

Red Back

User Manual



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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. HyQuest Solutions 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 HyQuest Solutions has been advised of the possibility of such damages.

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II Scope of Delivery

Basic Kit:

- Bucket Meter
- Screw Driver
- 2.5 m Connecting Lead
- Calibration Certificate and Table
- 30 ml of Current Meter Oil

III Safety Instructions

- Read the user manual including all operating instructions prior to installing, connecting and powering up the HyQuest Solutions RedBack. 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.
- HyQuest Solutions RedBack 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 RedBack, 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 HyQuest Solutions RedBack 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 HyQuest Solutions RedBack 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 sensor to the manufacturer's named repair centre. You can find information on how to return items for repair in the relevant section of the HyQuest Solutions web site.



- Disposal instructions: After taking the HyQuest Solutions RedBack out of service, it must be disposed of in compliance with local waste and environmental regulations. The HyQuest Solutions RedBack 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.

HyQuest Solutions 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!

HyQuest Solutions' Redback is a cup-type current meter for the measurement of water flow in open and closed waters to a fine degree of accuracy and repeatability. This is due to its advanced contact switching system and interchangeable bucket system that provides trouble free operation.

2 Installation

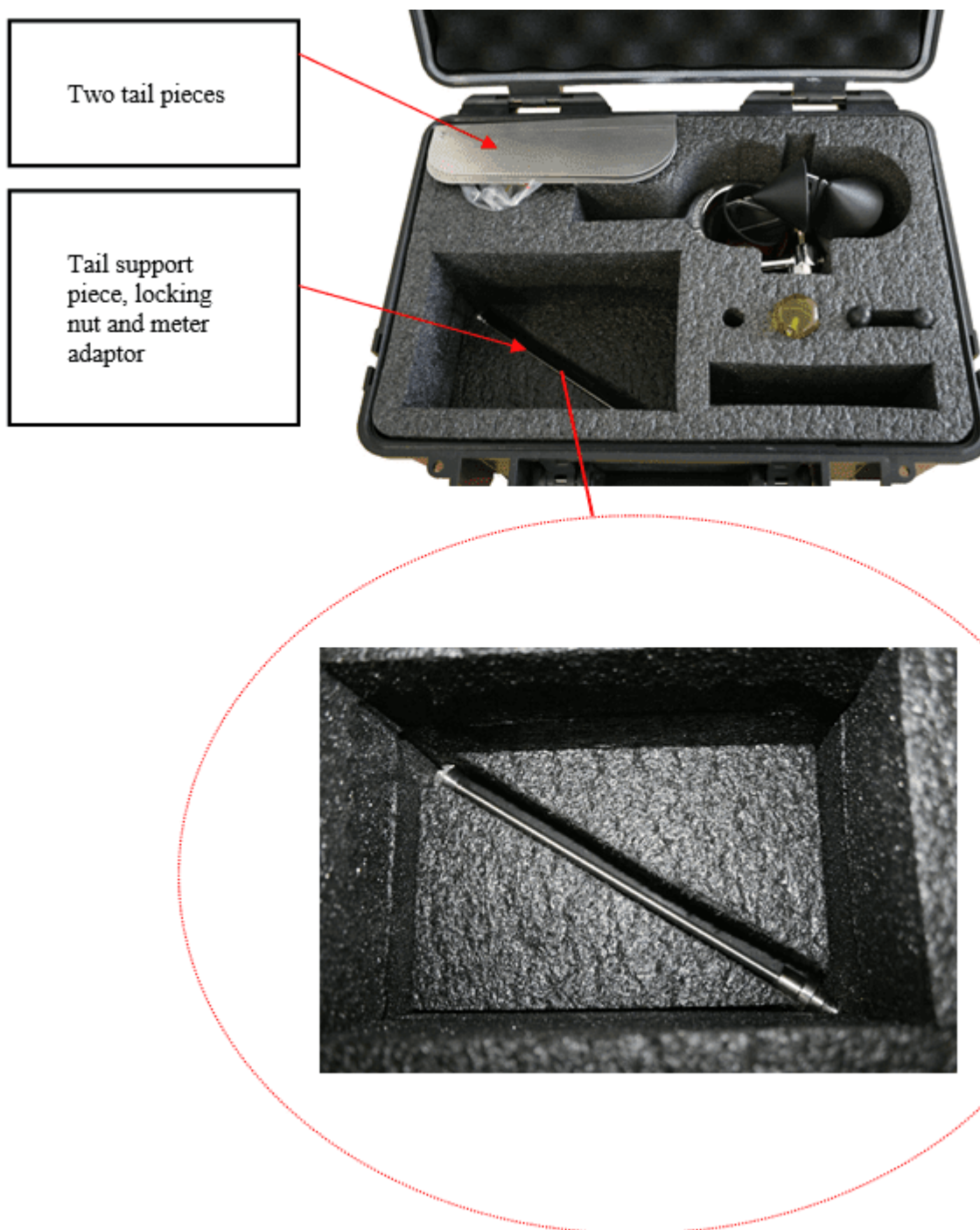
This chapter contains the following subsections:

