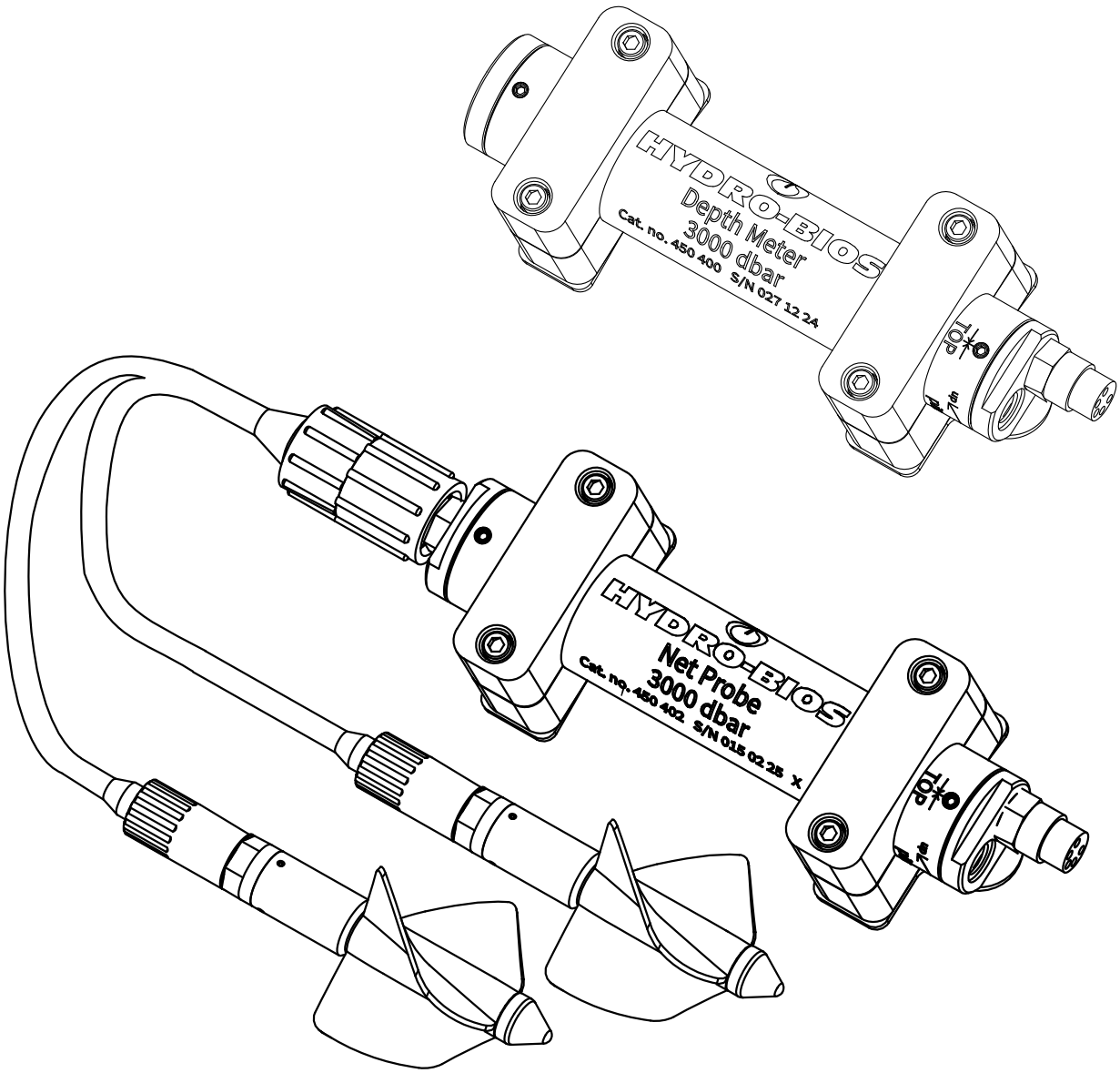



# Depth Meter / Net Probe with 2 Flow Meter

OPERATION MANUAL

Product ID 450 410 / 450 412

Edition 01/26

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# SAFETY INSTRUCTIONS

**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 follow this 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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## TERMINOLOGY

underwater unit: underwater device with mounted motor unit

probe housing: pressure housing with electronics (instruments without motor)

# GENERAL DESCRIPTION

The Depth Meter and the Net Probe with 2 Flow Meters are light and versatile precision measuring instruments for the acquisition of pressure data during operation of plankton nets, water samplers etc. for limnic and oceanographic applications. The Net Probe is equipped with 2 Flow Meter for additional acquisition of flow velocity and volume data.

The Depth Meter and the Net Probe with 2 Flow Meters can be operated in ONLINE MODE (with data transfer to the Command Unit via electro-mechanical cable) as well as in OFFLINE MODE (where the measuring data is stored inside the internal data memory of the probe). Data includes an inclinometer reading to measure orientation as pitch and roll or tilt angle. This enables online or offline monitoring of the orientation of any equipment the instrument is attached to.

The state-of-the-art electronics, optimized in power consumption, is designed for ambient temperatures from –40° C up to +85° C.

The system consists of an underwater unit with measuring electronics (effective data memory 120 MByte) and pressure sensor and a Command unit which is the link between Depth Meter / Net Probe and a PC during ONLINE OPERATION. The Command Unit additionally displays the measuring data.

Power supply is made by integrated rechargeable LiFePo4 batteries which can be charged with a supplied microprocessor-controlled charger. The charger is usable worldwide. The capacity of the rechargeable LiFePo4 batteries is sufficient for up to 170 hours of continuous operation.

The measuring data of the pressure sensor can be stored in the instrument’s data memory. The internal data memory is sufficient for 14 days of recording at 10 Hz, 36 days of recording at 4 Hz, 72 days of recording at 2 Hz and 145 days of recording at 1 Hz.

The instruments are delivered with the data acquisition software OceanLab 4. This Windows based software is an easy-to-use package for pre-deployment probe set-up, real-time data acquisition, data visualization, data storing and data export in ASCII-format.

