

The logo for HydroMet, featuring a white diagonal slash followed by the word "HydroMet" in a bold, white, sans-serif font.

/ HydroMet

User Manual

TB3 / 0.1 mm

The KISTERS logo, consisting of a white stylized 'K' symbol followed by the word "KISTERS" in a bold, white, sans-serif font. Below the name is the tagline "Empowering decisions of tomorrow" in a smaller, white, sans-serif font.

KISTERS
Empowering decisions of tomorrow

Table of Contents

I	Disclaimer	3
II	Safety Instructions	4
Part I	Introduction	5
Part II	Installation	6
2.1	Unpacking your TB3 Rain Gauge	6
2.2	Site Selection and Setup	6
Part III	Configuration	8
3.1	Calibration	8
3.2	Field Calibration Device	8
Part IV	Operation	9
4.1	Test Operation	9
4.2	Electrical	9
Part V	Maintenance	10
Part VI	Repair	13
6.1	TB3 Part List	14
Part VII	Technical Data	20
Part VIII	Obligations of the Operator and Disposal	21
8.1	Obligations of the Operator	21
8.2	Dismantling / Disposal	21

I Disclaimer

The information provided in this manual was deemed accurate as of the publication date. However, updates to this information may have occurred.

This manual does not include all of the details of design, production, or variation of the equipment nor does it cover every possible situation which may arise during installation, operation or maintenance. KISTERS shall not be liable for any incidental, indirect, special or consequential damages whatsoever arising out of or related to this documentation and the information contained in it, even if KISTERS has been advised of the possibility of such damages.

Any errors found in any KISTERS product should be reported to KISTERS where every effort will be made to quickly resolve the problem.



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This document is public.

II Safety Instructions

- Read the user manual including all operating instructions prior to installing, connecting and powering up the KISTERS TB3_0_1. The manual provides information on how to operate the product. The manual is intended to be used by qualified personnel, i.e. personnel that have been adequately trained, are sufficiently familiar with installation, mounting, wiring, powering up and operation of the product.
 - Keep the user manual on hand for later reference!
 - If you encounter problems understanding the information in the manual (or part thereof), please consult the manufacturer or its appointed reseller for further support.
 - KISTERS TB3_0_1 is intended to be used in hydrometeorological or environmental monitoring applications.
 - Before starting to work, you have to check the functioning and integrity of the system.
 - Check for visible defects on the TB3_0_1, this may or may not include any or all of the following mounting facilities, connectors and connections, mechanical parts, internal or external communication devices, power supplies or power supply lines, etc.
 - If defects are found that jeopardize the operational safety, work must be stopped. This is true for defects found before starting to work as well as for defects found while working.
 - Do not use the KISTERS TB3_0_1 in areas where there is a danger of explosion.
 - The present user manual specifies environmental/climatic operating conditions as well as mechanical and electrical conditions. Installation, wiring, powering up and operating the KISTERS TB3_0_1 must strictly comply with these specifications.
 - Perform maintenance only when tools or machinery are not in operation.
 - If guards are removed to perform maintenance, replace them immediately after servicing.
 - Never make any electrical or mechanical diagnostics, inspections or repairs under any circumstances. Return the product to the manufacturer's named repair centre. You can find information on how to return items for repair in the relevant section of the KISTERS website.
-  Disposal instructions: After taking the KISTERS TB3_0_1 out of service, it must be disposed of in compliance with local waste and environmental regulations. The KISTERS TB3_0_1 is never to be disposed in household waste!
-  Inputs and outputs of the device are protected against electric discharges and surges (so-called ESD). Do not touch any part of the electronic components! If you need to touch any part, please discharge yourself, i.e. by touching grounded metal parts.

1 Introduction

Thank you for choosing our product. We hope you will enjoy using the device.

KISTERS manufactures, sells, installs and operates quality instrumentation, data loggers and communication technology. Products are designed with passion for environmental monitoring and with a deep understanding of the quality, accuracy and robustness needed to fulfil the requirements of measurement practitioners in the field.

The present User Manual will help you understand, install and deploy the device. If, however, you feel that a particular information is missing, incomplete or confusing, please do not hesitate to contact us for further support!

KISTERS' TB3 is a high-quality tipping bucket rain gauge for measuring rainfall and precipitation in urban and rural locations. Due to the integrated syphon, the gauge delivers high levels of accuracy across a broad range of rainfall intensities. With the optional heater the TB3 is the ideal device for cold climates.

2 Installation

This chapter contains the following subsections:

- [Unpacking your TB3 Rain Gauge](#)
- [Site Selection and Setup](#)

2.1 Unpacking your TB3 Rain Gauge

Please verify you have received the items listed in section Scope of Delivery 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.