- [Assembling the Tail Fin](#)

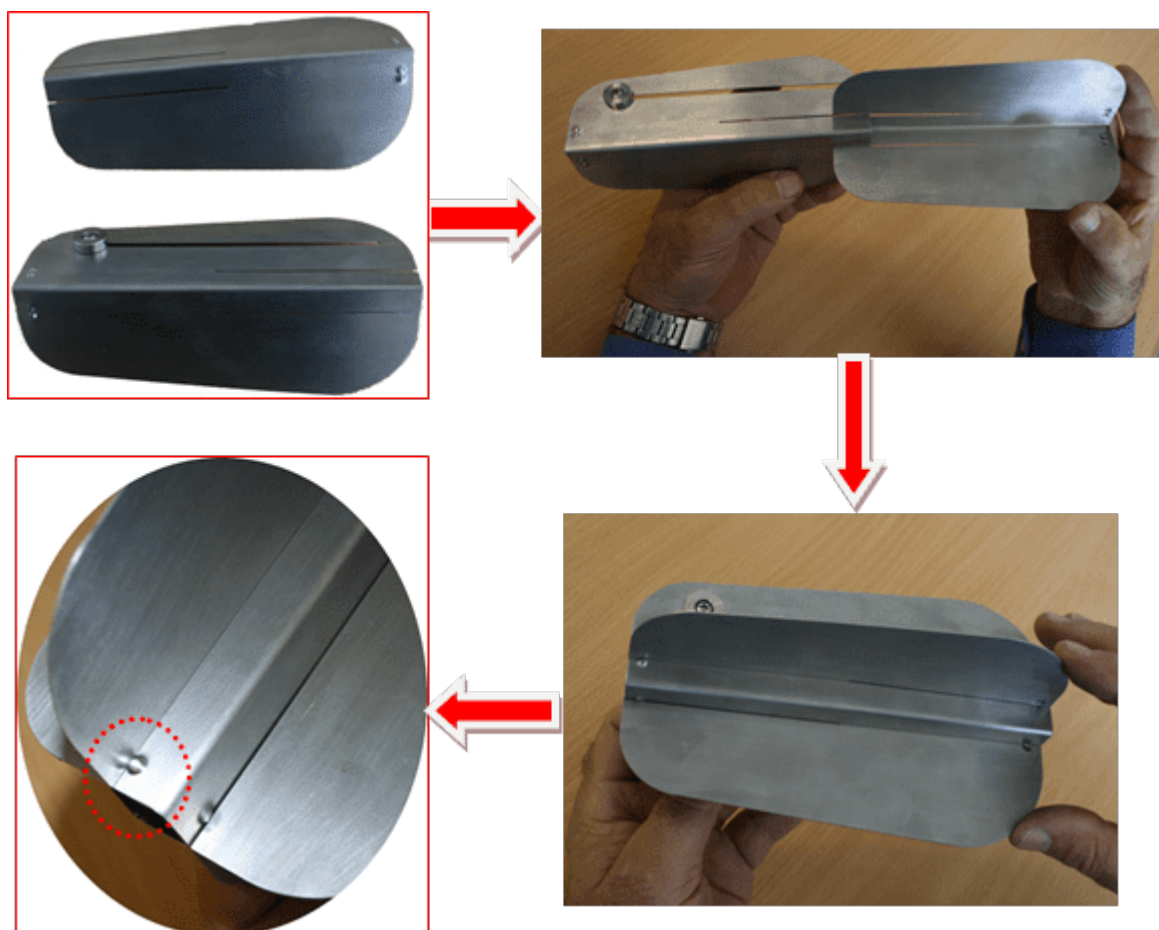
2.1 Assembling the Tail Fin

This instruction manual provides graphical instructions on how to assemble the tail fin.