# STANDARD EQUIPMENT

1. 1 Underwater unit with integrated pressure sensor
2. 2 Electronic flow meters with connecting cables, approx. 2 m long and clamps (Net Probe only)
3. 1 Automatic charger with connecting cable
4. 1 Command Unit
5. 1 Adaptor cable: MC IL 5 M - IL 2 M, 80 cm long — Fig. 1 B
6. 1 Pig tail SUBCONN IL 2 F — Fig. 1 C
7. 1 Slip ring box cable, approx. 3 metres long — Fig. 1 F
8. 1 Full speed serial cable: SUBCONN MC IL 5 M – 2 m – Lemo — Fig. 1 J
9. 1 PC to serial cable: SUBCONN MC IL 5 M – 2 m – USB — Fig. 1 K
10. 1 Dummy connector MC DC 5 M
11. 1 Dummy connector DC 2 M
12. 1 Dummy connector DC 2 F
13. 1 Dummy connector DCS 2 M-1 (Net Probe only)
14. 1 Dummy connector DCS 2 M (Net Probe only)
15. 1 Spare O-ring 125
16. 1 Can O-ring lubricant
17. 1 Can pin lubricant
18. 1 Hexagon socket screw key 5 mm
19. 1 Hexagon socket screw key 2.5 mm
20. 1 Spare fuse (125V~, 125mA, Littelfuse 154.125) for long distance telemetry protection
21. 1 Operation manual
22. 1 USB flash drive OceanLab
23. 1 Mounting plate with 2 STAUFF – clamps
24. 2 Shackles 6 mm

# TECHNICAL DATA

| **Depth Meter:** | Depth Meter | Net Probe |
|---|---|---|
| Diameter: | Ø45 mm | Ø45 mm |
| Length (without dummy connector): | 254 mm | 300 mm |
| Weight (including mounting plate): | 1.3 kg | 1.35 kg |

| | |
|---|---|
| Material: | titanium, stainless steel |
| Connector: | SUBCONN MC BH 5 F |
| Adaptor cable: | MC IL 5 M – 80 cm - IL 2 M |
| Operational depth: | 3000 dbar |
| Electronics operate from: | -40° C … +85° C |
| Data memory: | 120 MB,<br>approx.. 120 days recording time @1Hz (Depth Meter)<br>approx.. 65 days recording time @1Hz (Net Probe) |
| Data sampling rate: | 1 Hz, 2 Hz, 4 Hz, 10 Hz<br>*user adjustable* |

## *NOTICE*

To avoid damage do not exceed the maximum operational depth of the instrument!

**Power supply of underwater unit:**

| | |
|---|---|
| Type: | rechargeable LiFePo4 batteries |
| Capacity: | 1100 mAh, up to 170 hours of continuous operation |
| Charge conditions: | approx. 1.5 hour at 1500 mA to 80 % capacity<br>approx. 3 hours to 100 % capacity |
| Charge temperature: | +5° C ... +55° C |
| Life expectancy: | more than 2000 charge-discharge-cycles |
| Self-discharge: | typ. 1 % per month |

**Charger for underwater unit:**

| | |
|---|---|
| System: | microprocessor-controlled charger for LiFePO4-packs |
| Type: | FRIWO FW7290 Lifepo4 Charger for 2 cell |
| Input voltage: | 100 ... 240 V AC |
| Charge current: | 1500 mA |

**Pressure sensor:**

| | |
|---|---|
| Type: | piezo-resistive cell |
| Range: | 0 … 3000 dbar |
| Resolution: | 0.1 dbar<br>(0.15 dbar for 6000 dbar version) |
| Initial accuracy (0..50° C): | typ. <0.02 % f.s. |

**Inclinometer:**

| | |
|---|---|
| Type: | 3 axis MEMS accelerometer |
| Static accuracy: | ±1° |
| Resolution: | 1° |

**Data transmission:**

| | |
|---|---|
| Connector**:** | SUBCONN MC BH 5 F |
| Pig tail (included): | SUBCONN IL 2 F |
| Full speed serial: | USB 2.0, 2 meter cable<br>short circuit and ESD protected<br>*for programming and bulk data retrieval* |
| Telemetry: | 4.8 kbaud, 3.3 V<br>for cable lengths >10 km,<br>protected against overvoltage, short circuit, ESD protected<br>*for online operation* |

**Telemetry cable connection requirements:**

Single- or multi conductor cable, negative pole may be in contact with sea water.

Resistance (go- and return line): max. 1 kOhm

*The single- or multi conductor cable is not included in our scope of delivery!*

# INCLINOMETER

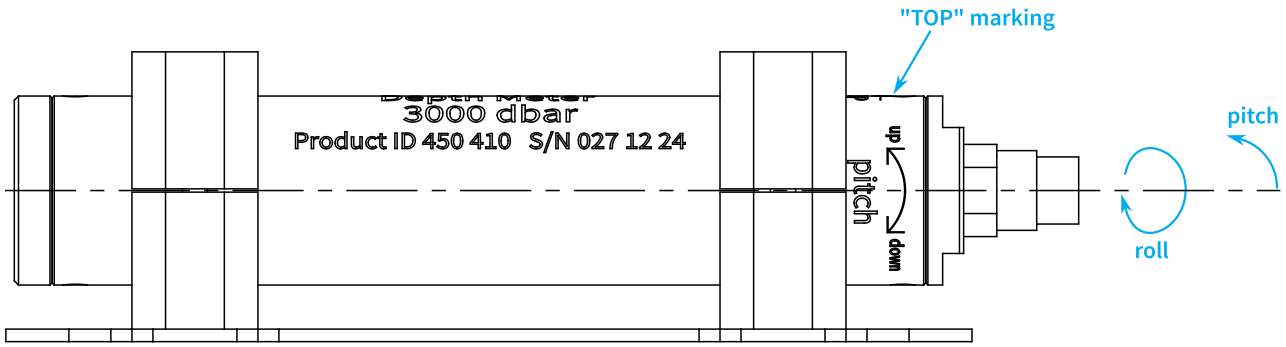
Both the Command Unit and OceanLab will display the instrument's orientation either as

- both pitch and roll angles
  or
- a single tilt angle.

It will automatically switch between the two depending on the orientation of the instrument as described below. Make sure to mount the instrument in one of these orientations if angle measurements are of interest.

