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INTEGRATING WATER SAMPLER IWS 3

With bluetooth connectivity, long-distance telemetry,
time integrated and spot sampling

CATALOGUE NO. 436 601 / 436 606

OPERATION MANUAL



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CONTENTS

GENERAL DESCRIPTION	3
STANDARD EQUIPMENT	4
TECHNICAL DATA	5
CHARGING THE ACCUMULATORS OF THE SAMPLER	6
BATTERY REPLACEMENT OF THE HAND UNIT	7
CONNECTIVITY	8
HAND UNIT: SWITCHING ON AND OFF, CONNECTING.....	9
HAND UNIT: MAIN SCREEN	10
HAND UNIT: PROGRAMMING, SAMPLING MODE DEPTH	11
HAND UNIT: PROGRAMMING, SAMPLING MODE TIME	12
HAND UNIT: PROGRAMMING, SAMPLING MODE SPOT SAMPLE.....	13
HAND UNIT: EMPTY SAMPLER.....	14
HAND UNIT: FILL SAMPLER.....	15
HAND UNIT: MENU PROTOCOL	16
HAND UNIT: MENU ZERO OFFSET	17
HAND UNIT: MENU AIR PRESSURE, PHYS. UNIT	18
HAND UNIT: MENU LANGUAGE, SET CLOCK, IDENT NUMBER.....	19
OPERATION: DEPTH INTEGRATED SAMPLING	20
OPERATION: TIME INTEGRATED SAMPLING.....	22
OPERATION: SPOT SAMPLING	24
QUICK-START KEY, POWER-SAVE FUNCTION	26
PC SOFTWARE OCEANLAB.....	27
REPLACEMENT OF THE PISTON PACKING	32
REPLACEMENT OF ACCUMULATORS	33

GENERAL DESCRIPTION

The INTEGRATING WATER SAMPLER is a light and handy instrument for the acquisition of summing (integrating) water samples according to the European Water Framework Directive. Thereby the summing water sample is achieved in one single draft. There is no need for repeated operations of standard water samplers, followed by mixing procedures, as in the past.

The present version (version 3) of the IWS has been extended by additional functions as follows:

- Wireless communication between Sampler and Hand Unit / PC via bluetooth
- Long-distance telemetry via electro-mechanical cables
- Time integrated sampling
- Spot sampling

The sampling technique is based on the lifting piston principle where a piston is actuated inside a transparent tube by an electric motor. A microprocessor control regulates the sampling procedure according to the pre-selected depth interval (where the depth measurements are made by using a high precision pressure sensor) or time interval.

The water enters the sampler via an intake pipe located at the bottom-middle of the sampler. The **intake pipe has a one-way valve** which only allows water to enter.

The power supply of the Sampler is made by rechargeable lithium-ion batteries, using the state-of-the-art lithium iron phosphate chemistry (LiFePO₄). Located inside an external power pack, the batteries can be charged with a supplied microprocessor-controlled charger. Thanks to most up-to-date technique and primary plug-set the charger is worldwide usable.

Please note: Due to shifting to a new type of rechargeable batteries, the **nominal battery voltage** of the IWS has been changed to **6.6V**.

Prior to the operation the requested depth interval (start and end depth) or time interval (start time and run time) is programmed or the spot sampling function is selected via Hand Unit (or PC). For depth integrated sampling the Hand Unit (or the PC) calculates the permitted mean downward velocity for the scheduled water column. Discontinuity of the downward velocity during the operation is compensated by the control of the Sampler. Upon reaching the end depth or end time the Sampler can be recovered with any upward velocity. The sample of 2.5 liters (Cat. No. 436 601) resp. 5 liters (Cat. No. 436 606) can be bottled when the Sampler is back onboard.

Additionally the Motor Unit is equipped with a **quick-start key**, performing the following function sequence without connecting the Hand Unit or the PC:

Empty Sampler – load existing program – activate Sampler

The **power-save function** automatically deactivates (and switches off) the Sampler when no operation is detected within 15 minutes upon activation in **depth integrating** or **spot sampling** mode by **quick-start key**.

Please note: The power-save function does not apply when the sampler is operated in time integrated sampling mode.

As a result of the integration of the INTEGRATING WATER SAMPLER into the PC software OceanLab, the system offers an extended operation protocol handling. The **protocol readout** function provides the opportunity to store and print operation protocols via PC.

STANDARD EQUIPMENT

1. 1 Integrating water sampler
2. 1 Dummy connector SUBCONN MC DC 5 M
3. 1 Automatic **LiFePO4** charger with connecting cable
4. 1 Hand Unit with programming cable
5. 1 Battery 9 V (PP3)
6. 1 Spare piston packing
7. 1 Hexagon socket screw key 5 mm
8. 1 Spanner 10 mm
9. 1 Operation manual
10. 1 USB-Stick OceanLab
11. 1 Connecting cable to PC

TECHNICAL DATA

Sampler:

Sampling volume:	2.5 liters (Cat. No. 436 601) resp. 5 liters (Cat. No. 436 606)
Overall length:	720 millimeters (2.5 liters) resp. 880 millimeters (5 liters)
Outer diameter:	190 millimeters
Empty weight:	8 kilograms
Operational depth:	100 meters
Underwater connector:	Subconn MC BH 5 F
Material of sampler getting in contact with sample:	PMMA, POM, NBR
Other material:	titanium, stainless steel
Operating temperature:	0 ... + 50°C
Sampling duration (one complete piston stroke):	max. 50 sec. (2.5 l) resp. 100 sec. (5 l)
Protocol memory:	sufficient for max. 500 operation protocols

Power supply:

Type:	2 LiFePO ₄ lithium ion batteries
Nominal voltage:	6.6V
Capacity:	2500 mAh, sufficient for approx. 20 fill-empty-cycles or for approx. 100 hours of continuous operation without motor action
Charge conditions:	approx 2.5 hours at 1500 mA to 80% capacity approx. 5 hours at 1500 mA to 100% capacity
Charge temperature:	+15 ... +35°C
Life expectancy:	up to 2000 charge-discharge-cycles
Self-discharge:	typ. 3% per month

Charger:

System:	automatic charger for double-cell LiFePO ₄ packs
Type:	FRIWO FW7290
Input voltage:	100 ... 240 V AC
Charge current:	1500 mA

Hand Unit:

Dimensions:	152 x 83 x 33,5 millimeters
Power supply:	Battery 9 V (PP3)
LC-display:	4 x 20 characters
Keyboard:	12 keys
Protection type:	IP 65
Operating temperature:	-5°C ... +50°C

CHARGING THE ACCUMULATORS OF THE SAMPLER

Safety instructions:

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 cabinet or power plug.

Use charger for rechargeable double cell LiFePO₄ packs only!

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

To avoid damages of the sampler electronics NEVER CONNECT CHARGER to sampler WHEN NO ACCUMULATORS ARE PLACED AND CONNECTED INSIDE EXTERNAL POWER PACK!

Charging procedure:

1. Bring the Sampler in a dry room.
2. Connect the Sampler to the charger by using the supplied connecting cable.
3. Connect charger to mains supply (100 ... 240 V AC). Select appropriate primary plug for your mains supply. The charging process will start automatically.
4. A **green fast flashing** of the chargers LED indicates the rapid charge process. Depending on state of discharge, the rapid charge process will last up to 2.5 hours.

Note: A **yellow fast flashing** of the chargers LED indicates that the batteries are defective or connected in wrong polarity.

5. Having completed the rapid charge process (leading to approx. 80% state of charge), the charger switches over to maintenance charge (indicated by **green slow flashing** of the chargers LED). The maintenance charge process will last up to additional 2.5 hours.
6. Having completed the maintenance charge process, a **permanent green** LED indicates that the batteries have been completely charged.
7. Disconnect charger from mains supply.
8. Disconnect Sampler from charger.

