

255-110x-B

User Manual

255-110-B Evaporation Gauge Reader (inches)

255-110M-B Evaporation Gauge Reader (millimeters)



Evaporation Gauge Reader

Phone (530) 823-7185

Email nova@novalynx.com **Website** www.novalynx.com

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.

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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 **255-110x-B Evaporation Gauge Reader** is a portable display for the NovaLynx 255-100 Analog Output Evaporation Gauge. The reader is calibrated in inches or millimeters, depending on the model chosen. Readings from the display indicate *relative* depth of water in the gauge. The difference between readings on successive days indicates the amount of evaporation.

The reader may be used during installation of the evaporation gauge and for checking the operation of the evaporation gauge during regular maintenance. The large LCD display is visible through the clear protective cover even in bright sunlight.


The NovaLynx 255-110x-B Reader is pre-calibrated using a generic slope with zero offset. Since the float in the 255-100 Evaporation Gauge does not rise until a certain amount of water is present, the display will not correspond to the actual depth of the water in the pan. However, since evaporation is a *relative* quantity (the difference in level between two points in time), the offset is not important, as long as the float is not resting on the bottom.

It is possible to calibrate the reader to a specific evaporation gauge using a two-point method, which will adjust the slope and offset so that the readings match (within reason) the depth of water in the evaporation pan. NovaLynx 195-BHW-KIT includes software and a USB cable for programming the slope and offset. Instructions for programming the display are available in the NovaLynx 255-704-B Evaporation Logger User Manual, available on our website at www.novalynx.com.

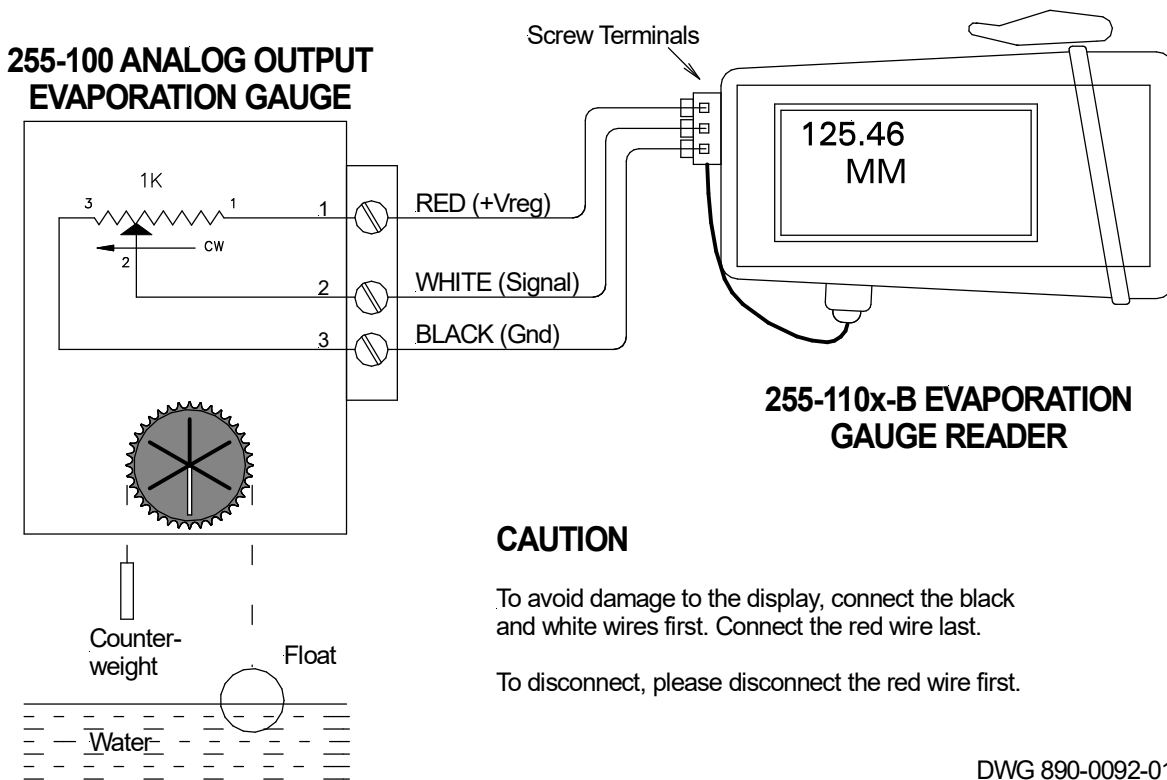
		Raw	Scaled
255-110-B Generic Calibration	Units:	Volts	Inches
	Value 1:	0.00000	0.00000
	Value 2:	2.50000	9.44400

