

User Manual

110-WS-NOVA-SAT

Satellite Weather Station





Phone (530) 823-7185 Email <u>nova@novalynx.com</u> Website <u>www.novalynx.com</u>

Receiving and Unpacking

Carefully unpack all components and compare to the packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

Returns

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage during the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with the packaging. Please write the RA# on the outside of the box.

Warranty

NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation's liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

Address

NovaLynx Corporation 431 Crown Point Circle, Suite 120 Grass Valley, CA 95945-9531 USA Phone: (530) 823-7185 Email: nova@novalynx.com Website: www.novalynx.com

Copyright © 1988-2021 by NovaLynx Corporation

| | С | ONTER | NTS | |
|---|-----|---------|-----------------------------------|----|
| 1 | F | ORWA | RD | 6 |
| 2 | 11 | NTROD | UCTION | 6 |
| 3 | Т | ECHNIC | CAL SPECIFICATION | 7 |
| 4 | Р | RE-INS | TALLATION | 8 |
| | 4.1 | Set | up | 8 |
| | 4.2 | Pov | ver-on Test | 8 |
| | 4 | .2.1 | Unit A and Unit B Operation | 8 |
| | 4 | .2.2 | Satellite Modem Board Operation | 8 |
| | 4 | .2.3 | Data Delivery | 9 |
| 5 | V | VEBSITE | E FEATURES | 9 |
| | 5.1 | Log | in Page | 9 |
| | 5.2 | Hor | ne Page | 10 |
| | 5.3 | Sta | tion Graph Page | 11 |
| | 5 | 5.3.1 | Graphing Groups | 11 |
| | 5 | .3.2 | Data Export | 11 |
| | 5.4 | Ala | rms Page | 12 |
| 6 | 11 | NSTALL | ATION | 12 |
| | 6.1 | Site | Considerations | 12 |
| | 6 | 5.1.1 | Wind Speed and Direction | 13 |
| | 6 | 5.1.2 | Temperature and Relative Humidity | 13 |
| | 6 | 5.1.3 | Precipitation | 13 |
| | 6 | 5.1.4 | Power requirements | 13 |
| | 6.2 | Мо | unting options | 13 |
| | 6 | 5.2.1 | Do it yourself mast | 13 |
| | 6 | 5.2.2 | NovaLynx tripod | 14 |
| | 6 | 5.2.3 | Tower mount | 14 |
| | 6.3 | Arr | angement of equipment on the mast | 14 |
| | 6 | 5.3.1 | Wind Speed and Direction sensor | 14 |
| | 6 | 5.3.2 | Solar Panel (optional) | 14 |
| | 6 | 5.3.3 | Rain Gauge | 14 |
| | 6 | 5.3.4 | Weather station enclosure | 14 |
| | 6 | 5.3.5 | Barometric pressure | 14 |
| | | | | |

| | 6.3. | .6 | Temperature and Relative Humidity sensor | . 14 |
|---|------|--------|---|------|
| | 6.3. | .7 | Antenna | . 15 |
| | 6.4 | Sens | sor wiring. | . 15 |
| | 6.5 | Pow | /er-up | . 16 |
| | 6.5. | .1 | Connect the battery | . 16 |
| | 6.5. | .2 | Connect the charger | . 16 |
| | 6 | .5.2.1 | AC to DC Adapter Option | . 16 |
| | 6 | 5.2.2 | Solar Panel Option | . 16 |
| 7 | MES | SSAGI | E FORMAT | . 17 |
| | 7.1 | Seria | al interface | . 17 |
| | 7.2 | ID n | umbers | . 18 |
| | 7.3 | Data | a Types | . 18 |
| | 7.3. | .1 | Analog Input | . 18 |
| | 7.3. | .2 | Frequency Input | . 18 |
| | 7 | .3.2.1 | Rate measurement (wind speed) | . 18 |
| | 7 | .3.2.2 | Peak measurement (peak gust) | . 18 |
| | 7 | .3.2.3 | Total measurement (wind run) | . 20 |
| | 7 | .3.2.4 | Run time measurement (spare) | . 20 |
| | 7.3. | .3 | Pulse Accumulator Input | . 20 |
| | 7.4 | Data | a usage calculations | .21 |
| 8 | STA | TION | CONFIGURATION | .22 |
| | 8.1 | Con | nection and Upload | . 22 |
| | 8.1. | 1 | USB Cable | . 22 |
| | 8.1. | 2 | FlowSensor Software | . 23 |
| | 8.1. | 3 | Configuration Retrieval | . 23 |
| | 8.2 | Flow | vSensor: Operation tab | . 24 |
| | 8.3 | Flow | vSensor: Reporting tab (Unit A) | . 25 |
| | 8.4 | Flow | vSensor: Freq Setup tab (Unit A) | . 26 |
| | 8.5 | Flow | vSensor: Configuration tab (Unit A) | . 27 |
| | 8.6 | Flow | vSensor: Accumulators tab | . 28 |
| | 8.7 | Flow | vSensor: Aux Port Forwarding and Diagnostics tabs | . 28 |
| 9 | MA | INTEN | IANCE | .28 |
| | 9.1 | Sens | sor maintenance | .28 |

| 9.1 | .1 | Air temperature and humidity sensor maintenance | . 28 | | | | |
|--------|------------------------------------|---|------|--|--|--|--|
| 9.1 | .2 | Barometric pressure sensor maintenance | . 28 | | | | |
| 9.1 | .3 | Wind speed and Direction sensor maintenance | . 29 | | | | |
| 9.1 | .4 | Rain gauge maintenance | . 29 | | | | |
| 9.2 | Solar | r panel maintenance | . 29 | | | | |
| 9.3 | Stati | on maintenance | . 29 | | | | |
| APPEND | DIX A - S | Sensor Calibration Table | . 30 | | | | |
| APPEND | APPENDIX B - Default Configuration | | | | | | |
| APPEND | APPENDIX C - Wire Diagram | | | | | | |

1 FORWARD

Thank you for purchasing NovaLynx products. NovaLynx has been designing and manufacturing weather instruments since 1988. NovaLynx represents several well-known brands of quality manufacturers, including Gill Instruments, RM Young, Kipp & Zonen, and Vaisala. It is our hope that our products will meet all your monitoring requirements.

2 INTRODUCTION

110-WS-NOVA-SAT Satellite Weather station includes a standard suite of instruments to read air temperature, relative humidity, barometric pressure, precipitation, wind speed, and wind direction. Peak gust and wind run are calculated from the wind speed input. Additional calculated values can be added as virtual sensors at the website. The station communicates directly with the Iridium satellite network to place your data on the internet for convenient access.

The station conserves energy by entering sleep mode whenever it is not taking readings or transmitting data. It can operate from the battery for several days, or indefinitely when the battery is recharged by a small solar panel. The 110-WS-NOVA-SAT is ideal in locations where other means of communication, such as cellular, are not reliable. Satellite service is available everywhere there is a clear view of the sky as long as there are no strong sources of radio-frequency interference.

110-WS-NOVA-SAT can be permanently installed on a fixed mast or tower, or set up for temporary operation on a well-secured tripod.