## PITCH AND ROLL

Will be displayed if the instrument is within ± 60° of the following orientation (outside this range, the tilt angle will be displayed instead):



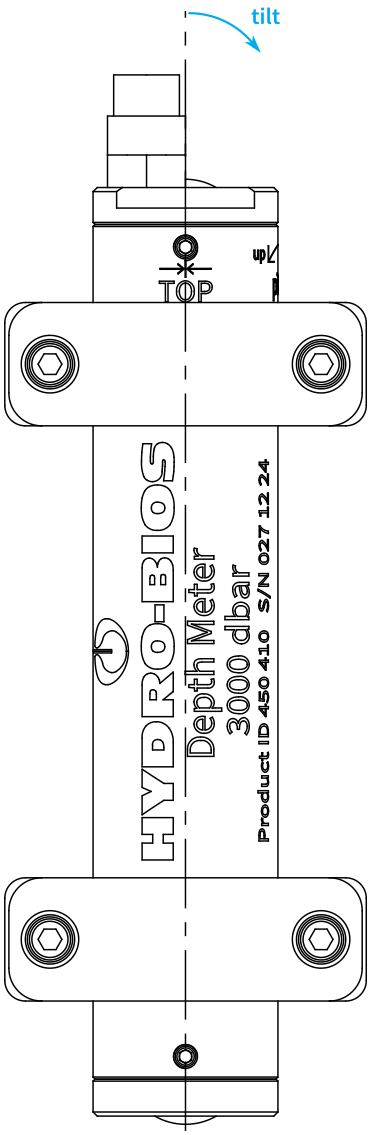

Marking "TOP" facing upward and tow direction to the right in the picture above

This orientation can be useful to determine whether or not a towed instrument is in a horizontal orientation (e.g. whether a net opening is facing the tow direction).

## TILT

Will be displayed if the instrument is within ± 60° of the following orientation (outside this range, pitch and roll angles will be displayed instead):

The tilt angle is useful to determine whether or not an instrument is in a vertical position.




## USER CALIBRATION (RESET FUNCTION)

The inclinometer is factory calibrated and there is usually no need to perform a field calibration. However, if the instrument is mounted to another net or water sampler slightly outside one of the orientations above (i.e. displaying a small offset <5° when this other instrument is in its neutral position), this offset can be compensated:

- Put the instrument in a static neutral position
  *i.e. do not perform this on deck of a ship, doing so will lead to angle measurement errors*
  - for horizontal operations, make sure pitch and roll both do not exceed 5°
  - for vertical operations make sure tilt does not exceed 5°

Command Unit:

- Press the soft button next to the angle display in the main component window.
- Press **Reset**.

OceanLab:

- Click on Controlling mode > Tilt.
  *Tilt, pitch and roll all have the identical reset function included in their Controlling mode. It does not matter which one is accessed to press* **Reset**.
- Click **Reset**.

# INTERNAL BATTERY

The lithium ion battery built into the instrument use lithium iron phosphate (LiFePO4) chemistry. This chemistry inherently is the **safest** currently available on the market with highest thermal and chemical stability and highest tolerance to abuse. In contrast to other lithium ion batteries, the LiFePO4 battery does **NOT** tend to thermal runaway, gassing or explosion.

LiFePO4 batteries have **no memory effect**, thus a partial charge is possible with no adverse effects. They can be partially charged or discharged with no adverse effect on cycle life.

**NOTICE**

**Do not store the device with fully depleted battery for extended periods – this will reduce the life span of the battery.** Instead, charge to approx. 80% state of charge (according to item 5. at page **Fehler! Textmarke nicht definiert.**) and keep cool for storage.

The Battery is fully integrated into the underwater unit of the Depth Meter / Net Probe. A replacement by the end user is not possible.

The underwater unit of the MPP has to be returned to our factory for battery replacement when it has reached its end of life.

The expected life time of the battery is typically 2000 charging cycles / 10 years.

## CHARGING

**WARNING**

Keep the charger in a dry place (indoor use only)!

The charger should be disconnected from mains supply when not in use.

Do not plug in the charger in case of damaged case, power plug or cable.

**Do not use the supplied charger for batteries other than rechargeable double cell LiFePO4 packs!**

1. Bring the Depth Meter / Net Probe in a dry room.
2. Remove dummy connector MC DC 5 M.
3. Connect the charger to the instrument.
4. Connect charger to mains supply (100 ... 240 V AC). Select appropriate primary plug for your mains supply. The charging process will start automatically.

   A **fast flashing green** LED indicates the rapid charge process. Depending on state of discharge, the rapid charge process will last up to 1.5 hours.

   A **fast flashing yellow** LED indicates that the batteries are defective or connected with wrong polarity.

Having completed the rapid charge process (leading to approx. 80% state of charge), the charger switches over to maintenance charge (indicated by **slow flashing green** LED). The maintenance charge process will last up to an additional 2.5 hours.

Having completed the maintenance charge process, a **permanent green** LED indicates that the batteries have been completely charged.

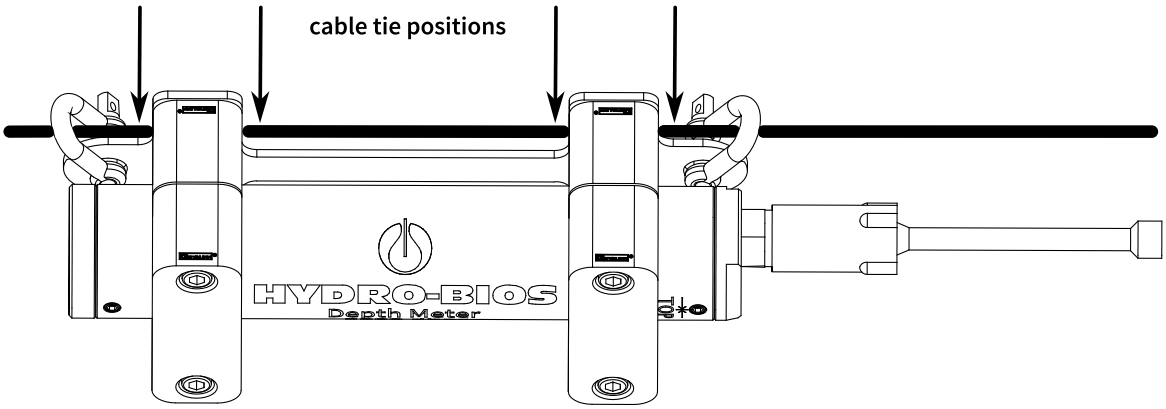
5. Disconnect charger from mains supply.
6. Disconnect instrument from charger.
7. Slightly grease the contacts of the dummy MC DC 5 M with pin lubricant, plug the dummy connector to the instrument and secure it with the locking sleeve.