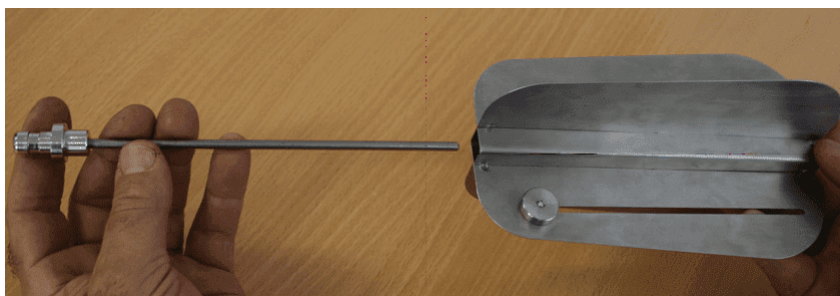
Step1. Open the case and locate the tail pieces



Step2. Assemble the tail pieces together as shown below



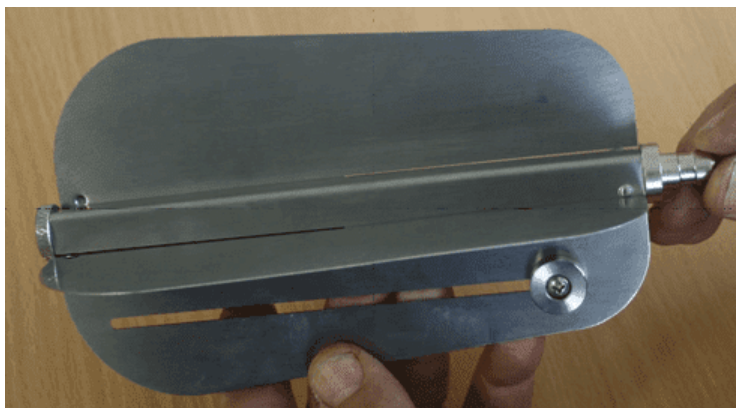
Step3. Assemble the tail pieces to the tail support as shown below



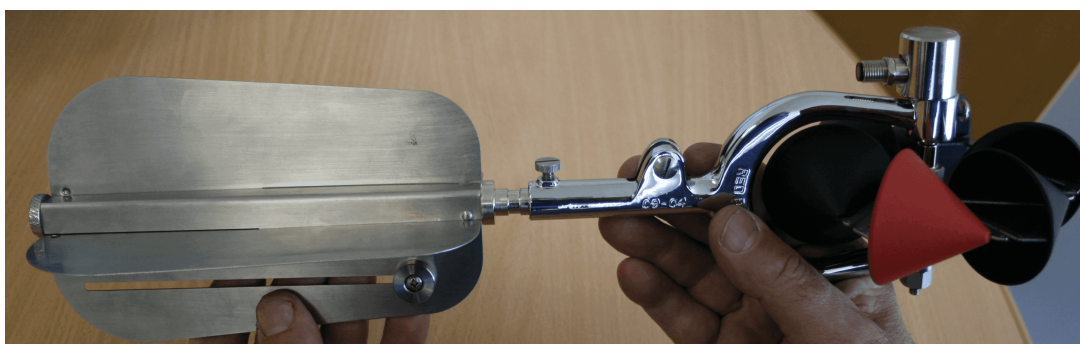
Step4. Tighten the locking nut as shown



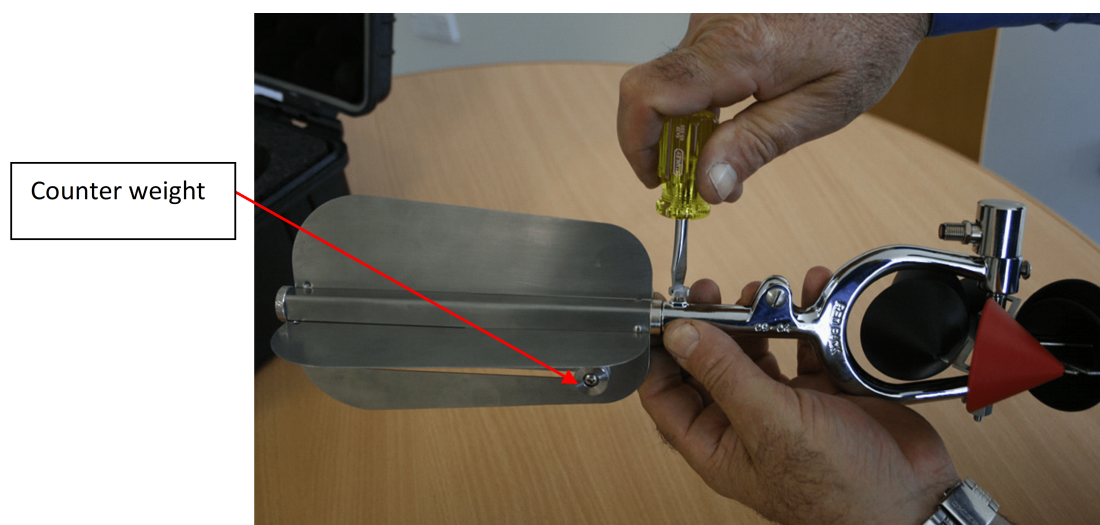
Step5. Ensure the adaptor is jammed tight against the tail pieces



