



Monitoring stormwater drainage with a Global Water WS705 water sampler.

## CHAPTER 3. SAMPLING

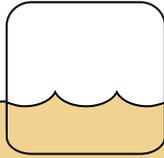
*Sampling Systems, Samplers, Groundwater Pumps, and Handheld Samplers*

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### Setting Up the WS705-755

To set up your WS705 or WS755 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 WS705-755 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 WS705-755, 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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## WS705-755 Improved Water Samplers

Combined Composite/Discrete Samplers for a Range of Sampling Requirements

### Description

Global Water's WS705 single-bottle and WS755 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 WS705-755's state of the art controller gives you power over your sampling process. With the sample size control, you can adjust the WS705-755 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 WS755 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.

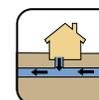
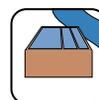
### Useful Inputs and Outputs

Both the WS705 and WS755 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 122) or other monitoring device.

### Range of Features and Options

The WS705 and WS755 samplers are housed in a rugged, weatherproof enclosure featuring heavy duty polyurethane wheels and a retractable extension handle for easy transportation. Both units include 15 feet of reinforced sampling hose with an intake strainer for each pump, a 1 gallon (WS755) or 2.5 gallon (WS705) polybottle for each pump, and a rechargeable battery and charger. 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.

## WS705-755 Improved Water Samplers

### Features

- Ideal for wastewater, industrial, and environmental sampling
- Quick disconnect pickup hose conveniently stored inside the enclosure for easy transport
- Heavy duty wheels and retractable handle built in
- Enclosed battery compartment and smart battery charger to improve battery life
- Automatic backflush clears pickup strainer and hose
- Rugged construction for harsh environments

### Specifications

Operating Temp	32° to +158°F (0° to +70°C)
Materials	Enclosure: Expanded UV protected PVC  Bottle: 2.5 gal (9.5 l) Polyethylene (WS705), two 1 gal (3.8 l) Polyethylene (WS755)  Pickup Hose: 15 ft (4.6 m) reinforced PVC 1/4 in ID polyethylene flexible tubing section with 20-Mesh intake strainer  Pump Tubing: Norprene® 1/4 in ID, 7/16 in OD
Sample Pump	Flow Rate: 1000 ml per minute at a 4 foot head  Type: Peristaltic  Maximum Lift: ~20 feet (6 m)



The WS755 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.

Battery	Rechargeable 5 AH Gel Cell
Battery Life	WS705: ~1 hour continuous pumping under load  WS755: ~½ hour continuous pumping under load  Standby: 3 months while still retaining enough power to run the pump to capacity
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	22x18x10 inches (56x45.7x25.4 cm) (HxWxD)
Weight	WS705: 26 lbs/11.7 kg (shipping weight 28 lbs/12.7 kg)  WS755: 30 lbs/13.6 kg (shipping weight 32 lbs/14.5 kg)

\*Visit our website for information on the WS700/750 water samplers

### Ordering & Options

#### Improved Water Samplers

Order No.	Bottles	Inputs	Outputs
WS755	2	2	2
WS705	1	1	1

#### Standard Water Samplers

Order No.	Bottles	Inputs	Outputs
WS750	2	2	2
WS700	1	1	1

#### Accessories

Order No.	Description
WSSWK	Stormwater Kit
O1-342	Quick Release Pump Head
SMPLAC	AC-Powered Battery Option for WS700. Includes BC100, Smart Charger
BC100	Smart Battery Charger for WS700, see page 128
GL500-7-2	9-Channel Datalogger
GL500-2-1	3-Channel Datalogger
RG750	420 mA to Pulse Converter Module (one pulse per 15 min at 20mA)
RG755	420 mA to Pulse Converter Module (one pulse per 30 min at 20mA)
SP101	Solar Panel (2 watts, 80mA minimum)
SP102	Solar Panel (5 watts, 300mA minimum)



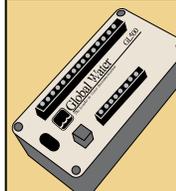
The WS705 single bottle sampler allows you to take a time or flow (with optional flow monitor) weighted composite sample or a discrete (grab) sample.