2.2 Site Selection and Setup

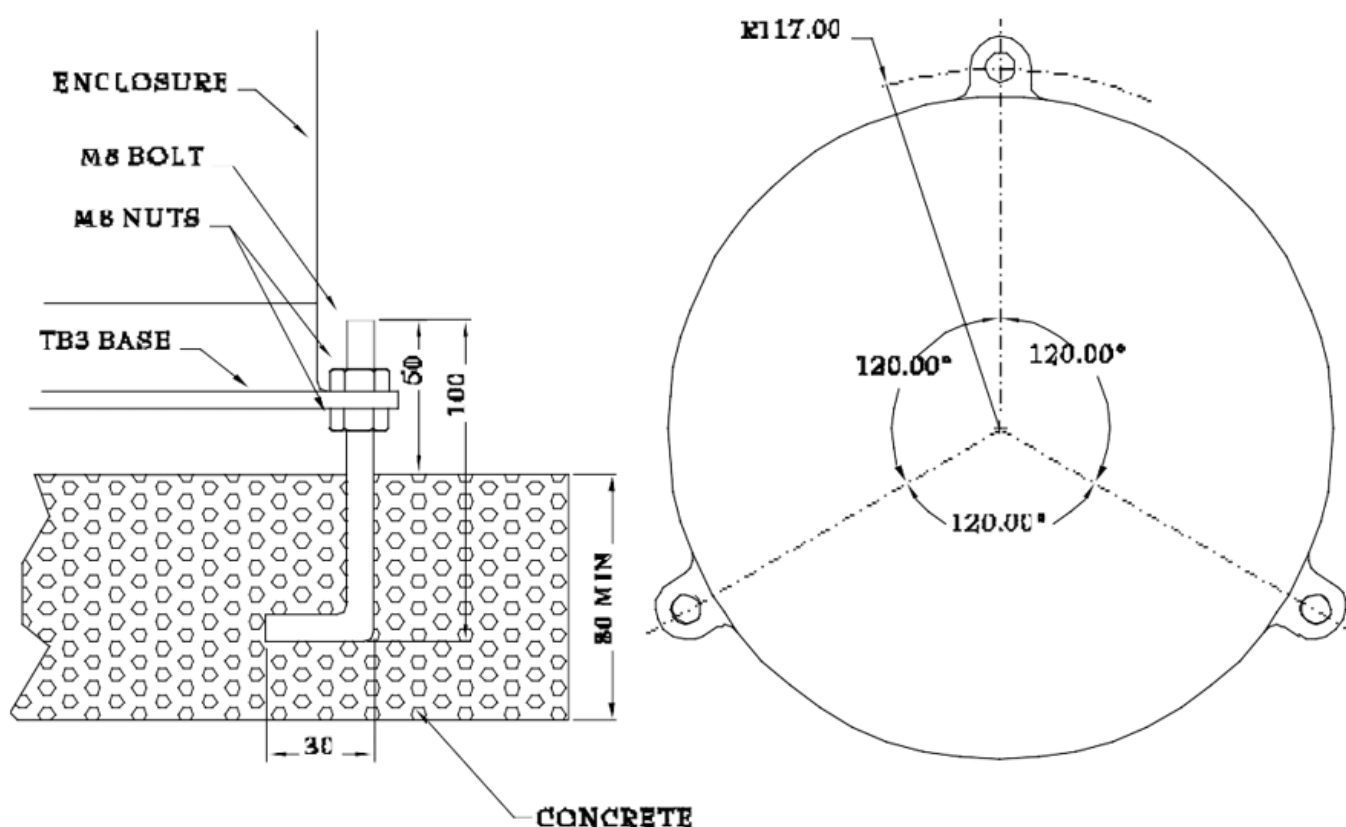



Figure 1 - Diagram 1

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.

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.

3 Configuration

This chapter contains the following subsection:

- Calibration 
- Field Calibration Device 

3.1 Calibration

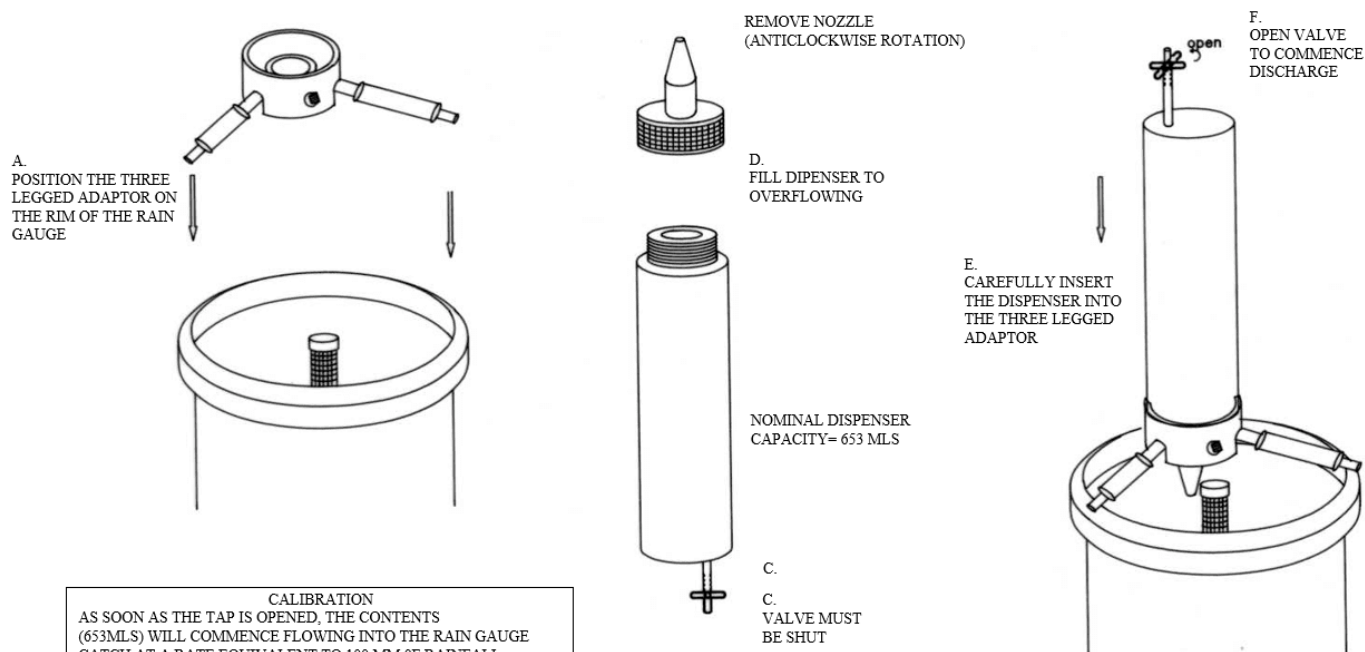
All gauges have been calibrated by KISTERS prior to despatch.

