

INSTRUCTION MANUAL
TIPPING BUCKET RAINGAUGE
MODEL TB3



QUALITY SYSTEM
ISO:9001
CERTIFIED

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TIPPING BUCKET RAINGAUGE MODEL TB3

I. GENERAL

The Hyquest Solutions Tipping Bucket Raingauge (TB3) is recognised as the standard for measuring rainfall and precipitation in remote and unattended locations. The TB3 raingauge operates on the tipping bucket principle, and can be supplied with two types of bucket assemblies; Painted Metal (Brass) or Chrome Plated ABS (Plastic). A receiver of 200mm diameter collects the rainfall, which then flows through the Stainless Steel Catch Filter into the Syphon Mechanism before being passed into the tipping bucket measuring system. One tip of the bucket will occur when the calibrated resolution of precipitation is collected (either 0.2, 0.5, 1.0mm or 0.01 inch). When the bucket tips, it will pass the encapsulated Dual Reed Switch assembly that detects these events and produces a momentary contact closure signal for:

- logging into our of precipitation Rainfall Data Logger, Model ML1-FL
- telemetered rainfall systems such as the RainTrak, Model, Model RT-3G
- displayed on our Total Rainfall Display (TRD).

II. UNPACKING YOUR TB3 RAINGAUGE

- This package should contain:
- TB3 Rain gauge
- TB311/5 5 metre connecting lead
- M4 Allen Key

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

To prepare the Tipping Bucket Raingauge 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 that secures the bucket assembly during transit.

Your Tipping Bucket Raingauge is now ready for installation.

III. SPECIFICATION

Receiver: 200 mm \pm 0.3 diameter heavy duty cast aluminium, Powder coated.

Resolution: one tip at 0.2, 0.5, 1.0 mm or 0.01 inch of rainfall.

Maximum Intensity: 700 mm / hr.

Calibration accuracy:

TB3 bucket capacity	Range	Accuracy
0.1mm, 0.2mm, 0.01", 0.5mm & 1.0 mm	0-250 mm/hr	\pm 2 %
	250-500 mm/hr	\pm 3 %

Long term stable calibration.

Humidity: 0 to 100 %

Temperature: - 20 to +70° C

Contact system: dual reed switches encapsulated with varister protection.

- Max Capacity: 24 Volts (0.5 amp max.)
- Resistance: Initial contact resistance 0.1 OHMS
- M.T.B.F: 10^8 to 10^9 Operations

Syphon: 0.4 mm (12 ml) capacity of rainfall - made from Brass with a non hydroscopic outer body. The syphon can be dismantled for routine cleaning and servicing.

Bucket: Two types of bucket assemblies available; synthetic ceramic coated Brass bucket, balanced to \pm 0.05 gms, and injection moulded, chrome plated, non-hydroscopic ABS plastic, UV stabilised, balanced to \pm 0.05gms.

Base: Diecast aluminium.

Level: bulls eye level adhered to aluminium base.

Mounting holes: three 10 x 20 mm slotted holes with 234 to 254 PCD cast in feet attached to outside diameter of base.

Drain fittings: to attach 12.5 mm inside diameter tubing, to catch rainfall after passing through buckets.

Pivots: ground Sapphire Pivots with tough 316g stainless steel shaft.

Insect covers: stainless steel mesh on all openings to prevent insects and ants entering gauge.