3 TECHNICAL SPECIFICATION

| Satellite Weather Station | 1 | 10-WS-Nova-Sat | | | | | |
|---------------------------|--|------------------|--|--|--|--|--|
| | 4x analog in: 0-5Vdc standard (0-1mA, 0-20mA with included resis | stors) | | | | | |
| I/O Ports | 2x digital in: pulse counter for rain, wind run, etc. | | | | | | |
| | 2x frequency in: 10 kHz max, 10ms minimum pulse width for wind | speed, peak gust | | | | | |
| | Iridium satellite module, 1616 MHz to 1626.5 MHz, 3dB ground plane independent | | | | | | |
| Communications | magnet mount antenna with 5' (1.5 m) cable | | | | | | |
| Resolution | 10-Bit @ 0-5V | | | | | | |
| Sensor Excitation | Switched unregulated battery (12V nominal), regulated 5V | | | | | | |
| Sampling Interval | Programmable, seconds to days | | | | | | |
| Connectors | 12x Screw terminal | | | | | | |
| Power | 12V @ 13mA sleep mode 130mA (average) satellite transmit mod | e | | | | | |
| Battery | AGM Sealed lead acid 12V 7Ab | <u> </u> | | | | | |
| Battery | $Operating = (14^{0} \text{ to } (18^{0} \text{ to } (10^{0} \text{ to } (85^{0} \text{ c})))$ | | | | | | |
| Temperature Range | Operating: $+14 + t0 + 185 + (-10 + 00 + 85 + 0)$ | | | | | | |
| A : | Storage: -58 F to +185 F (-50 C to +85 C) | | | | | | |
| Air Temperature | | 110-WS-251HA | | | | | |
| Range | -40° to $+140^{\circ}$ F (-40° to $+60^{\circ}$ C) | | | | | | |
| Accuracy | $ = 0.5 C (+10 t0 +50 C), \pm 0.6 C (-40 t0 +10 C & +50 t0 +60 C) $ | | | | | | |
| Relative Humidity | 0.01.000 | 110-WS-25THA | | | | | |
| Operating Range | 0-100% RH | 110 110 2011 | | | | | |
| Accuracy 0-90%RH | ± 3%RH (0-40°C); ± 5%RH (-40 to 0°C & +40 to 60°C) | | | | | | |
| Accuracy 90-100%RH | ± 5%RH (0-40°C); ± 7%RH (-40 to 0°C & +40 to 60°C) | | | | | | |
| Serviceability | Replaceable Humicap [®] sensor and filter | | | | | | |
| Output | 0 to 1 volt | | | | | | |
| Barometric Pressure | | 110-WS-25BP-12 | | | | | |
| Range | 150-1150 mb (4.43 to 33.96 inHg) approximate | | | | | | |
| Accuracy | 1.5% (+/- 15mB) | | | | | | |
| Non-linearity | <1% | | | | | | |
| Output | 0 to 5 volt | | | | | | |
| Wind Speed | | 200-WS-02F | | | | | |
| Range | 0 to 125 mph (0-57 m/s) | | | | | | |
| Accuracy | ±1 mph | | | | | | |
| Resolution | >0.1 mph | | | | | | |
| Threshold | 0.8 mph | | | | | | |
| Speed constant | 1.25 mph = 1 pps | | | | | | |
| Output | reed switch contact closure | | | | | | |
| Wind Direction | | 200-WS-02F | | | | | |
| Range | 0-360° | | | | | | |
| Accuracy | ±3° | | | | | | |
| Resolution | >1% | | | | | | |
| Ihreshold | 1.2 mph (0.54 m/s) | | | | | | |
| Output | U-5 volt (with 5 V excitiation) | 200 14/2 255 0 | | | | | |
| Precipitation | | 200-WS-25RG | | | | | |
| Туре | 8" diameter (20.5cm) collector meets NWS specifications | | | | | | |
| Accuracy | ± 2% at < 2" per hour | | | | | | |
| Resolution | 0.01 [°] /tip | | | | | | |
| Output | < 0.1 sec reed switch closure | | | | | | |

4 PRE-INSTALLATION

4.1 Setup

Each weather station has been pre-configured to read and transmit data from all the sensors that were included with the original order. It is not necessary to learn how to program the unit unless additional sensors are added or removed.

The power-on tests below illustrate the function of the LEDs under normal operation. These checks can be done without connecting the sensors, although that means any data reaching the website will not be valid. You may connect the sensors if you prefer.

In some cases the unit can be operated indoors for testing purposes if the antenna is placed on a windowsill facing outside. If that option is not available choose an outdoor setting where there is some shade so that the LED indicators will be easily visible. Do the following to observe the normal operation of the station:

4.2 Power-on Test

Open the station lid and locate the satellite modem board. Bring the antenna connector up through the conduit fitting and connect it to the antenna (ANT) port on the satellite modem board (this will keep the cable from getting pinched if the lid closes). Place the antenna magnet side down on a horizontal flat surface.

It is not necessary to connect the battery charger for the following tests. The station can operate for several days on the battery alone, so you can run this test without a charger for a day or so if desired, but be sure to close the lid of the unit if it is outdoors (to keep moisture and debris out).

4.2.1 Unit A and Unit B Operation

Connect power to the station by connecting the red battery lead to the positive terminal of the battery. Observe the red LEDs on the two processor boards. These LEDs will blink 3 times on booting. They will remain on if the battery voltage is above 12.8 volts. Below that voltage the LEDs will turn off after a short time to conserve power and the processors will remain in sleep mode until it is time to transmit data.

Each Unit has a test button located next to the red LED. The test button will wake the processor and cause it to transmit data.

4.2.2 Satellite Modem Board Operation

Observe the TX and RX LEDs on the satellite modem board as you connect power by plugging in the battery. Both LEDs will blink 3 times indicating the board has booted, and then the Green TX LED will blink 3 times more indicating success. The RadioOn LED will also turn on, but may not stay on depending on the battery voltage level.

Press the test button on one of the processor boards to force a reading. After a short interval the data will be sent to the radio modem board and the green TX LED will turn on. The satellite radio will remain

on while there is data in the queue. If after several minutes the green TX LED does not turn off, move the antenna to a location with a better view of the sky or away from any possible interference.

4.2.3 Data Delivery

The Unit A and Unit B processors each have independent timers that determine when the sensors will be read and data transmitted. During set-up or whenever needed to check system operation, one can press the test button on one or both units to stimulate a report. The green TX LED on the satellite modem board will indicate whether data is waiting to be transmitted. When the TX LED turns off this usually indicates the message has been sent successfully. The TX LED will also be turned off if a message cannot be delivered within 20 minutes. In this case the message is lost.

Successful messages are processed through the Iridium satellite network, then collected by servers operated by McCrometer Inc., headquartered in Hemet, CA. McCrometer Inc. manages all fees and support connected with your website service.

The following Website Features section details the use of the website where your data is delivered. We recommend that you log in to your website and verify that messages sent during the Power-on testing are displayed. Remember, if the sensors were not connected the data will not be valid, but you will know the communications are working and all the parameters are set up with the proper units.

5 WEBSITE FEATURES

5.1 Login Page

Visit the <u>www.automata-inc.net</u> login page from a computer or cell phone browser and enter your user name and password. Your credentials can be found in the Quick Reference guide. Enter the information and click "Log In" to enter the site.



5.2 Home Page

Select the Home page. The Home page displays a map and a table of the most recent data.



- The drop-down box below the map is used to switch between stations. If there is more than one station in the network, select the one being tested in the "Select a Station" dropdown box.
- The timestamp indicates the time each data packet was received at the server, except in cases where the station has been programmed to append a timestamp. Timestamps are stored as UTC time values. Use the Time Zone selection drop-down to convert UTC to the local time zone.

The color of the text indicates whether the data is recent.

- Black text indicates the data was received within the last 35 minutes.
- Red text indicates data older than 35 minutes but less than 24 hours.
- Blue text indicates the data is more than 24 hours old.

| | Nova | -SAT | |
|---------------------|--------|---------|---------------------|
| Sensor | Value | Units | Timestamp |
| Air Temperature | 89.33 | Deg. F | 8/6/2018 3:31:57 PM |
| Relative Humidity | 17.11 | % RH | 8/6/2018 3:31:57 PM |
| Wind Speed | 0.78 | Mph | 8/6/2018 3:31:57 PM |
| Barometric Pressure | 921.60 | mb | 8/6/2018 3:36:46 PM |
| Wind Direction | 17.24 | Degrees | 8/6/2018 3:36:46 PM |
| Wind Gust | 1.96 | Mph | 8/6/2018 3:36:46 PM |
| Battery Volts | 12.77 | Volts | 8/6/2018 3:36:46 PM |
| Wind Run | 85.00 | Miles | 8/6/2018 3:36:46 PN |
| | 0.00 | Inches | 8/6/2018 3:36-46 PM |

Tim

5.3 Station Graph Page

Select the Station_Graph page. The graph will be blank until a station and a sensor are selected.



- Use the drop-down boxes to select the station and a sensor, then click "Add Sensor". If data are available within the last week it will be displayed.
- Adjust the "From:" and "To:" date and time selections to expand or shrink the time period. Click "Redraw Graph" to apply the changes. Up to six sensors can be added to the graph.
- Sensors can be removed by clicking the "Remove" button to the right of the displayed sensors.

5.3.1 Graphing Groups

Combinations of sensors can be selected for display, such as the temperature and humidity shown, and then saved as a group.

- To create a group, first select all the sensors required so that they are displayed together.
- Type a name for the group in the box next to the "Add These Sensors to new Graphing Group" button, then click the button. The new group name will be added to the drop-down list next to the "Select Group to Graph" button.
- In future, select the group from the drop-down list and then click the "Select Group to Graph" button.

5.3.2 Data Export

Click "Export to Excel" to create a file consisting of the currently selected sensors within the timeframe selected. Open or Save the file depending on whether you intend to keep the data.

| What do you want to do with StationGraph_2018530.xlsx (10.3 KB)? From: automata-inc.net | Open | Save | ^ | Cancel | × |
|--|------|------|---|--------|---|
| | | | | | |

| 1 | A | В | С | D | E | F | G | | |
|---|----------------------|--------------------------|--------------|-----------|-------|----------------------|--------------------------|--|--|
| 1 | Station Name | Sensor Type | Sensor Value | Sensor ID | Units | Timestamp | Sensor Label | | |
| 2 | Nova-SAT | Nova-SAT RelHumidity 69. | | 750132 | % RH | 5/16/2018 2:00:07 PM | Relative Humidity | | |
| 3 | Nova-SAT RelHumidity | | 74.29152 | 750132 | % RH | 5/16/2018 2:05:07 PM | Relative Humidity | | |
| 4 | Nova-SAT | RelHumidity | 84.06672 | 750132 | % RH | 5/16/2018 2:10:07 PM | Relative Humidity | | |
| 5 | Nova-SAT | RelHumidity | 81.62292 | 750132 | % RH | 5/16/2018 2:15:07 PM | Relative Humidity | | |
| 6 | Nova-SAT | RelHumidity | 86.51052 | 750132 | % RH | 5/16/2018 2:20:07 PM | Relative Humidity | | |
| Station Data Sensor Id 750131 Station Data Sensor Id 750132 (+) | | | | | | | | | |
| READY | | | | | | | | | |

Exported data in Excel spreadsheet. (The column width was adjusted to fit.)

