

MANUAL
FOR
EVAPOROGRAPH
Model 6810-A
6811

6810-01

TABLE OF CONTENTS

1.0	Introduction
2.0	Specifications
3.0	Installation
4.0	Theory of Operation
5.0	Calibration
6.0	Maintenance
7.0	Parts List
8.0	Warranty

ECN: 2103

ADDENDUM
TO
EVAPOROGRAPH MANUAL

Mechanical recording weather instruments supplied by NovaLynx such as Model 255-6810-A have been revised. The spring and battery powered clocks used in the drum recorder have been replaced by electronic powered clock mechanisms.

The new solid state clock assemblies have replaced all previously used clocks in this type of recording instrument. The new clock is a self contained unit and features a slide switch that allows selection of the rotation period of the recording drum. Selection of one day, seven days, and one month rotations are available without the need to change drive gears as was the case with the spring driven clocks. The selector switch is located inside the top portion of the drum. A flashing LED indicates the selected rotation rate. Two AA size batteries are needed to power the clock. The battery holder is located inside the drum housing. The drum housing is removed by holding it and the clock base and twisting to separate the two pieces. Observe the battery polarity marks on the battery holder during battery insertion.

Installation of the clock drum onto the main shaft is the same as for the spring driven clocks.

CAUTION: The new electronic clock drum recorders can be used with only those charts having 26 hour and 176 hour timing marks. Do not attempt to use the electronic clock with the old style 24 hour and 168 hour chart paper. The one month chart paper can be used with either style clock.

Size 12.5" W x 8.0" H x 5.5" D
(318 mm W x 203 mm H x 140 mm D)
Weight/Shipping 9 lbs/16 lbs
(4.1 kg/7.3 kg)

3.0 INSTALLATION

- 3.1 General: This instrument is thoroughly tested and fully calibrated at the factory and is ready for installation. Please follow Sections 3.2 to 3.4 if any damage has occurred.
- 3.2 Receiving Instructions: Upon receipt all items must be carefully inspected to assure no damage has occurred during shipment. Do not discard any packing materials until you are certain no freight damage exists and all items are accounted for including any cables, small parts and accessories.
- 3.3 Freight Damage: If any items have been damaged during shipment, contact your local representative of the freight company which delivered and file a claim for loss. The claim must be filed at the receiving location. Keep instruments and shipping material in "as received" condition until the freight handler has finished his inspection.
- 3.4 If damage has occurred, notify WEATHERtronics for repair. We will provide you a return authorization number to expedite your repair. When returning this instrument, please enclose complete details of damage.
- 3.5 The Model 6810 Evaporograph is shipped in a dual fiber-board container. The inner container is packed with styrofoam panels to protect the instrument from damage during shipment. The outside container is also filled with foam chips for further protection.
- 3.6 The following instructions (Sections 3.6 to 3.9) apply to the spring wound clock. Remove the clock and winding key from the packing box. The clock is shipped from the factory with the seven day gear attached. The one day gear is located on the top of the clock.
- 3.7 Select the desired chart time period (one or seven days.) This clock comes standard with two gears for selecting chart speed. The one day gear is the larger diameter and has 22 teeth. The seven day gear is the smaller diameter, having 18 teeth. Be sure to

install the correct gear over the corresponding shaft. If incorrectly installed, or if both gears are installed at the same time, severe damage may occur to the clock mechanism. Insert the winding key in the top of the clock, through the sliding door opening. Wind the clock in the direction of the arrow (counterclockwise) approximately seven turns. Do not force the winding key. The clock will automatically start keeping time. Remove the key and close the door while in operation.