### Replacement Parts

Order No.	Description
00-010	Spare 12V Gel Cell Battery
O1-947	Universal Charger (WS705/755)
FE0400	Battery Charger (WS700/750)
CA0850	Quick-Disconnect Fitting Plug & Cap
CA0860	Tubing Quick-Disconnect Fitting
00-418	1-Gallon Plastic Bottle (WS755/750)
00-419	2.5-Gallon Plastic Bottle (WS705/700)
00-835 <sup>2</sup>	1-Gallon Glass Bottle
CA0200	WS705/700 Bottle Cap with Float Switch for 2.5 Gal Plastic Bottle
CA0250	WS705/700 Bottle Cap with Float Switch for 1 Gal Glass Bottle
CB0200	WS755/750 Bottle Cap with Float Switch for 1 Gal Plastic Bottle
CA0600	Stainless Steel Suction Strainer #20 Mesh
O1-881	Replacement #20 Mesh Strainer Head
O1-945	#6 Mesh Strainer Head
00-546	Suction Hose, per foot
00-744	Peristaltic Pump Tubing, per foot

2) Only one glass bottle will fit in the WS700/750 sampler case without removing battery.

### You may also like . . .

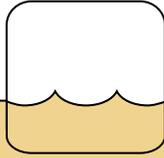


**Global Logger**  
Multichannel datalogger for recording sampler collection data.

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**Refrigerated Samplers**  
Portable and rugged refrigerated samplers

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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.

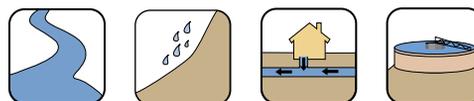
#### Accurate Open Channel Flow Monitor

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 122 and the 3-channel GL500 on page 123 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



(Two-bottle system shown. Call for more information.)

### Specifications

#### Composite Water Sampler

Please see specifications for the WS700 on website.

#### 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 <sup>3</sup> s, 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
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 $\mu$ 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 $\mu$ 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

### Features

- Scalable flow proportional sample triggering ideal for environmental, wastewater, and industrial flow sampling
- 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

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
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 to +185°F (-40 to +85°C) (battery may not apply)
Enclosure	Expanded UV protected PVC
FSS-STD (2 enclosures)	Sampler: 22x17x9 inch (56x43x23 cm) (HxWxD), 20 lbs (9 kg) Flow Logger: 14.5x10x6 inch (17x25x15 cm) (HxWxD), 14.1 lbs (6.4 kg)
FSS-LTS (2 enclosures)	Sampler: 22x17x9 inch (56x43x23 cm) (HxWxD), 20 lbs Flow Logger: 14.5x10x6 inch (17x25x15 cm) (HxWxD), 13.1 lbs (5.9 kg)
FSS-INT (1 enclosure)	Dimensions: 22x17x9 inch (56x43x23 cm) (HxWxD) Weight: 22 lbs (10 kg)

### Ordering & Options

#### Flow Sampling Systems<sup>1</sup>

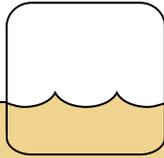
Order No.	Description
FSS-STD <sup>2</sup>	Standard Flow Sampling System
FSS-LTS <sup>3</sup>	Light Flow Sampling System
FSS-INT <sup>4</sup>	Integrated Flow Sampling System
FSS-C <sup>5</sup>	Custom Flow Sampling System

- 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
PDAWL16	PDA Package
00-010	Spare 12V Gel Cell Battery
FE0400	Battery Charger
00-835 <sup>6</sup>	1-Gallon Glass Bottle
CA0600	Stainless Steel Suction Strainer
00-546	Suction Hose, per foot
00-744	Peristaltic Pump Tubing, per foot

- 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  $\pm 10$  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.

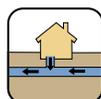
#### Rugged Composite/Discrete Water Sampler

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. With the unit's water sample size control, you can take individual time-weighted composite samples or full-bottle discrete grab samples.