NOTE: when data from two or more sensors are downloaded the data appears on separate worksheets. Select which worksheet is open by clicking the tabs at the bottom of the workbook.

| Armed Alarm | KEY Please format phone numbers like this: 5556667777 med Alarm Biastout | | | | | | | | | | | | | | | |
|------------------|--|-----------------|-------|-----|------|--------|--------------|----------------|----------------|---|--------------|----------------------------------|--------|--------|------------|--------|
| | AirTemp | | | | | | | | | | | | | | | |
| | | | | | | | Black out | | | | | | | | | Delete |
| Update Cancel | Nova-SAT | Air Temperature | 69.97 | < ~ | 50.0 | □ 35 ∨ | | 10 ~ 00 ~ AM ~ | 06 ~ 00 ~ PM ~ |] | Delete 0 Add | jon@novalynx.com > Delete Add | None ~ | None 🗸 | No Reset 🗸 | × |
| Add Station | Add Station Add Alarm NovaLynx_Map Change Map[NovaLynx_Map \ | | | | | | | | | | | | | | | |
| Nova-SAT | Nova SAT Please select a Sensor Manually Add Station Manually Add Alarm | | | | | | | | | | | | | | | |

5.4 Alarms Page

- Alarms may be set to alert on cold temperatures, low battery voltage, or other conditions of
 interest. When an alarm is triggered a phone call or email is sent to one or more users indicating
 which sensor is in alarm condition. The user must then cancel the alarm and take appropriate
 action. The alarm remains cancelled until the user logs in to the alarms page and arms the alarm.
- Add alarms by selecting a station and sensor and then clicking the "Manually Add Alarm" button. Edit the new alarm with the conditional statements provided. Click "Update" to save the alarm settings. Click "Arm" to enable the alarm, and "Disarm" to disable it when it is not needed. It is good practice to set up a condition that is easy to trigger and then cause the condition to test the alarm. Be sure to set the correct alarm level after the test to avoid false alarms.

6 INSTALLATION

6.1 Site Considerations

Selecting the proper site for weather station sensors is just as important as selecting the proper sensor for a particular application. Siting standards should be given first consideration in sensor placement, however, unusual requirements may call for special siting techniques. More complete siting information is available at <u>www.novalynx.com/reference</u>

6.1.1 Wind Speed and Direction

The quality of wind sensors can be diminished by poor exposure to local topography. Placement of the wind sensors should follow standards established by agencies such as the World Meteorological Organization (WMO) and the United States National Weather Service (NWS). The standard exposure of wind instruments over level, open terrain is 33' (10 meters) above the ground (WMO 1971). Open terrain means the distance between the wind sensors and the nearest obstruction is at least ten times the height of that obstruction. While the WMO standard for siting wind sensors at ten meters above ground level provides ambient wind monitoring, in micrometeorology wind sensors are often placed closer to the ground. This allows for wind monitoring in the environment of interest. The 200-WS-02F wind speed and direction sensor is designed to mount to the top of the mast, so the overall height of the mast or tripod/mast assembly will determine the sensor elevation.

6.1.2 Temperature and Relative Humidity

The 110-WS-25THA temperature and relative humidity sensor is supplied with a self-aspirated radiation shield and mast mounting hardware. Mast-mounted sensors are usually positioned at "shelter" height, or about four feet above ground level, on the north side of the mast. Temperature readings can be affected by heat reflected from the ground so try to avoid installation over asphalt or bare ground.

6.1.3 Precipitation

Whether heated or unheated, rain and snow sensors should always be located in a relatively flat, open area. Some obstructions can be helpful to block the wind for more accurate catch. However, leaves from trees can cause increased gauge maintenance. If natural wind breaks are not available, a wind screen accessory is recommended.

6.1.4 Power requirements

Stations that will operate from solar power must be located where there is adequate sunlight. Stations that utilize an AC to DC adapter will require a weatherproof receptacle nearby.

6.2 Mounting options

6.2.1 Do it yourself mast

Locally available materials can be used for the mounting mast. The wind sensor requires a 1" diameter vertical stub, while the rest of the weather station equipment fits 1 ¼" diameter pipe. The following list of materials will suit most applications:

- 2 feet of ³/₄" galvanized iron pipe (1.050" O.D.) for the top of the mast.
- ¾" to 1" galvanized adaptor (unless using larger pipe, see below)
- 10 feet of 1" galvanized iron pipe (1.315" O.D.). Larger pipe can be used for more stiffness.
- Teflon tape or pipe joint compound
- Premixed post hole cement be sure to set the mast at least 1½ feet into the cement.

6.2.2 NovaLynx tripod

NovaLynx tripods are available in 3', 5' and 10' versions, with swaged masts in varying lengths. Guy wires, anchors, and grounding equipment is also available. Tripods are suitable for permanent or temporary installations.

6.2.3 Tower mount

NovaLynx tower mounts are available for locations requiring taller, permanent installation. Please contact NovaLynx for further details.

6.3 Arrangement of equipment on the mast

6.3.1 Wind Speed and Direction sensor

The base of the 200-WS02F wind speed and direction sensor is designed to fit 1" pipe. Place the sensor on the top of the mast if possible. Alternative mounting to the side of the mast requires a 240-153 Tower Mount boom, sold separately. In either case, orient the North marker to north for accurate wind direction readings, then tighten the two mounting screws securely.

6.3.2 Solar Panel (optional)

Mount the solar panel below the wind speed and direction sensor on the south side of the mast (Northern hemisphere). The surface of the panel may need to be cleaned periodically, so mount it only as high as necessary to get full sun. If bird droppings become a problem, consider placing a spiked strip along the upper edge of the panel to keep birds from perching there.

6.3.3 Rain Gauge

Locate the rain gauge on the east or west side of the mounting pole at a convenient height for easy maintenance. Heated rain gauges should be mounted on a separate structure altogether, and never serviced unless the power to the heater has been disconnected.

6.3.4 Weather station enclosure

Mount the NEMA enclosure containing the monitoring equipment at convenient height (about 5') on the north side of the mast if possible. This makes it easier to see the LED lights when the door is open as it will be shaded from the sun (Northern hemisphere).

6.3.5 Barometric pressure

The barometric pressure sensor is protected by a plastic box that is not weather-tight. Therefore it should be mounted inside the NEMA enclosure. The opening where the wires enter the enclosure will allow enough air movement to equalize pressure inside the box.

6.3.6 Temperature and Relative Humidity sensor

Place the temperature and relative humidity sensor, which are enclosed in the radiation shield, on the north side of the pole below the Weather Station enclosure. If this is not convenient, place to the east or west side of the pole, opposite the side the rain gauge is located.

NovaLynx Corporation

6.3.7 Antenna

CAUTION: The antenna cable is delicate and can be damaged by mishandling. Do not pull on either the connector or antenna while installing the cable. Do not bend the cable in a tight radius or around sharp corners that might wear through the cable jacket. Do not tighten cable ties that hold the antenna cable to the point where they pinch the cable, as this can cause signal loss.

Mount the antenna bracket above the NEMA enclosure, then feed the cable up through the conduit fitting on the bottom of the NEMA enclosure. Make sure there will be slack in the cable when the connector is secured to the satellite modem board. Use moderate torque to tighten the nut on the antenna connector so that the circuit board is not damaged. Secure the cable to the mast (but don't pinch the cable) so that it cannot whip when there is wind.

6.4 Sensor wiring

CAUTION: Verify that power to the weather station is turned off before wiring any sensors. Failure to turn off the power may result in a short circuit that could cause permanent damage to your equipment.

Refer to the wire installation table (below) or to the NOVA-SAT Weather station wiring diagram (Appendix C).

- Loosen the lower screw of each terminal and install each wire according to the wire diagram. Tighten firmly.
- Verify that the upper screws are tight. Due to "creep" the terminals may need to be tightened a little after the first year of operation.
- Tug lightly on each wire to ensure a good connection.

Note: Some ground terminals must accommodate two wires.

| | Temperature & RH | Barometric Pressure | Wind Speed & Direction | Precipitation 200-WS-25RG |
|------------|------------------|---------------------|------------------------|------------------------------|
| 1 | Black/Bare | | 200 110 021 | |
| 2 | White | | | |
| 3 | Green | | | |
| 4 | Red | | | |
| 5 | | Black | Black | |
| 6 | | White | | |
| 7 | | | Green | |
| 8 | | Red | | |
| 9 | | | Red | |
| 10 | | | Brown | Black |
| 11 | | | White | |
| 12 | | | | Red |
| Ground Lug | Shield | Shield | Shield | |

6.5 Power-up

CAUTION: Check the wiring to ensure each sensor is connected properly and that there are no stray wires that could cause a short-circuit. Make sure the antenna is attached to the satellite modem board. Make sure the wire harnesses are properly seated on the processor boards and satellite modem board.

