

Operators Manual

SmartSystem SHIP L Datalogger



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1 Safety instructions

Intended use

Temperature

- Temperatures outside the operating range may damage the battery. For the operating range, see the information in the technical data sheet.

IP Protection

- Limited protection against dust ingress and protection against splashing water from all directions.

Air Pressure

- Excess pressure or vacuum can damage the device. Do not vacuum when used for air cargo.

Mechanical force

- Avoid violent shocks and impacts.

Microwave

- Do not expose the device to microwave radiation (risk of battery explosion).

X-rays

- Avoid long-term exposure to X-rays (risk of damage to the device).

Battery

- The battery cannot be removed or replaced. SmartMonitor SHIP L device has a rechargeable Non-lithium NiMH battery.
- Risk of fire or explosion if the battery is replaced by an incorrect type
- Risk of explosion if the battery is disposed of in a fire or hot oven
- Leaving the battery in an extremely high temperature surrounding environment can result in an explosion or leakage
- Do not subject battery to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas

Safe use

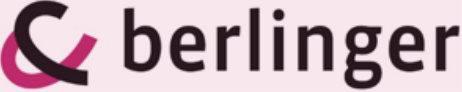
- Ordinary persons can install and operate the unit without taking any other safety precautions.

Radio Equipment







- Cellular (LTE M1, NB-IoT, 2G), BLE

2 Quick Guide

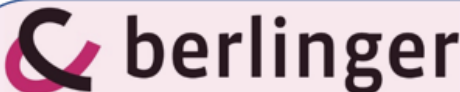
2.1 Quick Start if configuration is already loaded on the device











Quick Start SHIP L (if configuration is already on the device)

<h4>1. Start device</h4>  <p>Long press > 5 seconds</p> <p>Press long (>5 second) till  is shown on the display. → Device starts recording</p>	<h4>2. Place device</h4>  <p>Place device to the shipment</p>
<h4>3. At destination</h4>  <p>Remove device from the shipment</p>	<h4>4. Stop recording</h4>  <p>Long press > 5 seconds</p> <p>Press long (>5 second) till  is shown on the display. → Device sends automatically data to SmartView</p>

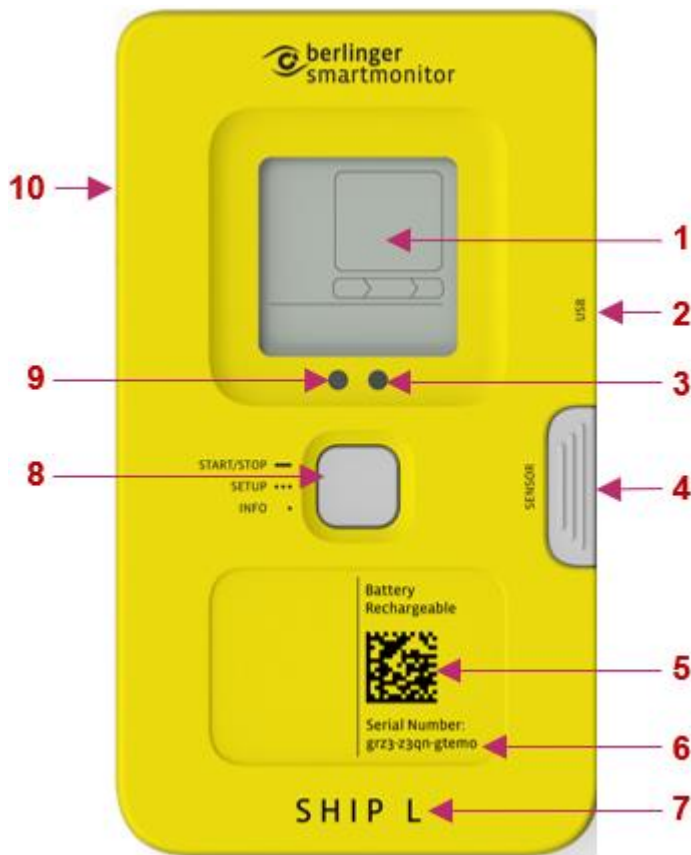
2.2 Quick Start if configuration needs first loaded to the device



