



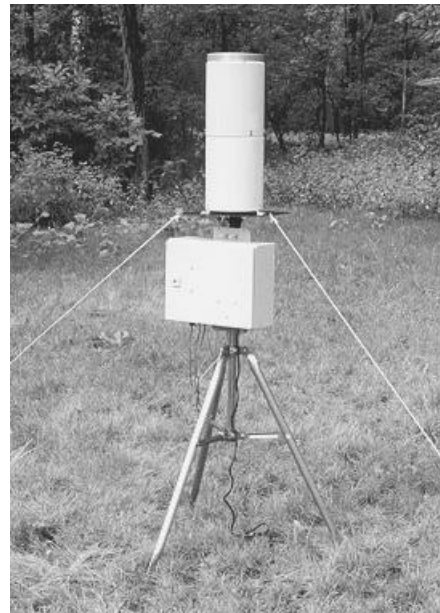
J & S Instruments, Inc.

3071 State Route 72 South
Springfield, Ohio 45505-5023
Phone 937-325-7499
Fax 937-323-9588
Toll-Free 888-LOG DATA

JS-425 Rain Gauge/pH Data Logging System Data Sheet

The JS-425 Rain Gauge/pH Data Logging System is designed for the correlated measurement of rainfall and its pH. This system consists of the following items: RG-400-8 Tipping Bucket Rain Gauge, JS-430 Flow Control Plumbing Assembly, 8710 pH Transmitter with 2721 Pre-Amp and S100C pH Sensor, 4150 Temperature Probe, JS-450 Data Logger, PSR-12-X Power Supply with GC-7-CA Gel Cell, JS-502-2ANG Enclosure and JS-610 Rain Gauge Mounting Platform. The system is designed as a turnkey package for easy installation in the field while providing high quality and accurate data on rainfall at the system's site. The basic process for logging rainfall data is as follows (see attached drawing). The rainfall is captured by a rugged and accurate rain gauge of which generates a pulse output to the data logger for a fixed volume of rainfall. The data logger collects the number of pulses over the user's defined period of time and logs the value along with a date and time stamp and other input channel data.

The discharge from the rain gauge is routed via the flow control plumbing through a retention cylinder in which both a pH sensor and a temperature sensor are located. The rain gauge discharge helps keep the clear glass cylinder clean with its natural flushing action while assuring the pH sensor remains wet even during long periods of time without rain. The low volume retention cylinder directs any volume greater than the cylinder's to the ground while minimizing the sample dilution larger cylinders' volumes would create. Additional plumbing can be fitted to this to direct the discharge to a sample collector. The pH and temperature sensors are attached to a pH transmitter from which a single 4 to 20 mA



output is supplied to the data logger. Each rainfall data logging cycle logs the pH reading. The pH transmitter has a LCD and front panel controls for calibrating the gel filled pH sensor with reference electrode in calibration standards to be supplied by the user. A two-point calibration is recommended and is temperature compensated by the temperature sensor input. The LCD is also available for real time monitoring of the rainfall sample's pH and temperature.

A NEMA 4 enclosure is supplied to contain and protect the data logger, the pH transmitter, the 12 VDC power supply and the gel cell battery. The enclosure has weather tight cable entrances for the sensor inputs and mounting hardware for locating it on the mast of the tripod assembly. The power supply converts the user supplied 110/220 VAC to 12 VDC of which in turn permits the data logger and pH transmitter to function. A 7 Ahr backup battery operates the system up to two days if primary power is interrupted. Once power is

restored, the backup battery will recharge and be available for the next interruption. An optional solar package is available.

The data logger is programmed and operated using supplied software and communicates to a personal computer via a RS232C port. This software requires any Windows® based operating system to run. By using this Visual Basic® generated software, the data logging schedule is selected by the user and conversions to engineering units of measure are automatic. Each data logging cycle provides a date and time stamp, interval rainfall and accumulated rainfall (zeroed at user determined cycle) and pH values. An air or rain temperature is logged if an optional temperature sensor is attached. The data logger has a non-volatile internal memory of 512,000 bytes of which will provide up to 40,000 lines of data. This is used to store the operating program and the logged data. Data downloading is accomplished by attaching a computer to the data logger and following on screen instructions. Downloading or program changes can be accomplished using an optional modem with interface cable.

The rain gauge, flow control assembly and enclosure are designed for attachment to a mounting platform. This tripod assembly is intended to be located in either unprepared or prepared sites to provide a secure installation/assembly of the system. It is complete with a mounting plate for securing the rain gauge and flow control assembly above the ground and a mast to accommodate the enclosure under the mounting plate. A three wire guy system secures the installation in high winds.

Once the data is downloaded and saved, it is formatted for importing into spreadsheets such as Excel® as a .CSV.

The JS-425 Rain Gauge/pH Data Logging

System (except the S100C) comes complete with a full one year warranty against defects in materials or workmanship. The S100C pH Sensor comes complete with a six month warranty against defects in materials or workmanship.

An optional heater package is available.

JS-425 Component Specifications:

RG-400-8 Tipping Bucket Rain Gauge

Accuracy: $\pm 0.5\%$ @ 1"/hr
Calibration: 0.01" or 0.25 mm
Collector: 8.00"
Output: 50 msec switch closure
Sensor: tipping bucket
Temperature Range: 0 to 60° C
Materials: PVC housing
 stainless steel hardware

JS-430 Flow Control Plumbing Assembly

Volume: 500 ml
Materials: glass retention cylinder
 PVC housing

8710 pH Transmitter

Accuracy: $\pm 0.2\%$ of scale
Range: 0 to 14
Resolution: 0.01 pH
 0.1° C
Calibration: pushbutton
Output: 4 to 20 mA
Power: +12 VDC
Temperature Range: -15 to 70° C
Quality: CE

S100C pH Sensor

Material: epoxy body
 glass bulb
Body Length: 3.5"
Cable: 48" w/ BNC connector
Reference: gel filled and sealed
Range: 0 to 14 pH
Response: 95% < 1 sec
Temperature Range: -5 to 50° C

2721 pH Pre-amp
Gain: X1 (unity)
Power: ± 5 VDC (supplied by 8710)

4150 Temperature Probe
Sensor: 3000 ohm thermistor
Length: 4"
Sheath Material: stainless steel
Cable: 48" w/ tinned leads

JS-450 Data Logger
A/D Conversion: 16 bit
Channels: 1 each pulse
 1 each 4 to 20 mA
 1 each thermistor
Accuracy: 0.1% of scale
Memory: 512,000 bytes
Quality: FCC part 15
Communications: RS232C
Software: Visual Basic based
 Requires Windows OS
Power: +12 VDC
Temperature Range: -40 to 85° C

PSR-12-X Power Supply
Input: 110 ± 10 VAC
 or
 220 ± 20 VAC
Output: 12 ± 2 VDC @ 2.1 A adjustable
Temperature Range: -40 to 70° C
Quality: UL and CE

Output: +12 VDC
Rating: 7 Ahr
Temperature Range: -60 to 60° C
Terminal: ¼" tab

JS-502-2ANG Enclosure
Dimensions: 11.75"x15.00"x6.15"
Rating: NEMA 4
Input: 110 ± 10 VAC
 or
 220 ± 20 VAC
Mounting Hardware: 2" aluminum angle
Quality: UL, CSA and TUV

JS-610 Rain Gauge Mounting Platform
Platform Dimensions: 12"x12"
Height: adjustable to 72"
Material: steel
Hardware: stainless steel

October 1998

GC-7-CA Gel Cell w/ Cable Assembly