HydroMet

User Manual

FCD

KISTERS

Empowering decisions of tomorrow

02-2024 – 01-04-002

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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.

This document is public.

II Scope of Delivery

- One nozzle included (extra nozzles with different nozzle rates optionally available)
- Calibration specifications
- Carry case

III Safety Instructions

- Read the user manual including all operating instructions prior to installing, connecting and powering up the KISTERS FCD. 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 FCD 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 FCD, 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 FCD 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 FCD 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 FCD out of service, it must be disposed of in compliance with local waste and environmental regulations. The KISTERS FCD 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' Field Calibration Device FCD checks rain gauges in the field for accuracy. The portable lightweight device effectively enables field technicians to run functional tests and verifications of any rain gauge in the field. The use of FCD saves time and money, because the tipping bucket rain gauges can remain fixed in their location without the need for dismantling and transport and with very short downtimes for calibration only.

2 Installation

Prior to performing a Rain Gauge calibration

- Clean the siphon and bucket area of the Rain Gauge.
- Pour a small amount of water into the catchment area to wet the siphon and bucket area. Ensure that the bucket tips at least 2 times during the wetting process, this will result in a more accurate verification result.

Performing a Rain Gauge calibration

Step 1:

- Remove the FCD from the carry case and ensure the valve is in the closed position (see Figure 1).

Figure 1

- Unscrew the nozzle from the cylinder and fill the cylinder to the very top with **clean** water (see Figure 2).

Figure 2

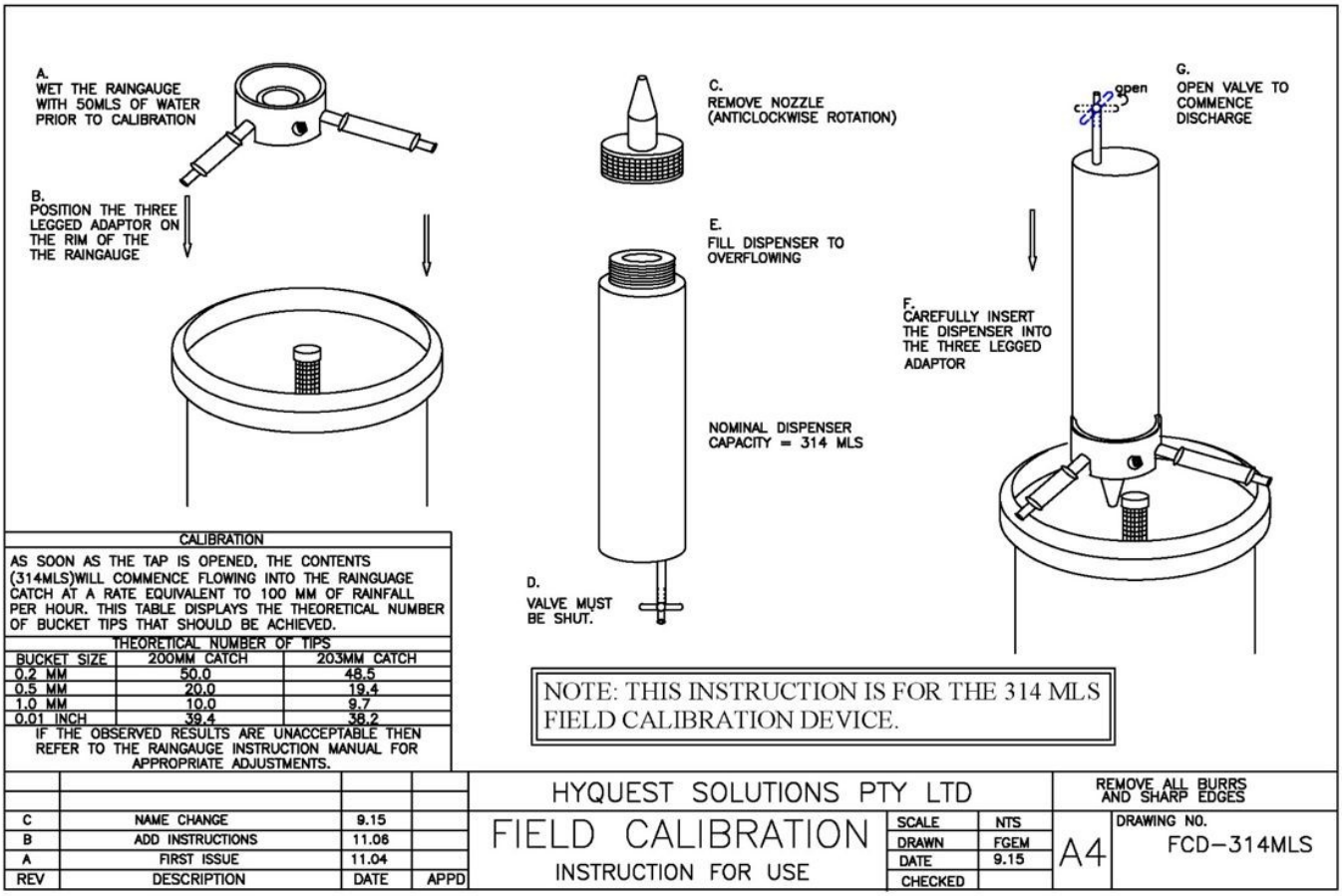
Step 2:

- The correct intensity nozzle is then screwed back onto the cylinder.
- Place the 3-legged adaptor on the catchment area of any KISTERS Instruments 200 mm or 203 mm Tipping Bucket Rain Gauge and then insert the tube assembly through the hole in the 3-legged adapter and open the valve to allow water to be dispensed (see Figure 3).

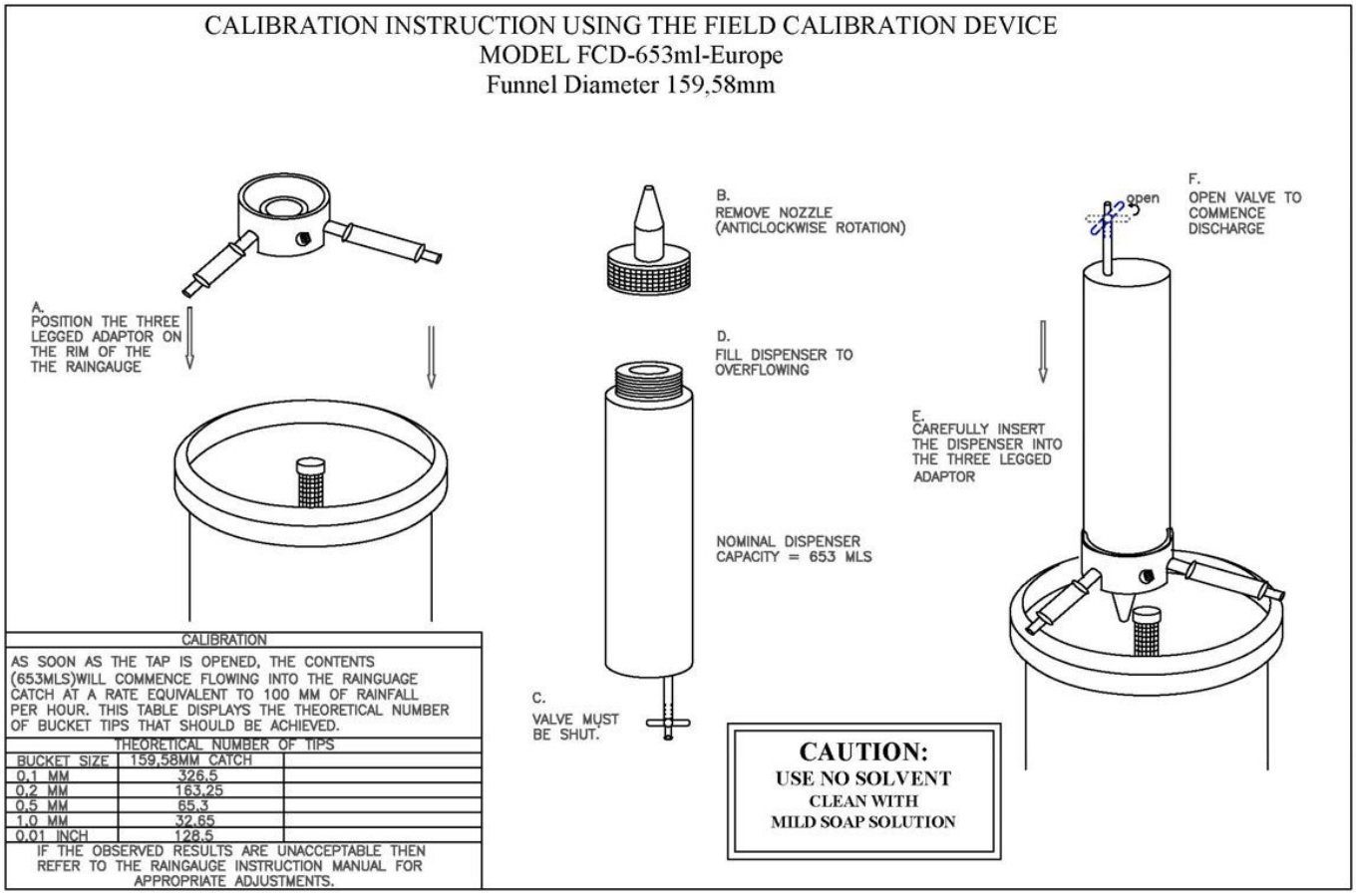
Figure 3

A pre-set volume of water will discharge through the Tipping Bucket Rain gauge. This process is to