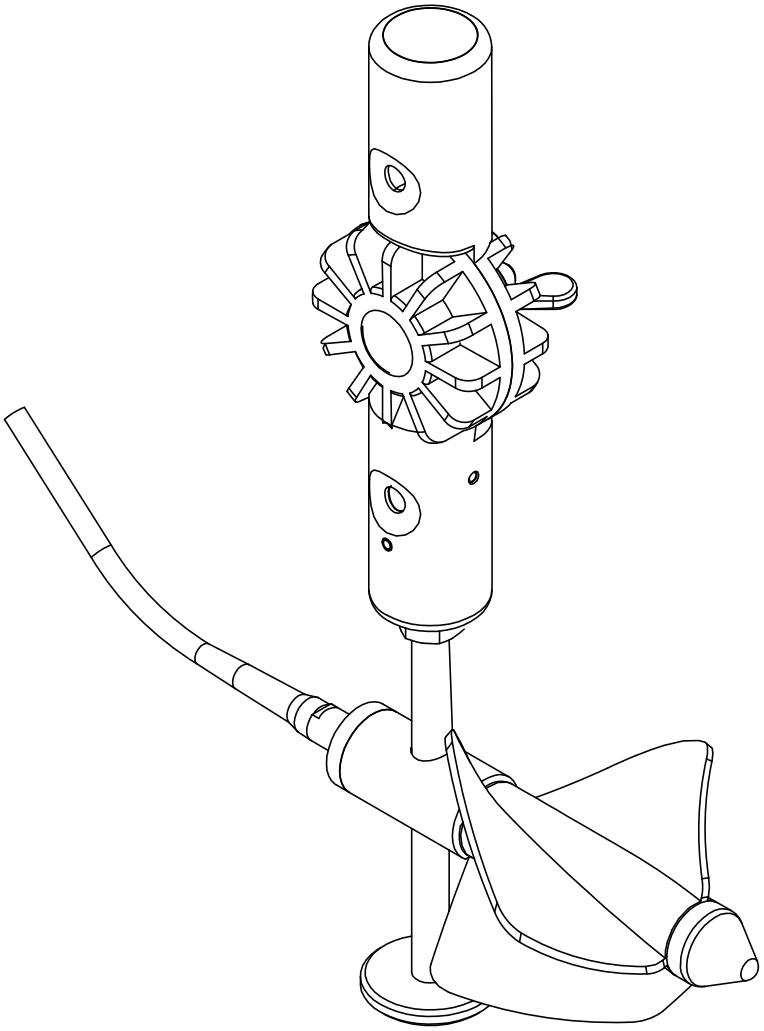
HYDRO-BIOS



ROD HELD CURRENT METER *RHCM*

OPERATION MANUAL

Product ID 445 500 / 445 515

Edition 06/25

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PREFACE

NOTICE



Please read this manual carefully before operating or performing maintenance on the instrument. Pay special attention to all danger, warning and caution statements. Failure to do so could result in serious injury and/or damage to the instrument. Keep manual available at all times.

LAYOUT AND MEANING OF WARNINGS

All safety instructions found in this operation manual are composed in accordance with the following pattern (signal words):

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.
NOTICE may also indicate a situation which, if not avoided, may cause damage to equipment.

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GENERAL DESCRIPTION

The Rod Held Current Meter RHCM is a portable point-by-point measuring instrument for assessing the current speeds in running waters.

The optimized evaluation algorithms allow for higher resolution and faster response of the sensor. The measuring cycle can be adjusted from 5 to 30 seconds (i.e. the display is the average of the last 5 to 30 seconds). Each measuring value can be stored in combination with a date and time stamp (created by an integrated real-time-clock).

The RHCM consists of a hydrometric vane at the lower end of a telescopic rod which can be angled up to ± 90°. The measuring head is connected to a splash-proof hand terminal by means of a data cable. The measuring values are displayed and stored together with a date and time stamp on the hand terminal, and the stored values can be transferred to a PC via serial port by means of the software OceanLab. At the PC the measuring files are stored in ASCII format for processing with current word processing, spread sheet and database software.