Quick Start SHIP L (if configuration needs first loaded to the device)

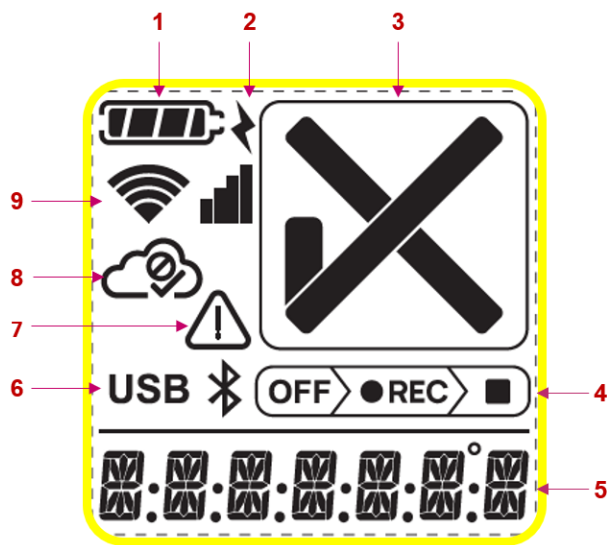
<p style="text-align: center;">1 . Start device</p> <div style="text-align: center;">  <p style="color: red; font-weight: bold;">Press quickly 3 times</p> </div> <p>Press quickly 3 times to start the device → Device starts to download the configuration</p>	<p style="text-align: center;">2 . Download configuration</p> <p>Device display shows following sequences on the display</p> <div style="text-align: center;">  </div> <p>Device is ready to use as soon as 7-segment display shows shipment name.</p>
<p style="text-align: center;">3. Start record</p> <div style="text-align: center;">  <p style="color: red; font-weight: bold;">Long press > 5 seconds</p> </div> <p>Press long (>5 second) till  is shown on the display. → Device starts recording</p>	<p style="text-align: center;">4. Place device</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Place device to the shipment</p>
<p style="text-align: center;">5. At destination</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Remove device from the shipment</p>	<p style="text-align: center;">6. Stop recording</p> <div style="text-align: center;">  <p style="color: red; font-weight: bold;">Long press > 5 seconds</p> </div> <p>Press long (>5 second) till  is shown on the display. → Device sends automatically data to SmartView</p>

3 Device view and description



No.	Name	Description
1	Display	Multi-information display
2	USB-connector	To charge the battery or download the data manually
3	Confirmation/Status LED	LED (small lamp) indicates if use of multifunctional button was successful or not
4	Cover for ext. sensor	Protect plug for external sensor
5	QR Code	Contains the serial number for M2M (Machine to Machine)
6	Serial number	Serial number of the device
7	Device Type	Indicates which type of device you have
8	Multifunctional button	1 x long press → Start the device 1 x short press → Info 3 x short press → loading profile
9	Light sensor	Measure the light sensitivity
10	Humidity and atmospheric pressure sensor	Measure humidity and atmospheric pressure

4 Display

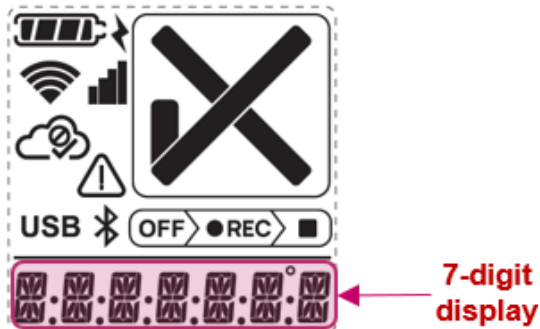


Icon	Name	Description
1	Battery status	Indicates the battery status
2	Battery charging	Indicates whether external power has been plugged in
3	Alarm status	<ul style="list-style-type: none"> ✓ Device indicates that there is no alarm violation ✗ Device indicates that there is one or more alarm violation
4	Logging Modus	<ul style="list-style-type: none"> OFF → SmartMonitor SHIP L is ready to start ● REC → SmartMonitor SHIP L is logging ■ → SmartMonitor SHIP L has stopped
5	7-digit display	Information line (see more in section 7-digit display)
6	External readout	Device ready for readout via USB or Bluetooth
7	Warning Symbol	Additional warning for function
8	Cloud status	<ul style="list-style-type: none"> ☁ Upload successful ☁⊗ Upload not possible
9	Signal strength	Cellular connection <ul style="list-style-type: none"> 📶 Cellular signal available 📶 No cellular signal available

4.1 7-digit display

The 7-digit display gives additional information about the status, shipment or other data.

