, WQS-LTS, and WQS-LTU only)
Relay Time Ranges	1-60,000 seconds (16.7 hours) Resolution: 1 second increments
Sleep Time Range	1-240 minutes (4 hours) Resolution: 1 minute increments
Analog Output	4mA minimum, 20mA maximum (sensor reading) Resolution: 0.005mA
Power	WQS-STD, WQS-LTS, WQS-LTU: Independent 12VDC rechargeable battery WQS-INT: Uses the sampler's 12VDC rechargeable battery 60mA DC normal, 100 mA maximum 120µA during sleep mode

Data Recorder

Memory	Non-volatile flash memory
Power	WQS-STD, WQS-LTS, and WQS-LTU: Independent 12VDC rechargeable battery WQS-INT: Uses sampler's 12VDC rechargeable battery Standby Current: 70µA typical Logging Current: 5mA typical + sensor current
Analog Sensor Inputs	4-20 mA Resolution: 12-bit, 4096 steps Sensor Warm-up Time: Programmable, 0 to 60 sec WQS-STD and WQS-INT: 6 input channels + flow rate + battery voltage monitor WQS-LTS and WQS-LTU: Flow rate + battery voltage monitor

Features

- Ideal for locating water quality trouble areas in wastewater, industrial, or stormwater systems
- Easy to use four button interface with user selectable sensor types
- Rugged construction for harsh environments
- Two independent programmable output relays with parallel open collector signal lines
- Scalable water quality triggers for taking composite samples
- Data recorder is Windows™ and Windows™ CE compatible

Digital Inputs	Maximum Input Voltage: 24VDC Maximum Frequency: 100Hz Minimum Pulse Width: 2mS Maximum Count: 65,535 (16-bit) WQS-STD and WQS-INT: Sample event + 1 input channel WQS-LTS and WQS-LTU: 1 input channel connected to sample
Sample Modes	Fixed interval programmable from 1 sec to >1 yr High speed 10 samples per second Logarithmic sample rate (approximation) Exception (log only on deviation from previous reading)
Storage Capacity	WQS-STD and WQS-INT: 40,879 recordings for all inputs plus time stamp WQS-LTS and WQS-LTU: 81,759 recordings for all inputs plus time stamp
Data Overwrite	Select memory wrap or unwrap (unwrap will stop logging once memory is full)
Communication Ports	WQS-STD and WQS-INT: RS-232 DB9 or USB Type B WQS-LTS: RS-232 4-pin circular connector WQS-LTU: USB Type B
Selectable Baud Rates	9600, 19200, 28800, 38400, 57600, 115200
Clock	Synchronizes to user's computer
Operating Temperature	Industrial, -40°C to +85°C (battery may not apply)
Enclosure	Expanded UV protected PVC

Size and Weight

Ordering & Options

Water Quality Sampling System¹

Order No.	Description	Price
WQS-STD ²	Standard Water Quality Sampling System	\$2,725.00
WQS-LTS ³	WQS with Built-In Serial Datalogger	2,300.00
WQS-LTU ³	WQS with Built-In USB Datalogger	2,300.00
WQS-INT ⁴	Integrated Water Quality Sampling System	2,030.00

- 1) Water quality sensors sold separately.
- 2) The WQS-STD includes a sampler and external controller and datalogger.
- 3) The WQS-LTS and -LTU includes the sampler and a controller with a built in 2-channel serial (LTS) or USB (LTU) datalogger in a separate enclosure.
- 4) The WQS-INT includes the sampler with an internal version of the controller and datalogger.

Accessories⁵

Order No.	Description	Price
WL400	Water Level Sensor, see page 6	\$525.00
WQ101	Water Temperature Sensor, see page 60	273.00
WQ201	pH Sensor, see page 60	579.00
WQ720	Turbidity Sensor, see page 66	982.00
WQ301	Conductivity Sensor, see page 61	630.00

- 5) See sampler replacement parts on page 45.

