



Texas Electronics, Inc.

The Gold Standard in Weather Instrumentation Since 1957

Rain Gauge Tipping Bucket

TR-525i Series Rainfall Sensor



Description

The Texas Electronics, Inc. TR-525I Rainfall Sensor is a remote tipping bucket style rain gauge that measures the amount of liquid precipitation.

The Rain Gauge is a freestanding receptacle for measuring precipitation. It contains an open top, which allows rainfall to fall into the upper portion, which is called the collector. Collected water is funneled to a mechanical device (tipping bucket), which incrementally measures the rainfall accumulation and causes a momentary closure of a switch. As water is collected, the tipping bucket fills to the point where it tips over. This action empties the bucket in preparation for additional measurement. Water discharged by the tipping bucket passes out of the rain gauge with no need for emptying.

The TR-525I was designed to meet the need for a rugged and reliable rain gauge tipping bucket with high accuracy and low cost.

Features & Benefits

- Interfaces to virtually all data acquisition systems
- Knife-edge collector optimizes rainfall catch
- Exceptional splash-out protection reduces wind errors
- Easy installation and maintenance
- Over 30 years in production
- Lightweight spun Aluminum Exterior
- Anodized aluminum collector for weather resistance
- Integral Bubble Level

Specifications

Resolution:	0.01" English 0.2 mm Metric (optional)
Accuracy:	1.0% up to 2"/hr (50 mm/hr)
Collector diameter:	6.060" (154 mm) with knife-edge
Funnel depth:	6.4" (163 mm)
Splash out protection:	>2" (50 mm)
Operating Temp:	32 to 125° F (0 to 50° C)
Storage Temp:	-40 to 160° F (-40 to 70° C)
Humidity Limits:	0 to 100%
Weight:	2.5 lbs. (1.2 kg) 6 lbs. (2.7 kg) shipping
Height:	10" (255 mm)
Cable:	25', 22 gauge 2 conductor
Switch:	Momentary potted reed switch
Switch rating:	30 VDC @ 2 A, 115 VAC @ 1 A
Switch Closure Time:	135 ms
Bounce Settling Time:	0.75 ms
Pivot:	Hardened SS Jewel & Pivot
Bucket:	Black ABS injection molded
Level:	Integral Bubble Level
Warranty:	3 years

Installation & Maintenance

Installation consists of attaching the three sensor support legs to a firm platform (such as our MB-525 Mounting Base). Pole mounting on the mast of a weather station is available by securing to the included side bracket.

Maintenance consists of routine cleaning of debris from the filter screen, and occasional calibration verification with our FC-525 Field Calibration Kit.

Ordering Information

Model #	Description
TR-525I	Rain Gauge, 6.06" collector, English (Please specify for calibration of 0.2 mm/tip)

Optional Parts / Accessories

HOB0	Event Datalogger and Software
MB-525	Pole Mounting Base
FC-525	Field Calibration Kit
BB-525	Bird Repellent
HT-525	Heater, 120 VAC
Cable	Additional Cable

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Rain Gauge Tipping Bucket

TR-525M Rainfall Sensor



Description

The Texas Electronics, Inc. TR-525M Rainfall Sensor is a remote tipping bucket style rain gauge that measures the amount of liquid precipitation.

The TR-525M rain gauge is a freestanding receptacle for measuring precipitation. It contains an open top, which allows rainfall to fall into the upper portion, which is called the collector. Collected water is funneled to a mechanical device (tipping bucket), which incrementally measures the rainfall accumulation and causes a momentary closure of a switch. As water is collected, the tipping bucket fills to the point where it tips over. This action empties the bucket in preparation for additional measurement. Water discharged by the tipping bucket passes out of the rain gauge with no need for emptying.

The TR-525M was designed to meet the need for a rugged and reliable metric rain gauge tipping bucket with high accuracy and low cost.

