

# MAINSTREAM IV FLOWMETER

## Permanent CPU

### Installation Manual



Revision	Date	Author	Modifications	Signature
01	08/06/11	GSE	Validation	GSE
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This document is the manual for the **installation of a permanent CPU for the Mainstream IV flow meter.**

For sensor installation, refer to the **level/velocity sensor installation manual.**

For acquisition programming, refer to the **programming manual for the Mainstream IV flow meter running in Winfluid.**

If you have any further questions, please contact **our Customer Service Department**

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## 1 Introduction

The Mainstream IV level/velocity flow meter is used to measure flow in open channels under part-filled pipe conditions.

The level/velocity probes are installed according to the **level/velocity sensor installation manual**.

It is powered by a continuous 24 VDC source. No special connectors are required for the level/velocity probes, which are wired directly onto the terminal block of the CPU.

The level/velocity probes and the CPU are configured via the Winfluid software package (using a laptop computer) or its mobile version, Winfluid Mobile (using a PDA). Refer to the **Mainstream IV flow meter recording programming manual**.

All of the commercial Catalogue Numbers related to the use of the Mainstream IV permanent CPU are listed in **Appendix 1**.

Hydreka shall not be held liable for the quality of the measurements performed using the Mainstream IV flow meter if the recommendations given below are not observed.

### 1.1 Environmental and safety conditions

Optimum use of the Mainstream IV flow meter requires a measurement environment that is not greatly exposed to environmental disturbances likely to affect the measurement (electromagnetism).

### 1.2 Conditions in the measurement environment

- Protection: IP 66
- Operating temperature range: -40 to 90°C

It is also important to prepare the site carefully before installation:

- Around-the-clock access
- Inspection port directly above the flow
- Port access shaft for quick installation of measurement conditioning boxes and easy access.
- Site not subject to risk of vandalism, electrical interference or risk of lightning.

It is important to arrange for protection against downstream influences (tide, etc.) to guarantee relevant measurements.

### 1.3 Software environment

The Mainstream IV permanent CPU can be configured using Winfluid and Winfluid Mobile software, both developed by Hydreka.

**Minimum software version: Winfluid 3.22 or Winfluid Mobile 2.22**

## **1.4 Safety**

Use of the Mainstream IV permanent CPU does not require any particular safety instructions.

The user is responsible for making all necessary safety arrangements to deal with the inherent hazards of the measurement site (gas detector) and the fluid whose flow rate is being measured (suitable protective gloves, etc.), for which HYDREKA cannot be held responsible.

## **1.5 Product transport**

The build quality of the permanent CPU is very robust. It is nevertheless recommended to avoid subjecting it to impact during transport (separation of the components).

## **1.6 Product guarantee**

The CPU is guaranteed for **two years** under the recommended conditions of use. Contact your HYDREKA customer service representative to invoke this guarantee if necessary. Check that all the components ordered are present before disposing of the packaging.

## **1.7 Conditioning the product before use**

The product does not require conditioning before use.

## 2 Description of the Mainstream IV permanent CPU product range

### 2.1 Description of the Mainstream IV permanent CPU

The Mainstream IV permanent CPU looks like this:



Figure 1: View of the Mainstream IV permanent CPU – front panel

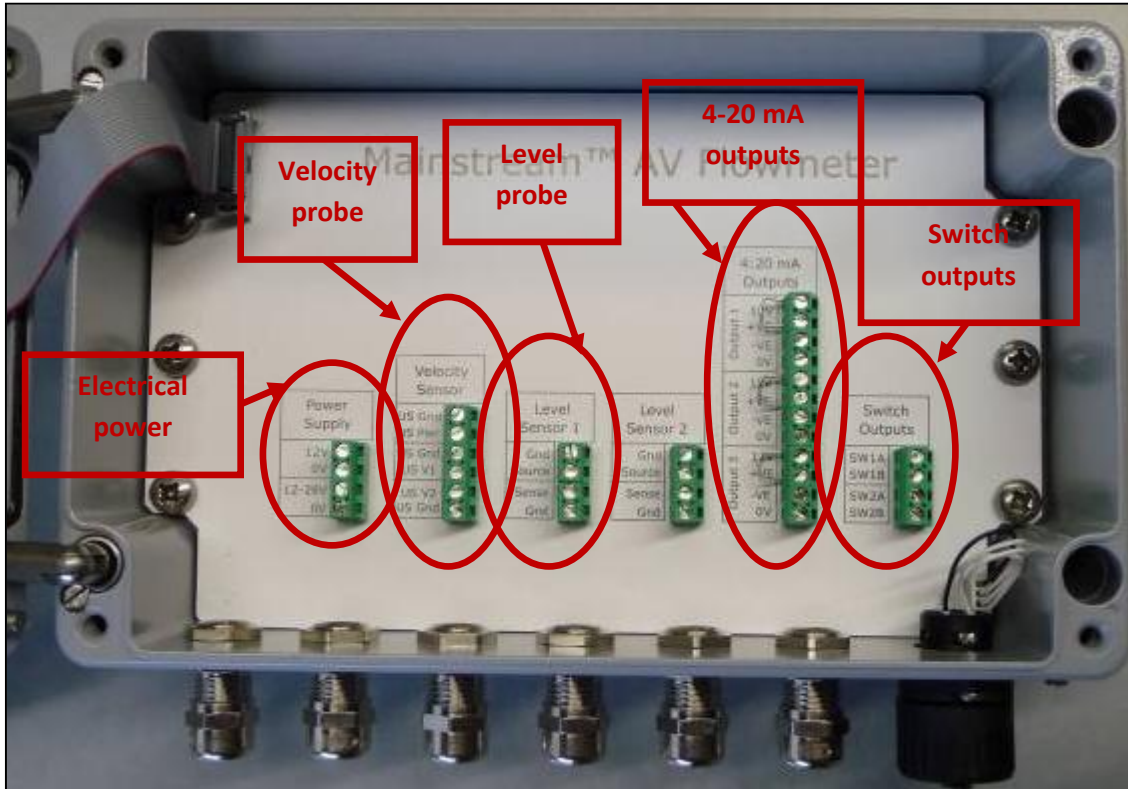


Figure 2: View of the Mainstream IV permanent CPU – interior

The dimensions of the CPU are as follows:

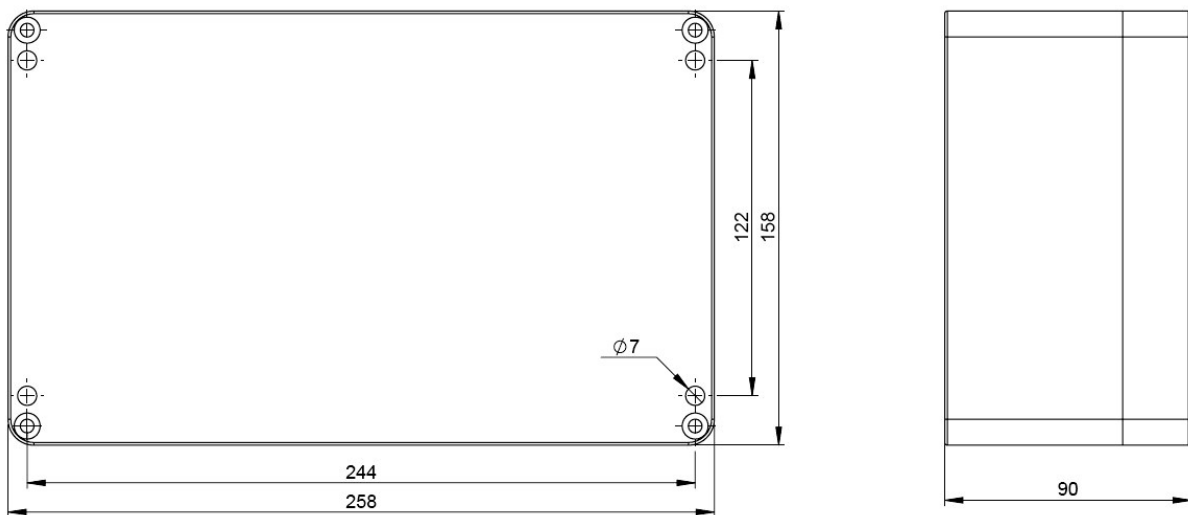


Figure 3: Dimensions of the Mainstream IV permanent CPU

The location of the CPU must be planned in advance, taking into account the lengths of the input cables (level/velocity probes) and the output cables (4-20 mA outputs, switch outputs, etc.).

It is important to keep the junction bridges on the 4-20 mA outputs to ensure that the outputs remain active.



## 2.2 Available models

Only one permanent CPU model is available: Catalogue Number **UC\_MSN4F**

## 3 Installation of the CPU

### 3.1 Wall mounting

An appropriate location is determined according to the configuration of the measurement site and the length of the input and output cables. Using the CPU mechanical diagram (see Paragraph 2.1 Description of the Mainstream IV permanent CPU), place the CPU in its permanent location (secure using a 3-mm diameter screw and wall plug system or place inside a locked protective box).

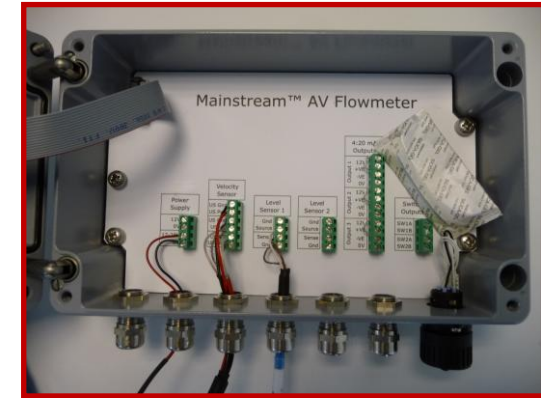
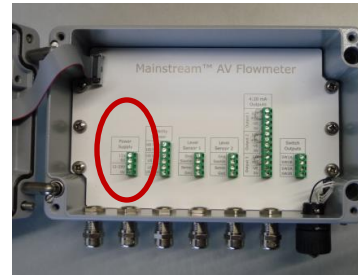
### 3.2 Internal wiring

#### 3.2.1 Electrical power supply

The electrical power consumption of the Mainstream IV permanent CPU is 200 mA at 24 VDC. The CPU power supply is connected according to the diagram below.

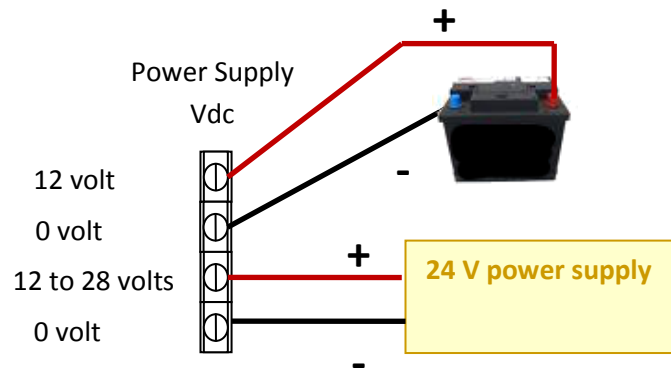
**WARNING: DO NOT SWITCH ON THE CPU ELECTRICAL POWER SUPPLY  
UNTIL ALL THE WIRING IS COMPLETE**