WQS-STD (2 enclosures)	Sampler: 22"H x 17"W x 9"D (56 x 43 x 23 cm), 20 lbs (9 kg) Water Quality Logger: 14.5"H x 10"W x 6"D (17 x 25 x 15 cm), 13.6 lbs (6.2 kg)
WQS-LTS and WQS-LTU (2 enclosures)	2 enclosures Sampler: 22"H x 17"W x 9"D (56 x 43 x 23 cm), 20 lbs (9 kg) Flow Logger: 14.5"H x 10"W x 6"D (17 x 25 x 15 cm), 12.6 lbs (5.7 kg)
WQS-INT (1 enclosure)	Dimensions: 22"H x 17"W x 9"D (56 x 43 x 23 cm) Weight: 21.5 lbs (9.75 kg)



Features

- Simple to operate – no programming required
- Rugged construction for harsh environments
- Meets federal, state, and local wastewater regulations

Specifications

Operating Temperature	0° to +70°C
Materials	Enclosure: Expanded UV protected PVC Bottle: 2.5 gallon polyethylene Pickup Hose: 15' reinforced PVC 1/4" ID polyethylene flexible tubing section with intake strainer Pump Tubing: Norprene® 1/4" ID, 7/16" OD
Sample Pump	Flow Rate: 1000 ml per minute at a 4 foot head Type: Peristaltic Maximum Lift: ~20 feet
Power	Internal 12V Rechargeable Battery, Smart Charger, with AC 120 VAC adapter/charger Standby: 3 months while still retaining enough power to run the pump to capacity is required
Start Delay	16 time settings from 0 to 12 hours
Composite Interval	15 time settings from 5 min. to 12 hours plus an external trigger mode setting
Sample Size	15 composite sample sizes from 50ml to 2 liters plus a full bottle discrete setting (approximate sizes at 4 foot head)
External Trigger Input(s)	250mS minimum pulse width switch closure or 4 to 24 VDC
Pulse Output(s)	5 VDC one-second pulse, 1000 ohm output impedance
Bottle Switch Input(s)	Switch closure input, floating reed switch in bottle
Rain & Water Sensors	Optional moisture sensors or switch closure inputs
Internal Fuse	10 A Slow-Blow
Size of Unit	27"H x 20"W x 20"D (69 x 51 x 51 cm)
Weight	40lb/18kg (shipping weight 42lb/19kg)

WS700R Refrigerated Wastewater Sampler

Portable and Rugged Refrigerated Sampler

Description

Global Water's WS700R Refrigerated Wastewater Sampler combines all of the features you need to meet a variety of sampling requirements, including: a battery-powered refrigerated enclosure, a 2.5-gallon polyethylene sample bottle for collecting refrigerated composite samples, a peristaltic sampling pump, a sample pickup hose, a circuit board controller, a rechargeable gel cell battery, smart charger, and a battery charger.

Easy Set Up

The WS700R is easy to set up in the field, as described further for the WS700-750 samplers in the sidebar article on page 44. The sampler requires two 120 V outlets to power the peristaltic pump and refrigerator. The unit is relatively small and can be easily hidden or protected inside of a fiberglass enclosure.

State of the Art Controller

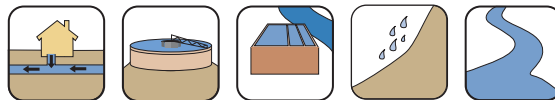
The WS700R's state of the art sampler controller gives you complete control over your water sampling process. With the sample

size control, you can take individual time-weighted composite samples or full-bottle discrete grab samples in a 2.5-gallon sample bottle. The sample interval control allows you set the time between individual composite samples or enable the external trigger mode for flow proportional sampling. A start delay timer allows you to start multiple samplers in the field at the same time, or to delay drawing a sample after a triggering event so that your sample better represents the water source. An automatic 15-second backflush cycle clears any debris from the strainer and empties the water from the hose so the next sample is not contaminated.

Flow Proportional Sampling

You can use an external pulse-type flowmeter such as the Open Channel Flow Meter (see page 26) to control the WS700R's sample interval for true flow proportional sampling. If you already have a flowmeter but it has a 4-20 mA output, you can adapt your meter for use with the RG750."

Applications



Ideal for sampling wastewater, industrial discharge, water, stormwater, and rivers and streams.

Ordering & Options

Refrigerated Samplers

Order No.	Description	Price
WS700R	Refrigerated Wastewater Sampler	\$1,255.00
WS700-PCO	Portable Cooler Composite Sampler	1,465.00
WS700-IBO	WS700 Sampler with Ice Bag Option	1,150.00

Accessories

Order No.	Description	Price
WSSWK	Stormwater Kit	\$205.00
01-342	Quick Release Pump Head	225.00
BC100	Smart Battery Charger, see page 128	105.00
RG750*	4-20 mA to Pulse Converter (1 pulse per 15 min @ 20mA)	475.00
RG755*	4-20 mA to Pulse Converter (1 pulse per 30 min @ 20mA)	475.00

* Specify unit conversion at time of order.