be repeated a second time for an accurate calibration check. The number of tips can be manually counted or stored on the data logger for calibration check evidence and then checked with "Calibration Specifications" to confirm that the results come within the acceptable range. **Note**: To avoid human counting errors, KISTERS also offers the optional CMCbt - Bluetooth Tip Counter.

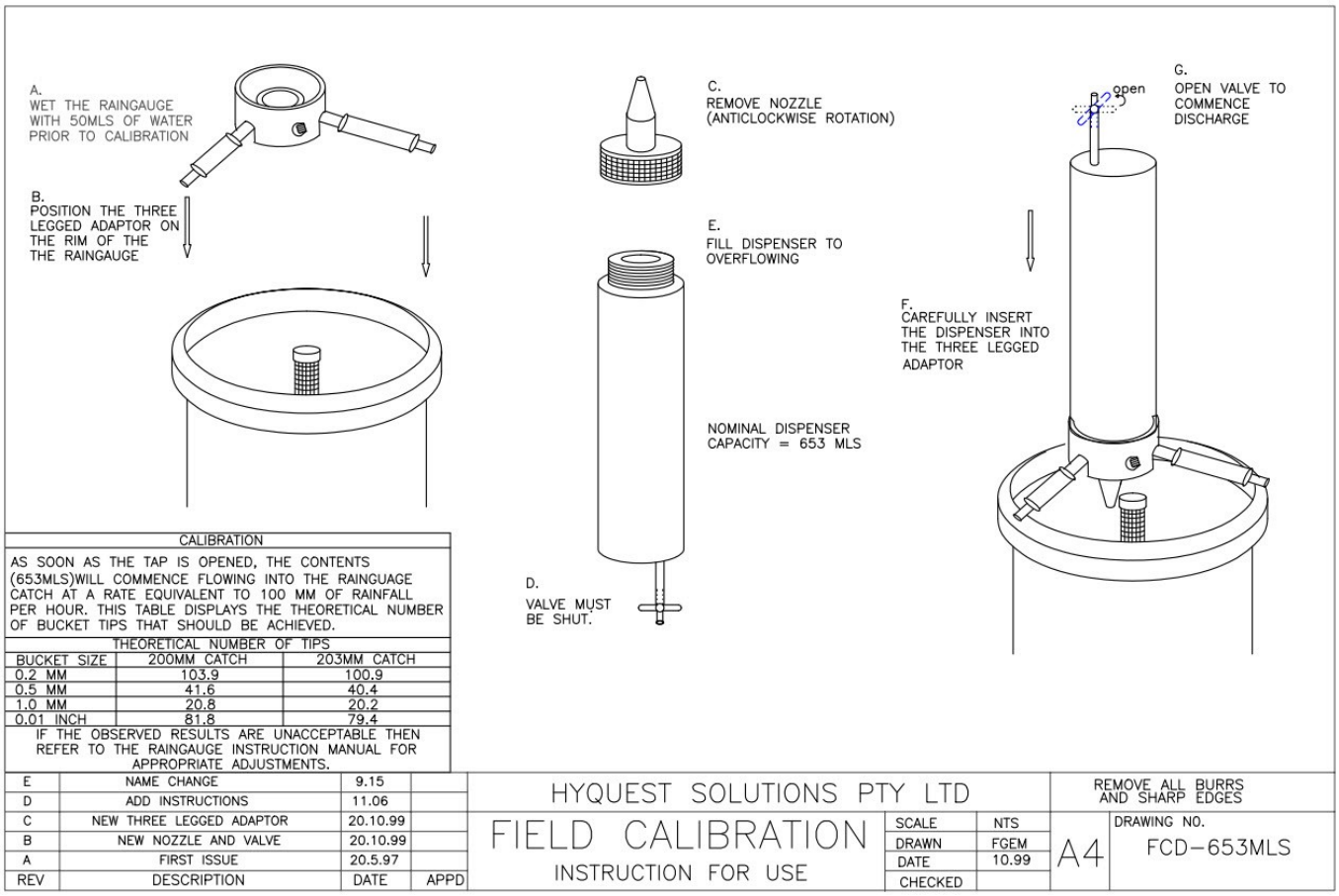
Instruction sheet for FCD-314 (Used with TB3, TB4 & TB6)