Step6. Assemble the Tail assembly to the RedBack Current Meter



Step7. Tighten the tail screw using the supplied screw driver



Note: Once the meter is submersed into the water, the user can balance the RedBack Current Meter using the counter weight balance attached to the tail assembly.

3 Operation

The standard operation of the current meter is used in conjunction with a wading rod and a current meter counter. This method requires the user to stand in the stream and observe the velocities of the flow at different depths across the streams.

The current meter can be fitted with a stabiliser tail fin which is attached to a hanger bar and Columbus gauging weight in sizes of 7, 15, 23, 34, 45, 68, 90 or 135 Kg. This assembly is suspended from a gauging winch with armoured signal cable.

Hyquest Solutions provides a range of counters to suit the RedBack. The models available are as follows:

Model CMC20A is a basic counter which can be set to count pulses for a specific time period (10-200 secs). The counter stops when the time period has elapsed and shows a digital reading for the number of pulses. A rating table is used to convert number of pulses to velocity.

Model CMCsp current meter counter with direct velocity reading, in-built Bluetooth module for connection to a PalmTM top or field PC, fixed measuring interval from 10 to 90 secs.

Model PVD100 same functions as the CMCsp but supplied in plastic case and neck straps.

The HydroMate CMC3 is the top of the range Current Meter Counter with a touch screen facility and direct velocity reading. This counter allows up to 32 current meter calibration formulas to be entered so that direct calculation of river flow can be achieved. The HydroMate CMC3 can store data for up to 30 sites with 30 verticals per site and 11 points per vertical. The CMC3 software can be easily upgraded as new features are made available.

4 Maintenance

A key concept in maintaining the accuracy of a current meter is to keep it in the same good condition as when it was obtained from the manufacturer or when it was last calibrated. In order to do so, cleaning the meter after use is essential.

After a day of use in the field

1. The pivot, magnet and reed switch chamber should be removed and cleaned using the supplied current meter oil, apply a small droplet to the upper and lower bearing surfaces. (Do not use “3-in-1” type oil; this type of oil will solidify when exposed to water.)
2. Using a magnifying glass a visual inspection should be carried out to ensure the bearing surface is not wearing or damaged. The pivot tip should feel sharp as opposed to dull or rounded. It should not have a burr detectable visually or by fingernail.
3. The pivot should be always adjusted to the right position by setting the locknut and then securely tightening the lock screw.
4. After oiling and replacing the pivot and the magnet/reed switch housing, ensure the meter is turning freely and comes to a smooth and gradual stop. The meter should not have any undue vibration when rotating. Apply oil to the bearing and pivot if vibration occurs as described in step 1.

Before use in the field

1. Inspect the meter carefully and perform a spin test visually observing the rotation. If the meter is turning freely and comes to a smooth and gradual stop, then the meter is ready for use. However, if the meter fails to spin freely cleaning and adjustment is required to ensure proper operation.

Inactive meter

1. Prior to the meter being stored, it should have been disassembled, inspected and cleaned as described. In case the period of storage is less than 5 weeks, the meter can be used without any additional maintenance other than a spin test.
2. If the meter was stored for a longer period of time, it is advisable to first clean the meter and then spin test before use.

For more information, see the following subsections:

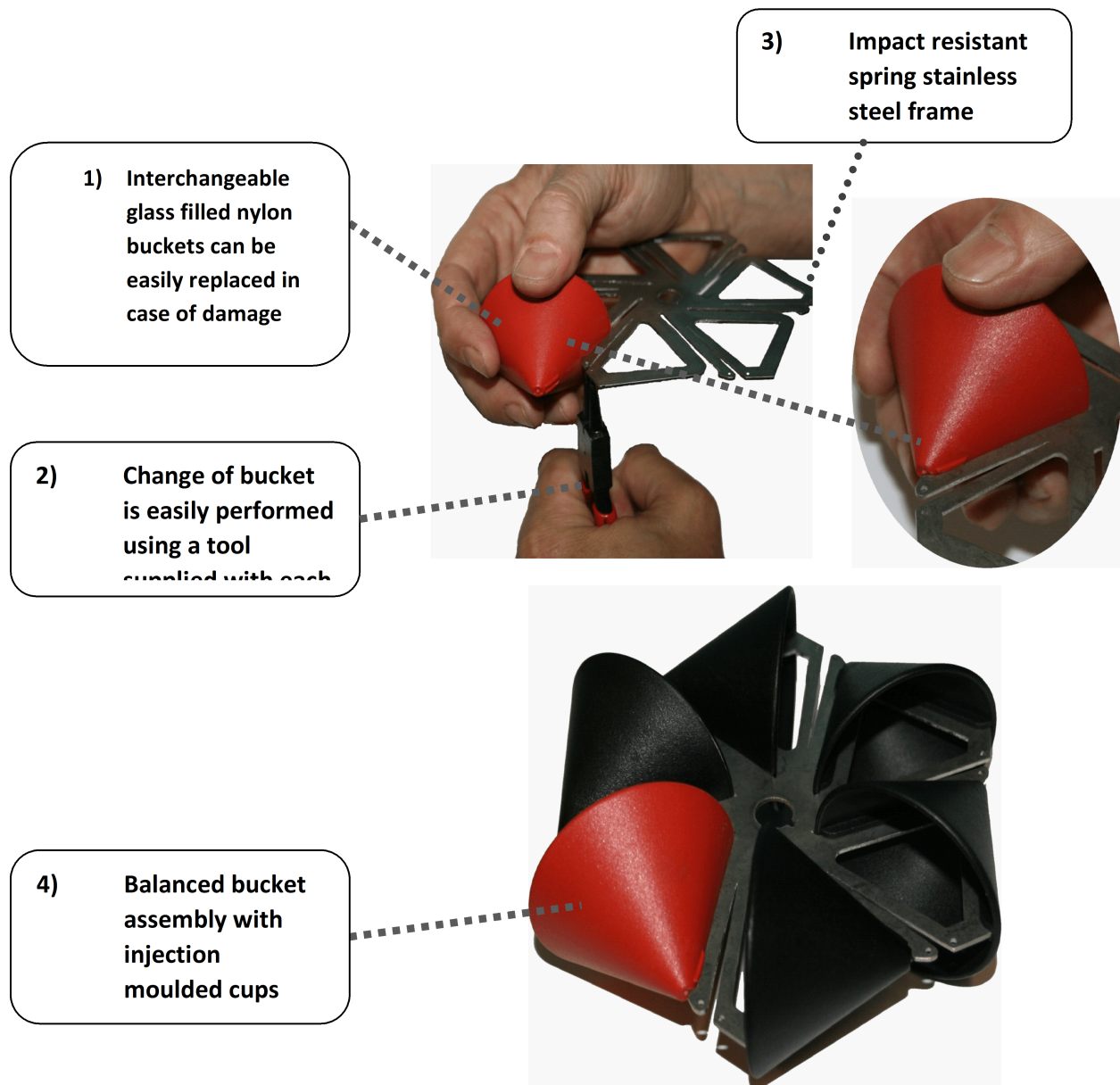
- [RedBack Meter Maintenance](#) ¹¹
- [Service and Recalibration](#) ¹³

4.1 RedBack Meter Maintenance

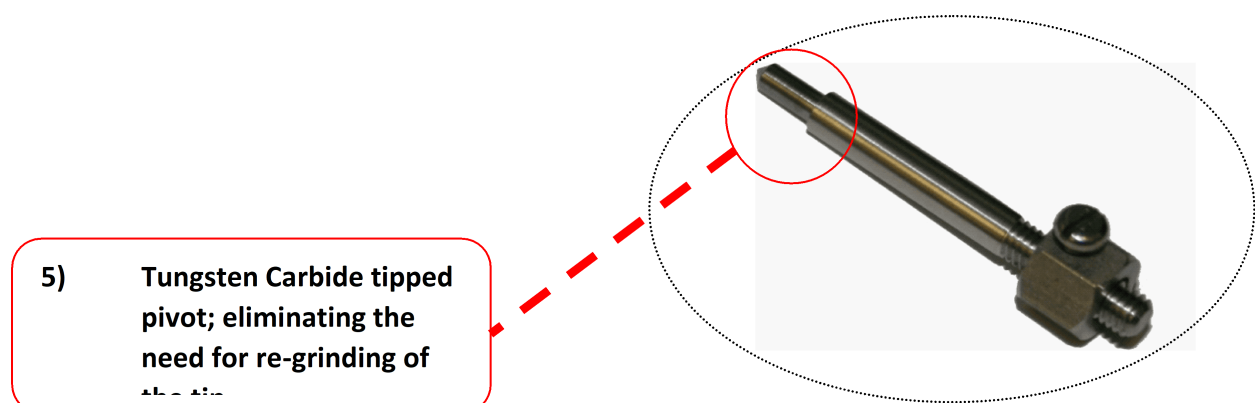
RedBack Meter Maintenance

The advantages of the RedBack over the traditional bucket meter can be summarised as follows:

- a) Flexible spring stainless steel frame which can resist force; where traditional stainless steel frame will bend slightly causing frame assembly to be out of balance, hence drift in calibration results
- b) Glass filled nylon interchangeable buckets are used instead of the traditional nickel plated brass bucket which if dented, will cause bad performance and inaccurate measurement. Moulded glass filled nylon buckets are identical in size, weight, hence calibration is maintained even if one or more damaged cups are replaced



- c) Advanced magnet/reed switch assembly provides superior performance and reliability; unlike traditional bucket meter cats whisker switch assemblies the RedBack reed switch is maintenance free.
- d) The pivot assembly is made from 316G Stainless Steel and has a Tungsten Carbide tip. The bearing plate is also made up of a similar metal. Hence, the turning motion is not affected by friction ensuring a low starting velocity and accuracy.



- e) Low maintenance and cost effective; The RedBack cost is incomparable to its accuracy +/-1%.

4.2 Service and Recalibration

HS recommends that the RedBack current meter should be recalibrated every 300 hours of use or once a year, whichever comes first (see Hyquest Solutions calibration certificate for details).



5 Repair

HyQuest Solutions precision instruments and data loggers are produced in quality-controlled processes. All HyQuest Solutions 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 HyQuest Solutions products perform to their fullest capacity when delivered.

Despite HyQuest Solutions 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 HyQuest Solutions' return and repair policy applies. For you as a customer, this means the following:

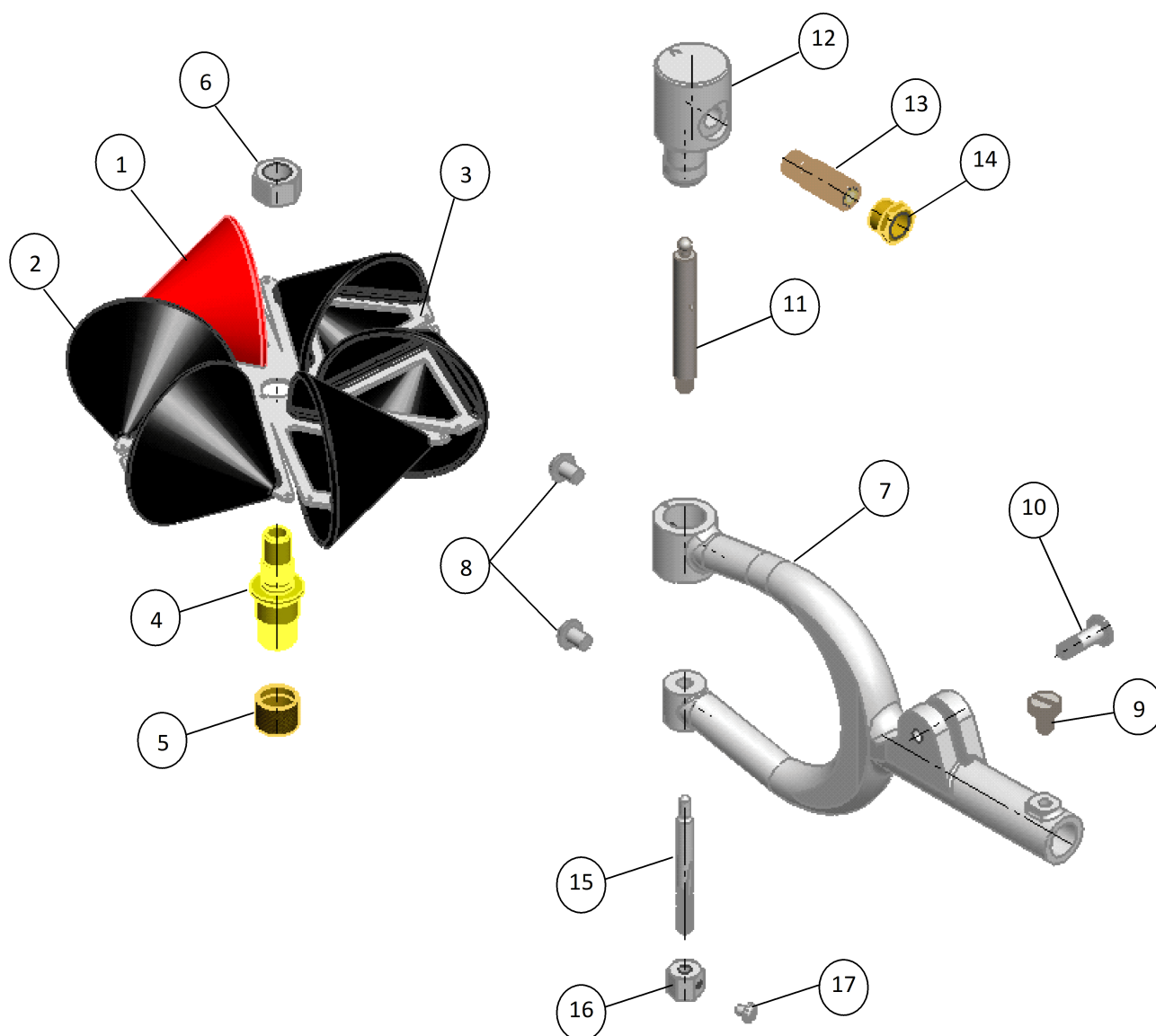
1. Contact HyQuest Solutions using the Repair Request Form made available online:
https://www.hyquestsolutions.eu/fileadmin/Form/Telemetry_Solution_app.jpg.pdf
In response you will receive a reference number that must be referenced on all further correspondence and on the freight documents accompanying your return shipment.
2. Please provide as much information and/or clear instructions within the return paperwork. This will assist our test engineers with their diagnosis.
3. Please do not ship the goods prior to obtaining the reference number. HyQuest Solutions will not reject any equipment that arrives without reference number; however, it may take us longer to process.