Replacement Parts

Order No.	Description	Price
00-010	Spare 12V Gel Cell Battery	\$30.00
CA0300	Stainless steel suction strainer	53.00
CD0300	WS700R Bottle Cap with Float Switch	48.00
01-283	WS700R 2.5 Gallon Plastic Bottle	15.00
00-546	Suction Hose	1.50/ft
00-744	Peristaltic Pump Tubing	5.25/ft

SP-Series Portable Samplers

Portable Samplers with Variable Speed, Push Button, and Quick Release Options

Description

Global Water's SP-Series Portable Samplers include the SP200 Variable Speed Peristaltic Sampling Pump, the SP250 Quick Release Sampler, and the SP100 Push Button Sampler. These samplers are ideal for taking samples from shallow wells, lakes, ponds, holding pools, and, in the case of the SP250, wastewater sources. The units are lightweight, rugged, easy to use, weather resistant, and require minimal maintenance.

High Sample Integrity

The SP-Series is designed for high sample integrity. Samples do not contact any sampler components other than the Norprene® and polyethylene tubing. The tubing is easy to clean and replace. To avoid cross-contamination or lengthy decontamination procedures, you can simply change the inexpensive tubing between samples.

SP200 Variable Speed Sampler

The SP200's manually-operated Peristaltic Sampling Pump has a reversible variable speed motor so you can sample at any speed up to 500 ml per minute and backflush the sample hose after a sample has been taken.

Specifications

Enclosure	Expanded UV protected PVC
Dimensions	SP200-100: 9 x 7.5 x 4.5" (23 x 19 x 11.4 cm) SP250: 14 x 12 x 6" (36 x 30.5 x 15 cm)
Weight	SP200: 4.5lbs/2kg (shipping weight 6lbs/2.7kg) SP250: 7.5lbs/3.5kg (shipping weight 9lb/4.1kg) SP100: 6lbs/2.7kg (shipping weight 7lbs/3.2kg)
Operating Temperature	0 to 70°C
Power	SP200-250: 12 VDC, 2A max. current draw SP100: Rechargeable 5 AH gel cell battery (2-1/2 hours of continuous sampling)
Flow Rate	SP200: Variable analog, up to 500 ml per minute at 4' head SP250: Variable depending on tube size and head height SP100: 1000 ml per minute at 4' head

SP250 Quick Release Sampler

The SP250 Quick Release Water Sampler allows you to take manual samples with the ability to backflush the sample hose after a sample has been taken. The unit uses the Masterflex™ easy load design and adjustable tubing retention system to allow you to use multiple tubing sizes and change the tubing without removing the pump head from the drive.

SP100 Push Button Sampler

The SP100 portable sampler allows you to take a manual sample and backflush the sample hose with an easy push button control.

Power Requirements

The SP200 and SP250 require an external 12 volt DC power source that can supply at least 2A continuous. The units include power cords (10 ft/3.05 m) fitted with alligator clips for easy connection to almost any 12 VDC battery. The SP100 includes an internal 5AH 12 VDC rechargeable gel cell battery that will power the water sampler to pump approximately 150 liters (40 gallons) between rechargings. The SP100 also includes a battery charger that will recharge the battery within 12 hours.

Backflush Rate	Same as flow rate
Pump Type	SP200-100: Peristaltic SP250: Peristaltic, Masterflex™ easy-load
Maximum Lift	22'
Pump Tube	SP200-100: Norprene® 1/4" ID SP250: See table below
Sample Hose	SP200-100: 15' nylon reinforced 1/4" ID polyethylene flexible tubing section with intake strainer (hose may be extended, as required, using standard 1/4" tubing and fittings) SP250: Supplied with 1/4" Norprene® and 15' nylon reinforced polyethylene tubing with intake strainer

SP250 Pump Tube

Tubing Size	1/513	1/514	1/516	1/525	1/517	1/518
Inside Dia. in (mm)	0.03 (0.8)	0.06 (1.6)	0.12 (3.1)	0.19 (4.8)	0.25 (6.4)	0.31 (7.9)
Hose Barb in (mm)	1/16 (1.6)	1/16 (1.6)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)



SP200

Features

- Easy sample collection
- Reversible motor to backflush hose
- Lightweight, weather resistant enclosure
- SP200 allows samples at any speed up to 500 ml per minute rate at 4 foot head
- SP250 is ideal for fast tubing changes and reduced maintenance
- SP100 uses easy push-button control for exact sample sizes



SP250



SP100

Applications



Ideal for sampling shallow wells, lakes, ponds, holding pools, and, in the case of the SP250, wastewater sources.

