

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

/ HydroMet

User Manual

Flying Fox

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

KISTERS
Empowering decisions of tomorrow

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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.


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This document is public.

II Scope of Delivery

- Flying Fox carriage
- Remote control
- Power supply/charger (100-240 V ac, 50/60 Hz)
- IC regulated dc-dc converter (with car cigarette lighter plug)
- 2 fixing pins (with safety locking pins)
- **Note:** Batteries are not supplied with this unit, see [Technical Data](#)  for battery details.
- Not included: Measuring instruments, ADCP boats

III Safety Instructions

- Read the user manual including all operating instructions prior to installing, connecting and powering up the KISTERS FlyingFox. 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 FlyingFox 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 FlyingFox, 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 FlyingFox 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 FlyingFox 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 FlyingFox out of service, it must be disposed of in compliance with local waste and environmental regulations. The KISTERS FlyingFox 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

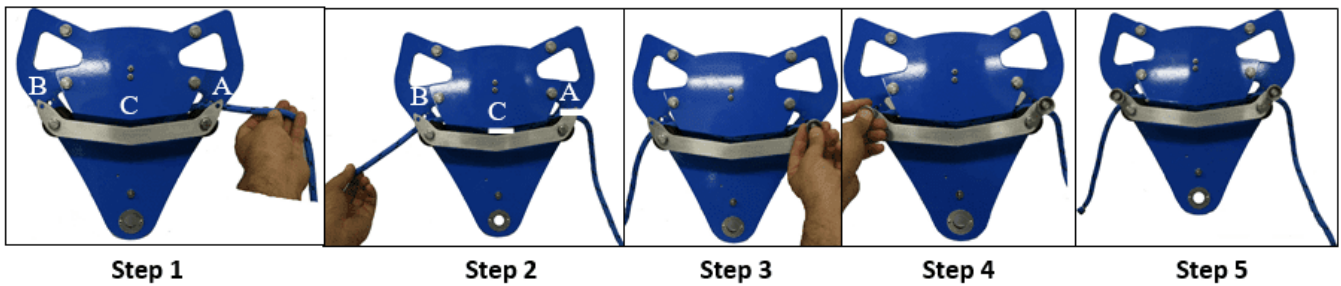
Thank you for choosing our product. We hope you will enjoy using the device.

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!

The Flying Fox is a portable towing and positioning system with built-in electric motor and remote control. It moves remote-controlled over a span of rope transversely to the flow axis and pulls a measuring device – e.g. an ADCP boat – for cross-section measurement through the river, and positions the device exactly at the measuring point.

2 Installation



Using a low stretch, high strength 8 mm diameter rope (such as the Donaghy's "Spectraspeed" = 3 tonne breaking strain), install it across the river by attaching to trees, vehicles etc.

Note: For ease of installation, do not **fully** tension the rope until the Flying Fox is fitted to the rope (step 5) as follows:

Feed the rope above the roller (A) as shown in step 1. Position the rope under the rubber pulley at (C), then pull the rope above the second roller (B) and position the rope between the rollers and insert pins as shown in step 3 and 4.

Turn on the Flying Fox and operate it forward and backward, while viewing the "motor current" on the LCD display - as shown on the next [page](#). For optimum performance, the tension of the rope should be adjusted until the motor current is about 2.0 A to 3.0 A. If the current is too high, reduce the rope tension! This will give the Flying Fox the maximum battery duration.

3 Operation

This chapter contains the following subsections:

- [Flying Fox Operation](#) ⁸
- [Remote Control](#) ⁹
- [Operating Frequency](#) ¹²

3.1 Flying Fox Operation





Note: The Flying Fox Carriage and Flying Fox Hand Controller are not supplied with batteries. Please ensure that the correct rechargeable batteries are fitted before connecting the chargers to avoid the risk of fire during charging. See [Technical Data](#) ¹⁴ for correct battery details.