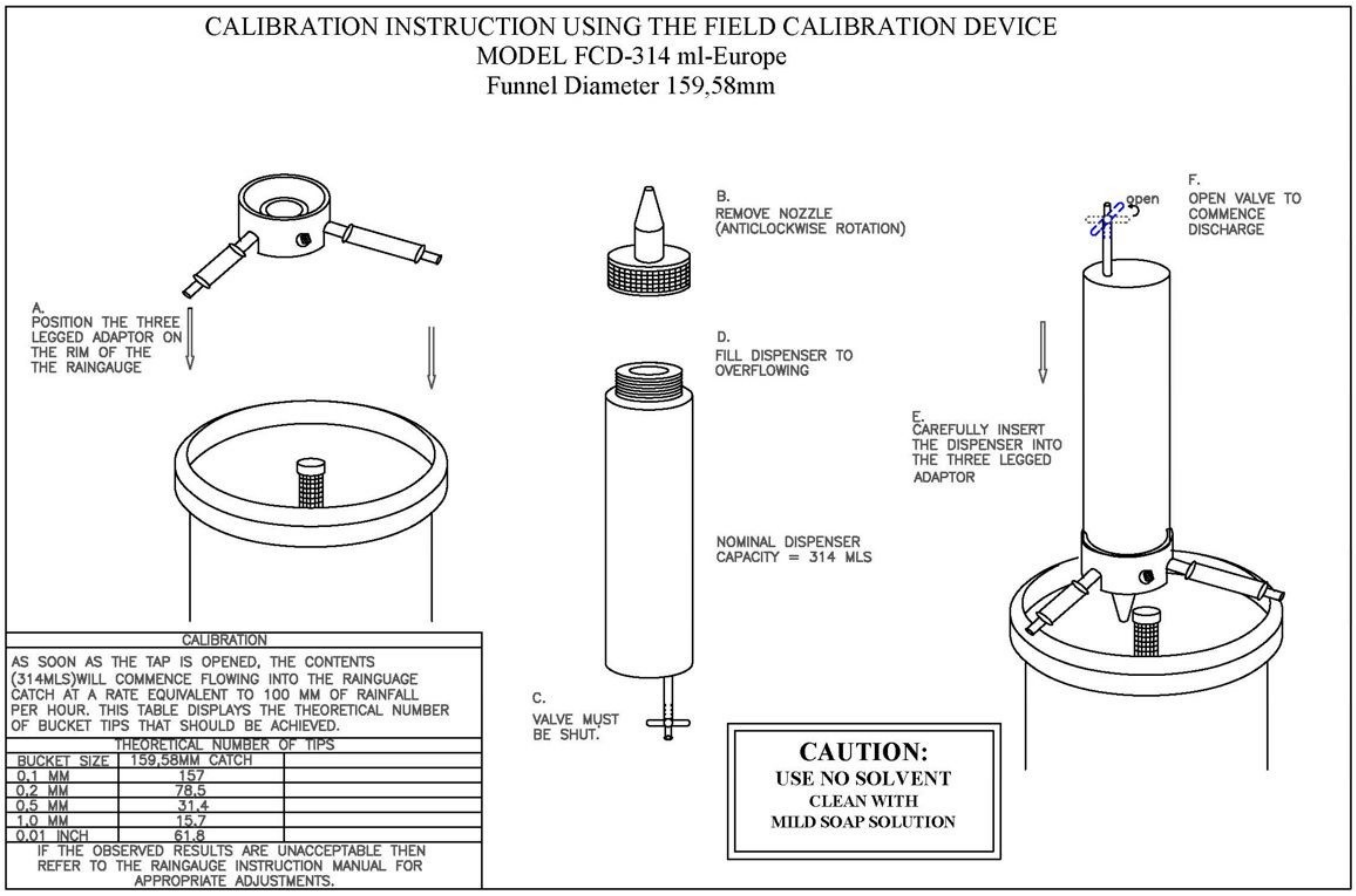
Instruction sheet for FCD-653ml-Europe (Used with TB3, TB4 & TB6)