In normal logging operation it displays the temperature.



5 Multifunctional button

SmartMonitor SHIP L device has one multifunctional button to operate.

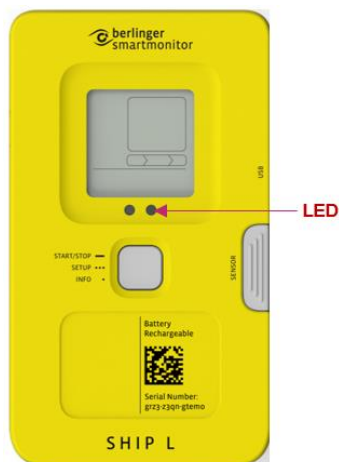


- 1 x long press → Start / Stop the device
- 3 x short press → Setup – Load configuration
- 1 x short press → Information

- **Long press to multifunctional button**
One long press (> 5 sec.) to multifunctional button will start or stop the device.
- **3 short press to multifunctional button**
Three short press to the multifunctional button will start setup process
- **1 short press to multifunctional button**
One short press to the multifunctional button, device will show information on the display or skip to the next information.

6 Confirmation LED

Device has an LED which gives an indication if the use of multifunctional button was successful or if a task has been terminated.



★ 1 x short white flash → Confirmation of an action or task

★ 1 sec. **green** flash → “Cancel Message”
Short press has released too early.

★ ★ ★ **Green** blinking → when longpress is going on

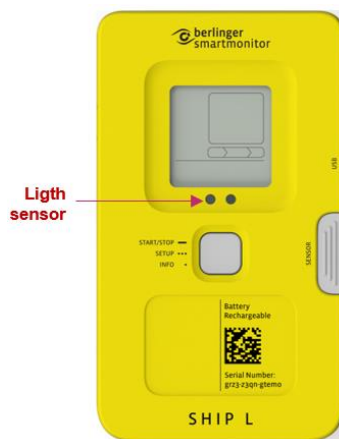
★ ★ ★ 1 x long **green** flash → Longpress was successful, multifunctional button can be released

1 x long **blue** flash → Information about a BLE connection

1 x long **red** flash → Information about cancelling a status

7 Light sensor

SmartMonitor SHIP L device has a built-in light sensor to monitor whether a transport box has been opened and the light ratio has changed. That sensor can be enabled or disabled in the Berlinger SmartView software (version 6.0 and higher).



Important:

Do not stick any label or tape over the light sensor.

8 Humidity and pressure sensor

SmartMonitor SHIP L has a built-in humidity and atmospheric pressure sensor which can be enabled or disabled in the Berlinger SmartView software (version 6.0 and higher) configuration. The sensor is located on the left side of the device.



Important:

Keep the white sensor protector clean

Do not remove the grey sensor protection

Do not press on the grey sensor protection

Do not stick any label or tape over the light sensor

The sensor shall not get in close contact with volatile chemicals such as solvents or other organic compounds. Especially high concentration and long exposure must be avoided. Ketenes, Acetone, Ethanol, Isopropyl Alcohol, Toluene, etc. are known to cause drift of the humidity reading.

9 Tilt / Shock / Vibration

SmartMonitor SHIP L has a built-in motion sensor to record tilt, shock and vibration. The sensor is positioned inside the device and is not visible from the outside.

Tilt, shock and vibration can be enabled or disabled in the Berlinger SmartView software (version 6.0 and higher) configuration.

No maintenance or service is required for this built sensor.

10 Configuration

The configuration for the SmartMonitor SHIP L device can be defined via the Berlinger SmartView software (version 6.0 and later).