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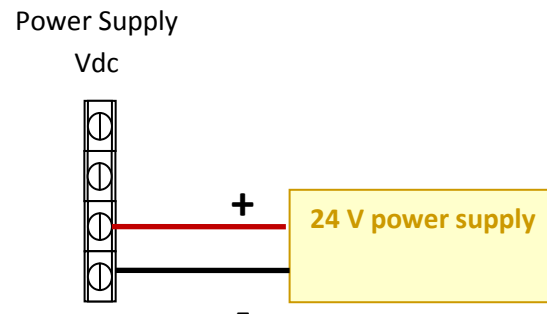
**Configuration 1: 24 V power supply + 12 V backup battery**

The 12 V battery is charged by an internal circuit in the Mainstream IV powered at 24 V. This circuit automatically takes over when the 24 V power supply is cut off. The 4-20 mA outputs are no longer active when the 12 V battery power supply takes over, but recording, communication and the pulse outputs remain operative



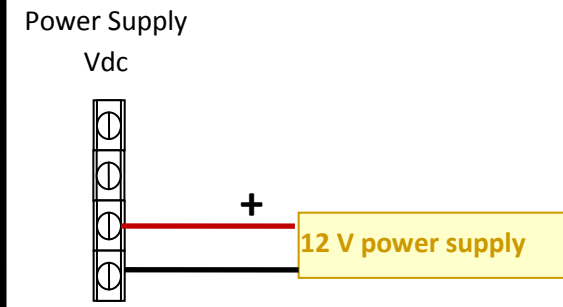
OR

**Configuration 2: Simple 24 V power supply**



OR

**Configuration 3: Simple 12 V power supply**

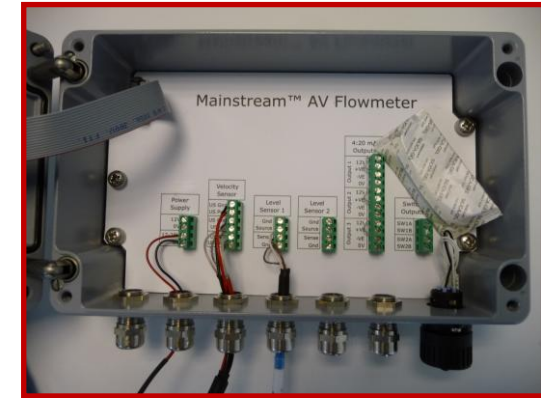
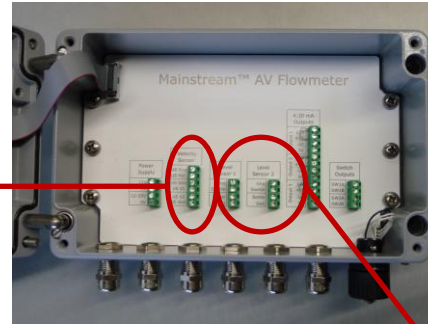


### **3.2.2 Wiring of level/velocity probes and output channels**

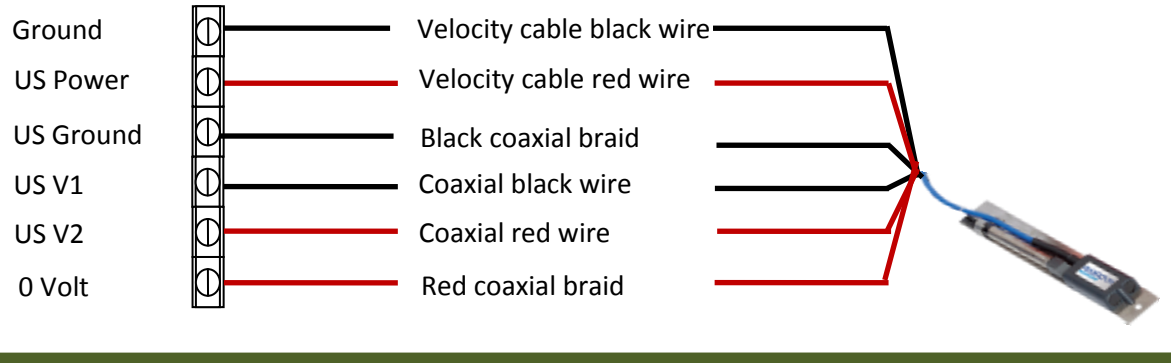
The stripped wires must be routed through the cable glands at the bottom of the unit and connected to the CPU terminal box as shown in the diagrams below.