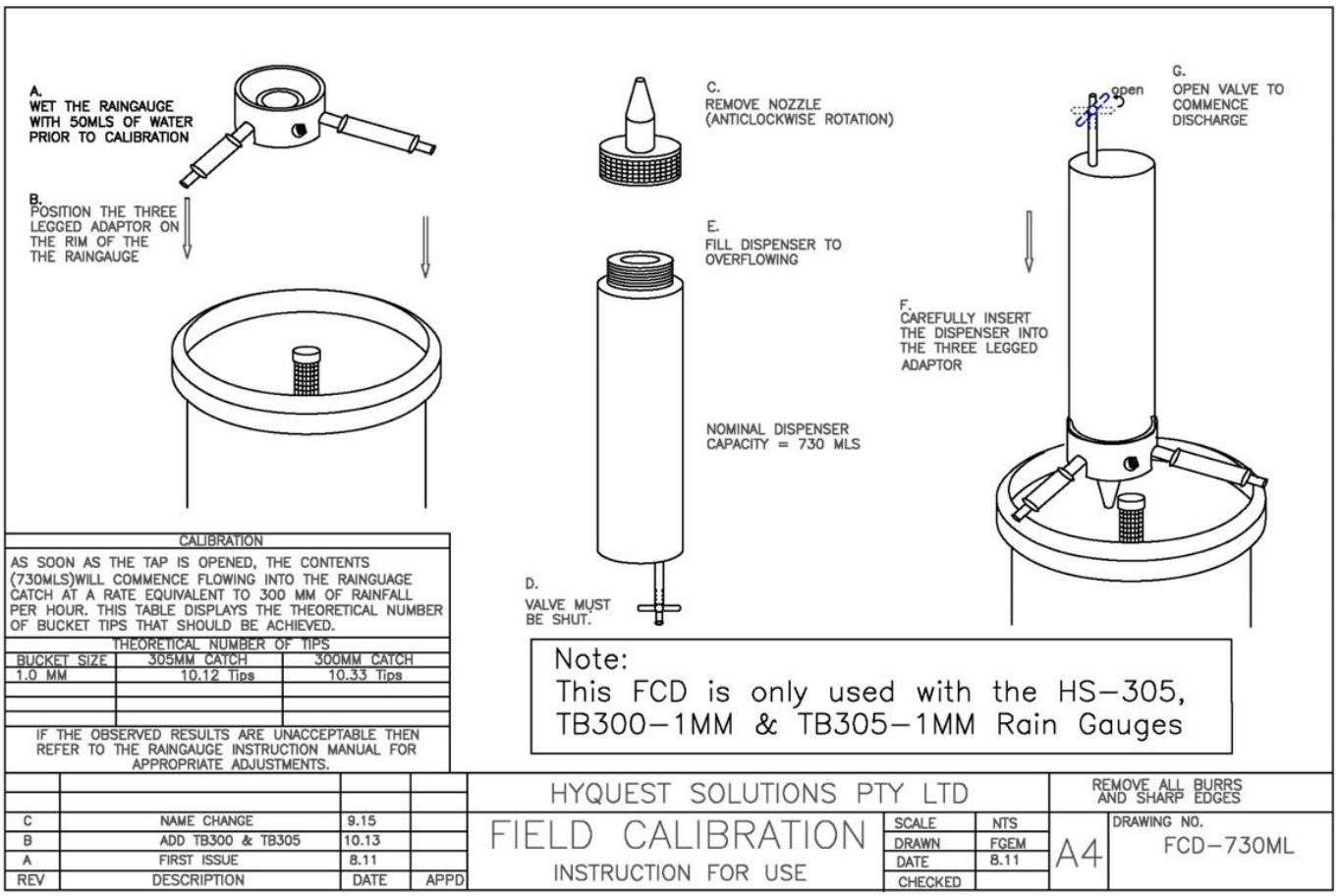
Instruction sheet for FCD-653MLS (Used with TB3, TB4 & TB6)