The following products and services are available from KISTERS:

- 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 KISTERS' factory.

Please contact either KISTERS or our local distributor for further information.

3.2 Field Calibration Device



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.		
THEORETICAL NUMBER OF TIPS		
BUCKET SIZE	282.8 MM CATCH	
0.1 MM	103.9	
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

4 Operation

This chapter contains the following subsections:

- [Test Operation](#) ଓଡ଼ିଆ
- [Electrical](#) ଓଡ଼ିଆ

4.1 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.

4.2 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.

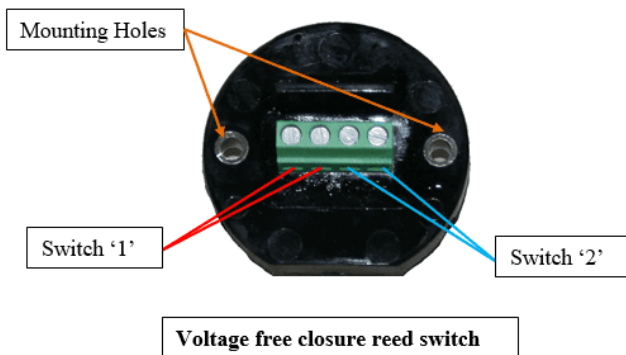


Figure 2 - Diagram 3

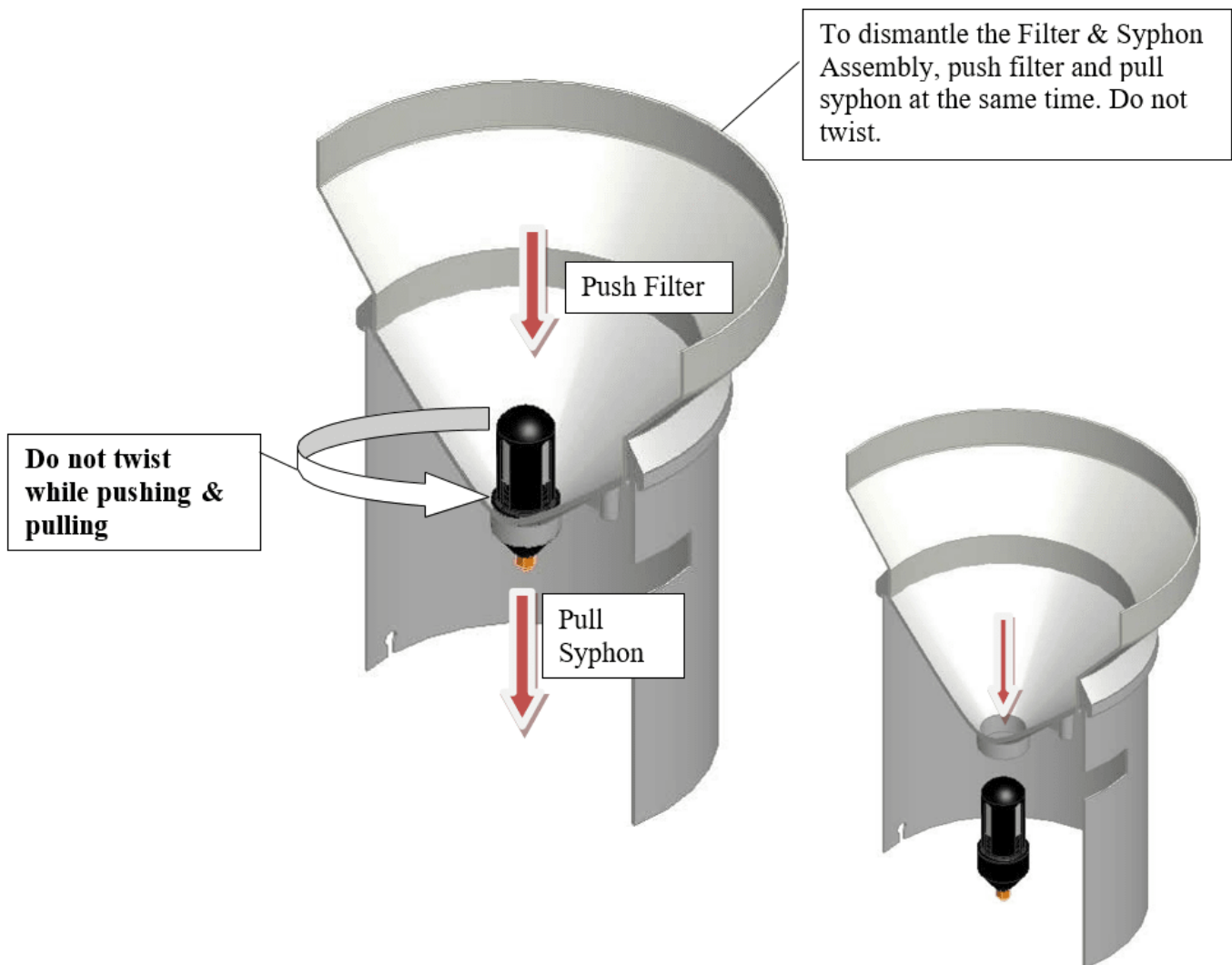
5 Maintenance

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

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



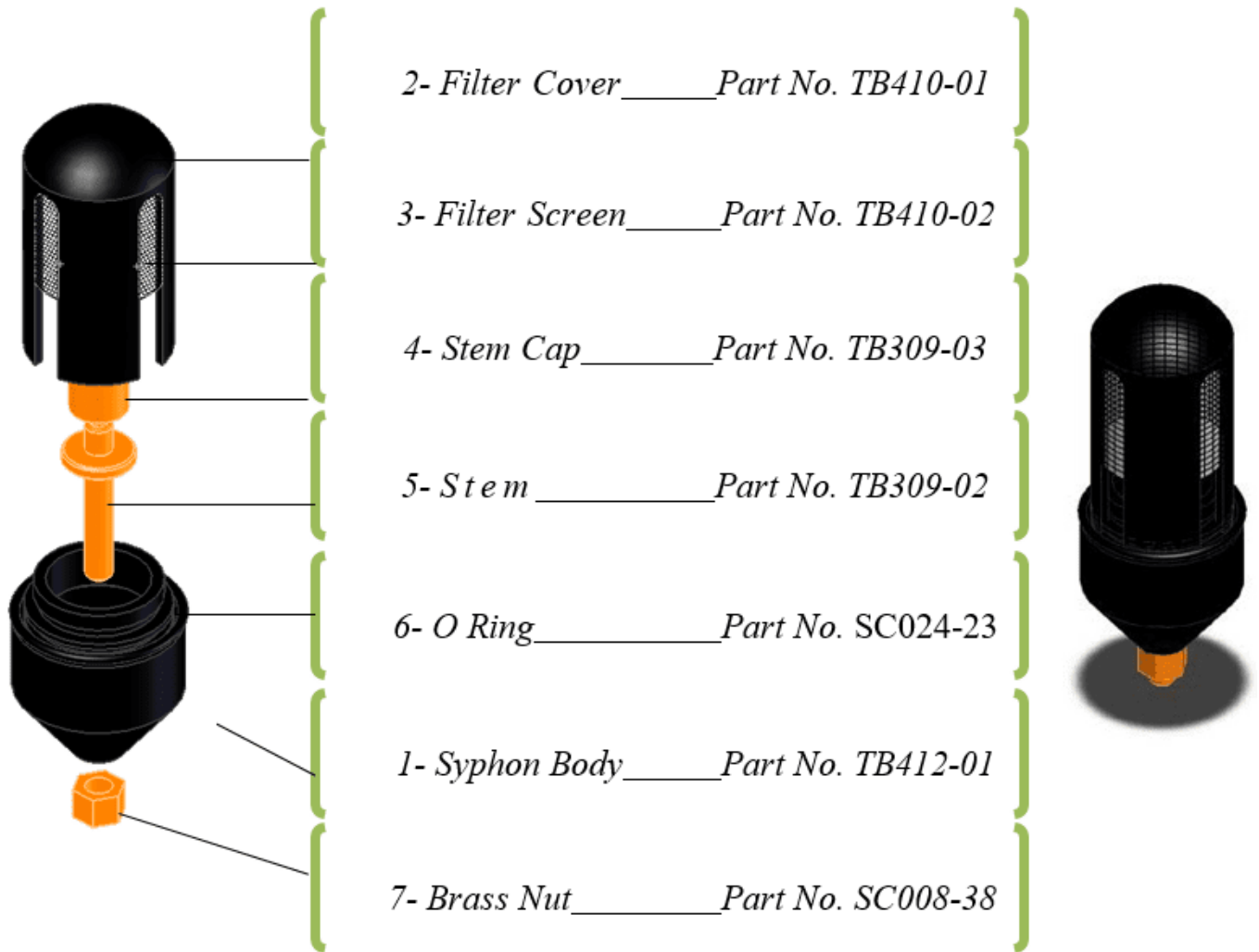
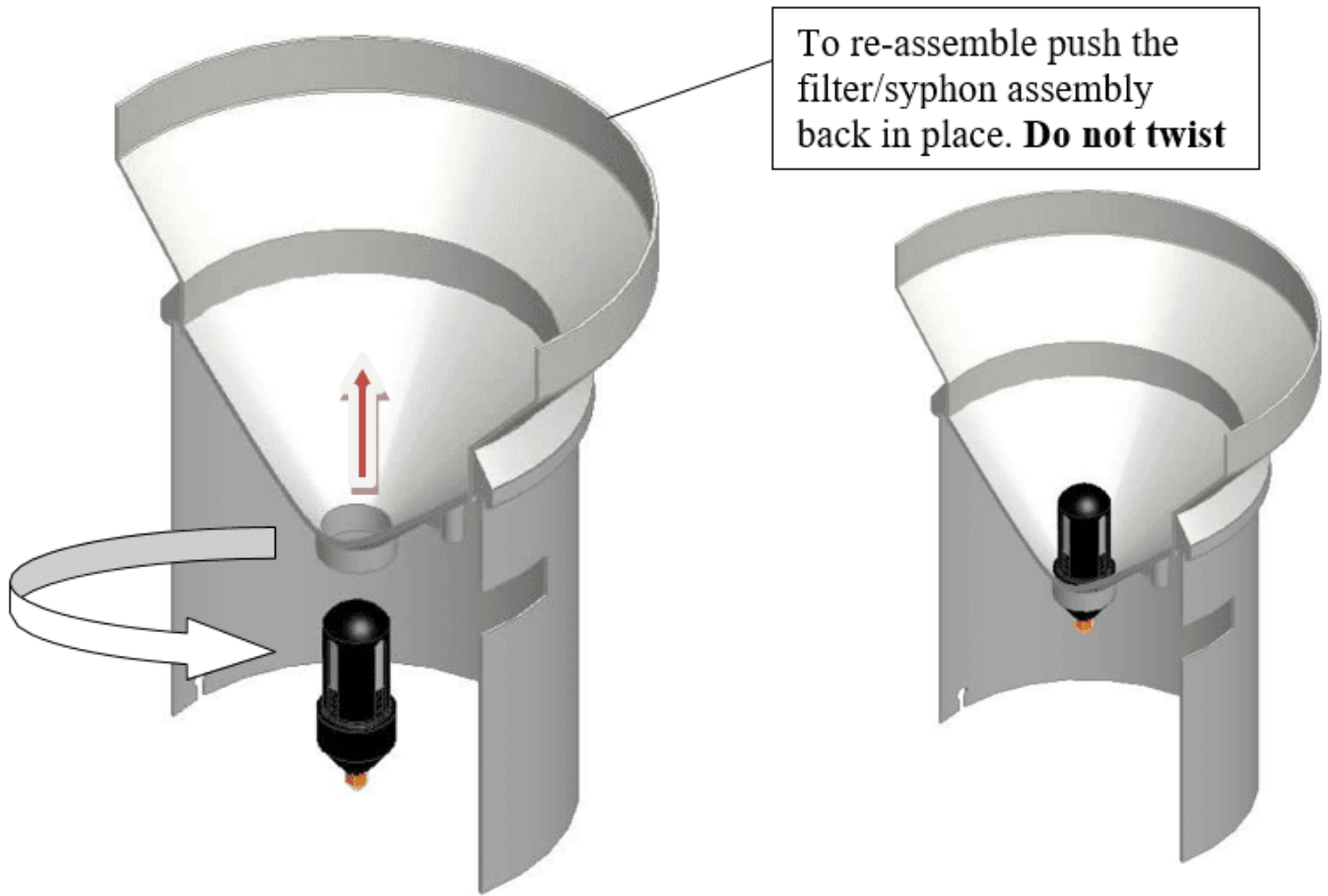