***NOTICE***

**In no case must the underwater unit be submerged without the appropriate cable connections resp. dummy connectors attached!**

# PREPARATION OF DEPLOYMENT

The Depth Meter / Net Probe is fixed in the clamps with mounting plate. Attach the instrument's mounting plate with cable ties to the mechanical cable close the net or other instrument to be monitored. For additional safety mount the supplied shackles as illustrated below. If inclination is of interest mount the instrument as described in the section INCLINOMETER page 8.




If a Net Probe is to be deployed without flow meters (used as a Depth Meter only) make sure to plug in the dummy connectors (DCS 2 M, DCS 2 M-1) with the locking sleeve to the flow meter connector in order to protect it from the water.

## SETTING THE PRESSURE SENSOR OFFSET

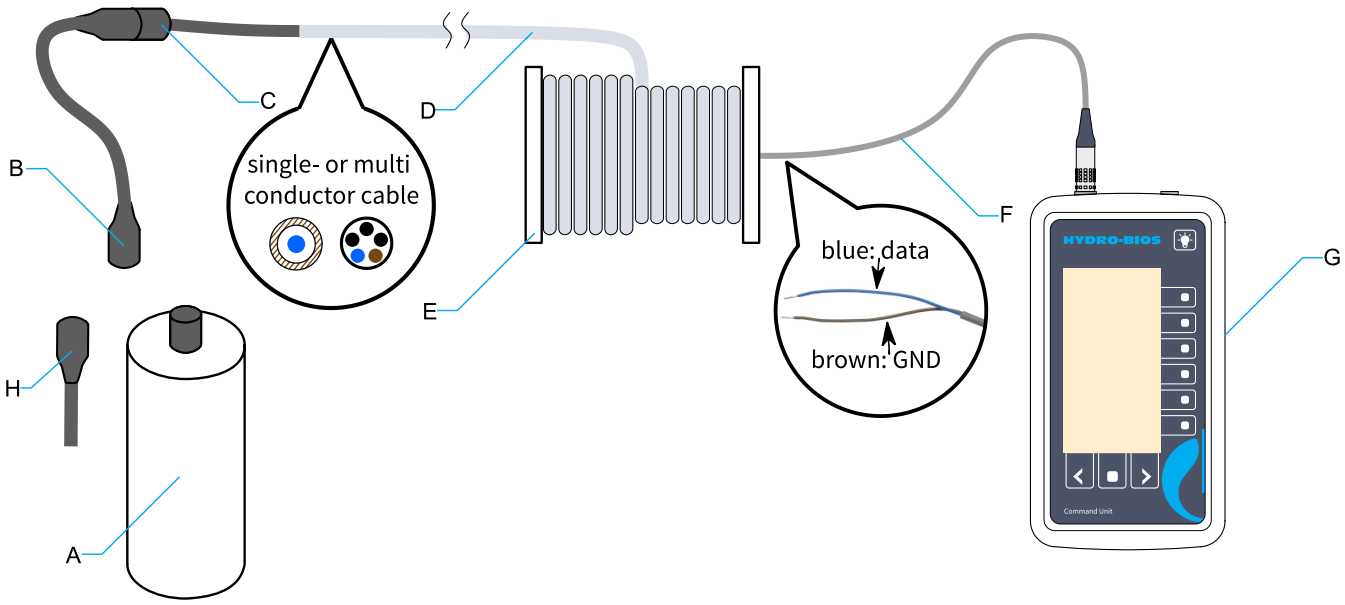
The pressure reading can be offset by a user settable value *in meters* to account for the fact that the net opening (or other point of interest) is usually below (or above) the position of the pressure sensor. To set this offset value on the Command Unit press the soft button next to the pressure reading. This can alternatively be done in OceanLab's Controlling mode under "Pressure".

## MOUNTING THE FLOW METERS (NET PROBE ONLY)

- Use the mounting clamps to mount the Flow Meters in the nets.
- Make sure they are centered and their rotational axis is perpendicular to the net opening.
- Connect the Flow Meters to the instruments' connector (BH 4 F).
    - In case only one Flow Meter is to be used the remaining open sockets have to be sealed with the corresponding half of the split dummy connector and secured with the locking sleeve.
- Set the net opening area of each net in the Command Unit:
    - Press the soft button next to the **Volume 1 / Volume 2** reading.
    - Press the soft button next to **Edit net opening**.
- Alternatively this can be set in OceanLab using the Controlling mode and then click on **Volume 1 / Volume 2**. This can also be done after the deployment when viewing a recorded file on the PC. *This is useful in case someone forgot to set the net opening before deployment.*

# ONLINE OPERATION

## WIRING FOR ONLINE OPERATION




*A. underwater unit attached to instrument*
*B. adaptor cable: 5-pin connector to 2-pin connector*
*C. 2-pin socket (pig tail) attached to winch cable*
*D. electromechanical winch cable (e.g. single- or multi conductor cable)*
*E. winch and winch cable*
*F. slip ring box cable: 2 open wires to 4-pin lemo plug*
*G. Command Unit*
*H. dummy connector*