- 3.8 Remove the chart clip from the side of the clock drum. Select the appropriate chart and fill in the station number and date the chart was started. Place the right hand margin of the chart in line with the right side of the chart clip notch. Wrap the chart around the drum in a clockwise motion. The left-hand edge of the chart should overlap the right-hand edge. Place the chart clip over both layers of the chart and seat it in the notch.
- 3.9 Place the clock over the gear post and secure it with the knurled nut. Go to Section 3.17 for further instructions.
- 3.10 The following instructions (Sections 3.10 to 3.16) apply to the 1.5 VDC battery operated clock. Remove the clock from the packing box. Carefully remove the drum from the clock mechanism by twisting the drum counterclockwise and lifting up.
- 3.11 Select the chart time interval by using the correct gear. The instrument is supplied with the seven day gear installed. Remove the black rubber bushing and install the one day gear if desired. The one day gear is located inside the clock mechanism. Do not use both gears at the same time or severe damage may occur to the clock mechanism.
- 3.12 Use two 1.5 VDC "D" cell batteries to operate the clock. Place both batteries in the battery holder with the negative end facing the knurled screws or black wire.
- 3.13 Start the clock by pushing in the left-hand edge of the starting bar located on the clock escapement, below the fast-slow adjustment lever. Rapidly release this bar. The gears should turn and a ticking sound should be heard. If not, repeat this step.

- 3.14 Replace the clock drum over the clock mechanism and rotate it clockwise.
- 3.15 Place the chart paper on the clock drum as described in Section 3.8.
- 3.16 Remove the two hex nuts from the clock shaft. Place the clock/clock shaft assembly through the base of the instrument and tighten both hex nuts. Be sure that the spacer bushing is between the base and the clock assembly.
- 3.17 Turn the clock assembly so that the pen is set to the correct time mark.
- 3.18 Fill the V-point pens with ink approximately three-quarters full. Remove the shipping clip on the pens. Return the pens onto the chart using the pen lift lever mounted on the base of the instrument.
- 3.19 Be sure a clean filter paper disk is installed at the evaporation surface. This filter paper keeps the cloth wick clean and must always be installed. The filter paper is installed by removing the filter ring.
- 3.20 Fill the water cistern with distilled water until the pen arm drops below zero. Distilled water should only be used. This will prevent mineral deposits from forming in the water tubing. Inaccuracies of several percent can occur if distilled water is not used. Be sure the cover to the cistern is closed after filling.
- 3.21 Open the cock valve by turning it toward the right to bring the pen arm up to the zero baseline. The valve only needs to be opened a small amount.
- 3.22 Close and lock the instrument cover. If the instrument is located outdoors, it can be placed in an instrument shelter (Model 8120) to protect it from rain, solar radiation, and dust. This shelter provides free circulation of air at all times. The instrument can also be exposed outdoors without any shelter.
- 4.0 THEORY OF OPERATION
- 4.1 This instrument is designed to accurately record the rate of evaporation. If properly calibrated the total

amount of evaporation can also be measured. Evaporation rates are directly effected by surface winds, humidity, and temperature as well as the temperature of the instrument.

4.2 The Evaporograph should be used as a recording survey instrument. The instrument should be located at the site along with a standard Weather Bureau evaporation station. Data should be taken for several weeks from the Evaporograph and the station and a correlation between the two formed. The evaporation station can then be removed and transferred to another site while data is continued to be collected on the Evaporograph. From the correlation factor, rate of evaporation and evaporation quantities can be determined.

4.3 Distilled water is poured through a small opening in the water cistern. This water raises a float which, through a mechanical linkage, lowers the pen arm. The water is brought up the riser tube to the filter paper using a cloth wick. As the water evaporates the reservoir lowers, thus raising the pen.

5.0 CALIBRATION

5.1 This instrument is designed to compare and track data collected by an evaporation station. Since ambient conditions around the Evaporograph vary the instrument is supplied with a standard calibration. For precise measurements a direct calibration for the instrument is recommended. A correlation factor is derived from evaporation station comparisons and this factor is applied to the recorded data.