6.5.1 Connect the battery

Connect the red battery plug to the positive terminal of the battery to power the system. While initializing several lights will blink indicating boot-up and diagnostics. Refer to Section 5.2 for information about the meaning of the blinks.

6.5.2 Connect the charger

After the system is powered and operating it is time to connect the battery charger. The charger is either a solar panel or an AC to DC adapter, depending on which was ordered.

6.5.2.1 AC to DC Adapter Connection

The adapter's DC output cable extends above the back plate and is clipped to the inside of the NEMA enclosure. A plug on the end of the cable fits a similar plug which is connected through the fuse to the battery. To use the adapter, connect the plugs together. The adapter's AC input cable extends though the conduit fitting on the lower right side of the NEMA enclosure. Connect the AC plug to a 100-240 VAC weatherproof receptacle.

The AC to DC adapter is mounted behind the back plate; however, the indicator LED on the adapter is visible through a small hole in the back plate. While the charger is operating the indicator LED will be red when charging a low battery and will turn green when the battery is charged.

NOTE: When the AC to DC adapter is not connected to an AC source a small amount of DC current can bleed through the charger, gradually discharging the battery. If the unit is going to be idle for any significant amount of time, disconnect the red battery connector from the battery to avoid discharging the battery.

6.5.2.2 Solar Panel Option

The voltage from the panel is regulated by a module that is mounted on or near the solar panel. The solar panel cable is equipped with a plug that fits a similar plug which is connected through the fuse to the battery. Bring the cable from the solar panel up through the conduit fitting on the NEMA enclosure.

Power up the station before connecting the solar panel. Make a note of the battery voltage prior to connecting the solar panel, then note the voltage rise after connecting the panel to ensure the panel is charging the battery (good sunlight required).

Do not operate the station on the solar panel alone as it cannot source enough current to operate the satellite radio. Disconnect the solar panel before disconnecting the battery whenever powering down the station.

7 MESSAGE FORMAT

7.1 Serial interface

Each processor board includes 2 serial ports which communicate at 9600 baud, 8 bits, no parity, 1 stop bit, and no handshaking. Connector J2 is the main serial port, while connector J3 is an auxiliary serial port. The main serial port on Unit A connects to the auxiliary port on Unit B. The main port on Unit B connects to the satellite modem board.

Messages are coded in a proprietary format and delivered as hex values. The output is not readily understandable in a terminal program such as HyperTerminal. Use FlowSensor software to view the data while directly connected to the station. This method is described in detail in Section 9 of this manual.

There are actually two data formats that can be used - Standard and Condensed. Standard format transmits each sensor value as a packet of 4 bytes, while Condensed format transmits all the values in one packet and includes a header and CRC. The extra overhead of the Condensed format actually uses more bytes to transmit when there are less than 4 sensors in the packet.

While the station is operating and connected to the internet, the data will be available on the McCrometer website. Data from the station can be downloaded from the website in comma separated value format for transfer to a spreadsheet (Section 6.3.2).

Each Unit has its own timer function which sets the reporting intervals. When the boards are started simultaneously the reports often happen at nearly the same time, making it look like the station is acting as one unit, but in reality they could report at different times and can be programmed to transmit at different intervals.

7.2 ID numbers

Each board is assigned an ID number for purposes of identifying the data when it is received at the website. The table at the right shows the numbers that are allotted when Unit A is assigned ID 100 and Unit B is assigned ID 120.

Not all sensors are enabled to report from each board. Unused sensors are disabled to reduce the amount of data transmitted, which translates to smaller data service charges.

| Unit A | Unit B | Channel Eurotion |
|--------|--------|----------------------------|
| 100 | 120 | |
| 101 | 121 | Analog In 1 / 3 |
| 102 | 122 | Analog In 2 / 4 |
| 104 | 124 | Analog Output |
| 109 | 129 | Battery Voltage |
| 111 | 131 | Pulse count 1 accumulation |
| 112 | 132 | Run Time (minutes) |
| 113 | 133 | Pulse count 2 accumulation |

7.3 Data Types

7.3.1 Analog Input

Analog data are produced by sensors such as the barometric pressure sensor where atmospheric pressure changes continuously over a range of values. Common units for barometric pressure are mmHg, inHg, mB, and kPa. The 0 to 5 volt output of the sensor is read as a number from 0 to 1023 by the 10-bit analog to digital converter in the processor chip. The value is transmitted as raw data (no units) to the website. The website is programmed to interpret the linear data by applying a multiplier and offset to present the data in engineering units such as inHg or mB. Non-linear sensors may be accommodated using 3rd order polynomials or in special cases by using a lookup table.

7.3.2 Frequency Input

The frequency input circuitry accepts pulses, square waves, and sine waves within a certain amplitude range up to speeds of 10 kHz. The signal provides information for four basic measurements: rate, peak, total, and run time.

7.3.2.1 Rate measurement (wind speed)

The 110-WS-NOVA-SAT calculates wind speed by counting pulses from the wind speed sensor over a set time period, usually 10 seconds. The 200-WS-02F produces 1 pulse per second for every 1.25 miles per hour. At 100 mph, this works out to 80 pulses per second. This number, 80, is programmed as the maximum for the sensor, and scaled proportionally over the range of the Analog Output (a number from 0 to 1023). The raw value number is transmitted as the wind speed by Unit A (ID 104).

7.3.2.2 Peak measurement (peak gust)

Peak gust is averaged over a 20-second interval by the frequency input on Unit B (ID 124). The peak measurement is captured and retained during a programmable number of sampling intervals, then output as a new data point. For this reason peak gust readings lag changes in wind speed.



The peak gust update intervals are usually matched to the reporting interval of the station as shown in the table below:

| Station Report Interval | Sample time | Analog Output |
|-------------------------|-------------|-----------------|
| (minutes) | (Seconds) | Update Interval |
| 15 | 20 | 45 |
| 30 | 20 | 90 |
| 60 | 20 | 180 |

The appropriate Update Interval can be calculated for any reporting period with this formula:



Report Interval (minutes) * 60 / Sample time = Analog Output Update Interval

7.3.2.3 Total measurement (wind run)

Wind run is simply the total of all the wind past a given point, in this case the anemometer. The number of pulses is divided by the pulses per mile (or pulses per kilometer), and reported as "miles" or "km" on ID 131.

7.3.2.4 Run time measurement (spare)

Run time is often used when monitoring flow (as in reading an irrigation flow meter). It is the total time in minutes that the water has been flowing. The 110-WS-NOVA-SAT can be programmed to read most flow meters that have a pulse output. The frequency inputs of both Unit A and Unit B are connected to the frequency input screw terminal to read wind speed and peak gust from one wind speed sensor. Disconnect one of the wires if needed to monitor flow and connect it to the flow meter's pulse output. Connect flowmeter ground to a ground terminal. Program the frequency channel, and then enable the flow, total, and run time channels as desired. Contact McCrometer to set up the web server to accommodate the new data.

7.3.3 Pulse Accumulator Input

The Pulse count 2 accumulation input accepts switch closure signals that occur at slower rates, such as when monitoring rainfall. In the case of the 200-WS-25RG, each tip of the bucket registers one count on the accumulator. The raw count value is sent to the website where it is multiplied by 0.01 to display inches of rain. Eventually the rainfall accumulator will overflow and start again at zero, but the website detects the overflow and adjusts accordingly.

The rainfall accumulator can be reset by use of the FlowSensor programming software, but this in an inconvenient process if the station is remote. It is possible to set up virtual sensors on the website such that rain accumulation for specific periods are displayed. Contact your McCrometer representative if you wish to set up virtual sensors.

7.4 Data usage calculations

Estimates of data usage are made to determine which data plan is appropriate for a given application. The following rules apply:

- Each sensor requires 4 bytes per report when Standard format is selected
- Each message sent by the satellite radio will be counted as 10 bytes minimum
- No "event" type reports are enabled it is not possible to anticipate how often events will occur and thus no estimate can be made.
- "Monthly" usage is calculated based on a 30 day basis.

| Unit A | | Example 1 | Example 2 | Example 3 |
|--------------------------------|---------------------|-----------|-----------|-----------|
| Analog In 1 | Temperature | 4 | 4 | 4 |
| Analog In 2 | Humidity | 4 | 4 | 4 |
| Analog Output | Wind Speed | 4 | 4 | |
| Total Unit A (10-byte minimum) | | 12 | 12 | 10 |
| Unit B | | | | |
| Analog in 3 | Barometric Pressure | 4 | 1.5 | 4 |
| Analog in 4 | Wind Direction | 4 | 1.5 | 4 |
| Analog Output | Peak Gust | 4 | 1.5 | 4 |
| Battery Voltage | Battery Voltage | 4 | 1.5 | |
| Pulse count 1 accumulation | Wind Run | 4 | 1.5 | |
| Pulse count 2 accumulation | Precipitation | 4 | 1.5 | 4 |
| Condensed format overhead | | | 9 | |
| Total Unit B | | 24 | 18 | 16 |
| Total Bytes Unit A & B | | 36 | 30 | 26 |

Example 1 assumes both units report all their sensors in Standard format (4 bytes per sensor).

