FISCHER & PORTER REBUILD (FPR-D)

RECORDING RAIN GAUGE

OBSERVER INSTRUCTIONS

JULY 21, 2009

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service - Cooperative Weather Observer Program
Office of Climate, Water, and Weather Services
Observing Services Division - W/OS7

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1. Introduction

1.1. Fischer & Porter Rain Gauge: The new recording rain gauge is housed entirely within the body of the original Fischer & Porter (F&P) containment shell (Fig 1.1). Once you open the access door (Fig 1.2) you will see a blue and white plastic box that contains the data recorder. This is the Precip Recorder and it takes the place of the paper-tape assembly for the purpose of recording the weight of the liquid in the bucket (Fig 1.3).

Fig 1.1

Fig 1.2

Fig 1.3

1.2. Weighing Sensor: The weight of the catch bucket with liquid rests upon a metallic bar that bends with increased weight. This weighing sensor is very sensitive and can detect changes of one hundredth of an inch of precipitation in a matter of several seconds. Readings from the sensor are processed by the Precip Recorder. Fifteen minute data, based on weighing sensor measurements, are available when you insert a memory card to the slot on the right side of the Precip Recorder (Fig 1.5).

1.3. Precip Recorder Display: The Precip Recorder stays in a 'sleep' mode until you wake it up by pressing any one of the key pad's buttons. The blinking green lamp tells you the rain gauge recorder system is working properly.

Fig 1.4

The green fluorescent display communicates the running total of precipitation plus any other additive like oil or anti-freeze. It also shows the current date and time.

Your National Weather Service (NWS) representative has pre-programmed the Precip Recorder for automated operation.

The four Arrow buttons allow you to scroll through six menus to view rain gauge status and view a log of times you checked the recorder and downloaded precipitation data.

Fig 1.5

To collect data, the NWS mails you a small Memory Card, once per month. In the first few days of the month you insert the card to the slot in the right side of the Precip Recorder (Fig 1.6) and download the rain gauge data.

Fig 1.6

You insert the Memory Card and the system automatically downloads data to the Memory Card.

Follow instructions on pages 7 and 8, Monthly Data Retrieval, to understand how the system responds and when to eject the Memory Card.

Expect the rain gauge to take about five minutes to download the last 60 days of data. Always wait nearby the Precip Recorder while it conducts the download – and never conduct the download when the weather is raining or snowing.

2. Viewing the Menus

The Home Display (Fig 2.1) will always appear when you wake-up the system. It gives you the Precip value in hundredths of an inch together with the current date and time. When you press the keypad's down arrow key (▼) you advance to the next menu of the six menus. All six menus are listed in Figure 2.2.

Fig 2.1

Fig 2.2

The menu revolves back to the Home Display (Fig 2.1) if you keep pressing the down-arrow (▼) key.

Primary Menus	Description
Precip 15.00 2009/02/13 10:52:30	This is the 'home menu' it appears on power-up.
Battery Now 12.6V	Battery voltage.
Logged Data	Stored 15-min data.
Station Setup	Password protected
Diagnostic	Calibration
Station Name & Time	COOP site number

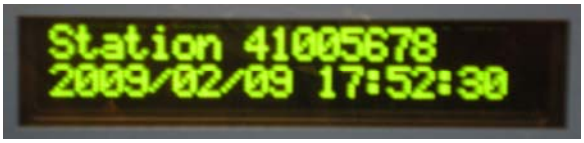
Observers are not required to access any of these six menus. If your NWSREP asks you, you may conduct a routine check of battery voltage, or perhaps a quick check of the Logged Data. See Appendix B, for a table that shows the Precip Recorder's menu and sub-menus.

Press the ▼ (down) key twice, and you advance to the parameter 'Battery Now' – this informs you of the battery's voltage.

Fig 2.3

Press ▼ (down) four more times and your COOP station name and number appear on the screen, this is the Station Name and Time, menu (Fig 2.4).

Fig 2.4



No action is required. To return to the home display, simply press the ▼ (down) button one more time and you revolve back to the first of the six menus.

3. Routine Checks

Whenever you open the F&P containment shell, always wake-up the green fluorescent display. Use any of the 'arrow buttons' or either the 'Set,' or 'Off' button.

The ▲(up) button will wake-up the display.