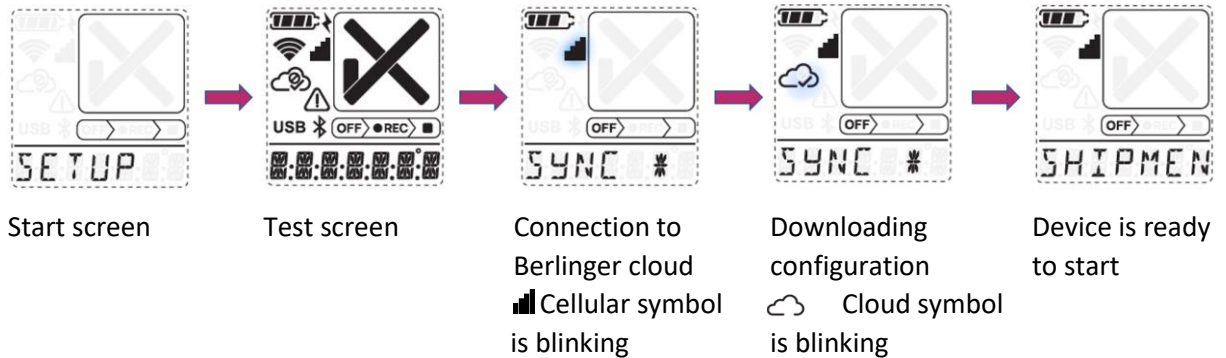
SmartMonitor SHIP L can be ordered pre-configured with a customer desired configuration or with a standard configuration.

If a new configuration is to be loaded, it is configured in the Berlinger SmartView software (version 6.0 and higher) and then assigned to the device.

To load a defined and assigned configuration, the multifunctional button on the SmartMonitor SHIP L device must be pressed 3 times in quick succession.



The display starts showing after press quickly 3 times following screen:



11 Start/Stop

11.1 Start

To start the device, press the multifunctional button once >5 seconds or as long till display shows "SETUP" or the green LED lights for at least 2 sec.



The following information will be displayed on the screen. While the information "****START****" will be displayed **as a ticker**, keep pressed the multifunctional button and hold the multifunctional button for at least 5 seconds.

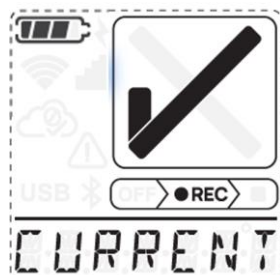


As confirmation the green LED will flash for at least 2 sec.



If no start delay is configured, the device goes directly into the Record modus and shows **●REC** on the display as confirmation that the device is recording.

The large indicator on the screen ✓ or ✗ shows directly if the device is in good or alarm situation. The 7-segment displays the "CURRENT" temperature.



11.2 Stop

To stop the device, press the multifunctional button once >5 seconds or as long till display shows "STOP" or the green LED lights for at least 2 sec.



As soon as the device has stopped, the 7-segment display shows "STOP".

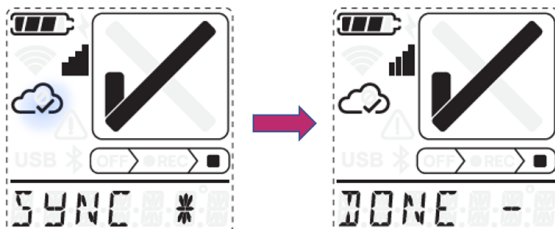
Additionally, the Stop symbol will be shown ■.



As confirmation the LED will flash 3 times short.



Device will start now the synchronisation process by uploading the remaining data.



Synchronisation in progress "SYNC"
☁ Cloud Symbol is blinking

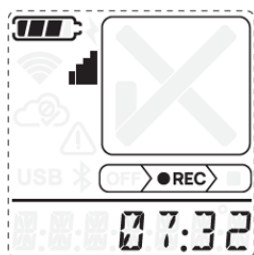
Synchronisation completed "DONE"

12 Start delay

For SmartMonitor SHIP L device you have the possibility to configure in Berlinger SmartView software (version 6.0 and higher) with a start delay or with a scheduled start.

12.1 Start SmartMonitor SHIP L with start delay

If a start delay is configured a counter in minutes:seconds will start counting down to 00:00, after that, the device starts and goes to the Record modus.