Example 2 illustrates the effect of Unit B reporting in Condensed format.

Example 3 reduces data by disabling some parameters (peak gust, battery voltage, and wind run)

From the previous examples one can estimate the bytes per month as shown below:

| | Example 1 | Example 2 | Example 3 |
|-------------------------|-----------|-----------|-----------|
| Report every 15 minutes | | | |
| Bytes per day | 3,456 | 2,880 | 2,496 |
| Bytes per month | 103,680 | 86,400 | 74,880 |
| Report every 30 minutes | | | |
| Bytes per day | 1,728 | 1,440 | 1,248 |
| Bytes per month | 51,840 | 43,200 | 37,440 |
| Report every 60 minutes | | | |
| Bytes per day | 864 | 720 | 624 |
| Bytes per month | 25,920 | 21,600 | 18,720 |

8 STATION CONFIGURATION

The 110-WS-NOVA-SAT Weather Station is pre-configured to operate the sensors included with the order. It may be necessary at some time to change certain parameters to add or remove sensors or change the reporting intervals. FlowSensor software is provided to program any required changes.

8.1 Connection and Upload

8.1.1 USB Cable

A USB to serial connection cable (320-341-1031-181ALF) is required to program the station. The first time the cable is used the computer must install a driver (Windows 10 will find the appropriate one). If the driver does not automatically load then visit

<u>http://www.ftdichip.com/FTDrivers.htm</u> to obtain the correct one.



Only one unit can be programmed at a time.

- To program Unit A, unplug the serial cable from J2 on the upper board and connect the programming cable.
- To program Unit B, unplug the serial cable from J2 on the lower board and connect the programming cable.
- Power the station by connecting the red battery lead.



8.1.2 FlowSensor Software

Obtain FlowSensor software from the included CD or this link: <u>https://novalynx.com/downloads/NanoConfig1_1_2_25.exe</u>

Create a folder and then copy NanoConfig1_1_2_25.exe to the folder. The program is executable and does not need to be installed by Windows. Double-click the program file icon to start the program. Create a shortcut to your desktop for added convenience.

| ain Com | Port: COM | B Open | (click to close) | READY | Talk to ID: 100 | Find ID | | |
|--|-------------------------------|--|--|--------------|---------------------|---------------------|-------------|---|
| et Norma | Station Repo | Get Full | Station Report | Get Complete | Configuration | | | |
|)peration | Reporting | Freq Setup | Configuration | Accumulators | Aux Port Forwarding | Diagnostics | | |
| Receive Type: Receive Timesta | ed from ID: ed at: amp: | 130 STANDARE 22-May-20 (None) | 9 F <mark>MT EVENT</mark> 18 14:45:44 | | | | | |
| Last rec | eived values | | | | | | | |
| 22-Ma | y-2018 1 <mark>4:4</mark> 6:(| 05 Analog | In 1 (0-1023): | 127 | 22-May-2018 14:46: | 03 Pulse count 1 ac | cumulation: | 0 |
| 22-Ma | y-2018 14:46: | 05 Analog | In 2 (0-1023): | 108 | 22-May-2018 14:46: | 04 Run time (minut | es): | 0 |
| | y-2018 14:46:(| 05 Analog | Output (0-1024) | : 0 | 22-May-2018 14:46: | 04 Pulse count 2 ac | cumulation: | 0 |
| 22-Ma | | | | | | | | |

8.1.3 Configuration Retrieval

- Enter the correct Com port number in the "Main Com Port:" text box (e.g. COM4)
- Click the red "(Closed, click to open)" button. The button label will change to "Open (click to close)" if the operation was successful.
- Observe the "Msg rcvd:" line for activity. There should be a rapid series of messages reporting in as the program uploads the current configuration information. If there is no response check the COM port, the connections to the board, and ensure the board has power. Close and reopen the COM port.

NOTE: the computer assigns the COM port number depending on which COM ports are free at the time. Connect the USB programming cable to your computer and then open Control Panel / Device Manager / Ports(COM & LPT) to determine which port was assigned.



8.2 FlowSensor: Operation tab

The operation tab displays the most recently received data from the connected unit.

• The unit ID number is displayed in the "Talk to ID:" text box.

| Talk to ID: | 100 | Find ID |
|-------------|-----|---------|
| | | |

- The "Last Report:" section displays information about the last message received. NOTE: The message type referred to as "STANDARD FMT EVENT" does not mean the station has sensors programmed to report in event mode. Event programming will be discussed under the "Reporting" tab.
- The "Last received values:" section displays the raw data from the sensors except in the case of the battery voltage, which is displayed as volts x 100 (i.e. 1328 = 13.28 volts).

| Last received values: | | | | | |
|-----------------------|--------------------------------|------|----------------------|-----------------------------|---|
| 22-May-2018 14:46:05 | Analog In 1 (0-1023): | 127 | 22-May-2018 14:46:03 | Pulse count 1 accumulation: | 0 |
| 22-May-2018 14:46:05 | Analog In 2 (0-1023): | 108 | 22-May-2018 14:46:04 | Run time (minutes): | 0 |
| 22-May-2018 14:46:05 | Analog Output (0-1024): | 0 | 22-May-2018 14:46:04 | Pulse count 2 accumulation: | 0 |
| 22-May-2018 14:46:05 | Battery Voltage (volts x 100): | 1328 | | | |

NOTE: When programming Unit B, Analog 1 is actually Analog In 3, Analog 2 is actually Analog In 4, with respect to the overall station.

• The raw values can be converted to engineering units if necessary for comparing the readings to a reference sensor. To convert the raw data to engineering units you will need the adder and multiplier calibration factors. A table of common units is included in Appendix A for your convenience.

Example: Analog 1 in the illustration above reads 127. Analog 1 is the temperature sensor.The multiplier for temperature in Degrees F is 0.87977The adder for temperature (both DegF and DegC) is -40.

| Conversion formula: | (Raw value x Multiplier) + Adder = Temperature |
|---------------------|---|
| By substitution: | (127 * 0.87977) + (- 40) = 71.73 Deg F . |

8.3 FlowSensor: Reporting tab (Unit A)

| Flow Sensor 1.1.2.25 Main Com Port: COM4 Op | en (click to close) | READY | Talk to ID: 100 | Find ID | | <u>81</u> |
|---|--------------------------------|--------------------|---|-------------|----|-----------|
| Get Normal Station Report Get I | Full Station Report | Get Complete | Configuration | | | |
| Operation Reporting Freq Setu | up Configuration | Accumulators | Aux Port Forwarding | Diagnostics |] | |
| Station reports include: | Station report inte | erval (minutes, u | se 0 to disable reports): | 15 | | Set |
| Analog In 1 Analog In 2 | Station report inte | erval (seconds, u | se 0 to dis <mark>a</mark> ble reports) | 0 | | Set |
| Analog Output | Report timestamp | os (ignored if clo | ck not yet set): | OFF | On | Off |
| Battery Voltage Pulse count 1 accumulation | Analog In 1 Scan | Time (0-255 mir | utes, 0=no ev <mark>ents</mark>): | 0 | | Set |
| Run time (minutes) | Analog <mark>In</mark> 1 Delta | for Event (0-102 | 23): | 10 | | Set |
| Pulse count 2 accumulation Report type | Analog In 2 Scan | Time (0-255 mir | utes, 0=no events): | 0 | | Set |
| | Analog In 2 Delta | for Event (0-102 | 23): | 10 | | Set |
| Analog In 1 | Battery Scan Time | (0-255 minutes | , 0=no checking): | 0 | | Set |
| Analog In 2 | Battery Delta for B | Event (0-1500, m | nillivolts): | 36 | | Set |
| Analog Output | Analog Output Sc | an Time (0-255 | minutes, 0=no checking | j): 0 | | Set |
| Pulse count 1 accumulation | Analog Output De | elta for Event (0- | 1023): | 10 | | Set |
| Run time (minutes) | Pulse Input 2 Delt | a Count for Eve | nt (0-65535): | 1 | | Set |
| Report type | | | | | | |

- The check boxes on the Reporting tab are used to enable or disable channels. Station reports are generated at intervals set by the "Station report interval" minutes and seconds values.
- Event reports, if enabled, occur at the scan time if the sensor output has changed an amount greater than the "Delta for Event" value.
- Timestamps are generally not used in order to reduce the number of bytes per report. Satellite communication is reasonably timely so that the timestamp applied to the data by the server is sufficient. To use the timestamp feature, the Condensed message format must be selected and the clock must be set. The clock is set using a "Configuration" tab button. Note that if the station is turned off for any reason the clock will need to be set again as there is no battery backup.