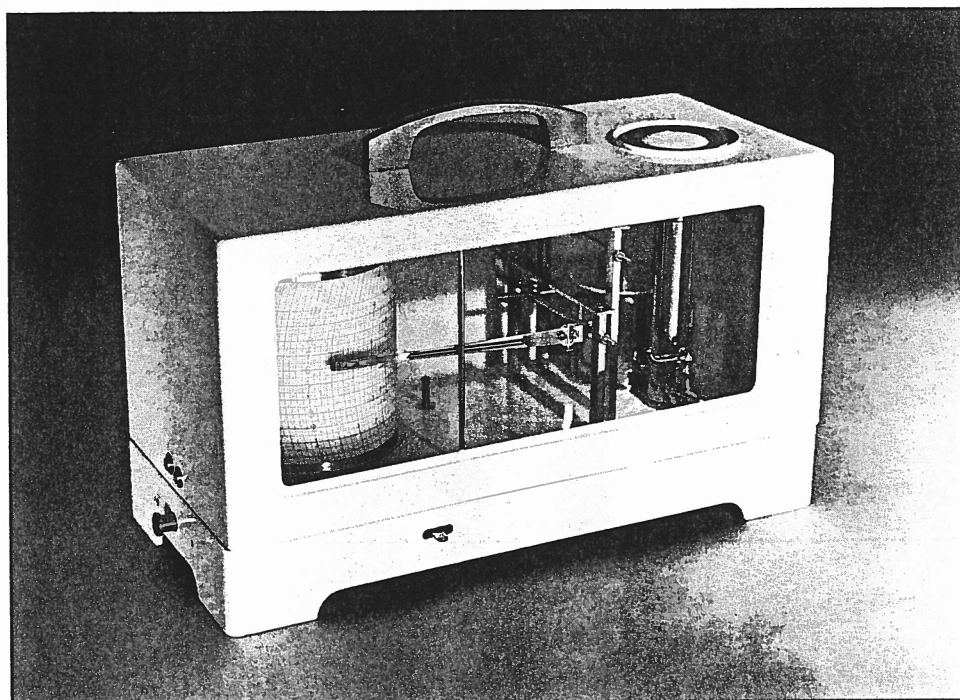
5.2 The Evaporograph is scaled so that the pen will make one transverse upon evaporation of 10 mm of height of water. In environments of minimal evaporation the pen arm linkage can be varied for a lower full scale value thus increasing the instrument's resolution.

6.0 MAINTENANCE

6.1 The instrument should be routinely maintained preventing dust and dirt build-up. Whenever a chart change is required, simply brush the dust and dirt from the instrument. This type of preventive maintenance will provide long reliable recorder operation. At routine intervals, 3 to 6 months, clean all pivot points with solvent and with a small brush apply a light coat of instrument oil.

- 6.2 Alkaline batteries should be used for battery operated clocks. Change batteries every six months.
- 6.3 Inspect the filter paper each time the chart is changed or water is added to the cistern. If the filter paper is soiled replace it with a new filter. Never operate the instrument without the filter paper installed. Also, use only distilled water in the cistern.
- 7.0 PARTS LIST
- 7.1 The following pages include assembly drawings and parts list for this instrument. Please note that the parts lists are arranged in assembly/sub-assembly form. Each sub-assembly is listed on a separate page. Sub-assemblies and parts are broken down to the smallest, economically practical size available from WEATHERtronics.
- 8.0 WARRANTY
- 8.1 All instruments are warranted for one year, unless otherwise specified, against defects in material or workmanship. Should any instrument prove to be defective within the warranty period, upon written notice and return of the instrument freight prepaid, WEATHERtronics, Inc. will at its option repair or replace the defective unit and return it freight collect. Instruments abused, improperly used or installed and modified or altered by others may cancel the warranty.

Evaporograph



- ✓ Provides continuous evaporation record
- ✓ Self-contained
- ✓ Portable
- ✓ Corrosion resistant

The Evaporograph is a survey instrument for use in hydrology, forestry, biology, and meteorology. It provides a graphic record of the time distribution of evaporation. Distilled water from an internal cistern evaporates through an exposed filter paper on the top of the instrument. The filter paper is in capillary contact with the water by means of a wick. The decrease in water level due to evaporation is measured by a float which drives the recording pen arm. In the standard configuration, approximately 10 mm of free water will evaporate through the filter paper. For applications which require a larger evaporation range, the exposed surface area of the paper can be reduced. This slows the evaporation rate and extends the measuring range, although with some loss of accuracy.