Fig 3.1

3.1. Precip Parameter: This **Precip** display gives the current weight of liquid in the bucket. This includes rain water, melted snow, mineral oil, antifreeze, and possibly anything that fell into the bucket since it was last serviced.

Fig 3.2

In this example (Fig 3.2), the Precip shows 15.00 inches of liquid in bucket.

If the display ever reads a negative value or reports more than 15.00 inches (bucket capacity is 20 inches), phone your NWS Representative (NWSREP) so he/she can service the gauge. Your responsibility is to journal any maintenance action (if delegated by NWSREP) or a data discrepancy, to the Log Sheet, as described in pages 9-10, of Section 7.

3.2 Date and Time: The current date and time appear in the Home Display (Fig 3.2) and also appear one the last menu, the Station Name and Time (Fig 2.4).

The year, month, and day, appear on the left side: **2009/02/13.** Shows Feb 13, 2009.

The time in hours, minutes, and seconds, appears next: **10:52:30.** This is 10:52am local Standard time in a 24 hour convention.

Understand that the time is always kept in **Standard** time. Our policy is to never adjust to daylight savings time. If you notice the **minutes** are off by more than 10 minutes, then phone your NWSREP to inform him/her of the error. Discrepancies on the display may indicate a system problem that requires a station visit by your NWSREP.

3.3 Spare Memory Card: You should keep a spare Memory Card in its plastic protective case resting on the support stage several inches below the memory card slot. right beside the Precip Recorder. The support stage is visible in Fig 1.5.

4. Monthly Data Retrieval

In the first five days of each month, but never before 12am on the first day of month, at a time when it is not raining or snowing, walk out to the Fischer & Porter gauge, and retrieve the precipitation measurements. This outdoor procedure might take 5 minutes.

4.1. Insert Memory Card: Insert the Memory Card into the slot on the right side of the Precip Recorder (Fig 4.1) with the card's label-side facing you. Press it in, until it clicks.

Fig 4.1

4.2. Display responds: Auto Log Download of 60 days in 8 seconds.

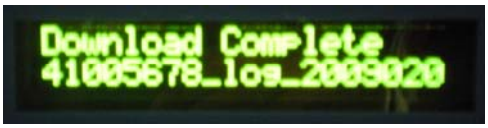
Fig 4.2

Then the display gives a running percentage of the portion of data copied to the memory card until 100% complete. This process might take five minutes to complete.

Fig 4.3

4.3. Verify the End of Download: View the display to confirm the download has completed.

Fig 4.4



4.4. Remove Card: Press the **OFF** button several times to return to the Home Menu. Then eject the card by pressing it in and then releasing it gently. Place the plastic protective plug back into its slot.

Fig 4.5

4.5. Enclose for Mailing: Place the plastic Memory Card into its clear plastic protective cover (Fig 4.6). Then, place the memory card into the standard ten inch, yellow mailing envelope (Fig 6.1), for delivery to your forecast office NWSREP.

Fig 4.6

5. Review the Log Sheet

Certain Observers are given the responsibility to perform gauge/bucket maintenance. These Observers are required to review and update the Log Sheet for any performed maintenance or discrepancies that occurred since the last monthly submission.

If your Log Sheet contains any entries, then mail it to your NWSREP together with the monthly Memory Card. If maintenance was not performed in last one month, or there were no discrepancies, do not mail the Log Sheet.

6. Mail the Memory Card

By the 7th day of month, mail the Memory Card, in its plastic protective case, to your NWSREP in the same type of envelope you used to mail the Punch Tape records to your Weather Forecast Office (WFO).

The Jiffy No. 0 (zero) padded mailing envelope (see Fig 6.1) is the appropriate envelope because you may include the log sheet and/or Form B91 if you also observe with the standard rain gauge or observe temperature. The photo shows the standard ten inch

square, darker color envelope. Newer, bubble-pack square envelopes have thinner paper and tear more easily and can result in the Memory Card being lost in the mail.

Certain United States Postal Service (USPS) centers might use electro-magnetic scanning devices to screen materials coming through the mail. To avoid potential damage to the Memory Card, you may write: '**Sensitive Magnetic Media, Handle Manually**' on the front of the Jiffy No. 0 mailing envelope.

Fig 6.1

Note: The Memory Card was purchased by the National Weather Service and is considered Government property – therefore please do not use it other than to download data from the Fischer-Porter rain gauge.