#### 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 122 and the 3-channel GL500 on page 123 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



(Two-bottle system shown. Call for more information.)

### Specifications

#### Composite Water Sampler

Please see specifications for the WS700 on website.

#### Process Controller

Sensor Display	5 digit + decimal place, LCD
Accuracy	0.1% full scale + 0.005mA + sensor error
Analog Sensor Input	4-20 mA, 0-5V, 01V jumper selectable
Input Resolution	0.005mA 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 + sensor + battery voltage monitor WQS-LTS and WQS-LTU: sensor + 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 to +185°F (-40 to +85°C) (battery may not apply)
Enclosure	Expanded UV protected PVC

### Ordering & Options

#### Water Quality Sampling System<sup>1</sup>

Order No.	Description
WQS-STD <sup>2</sup>	Standard Water Quality Sampling System
WQS-LTS <sup>3</sup>	WQS with Built-In Serial Datalogger
WQS-LTU <sup>3</sup>	WQS with Built-In USB Datalogger
WQS-INT <sup>4</sup>	Integrated Water Quality Sampling System

- 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.

#### Accessories<sup>5</sup>

Order No.	Description
WL400	Water Level Sensor, see page 6
WQ101	Water Temperature Sensor, see page 60
WQ201	pH Sensor, see page 60
WQ730	Turbidity Sensor, see page 64
WQ301	Conductivity Sensor, see page 61

- 5) See sampler replacement parts on page 45.

#### Size and Weight

WQS-STD (2 enclosures)	Sampler: 22x17x9 inch (56x43x23 cm) (HxWxD), 20 lbs (9 kg) Water Quality Logger: 14.5x10x6 inch (17x25x1.5 cm) (HxWxD), 13.6 lbs (6.2 kg)
WQS-LTS and WQS-LTU (2 enclosures)	Sampler: 22x17x9 inch (56x43x23 cm) (HxWxD), 20 lbs (9 kg) Water Quality Logger: 14.5x10x6 inch (17x25x1.5 cm) (HxWxD), 12.6 lbs (5.7 kg)
WQS-INT (1 enclosure)	Dimensions: 22x17x9 inch (56x43x23 cm) (HxWxD) 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 Temp	32° to +158°F (0° to +70°C)
Materials	Enclosure: Expanded UV protected PVC Bottle: 2.5 gal (9.5 l) polyethylene Pickup Hose: 15 ft reinforced PVC 1/4 in ID polyethylene flexible tubing section with intake strainer Pump Tubing: Norprene® 1/4 in ID, 7/16 in OD
Sample Pump	Flow Rate: 1000 ml per minute at a 4 foot head Type: Peristaltic Maximum Lift: ~20 feet (6.1 m)
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 switch in bottle
Rain & Water Sensors	Optional moisture sensors or switch closure inputs
Internal Fuse	10 A Slow-Blow
Size of Unit	27x20x20 inch (69x51x51 cm) [HxWxD]
Weight	40 lb (18 kg) (shipping weight) 42 lb (18 kg)

## 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 WS705-755 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

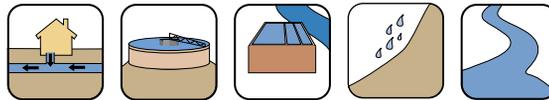
The WS700R's state of the art sampler controller gives you complete control over your water sampling process. With the sample

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
WS700R	Refrigerated Wastewater Sampler
WS700-PCO	Portable Cooler Composite Sampler
WS700-IBO	WS705 Sampler with Ice Bag Option

#### Accessories

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

#### Replacement Parts

Order No.	Description
00-010	Spare 12V Gel Cell Battery
CA0600	Stainless steel suction strainer
CD0300	WS700R Bottle Cap with Float Switch
01-283	WS700R 2.5 Gallon Plastic Bottle
00-546	Suction Hose
00-744	Peristaltic Pump Tubing