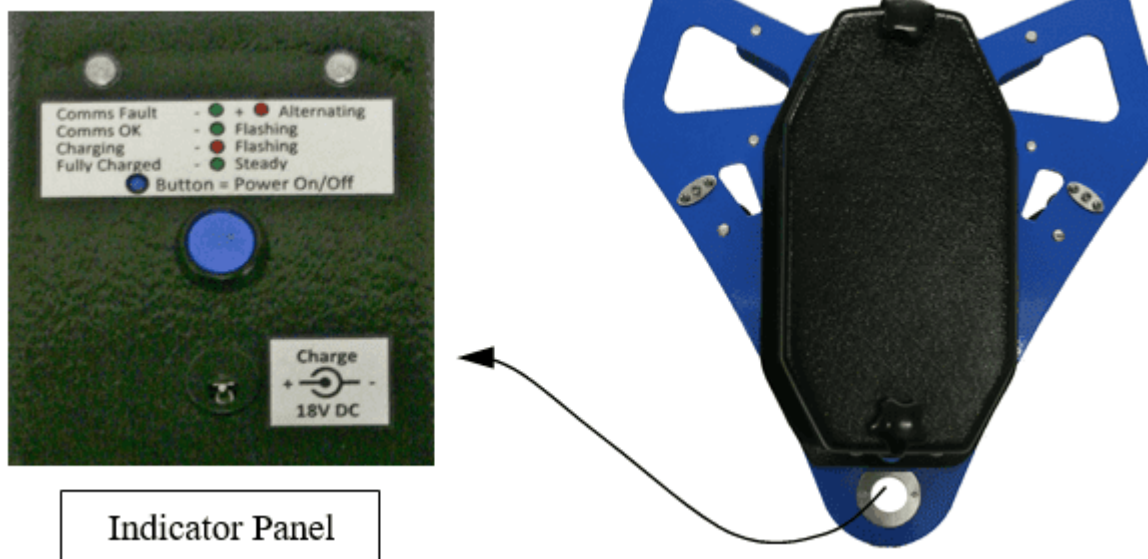
Turn it **ON** - Press the blue button on the Flying Fox.

Turn it **OFF** - Press the blue button on the Flying Fox again - the LEDs will turn off.

(The Flying Fox will automatically turn off if there has been no communications for 3 hours.)

The LED's on the Flying Fox indicate the internal state:

	<p>Comms Fault - when the green and red LED's flash alternately. Turn on the Remote Control and wait 5 seconds for comms to be established.</p> <p>(If the Remote Control has an Emergency Stop button then the system operates by automatically frequency hopping through the spectrum - and it will eventually connect - however, if there is no Emergency Stop button, then the system operates on a single frequency that is selectable from the Remote Control - so you may need to select a new frequency from the Remote Control sub menus until only the green LED flashes.)</p>
	<p>Comms OK - when the green LED flashes on its own. The communications between the Flying Fox and the Remote Control is OK.</p>
	<p>Charging - when the red LED flashes on its own. The 18 V dc supply is charging the internal 12 V dc SLA battery. This can be plugged in at any time and the unit will start charging. As the charging progresses, the red LED flashes faster. The battery voltage can be viewed on the Remote Control LCD if required. (Will take 3-4 hours to charge from fully flat)</p> <p>Note: The dc-dc car charger included with the Flying Fox can only be used to charge the NiMh batteries in the Remote Control - it cannot be used to charge the 12 V SLA battery in the Flying Fox. The 18 V dc plugpack can be used to charge either the 12 V dc SLA battery OR the NiMh batteries in the Remote Control.</p>
	<p>Charging complete - when the green LED is on steady. The battery is then trickle charged to keep it at optimum charge.</p>



Indicator Panel

3.2 Remote Control

Press and hold the blue button to turn **ON** the remote control.