8.4 FlowSensor: Freq Setup tab (Unit A)

Below is a screenshot of Unit A with settings compatible with the 200-WS-02F wind speed and direction sensor.

| Flow Sensor 1.1.2.25 Main Com Port: COMA Core (dictor store) RE | ADY | Talk to ID: 100 | E-d D | | × |
|--|----------|---------------------|-------------|--|---|
| Get Normal Station Report Get Full Station Report Get Concernant | Complete | Configuration | rind iD | | |
| Operation Reporting Freq Setup Configuration Accu | mulators | Aux Port Forwarding | Diagnostics | | |
| Sample Time (2 - 7200 seconds, even values only): | 10 | Set | | | |
| Pulse_Inputs/Output divide ratio (1 - 4294967295): | 2880 | Set | | | |
| Freq for Min Output (0 - 10000 Hz): | 0 | Set | | | |
| Freq for Max Output (1 - 10000 Hz): | 80 | Set | | | |
| Min Analog Output (0 - 999‰ [per mille]): (Set to 200‰ for 4-20 mAmp output) | 0 | Set | | | |
| Max Analog Output(1 - 1000‰ [per mille]): (Set to 1000‰ for 4-20 mAmp output) | 1000 | Set | | | |
| Analog Output Update Interval (n = 1 - 255 sample times): n = 1 : Average over sample time n > 1 : Peak over n samples | 1 | Set | | | |
| Analog Calibration(500 - 2000‰ [per mille]): (Set to 1000‰ for nominal calibration, 0-1024 PWM range) (Set to 977‰ for 0-1000 PWM range) | 1000 | Set | | | |
| Sampling Interval | | | | | |
| Continuous Continuous Use Analog | Output S | ican Time | | | |
| Pulse input circuit warmup time (0-10 seconds): 0 | | Set | | | |

- The sample time is the period where counts are being accumulated to determine wind speed or gust.
- The Pulse Input divide ratio is calibrated for 1 mile per count of wind run.
- The 0 to 80 Freq values set the Analog Output equivalent to 0-100 mph (cal factor 1.25 pulses / mph).
- The analog output signal of the circuit board is not being used; however, it could be connected to other monitoring equipment for a visual display.
- Choose n = 1 for wind speed. Note that Unit B uses a number greater than 1 to calculate Peak Gust. (Refer to Section 8.3.2.2 for more information.)
- Analog calibration is 1000 for correct data output readings. When using the analog output signal the calibration factor is approximately 977.

8.5 FlowSensor: Configuration tab (Unit A)

| Operation Reporting Freq Setup Configuration Accumu | ulators Aux Port Forwarding Diagnostics |
|---|---|
| PIC Software Version: 12.25 NowSensor Software Version: 1.1.2.25 | |
| Date and time (UTC): | (NOT SET) rcvd at 06-Aug-2018 23:16:42 UTC Set to Now |
| Analog input circuit warmup time (0-10 seconds): | 2 Set |
| Radio warmup time (0-60 seconds): | 2 Set |
| Radio post Tx time (1-60 seconds): | 2 Set |
| Station ID (0-32767): | 100 Set |
| Message Format: | Standard Condensed |
| Aux Port Transfer Mode: | OFF On Off |
| Aux Port Transfer Delay (1-255 seconds): (separation when regular msgs and aux data sent on main por | t) Set |

- Timestamps are normally applied at the time data reaches the server. However, the station can generate timestamps if required. Click "Set to Now" to set the processor's clock if timestamps are required. Also set the Message Format to "Condensed". Note: the time will be lost if the station is powered down because there is no battery backup for the timekeeping function.
- "Analog input circuit warmup time" controls how long the +12Vsw circuit is on before a sensor reading is taken. The +12Vsw circuit is connected to screw terminals 4 and 8, to power the sensors. The red LED on each processor board is also connected to the +12Vsw circuit, so they will be lit whenever there is power to the sensors. The +12Vsw circuit remains on when the battery voltage is above approximately 12.8 volts. Below that threshold the processor switches the circuit as required to save power. It is important that the warmup time be set long enough for the slowest sensor to get to a stable output before the sensor is read. One second is adequate for the sensors delivered with the 110-WS-NOVA-SAT Weather station. If other sensors are used please refer to their data sheets for an appropriate warm-up period.
- Radio warmup time is somewhat arbitrary because the satellite radio modem controls its own power supply once data is fed to it. Short warmup and post Tx times will conserve some power.
- Station ID must be coordinated with the webserver in order to display data. Do not change the ID number unless instructed to do so by a McCrometer representative.
- The message format chosen will affect the overall number of bytes in a message. Refer to the Data Usage Calculations section for additional information and examples.
- Aux Port Transfer Mode is set to OFF for Unit A boards. The function is ON for Unit B boards to enable the data from Unit A to be passed through to the satellite modem board.
- The Aux Port Transfer delay applies to Unit B, and is normally set to a small value or zero.

8.6 FlowSensor: Accumulators tab

The current values on the various accumulators can be viewed and altered or cleared to zero on the Accumulators tab of the program, with one exception. A software bug prevents changing the Run time seconds accumulator.

| Flow Sensor 1.1.2.25 Main Com Port: COM4 Opt | en (click to close) | READY | Talk to ID: 150 | Find ID | - 0 | × |
|--|---------------------|----------------|---------------------|------------------------------|-----------------|---|
| Get Normal Station Report Get F | ull Station Report | Get Complete (| Configuration | | | |
| Operation Reporting Freq Setu | p Configuration | Accumulators | Aux Port Forwarding | Diagnostics | | |
| Get Accumulators | | | | | | |
| Pulse count 1 accumulation: (accur | n1) 0 | 0 | Set | | | |
| Pulse count 1 remainder: (accum1) | J) O | 0 | Set | Program "bu | ig": Set butto | n |
| Run <mark>time</mark> (minutes, accum2): | 0 | 0 | Set | affects Pulse Accumulatio | e count 1 m. | |
| Run time (seconds, accum2S): | 2 | 0 | Set | | | |
| Pulse count 2 accumulation (accum | 13): 0 | 0 | Set | | | |

8.7 FlowSensor: Aux Port Forwarding and Diagnostics tabs

The Aux Port Forwarding and Diagnostics features were included for testing purposes during development. There are no settings that need to be adjusted for operating the station on these tabs.

9 MAINTENANCE

9.1 Sensor maintenance

Instruction manuals are available for the individual sensors included with the 110-WS-NOVA-SAT Satellite Weather Station. Please refer to the manuals (available on our website at <u>www.novalynx.com</u>) for more details on maintenance and calibration.

9.1.1 Air temperature and humidity sensor maintenance

Regular inspections of the sensor should be made to detect problems with the cable and to prevent build-up of dirt, dust, and atmospheric pollutants. General cleaning of the outer case and routine testing of the sensor's operation are normally all that is required. Please refer the 110-WS-25THA Instruction Manual for information on cleaning the sensor element should that become necessary.

9.1.2 Barometric pressure sensor maintenance

The barometric pressure sensor does not require routine maintenance. However, if readings are suspect first make sure there is some air gap around the cables where they enter the NEMA enclosure to allow the air pressure to equalize. If there is an offset error the adder calibration parameter at the

McCrometer website must be adjusted to compensate. The sensor itself has no user-adjustable offset feature.

9.1.3 Wind speed and Direction sensor maintenance

Wind sensors experience vibration due to high velocity wind. The vibration can loosen the mounting screws or the support structure. Regular inspection of the mounting hardware is required to prevent damage to the sensor. Make sure the North indicating label is oriented correctly, then tighten the mounting screws. Clean the sensor as required, and lube the cup assembly bearing with a light machine oil (fishing reel oil, for instance). Inspect the cable and ensure it is secured to the mast to prevent damage due to wind whipping.

9.1.4 Rain gauge maintenance

If a heated rain gage has been substituted for the standard 200-WS-25RG then be sure to disconnect power before servicing the sensor. Refer the instructions for the specific model for maintenance guidelines. The 200-WS-25RG can be serviced by loosening the four screws near the bottom of the plastic funnel assembly, then rotating slightly counter-clockwise. Lift the funnel assembly carefully and clean it with soapy water. Use a pipe cleaner to clear the small end of the funnel. If it becomes necessary to remove the cotter pin and filter, be sure to reinstall them after cleaning and bend the tips of the cotter pin all the way up alongside the funnel. If the tips are not bent back far enough water may be directed away from the tipping bucket cups, causing under-reporting of rainfall. Make sure the rain gage is mounted level for accurate readings. Refer the 200-WS-25RG manual for calibration instructions.

9.2 Solar panel maintenance

Clean the upper surface of the solar panel with water as needed. NOTE: if the panel is hot from exposure to the sun, place a shade over it to allow it to cool before washing. If bird droppings are a problem then consider mounting a spike strip along the upper edge of the panel to keep birds from roosting.

9.3 Station maintenance

Check the battery voltage periodically to ensure the battery is charging. A fully charged battery reads approximately 13.8 volts. If the battery voltage channel is enabled to report then graph the battery voltage and check whether the charging system is working. If the voltage drops below 11.5 volts at night then the battery may be getting old and in need of replacement.