Ordering & Options

Portable Samplers

Order No.	Description	Price
SP200	Peristaltic Sampling Pump	\$625.00
SP250	Quick Release Sampler	979.00
SP100	Push Button Sampler	459.00

Replacement Parts

Order No.	Description	Price
00-010	12V 5AH Rechargeable Battery	\$30.00
FE0400	Battery Charger (120VAC to 12 VDC)	18.00
00-546	1/4" Pickup Hose	1.50/ft
CA0300	Pickup Strainer	53.00
00-744	1/4" Peristaltic Pump Tubing	5.25/ft



GP/WP-Series Groundwater Pumps

Groundwater Pumps for Purging, Testing, and Well Development

Features

- Easy groundwater sample collection
- Used and trusted within the groundwater industry for more than 15 years
- Recommended by drillers, hydrologists, and field technicians
- Practical for dedicated use and disposal
- Reduces labor costs and saves time

Applications



Ideal for groundwater purging, testing, and well development.

Description

The GP-Series Groundwater Pumps include Submersible Pumps and Inline Pumps, while the WP-Series Groundwater Purging Pump Kits include pumps, cables, and alligator clips to provide a ready-to-use pump solution. All the pumps provide easy-to-use, high-quality, economical solutions for purging, ground water testing, and well development.

The Submersible units can be used to depths of up to 60' (18m), and the Inline units can be used at greater depths when stacked in a series. When used together, a Submersible unit with multiple Inlines will allow testing of wells up to 200' deep. The WP Kits include the 5 amp Mini Purger with 50' of cable and the 10 amp Super Purger with 70' of cable. The Super Purger can sample to a depth of 60' (18m) and at a rate of up to 3 gallons (11.4 liters) per minute.

Smart Design

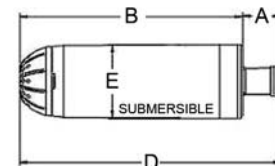
The GP/WP-Series Pumps have a slim diameter, which minimize well hang ups and is ideal for use in 2" or larger monitoring wells. The pumps are self priming when fully submersed and can be connected directly to DC

power sources to begin pumping. Each GP pump includes 3' of cable.

The pumps are tough and powerful, having a plastic construction and a stainless steel impeller. They allow pumping of up to 3 gallons (11.4 liters) per minute. The GP/WP-Series Pumps have been used and trusted within the groundwater industry for more than 15 years and are recommended by drillers, hydrologists, and field technicians around the world.

Long Life

The GP/WP-Series Pumps can be run continuously for 48 hours without motor damage, even in dry conditions, although for the best results running periods should be restricted to 15 minutes with a 5 minute cool down period. The pumps have an overall life expectancy of approximately 400 hours, although lab tests have shown that they can last up to 750 hours.



Specifications

Model	GP8815	GP8825	GP9216	GP9955	GP9255	WP4012	WP6012
Voltage	12VDC	24VDC	12VDC	12VDC	12VDC	12VDC	12VDC
Recommended Fuse	5 amp automotive	3 amp automotive	8 amp automotive	5 amp automotive	8 amp automotive	5 amp automotive	10 amp automotive
Hose Connections	To suit 10mm or 13mm (3/8" or 1/2") bore flexible hose						
Materials	ABS plastic, stainless steel, Nitrile	PC ABS Copolymer + PBT, stainless steel, Nitrile	ABS plastic, stainless steel, Nitrile	PC ABS Copolymer + PBT, stainless steel, Nitrile	ABS plastic, stainless steel, Nitrile	ABS plastic, stainless steel, Nitrile	ABS plastic, stainless steel, Nitrile
Weight	0.4 lbs (0.18 kg)		0.2 lbs (0.09 kg)		2 lbs (0.9 kg)	4 lbs (1.4 kg)	

Submersible Dimensions	A	B	D	E
GP881	21mm 13/16"	97mm 3-13/16"	118mm 4-5/8"	36mm 1-7/16"
GP921	25mm 1"	141mm 5-11/16"	166mm 6-9/16"	40mm 1-9/16"
WP4012	21mm 13/16"	114mm 4-1/2"	135mm 5-5/16"	40mm 1-9/16"
WP6012	19mm 3/4"	241mm 9-1/2"	260mm 10-1/4"	40mm 1-9/16"

