260-RGAI-70

User Manual

260-RGAI-70 Rain Gauge Analog Output Interface





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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

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TYPICAL SYSTEM CONFIGURATION



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

The **260-RGAI-70 Rain Gauge Interface** converts the signal from a tipping bucket rain gauge into a 4-20 mA current loop signal, ideal for input to a PLC or SCADA system. It features reliability, low cost, low power drain, accuracy, simplicity of operation and ruggedness.

In ramp mode (default), each tip of the rain gauge bucket causes the output signal to increase 1% of full scale. Each complete excursion of the output signal from zero to full scale represents 100 tips of the bucket. During periods of no rain there is no change in the output signal, as long as power is not interrupted to the transmitter board.

In rain detector mode, the output stays at 4mA until a bucket tip is detected. Then the output goes to 20mA and remains until the rain detect timeout period expires following the last detected tip.

The mode selection is made by a switch on the transmitter circuit board. Setting 0 enables ramp mode, while settings 1 thru 9 determine the timeout period in rain detector mode. The switch is adjusted by means of a small flat-blade screwdriver.

260-RGAI-70 Rain Gauge Analog Output Interface Electronics: +/- 1% Accuracy Rain Gauge: depends on model chosen Input Dry contact switch closure Output 4-20 mA Loop Powered (12-24 Vdc supply) Maximum Loop Resistance Rmax = (Vsupply - 10V) / 20mARain Detect Mode User selectable 1-80 minute pulse period Environmental -22°F to 158°F (-30°C to 70°C) Dimensions 3.8" x 4.6" x 2.4" (97 x 117 x 61 mm) Weight / Shipping 0.35 lbs / 1 lb (159g / 454 g)

3 SPECIFICATIONS

4 SITE SELECTION

The rain gauge exposure is important to collecting accurate information. Refer to the manual for your rain gauge for specific recommendations. Ensure the rain gauge is level, otherwise the system may not operate correctly.

If possible, locate the 260-RGAI-70 transmitter enclosure indoors or other protected location. The enclosure is watertight if the cover is installed properly.

5 POWER SUPPLY

- **CAUTION:** Do not apply power to the rain gauge input terminals, as this will damage the transmitter board.
- **NOTE:** The power supply voltage ripple must be less than 100 volts per second for proper operation.

A 12-24 VDC loop power supply is recommended for operation of this instrument. The input voltage must take into account all resistance in the current loop. If the input voltage is too low the output will not reach full scale.

Total resistance of the current loop includes the input impedance of the monitoring system plus the resistance of the wiring.

- Find the input impedance of your system by consulting the user manual.
- Calculate the wiring resistance using the chart.
- Add together to obtain the total loop resistance.
- Consult the chart below to determine the required minimum power supply voltage.

RESISTANCE OI	F COPPER WIRE
AWG	Ohms / foot
12	0.0016
14	0.0026
16	0.0041
18	0.0065
20	0.0103
22	0.0165
24	0.0262



6 WIRING

- **CAUTION:** Do not apply power to the rain gauge input terminals, as this will damage the transmitter board.
- **CAUTION:** Turn off power to the equipment before making any connections.



- 1. Connect the rain gauge to the INPUT terminal block. Polarity is not important as long as the rain gauge switch is dry contact.
- 2. Connect the user equipment to the LOOP terminal block. Apply positive power supply voltage to the "+" terminal as shown in the diagram above. Connect the 4-20 mA output "-" terminal to your monitoring equipment.
- 3. Visually confirm that the MODE SELECT SWITCH is at the desired setting. Position 0 (RAMP MODE) is the default setting for incrementing the output as rain accumulates. All other positions place the unit in RAIN DETECT MODE, with the timeouts shown in the chart.

NOTE: There is a pushbutton switch on the circuit board below the selector switch. The pushbutton has no function in this application. It will not reset the output.

7 OPERATION

7.1 Ramp Mode

Once the wiring has been completed and power applied to the system, the output of the 260-RGAI-70 will be 4 mA, indicating no rainfall. Each time the bucket in the rain gauge tips, the output will increase by 0.16 mA. When the maximum value is reached (20 mA), the next tip will return the output to 4 mA.

The output holds at the value reached when the last tip is detected, unless the power to the loop circuit is interrupted. Therefore, if it is desirable to reset the output to 4 mA (indicating no rain), simply interrupt the power to the unit.

The monitoring equipment may need to be programmed to output the amount of rain in inches or millimeters to make the information understandable. Each rain gauge has a calibration factor expressed as inches or millimeters per tip. To calculate the full scale range, multiply the calibration factor by 100.

Example:

260-2501 Rain Gauge with a calibration factor of 0.01"/tip. Full Scale Range = 0.01"/tip x 100 tips = 1 inch = 20 mA

7.2 Rain Detector Mode

After the wiring has been completed and power applied to the system, the output of the 260-RGAI-70 will be 4 mA, indicating no rainfall. When rain is detected (i.e. the bucket tips) the output goes to 20 mA and a timer begins to count down. If more tips are detected before the timer expires, the timer resets and begins to count down. This continues until the last tip is detected, and the timer finally expires, causing the output to return to 4 mA. The duration of the timer is set by the mode select switch, as discussed in the previous section.

7.3 Mode Comparison Graphs



DWG 890-0125-01

8 MAINTENANCE

The transmitter circuit board does not require calibration. To test the operation of the board independently of the rain gauge, disconnect the rain gauge from the input terminals. Use a short piece of wire to momentarily connect the input terminals on the transmitter circuit board, at 2-second intervals. This will simulate pulses from the rain gauge. If the output of the transmitter fails to respond, contact NovaLynx for a Return Authorization (RA) number.

9 TROUBLESHOOTING GUIDE

TROUBLESHOOTING MATRIX				
Loop Current = 0 mA	Current loop polarity is reversed Open circuit in the cable Power supply failure			
Loop Current < 4 mA	Low power supply voltage Loop resistance too high			
Loop Current > 20 mA	Short circuit in the cable			
Loop current does not reach 20 mA, otherwise operates properly.	Low power supply voltage Loop resistance is too high			