# 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

Operating Temp	32° to +158°F (0° to +70°C)
Power	SP200-250: External, 12 VDC, 2A max. current draw SP100: Rechargeable 12 VDC, 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 ft head SP250: Variable depending on tube size and head height SP100: 1000 ml per minute at 4 ft head
Backflush Rate	Same as flow rate
Pump Type	SP200-100: Peristaltic SP250: Peristaltic, Masterflex™ easy-load
Maximum Lift	22 ft (6.7 m)
Pump Tube	SP200-100: Norprene® 1/4" ID SP250: L/S 17, See table below
Sample Hose	15 ft (4.6 m) nylon reinforced polyethylene tubing with intake strainer

### 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.

Enclosure	Expanded UV protected PVC					
Dimensions	SP200-100: 9 x 7.5 x 4.5 inch (23 x 19 x 11.4 cm) SP250: 14 x 12 x 6 inch (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/4.1 kg) SP100: 6lbs/2.7kg (shipping weight 7lbs/3.2kg)					

### SP250 Pump Tube

Tubing Size	L/S 13	L/S 14	L/S 16	L/S 25	L/S 17	L/S 18
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
SP200	Peristaltic Sampling Pump Battery not included
SP250	Quick Release Sampler Battery not included
SP100	Push Button Sampler

### Replacement Parts

Order No.	Description
00-010	12V 5AH Rechargeable Battery
FE0400	Battery Charger (120VAC to 12 VDC)
00-546	¼ inch Pickup Hose
CA0600	Pickup Strainer
00-744	¼ inch ID Norprene Peristaltic Pump Tubing
01-746	L/S 17 PharMed BPT Peristaltic Pump Tubing



# GP/WP-Series Groundwater Pumps

Groundwater Pumps for Purging, Testing, and Well Development

## Description

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

The Submersible pumps can be used to depths of up to 60 feet (18 m), and the Inline units can be stacked in series to draw water from greater depths. When used together, a Submersible unit with multiple Inlines will allow testing of wells up to 200 feet (61 m) deep. The WP Kits include the 5 amp Mini Purger with 50 feet (15.2 m) of cable and the 10 amp Super Purger with 70 feet (21.3 m) of cable. The Super Purger can sample to a depth of 60 feet (18 m) 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 inch (5 cm) 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 pump includes 3 feet (0.9 m) 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. They have an overall life expectancy of approximately 400 hours, although lab tests have shown that they can last up to 750 hours.

## 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



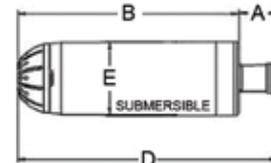
Ideal for groundwater purging, testing, and well development.

## Specifications

Model	GP1352	GP1354	GP1652	GP1392	GP1692	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 3/8 or 1/2 inch (10 or 13mm) 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	0.3 lbs (0.15 kg)		0.3 lbs (0.15 kg)		2 lbs (0.9 kg)	4 lbs (1.4 kg)	

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	
GP1352 & GP1354	1.4-3.1	3.5	3.0	2.3	1.9	1.3	0.7	0.2							
GP1652	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	
GP1392	1.4-3.1	3.5	3.0	2.3	1.9	1.3	0.7	0.2							
GP1692	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	2.0-3.5				3.2	2.6	2.0	1.5	1.0	0.6	0.1				
WP6012	5.5-8.4			3.0	2.6	2.3	1.9	1.6	1.4	1.1	0.8	0.5	0.3	0.1	

Note: GP pumps tested with 37 inches of cable. All tests carried out with 1/2 inch ID tubing.



Submersible Dimensions	A	B	D	E
GP1352, 1354, 1652	20mm 13/16 in	109mm 4.5/16 in	129mm 5.1/16 in	36mm 1.7/16 in
GP1392, 1692	20mm 13/16 in	115mm 4.1/2 in	134mm 5.1/4 in	36mm 1.7/16 in
WP4012	21mm 13/16 in	114mm 4.1/2 in	135mm 5.5/16 in	36mm 1.7/16 in
WP6012	19mm 3/4 in	241mm 9.1/2 in	260mm 10.1/4 in	36mm 1.7/16 in

## Ordering & Options

Order No.	Description
GP1352	Groundwater Pump, 0-30 ft, 12VDC
GP1354	Groundwater Pump, 0-30 ft, 24 VDC
GP1652	Groundwater Pump, 0-60 ft
GP1392	Inline Groundwater Pump, 0-30 ft
GP1692	Inline Groundwater Pump, 0-60 ft
WQEXC	Extra Cable (up to 100 ft can be added)
WP4012	Mini Purger (includes 50 ft of cable)
WP6012	Super Purger (includes 70 ft of cable)
WP9012 <sup>1</sup>	Mega Purger (includes 90 ft of cable)

1) See website for specifications.