Instruction sheet for FCD-314 (used with 159,58mm dia. Rain Gauge)



Instruction sheet for FCD-730 (used with HS-305, TB300-1mm & TB305-1mm)



3 Maintenance

The role the FCD is to check whether your rain gauge is providing accurate readings when a certain volume of water is discharged into the rain gauge collector. Therefore, prior to using the FCD, the rain gauge should be cleaned and maintained as follows:

1. Remove the enclosure, clean the funnel and filter to ensure water from the FCD is flowing as it should be
2. Using a tooth brush and methylated spirit clean the bucket gently from any sediment that is adhered to the internal surfaces of the bucket.
3. Dismantle the syphon and clean it (refer to rain gauge manual or video on the link below).
4. Ensure the bucket axle is tipping freely.
5. Ensure the rain gauge is sitting level by checking the bubble level on the base.
6. Check the reed switch operation on the rain gauge using a multi meter.
7. Avoid performing the calibration check when there is any rainfall or strong gust of wind.

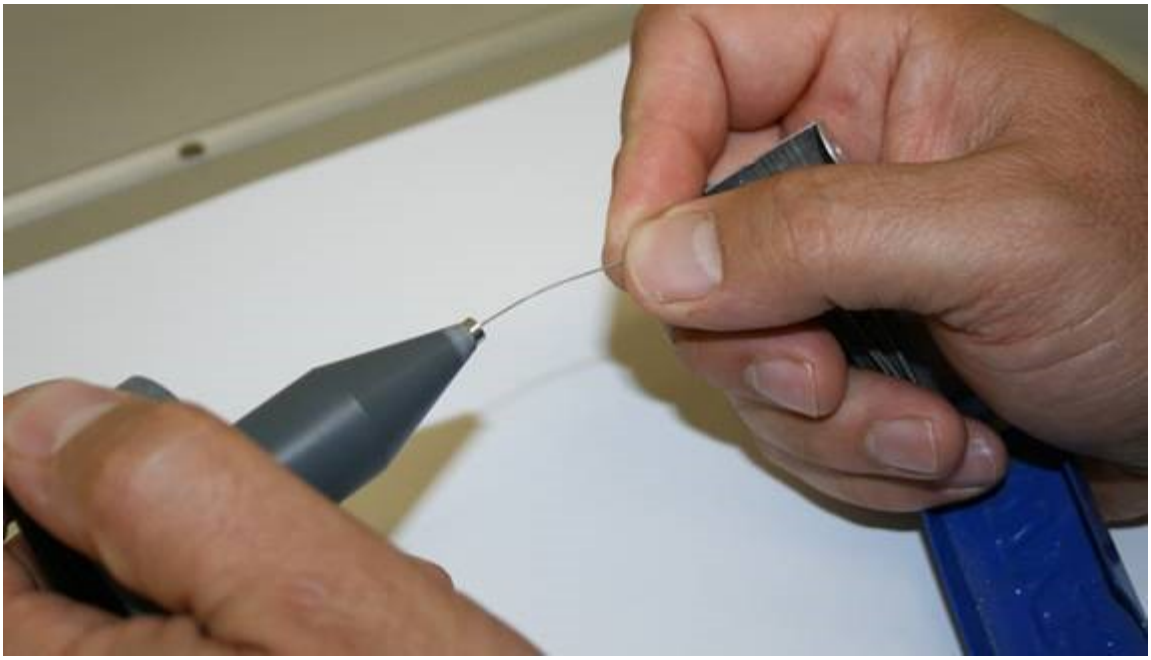
Please note, KISTERS has a video that shows how to maintain a rain gauge at the link below:

http://www.youtube.com/watch?v=a7mvydLKfB8

The FCD is easy to maintain. Only cleaning is required from time to time due to the fact that the unit is mainly used in the field it can get dirty easily.