STANDARD EQUIPMENT

1. Measuring head with angle joint and connecting cable to hand terminal
2. Teleskopic rod
3. Hand terminal
4. Battery 9 V (PP3)
5. USB flash drive OceanLab
6. Connecting cable to PC, approx. 3 metres long
7. Operation manual
8. USB-Adaptor

TECHNICAL DATA

Measuring range:		0.100 ... 9.999 m/s
Resolution:		0.001 m/s
Accuracy:		< ± 5% (0.100 ... 0.499 m/s) f.s.
		< ± 1% (0.500 ... 9.999 m/s) f.s.
Measuring cycle:		5 to 30 s (user adjustable)
Data memory:		40 files with 100 values each (= 4,000 measuring values)
		each measuring value marked with date and time stamp
Data conservation:		> 100 years
Interface:		Serial port, transmission speed 38400 baud,
		± 15kV ESD-protection (IEC 1000-4-2)
Power supply:		Internal: battery 9 V (PP3)
	or	External: 7 ... 12 V DC, max. 12 mA
Ambient temperature:		0 ... 50°C
Protection type hand terminal:		IP 65
		EN 50081-1, EN 50082-1
Submerging depth of measuring head:		max. 10 m
Options:		Mains supply circuit
		Data memory up to 4 MByte
		Telescopic rod up to 4.5 m length

HAND TERMINAL

COMPONENTS

The splash-proof hand terminal is equipped with the following elements:

1. LC-display with 4 lines
2. Bank of 12 keys, partly with double function.
3. The second function of a key is accessable upon pressing the **SHIFT** key before.
4. 4-pin socket to connect the measuring head.
5. 3-pin socket to connect a PC.
6. Battery case (at rear side) for a battery 9 V (PP3)
7. 2 banana sockets to connect an external mains supply circuit (7...12 V DC, 12 mA)

BATTERY REPLACEMENT

The battery case is located at the rear side of the hand terminal. For battery replacement remove the lid (kept by two screws), remove the exhausted battery, clip a fresh battery (9 V, PP3) upon the battery contacts and remount the lid.

NOTICE

Replace battery when voltage falls below 6.0 V.

SWITCH ON

Switching on of the hand terminal is made by pressing any key once. The LC-display will indicate the main screen.

SWITCH OFF

Switching off is made by pressing any key for approx. 2 - 3 seconds until the text at the display disappears. Additionally an integrated auto power off switches off the hand terminal after approx 5 minutes of inactivity.

MAIN SCREEN (F1)

The main screen appears at the LC-display upon switching on the hand terminal:

RHCM	8.7 V
FILE 38	DATA 16
02-25-2024	08:53:16
VELOCITY	0.000 m/s

This **MAIN SCREEN** will be displayed any time you call function **F1** (by pressing **SHIFT** and **7** successively).

RHCM 8.7 V:	Type of instrument and battery voltage of hand terminal.
FILE 38 DATA 16:	Number of active file for data storage (40 files available) and index of data set for next measuring value. Capacity of each file is 100 measuring values. A fully utilized file will be marked with **DATA ---.**

02-25-2024	**08:53:16:**	Current date (mm-dd-yyy) and time (hh:mm:ss).
VELOCITY	**0.000 m/s:**	Current measuring value of hydrometric vane.

The actual measuring value of the hydrometric vane is stored upon pressing the **ENTER** key.

FILE SELECTION FOR DATA STORAGE (F2)

To select a file for data storage press keys **SHIFT a**nd **9** successively:

```
STORE DATA
 FILE: 01

 STORE = ENTER
```

Thereafter enter a two digit file number and confirm selection by pressing the **ENTER** key.

DISPLAY STORED DATA (F3)

To select a file for display press keys **SHIFT** and **5** successively:

```
READ DATA
 FILE: 01

 READ = ENTER
```

Thereafter enter a two digit file number and confirm selection by pressing the **ENTER** key. The stored data will be displayed in the following format:

```
READ DATA
 FILE 39        DATA  27
 02-25-2008      14:33:08
 VELOCITY     0.686 m/s
```

The navigation inside the file is made via the cursor keys ⇧ (by pressing **SHIFT** and **8** successively) and ⇩ (by pressing **SHIFT** and **2** successively).