7. Journal Responsibility

7.1 Continuous Automated Logging: Previously, any time you suspended the F&P gauge from its 15-minute timer or each month when you removed the Punch Tape from the sprockets, you were required to write down the 'OFF Date/Time', as well as your Station ID (i.e., 23-4652), your Station Name (i.e., Lake City), and your State (i.e., MO) in felt tip marker to your Punch Tape. You then had to draw a straight line (i.e., a "time line") across the width of the Punch Tape, to stand as an unmistakable reference to show where the interruption began. When you rethreaded the paper you would mark 'ON Date/Time.'

With the FPR however, the recorder continues to run un-interrupted while you perform the critical monthly task of downloading precipitation data to the Memory Card. So, you do not need to document the date or time (i.e., OFF date/time) when you download the monthly data.

Each time you wake-up the display or download data to memory card, the Precip Recorder will self-log the date and time of the event as, 'Display On, 09/20/2008, 10:12:54.' This way a permanent record is made to the electronic data, much in the same way your pen-on-paper notations worked.

7.2 Bucket Maintenance – Journal Entries: When the bucket is emptied or when anti-freeze and oil are added, the weight of the collection bucket will change and produce a discontinuity in the 'Precip' record. For these actions you must write a journal entry into the Log Sheet to show the date and time when you conducted these tasks. This is analogous to the "OFF Date/Time" you entered on the F&P Punch Tape.

For example, anytime you partially drain the bucket, the statement: 'partially drained bucket' shall be written into the log sheet (see Fig 7.1).

Likewise, anytime antifreeze is added, the statement: 'antifreeze added to bucket' shall be written to the log sheet (see Fig 7.1).

F&P OBSERVER LOG SHEET
REQUIRED ENTRIES

COOP Station Number: _____ **Your Name:** _____ **Institution Name:** _____

LOG DATE	BUCKET LEVEL?	OIL ADDED?	ANTIFREEZE ADDED?	FUNNEL IN / OUT?	SPECIAL NOTES:
Date of Journal Entry	Date and time bucket was partially drained or completely emptied.	Date and time oil was last added. Typical is half-quart (16oz).	Date and time antifreeze was last added. Typical is 2 quarts (64oz).	Date and time funnel was removed for winter; or installed for summer.	Any anomaly or outage event? Give date and the elapsed time of outage. Describe the problem.
Apr 15, 2009	2pm Apr 15, 2009 - partially drained – New level is 2.37 inch	11am May 5, 2008	11am Oct 9, 2008, for winter.	Installed 2pm Apr 15, 2009, for summer.	This log-sheet is being mailed to NWS with memory card on or about May 3, 2009.

Fig 7.1

Note: For those Observers who have an agreement to drain the bucket when it is full, and to replenish levels of mineral oil and antifreeze, certain additional procedures apply. Before taking any action on the bucket, you must first wake-up the display by pressing any of the arrow buttons. Then, drain and add fluids to the bucket. When you are finished, press a button to wake-up the display a second time. This second wake-up should be done as you are ready to close the door and leave the gauge. In this way by lighting the display screen twice, the system writes an internal record into the data, so that everyone understands the Observer changed the 'Precip' level and added oil and/or antifreeze and this was not a precipitation event.

7.3 Log Sheet Requirements: If delegated to the Observer, there are twelve examples of actions and events that are necessary for Observers to journal in the F&P Log Sheet. They are listed in Appendix C, of this instruction guide. For most sites the NWSREP conducts these actions and may use a different form to document them.

You may keep a printed copy of the F&P Log Sheet in a protective clear plastic envelope in the containment shell next to the Precip Recorder. If you need additional F&P Log Sheets like the one in Appendix D, please phone your NWSREP.

APPENDIX A – MAILING ADDRESS FOR MEMORY CARD TO WFO

1. Where is my local WFO? _____.

WFO Name

_____.

Street Address

_____.

Town, State, Zip Code

_____.

Phone Number

2. Who is my NWSREP? _____.

First and Last Name

_____.

Phone Number

_____.

E-mail at WFO

3. Does my NWSREP have an alternate?

_____.

First, Last Name

_____.

Phone Number

_____.

E-mail at WFO

Note: Please journal all routine maintenance actions you have been asked to conduct within two weeks of the action, and mail the Log Sheet to your NWSREP in the same type of envelope as used for normal monthly delivery of the Memory Card. Always phone or e-mail your NWSREP if you encounter a discrepancy (i.e., false looking Precip reading, power outages, object in bucket) or when the bucket is reaches 15 inches and draining is required. Your NWSREP will keep a copy of your Log Sheet at his WFO.