A white enamel finish on the case minimizes heat effects from solar radiation. A funnel around the filter paper holder collects rain water and drains it away from the measuring system. All materials in the evaporograph are corrosion resistant. The instrument base is heavy cast aluminum. Internal parts are chrome-plated brass or stainless steel.

The clock is battery-operated with rotation periods of 1 day (26 hours), 7 days (176 hours), and 31 days. A switch is used to select the desired rotation. The pen is a disposable cartridge type for clear recording and easy maintenance.

The evaporograph may be located indoors or outdoors. If used outdoors, the instrument can be installed in a louvered shelter or exposed to ambient conditions. When used as a survey instrument, the evaporograph is typically

correlated with an evaporation pan in the same area to determine any required correction factor.

Specifications

Sensor: wetted filter paper and water cistern with float
 Range: 0 to 10 mm standard
 Accuracy: ± 0.3 mm
 Filter paper exposed area: 1.37 in² (8.81 cm²)
 Chart size: 3.5" H x 11.5" L (89 x 292 mm)
 Graduations: 0.5 mm
 Resolution: 0.25 mm
 Clock type: 1.5 Vdc battery-operated (2 AA cells)
 Drum rotation: 1 day (26 hours), 7 days (176 hours), or 31 days, switch selectable
 Pen type: cartridge
 Size: 12.5" W x 8" H x 5.5" D (318 x 203 x 140 mm)
 Weight/shipping: 9 lbs/16 lbs (4 kg/7.3 kg)

Ordering Information

6810-A Evaporograph with 1-7-31 day clock, pen, one pack of filter paper, and one pack of weekly or monthly charts (specify charts)
 68115 Filter Paper, 100 sheets/pack
 88101 Replacement Cartridge Pen, blue
 88102 Replacement Cartridge Pen, red

Charts


	Range	Drum Rotation	Charts/Box
68101	0-10 mm	176 hrs	55
68102	0-10 mm	26 hrs	400
68103	0-10 mm	31 days	25

BILL OF MATERIALS

MODEL/PART NUMBER 6810, 6811

DESCRIPTION Evaporograph

DATE June 23, 1978

Item No.	Part No.	Suffix	Qty.	Unit	Description	Reference No.		
1	8810		1	ea	Pen, V-Point			
2	8820		1	ea	Ink, blue			
3	8828		1	ea	Clock, spring wound	6810		
	8834		1	ea	Clock, 1.5VDC battery	6811		
4	68115		1	pk	Filter Paper			
5	88262		1	ea	Gear 1 day 22 tooth			
	88263		1	ea	Gear 7 day 18 tooth			
6	88281		1	ea	Chart Clip			
7	88282		1	ea	Clock Key	not shown		
8	962775		1	ea	Pen Arm M 677019			
9	962776		1	ea	Pen Lifter Assembly			
10	962777		1	ea	Instrument Base			
11	962778		1	ea	Instrument Cover			
12	962779		1	ea	Window			
13	962780		1	ea	Filter Retaining Ring			
14	962781		1	ea	Wick Assembly	not shown		
15	962782		1	ea	Cock Valve			
16	962783		1	ea	Water Cistern			
17	962784		1	ea	Window			
A	6810	01	MANUAL			Rev.	Date	Orig. WSH
B	6810	03	ASSY. DWG.					Engr. WSH
C		04	SCHEMATIC					Appv.
D								Doc. No. 6810 -
 WEATHERtronics INCORPORATED							Sheet	of
							1	1
2777 Del Monte St., West Sacramento, California 95691 Telephone (916) 371-2660 Telex: 377 • 395								