Bare wires must be used for the alarms and the 4-20 mA outputs. Take care to determine in advance whether the 4-20 mA outputs are active or passive before applying power.

**Doppler effect**  
**velocity probe**



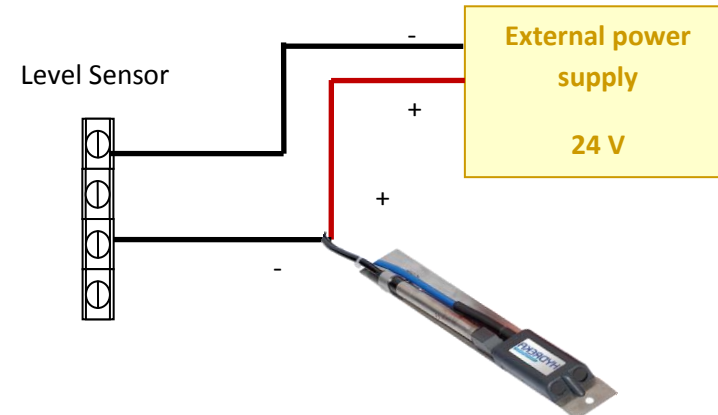
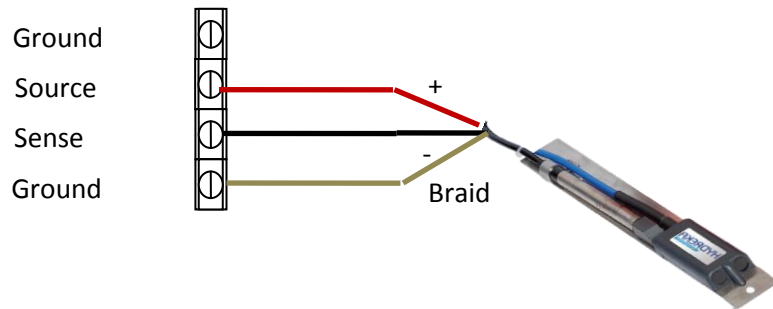
Velocity Sensor

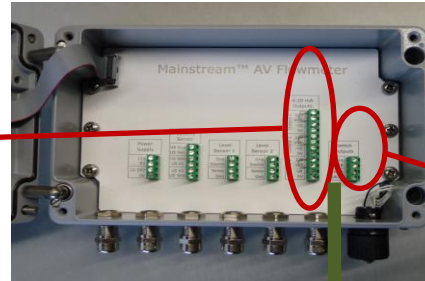


**Level probe 4-20 mA**

**OR**

Level Sensor

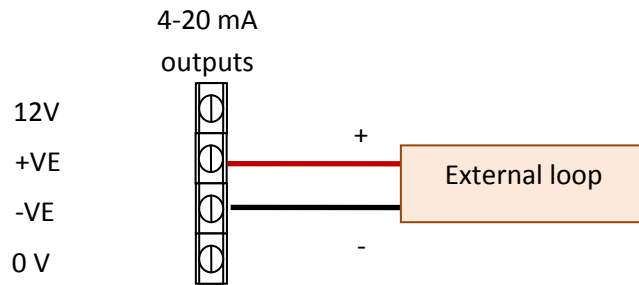




**4-20 mA outputs**

**Switch output**

**Passive 4-20 mA output**



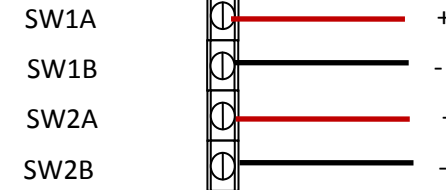
In this configuration, the external loop produces the voltage at the positive and negative terminals.