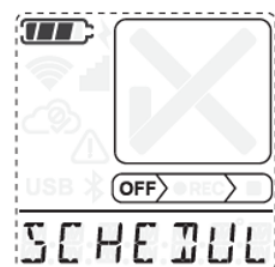


12.2 Start SmartMonitor SHIP L with scheduled start

If a scheduled start is configured a counter in days:hours:minutes (e.g., 01d14:32 = start in 1 day 14 hours and 32 sec) will be displayed on the 7-segment display.



By a short press to the multifunctional button, the information *SCHEDULED START* will show as ticker on the display with above information about the time till the device will start recording.



13 Usage Process

SmartMonitor SHIP L is mainly used for monitoring temperature sensitive products throughout the supply chain. The device has various configuration options. The device states are visualized below and described in more detail in the following chapters. The usage process may vary depending on the configuration.






13.1 Preparation

13.1.1 Battery check

Check if the internal battery is charged and has enough capacity for the shipment. A device with a fully charged battery can record with a logging interval of 10 minutes without GNSS (Global Navigation Satellite System):

- at 5 °C: > 60 days at a transfer interval of 1h
- at 20 °C: > 60 days at a transfer interval of 1h
- at -20 °C: >60 days at a transfer interval of 6h
- at -30 °C: >60 days at a transfer interval of 6h

To check the battery level, press the multifunctional button once. The battery level is displayed as follow:

-  Fully charged battery → Device can be used for shipment
-  Charged battery → Battery needs to be charged
-  Half charged battery → Battery needs to be charged
-  Low battery → Battery needs to be charged
-  Empty battery Battery needs to be charged

If nothing happens after pressing the multifunctional button, the battery needs to be charged.

If battery needs to be charged, connect it with a USB-C connector to a USB charger.

Important:

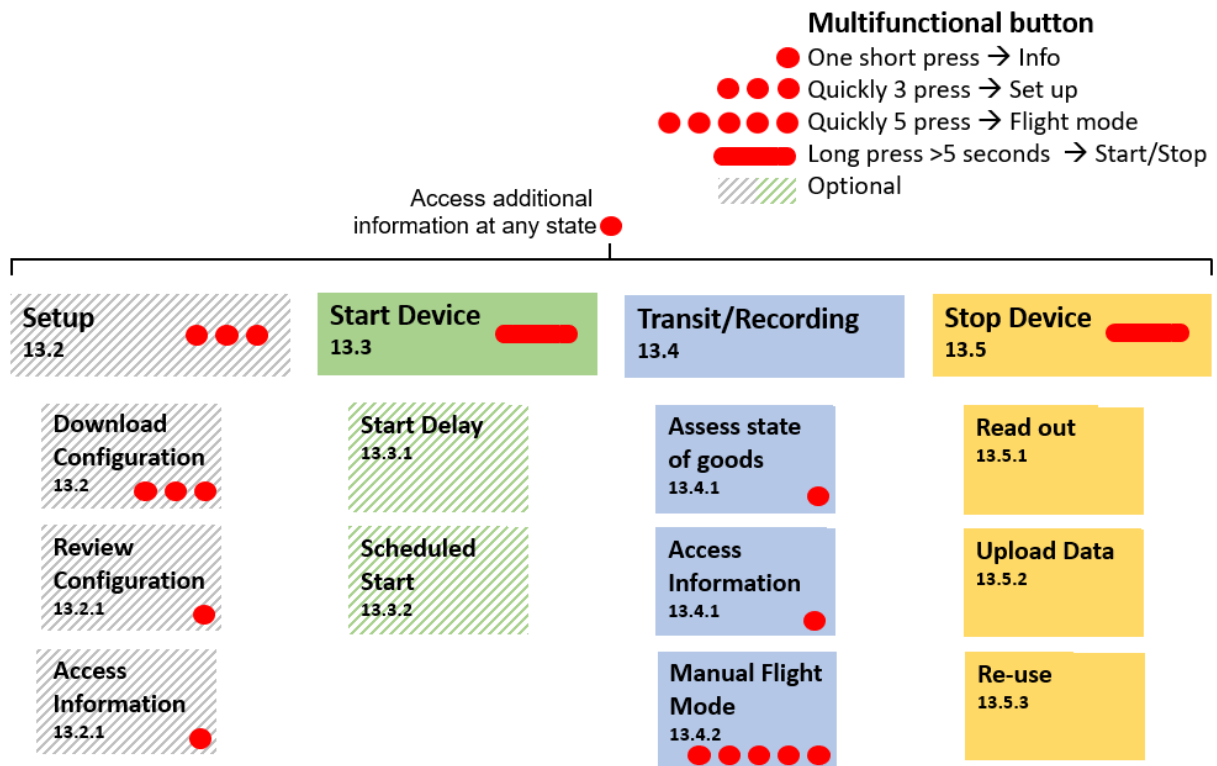
Charging the battery is only possible with a deactivated (switched off) SmartMonitor SHIP L device.