Periodically check the screw terminals to ensure the wires are held securely.

Check the antenna cable for signs of wear and make sure it is not bent or pinched. The connector at the Satellite modem board should be snug.

APPENDIX A - SENSOR CALIBRATION TABLE

| | | Nova-SAT Se | ensors | | | |
|------------|----------------------------|-----------------------|-----------------------|-----------|------------|------------|
| 100 | Unit A | Parameter | Range | Adder | Multiplier | Units |
| 101 | Applog in 1 | Tomporaturo | -40 to 140 F | -40.00000 | 0.87977 | Deg F |
| 101 | | remperature | -40 to 60 C | -40.00000 | 0.48876 | Deg C |
| 102 | Analog In 2 | Humidity | 0 to 100% | 0.00000 | 0.48876 | % |
| | | | 0 to 100 mph | 0.00000 | 0.09775 | mph |
| 104 | Analog Output | Wind Speed | 0 to 161 kph | 0.00000 | 0.15732 | kph |
| | | | 0 to 44.7 m/s | 0.00000 | 0.04370 | m/s |
| 109 | Battery Voltage | Battery Volts | 0 to 15 Volts | 0.00000 | 0.01466 | Volts |
| 111 | Pulse count 1 accumulation | Spare | | | | |
| 112 | Run Time (minutes) | Spare | | | | |
| 113 | Pulse count 2 accumulation | Spare | | | | |
| 120 | Unit B | | | | | |
| | | Barometric Pressure | 114 to 1204 mbar, hPa | 114.00000 | 1.06549 | mbar, hPa |
| 121 | Applog in 2 | (Adjust the Adder | 11.4 to 120.4 kPa | 11.40000 | 0.10655 | kPa |
| 121 | | per individual sensor | 85.5 to 905.5 mmHg | 85.50000 | 0.80156 | mmHg |
| | | offset.) | 3.36 to 35.51 inHg | 3.36000 | 0.03143 | inHg |
| 122 | Analog In 4 | Wind Direction | 0 to 360 Deg | 0.00000 | 0.35191 | Deg |
| | | | 0 to 100 mph | 0.00000 | 0.09775 | mph |
| 124 | Analog Output | Peak Gust | 0 to 161 kph | 0.00000 | 0.15732 | kph |
| | | | 0 to 44.7 m/s | 0.00000 | 0.04370 | m/s |
| 129 | Battery Voltage | Spare | | | | |
| 121 | Rulse count 1 accumulation | Wind Run | | 0.00000 | 1.00000 | Miles |
| 131 | | | | 0.00000 | 1.60934 | Kilometers |
| 132 | Run Time (minutes) | Spare | | | | |
| 122 | Bulso count 2 accumulation | Procipitation | | 0.00000 | 0.01000 | Inches |
| 133 | | | | 0.00000 | 0.25400 | mm |