Features & Benefits

- High-resolution metric output
- Interfaces to virtually all data acquisition systems
- Knife-edge collector optimizes rainfall catch
- Exceptional splash-out protection reduces wind errors
- Easy installation and maintenance
- Over 30 years in production
- Lightweight spun Aluminum Exterior
- Anodized aluminum collector for weather resistance
- Integral Bubble Level

Specifications

Resolution:	0.1 mm Metric
Accuracy:	1.0% up to 2"/hr (50 mm/hr)
Collector diameter:	9.66" (245 mm) with knife-edge
Funnel depth:	7.2" (183 mm)
Splash out protection:	>2" (50 mm)
Operating Temp:	32 to 125° F (0 to 50° C)
Storage Temp:	-40 to 160° F (-40 to 70° C)
Humidity Limits:	0 to 100%
Weight:	2.5 lbs. (1.2 kg) 6 lbs. (2.7 kg) shipping
Height:	12" (305 mm)
Cable:	25', 22 gauge 2 conductor
Switch:	Momentary potted reed switch
Switch rating:	30 VDC @ 2 A, 115 VAC @ 1 A
Switch Closure Time:	135 ms
Bounce Settling Time:	0.75 ms
Pivot:	Hardened SS Jewel & Pivot
Bucket:	Black ABS injection molded
Level:	Integral Bubble Level
Warranty:	3 years

Installation & Maintenance

Installation consists of attaching the three sensor support legs to a firm platform (such as our MB-525 Mounting Base). Pole mounting on the mast of a weather station is available by securing to the included side bracket.

Maintenance consists of routine cleaning of debris from the filter screen, and occasional calibration verification with our FC-525 Field Calibration Kit.

Ordering Information

Model #	Description
TR-525M	Rain Gauge, 25 mm collector, Metric

Optional Parts / Accessories

HOB0	Event Datalogger and Software
MB-525	Pole Mounting Base
FC-525	Field Calibration Kit
BB-525	Bird Repellent
HT-525	Heater, 120 VAC
Cable	Additional Cable

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Rain Gauge Tipping Bucket

TR-525S Rainfall Sensor



Description

The TR-525S is a remote rain gauge that measures the amount of liquid precipitation. It utilizes a unique siphoning mechanism that allows an extended range of accuracy. This system allows control of the "flow rate" for accumulated precipitation. This metering geometry assures higher levels in both accuracy and repeatability during periods of extremely heavy rainfall.

The TR-525S is a freestanding receptacle for measuring precipitation. It contains an open top, called the collector, which allows rainfall to enter. The 4" deep collector is specially designed to prevent splash out and overflow, two possible causes for loss of accuracy during extremely heavy rainfall events. Collected water is siphoned into a mechanical device (tipping bucket). The tipping bucket then incrementally measures the rainfall accumulation and causes a momentary closure of a switch. As water is collected, the tipping bucket fills to the point where it tips over. This action empties the bucket in preparation for additional measurement. Water discharged by the tipping bucket passes out of the rain gauge with no need for emptying.

Features & Benefits

- Siphoning technique allows extended accuracy range
- Interfaces to virtually all data acquisition systems
- Knife-edge collector optimizes rainfall catch
- Exceptional splash-out protection reduces wind errors
- Easy installation and maintenance
- All aluminum exterior
- Integral Bubble Level

Specifications

Resolution:	0.01" English
	0.2 mm (optional)
Accuracy:	1.0% up to 12"/hr (305 mm/hr)
Siphon starting threshold:	<0.01" (<0.254 mm)
Collector diameter:	8.00" (203 mm) with knife-edge
Funnel depth:	>7" (163 mm)
Splash out protection:	4" (50 mm)
Operating Temp:	32 to 125° F (0 to 50° C)
Storage Temp:	-40 to 160° F (-40 to 70° C)
Humidity Limits:	0 to 100%
Weight:	6 lbs. (2.7 kg)
	8 lbs. (3.6 kg) shipping
Height:	15" (381 mm)
Cable:	25', 22 gauge 2 conductor
Switch:	Momentary potted reed switch
Switch rating:	30 VDC @ 2 A, 115 VAC @ 1 A
Switch Closure Time:	135 ms
Bounce Settling Time:	0.75 ms
Pivot:	Hardened SS Jewel & Pivot
Bucket:	Black ABS injection molded
Level:	Integral Bubble Level
Warranty:	3 years

Installation & Maintenance

Installation consists of attaching the three sensor support legs to a firm platform (such as our MB-525 Mounting Base). Pole mounting is not recommended for this sensor.

