

## MODEL 5400 Satellite Data Transmitter

### General Description

HydroLynx offers our 5400 series Satellite Data Collection Units (DCU) as a solution for problematic terrestrial radio paths or as a redundant telemetry solution. A satellite radio transmits data via ORBCOMM, a real-time commercial satellite telemetry provider. The satellite data radio “pings” a low earth orbiting satellite when data is to be transmitted by the DCU. An error-free communication link is established between the remote site and the ORBCOMM ground station. Data is routed to a dedicated server maintained by ORBCOMM. The client’s NovaStar ALERT base station automatically pulls the data from the server via an Internet connection.

Data transmitted from a remote station normally arrives at the ALERT base station within one minute but on occasion may take up to ten minutes. This path provides data on a time scale that is not matched by the GOES satellites which often have latencies of one hour or more.

The Model 5400 Satellite DCU can be configured as a rainfall station or rainfall and water level station. Both fixed interval and event data reporting are supported. A programmable fixed reporting interval is configurable from 5 minutes to 24 hours. Rainfall accumulator, water level, and battery voltage are transmitted for all fixed interval or event reports.

Event reporting of precipitation is started whenever the bucket tips. A timer is started that transmits one minute rainfall accumulations every five minutes until the rainfall stops.

Water Level event reporting is initiated when the water level changes by an amount, programmable over the range from 0.1 to 2.0 feet. The sensor sample interval is programmable over the range from 5 minutes to 1 hour. Data from all sensors are included in the Event-Based Water Level transmission.

Slope and Offset variables are included in the field accessible configuration to convert raw water level sensors data into Engineering Units (feet, meters, etc).

### Specifications

#### Environment

Operating temperature: ..... -40 to 65 °C  
Storage temperature: ..... -60 to 75 °C  
Operating humidity: ..... 0 to 100 %RH, non-condensing

#### Model 5400 Logic Board

Memory size: ..... 1 MB CMOS EPROM, 256 kB CMOS RAM, 768 kB battery backed

Manual controls: ..... Reset, Test, and Programming switch  
Diagnostic LEDs: ..... Time set, Digital input event, TX-on  
Stand by current: ..... <100 µA

Supply voltage: ..... 10.5 to 18.5 Vdc (12.2 to 14.5 Vdc battery operated with radio)  
Serial port baud rate: ..... 9600  
Transmitter baud rate: ..... 9600  
CPU type: ..... PIC18F252 (20MHz)  
Clock: ..... Real-time clock  
Digital inputs: ..... 2 digital up/down channels, up to 50 event triggers/second  
Analog inputs: ..... 3 channels (1 external, 2 internal), 1 external analog channel (0-5 Vdc), 16-bit resolution, 1 internal channel for battery, 1 internal channel for temperature  
Analog supply voltages: ..... Vbatt (12 Vdc nominal) non-switched, +12 Vdc non-switched, +5 Vdc non-switched, Vsw (12 Vdc nominal) switched, Vref (+5 Vdc) switched  
Serial inputs: ..... 1 for displays and NMEA0183 and NMEA2000 sensor interfaces  
RS232 inputs: ..... 1 for programming and data downloading

#### Satellite Radio

Manufacturer: ..... ORBCOMM  
Modem: ..... ST2500  
Transmit Frequency: ..... 148 to 150.05 MHz  
Transmit Power: ..... 5 Watts  
Receive Frequency: ..... 137 to 138 MHz  
Dynamic Range: ..... 40 dB minimum  
Sensitivity  
Minimum BER: ..... E-5@ -118 dBm  
Typical BER: ..... E-5@ -120 dBm

#### Power Requirements

External: ..... 9 to 36 Vdc  
Battery: ..... 8 or 12 Vdc  
Power  
Transmit: ..... 2.5 A max. @ 12v; 2.0 A max. @ 15v  
Receive: ..... 90 mA  
Power Save Receive: ..... 60 mA  
Sleep: ..... 50 µA typical, 100 µA maximum  
Position Accuracy GPS: ..... < 5 m CEP

#### Physical

Enclosure: ..... Aluminum canister  
Size: ..... 8 in. diameter x 23 in. high  
Weight: ..... 19 lbs with battery  
Shipping weight: ..... 12 lbs (battery shipped separately)  
Sensor inputs: ..... Keyed MS male connectors  
5400-54 ..... 1 Digital Precipitation Input  
5400-90, N ..... 1 Digital Precipitation Input, 1 Analog Water Level Input  
Battery: ..... 12 Vdc, 18 Amp-hour rechargeable gel cell  
External 12 Vdc connector: ..... 3 pin MS male connector  
Antenna: ..... BNC female bulkhead connector  
Serial console: ..... DB9 female connector on board

### Ordering Information

5400-54 ..... Satellite Transmitter in Round Canister, Satellite Radio, 1 Precipitation Input  
5400-90 ..... Satellite Transmitter in Round Canister, Satellite Radio, 1 Precipitation Input, 1 Analog Water Level Input  
5400N ..... Satellite Transmitter in NEMA 4X Enclosure, Satellite Radio, 1 Precipitation Input, 1 Analog Water Level Input

### Options

5400RS232 ..... 7 Pin MS Male Bulkhead Connector