To clean the FCD use only the following:

1. Warm water
2. Use mild soap solution (do not use methylated spirit or any other solvent that may damage the FCD)
3. Ensure that the FCD discharge time is as indicated in the table below. If the discharge rate is slower than the time on the table, use a fine tool to clean the nozzle hole as shown in the picture below.



The tool should fit in the hole as a close fit (not tight or loose fit)

For more information about the flow rate times of each nozzle, see ch. Technical Data 13.

4 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.

5 Technical Data

Material	▪ Body: synthetic thermoplastic resin (polycarbonate) and Delrin® ▪ Nozzle: Delrin® and nickle silver ▪ Vent: stainless steel ▪ Adaptor: Delrin®
Capacity	▪ Model FCD-314: 314 ml (used with TB3, TB4, TB6, TB7) ▪ Model FCD-653: 653 ml (used with TB3, TB4, TB6, TB7) ▪ Model FCD-730: 730 ml (used with HS-305, TB300, TB305)
Discharge Nozzle	Dispense rate as per model ordered
Carry Case	Robust synthetic carry case with a heavy-duty foam insert
Packed Weight and Size	▪ FCD-314: 1.4 kg, 400 × 350 × 90 mm (W × D × H) ▪ FCD-653: 1.5 kg, 400 × 350 × 90 mm (W × D × H) ▪ FCD-730: 2.6 kg, 455 × 330 × 152 mm (W × D × H)

Flow Rate times

The table below shows the flow rate time for each nozzle rate.

Rate in mm/hr	**FCD-314 (200 mm funnel)**			**FCD-653 (200 mm funnel)**			**FCD-730 (300 mm funnel)**		
	Theoretical Value Min/Sec	Min Accepted Min/Sec	Max Accepted Min/Sec	Theoretical Value Min/Sec	Min Accepted Min/Sec	Max Accepted Min/Sec	Theoretical Value Min/Sec	Min Accepted Min/Sec	Max Accepted Min/Sec
50	12/0	9/36	14/24	24/57	19/57	29/56	12/24	9/55	14/52
100	6/0	4/48	7/12	12/28	9/59	14/58	6/12	4/57	7/26
200	3/0	2/24	3/36	6/14	4/59	7/29	3/6	2/29	3/43
300	2/0	1/36	2/24	4/9	3/20	4/59	2/4	1/39	2/29
500	1/12	0/58	1/26	2/30	2/0	3/0	1/14	0/59	1/29

Please note the minimum and maximum values are based on ± 20 % acceptance criteria.

Rate in mm/hr	**FCD-653 (282.82 mm funnel) 0.1 mm rain gauge**			**FCD-730 (305 mm funnel)**		
	Theoretical Value Min/Sec	Min Accepted Min/Sec	Max Accepted Min/Sec	Theoretical Value Min/Sec	Min Accepted Min/Sec	Max Accepted Min/Sec
50	12/28	9/59	14/58	11/59	9/36	14/23
100	6/14	4/59	7/29	6/0	4/48	7/12

Rate in mm/hr	FCD-653 (282.82 mm funnel) 0.1 mm rain gauge			FCD-730 (305 mm funnel)		
200	3/7	2/30	3/44	3/0	2/24	3/36
300	2/5	1/40	2/30	2/0	1/36	2/24
500	1/15	1/0	1/30	1/12	0/58	1/26

Please note the minimum and maximum values are based on ± 20 % acceptance criteria.

Rate in mm/hr	FCD-653 (159.6 mm funnel)			FCD-314 (159.6 mm funnel)		
	Theoretical Value Min/Sec	Min Accepted Min/Sec	Max Accepted Min/Sec	Theoretical Value Min/Sec	Min Accepted Min/Sec	Max Accepted Min/Sec
50	39/11	31/21	47/1	18/50	15/4	22/36
100	19/35	15/40	23/30	9/25	7/32	11/18
200	9/48	7/50	11/45	4/43	3/46	5/39
300	6/32	5/13	7/50	3/8	2/31	3/46
500	3/55	3/8	4/42	1/53	1/30	2/16

Please note the minimum and maximum values are based on ± 20 % acceptance criteria

6 Obligations of the Operator and Disposal

This chapter contains the following subsections:

6.1 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.

6.2 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.

Contact Data

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