The battery:

The lithium ion batteries embedded in the INTEGRATING WATER SAMPLER use the lithium iron phosphate (LiFePO₄) chemistry. This type of battery inherently is the **safest** rechargeable battery 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.

Battery maintenance:

LiFePO₄ batteries do have **no memory effect**, thus a random or partial charge is fine. LiFePO₄ batteries do not need a full charge or discharge for a long battery life.

Charge batteries to approx. 80% state of charge (according to item 5. at this page) and keep them cool for storage - this reduces self discharge and prolongs the battery life.

Avoid total discharge of the batteries to ensure a long battery life. **Charging of batteries is needed at the latest when the battery voltage falls below 4.4V.**

The capacity of completely charged accumulators is sufficient for approx. 20 fill-empty-cycles of the Sampler or for approx. 100 hours of continuous operation of the Sampler without motor action.

BATTERY REPLACEMENT OF THE HAND UNIT

1. The battery case is located at the rear side of the Hand Unit. For battery replacement remove the lid, kept by two screws (tool: screwdriver for recessed-head screws).
2. Remove the exhausted battery.
3. Clip a fresh battery (9 V, PP3) onto the battery contacts.
4. Make sure that packing and sealing surfaces are clean.
5. Remount the lid (tool: screwdriver for recessed-head screws).

CONNECTIVITY

The INTEGRATING WATER SAMPLER IWS 3 provides three different options for connecting the Hand Unit to the Sampler. Two of them are also used to connect the Sampler to a PC.

All communication channels provide identical functionality.

Bluetooth

The wireless bluetooth communication should primarily be used for communication between Sampler and Hand Unit resp. PC, eliminating the need to connect a cable to the sampler for each sampler setup or protocol readout.

To establish wireless connection between Sampler and PC please refer to the manual of your bluetooth-adaptor to create a virtual COM-port for your IWS (use bluetooth PIN code "0000").

The bluetooth interface is **not** able to switch on the Sampler. When using the bluetooth communication the Sampler has to be switched on manually by pressing the quick-start key at the Sampler once (for one second or less). Afterwards the communication has to be started manually at Hand Unit or PC.

Serial COM-port

The communication via serial COM-port is provided for applications where no bluetooth connectivity is available at the PC or bluetooth can not be used for any other reason.

When using the serial COM-port the Sampler is switched on automatically.

Use the supplied programming cable to connect the Sampler to the Hand Unit.

Use the supplied PC cable to connect the Sampler to the PC.

Long-distance telemetry

The long-distance telemetry can only be used for connecting the Hand Unit to the Sampler and is scheduled for applications where a supervision of the Sampler is needed during the entire operation. It is not supported by personal computers.

When using the long-distance telemetry the Sampler is switched on automatically.

Please contact HYDRO-BIOS in case you want to use the long-distance telemetry. Usually you will already have an adequate electro-mechanical cable available which has to be adapted by fitting adaptor cables or connectors.

HAND UNIT: SWITCHING ON AND OFF, CONNECTING

To switch on the Hand Unit press any key once.

To switch off the Hand Unit press any key for 3 seconds until the text at the display disappears. To make sure that the Sampler is in the intended state (“**PROGRAM ACTIVE**” when the Sampler shall be deployed, “**PROGRAM INACTIVE**” when no operation is planned) it is advised to switch into **MAIN SCREEN** before switching off the Hand Unit. Please note that the accumulators of the Sampler will be discharged within approx. 100 hours whilst the **PROGRAM** is **ACTIVE**.

Additionally an integrated auto-power-off function switches off the Hand Unit after 5 minutes of inactivity (no key pressed, no communication with the Sampler).

After switching on the following text will be temporarily displayed at the LC-display:

HAND UNIT	9.2 V
NO DATA	
BLUETOOTH = ENTER	

HAND UNIT
NO DATA

9.2 V

Battery voltage of the Hand Unit.

No instrument connected or connected instrument not ready for communication.

alternatively:

INVALID DATA

BLUETOOTH = ENTER

The instrument connected is not supported by the Hand Unit.

To connect the Hand Unit to the Sampler via bluetooth press **ENTER**.

After pressing **ENTER** the Hand Unit searches for active bluetooth devices.

HAND UNIT	9.2 V
SEARCHING...	

When detecting only one IWS the connection is established whilst displaying:

HAND UNIT	9.2 V
CONNECTING...	

When detecting more than one IWS the Hand Unit displays a select list as follows:

CONNECT TO IWS:	
>	2712
	3312
	1713

The navigation inside the list is made via the cursor keys $\uparrow$ (by pressing **SHIFT** and **8** successively) and $\downarrow$ (by pressing **SHIFT** and **2** successively).

To connect to the selected IWS press the **ENTER** key.

To quit the list call one of the function keys **F1** to **F5**.

HAND UNIT: MAIN SCREEN

When a correct communication between Hand Unit and Sampler has been established, the following **MAIN SCREEN** will be displayed:

IWS	5.0 l	100 m
PROGRAM INACTIVE		
SAMPLER	6.5 V	
0 %	0.00 m	

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

IWS	5.0 l	100 m	Type of instrument connected: IWS with 2.5 resp. 5 liters volume, maximum operational depth 100 meters.
PROGRAM INACTIVE			The Sampler is switched off and not ready for automatic sampling.
alternatively:			
PROGRAM ACTIVE			The Sampler is switched on and ready for automatic sampling.
SAMPLER	6.5 V		Accumulator voltage of the Sampler. Please note: When the accumulator voltage falls below 4.4 V, the Sampler will be switched off automatically. Before re-starting the accumulators of the Sampler must be charged.
0 %			Filling level of the Sampler (range 0 ... 100 %).
0.00 m			Current immersion depth of the Sampler, increased by the DISTANCE as configured inside menu item ZERO OFFSET (see page 17).

HAND UNIT: PROGRAMMING, SAMPLING MODE DEPTH

To open the **PROGRAMMING** dialog call function **F2** by pressing **SHIFT** and **9** successively.

SAMPLING MODE
> DEPTH
TIME
SPOT

The navigation inside the list is made via the cursor keys $\uparrow$ (by pressing **SHIFT** and **8** successively) and $\downarrow$ (by pressing **SHIFT** and **2** successively).

To enter the selected **SAMPLING MODE** press the **ENTER** key.

To quit the list call one of the function keys **F1** to **F5**.

Sampling Mode DEPTH:

To achieve depth integrated samples **START** depth and **END** depth have to be programmed:

START	001.50 m
END	065.00 m
v max	0.64 m/s
ACTIVATE = ENTER	

The first digit of the **START** depth is blinking and can be entered via the keyboard. Thereafter the remaining digits of **START** and **END** depth can be entered. The navigation during data input is made via cursor keys $\leftarrow$ (by pressing **SHIFT** and **4** successively) and $\rightarrow$ (by pressing **SHIFT** and **6** successively). Upon finishing the programming procedure by pressing the **ENTER** key, the entered data are checked and stored inside the Sampler and the Sampler is activated for automatic sampling. Additionally the maximum downward velocity for the current program is calculated and indicated at the Hand Unit.

Please note, that programming can only be made when the Sampler is **INACTIVE**, the driving motor of the piston is not running and the filling level is **0%**.

START **001.50 m** Start depth of the operation.

END **065.00 m** End depth of the operation.

v max **0.64 m/s** Maximum downward velocity for the current program, based on the sampling duration of 50 sec. (2.5 l) resp. 100 sec. (5 l).