Custom requirements for items sent to HyQuest Solutions 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. HyQuest Solutions 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.



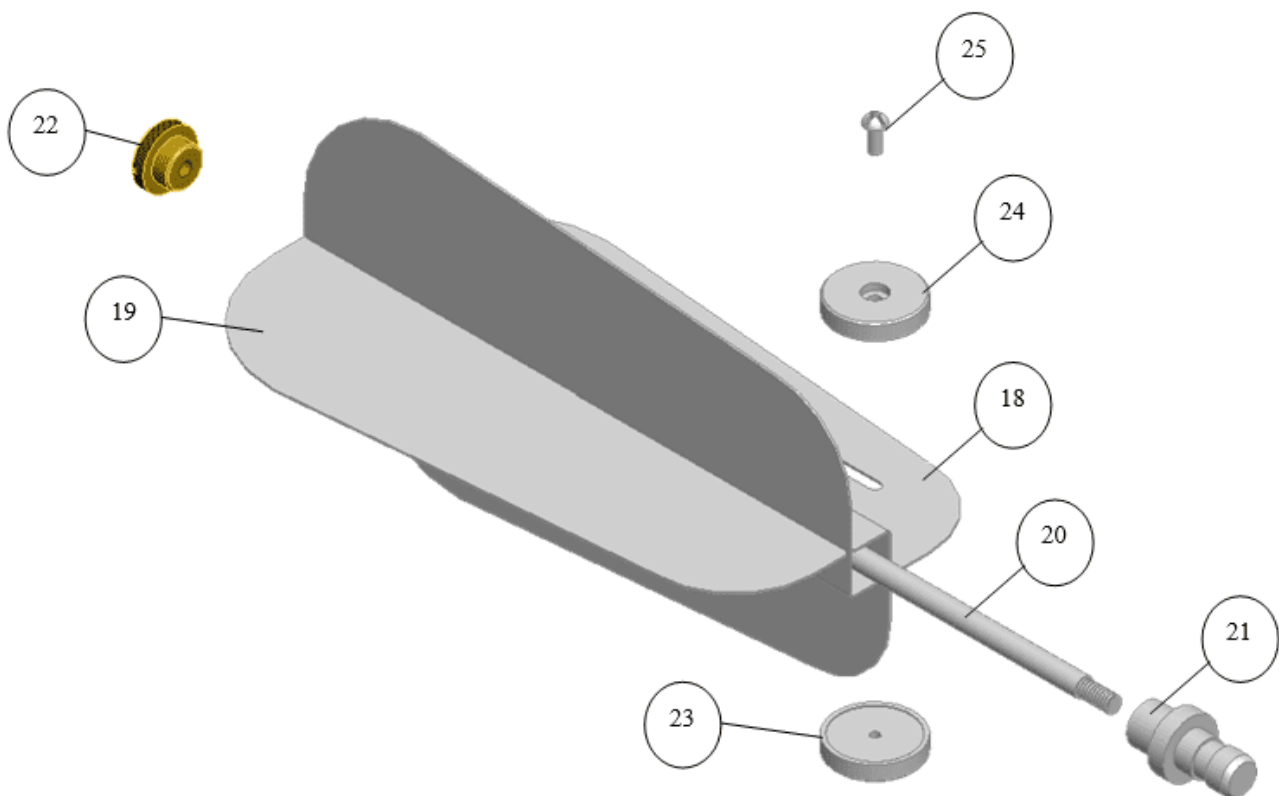
5.1 Meter Part List



No.	PART NAME	DESCRIPTION	QUANTITY
1	BUK01-01R	RED BUCKET	1
2	BUK01-01B	BLACK BUCKET	5
3	BUK01-02	BUCKET WHEEL	1
4	BUK05-01/02/03/06	BEARING CARRIER WITH BEARING INCLUDED	1
5	BUK05-04	RAISING NUT	1
6	BUK05-05	HUB NUT	1
7	BUK03-01	MAIN BODY	1

No.	PART NAME	DESCRIPTION	QUANTITY
8	SC022-74	SLOT HD SCREW	2
9	BUK03-03	TAIL SCREW	1
10	BUK03-02	HANGER BAR SCREW	1
11	BUK06-01/02	CONTACT SHAFT WITH MAGNET	1
12	BUK07-01	MAGNET & REED SWITCH CHAMBER	1
13	BUK07	REED SWITCH ASSEMBLY	1
14	PYG10-06	REED SWITCH HEX NUT	1
15	BUK04-02	PIVOT	1
16	BUK04-01	PIVOT ADJUSTING NUT	1
17	SC022-73	PIVOT SCREW	1

5.2 Tail Part List



No.	PART NAME	DESCRIPTION	QUANTITY
18	BUK08-01	TAIL PIECE - COUNTER WEIGHT SIDE	1
19	BUK08-02	TAIL PIECE	1
20	BUK08-03	BODY SUPPORT ROD	1
21	BUK08-04	TAIL ADAPTOR	1
22	BUK08-05	TAIL LOCKING NUT	1
23	BUK08-06	COUNTER WEIGHT	1
24	BUK08-07	COUNTER WEIGHT NUT	1
25	SC022-08	COUNTER WEIGHT SCREW	1

6 Technical Data

Construction	▪ Cast brass body, nickel-plated ▪ 6 durable glass-filled nylon buckets ▪ Stainless steel bucket wheel frame ▪ Stainless steel pivot with tungsten carbide tip
Operating Velocity Range	0.025 m/sec to 8 m/sec
Reed Switch	Encapsulated reed switch