13.1.2 Display check


To check the display, press once short the multifunctional button, the display will show the status of the device. (Check also chapter Maintenance)

13.1.3 Housing check

Check if the housing is not damaged and no label is attached over the light and humidity sensor.




13.2 Setup

If no configuration is already loaded on the device, press the multifunctional button quickly 3 times .


→ The configuration will be loaded. See chapter 5 *multifunctional button*


Configuration of device can be done with Berlinger SmartView software (version 6.0 and higher).

13.2.1 Review/Check configuration

To confirm that the loaded configuration is correct, check the configuration on the display by pressing the multifunctional button once .

13.3 Start

To start the device, press the multifunctional button once (long press)  for more than 5 seconds.

After that, the device will go to record mode and the display will show  **REC** accordingly. See chapter 5 *multifunctional button*

13.3.1 Start delay

If a start delay is configured, the device waits with start recording until start delay has expired. This is indicated by a countdown in the display.

The device cannot be stopped during start delay phase. This is a safety feature to prevent the device from being stopped by mistake.

13.3.2 Scheduler Start

Device has the possibility to configure it with a scheduled start via Berlinger SmartView software (version 6.0 and higher).

13.4 Transit/Recording

As long as the device is in transit, it records the temperature (and other parameters if set) and transmits the data at a predefined interval via the cellular network to Berlinger SmartView software (version 6.0 and higher). When the device is in the aircraft (airborne), the SmartMonitor SHIP L automatically turns off the cellular transmission for safety reasons.

The display shows the current temperature and informs via the hook ✓ or cross ✗ whether the alarm parameters have been violated.

13.4.1 Assess state of goods and information


As long as the device is in Transit user has the possibility to asset state of the goods and get information on the device display by pressing the multifunctional button once ●.

13.4.2 Manual Flight Mode

As soon as the device is in Aircraft (airborne) the SmartMonitor SHIP L automatically turns off the cellular transmission for safety reasons. Customer has also the possibility to set the device manually to Flight mode (no data will be sent via cellular network after that manually action).

To set the device manually to flight mode, press the multifunctional button quickly 5 times ●●●●●.

13.5 Stop

To stop the device, the key must be pressed for at least 5 seconds (log press) . The lower part of the display shows information about how long the multifunctional button must be pressed. See chapter 5 *multifunctional button*

13.5.1 Read out

Once stopped the device at final destination automatically, it sends all measured data to Berlinger SmartView software (version 6.0 and higher).

If after a shipment an automatically upload is not possible, the two icons Bluetooth ⌘ and USB will flash. In that case read out of measured data can be done manually via USB.

- **Read out via USB:**

Connect the device to a computer, device will start immediately with downloading the data to your computer.

- **Read-out via Bluetooth:**
Read out via Bluetooth will be possible with a later version

13.5.2 Upload data manually of read out data to Berlinger SmartView

To upload the manually read out data to Berlinger SmartView software (version 6.0 and higher) you have two possibilities:

- Direct upload to Berlinger SmartView software (version 6.0 and higher):
Open Berlinger SmartView software (version 6.0 and higher), chose Device → Upload Data File → Select the datafile to upload → confirm it by pressing Upload File(s)
- Via e-mail:
Send the read out datafile via e-mail to qtag-upload@smartview.berlinger.com

13.5.3 Return device

If the transport is complete and the data are uploaded to Berlinger SmartView software (version 6.0 and higher), the device can be used for the next shipment.