ACTIVATE = ENTER To store the entered program and to activate the Sampler press the **ENTER** key.

alternatively:

DEACTIVATE = ENTER The Sampler is active, to switch off the Sampler (when no operation is planned) press the **ENTER** key.

alternatively:

21 % **0.00 m** The filling level of the Sampler differs from zero. Programming is not possible until the piston has been run-down (see function **F3, EMPTY SAMPLER**).

HAND UNIT: PROGRAMMING, SAMPLING MODE TIME

Sampling Mode TIME:

To achieve time integrated samples **START TIME** and **RUN TIME** have to be programmed:

08.20.2013	15:23:45
START TIME	16:36
RUN TIME	03 h 17 min
ACTIVATE = ENTER	

The first digit of the **START TIME** is blinking and can be entered via the keyboard. Thereafter the remaining digits of **START TIME** and **RUN TIME** can be entered. Upon finishing the programming procedure by pressing the **ENTER** key, the entered data are checked and stored inside the Sampler and the Sampler is activated for automatic sampling.

Please note that the **START TIME** is programmed **WITHOUT** date specification, enabling the user to repeat a time integrated sampling scenario on regular basis without the need to re-programme the sampler.

Programming can only be made when the Sampler is **INACTIVE**, the driving motor of the piston is not running and the filling level is **0%**.

08.20.2013	15:23:45	Date and time of the Samplers real-time clock.
START TIME	16:36	Time of day to start the sample within the interval 00:00 ... 23:59.
RUN TIME	03 h 17 min	Duration of integration time, max. 23 h 59 min
ACTIVATE = ENTER		To store the entered program and to activate the Sampler press the ENTER key.

alternatively:

DEACTIVATE = ENTER		The Sampler is active, to switch off the Sampler (when no operation is planned) press the ENTER key.
---------------------------	--	---

alternatively:

21 %	0.00 m	The filling level of the Sampler differs from zero. Programming is not possible until the piston has been run-down (see function F3, EMPTY SAMPLER).
-------------	---------------	--

HAND UNIT: PROGRAMMING, SAMPLING MODE SPOT SAMPLE

Sampling Mode SPOT SAMPLE:

SPOT SAMPLING provides an easy way to achieve a sample of the complete sampler volume (full piston stroke) at a single depth (spot).

08.20.2013	15:23:45
SPOT SAMPLE ACTIVATE = ENTER	

When immersed after activation, the Sampler will automatically be armed upon detecting an increasing water depth within 3 successive seconds with a minimum lowering speed of 10 cm/s.

(For spot sampling in small water depths the Sampler may **immediately** be retrieved to a smaller water depth after lowering for arming.)

The full piston stroke will start automatically when the sampler is stopped within a depth interval of max. ± 30 cm for min. 10 seconds. The piston stroke takes up to 50 seconds for the 2.5 l model and up to 100 seconds for the 5 l model.

The Sampler is activated in **SPOT SAMPLING** mode by pressing the **ENTER** key.

08.20.2013 **15:23:45**

SPOT SAMPLE

ACTIVATE = ENTER

alternatively:

DEACTIVATE = ENTER

alternatively:

21 %

0.00 m

Date and time of the Samplers real-time clock.

Indication of sampling mode

To activate the Sampler press the **ENTER** key.

The Sampler is active, to switch off the Sampler (when no operation is planned) press the **ENTER** key.

The filling level of the Sampler differs from zero. Programming is not possible until the piston has been run-down (see function **F3, EMPTY SAMPLER**).

HAND UNIT: EMPTY SAMPLER

IMPORTANT NOTICE: Make sure that the hose clamp (located at the bottom side of the Sampler) has been opened before using the **EMPTY SAMPLER** function!

To open the **EMPTY SAMPLER** dialog call function **F3** by pressing **SHIFT** and **5** successively:

EMPTY SAMPLER	
START = ENTER	
SAMPLER	6.5 V
100 %	0.00 m

EMPTY SAMPLER
START = ENTER
alternatively:
STOP = ENTER

Name of function.

To run-down the piston press the **ENTER** key.

SAMPLER **6.5 V**
100 %
0.00 m

The piston is currently running down. To stop the emptying process press the **ENTER** key.

Accumulator voltage of the Sampler.

Filling level of the Sampler.

Current immersion depth of the Sampler, increased by the **DISTANCE** as configured inside menu item **ZERO OFFSET** (see page 17).

When the current program of the Sampler has not yet been finished the emptying process can not be started. This state is indicated by the following screen:

EMPTY SAMPLER	
PROGRAM ACTIVE	
DEACTIVATE = ENTER	

EMPTY SAMPLER
PROGRAM ACTIVE
DEACTIVATE = ENTER

Name of function.

The Sampler is still active.

To deactivate the Sampler press the **ENTER** key.

HAND UNIT: FILL SAMPLER

To open the **FILL SAMPLER** dialog call function **F4** by pressing **SHIFT** and **1** successively:

FILL SAMPLER	
START = ENTER	
SAMPLER	6.5 V
7 %	0.00 m

FILL SAMPLER
START = ENTER
alternatively:
STOP = ENTER

Name of function.

To run-out the piston press the **ENTER** key.

SAMPLER **6.5 V**
7 %
0.00 m

The piston is currently running out. To stop the filling process press the **ENTER** key.

Accumulator voltage of the Sampler.

Filling level of the Sampler.

Current immersion depth of the Sampler, increased by the **DISTANCE** as configured inside menu item **ZERO OFFSET** (see page 17).

The following screen indicates that the Sampler is filled completely:

FILL SAMPLER	
SAMPLER	
100 %	0.00 m

When the current program of the Sampler has not yet been finished the filling process can not be started. This state is indicated by the following screen:

FILL SAMPLER	
PROGRAM ACTIVE	
DEACTIVATE = ENTER	

FILL SAMPLER
PROGRAM ACTIVE
DEACTIVATE = ENTER

Name of function.

The Sampler is still active.

To deactivate the Sampler press the **ENTER** key.

HAND UNIT: MENU PROTOCOL

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

MENU
> PROTOCOL
ZERO OFFSET
AIR PRESSURE

The navigation inside the menu is made via the cursor keys $\uparrow$ (by pressing **SHIFT** and **8** successively) and $\downarrow$ (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 **PROTOCOL**:

The menu item **PROTOCOL** is used to make sure that an operation has been carried out successfully.

MENU

OPERATION OK

One of the following protocol messages will be displayed:

OPERATION OK

The operation has been carried out successfully.

END DEPTH MISSING

The Sampler did not pass the programmed end depth. The operation must be repeated with either longer rope or new program with smaller END depth.

END TIME MISSING

The Sampler has been deactivated before the RUN TIME had elapsed. The operation has to be repeated.

v max EXCEEDED

The maximum downward velocity was exceeded during the operation. The operation must be repeated with smaller velocity.

BATTERY DISCHARGED

The accumulators of the Sampler are discharged. The operation must be repeated after charging the accumulators.

HAND UNIT: MENU ZERO OFFSET

Menu item **ZERO OFFSET**:

The inlet of the Sampler (intake pipe located at the bottom-middle of the sampler) has a vertical distance from the pressure sensor of 30 cm (2.5 l) resp. 46 cm (5 l). This leads to the fact that the actual sampling depth in fact is 30 cm (for the 2.5 l version) or 46 cm (for the 5 l version) greater than programmed.

For high precision samples the menu item **ZERO OFFSET** allows for automatic clearing of this vertical distance.

MENU	
SENSOR - INLET	
DISTANCE	0.46 m
STORE = ENTER	

The first digit of the **DISTANCE** is blinking and can be entered via the keyboard. The navigation during data input is made via cursor keys ⇐ (by pressing **SHIFT** and **4** successively) and ⇒ (by pressing **SHIFT** and **6** successively). To store the value press the **ENTER** key.