		Raw	Scaled
255-110M-B Generic Calibration	Units:	Volts	millimeters
	Value 1:	0.00000	0.00000
	Value 2:	2.50000	239.89000

3 SPECIFICATIONS

255-100x-B Evaporation Gauge Reader	
Display	LCD, 5-digit
Range	
Model 255-110-B	0 to 9.444 inches
Model 255-110M-B	0 to 239.89 millimeters
Resolution	
Model 255-110-B	0.001 inches
Model 255-110M-B	0.01 millimeters
Accuracy	± 0.1% of reading
Sensor excitation	2.5 Volts, 4 mA total. Excitation 5 mS before sensor reading begins.
Operating Temperature	32 to 122 °F (0 to 50 °C)
Communications	USB 2.0 interface
Enclosure	Clear ABS, 2.7" x 4.3" x 1.3" (69 x 110 x 33 mm)
Battery	Two AAA 1.5 V alkaline batteries, user replaceable
Weight / shipping	8 oz / 1 lb (227g / 454 g)
	The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).

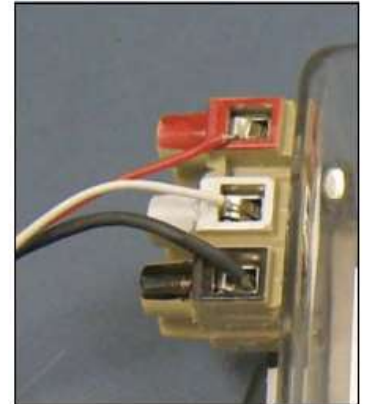
4 CONNECTIONS



DWG 890-0092-01.

The 255-110x-B Evaporation Gauge Reader uses very little power, and can typically run for a full year on the two replaceable AAA batteries. The display remains on even when not in use, so it is ready to take readings as soon as it is connected to the evaporation gauge.

1. Use a small screwdriver to loosen each screw on the terminal block.
2. Connect the black (ground) and white (signal) wires to the color-coded terminals.
3. Connect the red (+Vreg) wire last.
4. The display will update with the water level reading within 15 seconds.
5. After recording the water level reading, disconnect the red wire first, to avoid possible damage to the reader.



Connection Terminals

NOTE: when not connected to the evaporation gauge the readings on the display will fluctuate randomly. This is normal.

5 APPLICATION: EVAPORATION MONITORING

Evaporation is calculated as the difference in water level readings taken at regular intervals, typically every 24 hours. To begin, the evaporation pan and analog output evaporation gauge must be set up and filled with water. The installation and operation of the NovaLynx 255-100 Evaporation Gauge and NovaLynx 255-200 Evaporation Pan are discussed in their respective user manuals, available at www.novalynx.com

Each day (or other regular interval), connect the reader to the evaporation gauge following the instructions (Section 4). Record the measurement in your log. **Note:** *If the water in the pan is not still (possibly due to wind), take two or more readings, calculate the average and record.*

Observe the water level in the evaporation pan. The level should be maintained between 2 to 3 inches below the rim of the evaporation pan. Avoid letting the level fall more than 5 inches.

- If it is necessary to re-fill the pan, be sure you have recorded your daily reading first, then refill the pan.
- If a significant amount of precipitation has fallen it may be necessary to remove some water from the pan. Be sure you have recorded your daily reading first, then remove excess water from the pan.
- After adjusting the water level, wait until the water is still and then take a new reading. Record the new level along with a note that the evaporation pan was refilled or water was removed.

The evaporation gauge reader may be left attached to the evaporation gauge or it may be disconnected and used at another evaporation monitoring site. If the reader is to be left connected, provide a shelter that will keep the sun and rain off of the reader, otherwise moisture on the terminals could cause corrosion, and strong sunlight could overheat the display.

6 APPLICATION: EVAPORATION LOGGING

The display in the 255-110x-B Evaporation Gauge Reader is the same device as the logger that is incorporated in the NovaLynx 255-704-B Evaporation Logger. If the reader is going to be used at only one site, and it is feasible to leave the reader connected throughout the season, then it can be used to log the water level in the evaporation pan on a continuous basis. Please refer to the 255-704-B Evaporation Logger User Manual (www.novalynx.com) for instructions on how to operate as a logger.