1. Connection between Command Unit and underwater unit is made by a single- or multi conductor cable in conjunction with the supplied adaptor cable MC IL 5 M – IL 2 M. The single- or multi conductor cable is not included in our scope of delivery.
    a. When using a *single conductor cable* (one isolated core and outer steel armour) the isolated core of the cable has to be connected to the white core of pin 2 (data) of the supplied pig tail SUBCONN IL 2 F. The outer steel armour of the cable has to be connected to the black core of pin 1 (ground).
    b. When using a *multi conductor cable* (two or more isolated cores) any two cores of this cable have to be connected to the white (data) and the black (ground) wires of the supplied pig tail SUBCONN IL 2 F.
    c. When an existing single- or multi conductor cable is *already equipped with an underwater connector*, the supplied pig tail SUBCONN IL 2 F has to be combined with a counter plug (corresponding to the existing connector) to a cable adaptor.
2. The connection from the ship side end of the single- or multi conductor cable at the winch drum (via slip rings of the winch) to the Command Unit has to be made by using the supplied slip ring box cable: The steel armour (or core in case of a multi conductor cable) coupled to pin 1 (ground)

of the plug SUBCONN IL 2 F has to be connected to the brown wire of the slip ring box cable. The core coupled to pin 2 (data) of the plug SUBCONN IL 2 F has to be connected to the blue wire of the slip ring box cable.

**NOTICE**

To avoid corrosion at the contacts of the underwater connectors the contacts should be slightly greased with pin lubricant and always be protected by the corresponding dummy when the single- or multi conductor cable is not used.

**NOTICE**

When the connector IL 2 F has been attached to the single- or multi conductor cable recently or when a new cable adapter has been attached, a continuous supervision of the display of the Command Unit is recommended during the first operation. For localization and repair of faults see chapter *Localization of faults* of the Command Unit operation manual.

**NOTICE**

THE CONNECTION OF THE UNDERWATER CONNECTOR TO THE SINGLE- OR MULTI CONDUCTOR CABLE HAS TO BE MADE WITH GREATEST CARE!

**MOST MALFUNCTIONS ARE CAUSED BY CABLE CONNECTION FAULTS!**

In particular make sure not to accidentally connect HYDRO-BIOS-equipment to devices from other manufacturers because this could damage the Command Unit, the instrument or other connected equipment.

## INSTRUMENT AND WIRING TEST BEFORE ONLINE OPERATION

This test should be carried out in order to check the function of Command Unit and underwater unit in conjunction with shipside wiring (i.e. single- or multi conductor winch cable, slip ring, wiring to lab):

- prior to first deployment on any vessel
- after any changes / work / maintenance on related shipside wiring, winch, slip ring, wet end terminator of electromechanical cable
- when Depth Meter and / or winch have not been used for an extended period of time

***NOTICE***

Make sure no other electrical / electronical equipment is actively using the abovementioned electrical connections during test or operation of the Depth Meter. Failure to do so may result in loss of data and / or damage to equipment.

1. Connect the slip ring box cable to the Command Unit.
2. Remove dummy connector SUBCONN MC DC 5 M from the underwater unit.
3. Slightly grease the pins of all underwater connectors of the underwater unit and the adaptor cable with PIN-lubricant.
4. Connect adaptor cable MC IL 5 M – IL 2 M to the connector MC BH 5 F on the underwater unit.
5. Connect the single- or multi conductor cable to the adaptor cable.
6. Switch on the Command Unit, the display shows the main screen which includes pressure readings, among other data.
7. Net Probe only: Turn the Flow Meters, the display shows the velocity.
8. Check battery voltage displayed on the Command Unit.
9. Switch off the Command Unit.

If this test passes the data connection is ready.

**Should the test fail see the chapter *Localization of faults* of the Command Unit operation manual.**

## ONLINE OPERATION: DEPLOYMENT

When the Depth Meter / Net Probe has not been operated for a longer period an INSTRUMENT AND WIRING TEST BEFORE ONLINE OPERATION acc. to page 15 should be carried out to check proper functioning of the system.

1. Mechanically mount the Depth Meter / Net Probe to the instrument of interest.
2. Mechanically attach both to the single- or multi conductor cable.
3. Net Probe only: Mount the 2 Flow Meters to the net opening.
4. Remove dummy connector MC DC 5 M from the underwater unit.
5. Connect adaptor cable MC IL 5 M - IL 2 M to underwater unit and pig tail.
6. Connect Command Unit to the slip ring box cable.
7. Additional option: connect Command Unit to the PC.

a. At the PC: Open data acquisition software OceanLab and start data transfer by using the button **Connect**.

8. Switch on the Command Unit by pressing any key once. The main screen will be displayed.
9. Inside the **Pressure** menu press **Reset pressure** to compensate air pressure variations if necessary.
10. Send instruments to sea and carry out the mission as scheduled.
11. When the underwater unit is back on board switch off the Command Unit.
12. Remove adaptor cable MC IL 5 M - IL 2 M from pig tail and underwater unit.
13. Regularly grease the pins of the dummy connector with supplied PIN-lubricant. Plug dummy MC DC 5 M on the connector of the underwater unit.

***NOTICE***

**In no case must the underwater unit be submerged without the appropriate cable connections resp. dummy connectors attached!**

14. Thoroughly rinse all instruments with fresh water after use.

**Note:** When no PC is available to store measured data during the online operation, the Depth Meter / NetPorbe can optionally record the measuring data inside its internal data memory. This way live data can be viewed on the Command Unit screen while still recording data for review when a PC is available:

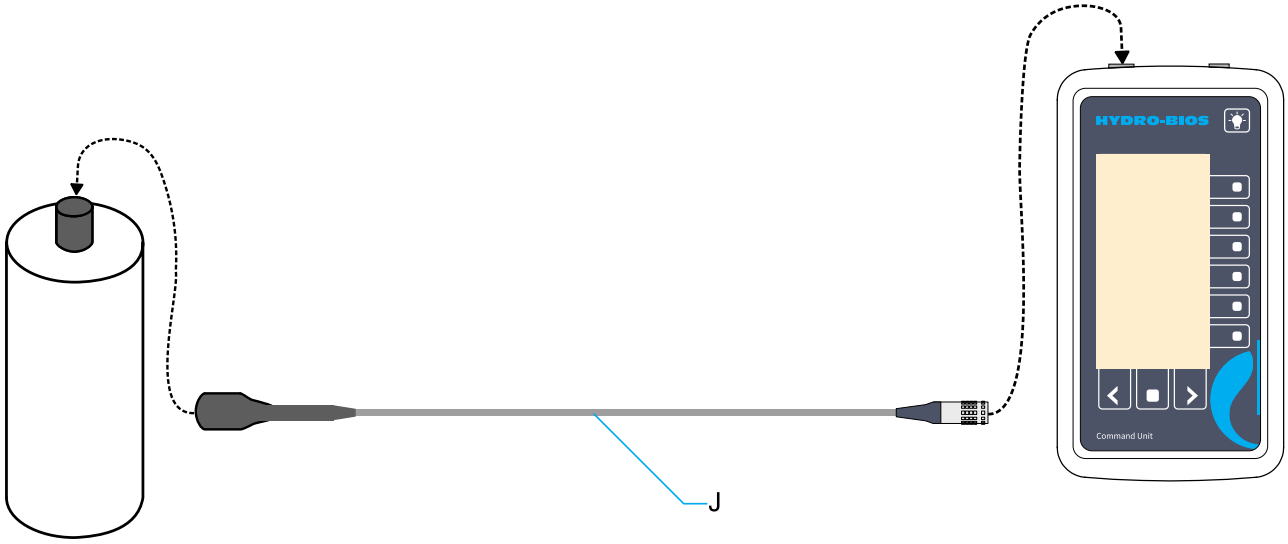
1. Open the Command Unit's **Memory** menu to check the remaining memory capacity. When the free capacity inside the data memory is insufficient, press **Clear memory** to clear the data memory of the underwater unit.
2. Use the Command Unit's **Start recording** button before sending the instruments to sea and start the recording process.
3. When the underwater unit is back on board use the Command Unit's **Stop recording** button to deactivate the recording process.
4. Connect underwater unit directly to the PC to transfer the measuring data from the underwater unit's data memory into a disk file or use the Command Unit's transport mode (page 18).

# OFFLINE OPERATION

## ACTIVATE RECORDING FOR OFFLINE OPERATION

To activate the Depth Meter for offline operation use one of the two methods below. Which one is most convenient will depend on the setup and operation details.

**METHOD A: USING COMMAND UNIT**




*J. full speed serial cable*

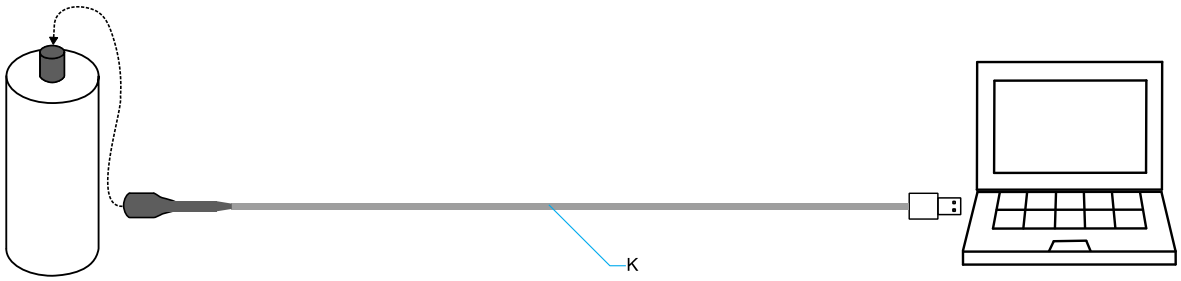
1. Establish a direct connection between Command Unit and Depth Meter / Net Probe using the full speed serial cable.
2. Switch on the Command Unit.
3. Check if the remaining memory capacity is sufficient for the planned mission.

   *It is displayed on the main screen (e. g.* **Free memory: 200 hours***).*

   *It may be necessary to change the page using* **>** *and* **<** *in order to see this.*
4. When the remaining capacity seems insufficient click on button **Clear memory** to clear the data memory of the underwater unit.

   **THIS FUNCTION IS IRREVERSIBLE! Make sure to save any files you wish to keep to a PC beforehand.**
5. Press the soft button **Start recording** (you may have to scroll left or right by using the **<** and **>** soft buttons below the screen) to start the offline mode of the Depth Meter / Net Probe. The measuring data of the pressure sensor will be stored inside the instrument.
6. Proceed with instructions in section ONLINE OPERATION: DEPLOYMENT.

**METHOD B: USING PC RUNNING OCEANLAB**




*K. PC to serial cable*

1. Establish a connection between Depth Meter / Net Probe and PC using the PC to serial cable.
2. On the PC: Open data acquisition software OceanLab and start communication between underwater unit and PC by pressing **Connect**.

   *OceanLab now displays sensor and state readings for the Depth Meter / Net Probe.*
3. Click on **Controlling mode**.
4. Select **Memory** from the list of components and make sure that the remaining data memory is sufficient for the next operation.
5. Click **Activate** inside the components window or inside the controlling dialog **Memory** to start the offline mode of the Depth Meter / Net Probe. The measuring data of the pressure sensor will be stored inside the instrument.
6. Click **Stop session** in OceanLab.
7. Proceed with instructions in section ONLINE OPERATION: DEPLOYMENT.