Press and hold the blue button to turn **OFF** the remote control

Two models of Remote Control:

Remote Control without Emergency Stop

This model operates on a single frequency in the approved spectrum of 902 MHz to 928 MHz (26 frequencies at 1 MHz spacing) - the frequency can be set/changed in the remote control's **REMOTE...** menu according to the table in section [Operating Frequency](#) ¹². Multiple units can be operated in the same area by selecting a different frequency for each system. These systems have remote control software version 1.xx



If there is no communications between the remote control and the Flying Fox, with both units powered on, step through each frequency on the remote control until communications starts.

Remote Control with red Emergency Stop button

This model operates in the approved spectrum by automatically frequency hopping every 400 ms. This is called Frequency Hopping Spread Spectrum (FHSS).

(64 frequencies between 902 MHz and 928 MHz - US Model)

(70 frequencies between 863 MHz and 870 MHz - EU Model)

Note:

1. If the remote control has software version 2.xx, it will communicate with **any** Flying Fox - so multiple systems in the same area **cannot** be used.
2. If the remote control has software version 3.xx, then it **must** be paired with a specific Flying Fox - so that multiple systems **can** be used in the same area. (The "pairing" of the remote control can be easily changed by the operator if necessary).

The emergency stop button has been added to provide compliance with EN14492-1 standard in Europe - and has the following functionality:

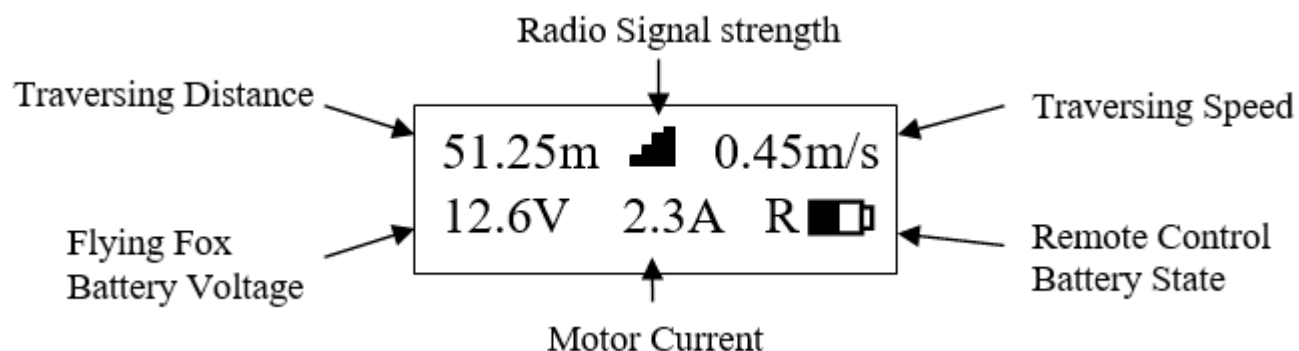


When the emergency stop is pressed:

- The Flying Fox will stop immediately.
- The Flying Fox will not respond to Fwd / Rev commands from the remote control.
- The remote control will display **EMERGENCY STOP** on the LCD.
- The remote control will beep continuously while in emergency stop to get the users attention.

To remove the system from emergency stop mode, rotate the red button in the direction of the arrows and it will click upwards - normal operation will resume.

During normal operation the main LCD Display indicates:



To zero Traversing Distance - Press the Push Select knob on the remote control Unit while the menu above is displayed - the LCD will display **SET WATERS EDGE** - press the blue button momentarily to zero the traversing distance.

Radio Signal Strength - Strength is usually high (Range is 175 m+ (= 575 ft+))

To set Traversing Speed - Turn the speed knob on the remote control left hand side to set the desired speed.

Flying Fox Battery Voltage - The Flying Fox voltage is measured and sent back to the remote control. If this voltage falls below 10.8 V the remote control will start beeping. The Flying Fox should be brought in as soon as possible (so it doesn't get stranded in the middle of the stream) and the battery re-charged or replaced with a fully charged battery. You will be able to drive the Flying Fox about 100 m (300 ft) once the battery reaches this voltage.