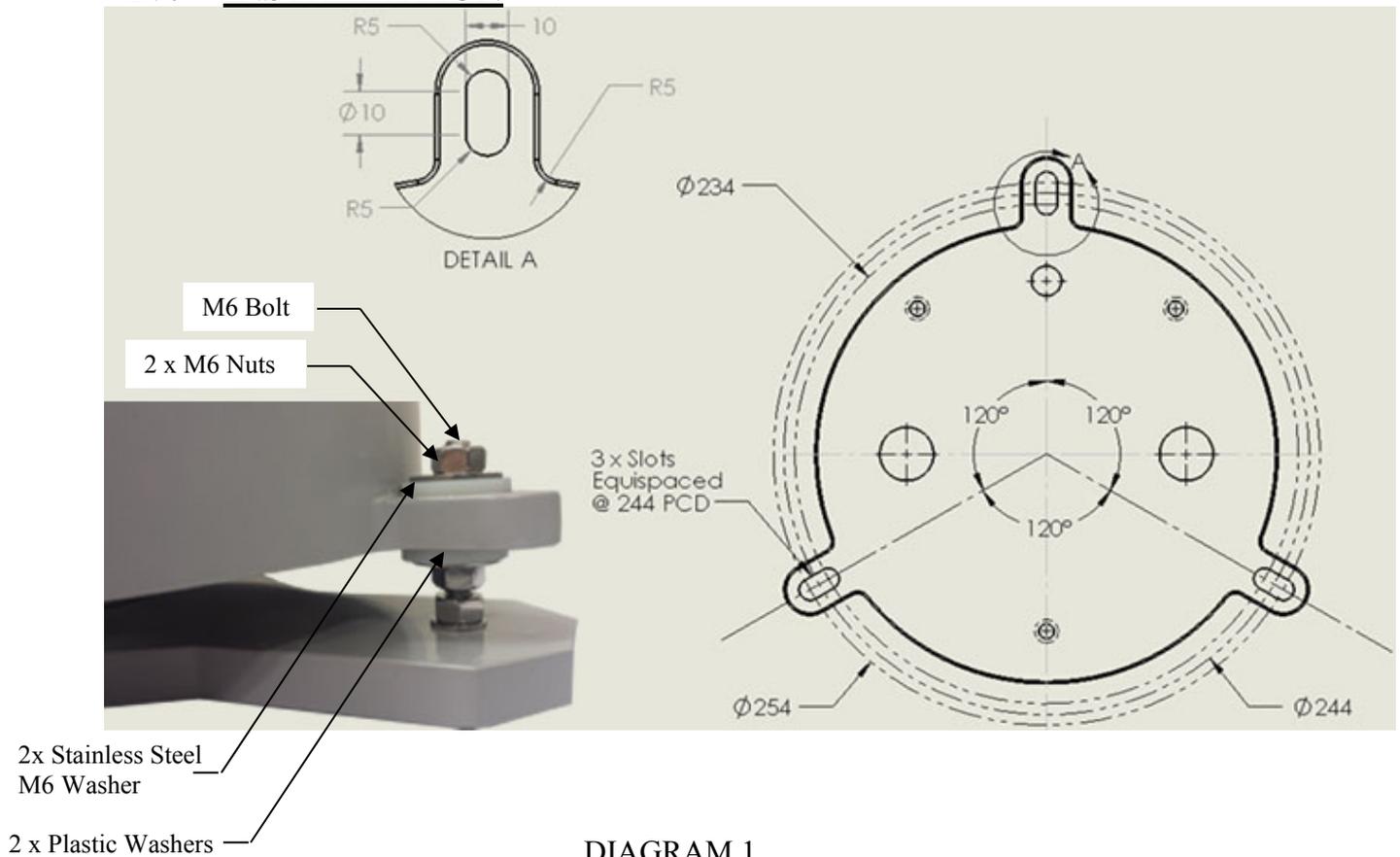
Outer enclosure: keyed to enable the release of the outer enclosure without the need for the removal of the three securing screws.

Height: 330 mm

Weight: 3 kg

Packed Dimensions: 24cm L x 24cm W x 42cm H x 5 kg (0.03m³)

IV. INSTALLATION



Important Notice:

The 6 plastic washers are supplied with each rain gauge for the following reasons:

- 1- Avoid scratching the paint on the base and expose the base to an external harsh and corrosive environment.
- 2- Avoid the stainless steel bolt and washers from damaging the paint on the aluminium base and creating galvanic corrosion between stainless steel and aluminium.

Please note:

Stainless Steel bolts and nuts are part of the Mounting Plate Part No. TB334. This part is supplied as an accessory and not part of the rain gauge kit.

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 detailed 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 raingauge 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.

