INSTRUCTION MANUAL

TIPPING BUCKET RAIN GAUGE

MODEL TB3/0.1mm
# Table of Contents

I. GENERAL .......................................................................................................................... 3  
II. UNPACKING YOUR TB3 RAIN GAUGE ...................................................................... 3  
III. SPECIFICATION ......................................................................................................... 4  
IV. INSTALLATION ........................................................................................................... 5  
V. TEST OPERATION ......................................................................................................... 6  
VI. MAINTENANCE .......................................................................................................... 7  
VII. ELECTRICAL ........................................................................................................... 9  
VIII. CALIBRATION ......................................................................................................... 9  
IX. TB3 PART LIST ........................................................................................................... 10  
   TB3 Base Part List ......................................................................................................... 11  
   TB3 Bucket Part List ..................................................................................................... 12  
   Syphon Part List .......................................................................................................... 13  
   Filter Part List .............................................................................................................. 14  
   Enclosure Part List ....................................................................................................... 15  
XI. FIELD CALIBRATION DEVICE ............................................................................... 16
TIPPING BUCKET RAIN GAUGE MODEL TB3/0.1mm

I. GENERAL

The HyQuest Solutions Tipping Bucket Rain Gauge (TB3/0.1mm) is recognised as the standard for measuring rainfall and precipitation in remote and unattended locations. The TB3 Rain Gauge operates on the tipping bucket principle, and has two types of buckets; metal and plastic. A receiver of 282.2mm diameter collects the rainfall, which is strained by a catch filter and a syphon before being passed to the tipping bucket measuring system. Tips of the bucket occur with each 0.1mm of precipitation collected. A reed switch detects these events and produces a momentary contact closure signal for:

- logging in our Rainfall Data Logger
- transmission by our Radio Reporting Rain Gauge, or
- display on our Rainfall Counter.

II. UNPACKING YOUR TB3 RAIN GAUGE

- This package should contain:
- TB3 Rain Gauge
- TB311/5 5 metre connecting lead

Please verify you have received these items and that the Tipping Bucket Rain Gauge resolution is as ordered.

To prepare the Tipping Bucket Rain Gauge for installation:

- lift the unit from the carton and place on secure surface
- remove polythene bag
- loosen the three enclosure securing screws and back them off until screw head is clear of the enclosure.
- lift the enclosure from the gauge
• carefully remove the elastic band/support pad from the bucket.

Your Tipping Bucket Rain Gauge is now ready for installation.

III. SPECIFICATION

Receiver: 282.2 mm ± 0.3 diameter machined aluminium, Powder coated.

Sensitivity: one tip at 0.1 mm of rainfall.

Maximum intensity: 700 mm/hr.

Calibration accuracy:

<table>
<thead>
<tr>
<th>TB3 bucket capacity</th>
<th>Measuring range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1mm</td>
<td>0-125 mm/hr</td>
<td>± 2 %</td>
</tr>
<tr>
<td></td>
<td>125-250 mm/hr</td>
<td>± 3 %</td>
</tr>
</tbody>
</table>

Long term stable calibration.

Humidity: 0 to 100 %

Temperature: -20 to +70° C

Contact system: dual reed switches potted in soft silicon rubber with varistor protection.

- Max Capacity: 24 Volts (0.5 amp max.)
- Resistance: Initial contact resistance 0.1 OHMS
- M.T.B.F: 10⁸ to 10⁹ Operations

Syphon: 0.19 mm capacity of rainfall - made from brass with a non hydroscopic outer case. The syphon can be dismantled for routine cleaning and servicing.

Bucket: Two types of buckets, synthetic ceramic coated brass bucket balanced to + 0.05 gms, and injection moulded non hydroscopic plastic ABS UV STABILISED balanced + 0.05gms.

Base: Diecast aluminium.

Level: bulls eye level adhered to aluminium base.

Mounting holes: three 10 mm diameter mounting holes with 234 mm PCD cast in feet attached to outside diameter of base.

Drain fittings: to attach 12 mm inside diameter tubing, to catch rainfall after passing through buckets.