A fully charged battery will drive the Flying Fox for approx 600m (1800ft) at any speed setting !
 (eg. 20 min continuous at 0.5m/s (1.6ft/s) : 50min continuous at 0.2m/s (0.6ft/s))

Spare batteries can be purchased from KISTERS or purchase a 12 V 2.8 Ah (132 × 97 × 33 mm) PowerSonic PS-1228 battery locally.

Motor Current - The current drawn by the motor is measured by the Flying Fox and sent back to the remote control. This is used when setting the cable tension.

Remote Control Battery State - Indicates the charge of the internal NiMh AA batteries. (The remote control can be charged by either the 18 V dc mains charger or the 12 V dc car charger)

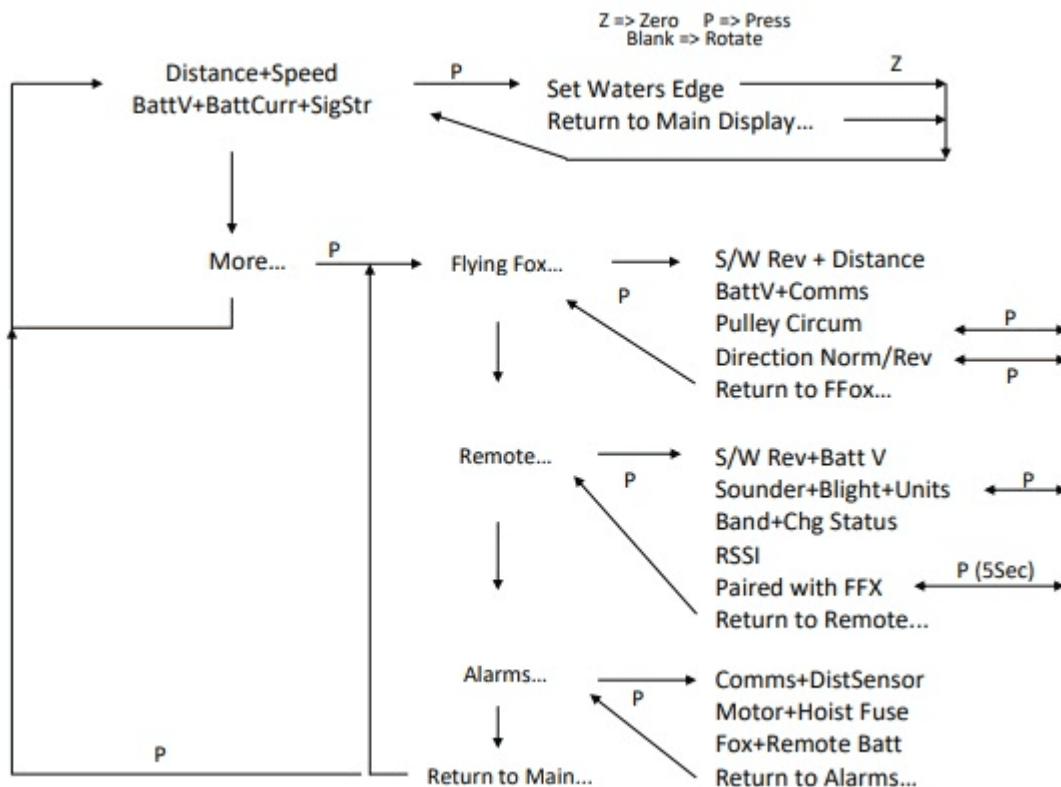
Navigating Remote Control Menus

The Scroll Menu knob can be rotated and pressed - this is used to navigate and select menus.

Rotate the Scroll Menu knob to display **MORE...** and press the same knob.

Rotate the Scroll Menu knob to display **FLYING FOX...**, **REMOTE...**, **ALARMS...** or **RETURN TO MAIN DISPLAY...**

(Different software versions may have slight variations, but the following is the basic menu structure.)