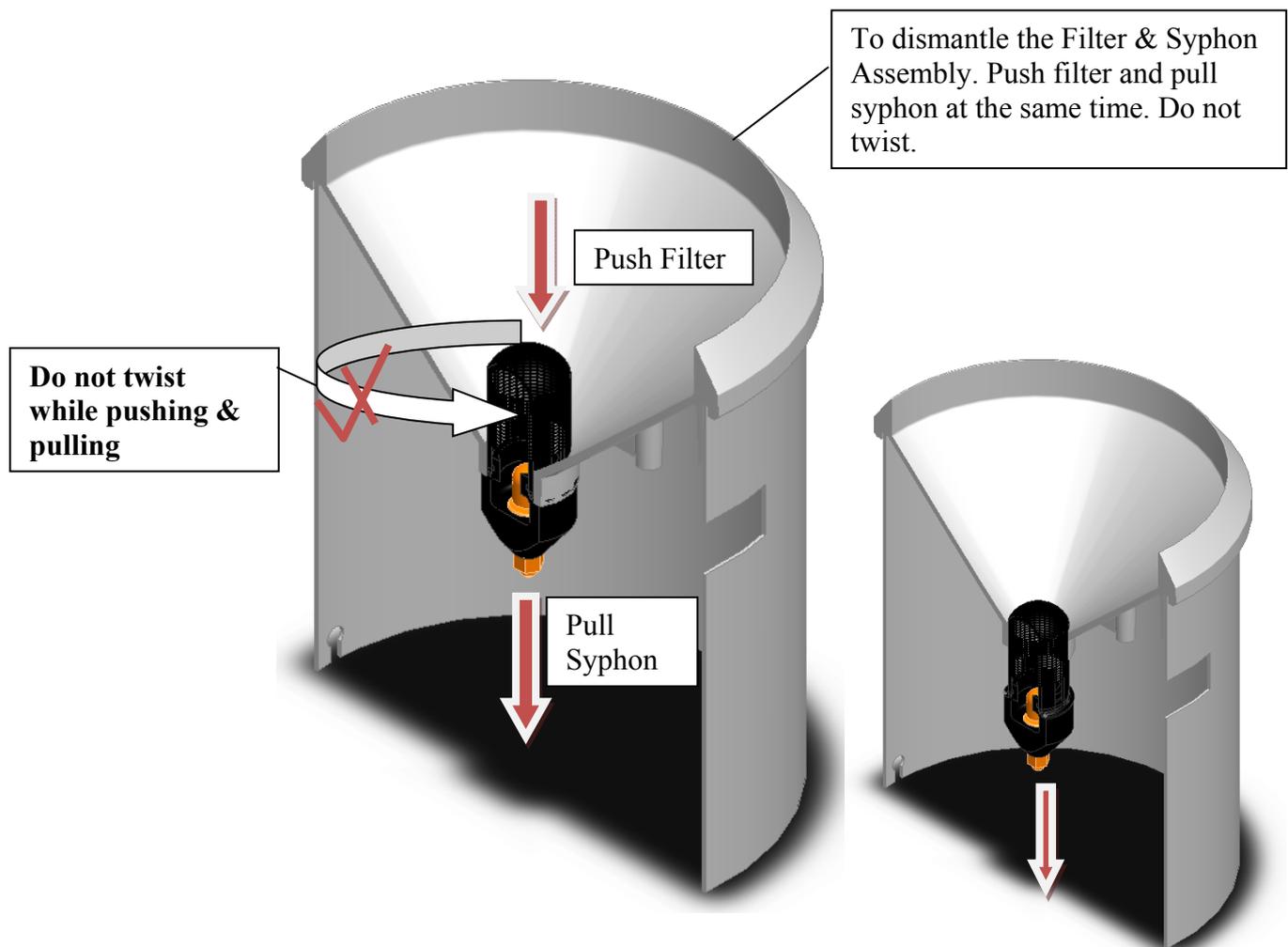
VI. MAINTENANCE

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**
- **Ensure Rain Gauge is level using the bubble level fitted to the base**
- **Enclosure locking screws - lightly lubricate after cleaning**
- **All insect screens**

i. Dismantle Details

- Unscrew nut
- Lightly press stem down on surface until stem pops out of syphon body.
- Remove stem from syphon body.
- Unscrew cap
- Clean all items