7 APPLICATION: EVAPORATION GAUGE CHAIN INSTALLATION

The 255-110x-B Evaporation Gauge Reader can be used to verify proper installation of the evaporation gauge, as well as being the method for reading the gauge. The evaporation gauge consists of a precision potentiometer connected to a sprocket which is turned by the float and counterweight mechanism (diagram, below). It is important when setting up the evaporation gauge that the sprocket is correctly synchronized with the chain that holds the float and counterweight. The reason is that the potentiometer has an electrical "dead band" where the resistance is infinite and the readings from the gauge would be meaningless.

Chain Installation Using the Reader

1. Make sure the gauge is empty of water.
2. Connect the reader (Section 4).
3. Turn the sprocket until the display reads within the following range:

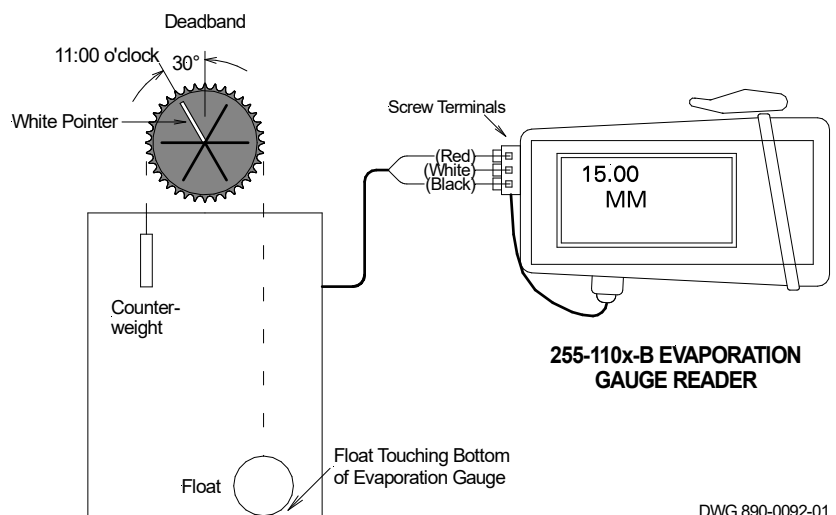
- Between 0.40 to 0.75 inches
- Or

- Between 10.0 to 20.0 mm

Note: *The white pointer will be at approximately 11:00 o'clock or 30 degrees to left of top.*

4. Lift the chain until all the slack is taken up, but the float is still resting on the bottom of the gauge. Drape the chain over the sprocket so that the float is on the right and the counterweight is on the left. If the indication on the reader is not within range, re-adjust the sprocket.

Note: *This method will not work correctly if the generic calibration of the display has been changed.*

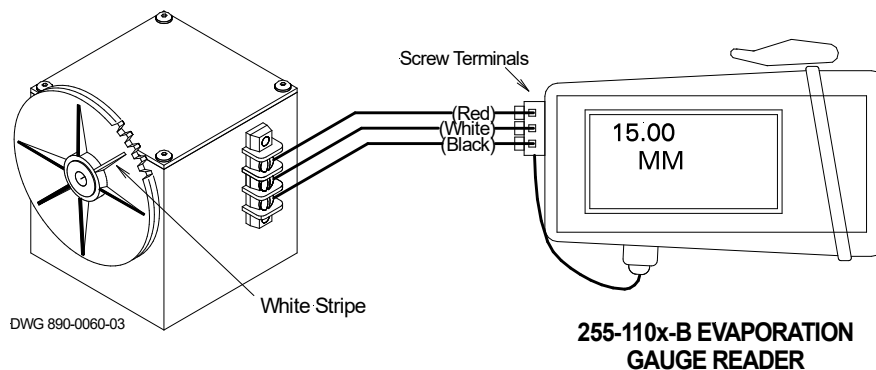


8 APPLICATION: EVAPORATION GAUGE CALIBRATION CHECKUP

The 255-110x-B Evaporation Gauge Reader can be used to check the accuracy of the potentiometer as part of a regular maintenance cycle. At a minimum, the operation of the potentiometer should be checked at the beginning of a monitoring season. **The following procedure applies to the reader when it is calibrated to the generic factory settings.**

Disassembly

1. Remove the four screws holding the evaporation gauge cover and lift the cover off.
2. Remove the chain from the sprocket by lifting the counterweight. Drape the counterweight and chain over the outside of the gauge. Do not attempt to remove the float.
3. Rotate the sprocket by hand to verify that it turns freely 360° without binding. It should spin freely when given a small push.