The Flying Fox menus show the Flying Fox software version, the traversing distance, the comms state and the pulley diameter - this can be used to fine tune the distance measurement for different size ropes.

Distance Measurement - the drive pulley rotation is measured and used to determine the distance travelled - the pulley diameter parameter in the Flying Fox menu can be adjusted to fine tune the distance measurement if accuracy is required.

The **REMOTE** menu shows the remote control software version, the battery voltage, the back lighting state, the units (m or ft), the operating frequency and the remote control charger state. Pressing the Push Select knob allows the different menu options to be selected.

The **ALARM** menu shows the Flying Fox comms and battery state, and the remote control battery state.

Pairing a Remote Control with a Flying Fox

Note: This feature is only available in remote control software version 3.xx.

- Navigate to the **PAIRED WITH FFOX** menu on the remote.
- Press and hold the Push Select button for 5 seconds and the menu will change and read **NEW PAIR WITH ... SERNO XX-XX**
- Turn off the Flying Fox you want to pair with and wait 5 seconds.
- Turn on the Flying Fox you want to pair with. (For the first 3 seconds after turning on, it checks to see if a remote control is trying to pair with it).
- In the menu of the remote control the serial number of the Flying Fox is displayed. Compare this number with the serial number label on the Flying Fox itself.
- Press the Push Select button and the remote control and Flying Fox will pair and resume normal communication. This pairing between the remote control and Flying Fox is stored in non-volatile memory, so the next time the remote control and Flying Fox are turned on, they will resume the paired connection.

3.3 Operating Frequency

There are 3 models of the Flying Fox (please specify the model when ordering):

1. The original Flying Fox model operates on a single frequency in the 915 MHz band (902.5 MHz, 903.5 MHz, 904.5 MHz, ... 927.5M Hz).
2. The EU model of the Flying Fox operates on the 868 MHz band using Frequency Hopping Spread Spectrum (FHSS) and jumps between 70 different frequencies, staying on any one frequency for a maximum of 400 ms. This model is CE approved and has an emergency stop button.
3. The US model of the Flying Fox operates on the 915 MHz band using FHSS and jumps between 64 different frequencies, staying on any one frequency for a maximum of 400 ms. This model has been tested to meet FCC standards and has an emergency stop button.

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

Transect Speed	User selectable from 0 to 0.5 m/sec (0.1 to 1.6 ft/sec)
Transmitter Range	Up to 175 m (574 ft)
Frequency Band	License-free, ISM band for short-range devices (Australia, Europe, USA)
Power Supply	<ul style="list-style-type: none"> ▪ Carriage battery: 12 V, 2.8 Ah Sealed Lead Acid (SLA) battery ▪ Remote control battery: 3 × AA rechargeable NiMh batteries. Recommended brands: Panasonic, eneloop ▪ Main charger: 220 V ac or (110 V ac) ▪ Cigarette lighter battery charger
Enclosure	Powder coated aluminium, ABS
Operating Time	<ul style="list-style-type: none"> ▪ A fully charged battery will drive the Flying Fox for approx. 600 m (1968 ft) total traversing distance at any speed setting. (Please note: This is not the radio range) ▪ For example: A 100 m span can be traversed 6 times, i.e. 20 minutes continuous at 0.5 m/s (1.6 ft/s) or 50 minutes continuous at 0.2 m/s (0.6 ft/s).
Rope	<ul style="list-style-type: none"> ▪ Any low stretch, high strength 8 mm (5/16") diameter rope ▪ Optionally available, see below
Dimensions	L × W × D: 370 × 340 × 190 mm
Weight	<ul style="list-style-type: none"> ▪ Tow vehicle weight: 5 kg (10.5 lbs) ▪ Shipping weight with case: 10 kg (22.5 lbs)
Compliance	CE, FCC, RoHS

6 Obligations of the Operator and Disposal

This chapter contains the following subsections:

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

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.

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