## DRP Handled Dippers

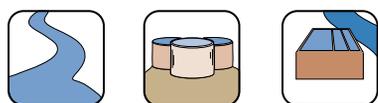
### Lightweight Long Handheld Sampler



#### Features

- Strong but lightweight
- Inert high density polyethylene

#### Applications



Ideal for removing samples from streams, basins, and large tanks.

#### 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

#### You may also like . . .

##### FSS Flow Sampling System

A unique combination of instruments that makes monitoring, sampling, and recording stormwater, wastewater, or industrial discharge flows easy.

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## SLDG Sludge Judge®

Sampler for Accurate Readings of Settled Solids



#### Description

The SLDG Sludge Judge® sampler is designed to take accurate readings of settled solids that are 5% or less in a variety of liquids at any depth. The SLDG is ideal for applications in non-caustic materials where accurate sample levels of settled solids are needed, including sewage treatment plants, chemical plants, and food processing facilities. The sludge sampler holds approximately 3 oz. per foot (89 ml per 0.31 m) and comes in 5 ft (1.53 m) sections of 3/4 in (1.90 cm) plastic pipe with screw-type connectors. The top section of the unit includes a nylon rope for raising and lowering the sampler. Individual sections can be combined as required to achieve the length needed. Among the sampler's accessories are a convenient canvas carrying case that holds up to four sections, a cleaning brush, a cleaning rod, and cotton strips. Please note, do not use the standard instrument in liquids over 165°F (74°C). The Sludge Judge® is not autoclavable.

For maximum strength and rigidity, we recommend the Sludge Judge® Ultra, which is constructed of extremely strong polycarbonate and treated with an ultraviolet stabilizer to help reduce deterioration from the sun's harmful rays. The material is very rigid, minimizing bending when the sampler is full

#### Ordering & Options

##### Original Sludge Judge®

Order No.	Description	Length
CY0000	Sludge Judge	15 ft
CY0010	Top Section with Rope	5 ft
CY0020	Bottom Section with Valve	5 ft
CY0030	Extension Sections	5 ft

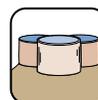
##### Sludge Judge® Ultra

Order No.	Description	Length
CY0100	Sludge Judge Ultra	15 ft
CY0110	Top Section with Rope	5 ft
CY0120	Bottom Section with Valve	5 ft
CY0130	Extension Sections	5 ft

#### Features

- Take accurate readings of settled solids
- Combine sections to achieve the sampling length needed
- Ideal for sewage treatment plants, chemical plants, and food processing facilities

#### Applications



Ideal for sampling settled solids in sewage treatment plants, chemical plants, and food processing facilities.

of water or other liquids. The unit is durable in cold temperatures and can withstand heat up to 280°F (138°C) (with careful handling). The sampler's 3/4 in (1.9 cm) diameter tubing is marked with blue tape to designate 1 ft (0.31 m) measurements. The unit is made up of three 5 ft (1.53 m) sections (top, extension, bottom), and individual sections can be combined as required. The carrying case and cleaning brush for the original Sludge Judge® may be used with this unit. Please note, the Sludge Judge® Ultra is not autoclavable.

#### Accessories

Order No.	Description
CYA000	Canvas Carry Bag
CYA010	Cleaning Brush, 6 ft
CYA020	2-Piece Aluminum Cleaning Rod, 6 ft
CYA030	Cotton Cleaning Strips, Bag of 50

“In sweet water  
there is a pleasure  
ungrudged by  
anyone.”

– Ovid, 13 A.D.