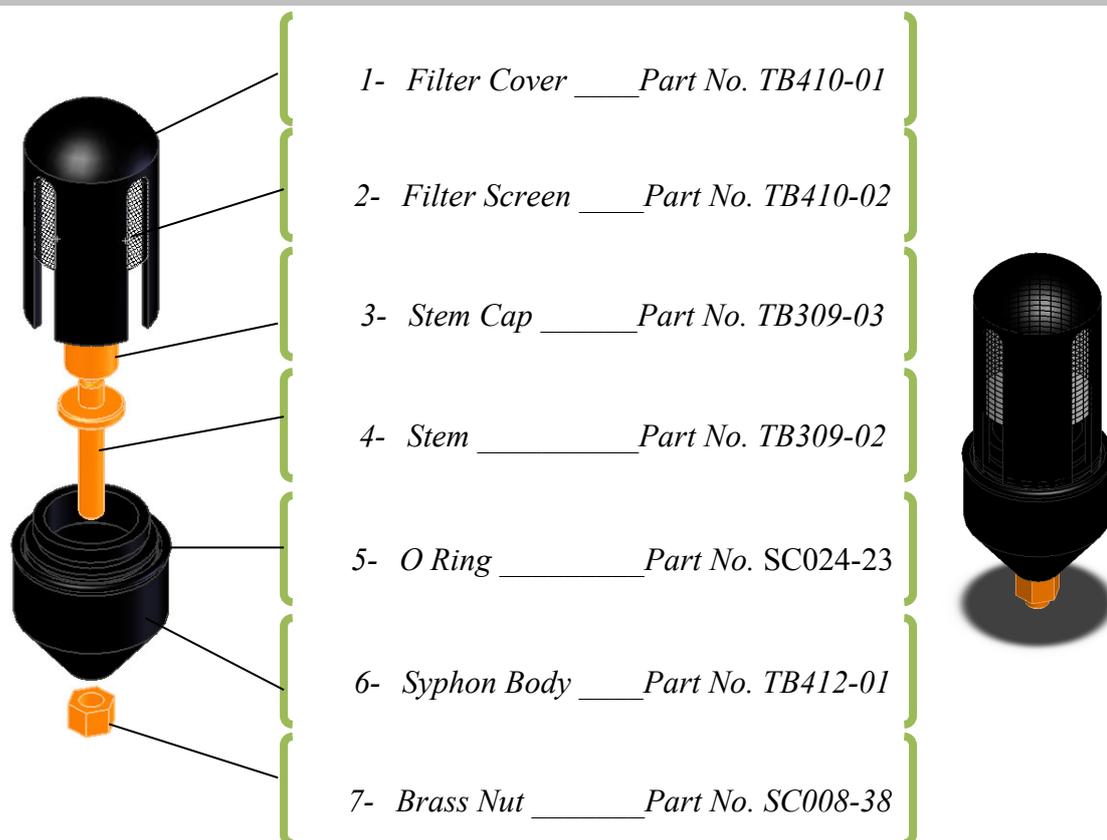
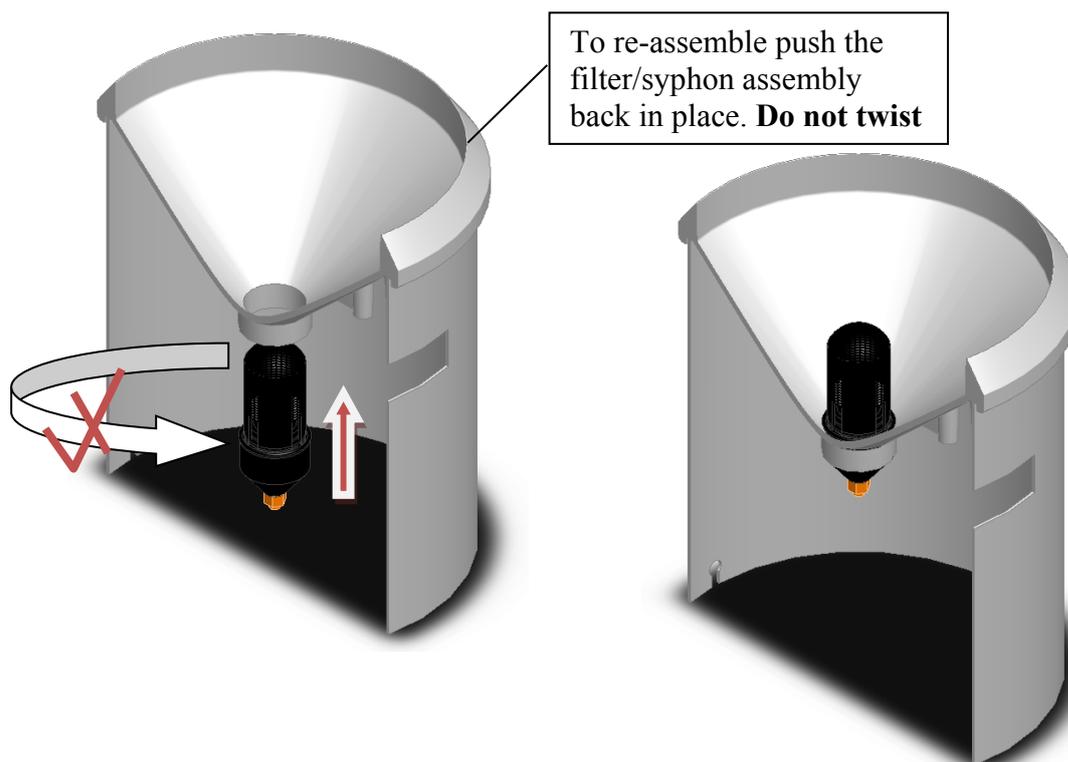


DIAGRAM 2

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.