Maintenance consists of routine cleaning of debris from the filter screen, and occasional calibration verification with our FC-525 Field Calibration Kit.

Ordering Information

Model #	Description
TR-525S	Rain Gauge, 8.00" collector, English, Siphon (please specify for metric calibration)

Optional Parts / Accessories

HOBO	Event Datalogger and Software
MB-525	Pole Mounting Base
FC-525	Field Calibration Kit
BB-525	Bird Repellent
HT-525	Heater, 120 VAC
Cable	Additional Cable

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Rain Gauge Tipping Bucket

TR-525USW Rainfall Sensor



Description

The Texas Electronics, Inc. TR-525USW Rainfall Sensor is a remote tipping bucket style rain gauge that measures the amount of liquid precipitation.

The Rain Gauge is a freestanding receptacle for measuring precipitation. It contains an open top, which allows rainfall to fall into the upper portion, which is called the collector. Collected water is funneled to a mechanical device (tipping bucket), which incrementally measures the rainfall accumulation and causes a momentary closure of a switch. As water is collected, the tipping bucket fills to the point where it tips over. This action empties the bucket in preparation for additional measurement. Water discharged by the tipping bucket passes out of the rain gauge with no need for emptying.

The TR-525USW was specifically designed to meet the National Weather Service's requirements for rainfall measurement.

Features & Benefits

- Meets government requirements for an 8" collector
- Interfaces to virtually all data acquisition systems
- Knife-edge collector optimizes rainfall catch
- Exceptional splash-out protection reduces wind errors
- Easy installation and maintenance
- Over 30 years in production
- Lightweight spun Aluminum Exterior
- Anodized aluminum collector for weather resistance
- Integral Bubble Level

Specifications

Resolution:	0.01" English
Accuracy:	1.0% up to 2"/hr (50 mm/hr)
Collector diameter:	8.00" (203 mm) with knife-edge
Funnel depth:	6.4" (163 mm)
Splash out protection:	>2" (50 mm)
Operating Temp:	32 to 125° F (0 to 50° C)
Storage Temp:	-40 to 160° F (-40 to 70° C)
Humidity Limits:	0 to 100%
Weight:	2.5 lbs. (1.2 kg) 6 lbs. (2.7 kg) shipping
Height:	11" (280 mm)
Cable:	25', 22 gauge 2 conductor
Switch:	Momentary potted reed switch
Switch rating:	30 VDC @ 2 A, 115 VAC @ 1 A
Switch Closure Time:	135 ms
Bounce Settling Time:	0.75 ms
Pivot:	Hardened SS Jewel & Pivot
Bucket:	Black ABS injection molded
Level:	Integral Bubble Level
Warranty:	3 years

Installation & Maintenance

Installation consists of attaching the three sensor support legs to a firm platform (such as our MB-525 Mounting Base). Pole mounting on the mast of a weather station is available by securing to the included side bracket.

Maintenance consists of routine cleaning of debris from the filter screen, and occasional calibration verification with our FC-525 Field Calibration Kit.

Ordering Information

Model #	Description
TR-525USW	Rain Gauge, 8.00" collector, English

Optional Parts / Accessories

HOBO	Event Datalogger and Software
MB-525	Pole Mounting Base
FC-525	Field Calibration Kit
BB-525	Bird Repellent
HT-525	Heater, 120 VAC
Cable	Additional Cable