Please note that the **DISTANCE** value entered here has to be understood as a depth sensor offset and increases the measured immersion depth inside the **MAIN SCREEN** accordingly. Thus the **START** depth inside the **PROGRAMMING** dialog must not be smaller than the **DISTANCE** value. Failing this will lead to a sudden start of the piston drive after finishing the programming procedure to reach a piston position which corresponds to the current immersion depth.

HAND UNIT: MENU AIR PRESSURE, PHYS. UNIT

Menu item **AIR PRESSURE:**

Due to the high accuracy of the pressure sensor used inside the IWS air pressure fluctuations cause variations of the immersion depth measurements which can be eliminated with assistance by the menu item AIR PRESSURE.

The Sampler **must not be immersed into the water** whilst compensating the air pressure influences.

MENU
AIR PRESSURE
COMPENSATE = ENTER

The air pressure compensation will be carried out upon pressing the **ENTER** key. As reply the Hand Unit will indicate **COMPENSATED** in the fourth line of the LC-display.

Menu item **PHYS. UNIT:**

The menu item **PHYS. UNIT** offers the choice between two physical units for immersion depth measurements:

MENU
> m (LIMNOLOGY)
dbar
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.

The calculation of the immersion depth from the water pressure is made according to the formula:

$$\text{immersion depth [m]} = \text{water pressure [dbar]} * 1,019716$$

Please note that the physical unit **m** (meter) is applicable for limnic operations only. In salt water the calculation of the immersion depth is not possible without conductivity and temperature measurements.

HAND UNIT: MENU LANGUAGE, SET CLOCK, IDENT NUMBER

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 **SET CLOCK**:

The menu item **SET CLOCK** is used to adjust the Samplers real-time clock:

MENU SET CLOCK 08.20.2013 15:23:45 STORE = ENTER
--

The first digit of the date is blinking and can be entered via the keyboard. Thereafter the remaining digits of date and time for the Samplers real-time clock can be entered. Press the **ENTER** key to store date and time inside the Sampler.

Menu item **IDENT NUMBER**:

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

MENU IDENT NUMBER 12345

OPERATION: DEPTH INTEGRATED SAMPLING

1. Switch on the Sampler by pressing the quick-start key at the Sampler once (for one second or less).
2. Switch on the Hand Unit by pressing any key once. The following text will be displayed at the LC-display:

HAND UNIT	9.2 V
NO DATA	
BLUETOOTH = ENTER	

3. Press **ENTER** to activate bluetooth.
4. When more than one IWS is available inside the bluetooth range select scheduled IWS from list.

CONNECT TO IWS:
> 2712
3312
1713

The navigation inside the list is made via the cursor keys $\uparrow$ (by pressing **SHIFT** and **8** successively) and $\downarrow$ (by pressing **SHIFT** and **2** successively). To connect to the selected IWS press the **ENTER** key.

5. The **MAIN SCREEN** will be displayed when communication has been established:

IWS	5.0 l	100 m
PROGRAM INACTIVE		
SAMPLER	6.5 V	
0 %	0.00 m	

6. When the filling level of the Sampler differs from **0 %** or the piston is not completely run-down please use function **EMPTY SAMPLER F3** by pressing **SHIFT** and **5** successively.
7. When the immersion depth indication differs considerably from the **DISTANCE** as entered inside menu item **ZERO OFFSET** please enter the **MENU (F5)** and use menu item **AIR PRESSURE** (by pressing **SHIFT** and **3** successively) to eliminate the air pressure fluctuation.
8. Enter the function **PROGRAMMING F2** (by pressing **SHIFT** and **9** successively):

SAMPLING MODE
> DEPTH
TIME
SPOT

9. Select **DEPTH** as Sampling mode via cursor keys and press the **ENTER** key.

START	001.50 m
END	065.00 m
v max 0.64 m/s	
ACTIVATE = ENTER	

Use the keyboard to enter **START** and **END** depth.

-
10. Upon finalizing the programming procedure by pressing the **ENTER** key the Sampler is activated for the next operation. Additionally the maximum downward velocity for the current program is calculated, based on the sampling duration of 50 sec. (2.5 l) resp. 100 sec. (5 l), and indicated.
 11. Enter the **MAIN SCREEN F1** (by pressing **SHIFT** and **7** successively):

IWS	5.0 l	100 m
PROGRAM ACTIVE		
SAMPLER		6.5 V
0 %		0.00 m

Make sure that the second line of the LC-display indicates:

PROGRAM ACTIVE

12. Switch off the Hand Unit by pressing any key for 3 seconds until the text at the display disappears.
13. Close the hose clamp located at the bottom side of the Sampler.
14. Put the Sampler into the water and lower it to depth considering the maximum downward velocity as calculated by the Hand Unit. The sampling duration (complete piston stroke) takes min. 50 sec. (2.5 l) resp. 100 sec. (5 l). Upon passing the end depth the Sampler can be recovered with any upward velocity.
15. Extract the sample by opening the hose clamp located at the bottom side of the Sampler.
16. After extracting the sample re-establish wireless connection between Hand Unit and Sampler as described above.
17. Enter the **MENU (F5)** and use menu item **PROTOCOL** to check that the operation has been carried out successfully.
18. Run-down the piston by using the function **EMPTY SAMPLER (F3)**.
19. Before switching off the Hand Unit enter the **MAIN SCREEN (F1)**

IWS	5.0 l	100 m
PROGRAM INACTIVE		
SAMPLER		6.5 V
0 %		0.00 m

and make sure that the second line of the LC-display indicates:

PROGRAM INACTIVE

20. Switch off the Hand Unit by pressing any key for 3 seconds until the text at the display disappears.

OPERATION: TIME INTEGRATED SAMPLING

1. Switch on the Sampler by pressing the quick-start key at the Sampler once (for one second or less).
2. Switch on the Hand Unit by pressing any key once. The following text will be displayed at the LC-display:

HAND UNIT	9.2 V
NO DATA	
BLUETOOTH = ENTER	

3. Press **ENTER** to activate bluetooth.
4. When more than one IWS is available inside the bluetooth range select scheduled IWS from list.

CONNECT TO IWS:
> 2712
3312
1713

The navigation inside the list is made via the cursor keys $\uparrow$ (by pressing **SHIFT** and **8** successively) and $\downarrow$ (by pressing **SHIFT** and **2** successively). To connect to the selected IWS press the **ENTER** key.

5. The **MAIN SCREEN** will be displayed when communication has been established:

IWS	5.0 l	100 m
PROGRAM INACTIVE		
SAMPLER	6.5 V	
0 %	0.00 m	

6. When the filling level of the Sampler differs from **0 %** or the piston is not completely run-down please use function **EMPTY SAMPLER F3** by pressing **SHIFT** and **5** successively.
7. When the immersion depth indication differs considerably from the **DISTANCE** as entered inside menu item **ZERO OFFSET** please enter the **MENU (F5)** and use menu item **AIR PRESSURE** (by pressing **SHIFT** and **3** successively) to eliminate the air pressure fluctuation.
8. Enter the function **PROGRAMMING F2** (by pressing **SHIFT** and **9** successively):

SAMPLING MODE
DEPTH
> TIME
SPOT

9. Select **TIME** as Sampling mode via cursor keys and press the **ENTER** key.

08.20.2013	15:23:45
START TIME	16:36
RUN TIME	03 h 17 min
ACTIVATE = ENTER	

Use the keyboard to enter **START TIME** and **RUN TIME**.