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 raingauge is critical to flood warning etc.

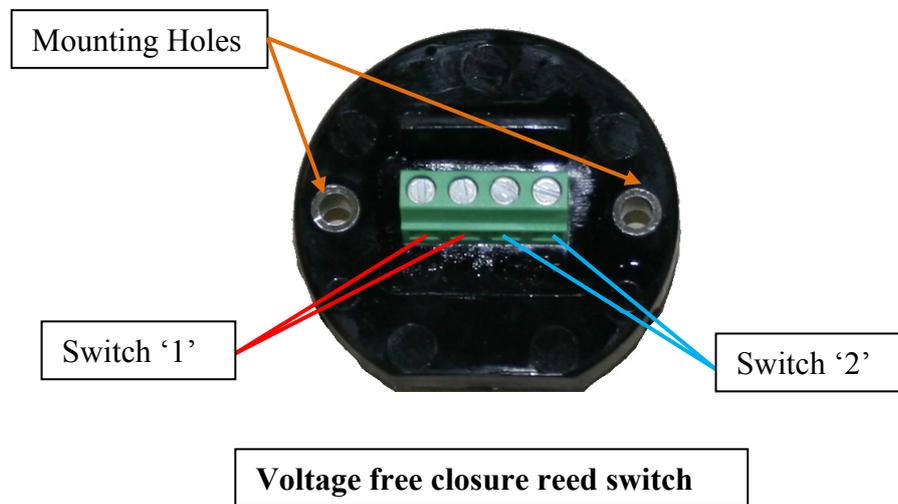


DIAGRAM 3

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 FCD, 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