The 4-20 mA output regulates the current.

Min. external voltage: 8V

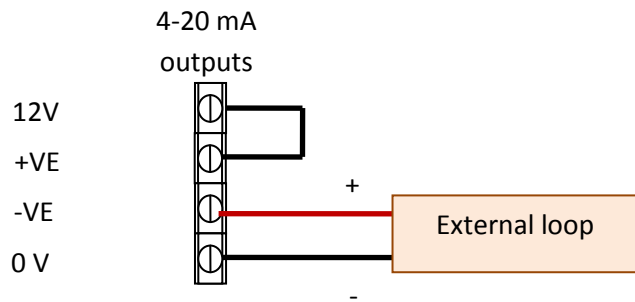
Max. external voltage: 24V

**Switch Outputs**



**OR**

**Active 4-20 mA output**



In this configuration, a current produced by a 12 V auxiliary power supply, internal to the Mainstream, is regulated by the 4-20 mA output.

Max. resistance of the external loop: 600 Ω

The auxiliary power supply is the same for the three 4-20 mA outputs. The three 4-20 mA outputs are not isolated from each other.

The auxiliary power supply is limited to 125 mA. Any higher consumption leads to a malfunction of the 4-20 mA outputs

### 3.3 Lightning protection of the CPU

The Mainstream IV permanent CPU has no protection against lightning and surges.

We recommend the installation of an external device to protect it from surges caused by lightning (lightning arrester, galvanic isolation, etc.).

It is possible to protect each of the 4-20 mA outputs that are **active and used** (i.e. programmed to output a 4-20 mA signal during programming in Winfluid) from surges from the connected system (remote management etc.) using galvanic isolation modules and observing the diagram below:

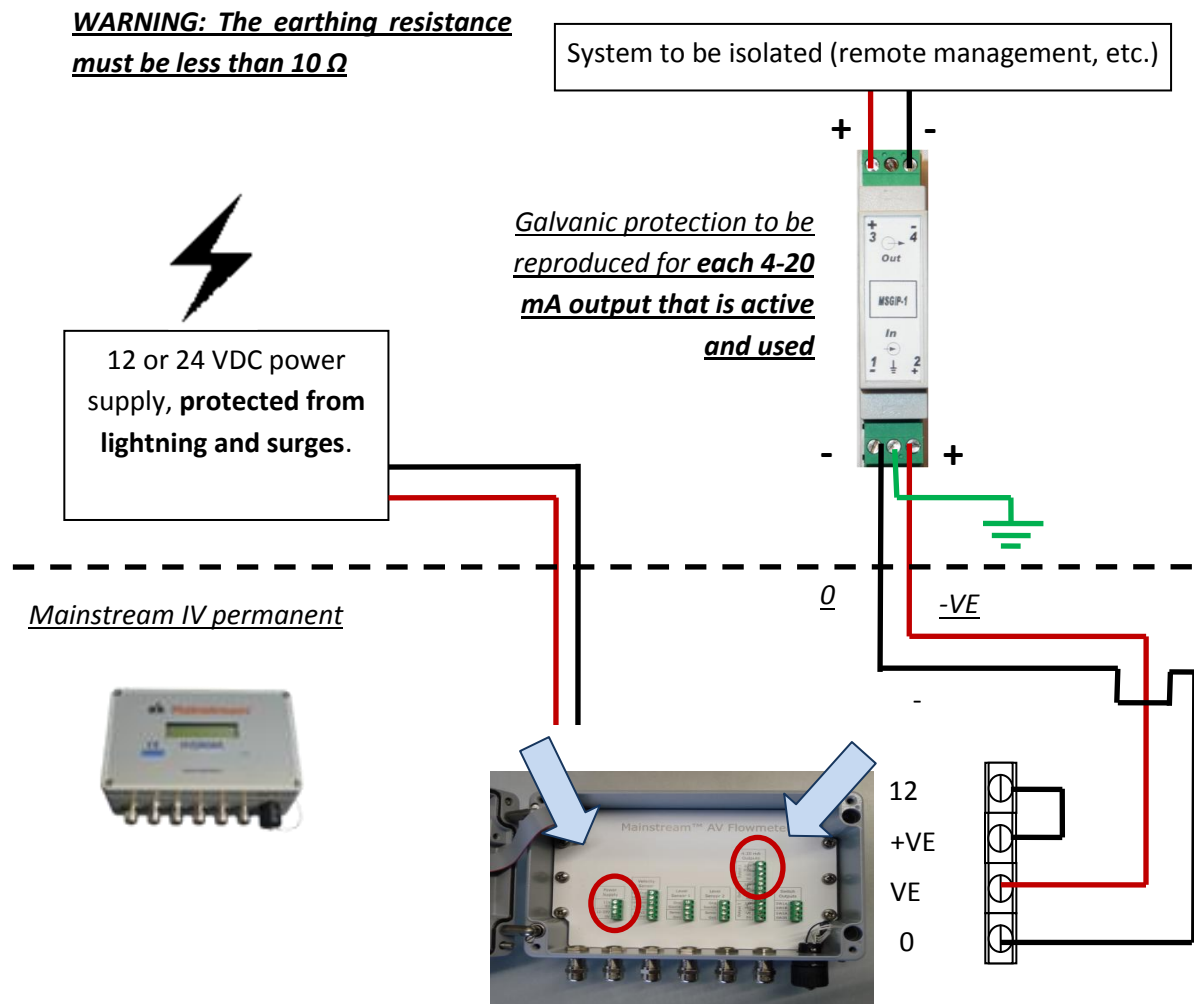


Figure 4: Lightning protection of the Mainstream IV permanent CPU

It is also possible to provide galvanic protection for level sensors (please ask us).

## 4 Maintenance

No particular scheduled maintenance operation for the Mainstream IV permanent CPU needs to be highlighted.

In addition to the necessary cleaning of the level sensor and velocity sensor during their use, it is recommended that the velocity and pressure sensors should be inspected **annually** on a COFRAC connected hydraulic bench. These tasks can be the subject of a maintenance contract with Hydreka. For further information, refer to the **level/velocity sensor installation manual**.

## **5 Product disposal**

Product disposal must take place in accordance with local regulations concerning electronic products at the end of their life cycle (for example, the European WEEE Directive, etc.)

## APPENDIX 1: HYDREKA Catalogue Numbers associated with the Mainstream IV permanent CPU

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UC_MSN4F	Mainstream IV permanent CPU with three 4-20 mA outputs
P_TX8350W-10	PTX1830 C.press. 0 to 350 mBar output 4-20mA cable 10 m
MAP99	'Vent to atmosphere' box for pressure sensor
P_TX7350W-10	PTX1730 C pressure 350mBar 4.20mA Diameter 17.5 mm cable 10 m
CABPUR2T	Polyurethane cable, two strands + braid (2 x 0.5 mm <sup>2</sup> )
V_MSN5-10	Mainstream velocity sensor 5 m/s cable 10 m
SUPMSNPQ5	Support plate for Mainstream level/velocity sensor (stainless steel)
CERINOA	1.5 m stainless steel hooping for Mainstream
ECAMS3	304 stainless steel spreader (tightening assembly) for Mainstream probe
ALIXPPA	110-220 V power supply, 15 W 24 VDC /625 mA with terminal block
CNT57A	Bare wire switch output - 4/20 mA bare wires for sampler Sigma SD900
CC_MSN4F	RS232 communication cable / PC Mainstream IV permanent
CABMSNA	Cable (bulk) to create extensions for the Mainstream velocity sensor
CABMSN	Polyurethane cable for Mainstream velocity sensor

Table 1: HYDREKA Catalogue Numbers associated with the Mainstream IV permanent CPU



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**NOTES**

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