Figure 3 - Diagram 2

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.



6 Repair

KISTERS precision instruments and data loggers are produced in quality-controlled processes. All KISTERS production and assembly sites in Australia, New Zealand and Europe are ISO 90001 certified. All equipment is factory tested and/or factory calibrated before it is shipped to the client. This ensures that KISTERS products perform to their fullest capacity when delivered.

Despite KISTERS most rigorous quality assurance (QA), malfunction may occur within or outside of the warranty period. In rare cases, a product may not be delivered in accordance with your order.

In such cases KISTERS' return and repair policy applies. For you as a customer, this means the following:

- Contact KISTERS using the Repair Request Form and the Declaration of Contamination made available online:

Region (Language)	Download Link
Asia-Pacific (English)	Repair Request Form (APAC) Declaration of Contamination (APAC)
Europe, the Middle East and Africa (English)	Repair Request Form (EMEA) Declaration of Contamination (EMEA)
Germany (German)	Repair Request Form (DE) Declaration of Contamination (DE)

In response you will receive a reference number that must be referenced on all further correspondence and on the freight documents accompanying your return shipment.

- Please provide as much information and/or clear instructions within the return paperwork. This will assist our test engineers with their diagnosis.
- Please do not ship the goods prior to obtaining the reference number. KISTERS will not reject any equipment that arrives without reference number; however, it may take us longer to process.

Custom requirements for items sent to KISTERS for warranty or non-warranty repairs: Check with your national customs/tax authorities for details, processes and paperwork regarding tax exempt return of products. Typically, special custom tariff codes are available (such as HS Code = 9802.00) that verify the item is being returned for repair and has no commercial value. Please note that the customs invoice / dispatch documents should also clearly state: "Goods being returned to manufacturer for repair - No Commercial value". It is mandatory to have any returned goods accompanied by a commercial invoice on headed paper. KISTERS reserves the right to charge the customer for time spent rectifying incorrect customs documents.

Note: Please ensure that your goods are packed carefully and securely. Damage that occurs during transit is not covered by our warranty and may be chargeable.