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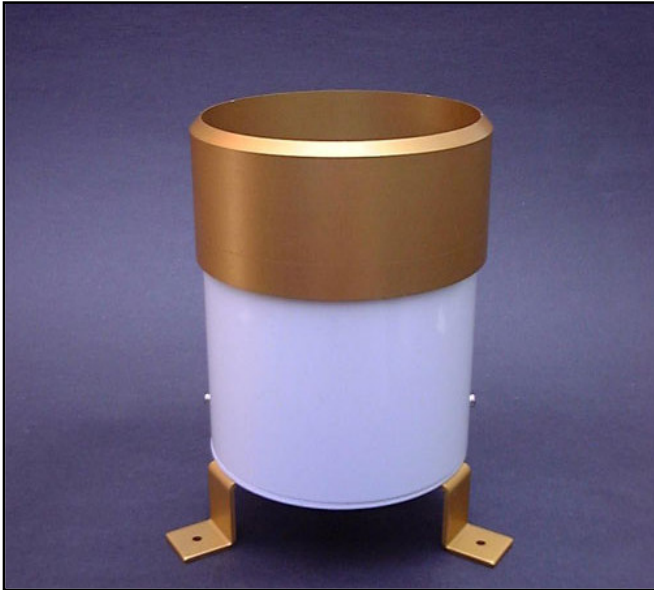


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Rain Gauge Tipping Bucket

TR-4 Rainfall Sensor



Description

The Texas Electronics, Inc. TR-4 low-cost Rainfall Sensor is a remote tipping bucket style rain gauge that measures the amount of liquid precipitation.

The Rain Gauge is a freestanding receptacle for measuring precipitation. It contains an open top, which allows rainfall to fall into the upper portion, which is called the collector. Collected water is funneled to a mechanical device (tipping bucket), which incrementally measures the rainfall accumulation and causes a momentary closure of a switch. As water is collected, the tipping bucket fills to the point where it tips over. This action empties the bucket in preparation for additional measurement. Water discharged by the tipping bucket passes out of the rain gauge with no need for emptying.

The TR-4 was designed to meet the need for a rugged and reliable rain gauge tipping bucket without the high accuracy of a research grade sensor, or the associated cost.

Features & Benefits

- Interfaces to virtually all data acquisition systems
- Knife-edge collector optimizes rainfall catch
- Exceptional splash-out protection reduces wind errors
- Easy installation and maintenance
- Rugged aluminum exterior
- Anodized aluminum collector for weather resistance
- Integral Bubble Level

Specifications

Resolution:	0.01" English
Accuracy:	3.0% up to 1"/hr (25 mm/hr)
Collector diameter:	3.90" (100 mm) with knife-edge
Funnel depth:	3" (76 mm)
Splash out protection:	>1.5" (38 mm)
Operating Temp:	32 to 125° F (0 to 50° C)
Storage Temp:	-40 to 160° F (-40 to 70° C)
Humidity Limits:	0 to 100%
Weight:	2 lbs. (0.9 kg) 4 lbs. (1.8 kg) shipping
Height:	6" (152 mm)
Cable:	25', 22 gauge 2 conductor
Switch:	Hermetically sealed reed switch
Switch rating:	30 VDC @ 2 A, 115 VAC @ 1 A
Switch Closure Time:	135 ms
Bounce Settling Time:	0.75 ms
Pivot:	Hardened SS Jewel & Pivot
Bucket:	Black ABS injection molded
Level:	Integral Bubble Level
Warranty:	3 years

Installation & Maintenance

Installation consists of attaching the three sensor support legs to a firm platform such as a fencepost. Pole mounting on the mast of a weather station is available by securing to the optional U-bolt assembly.

The sensor is dynamically calibrated at the factory and due to the nature of its operation should not require field calibration. Field maintenance should include occasional cleaning of the collector screen and inspection of the internal mechanism to make sure it is free from insects and debris.

Ordering Information

<u>Model #</u>	<u>Description</u>
TR-4	Rain Gauge, 3.90" collector, English (Please specify for pole mounting U-bolt)

Optional Parts / Accessories

HOBO	Event Datalogger and Software
BB-525	Bird Repellant Apparatus
Cable	Additional Cable

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Pole Mounting Base

MB-525



Description

The MB-525 Pole Mounting Base is designed to be an aid in quick and easy installation in any TR-525 series rain gauge. The base has three adjustable springs to allow quick adjustment and accurate leveling of the rain gauge. (Note: Rain Gauge not included)

Features & Benefits

- Quick and accurate adjustment
- Works with any TR-525 series rain gauge
- Low-cost verification
- Easy installation
- Utilizes a standard pipe flange
- Secure mounting

Pole Mounting Base Kit Contents

Base plate with 1.25" NPT pipe flange
Adjustment screws and springs
Threaded feet for TR-525

*Note: The 1.25" pipe is not included

Installation & Maintenance

Installation of TR-525 series rain gauge with the MB-525 pole mounting base consists of mounting a 1.25" pipe with a NPT thread vertically into the ground. Typical installations suggest the top of the rain gauge be 36" (91.4 cm) above the ground. Below is a chart that gives the height of each TR-525 rain gauge (Note: the MB-525 adds approximately 1" (2.54 cm) to the overall height.) and the suggest height of the pipe above ground. All distances are approximate.