Model	Current Draw (amp)	Output Performance (in gallons per minute) at Head (in feet)													
		0	5	10	15	20	25	30	35	40	45	50	55	60	
GP8815 & GP8825	1.4-3.1	3.5	3.0	2.3	1.9	1.3	0.7	0.2							
GP9216	3.0-6.5	4.0	3.6	3.2	2.8	2.6	2.3	2.0	1.8	1.5	1.1	0.9	0.6	0.3	
GP9955	1.4-3.1	3.5	3.0	2.3	1.9	1.3	0.7	0.2							
GP9255	3.0-6.5	4.0	3.6	3.2	2.8	2.6	2.3	2.0	1.8	1.5	1.1	0.9	0.6	0.3	
WP4012	3.5-5.2	2.5	2.2	1.8	1.4	1.0	0.6	0.3							
WP6012	5.5-8.4	3.0	2.8	2.5	2.3	2.1	1.9	1.7	1.5	1.3	1.1	0.8	0.6	0.3	

Note: GP pumps attached with 37" of cable. All tests carried out with 1/2" ID tubing.

Ordering & Options

Order No.	Description	Price
GP8815B	881 Groundwater Pump	\$38.00
GP8825B	882 Groundwater Pump	34.00
GP9216B	921 Groundwater Pump	60.00
GP9955B	Inline 991 Groundwater Pump	43.00
GP9255B	Inline 921 Groundwater Pump	60.00
WQEXC	Extra Cable (up to 100' can be added)	1.10/ft
WP4012	Mini Purger (includes 50' of cable)	92.00
WP6012	Super Purger (includes 70' of cable)	183.00

DRP Handled Dippers

Lightweight Long Handheld Sampler

Features

- Strong but lightweight
- Inert high density polyethylene

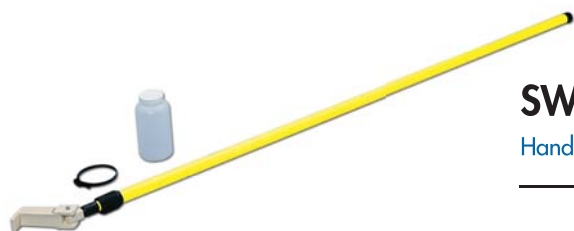
Description

The DRP-Series includes high density polyethylene dippers that are perfect for removing samples from streams, basins, and large tanks. Lightweight but durable, the dippers feature two pour spouts, graduations (in ounces and milliliters), and a PVC

grip handle. Choose from 16 oz. (500 ml) or 32 oz. (1,000 ml) cup sizes with handle lengths of 3, 6, or 12 feet (the 12 foot handle includes two pieces). Please note that dippers are not autoclavable.

Ordering & Options

Order No.	Sample Size	Handle Length	Price
CXBA00	16 oz. (500ml)	3 ft	\$30.00
CXBA10	16 oz. (500 ml)	6 ft	44.00
CXBA20	16 oz. (500 ml)	12 ft	86.00
CXBB00	32 oz. (1000 ml)	3 ft	43.00
CXBB10	32 oz. (1000 ml)	6 ft	52.00
CXBB20	32 oz. (1000 ml)	12 ft	88.00



SWNG Swing Sampler

Handheld Sampler for Horizontal Flows

Features

- Hinged end for easy sample collection
- Pole extends up to 12 feet

Description

The SWNG Swing Sampler is specifically designed for applications involving the collection of a sample from a horizontal flowing stream of water, such as a sewer, river, or other channel. The end of the sampler swings, allowing collection from different angles up to 90°. The SWNG includes a

6 ft (1.83 m) fiberglass pole that extends up to 12 ft, providing an adequate reach for most sampling situations. A 960 ml polyethylene bottle included with the sampler has a cover with a vinyl liner for leak-proof protection. The bottle is attached to a polyurethane holder and is held in place with a plastic snapper ring that has an adjustable locking device. Other types of bottles may be used, but a different type of fastener may be required to hold the bottle in place. Accessories include 12 packs of either 500 ml or 950 ml HDPE bottles, and additional snapper attaching rings.

Ordering & Options

Swing Sampler

Order No.	Description	Weight	Price
CXA000	Sampler with Pole & Bottle	5.13 lb (2.30 kg)	\$108.00

Accessories

Order No.	Description	Weight	Price
CXAA00	500 ml Bottles (12 pk)	1.06 lb (0.50 kg)	\$21/pk
CXAA10	960 ml Bottles (12 pk)	1.6 lb (0.70 kg)	28/pk
CXAB00	Small Snapper Ring (holds 500 ml bottle)	0.06 lb (0.03 kg)	5.00
CXAB10	Large Snapper Ring (holds 960 ml bottle)	0.13 lb (0.01 kg)	7.00