6.1 TB3 Part List



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

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

TB3 Base Part List

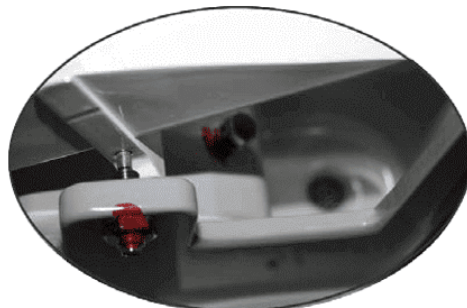


Item2.
Part no.: TB301-07
Descript: Fitting
Quantity: 2

Item4.
Part no.: SC040-16
Descript: Grommet
Quantity: 1

Item3.
Part no.: TB301-03
Descript: Insect Screen
Quantity: 2

Item5.
Part no.: TB301-02
Descript: Insect Screen
Quantity: 2



Item9.
Part no.: TB307
Descript: Reed Switch Assembly
Quantity: 1

Item10.
Part no.: TB303-04
Descript: Reed Switch Cover
Quantity: 1

Item6.
Part no.: TB301-05
Descript: Pivot Screw & Nut
Quantity: 2

Item16.
Part no.: SC045-02
Descript: Reed Switch Screw
Quantity: 2

Item8.
Part no.: (See next page)
Descript: Bucket Assembly
Quantity: 1



Item7.
Part no.: TB312
Descript: Adjusting Screw
Quantity: 2

Item13.
Part no.: SC023-09
Descript: Bullseye Level
Quantity: 1

Item11.
Part no.: SC022-08
Descript: Screw
Quantity: 2

Item12.
Part no.: SC008-24
Descript: Locknut
Quantity: 2

Item1.
Part no.: TB301-01
Descript: Base
Quantity: 1

Item14.
Part no.: SC045-21
Descript: Enclosure Screw
Quantity: 3

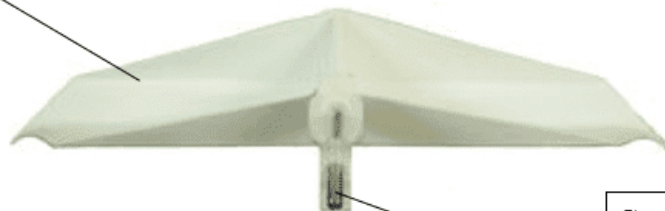
Item15.
Part no.: SC040-38
Descript: Cap Plug
Quantity: 2

TB3 Bucket Part List

Item17:

Part no: TB304
Descript: Bucket (0.1mm)

Quantity: 1

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

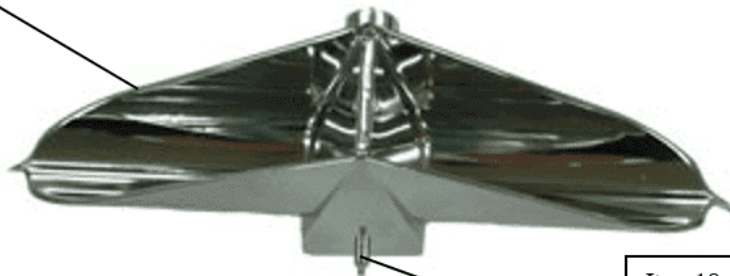
Metal Bucket

or

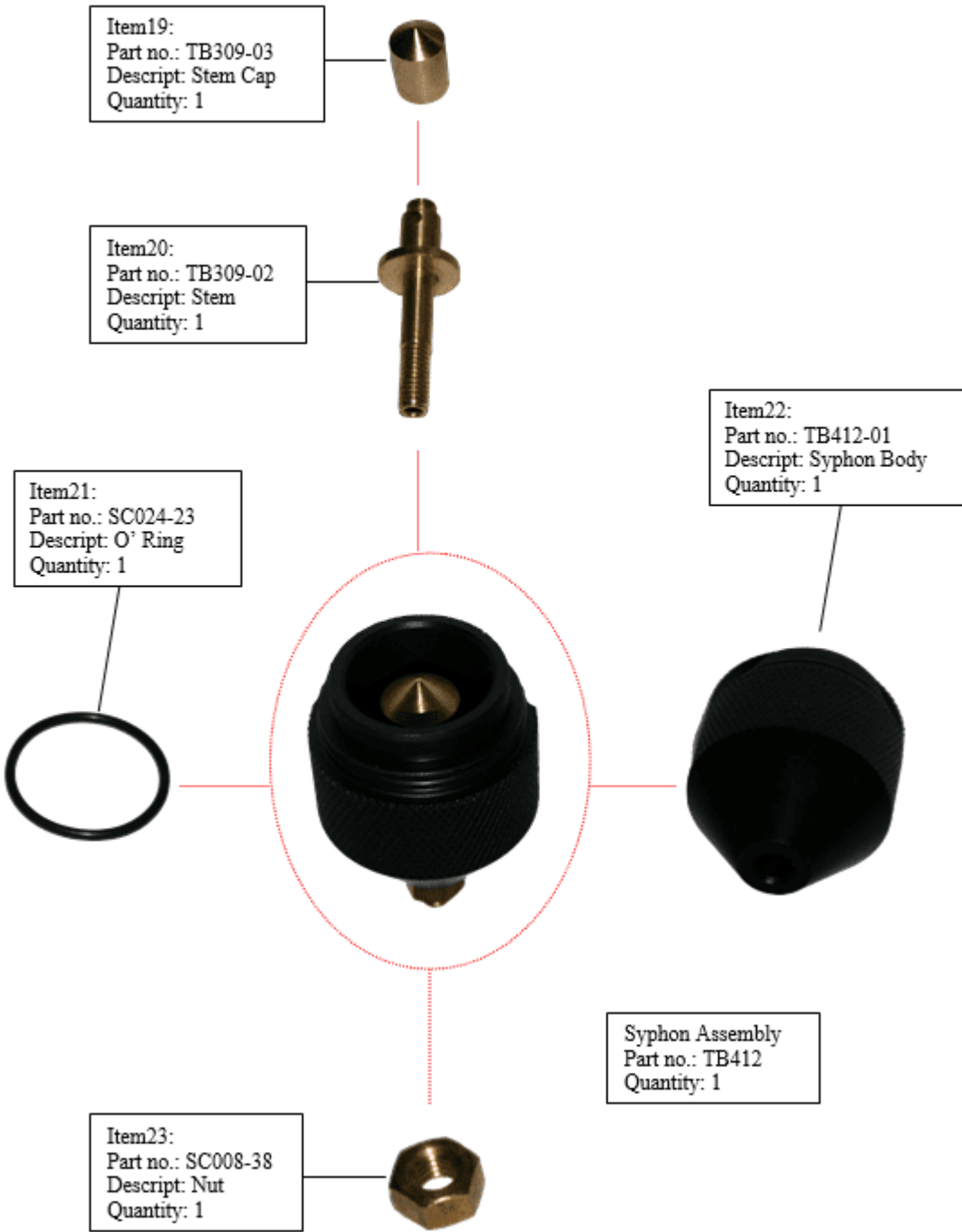
Item 17a:

Part no: TB304/0.2P
Descript: Bucket (0.1mm)

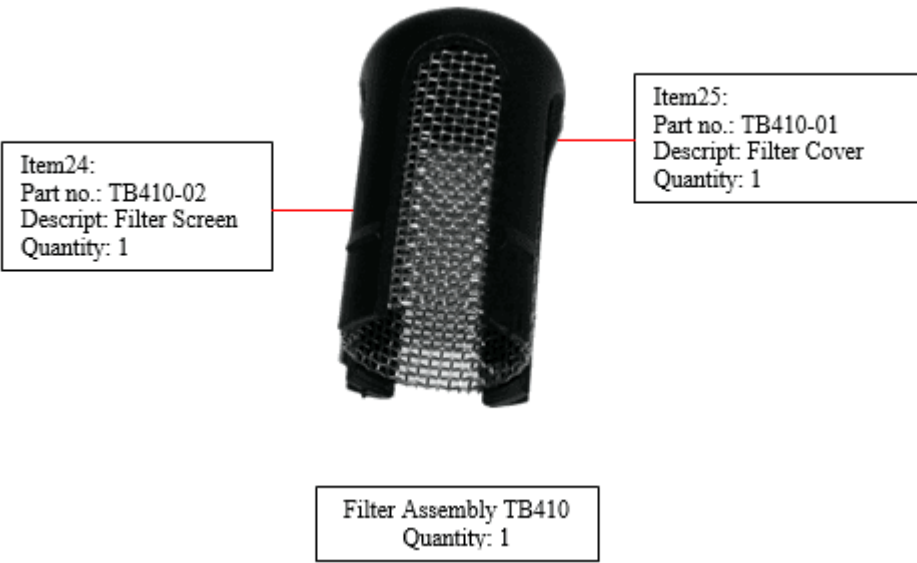
Quantity: 1

Item18:
Part no: TB304-03
Descript: Bucket Axle
Quantity: 1ABS UV
Stabilised
Plastic Bucket