Chrome Plated
ABS Plastic
UV Stabilised



Brass
Metal
Bucket

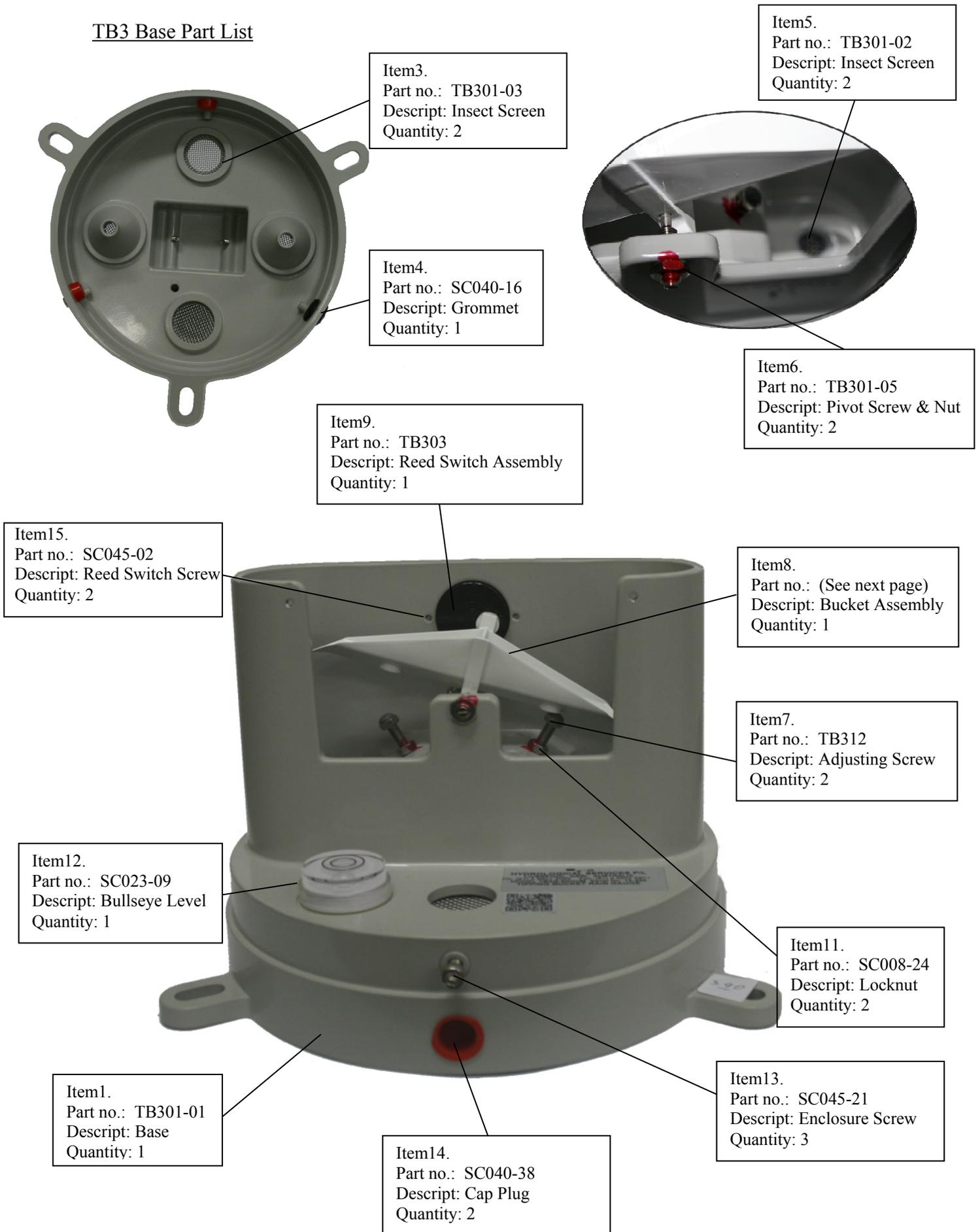


Note:

The TB3 Raingauge can be ordered either with a Synthetic Ceramic Coated Brass bucket or Chrome Plated, injection moulded, non-hydroscopic, UV Stabilised ABS plastic bucket.

Raingauge Part No.	Raingauge Description
TB3/0.2/M	Tipping Bucket Raingauge, bucket capacity 0.2mm, bucket type synthetic ceramic coated brass
TB3/0.01/M	Tipping Bucket Raingauge, bucket capacity 0.01inch, bucket type synthetic ceramic coated brass
TB3/0.5/M	Tipping Bucket Raingauge, bucket capacity 0.5mm, bucket type synthetic ceramic coated brass
TB3/1.0/M	Tipping Bucket Raingauge, bucket capacity 1.0mm, bucket type synthetic ceramic coated brass
TB3/0.2/P	Tipping Bucket Raingauge, bucket capacity 0.2mm, bucket type chrome plated injection moulded non hydroscopic plastic ABS UV Stabilised
TB3/0.01/P	Tipping Bucket Raingauge, bucket capacity 0.01inch, bucket type chrome plated injection moulded non hydroscopic plastic ABS UV Stabilised
TB3/0.5/P	Tipping Bucket Raingauge, bucket capacity 0.5mm, bucket type chrome plated injection moulded non hydroscopic plastic ABS UV Stabilised
-	-

TB3 Base Part List



TB3 Bucket Part List

Item17:

Part no: TB304
Descript: Bucket (0.2mm, 0.01")
or
Part no: TB305
Descript: Bucket (0.5mm)
or
Part no: TB306
Descript: Bucket (1.0mm)

Quantity: 1



Item18:
Part no: TB304-03
Descript: Bucket Axle
Quantity: 1

Metal Bucket

OR

Item17a:

Part no: TB304/0.2P
Descript: Bucket (0.2mm, 0.01")
or
Part no: TB305/0.5P
Descript: Bucket (0.5mm)