Output Signal	▪ Voltage free digital signal ▪ 1 full revolution of bucket assembly produces one pulse ▪ Converted to direct velocity reading when used in conjunction with HyQuest Solutions' PVD100, CMCsp or PVD200 (see below)
Overall Accuracy	±1 %
Calibration and Calibration Method	▪ Meter supplied with batch calibration certificate ▪ Individual meter calibration available on request (additional costs): ▪ Calibration in accordance with AS3778.6.3/ISO 3455 standard ▪ Up to 3 line fit ▪ Supplied with calibration and a rating table ▪ Calibrated over full velocity range
Carry Case	Heavy-duty case with durable moulded foam
Dimensions and Mass	500 × 390 × 190 mm; 5 kg

7 Obligations of the Operator and Disposal

This chapter contains the following subsections:

- [Obligations of the Operator](#) ¹⁹
- [Dismantling / Disposal](#) ¹⁹

7.1 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.

7.2 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.

EU WEEE Directive

As players in the environmental market, KISTERS AG and HyQuest Solutions are 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

Europe	HyQuest Solutions (KISTERS AG)	 +49 2408 9385 0
		 info@hyquestsolutions.eu
Australia	HyQuest Solutions Pty Ltd	 +612 9601 2022
		 sales@hyquestsolutions.com.au
New Zealand	HyQuest Solutions NZ Ltd	 +64 7 857 0810
		 sales@hyquestsolutions.co.nz
Latin America	HyQuest Solutions (KISTERS LATAM)	 +57 350 575 4079
		 sales-latam@hyquestsolutions.com
North America	Hydrological Services America LLC (KISTERS Group)	 +1 561 459 4876
		 sales-hsa@kisters.net