Pivots: ground sapphire pivots with hard stainless steel shaft.
Insect covers: stainless steel mesh on all openings to prevent insects and ants entering gauge.

Outer enclosure: keyed to enable the release of the outer enclosure without the need for the removal of the three securing screws.

Height: 342 mm

Weight: 3.2 kg

Packed Dimensions: 29x29x45cm : 4kg

IV. INSTALLATION

DIAGRAM 1

i. Site Selection

Rainfall measurements are intended to be representative of the actual rain falling on a given area. Some of the more important factors which influence the representativeness of a gauge are as follows:

- Site the gauge on level ground where possible. Avoid sloping sites.
- Site should have adequate protection from strong winds.
- Site should be free of large obstructions such as buildings and trees.
• Provide suitable ground surface to avoid splashing into the gauge.

ii. Setting up

• Install the gauge on the foundation. A suggested foundation is shown in Diagram 1.

• Loosen the three enclosure securing screws and the enclosure.

• The gauge is provided with a level. Proceed to level by adjusting the hold down anchors as required.

• Connect lead to the Rain Gauge terminals, in accordance with Diagram 3, and to the recording device, in accordance with manufacturer’s instruction manual.

V. TEST OPERATION

• Manually tip the bucket a number of times, ensuring that each tip is being recorded and that the tilting mechanism is operating freely.

• Replace and secure the enclosure.
VI. MAINTENANCE

The only routine maintenance required is cleaning. The following items should be checked regularly for cleanliness:

- Catch filter
- Syphon (refer diagram 2)
- Interior of bucket
- Top surface of adjusting screws
- Enclosure locking screws - lightly lubricate after cleaning
- All insect screens

i. Dismantle Details

(a) Unscrew nut
(b) Lightly press stem down on surface until stem pops out of syphon body.
(c) Remove stem from syphon body.
(d) Unscrew cap
(e) Clean all items

To dismantle the Filter & Syphon Assembly, push filter and pull syphon at the same time. Do not twist.

Push Filter
Pull Syphon
Do not twist while pushing & pulling
ii. Assembly Details

(a) Screw cap on stem. Finger tight only.
(b) Push stem into syphon body.
(c) Replace nut and tighten. Do not over tighten.

To re-assemble push the filter/syphon assembly back in place. Do not twist
VII. ELECTRICAL

Dual reed switches are provided for several reasons:

- Two isolated switches permit the control of two separate circuits; e.g. a local counter and a telemetry circuit.
- Parallel connection of both switches increases the current carrying capacity of the contact system if required.
- Parallel switch operation confers a degree of redundancy in locations where data from the Rain Gauge is critical to flood warning etc.

VIII. CALIBRATION

All gauges have been calibrated by HyQuest Solutions Pty Limited prior to despatch.

The following products and services are available from HyQuest Solutions Pty Ltd.:

- Field Calibration Device, Model TB320, for routine field check calibrations, supplied with operating instruction sheet.
- Laboratory Calibration Unit, Model TB340, for calibration after servicing in workshops, supplied with operating manual.
- Recalibration Service at HyQuest Solutions’ factory.

Please contact either HyQuest Solutions Pty Ltd or our local distributor for further information.
IX. TB3 PART LIST

<table>
<thead>
<tr>
<th>Rain Gauge Part No.</th>
<th>Rain Gauge Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB3/0.1/M</td>
<td>Tipping Bucket Rain Gauge, bucket capacity 0.1mm, bucket type synthetic ceramic coated brass</td>
</tr>
<tr>
<td>TB3/0.1/P</td>
<td>Tipping Bucket Rain Gauge, bucket capacity 0.1mm, bucket type chrome plated injection moulded non hydroscopic plastic ABS UV STABILISED</td>
</tr>
</tbody>
</table>

Note:

The TB3 Rain gauge can be ordered either with a synthetic ceramic coated brass bucket or chrome plated injection moulded non hydroscopic plastic ABS UV STABILISED
<table>
<thead>
<tr>
<th>Item</th>
<th>Part no.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TB301-01</td>
<td>Base</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>TB301-07</td>
<td>Fitting</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>TB301-03</td>
<td>Insect Screen</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>SC040-16</td>
<td>Grommet</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>TB301-02</td>
<td>Insect Screen</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>TB301-05</td>
<td>Pivot Screw &amp; Nut</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>TB312</td>
<td>Adjusting Screw</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>(See next page)</td>
<td>Bucket Assembly</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>TB307</td>
<td>Reed Switch Assembly</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>TB303-04</td>
<td>Reed Switch Cover</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>SC022-08</td>
<td>Screw</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>SC008-24</td>
<td>Locknut</td>
<td>2</td>
</tr>
<tr>
<td>13.</td>
<td>SC023-09</td>
<td>Bullseye Level</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>SC045-21</td>
<td>Enclosure Screw</td>
<td>3</td>
</tr>
<tr>
<td>15.</td>
<td>SC040-38</td>
<td>Cap Plug</td>
<td>2</td>
</tr>
<tr>
<td>16.</td>
<td>SC045-02</td>
<td>Reed Switch Screw</td>
<td>2</td>
</tr>
</tbody>
</table>

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**TB3 Base Part List**

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**Tipping Bucket Rain Gauge**

Issue 10:28/3/2018
TB3 Bucket Part List

Item 17:
Part no: TB304
Descript: Bucket (0.1mm)
Quantity: 1

Item 18:
Part no: TB304-03
Descript: Bucket Axle
Quantity: 1

OR

Item 17:
Part no: TB304/0.2P
Descript: Bucket (0.1mm)
Quantity: 1

Item 18:
Part no: TB304-03
Descript: Bucket Axle
Quantity: 1

Metal Bucket

ABS UV Stabilised Plastic Bucket
Syphon Part List

Item 19:
Part no.: TB309-03
Descript: Stem Cap
Quantity: 1

Item 20:
Part no.: TB309-02
Descript: Stem
Quantity: 1

Item 21:
Part no.: SC024-23
Descript: O’ Ring
Quantity: 1

Item 22:
Part no.: TB412-01
Descript: Syphon Body
Quantity: 1

Syphon Assembly
Part no.: TB412
Quantity: 1

Item 23:
Part no.: SC008-38
Descript: Nut
Quantity: 1
Filter Part List

<table>
<thead>
<tr>
<th>Item</th>
<th>Part no.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>TB410-02</td>
<td>Filter Screen</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>TB410-01</td>
<td>Filter Cover</td>
<td>1</td>
</tr>
</tbody>
</table>

Filter Assembly TB410
Quantity: 1
Enclosure Part List

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB332-01</td>
<td>Outer Funnel</td>
<td>1</td>
</tr>
<tr>
<td>TB337-01</td>
<td>Inner Funnel</td>
<td>1</td>
</tr>
<tr>
<td>TB337-02</td>
<td>Enclosure</td>
<td>1</td>
</tr>
<tr>
<td>TB418-06</td>
<td>Vent</td>
<td>1</td>
</tr>
<tr>
<td>SC022-72</td>
<td>Screw</td>
<td>3</td>
</tr>
</tbody>
</table>

**TB332 breakdown assembly**
A. Position the three legged adaptor on the rim of the rain gauge

B. Remove nozzle (anticlockwise rotation)

C. Valve must be shut

D. Fill dispenser to overflowing

E. Carefully insert the dispenser into the three legged adaptor

F. Open valve to commence discharge

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**CALIBRATION**

As soon as the tap is opened, the contents (653mls) will commence flowing into the rain gauge catch at a rate equivalent to 100 mm of rainfall per hour. This table displays the theoretical number of bucket tips that should be achieved.

<table>
<thead>
<tr>
<th>Bucket Size</th>
<th>Theoretical Number of Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 MM</td>
<td>1039</td>
</tr>
</tbody>
</table>

*If the observed results are unacceptable then refer to the rain gauge instruction manual for appropriate adjustments.*

**INSTRUCTION FOR TIPPING BUCKET**

**RAIN GAUGE FCD FIELD CALIBRATOR**