DELETE STORED DATA (F4)

To delete a single file or all files press keys **SHIFT** and **1** successively:

```
CLEAR DATA
 FILE: 39
 (00 = ALL FILES)
 CLEAR = ENTER
```

Thereafter enter a two digit file number and confirm selection by pressing the **ENTER** key. To delete all files inside the hand terminal enter **00** as file number.

NOTICE

THIS FUNCTION IS IRREVERSIBLE!

Therefore make sure having successfully transferred the measuring data from the instrument to a disk file!

MENU (F5)

To enter the **MENU**, offering additional dialogs, call function **F5** by pressing **SHIFT** and **3** successively.

```
MENU
 >  AVERAGING
    CLOCK
    LANGUAGE
```

The navigation inside the menu is made via the cursor keys ⇧ (by pressing **SHIFT** and **8** successively) and ⇩ (by pressing **SHIFT** and **2** successively).

To enter the menu item selected press the **ENTER** key.

To quit the menu or a menu item call one of the function keys **F1** to **F5**.

The **MENU** incorporates the following menu items:

Menu item AVERAGING:

The menu item **AVERAGING** is used to adjust the measuring cycle:

```
MENU

 AVERAGING            05 s
 STORE = ENTER
```

Enter the requested averaging time for the measuring cycle in seconds (05 up to 30 seconds). The selection will be stored upon pressing the **ENTER** key.

Menu item CLOCK:

The menu item **CLOCK** is used to adjust the internal real-time-clock of the hand terminal:

```
MENU
 SET CLOCK
 02-25-2008          14:33:08
 STORE = ENTER
```

Enter date (mm-dd-yyy) and time (hh:mm:ss) as needed and press the **ENTER** key to store new date and time.

Menu item LANGUAGE:

The menu item **LANGUAGE** offers the choice between English and German language:

```
MENU
 >  GERMAN
    ENGLISH
 STORE = ENTER
```

The selection is made via cursor keys ⇧ (by pressing **SHIFT** and **8** successively) and ⇩ (by pressing **SHIFT** and **2** successively) and will be stored upon pressing the **ENTER** key.

Menu item IDENT NUMBER:

The menu item **IDENT NUMBER** gives access to the identification number of the hand terminal:

```
MENU

  IDENT NUMBER      12345
```

PC-SOFWARE OCEANLAB

The standard HYDRO-BIOS data acquisition software OceanLab 3 has been extended by a module to easily transfer measuring data from the hand terminal of the RHCM to a PC for storage and evaluation. At the PC the measuring data of the RHCM are stored in ASCII-format and thus are accessible by current word processing, spread sheet and database software.

MINIMUM PC REQUIREMENTS

Pentium PC 350 MHz with 64 MB RAM, 10 MB free space on hard-disk drive,
USB-port,

Windows 11 / Windows 10 / Windows 8.1 / Windows 7

1 free serial COM-port (RS 232) or Bluetooth-adaptor

INSTALLATION: (Ensure you have Administrator Rights for the installation)

To install OceanLab 3 on your PC run Setup from the OceanLab USB flash drive. Follow the dialog box instructions to install the software. The installation directory (acc. to Microsoft guidelines) is C:\ProgramFiles\OceanLab3.

APPEARANCE OF OCEANLAB 3

OceanLab 3 consists of different program windows that can be independently modified in size and position at the Windows desktop.

The MAIN window incorporates the toolbar and the main menu. In the upper right of the MAIN window OceanLab 3 indicates the type of system connected in clear text and the identity number (IdentNo.) of the electronics board inside the instrument connected.

Additionally three LEDs indicate the communication state of OceanLab 3:

Green LED indicates that OceanLab 3 is sending commands to the hand terminal.

Blue LED indicates that OceanLab 3 receives data from the hand terminal.

Yellow LED not used for RHCM.

Inside the tabulated COMPONENTS window real-time measuring data received from the instrument are displayed in engineering units.