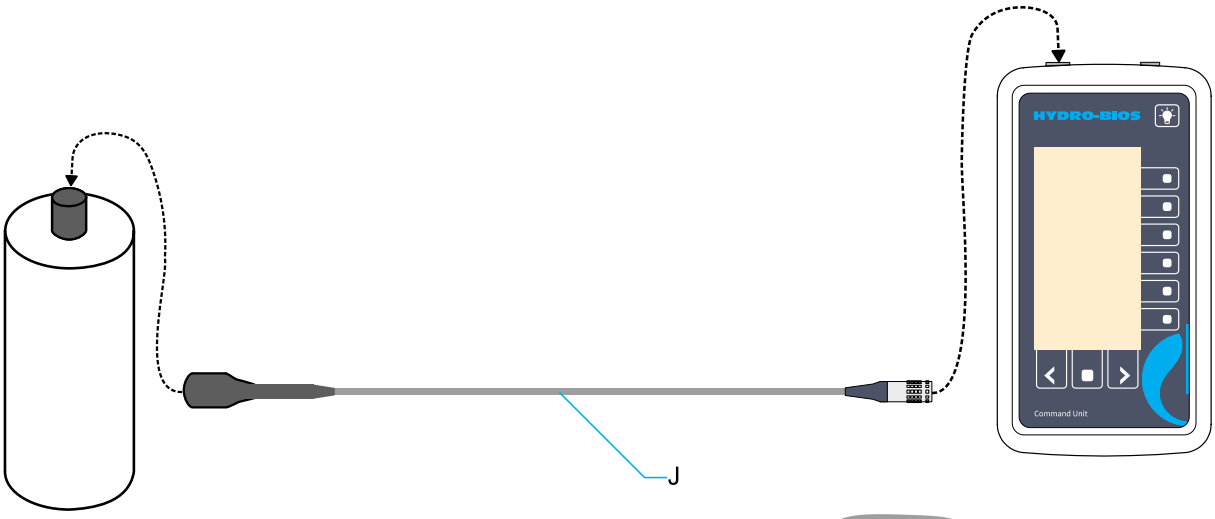
## OFFLINE OPERATION: DEPLOYMENT

1. Grease the pins of the dummy connector with supplied PIN-lubricant. Plug dummy MC DC 5 M on the connector of the underwater unit.
2. Mechanically mount the Depth Meter / Net Probe to the instrument of interest.
3. Mechanically attach both to the towing cable.
4. Net Probe only: Mount the 2 Flow Meters to the net opening.
5. Send instruments to sea and carry out the mission as scheduled.
6. When back on deck thoroughly rinse all instruments with fresh water.

## VIEWING RECORDED OFFLINE DATA

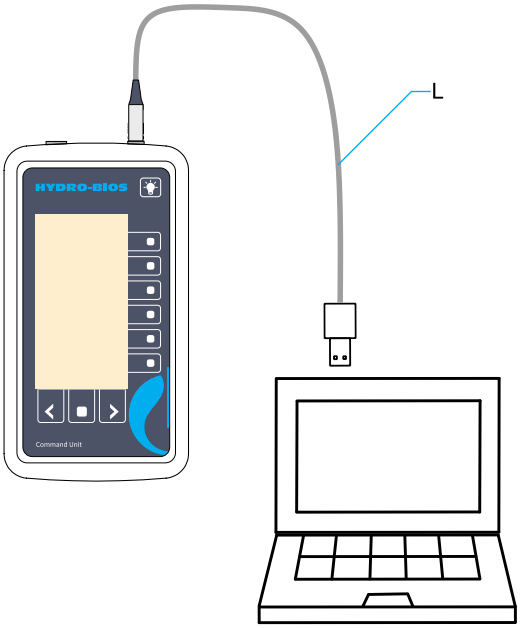
To view recorded offline data the files have to be transferred to a PC. This can be done using one of the two following methods:

**METHOD A: USING COMMAND UNIT TRANSPORT MODE**




*J. full speed serial cable*

*L. Command Unit serial cable to PC*




The Command Unit is used as a mass storage device. This is useful when the Depth Meter / Net Probe and the PC are outside of cable reach.

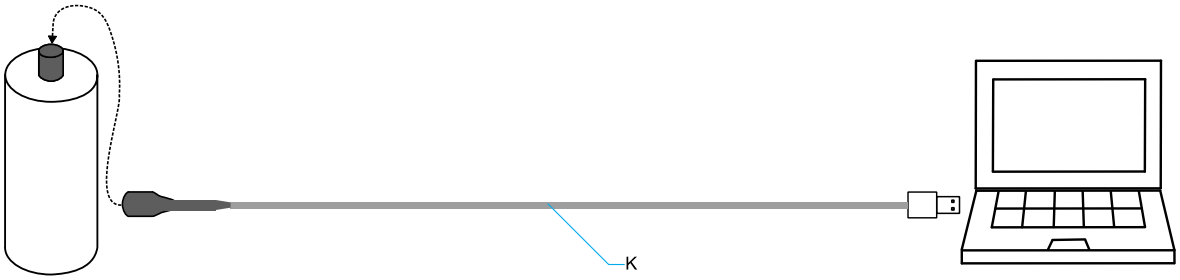
*See the Command Unit operation manual for more details on the data transport mode.*

In this mode, the Command Unit will remember the last underwater unit it has been connected to and list its options towards Oceanlab.

1. Switch on the Command Unit.
2. Press the soft button labelled **Data transport** if transport mode is not already active.
3. Establish a direct connection between Command Unit and Depth Meter / Net Probe using the full speed serial cable.
    - *If the Depth Meter / Net Probe is still recording at this point, the Command Unit will automatically leave the transport mode and show the main screen instead. In this case press* **Stop recording,** *then press the soft button next to* **Memory** *and then* **Synchronize** *to go back to the transport mode.*
    - *If there are new files available for syncing to the Command Unit, it will automatically start syncing data. A progress bar will now indicate that files are being transferred to the Command Unit. Depending on the sampling rate and mission duration this can take from several seconds to several minutes.*
4. When file transfer is complete (**Files synched**) disconnect the cable connecting Command Unit and instrument.
5. Establish a connection between OceanLab and Command Unit using the Command Unit serial cable to PC.
6. Start OceanLab and press **Connect**.

7. Continue with “Steps common to method A and B” below.

**METHOD B: USING DIRECT CONNECTION TO PC**




*K. PC to serial cable*

1. To prepare the data transfer of the stored data to the PC, establish a connection between Depth Meter / Net Probe and PC using the PC to serial cable.
2. On the PC: Open data acquisition software OceanLab and start communication between underwater unit and PC by pressing **Connect**.
3. Click **Deactivate** inside the components window to stop the offline mode of the Depth Meter / Net Probe.
4. Continue with “Steps common to method A and B” below.

**STEPS COMMON TO METHOD A AND B**

5. Inside OceanLab enter the **Controlling mode**.
1. Select **Memory** from the list of components.
2. All data files stored inside the instrument’s data memory are available inside the file table.
3. Follow the on screen instructions inside OceanLab to transfer files to the PC.
4. Close OceanLab when the data transfer has finished.
5. Disconnect the cable.

# MAINTENANCE

The best maintenance for the Depth Meter / Net Probe is to handle it with care. Despite the fact that the complete instrument is sturdily constructed, extreme shocks should be avoided.

