

CSI MODEL CS700-L RAIN GAGE INSTRUCTION MANUAL

REVISION: 2/96

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CAMPBELL SCIENTIFIC, INC.

RMA# _____

815 West 1800 North
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Non-warranty products returned for repair should be accompanied by a purchase order to cover the repair.



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CSI MODEL CS700-L RAIN GAGE

1. INTRODUCTION

The CS700-L tipping bucket rain gage is manufactured by Hydrological Services Pty. Ltd. (Model TB-3), and modified for use with Campbell Scientific dataloggers.

The CS700-L rain gage catches rainfall in the 7.87" (200 mm) collection funnel. When 0.01" of rainfall are collected, the tipping bucket assembly tips and activates a reed switch. The switch closure is recorded by the datalogger pulse channel. When the bucket tips, the water drains out the screened base of the gage.

2. SPECIFICATIONS

MODEL CS700-L RAIN GAGE

Funnel:	7.87" (200 mm)
Measurement Range:	0 to 19.7 in/hr (0 to 500 mm/hr)
Accuracy:	better than +2% @ 3.9in/hr (100mm/hr)
Resolution:	0.01" (0.254 mm)
Environmental Conditions:	
Temperature:	0°C to +50°C
Humidity:	0 to 100%
Contact:	Dual Reed Switch
Capacity:	12VA (0.5 amp max.)
Dimensions:	
Weight:	7.4 pounds (3.4 kg) w/ 25 ft. signal cable
Height:	13.5" (342 mm)
Diameter:	9.6" (244 mm)

NOTE: The black outer jacket of the cable is Santoprene® rubber. This compound was chosen for its resistance to temperature extremes, moisture, and UV degradation. However, this jacket will support combustion in air. It is rated as slow burning when tested according to U.L. 94 H.B. and will pass FMVSS302. Local fire codes may preclude its use inside buildings.



3. INSTALLATION

3.1 LOCATION

The rain gage should be mounted in a relatively level spot which is representative of the surrounding area. The lip of the funnel should be horizontal and at least 30 inches above the ground. The ground surface around the rain gage should be natural vegetation or gravel. The gage should not be installed over a paved or concrete surface.

For accurate measurements, the rain gage must be placed away from objects that obstruct wind. The minimum distance should be 2 times the height of the obstruction or more.

3.2 MOUNTING

The rain gage is designed to mount on a flat surface. Three equally spaced mounting pads are provided. The mounting pads are pre-drilled for three 3/8" (M8) bolts on a 9.21" (234 mm) diameter bolt circle. The CM100 mounting bracket is available from Campbell Scientific for installing the CS700-L on a 1-1/4" threaded pipe. The mounting bracket provides adjustment for leveling the CS700-L.

Mount the CS700-L to either a user supplied bracket or CM100. Remove the CS700-L funnel from the base by removing the three screws and lifting upward. Adjust the three nuts on the CM100 bracket to level the rain gage. On user supplied brackets, shims or washers can be used to level the rain gage. A

CS700-L RAIN GAGE

bubble level is mounted on the CS700-L base to facilitate leveling.

Remove the rubber shipping band and cardboard packing securing the tipping bucket assembly. Tip the bucket several times to insure the tipping mechanism is moving freely. Replace the housing assembly and tighten the three screws to secure the housing to the base.

3.3 WIRING

3.3.1 DATALOGGER WIRING

CR10, 21X, and CR7:

BLACK(+5V)-----Pulse Channel
WHITE(Ground)-----GND
CLEAR(Shield)-----GND

The BLACK (+5V Signal) lead connects to a pulse channel. The WHITE (Power Ground) connects to any ground channel (G). The CLEAR (shield) lead connects to any ground channel (G). The purpose of the shield wire is to drain any charges built up in the cable due to transients etc.

NOTE: If a pulse channel is not available, Control Port 7 or 8 can be used to record switch closures from a rain gage with the CR10 datalogger. Refer to the datalogger manual, section 8.5, for additional information.

BDR320:

BLACK (+5V)-----P1
WHITE (Ground)-----GND
CLEAR (Shield)-----GND

NOTE: On the BDR320, only pulse channel 1 can be used to measure a tipping bucket signal.

3.4 DATALOGGER INSTRUCTIONS

CR10, 21X, CR7 Programming:

The CS700-L rain gage is measured using Instruction 3 configured for a switch closure (option code 2).

In the following example, the datalogger continuously measures rainfall and outputs the time, date, and total rainfall every 60 minutes:

Input Location Labels:

1. Rain (in)

	1	Table Programs
01:	60	Sec. Execution Interval
01:	P3	Pulse
01:	1	Rep
02:	1	Pulse Input Channel
03:	2	Switch Closure
04:	1	Loc [:Rain (in)]
05:	0.01	Mult
06:	0	Offset
02:	P92	If time is
01:	0	minutes into a
02:	60	minute interval
03:	10	Set high Flag 0
03:	P77	Real Time
01:	110	Day,Hour-Minute
04:	P72	Totalize
01:	1	Repetitions
02:	1	Starting Input Location
05:	P	End Table 1

A multiplier of 0.01 converts the output to inches and a multiplier of 0.254 converts the output to millimeters.

4. MAINTENANCE

During each site visit, remove any debris, insects, sediment, etc. from the collection funnel, debris screen, siphoning mechanism, or tipping bucket assembly.

Verify the tipping bucket assembly moves freely, and that the datalogger records 0.01 in for each bucket tip.

5. CALIBRATION

The sensor is factory calibrated; recalibration is not required unless damage has occurred or the adjustment screws have loosened.

Nevertheless, the following calibration check is recommended once every 12 months:

- a. Remove the housing assembly from the base by removing the three screws and lifting upward on the housing.
- b. Check the bubble level to verify the rain gage is level.
- c. Pour water through the inner funnel to wet the two bucket surfaces. Using a graduated cylinder, slowly pour 314 cc (19.16 in^3) of water, over a 15 minute period, into the collection funnel. This volume of water is equal to .39 in of rainfall (10 mm).
- d. After the water has passed through the rain gage, the tipping bucket should have tipped 39 times.
- e. If the rain gage fails to record the correct number of tips, return the unit to Campbell Scientific for recalibration.