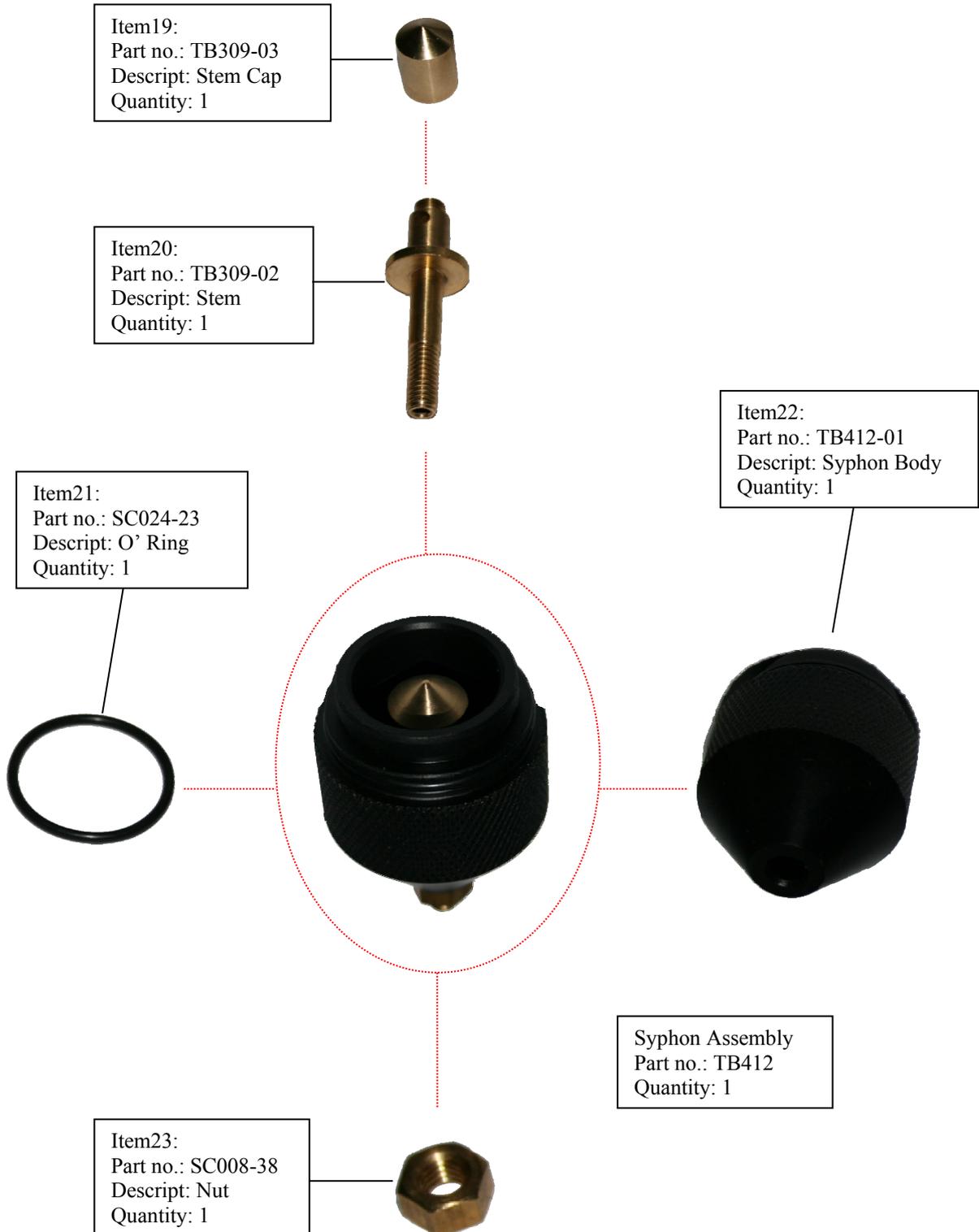
Quantity: 1



Item18:
Part no: TB304-03
Descript: Bucket Axle
Quantity: 1

ABS UV
Stabilised
Plastic Bucket

Syphon Part List



Note:
This Syphon is used for TB3 0.2mm, 0.5 mm and 0.01” capacity rain gauges

Item21a:
Part no.: SC024-23
Descript: O' Ring
Quantity: 1



Item22a:
Part no.: TB409-02
Descript: Syphon Body
Quantity: 1



Note:
This Syphon is used for TB3 1.0mm capacity rain gauge

Filter Part List

Item24:
Part no.: TB410-02
Descript: Filter Screen
Quantity: 1



Item25:
Part no.: TB410-01
Descript: Filter Cover
Quantity: 1

Filter Assembly TB410
Quantity: 1

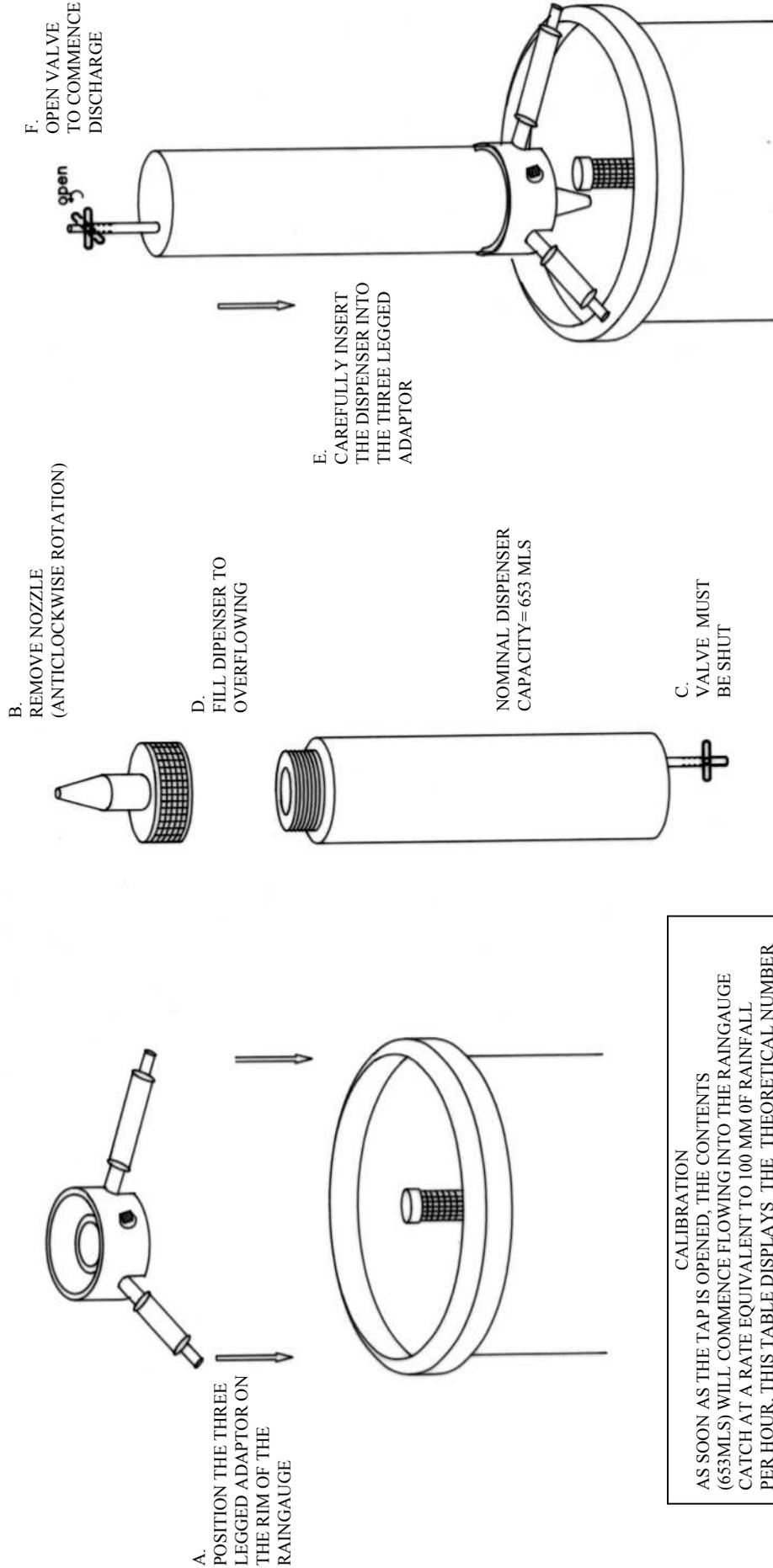
Enclosure Part List



Part no.	Description	Quantity
TB337-01	Funnel	1
TB337-02	Enclosure	1
TB418-06	Vent	1
SC022-72	Screw	3

TB337 breakdown assembly

XI. FIELD CALIBRATION DEVICE



CALIBRATION		
AS SOON AS THE TAP IS OPENED, THE CONTENTS (653MLS) WILL COMMENCE FLOWING INTO THE RAINGAUGE 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.		
BUCKET SIZE	200 MM CATCH	203 MM (8") CATCH
0.2 MM	103.9	100.9
0.5 MM	41.6	40.4
1.0 MM	20.8	20.2
0.01 INCH	81.8	79.4
IF THE OBSERVED RESULTS ARE UNACCEPTABLE THEN REFER TO THE RAINGAUGE INSTRUCTION MANUAL FOR APPROPRIATE ADJUSTMENTS		

INSTRUCTION FOR TIPPING BUCKET
RAINGAUGE FCD FIELD CALIBRATOR