-
10. Upon finalizing the programming procedure by pressing the **ENTER** key the Sampler is activated for the next operation.
 11. Enter the **MAIN SCREEN F1** (by pressing **SHIFT** and **7** successively):

IWS	5.0 l	100 m
PROGRAM ACTIVE		
SAMPLER		6.5 V
0 %		0.00 m

Make sure that the second line of the LC-display indicates:

PROGRAM ACTIVE

12. Switch off the Hand Unit by pressing any key for 3 seconds until the text at the display disappears.
13. Close the hose clamp located at the bottom side of the Sampler.
14. Put the Sampler into the water and lower it to depth. Wait for expiration of programmed schedule and recover the sampler.
15. Extract the sample by opening the hose clamp located at the bottom side of the Sampler.
16. After extracting the sample re-establish wireless connection between Hand Unit and Sampler as described above.
17. Enter the **MENU (F5)** and use menu item **PROTOCOL** to check that the operation has been carried out successfully.
18. Run-down the piston by using the function **EMPTY SAMPLER (F3)**.
19. Before switching off the Hand Unit enter the **MAIN SCREEN (F1)**

IWS	5.0 l	100 m
PROGRAM INACTIVE		
SAMPLER		6.5 V
0 %		0.00 m

and make sure that the second line of the LC-display indicates:

PROGRAM INACTIVE

20. Switch off the Hand Unit by pressing any key for 3 seconds until the text at the display disappears.

OPERATION: SPOT SAMPLING

1. Switch on the Sampler by pressing the quick-start key at the Sampler once (for one second or less).
2. Switch on the Hand Unit by pressing any key once. The following text will be displayed at the LC-display:

HAND UNIT	9.2 V
NO DATA	
BLUETOOTH = ENTER	

3. Press **ENTER** to activate bluetooth.
4. When more than one IWS is available inside the bluetooth range select scheduled IWS from list.

CONNECT TO IWS:
> 2712
3312
1713

The navigation inside the list is made via the cursor keys $\uparrow$ (by pressing **SHIFT** and **8** successively) and $\downarrow$ (by pressing **SHIFT** and **2** successively). To connect to the selected IWS press the **ENTER** key.

5. The **MAIN SCREEN** will be displayed when communication has been established:

IWS	5.0 l	100 m
PROGRAM INACTIVE		
SAMPLER	6.5 V	
0 %	0.00 m	

6. When the filling level of the Sampler differs from **0 %** or the piston is not completely run-down please use function **EMPTY SAMPLER F3** by pressing **SHIFT** and **5** successively.
7. When the immersion depth indication differs considerably from the **DISTANCE** as entered inside menu item **ZERO OFFSET** please enter the **MENU (F5)** and use menu item **AIR PRESSURE** (by pressing **SHIFT** and **3** successively) to eliminate the air pressure fluctuation.
8. Enter the function **PROGRAMMING F2** (by pressing **SHIFT** and **9** successively):

SAMPLING MODE
DEPTH
TIME
> SPOT

9. Select **SPOT** as Sampling mode via cursor keys and press the **ENTER** key.

08.20.2013	15:23:45
SPOT SAMPLE	
ACTIVATE = ENTER	

10. Press the **ENTER** key to activate the Sampler for the next operation.
11. Enter the **MAIN SCREEN F1** (by pressing **SHIFT** and **7** successively):

IWS	5.0 l	100 m
PROGRAM ACTIVE		
SAMPLER		6.5 V
0 %		0.00 m

Make sure that the second line of the LC-display indicates:

PROGRAM ACTIVE

12. Switch off the Hand Unit by pressing any key for 3 seconds until the text at the display disappears.
13. Close the hose clamp located at the bottom side of the Sampler.
14. Put the Sampler into the water. Lower it to depth with a minimum lowering speed of 10 cm/s for minimum 3 seconds to enable arming of the Sampler. Stop the Sampler in scheduled depth and keep it within a depth interval of ± 30 cm for 2 minutes to ensure that the full piston stroke has been finished. Recover the Sampler.
15. Extract the sample by opening the hose clamp located at the bottom side of the Sampler.
16. After extracting the sample re-establish wireless connection between Hand Unit and Sampler as described above.
17. Enter the **MENU (F5)** and use menu item **PROTOCOL** to check that the operation has been carried out successfully.
18. Run-down the piston by using the function **EMPTY SAMPLER (F3)**.
19. Before switching off the Hand Unit enter the **MAIN SCREEN (F1)**

IWS	5.0 l	100 m
PROGRAM INACTIVE		
SAMPLER		6.5 V
0 %		0.00 m

and make sure that the second line of the LC-display indicates:

PROGRAM INACTIVE

20. Switch off the Hand Unit by pressing any key for 3 seconds until the text at the display disappears.

QUICK-START KEY, POWER-SAVE FUNCTION

IMPORTANT NOTICE: **Make sure that the hose clamp (located at the bottom side of the Sampler) has been opened before pressing the quick-start key!**

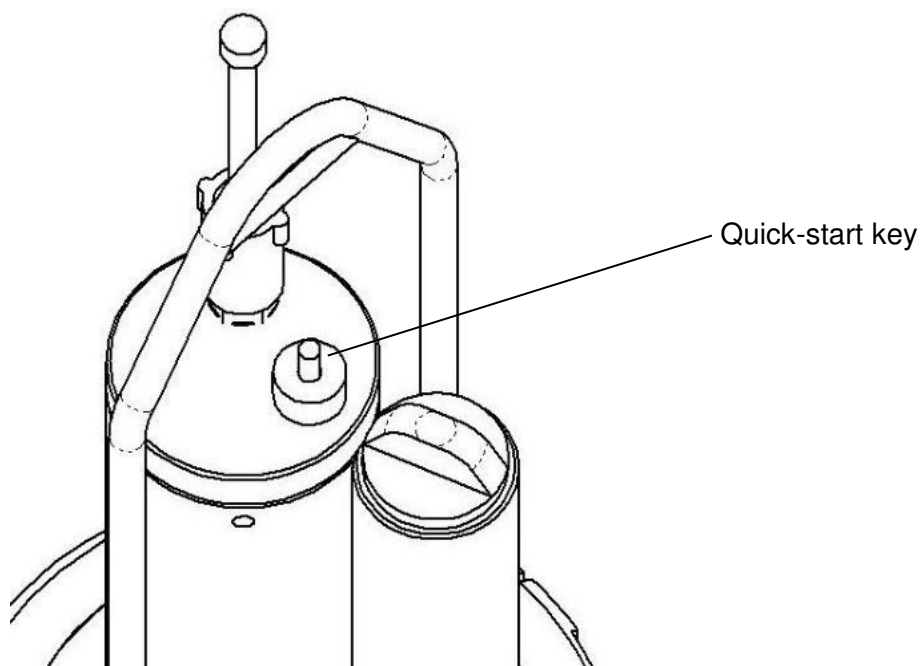
The **quick-start key** at the Motor Unit is used to prepare the Sampler for an operation without the need to connect the Hand Unit. **Sustained** pressing of the **quick-start key** until the electric motor of the Sampler makes a short move (approx. 3 to 4 seconds) will carry out the following function sequence:

Empty Sampler – load existing program – activate Sampler

Be sure that the piston of the Sampler **always** (also in case of completely run-down piston) sees a small distance. This is a confirmation for a successful activation of the Sampler.

The **quick-start key** is linked with the Samplers **power-save function**. The **power-save function** automatically deactivates (and switches off) the Sampler when no operation is detected (i.e. when the piston does not leave the start position) within 15 minutes upon activation by **quick-start key**. A re-start of the Sampler can be made at any time by pressing the **quick-start key** again.

Please note: The power-save function does not apply when the sampler is operated in time integrated sampling mode.