APPENDIX B : PRECIP RECORDER MENU TREE

Primary Menus	Second Level	Third Level
Precip and Time (Home Menu)	- none -	- none -
Battery Now 12.6V	- none -	- none -
Logged Data ▶	Precip ▶	Fifteen-minute data.
	Logged Events ▶	Ie., 'Display on', etc.
	All Logged Data ▶	Data and events.
Station Setup ▶	Measurement Setup	Password Protected
	Temperature Setup	Password Protected
	Other Settings	Password Protected
Diagnostic ▶	Two Point Calibration ▶	Instructions
	Precip Details ▶	Parameters
	Temp Details ▶	Parameters
	Software Version	- none -
Station Name & Time	- none -	- none -

The six primary menus revolve back to the Home Display (shaded-box) if you keep scrolling with the down-arrow (▼) key. To exit any of the second or third level menus, simply press the 'off' button.

APPENDIX C : REQUIRED JOURNAL ENTRIES

If your NWSREP has delegated certain maintenance activities for you, the Observer, then you are required to write down these activities in the Log Sheet provided you in Appendix D.

Date / Time*	Tell the NWSREP what actions you have taken.
Oct 2nd 3:00pm	Non-routine download to Memory Card
Oct 2nd 3:05pm	Routine Gauge Check
Nov 5th 9:40am	Started* - Bucket Emptying
Nov 5th 9:49am	Finished* - Bucket Emptying
Nov 6th 11:07am	Started*– Bucket Partial Draining (i.e., to retain mineral oil)
Nov 6th 11:10am	Finished* – Bucket Partial Draining (i.e., to retain mineral oil)
Nov 6th 11:10am	Foreign Object Found in Bucket (i.e., must communicate to NWS)
Nov 7th 12:15pm	Added Oil to Bucket
Nov 8th 1:30pm	Added Antifreeze to Bucket
Dec 5th 9:50am	Installed Funnel
Mar 6th 4:20pm	Removed Funnel
July 3rd 2:30pm	Time is more than 10 minutes fast/slow

Time * - Use the hours and minutes as they appear in the Precip Recorder display.
Started * - Indicates the time when you began to alter the contents of the bucket.
Finished * - Indicates the time you have concluded your maintenance action, and the bucket is ready to catch precipitation.

Note: The journal entries you make to your F&P Log Sheet must be mailed to your NWSREP with the Memory Card in the same envelope. In this way you inform the NWS of any needs for maintenance and supplies and you improve data reliability. Your Log Sheet may be used by the NWSREP to supplement the record s/he produces upon station visitation.

APPENDIX D

F&P OBSERVER LOG SHEET

COOP Station Number: _____ **Your Name:** _____ **Institution Name:** _____

LOG DATE	BUCKET LEVEL?	OIL ADDED?	ANTIFREEZE ADDED?	FUNNEL IN / OUT?	SPECIAL NOTES:
Date of Journal Entry	**Date and time bucket was partially drained or completely emptied.**	**Date and time oil was last added. Typical is half-quart (16oz).**	**Date and time antifreeze was last added. Typical is 2 quarts (64oz).**	**Date and time funnel was removed for winter; or installed for summer.**	**Any anomaly or outage event? Give date and the elapsed time of outage. Describe the problem.**
Apr 15, 2009	2pm Apr 15, 2009 - partially drained – New level is 2.37 inch	11am May 5, 2008	11am Oct 9, 2008, for winter.	Installed 2pm Apr 15, 2009, for summer.	This log-sheet is being mailed to NWS with memory card on or about May 3, 2009.

NWSREP Name: _____ **NWSREP Phone:** _____.

Instructions: Write only the maintenance actions or check-ups you have taken as an Observer. Always phone your NWSREP if there is an FPR system outage or an anomaly that might adversely affect the integrity of the power system, the data recorder, or the data itself. Your Observing Station may design its own worksheet to suit its needs with the intention to account for the same areas of operation as indicated above. If NWSREP approves, you may regularly mail your Observer Log Sheets to your NWSREP. You may store this Log Sheet beside the Precip Recorder, inside the gauge.