For system set-up OceanLab 3 offers an individual CONTROLLING dialog window for each implemented device, offering all necessary features of the specific device.

COMMUNICATION / CONNECTING

The communication between the PC and the hand terminal is made via a serial COM-port. Feel free to connect the hand terminal to any COM-port available at the PC. After starting OceanLab 3 and switching on the hand terminal click on button CONNECT inside the toolbar or select menu item CONNECT inside the FILE menu. During the connection process OceanLab 3 uses the first free COM-port to communicate with the hand terminal. When OceanLab 3 is unable to establish a connection to the hand terminal please select the appropriate COM-port inside the pull-down table COM-PORT of the CONNECT dialog. After having successfully connected OceanLab 3 enters the CONTROOLING MODE to give access to the data memory and the real-time-clock of the hand terminal.

The CONNECTING process can only be started when no session or simulation is active and no file is opened inside OceanLab 3.

When communication problems occur during a mission OceanLab 3 automatically tries to re-connect.

To stop the data transmission from the hand terminal to the PC use the button STOP SESSION inside the toolbar or inside the FILE menu.

To close the actual session and to prepare OceanLab 3 for the next mission use button CLOSE FILE inside the toolbar or inside the FILE menu.

CONTROLLING MODE

The tabulated COMPONENTS window offers a list of all components implemented into the actual instrument.

Clicking at one implemented device opens an individual CONTROLLING dialog for the selected device, offering all necessary features of the specific device (e.g. calibration coefficients, memory control ...).

The following CONTROLLING dialogs for RHCM are available:

MEMORY

The CONTROLLING dialog MEMORY is used to get access to the internal data memory of the instrument.

All data files stored inside the instruments data memory are available inside the FILE table. To display a file please select it form the pull-down list. The data sets of the file will be displayed as tabulated list. Selecting an empty file will result in an empty list.

The button SAVE SELECTED FILE is used to start the data transfer of the selected data file from the instrument into a disk file. The disk file be will stored at the PC in ASCII-format inside the LOGFILES directory of OceanLab. The file can be named at will. The location of the LOGFILES directory depends on the Windows version used on your PC. To find actual path of the LOGFILES directory **at your PC** please open the file DATA.TXT inside the OceanLab installation directory or use menu item ENTER FILES DIRECTORY inside the FILES menu to start the Windows Explorer inside the LOGFILES directory.

The button SAVE ALL FILES is used to save all data files of the instrument in one single disk file. The disk file will stored at the PC in ASCII-format inside the LOGFILES directory of OceanLab. The file can be named at will.

The button DELETE SELECTED FILE is utilized to clear one single data file of the instrument (as actually selected inside the pul-down list).

The button DELETE ALL FILES is utilized to clear the complete data memory of the instrument.

NOTICE

DELETE FUNCTIONS ARE IRREVERSIBLE!

Therefore make sure having successfully transferred the measuring data from the instrument to a disk file!

REAL TIME CLOCK

The CONTROLLING dialog REAL TIME CLOCK is used to adjust the real time clock of the instrument. The real time clock of the instrument can be synchronized with the PC clock or adjusted at will.

The date format is	MM-DD-YYYY	MM = month, 2 digits DD = day, 2 digits YYYY = year, 4 digits within the interval 2000 … 2099
The time format is:	hh:mm:ss	hh = hour, 2 digits within the interval 0 … 23 mm = minute, 2 digits ss = second, 2 digits

The button SET is used to transfer the new date and time to the instrument after modifications.

VELOCITY

The CONTROLLING dialog VELOCITY incorporates the indication of the sensors raw data and the possibility to read and modify the sensors calibration coefficients (cal 0 … cal 2) and the averaging time for the measuring cycle. The calibration coefficients are used as follows:

velocity [m/s] = cal 0 + cal 1 * velocity_raw + cal 2 * velocity_raw^2

The AVERAGING time for the measuring cycle can be adjusted within the interval from 5 up to 30 seconds.

The button SEND TO VELOCITY SENSOR is used to transfer calibration coefficients and averaging time to the instrument after modifications.