PC SOFTWARE OCEANLAB

The standard HYDRO-BIOS data acquisition software OceanLab 3 has been extended by a module, particularly to transfer extended protocol files of the INTEGRATING WATER SAMPLER to a PC. Furthermore the functions of the Hand Unit have been integrated into the software.

MINIMUM PC REQUIREMENTS

Pentium PC 350 MHz with 64 MB RAM, 10 MB free space on hard-disk drive,
CD-ROM drive,
Windows 7 / Vista / XP / 2000 / NT / Me / 98 / 95
1 free serial COM-port (RS 232) or bluetooth-adaptor
2-Button Wheel-Mouse

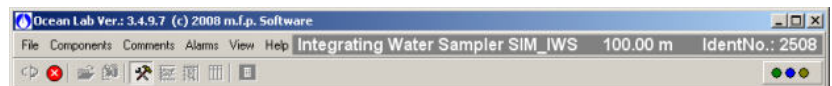
INSTALLATION: (Ensure you have Administrator Rights for the installation)

To install OceanLab 3 at your PC start the PC and place the software CD in your CD drive. With enabled AUTORUN function (see Windows manual) the installation will start automatically. When the installation process is not started automatically please select **START** from the Windows task bar and click on **RUN**. Enter the installation command "D:\Setup.exe" (where D is the identification letter for the CD drive in your PC) and confirm the command with the OK button. 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.

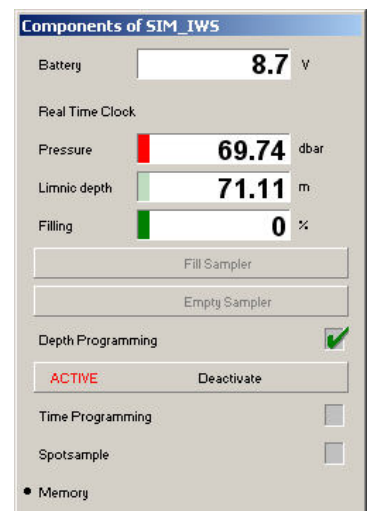
Yellow LED indicates that the electric motor inside the Sampler is active.

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 Sampler is made via a serial COM-port. Feel free to connect the Sampler to any COM-port available at the PC. When using **bluetooth** please refer to the manual of your bluetooth-adaptor to create a virtual COM-port for your IWS (use bluetooth PIN code "0000"). After starting OceanLab 3 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 Sampler. When OceanLab 3 is unable to establish a connection to the Sampler 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 CONTROLLING MODE to give access to the control of the Sampler.



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 Sampler to the PC please use the button STOP SESSION inside the toolbar or inside the FILE menu.

To close the current 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, clock...).

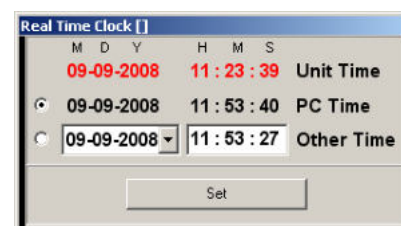
The following CONTROLLING dialogs for INTEGRATING WATER SAMPLER are available:

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 clock data will be used for the extended protocol readout.

The date format is MM-DD-YYYY MM = month, 2 digits
 DD = day, 2 digits
 YYYY = year, 4 digits
 (2000 ... 2099)

The time format is: hh:mm:ss hh = hour, 2 digits (0 ... 24)
 mm = minute, 2 digits
 ss = second, 2 digits



The 'Real Time Clock' dialog box has a title bar 'Real Time Clock []'. It contains three rows of time settings. The first row is 'Unit Time' with a date '09-09-2008' and time '11:23:39'. The second row is 'PC Time' with a date '09-09-2008' and time '11:53:40'. The third row is 'Other Time' with a date '09-09-2008' and time '11:53:27'. A 'Set' button is at the bottom.

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

PRESSURE

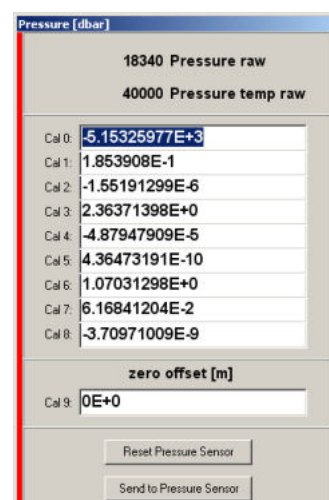
The CONTROLLING dialog PRESSURE WITH ZERO OFFSET incorporates the indication of the sensors raw data and the possibility to read and modify the sensors calibration coefficients (cal 0 ... cal 9).

The inlet of the IWS has a vertical distance from the pressure sensor. For high precision samples the vertical ZERO OFFSET (calibration coefficient cal 9) allows for automatic clearing of this vertical distance. The vertical ZERO OFFSET has to be entered in meters.

The button SEND TO PRESSURE SENSOR is used to transfer the calibration coefficients to the instrument after modifications.

Due to the high accuracy of the pressure sensor used inside the IWS air pressure fluctuations cause variations of the immersion depth measurements which can be eliminated with assistance by the button RESET PRESSURE SENSOR.

The Sampler **must not be immersed into the water** whilst compensating the air pressure influences.



The 'Pressure [dbar]' dialog box shows raw data: '18340 Pressure raw' and '40000 Pressure temp raw'. It lists calibration coefficients Cal 0 to Cal 8 with values like '-5.15325977E+3' for Cal 0. Cal 9 is labeled 'zero offset [m]' with a value of '0E+0'. At the bottom are buttons for 'Reset Pressure Sensor' and 'Send to Pressure Sensor'.

LIMNIC DEPTH

The LIMNIC DEPTH is a virtual device, calculating the current operational depth in fresh water from measured pressure. The CONTROLLING dialog LIMNIC DEPTH displays the measuring data used for the calculation and the calculation formula as follows:

$$\text{limnic_depth [m]} = \text{pressure [dbar]} * 1.019716$$

Please note that the data of LIMNIC DEPTH are **applicable for limnic operations only**.

FILLING

The CONTROLLING dialog FILLING incorporates the indication of the sensors raw data and the possibility to read and modify the sensors calibration coefficient cal0.

The button SEND TO FILLING SENSOR is used to transfer the calibration coefficient to the instrument after modifications.

The button FILL SAMPLER (also embedded in the COMPONENTS window) is used to run-out the piston of the sampler.

The button EMPTY SAMPLER (also embedded in the COMPONENTS window) is used to run-down the piston of the Sampler.



DEPTH PROGRAMMING

This CONTROLLING dialog is used to programme START and END DEPTH of the sampling interval of the Sampler (ref. chapter HAND UNIT: PROGRAMMING, page 11).

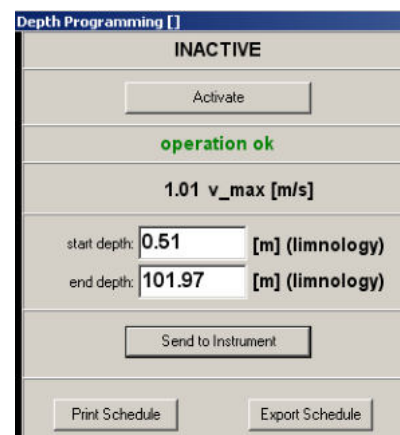
The physical unit (m or dbar) is controlled via menu PHYS. UNIT of the Hand Unit.

The button SEND TO INSTRUMENT is used to transfer the events to the Sampler. Additionally the maximum downward velocity v_max is calculated and indicated.

Please note that programming can only be made when the Sampler is INACTIVE, the driving motor for the piston is not running and the FILLING level is 0%.