To avoid corrosion and salt incrustation the complete instrument should be thoroughly rinsed with fresh water after each use.

## INSTRUMENT AND BATTERY TEST

This test ensures the instrument is working and that the rechargeable LiFePo4 batteries have sufficient capacity. It should be performed when the batteries are in an unknown state of charge or the Depth Meter has not been used for an extended period of time. The procedure is described assuming the Command Unit will be used to control the Depth Meter but it can also be carried out using a PC and Oceanlab.

1. Establish a direct connection between Command Unit and Depth Meter using the full speed serial cable.
2. Switch on the Command Unit.
3. Open the controlling dialog REAL TIME CLOCK and adjust the underwater unit's internal clock if necessary.
4. Open the controlling dialog PRESSURE to compensate air pressure variations by clicking **Reset pressure sensor**, if necessary.
5. Open the controlling dialog **Memory** to check the remaining memory capacity. When the free space inside the data memory seems barely sufficient click **Clear memory** to clear the data memory of the underwater unit. In case of not completely free memory the underwater unit will automatically create a new data file inside the data memory when started in Offline mode. The measuring data of previous offline operations will not be deleted but the underwater unit will stop recording measuring data automatically when the memory is completely used.
6. Use the Command Unit's **Recording** menu to activate the recording process.
7. Check battery voltage displayed on the Command Unit.

During the test observe the battery voltage displayed on the Command Unit. The batteries of the underwater unit should be charged when the battery voltage falls below 6 V (indicated by a blinking battery symbol next to the voltage value).

8. Use the Command Unit's **Recording** menu to deactivate the recording process.
9. Switch off the Command Unit.

## UNDERWATER CONNECTORS

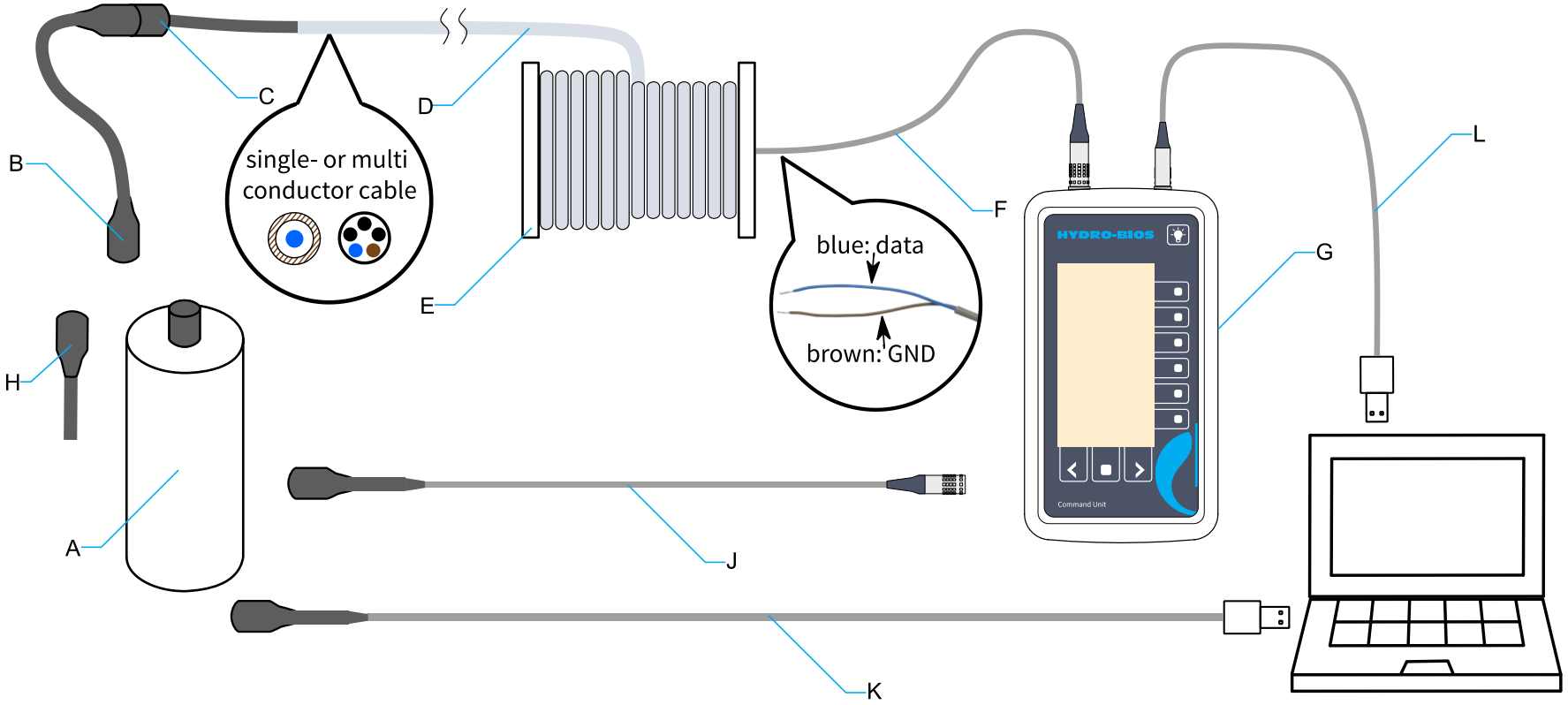
The underwater connectors need just a little care to ensure a long life-span. It is advisable to grease the sealing surfaces of the pins with pin lubricant. This avoids corrosion of the contacts and reduces wear while plugging and unplugging.

To conserve the cable connectors never unplug by pulling on the cable and avoid bending radii above all narrow, sharp edges.

***NOTICE***

**In no case must the underwater unit be submerged without the appropriate cable connections resp. dummy connectors attached!**

Clean underwater connectors with warm soapy water. Avoid getting them in contact with chemicals.




A. probe / sampler

B. adaptor cable

C. pig tail

D. electromechanical winch cable

E. winch

F. slip ring box cable

G. Command Unit

H. dummy connector

J. full speed serial cable

K. PC to serial cable

L. Command Unit serial cable to PC

*Fig. 1: connections overview*