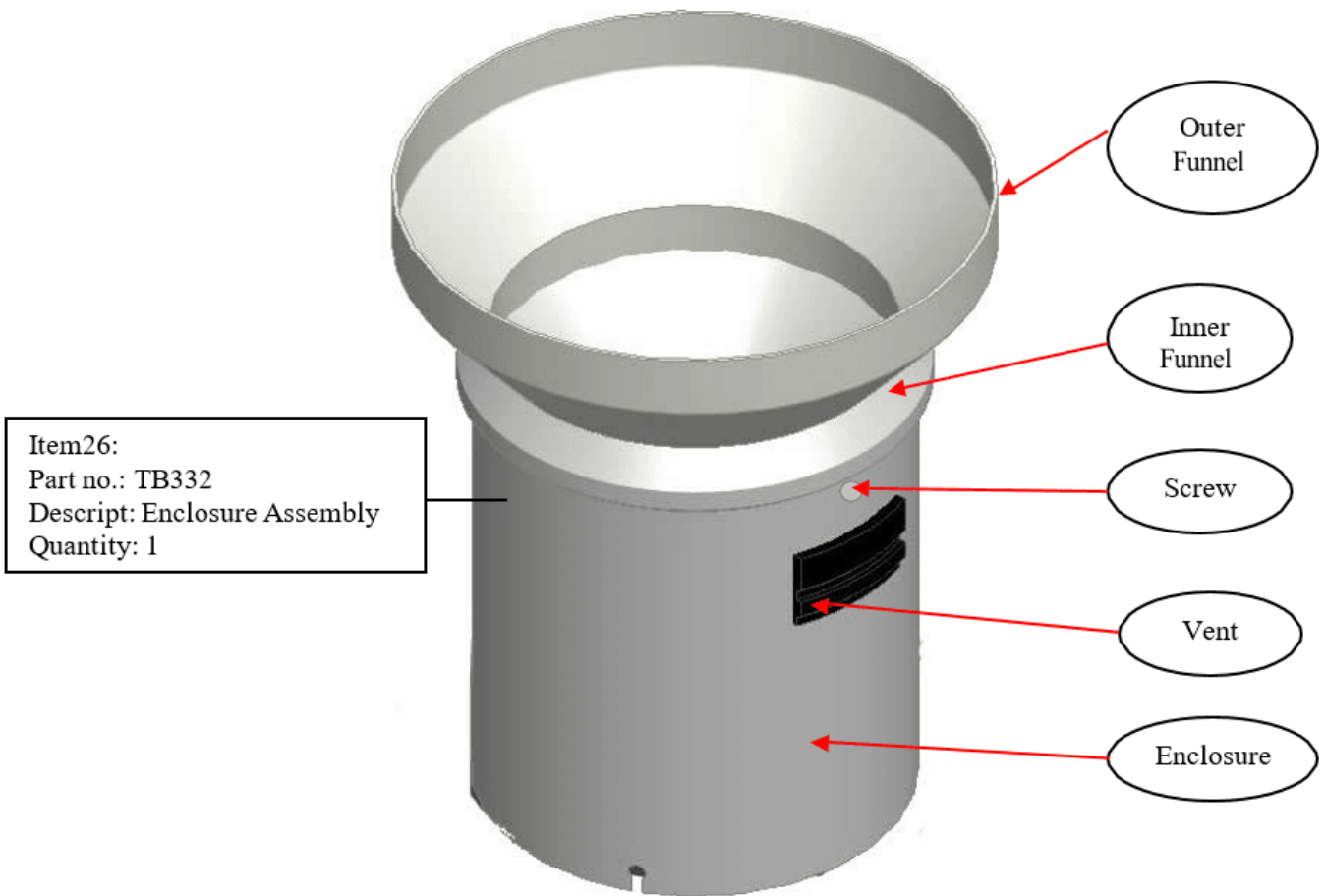
Syphon Part List



Filter Part List



Enclosure Part List



TB332 breakdown assembly

Part no.	Description	Quantity
TB332-01	Outer Funnel	1
TB337-01	Inner Funnel	1
TB337-02	Enclosure	1
TB418-06	Vent	1
SC022-72	Screw	3

7 Technical Data

Resolution	0.1 mm	0.2 mm, 0.5 mm, 1.0 mm, 0.01 inch	1.0 mm
Catch Diameter	282.84 mm	200 mm	
Bucket	Teflon-impregnated ASA plastic UV-stabilized or synthetic ceramic-coated bras		Synthetic ceramic-coated brass
Pivot/Bucket Mechanism	Machined, robust stainless steel axle resting on corrosion-free sapphire pivots		
Enclosure and Base	Anodized, powder-coated aluminium		
Accuracy	0 - 250 mm per hour: $\pm 2\%$ 250 - 500 mm per hour: $\pm 3\%$		
Range	0 - 700 mm/h (maximum intensity: 700 mm/h)		
Operating Temperature	-20 °C to +70 °C (heater recommended below +4 °C)		
Operating Humidity	0 to 100 %		
Dimensions and Mass	Ø 282.84 mm × H 410 mm 3.8 kg	Ø 282.84 mm × H 410 mm 3.8 kg	

8 Obligations of the Operator and Disposal

This chapter contains the following subsections:

- [Obligations of the Operator](#) 21
- [Dismantling / Disposal](#) 21

8.1 Obligations of the Operator

European Union

In the Single European Market it is the responsibility of the operator to ensure that the following legal regulations are observed and complied with: national implementation of the framework directive (89/391/EEC) and the associated individual directives, in particular 2009/104/EC, on minimum safety and health requirements for the use of work equipment by employees at work.

Worldwide

Regulations: If and where required, operating licences must be obtained by the operator. In addition, national or regional environmental protection requirements must be complied with, regardless of local legal provisions regarding the following topics:

- Occupational safety
- Product disposal

Connections: Local regulations for electrical installation and connections must be observed.

8.2 Dismantling / Disposal

When disposing of the units and their accessories, the applicable local regulations regarding environment, disposal and occupational safety must be observed.

Before dismantling

- Electrical Devices:
 - Switch off the units.
 - Disconnect electrical appliances from the power supply, regardless of whether the appliances are connected to the mains or to another power source.
- Mechanical devices:
 - Fix all loose components. Prevent the device from moving independently or unintentionally.
 - Loosen mechanical fastenings: Please note that appliances can be heavy and that loosening the fastenings may cause them to become mechanically unstable.

Disposal

Operators of old appliances must recycle them separately from unsorted municipal waste. This applies in particular to electrical waste and old electronic equipment.

Electrical waste and electronic equipment must not be disposed of as household waste!

Instead, these old appliances must be collected separately and disposed of via the local collection and return systems.

Integrated or provided batteries and accumulators must be separated from the appliances and disposed of at the designated


collection point. At the end of its service life, the lithium-ion battery must be disposed of according to legal provisions.

EU WEEE Directive





As players in the environmental market, KISTERS AG is committed to supporting efforts to avoid and recycle waste. Please consider:

- Avoidance before recycling!
- Recycling before disposal!



This symbol  indicates that the scrapping of the unit must be carried out in accordance with Directive 2012/19/EU. Please observe the local implementation of the directive and any accompanying or supplementary laws and regulations.

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