The button ACTIVATE resp. DEACTIVATE (also embedded in the COMPONENTS window) is used to switch the Sampler ON (ACTIVE) or OFF (INACTIVE) for automatic sampling.

The line above maximum downward velocity indicates the brief protocol (ref. chapter HAND UNIT: MENU PROTOCOL, page 16).



TIME PROGRAMMING

This CONTROLLING dialog is used to programme START TIME and RUN TIME for time integrated samples (ref. chapter HAND UNIT: PROGRAMMING, page 12).

The START TIME, which is the time of day to start the sample, has to be entered in the format:

hh:mm hours and minutes, 00:00 ... 23:59

Please note: The START TIME is programmed **WITHOUT** date specification, enabling the user to repeat a time integrated sampling scenario on regular basis without the need to re-programme the sampler.

The RUN TIME, which limits the integration time, has to be entered in the format:

hh:mm hours and minutes, 00:01 ... 23:59

The button SEND TO INSTRUMENT is used to transfer the entered parameters to the instrument.

Additionally the current date and time of the Sampler are displayed. To adjust the Samplers clock please select REAL TIME CLOCK inside the COMPONENTS WINDOW.

The line above date and time of the Sampler indicates the brief protocol (ref. chapter HAND UNIT: MENU PROTOCOL, page 16).

Please note that programming can only be made when the Sampler is INACTIVE, the driving motor of the piston is not running and the FILLING level is 0%.

The button ACTIVATE resp. DEACTIVATE is used to switch the Sampler ON (ACTIVE) or OFF (INACTIVE).

SPOT SAMPLE

SPOT SAMPLING provides an easy way to achieve a sample of the complete sampler volume (full piston stroke) at a single depth level.

When immersed after activation, the sampler will automatically be armed upon detecting an increasing water depth within 3 successive seconds with a minimum lowering speed of 10 cm/s. The full piston stroke will start automatically when the sampler is stopped within a depth interval of max. ± 30 cm for min. 10 seconds. The piston stroke takes up to 50 seconds for the 2.5 l model and up to 100 seconds for the 5 l model.

The CONTROLLING dialog SPOT SAMPLE FOR IWS only allows to start (ACTIVATE) and stop (DEACTIVATE) the Sampler in spot sampling mode.

The lowest line indicates the brief protocol (ref. chapter HAND UNIT: MENU PROTOCOL, page 16).

Please note that activation can only be made when the driving motor of the piston is not running and the FILLING level is 0%.

The button ACTIVATE resp. DEACTIVATE is used to switch the Sampler ON (ACTIVE) or OFF (INACTIVE).

M	D	Y	H	M	S	Unit Time
08	21	2013	08	40	31	

M	D	Y	H	M	S	Unit Time
08	21	2013	08	40	31	

MEMORY / PROTOCOL FILES

The CONTROLLING DIALOG MEMORY is used to get access to the extended protocol files, created by the sampler during operation. These extended protocol files can only be accessed via OceanLab, a display at the Hand Unit is not possible.

All protocol files of an INTEGRATING WATER SAMPLER are stored at the PC inside one single disk file. The disk file is located in a device-specific sub-directory of the LOGFILES directory of OceanLab 3 which is created inside an application data directory of Windows. The location of the application data directory depends on the Windows version used on your PC. To find current path of the LOGFILES directory **on your PC** please use menu item ENTER FILES DIRECTORY inside the FILES menu.

The disk file is automatically named:

IWS_nnnn.hbp

(nnnn is the internal identification number of the Sampler)

The disk file can be opened inside OceanLab without connecting a Sampler by selecting OPEN FILE inside the FILE menu of the MAIN WINDOW.

All new protocol files of the sampler are automatically appended to the disk file when a communication between Sampler and OceanLab has been established. Thus the file table always incorporates the complete protocol history of the currently connected Sampler in chronological order (bottom to top). A protocol file is not created until the operation has been completely finished (i.e. the Sampler has been deactivated). **Therefore make sure that the Sampler is indicated as INACTIVE inside the COMPONENTS WINDOW when updating the disk file.**

The top line of the MEMORY window indicates the number of protocol files **stored inside the Sampler**. The number of FILES IN MEMORY inside the Sampler is limited to 500. Delete the files in memory by using button CLEAR MEMORY before reaching 500 FILES IN MEMORY to avoid loss of protocol files because of completely full memory.

A preview of each protocol file can be displayed in the lower area of the MEMORY window by selecting it inside the table. Language and physical unit settings are controlled via Hand Unit menu.

A text window to enter individual operation descriptions is opened by double-click (or button OPEN SELECTED FILE) at the protocol file, where the previous entry is used as template.

The input is stored inside the disk file upon clicking on button OK. An X inside the last column of the file table highlights this protocol as already processed.

The button PRINT is used to open a print preview for a hard copy of the protocol file.

To discard the input please use button CANCEL to close the text window.

Memory []			
2 files in memory			
No.	Date	Start	
002	1910-05-18	17:31:12	
001	1910-05-14	18:00:00	

Spot Sample			
Program Start:		17:31:12	
Air Pressure [dbar]:		1.00	
Zero Offset [m]:		2.00	
	nominal	actual	
Start Depth [dbar]:	-	5.00	
End Depth [dbar]:	-	4.00	
Start Time:	-	01:55:12	
Runtime:	-	04:19:12	
Maximum Depth [dbar]:		120.00	
Filling [%]:		55	
Program End:		22:19:12	

operation o.k.

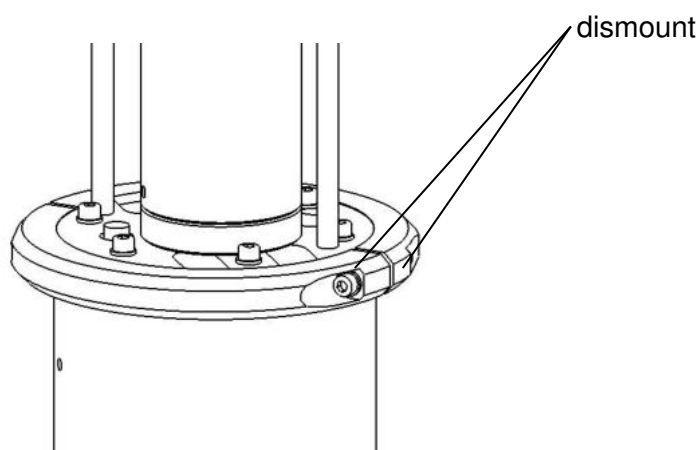
Open Selected File Clear Memory

Add-on Data	
Operation carried out by:	
Max Mustermann	
Operation:	
SH 355/035/08	
Sampling point 05	
OK	Print
Cancel	

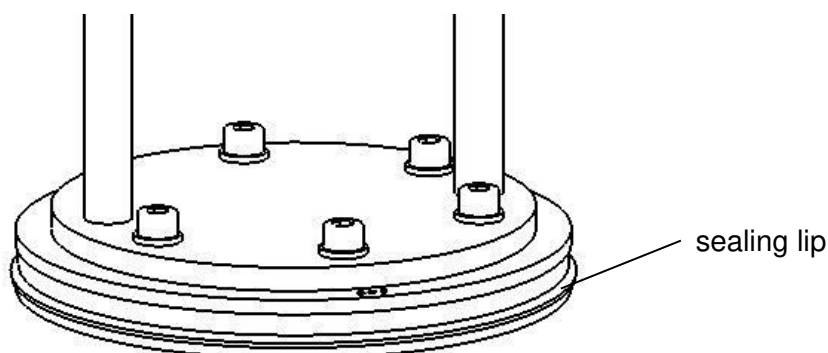
HYDRO-RISC	
INTEGRATING WATER SAMPLER (IWS)	
File No.	0002
Version	1.00
Release Date/Version	1910-05-14
OPERATION PROTOCOL	
Date of operation	
1910-05-18	
Location	
SH 355/035/08	
Sampling point 05	
Spot Sample	
Start Time (UTC) of program	17:31:12
Air Pressure (dbar) at Program Start/End	1.00
Zero Offset (m) at Program Start/End	2.00
Start Depth (dbar) at Program Start/End	5.00
End Depth (dbar) at Program Start/End	4.00
Start Time (UTC) of Sampling	01:55:12
Runtime (UTC) of Sampling	04:19:12
Maximum Depth (dbar) at Program Start/End	120.00
Filling [%] at Program Start/End	55
Program End (UTC) of Sampling	22:19:12
Operation o.k.	
Max Mustermann	