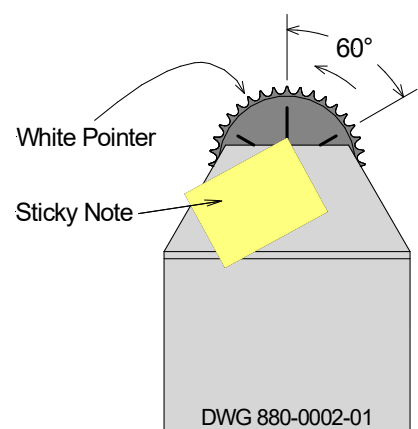
Testing with Evaporation Gauge Reader

Setup

1. Note that one ridge on the sprocket face has been painted with a white stripe. The other ridges are not painted and are spaced 60° around the face of the sprocket. The back side of the sprocket has similar ridges but none are painted.
2. Connect the reader to the evaporation gauge and verify that it responds to small movements of the sprocket. Remember, the display updates only once every 15 seconds. Be patient.

Procedure

1. Adjust the position of the sprocket until the display reads 9.00" or 228.6 mm. The white stripe on the **front** of the sprocket should be at approximately 1 o'clock position as viewed from the front.
2. While looking at the **back** of the sprocket, use a sticky-note as a pointer and apply it to the top of the evaporation gauge housing, aligning one corner to point at a rib on the back side of the sprocket.
3. Enter the measured value as the starting point in the table (next page).
4. Rotate the sprocket 60° counter-clockwise to the next ridge and record the measured value.
5. Continue recording measurements in 60° increments.



View from Back of Sprocket

6. Compare the actual readings with the expected readings at each measured point, and determine the Pass/Fail status.

Sprocket Position	Expected Value		Measured Value	Acceptable Limit		Pass	Fail
	inches	millimeters		inches	millimeters		
9.00" Starting point	9.000	228.6		±0.074	±1.9		
Rotated 60°	7.333	186.2		±0.074	±1.9		
Rotated 120°	5.666	143.9		±0.074	±1.9		
Rotated 180°	4.000	101.6		±0.074	±1.9		

Remedial Steps

- If the white stripe is not between 12:00 and 1:00 o'clock at the starting point (9.00" or 228.6 mm), the sprocket may have slipped on the shaft and be out of position.
- If the readings on the display are progressively worse the farther the sprocket is turned, the potentiometer may be out of specification, or there is added resistance in the circuit. Check all connections.
- If successive readings are non-linear then the potentiometer may need to be replaced.
- The measured depth of water and the display will not agree when calibrated to the generic settings, because the amount of water required to raise the float is not accounted for. This is normal as the amount of evaporation is *relative* (i.e. the difference of two readings). If precise agreement is desired, the display can be re-calibrated (Section 2).

Reassembly

Refer to Section 7 for instructions on synchronizing the chain and sprocket. Replace the cover of the evaporation gauge. Fill the evaporation pan and take a reading after the water has settled.

9 BATTERY REPLACEMENT

WARNING: Keep all batteries away from small children. Dispose of used batteries properly.

The battery status indicator is located in the upper right corner of the display screen. Replace the batteries at the beginning of the season, and as required. Battery life can vary depending on circumstances from 7 months to a year.



IMPORTANT: When the batteries are removed all programming is lost and the display will go blank UNLESS you provide power to the display while the batteries are being changed.*

FIRST: Connect a USB cable from your logger to a computer, USB wall charger, or USB output battery pack. The cable type is USB 2.0 A to Mini-B.



1. Open the battery door on the back of the logger.
2. Remove the old batteries.
3. Insert two new batteries **observing polarity**.
4. Reinsert the battery door and snap it back into place.

Note: A desiccant pack may be inside the logger box. It can be replaced or re-dried if needed.



* If the programming is lost, either return the unit to NovaLynx for inspection and reprogramming, or obtain the software (free download) and re-program the unit. Instructions for programming the display are detailed in the **NovaLynx 255-704-B Evaporation Logger User Manual**, available on our website at www.novalynx.com.