APPENDIX B - DEFAULT CONFIGURATION

| | Unit A Default Configuration | |
|---|---|---|
| Flow Sensor 1.1.2.25 | Flow Sensor 1.1.2.25 | E Flow Sensor 1.1.2.25 |
| Main Com Port: COM4 Open (click to close) READY Talk to ID: 100 Find ID | Main Com Port: COM4 Open (click to close) READY Talk to ID: 100 Find ID | Main Com Port: COM4 Open (click to close) READY Talk to ID: 100 Find ID |
| Get Normal Station Report Get Full Station Report Get Complete Configuration | Get Normal Station Report Get Full Station Report Get Complete Configuration | Get Normal Station Report Get Full Station Report Get Complete Configuration |
| Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics | Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics | Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics |
| Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set | Sample Time (2 - 7200 seconds, even values only): 10 | PIC Software Version: 12.25 |
| Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 | Pulse Inputs/Output divide ratio (1 - 4294967295); 2880 | FlowSensor Software Version: 1.1.2.25 |
| Analog In 2 Benot timestamos (innored if clock not yet set) | set | Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 22:54:14 U |
| Analog Output Analog Output Analog Output Analog Output On On Off | Freq for Min Output (0 - 10000 Hz): 0 | Analog input circuit warmup time (0-10 seconds): 2 |
| Analog In 1 Scan Time (U-255 minutes, U=no events): 0 Set | Freq for Max Output (1 - 10000 Hz): 80 Set | |
| Run time (minutes) Analog In 1 Delta for Event (0-1023): 10 Set | Min Analog Output (0 - 999‰ [per mille]): 0 Sat | Kadio warmup time (0-ou seconds): 2 |
| Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set | (Set to 200‰ for 4-20 mAmp output) | Radio post Tx time (1-60 seconds): 2 Set |
| Analog In 2 Delta for Event (0-1023): 10 Set | Max Analog Output(1 - 1000‰ [per mille]): 1000 Set (Set to 1000‰ for 4-20 mAmp output) | Station ID (0-32767): 100 Set |
| Event reports include: Battery Scan Time (0-255 minutes, 0=no checking): 0 Set | Analog Output Update Interval (n = 1 - 255 sample times): | Message Format: Condensed |
| Analog In 1 | n = 1 : Average over sample time 1 n > 1 : Peak over n samples | Aux Port Transfer Mode: OFF On Off |
| Analog Output | Analog Calibration/500 - 2000% [ner mille]): | Ann Best Terrefer Delay (1 355 eccende) |
| Analog Output Scan Time (0-255 minutes, 0=no checking): 0 Set | (Set to 1000% for nominal calibration, 0-1024 PWM range) 1000 Set | (separation when regular msgs and aux data sent on main port) |
| Pulse count 1 accumulation Analog Output Delta for Event (0-1023): 10 | (Set to 977‰ for 0-1000 PWM range) | |
| Run time (minutes) Pulse Input 2 Delta Count for Event (0-65535): 1 Set | Continuous Continuous Use Analon Output Scan Time | |
| Report type | | |
| | Pulse input circuit warmup time (0-10 seconds): 0 | |
| | | |
| | Unit B Default Configuration | |
| Flow Sensor 1.1.2.25 — | Unit B Default Configuration | I Flow Sensor 1.1.2.25 |
| Flow Sensor 1.1.2.25 Amin Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID | Unit B Default Configuration Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Find ID |
| Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration | Unit B Default Configuration Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration |
| Flow Sensor 1.1.2.25 Amin Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics | Unit B Default Configuration Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics |
| Flow Sensor 1.1.2.25 Amin Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Full Station Report Get Full Station Report Get Complete Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 |
| Flow Sensor 1.1.2.25 Analog In 1 Station reports include: Station report interval (seconds, use 0 to disable reports): | Unit B Default Configuration Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Full Station Report Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 |
| Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Find ID 120 Find ID Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Context Context Context | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC |
| Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set Analog In 1 Station report interval (seconds, use 0 to disable reports): Image: Analog In 2 Analog In 2 Image: Analog Output Report timestamps (ignored if clock not yet set): OFF On Off | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Fores for Max Output (1, 10000 Hz): 0 Set | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set |
| Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set I Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set I Analog Output Report timestamps (ignored if clock not yet set): OFF On Off I Battery Voltage Analog In 1 Scan Time (0-255 minutes, 0=no events): 0 Set | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 80 Set | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Care |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration 120 Find ID Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set If Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set If Analog In 2 Report timestamps (ignored if clock not yet set): 0FF On Offi If Battery Voltage Analog In 1 Scan Time (0-255 minutes, 0=no events): 0 Set If Pulse count 1 accumulation Analog In 1 Delta for Event (0-1023): 10 Set | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 80 Set Min Analog Output (0 - 999%o [per mille]): 0 Set (Set to 200%o for 4-20 mAmp output) 0 Set | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Protect Set |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Diagnostics Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set If Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set If Analog Output Report timestamps (ignored if clock not yet set): 0 Set If Analog Output Report timestamps (ignored if clock not yet set): 0 Set If Pulse count 1 accumulation Analog In 1 Sean Time (0-255 minutes, 0=no events): 0 Set If Pulse count 2 accumulation Analog In 2 Sean Time (0-255 minutes, 0=no events): 0 Set If Pulse count 2 accumulation Analog In 2 Sean Time (0-255 minutes, 0=no events): 0 Set | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 80 Set Min Analog Output (0 - 999% [per mille]): 0 Set Max Analog Output(1 - 1000% [per mille]): 1000 Contact | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Radio post Tx time (1-60 seconds): 2 Set |
| Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Full Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set I Analog In 1 Station report timestamps (ignored if clock not yet set): OFF On Off I Analog Output Report timestamps (ignored if clock not yet set): 0 Set I Pulse count 1 accumulation Run time (minutes) Analog In 1 Delta for Event (0-1023): 10 Set I Pulse count 2 accumulation Report type Analog In 2 Delta for Event (0-1023): 10 Set | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 I Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 80 Set Min Analog Output (0 - 999%s [per mille]): 0 Set Max Analog Output(1 - 1000%s [per mille]): 1000 Set Max Analog Output(1 - 1000%s [per mille]): 1000 Set | Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) revd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Radio post Tx time (1-60 seconds): 2 Set Station ID (0-32767): 120 Set |
| Image: Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration - - Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set If Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set If Analog In 2 Report timestamps (ignored if clock not yet set): 0FF On Offi If Battery Voltage Analog In 1 Scan Time (0-255 minutes, 0=no events): 0 Set If Pulse count 1 accumulation Analog In 1 Delta for Event (0-1023): 10 Set If Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set If Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set If Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set If Pulse count 2 accumulation Analog In 2 Delta | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 0 Set Min Analog Output (1 - 10000 Hz): 0 Set Max Analog Output (1 - 1000%s [per mille]): 1000 Set Max Analog Output (1 - 1000%s [per mille]): 1000 Set Analog Output Update Interval (n = 1 - 255 sample times): n = 1 - 255 sample times): n = 1 - 255 sample times): | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: © Standard @ Condensed |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration 120 Find ID Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set ✓ Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set ✓ Analog Output Report timestamps (ignored if clock not yet set): 0 Set ✓ Analog Output Report timestamps (ignored if clock not yet set): 0 Set ✓ Pulse count 1 accumulation Analog In 1 Scan Time (0-255 minutes, 0=no events): 0 Set ✓ Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set ✓ Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set ✓ Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set ✓ Pulse count 2 accumulation Analog In 2 Delta for Event (0-102 | Unit B Default Configuration Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 0 Set Min Analog Output (1 - 10000 Hz): 0 Set Max Analog Output (1 - 1000% [per mille]): 1000 Set (Set to 200% for 4-20 mAmp output) 1000 Set Analog Output Update Interval (n = 1 - 255 sample times): n = 1 : Average over sample time 45 Set n > 1 : Peak over n samplets 45 Set Set Set | Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: On Off |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set Ø Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set Ø Analog In 2 Analog In 1 Scan Time (0-255 minutes, 0=no events): 0 Set Ø Pulse count 1 accumulation Analog In 2 Delta for Event (0-1023): 10 Set Ø Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set Maiog In 2 Delta for Event (0-1023): 10 Set Set Analog In 2 Set Time (0-255 minutes, 0=no checking): 15 Set Analog In 1 Battery S | Unit B Default Configuration ■ Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Min Analog Output (1 - 10000 Hz): 80 Set Min Analog Output (0 - 999‰ [per mille]): 0 Set Max Analog Output (1 - 1000‰ [per mille]): 1000 Set Analog Output Update Interval (n = 1 - 255 sample times): n = 1 : Average over samples 45 Set Analog Calibration(500 - 2000‰ [per mille]): 1000 Set Set | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio post Tx time (1-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: ON On Off Aux Port Transfer Mode: ON On Off Aux Port Transfer Delay (1-255 seconds): 4 |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set I Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set I Analog In 2 Report timestamps (ignored if clock not yet set): 0 Set I Pulse count 1 accumulation Analog In 1 Scan Time (0-255 minutes, 0=no events): 0 Set I Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set I Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set I Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set I Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set I Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set I Pulse count 2 accumulation Analog In 2 Delta for Event (0-102 | Unit B Default Configuration ■ Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 80 Set Min Analog Output (0 - 999%s [per mille]): 0 Set Max Analog Output (1 - 1000%s [per mille]): 1000 Set Max Analog Output Update Interval (n = 1 - 255 sample times): n > 1 : Average over samples 45 Set Analog Calibration(500 - 2000%s [per mille]): 1000 Set Set Analog Calibration(500 - 2000%s [per mille]): 1000 Set Set to 1000%s for 4-20 mAmp output) 1000 Set | Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Radio post Tx time (1-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: ON On Off Aux Port Transfer Mode: ON On Off Aux Port Transfer Delay (1-255 seconds): 4 Set |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Accumulators Aux Port Forwarding Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set Ø Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set Ø Analog Output Report timestamps (ignored if clock not yet set): 0 Set Ø Analog Output Report timestamps (ignored if clock not yet set): 0 Set Ø Pulse count 1 accumulation Analog In 1 Scan Time (0-255 minutes, 0=no events): 0 Set Ø Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set Ø Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set Ø Analog In 1 Battery Scan Time (0-255 minutes, 0=no events): 0 Set Ø Analog In 2 Battery Delta for Event (0-1023): 10 Set Ø Analog In 2 Battery Delta for Event (0-1023): 10 Set | Unit B Default Configuration ■ Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 80 Set Min Analog Output (0 - 999%s [per mille]): 0 Set Max Analog Output (1 - 1000%s [per mille]): 1000 Set Max Analog Output Update Interval (n = 1 - 255 sample times): n = 1 : Average over sample time 45 Set N > 1 : Peak over n samples 45 Set Set Set Analog Calibration(500 - 2000%s [per mille]): 1000 Set Set Set (Set to 1000%s for nominal calibration, 0-1024 PWM range) 1000 Set Set Set <td< td=""><td>Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Radio post Tx time (1-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: ON On Off Aux Port Transfer Delay (1-255 seconds): 4 Set Separation when regular msgs and aux data sent on main port) 4 Set</td></td<> | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Radio post Tx time (1-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: ON On Off Aux Port Transfer Delay (1-255 seconds): 4 Set Separation when regular msgs and aux data sent on main port) 4 Set |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set Ø Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set Ø Analog In 2 Report timestamps (ignored if clock not yet set): 0 Set Ø Analog Uuput Report timestamps (ignored if clock not yet set): 0 Set Ø Analog Uuput Report timestamps (ignored if clock not yet set): 0 Set Ø Pulse count 1 accumulation Analog In 1 Delta for Event (0-1023): 10 Set Ø Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set Ø Report type Analog In 2 Delta for Event (0-1023): 10 Set Ø Analog In 1 Battery Scan Time (0-255 minutes, 0=no checking): 15 Set Ø Analog In 2 Battery Delta for Event (0-1023): 10 Set Ø Analog In 1 Battery Scan Time (0-255 min | Unit B Default Configuration Image: Flow Sensor 1.12.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Freq for Min Output (0 - 10000 Hz): 0 Set Freq for Max Output (1 - 10000 Hz): 80 Set Min Analog Output (0 - 999%s [per mille]): 0 Set Max Analog Output (1 - 1000%s [per mille]): 1000 Set Max Analog Output (1 - 1000%s [per mille]): 1000 Set Analog Output Update Interval (n = 1 - 255 sample times): n > 1 : Average over sample time 45 Set Analog Calibration(500 - 2000%s [per mille]): (Set to 1000%s for 0-1000 PWM range) 1000 Set (Set to 1000%s for nominal calibration, 0-1024 PWM range) 1000 Set (S | Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Radio post Tx time (1-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: ON On Off Aux Port Transfer Mode: ON On Off Aux Port Transfer Delay (1-255 seconds): 4 Set |
| Flow Sensor 1.1.2.25 — Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Diagnostics Station reports include: Station report interval (minutes, use 0 to disable reports): 15 Set Ø Analog In 1 Station report interval (seconds, use 0 to disable reports): 0 Set Ø Analog Output Report timestamps (ignored if clock not yet set): 0 Set Ø Analog Output Report timestamps (ignored if clock not yet set): 0 Set Ø Pulse count 1 accumulatora Analog In 1 Delta for Event (0-1023): 10 Set Ø Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no events): 0 Set Ø Pulse count 2 accumulation Analog In 2 Scan Time (0-255 minutes, 0=no checking): 0 Set Ø Analog In 2 Battery Voltage Analog In 2 Delta for Event (0-1023): 10 Set Ø Pulse count 2 accumulation Analog In 2 Delta for Event (0-1023): 10 Set Ø Analog In 1 Battery Voltage Set Set Ø Analog In 2 | Unit B Default Configuration Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report Get Full Station Report Get Complete Configuration Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics Sample Time (2 - 7200 seconds, even values only): 20 Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Pulse_Inputs/Output divide ratio (1 - 4294967295): 2880 Set Set Freq for Min Output (0 - 10000 Hz): 0 Set Set Min Analog Output (1 - 10000 Hz): 0 Set Set Max Analog Output (1 - 10000 Kg [per mille]): 0 Set Set Max Analog Output (1 - 1000%s [per mille]): 1000 Set Set Nanog Output Update Interval (n = 1 - 255 sample times): n > 1 : Peak over n samples 45 Set Analog Calibration(500 - 2000%s [per mille]): (Set to 1000%s for nominal calibration, 0-1024 PWM range) 1000 Set (Set to 577%s for 0-1000 PWM range) (Set to 5 | Image: Flow Sensor 1.1.2.25 Main Com Port: COM4 Open (click to close) READY Talk to ID: 120 Find ID Get Normal Station Report: Get Full Station Report: Get Complete Configuration Operation Reporting Freq Setup Configuration Accumulators Aux Port Forwarding Diagnostics PIC Software Version: 12.25 FlowSensor Software Version: 1.1.2.25 Date and time (UTC): (NOT SET) rcvd at 30-Jul-2018 23:12:23 UTC Analog input circuit warmup time (0-10 seconds): 1 Set Radio warmup time (0-60 seconds): 2 Set Station ID (0-32767): 120 Set Message Format: ON On Off Aux Port Transfer Delay (1-255 seconds): 4 Set Set Set Set Set |