Model #	Height	Height with MB-525	Suggested pipe height
TR-525I	10" (25.4 cm)	11" (27.9 cm)	25" (63.5 cm)
TR-525USW	11" (27.9 cm)	12" (30.5 cm)	24" (70 cm)
TR-525M	12" (30.5 cm)	13" (33 cm)	23" (58.4 cm)
TR-525S	15" (38.1 cm)	16" (40.6 cm)	20" (50.8 cm)

Once the pipe is installed simply screw the base onto the pipe. Then install the rain gauge onto the base as shown in the manual and the installation is complete.

Maintenance of the base consists of periodically verifying and adjusting the level of the rain gauge if necessary. No other maintenance is required.

Ordering Information

<u>Model #</u>	<u>Description</u>
MB-525	Pole Mounting Base for TR-525

Works With:

TR-525*	Rain Gauge/Tipping Bucket (Please specify exact model)
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Field Calibration Kit

FC-525



Description

The FC-525 Field Calibration Kit is designed to be a field verification of accuracy for a TR-525 series rain gauge. This unit is not intended to substitute a dynamic laboratory calibration; however it is a great indicator of accuracy. The kit comes complete with everything necessary to verify the accuracy and functionality of the rain gauge including multiple nozzles for testing over various rainfall rates.

Features & Benefits

- Quickly and accurately verifies calibration
- Works with any TR-525 series rain gauge
- Low cost verification
- Easy to use
- Eliminates unnecessary down time
- Multiple nozzles for various calibrations

Calibration Kit Contents

Pre-drilled graduated cylinder for accurate fluid measurement
 Black anodized calibration funnel
 #65 and #70 nozzles for multiple flow rates
 Cleaning pin for each nozzle
 Instructions for field calibration and adjustment

Calibration

There are typical two different types of calibration for a tipping bucket. The first, most common yet least accurate is a static calibration. The second and most accurate is a dynamic calibration. (Note: This kit allows for a dynamic calibration of a rain gauge in the field.)

Static calibration is when a specific volume of water is placed into a tipping mechanism. The mechanism is then adjusted until it tips. This process is sometimes continued until both sides of the tipping mechanism tip at the specified volume of water.

Dynamic calibration utilizes a similar technique but also tests over time. A specific volume of water is poured into the tipping mechanism over a specific period of time. The main difference in this calibration is that calibrating over time allows for compensation of error caused by spillage. When a tipping bucket fills to the point of tipping there is a brief time when additional water is allowed into the gauge. This additional water is called spillage or overage and typically causes tipping buckets to read low at high rainfall rates. Hence a quality rain gauge will be calibrated over a range of rainfall rates or flow rates to minimize this error. Note that ALL standard tipping buckets have spillage issues. This explains the need for a siphon rain gauge, such as our TR-525S, to regulate the flow into the tipping mechanism and therefore minimize the spillage over a much broader range of rainfall.

Tip Volume

Our ideal, factory calibrated tip volumes for each TR-525 series rain gauge is as follows:

Model #	Calibration (per tip)		
	0.01"	0.2 mm	0.1 mm
TR-525I	4.73 mL	3.72 mL	N/A
TR-525USW	8.23 mL	6.49 mL	N/A
TR-525M	N/A	N/A	4.73 mL
TR-525S	8.23 mL	6.49 mL	N/A
TR-4	1.95 mL	N/A	N/A

Ordering Information

Model #	Description
FC-525	Field Calibration Kit for TR-525

Works With:

TR-525* Rain Gauge/Tipping Bucket
(Please specify exact model)

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