REPLACEMENT OF THE PISTON PACKING

1. Before starting to replace the piston packing make sure that the Sampler is **INACTIVE** by using the Hand Unit (**MAIN SCREEN, F1**).
2. Disconnect the Hand Unit from the Sampler to avoid a sudden start of the piston drive.
3. First of all the upper locking ring has to be removed. For that purpose both screws and nuts of the upper locking ring have to be dismantled (tool: hexagon socket screw key 5mm and spanner 10 mm).



4. Thereafter the complete piston drive can be pulled out of the sampling tube. For this hold the sampling tube in position and pull vertically at the metal hoop.
5. Remove the piston packing. Therefore stitch a robust needle into the solid rectangular zone of the packing and lift the packing out of its groove. Make sure that the groove itself will not be damaged by the needle.
6. Clean the groove with a lint free cloth, if necessary.
7. Insert a new packing into the groove. Care for a correct position of the packing inside the nut (see sketch). The thin sealing lip of the packing must sit close to the lower cheek of the groove.

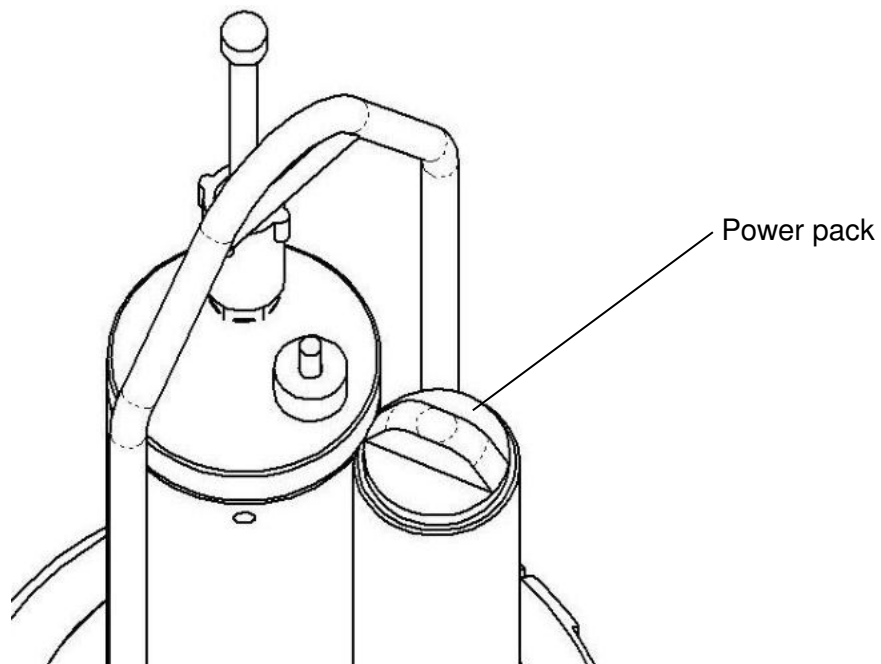


8. Moisten the packing with tap water and insert the piston into the sampling tube.
9. Press the complete piston drive into the sampling tube until stop.
10. Remount the upper locking ring by using the associated screws and nuts. Make sure that the locking ring exactly fits into the nut of the sampling tube.

REPLACEMENT OF ACCUMULATORS

To avoid damages of the sampler electronics NEVER CONNECT CHARGER to sampler WHEN NO ACCUMULATORS ARE PLACED AND CONNECTED INSIDE EXTERNAL POWER PACK!

1. Remove lid of power pack by unscrewing it (counter-clockwise).
2. Interrupt electrical connection from accumulators.
3. Extract accumulators.
4. Insert new accumulators (connecting wires heading upwards).
5. Re-establish electrical connection (2 color-coded banana plugs).
6. Store excessive wires beside accumulators.
7. Make sure that the sealing surface of the pressure tube is clean and uninjured. If necessary use a lint-free cloth for cleaning.
8. Make sure that the O-ring of the lid is clean and uninjured. If necessary use a lint-free cloth for cleaning.
A defective O-ring has to be replaced.
9. Remount lid by screwing it clockwise into the pressure tube of the power pack.



7.2 Konformitätserklärung



DECLARATION OF CONFORMITY Directive 1999/5/EG (R&TTE)

The manufacturer: AMBER wireless GmbH
Albin-Köbis-Straße 18
51147 Köln
Tel. +49-2203-699-1950

declares on its sole responsibility, that the following product:

Type-designation: BlueNiceCom 4 (AMB2300)

Intended purpose: 2,4GHz-Bluetooth™ wireless data modem
Transfer of digital messages

satisfies all the technical regulations applicable to the product
within the scope of council directives 2006/95/EC, 2004/108/EC
and 99/5/EC if used for its intended purpose and that the following
norms, standards or documents have been applied:

EN 300 328 V1.7.1 (2006-10)
EN 301 489-1 V1.6.1 (2005-09)
EN 301 489-17 V1.2.1 (2002-08)
EN 50371 (2002-11)
EN 60950-1 (2006-11)

FCC 47 CFR Part 15C - Intentional Radiators ANSI C63.4-1992
FCC-ID R7TAMB2300
RSS210 Issue 6 (09-2005), RSS-GEN Issue 1 (09-2005)

Köln, 03.12.2008
place and date of issue



Manufacturer/Authorized representative
Ulf Knoblich

7.3 Bluetooth SIG Qualification Design Certificate QDID B013784



Bluetooth SIG Qualification Design (QDL) Certificate

QDL Certificate: This certificate represents the Specifications declared by the Member as having passed the Bluetooth Qualification/Certification Process as specified within the Bluetooth Specifications and as required within the PRD 2.0.

Design Name:

BlueNiceCom 4

Certified



This Product Design has passed the Bluetooth Qualification Process!

Specification Version: 2.0/2.0+EDR

QDID: B013784

Declared Specifications: Baseband Conformance, Radio, Service Discovery Protocol, Logical Link Control and Adaption Protocol, Generic Access Profile, Link Manager, RFCOMM, Serial Port Profile, Service Discovery Application Profile, Interoperability Test Specification, Summary ICS, Product Type

Member Company:	Requirements:	Project Dates:
Amber wireless GmbH Hawstr. 2a Trier, Rheinlandpfalz 54290	1. Testing 2. Documentation 3. Assessment 4. Declaration 5. Listing 6. Marking 7. Compliance to Auditing and Enforcement	Assessment Date: February/29/2008 Listing Date: February/29/2008
BQE: Carsten Steinroeder		

Abbildung 9 SIG QDL Certificate

7.4 Compliance statement

FCC compliance statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference, and
- 2) This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IC compliance statement

Operation is subject to the following two conditions:

- 1) this device may not cause interference, and
- 2) this device must accept any interference, including interference that may cause undesired operation of the device.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.