Before the device will be used for the next shipment, follow the instruction at chapter Maintenance. If the unit was rented from Berlinger, return it to Berlinger in accordance with the RMA process.

14 Where to place SmartMonitor SHIP L

Berlinger recommends to place SmartMonitor SHIP L as close as possible to the product to be monitored so that the temperature can be recorded as accurately as possible.

If temperature monitoring is done with an external sensor, the external sensor should be as close as possible to the product to be monitored and the SmartMonitor SHIP L can be mounted on the outer cover.

Important:

If SmartMonitor SHIP L is mounted on the outer cover, Berlinger recommends securing the device so that it cannot be damaged.

The cable of the external sensor should be mounted in such a way that it does not interfere with the handling of the transport or can be pulled off.

15 External Temperature Sensor

Use only original Berlinger external sensors for SmartMonitor SHIP L.

Make sure that the sensor is properly connected to the device and the connector is secured (tightened by hand). Do not tighten the connector with pliers or any other tool, otherwise the connector may be damaged.

The cable must be attached to the shipment in such a way that it does not interfere with normal transport.

Berlinger offers several types of external sensor as:

1.5 Meter Temperature Sensor



1.5 Meter Temperature/Humidity Sensor



15.1 Connect an external sensor to SmartMonitor SHIP L device

To connect an external Berlinger probe to a SmartMonitor SHIP L remove the grey cover at the right site from device.



Remove the grey cover from the SHIPL device

Connector protection

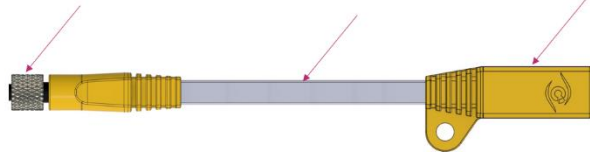


Plug in the connector by checking the mark at the connector and the plug of the SHIP L device.

Connector

1.5 Meter cable

Probe



Manually tighten the connector.

Tighten securing screw



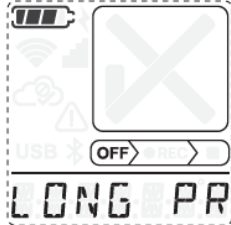
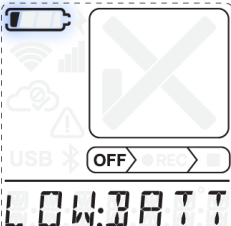

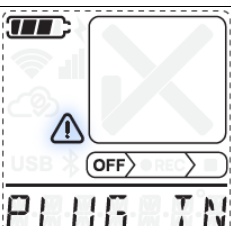
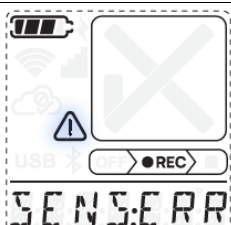
16 Connect SmartMonitor SHIP L device to SHIP S devices



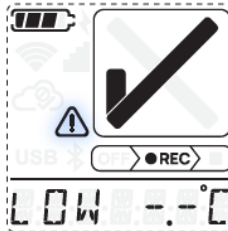
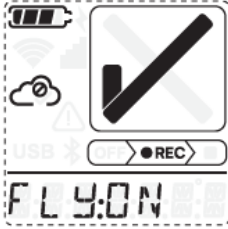
SmartMonitor SHIP L device can be used as a master device which can forward data from SmartMonitor SHIP S devices. Therefore, several SmartMonitor SHIP S can be used in one shipment.

Connection of SmartMonitor SHIP S devices must be configured in Berlinger SmartView software (version 6.0 and higher).



17 Troubleshooting

Problem	Effect	Solution
Blank display	No information visible	Connect the device to USB charger to charge the battery.
	Device cannot be started Display shows LONG PRESS	Press the multifunctional button at least 5 second.
	LOW BATTERY LOW:BATT will be shown on the 7-segment display and battery symbol is blinking	Connect the device to power to charge the battery.
	BATTERY EXPIRED BAT:EXPIRED will be shown on the 7-segment display and the battery symbol is blinking. Exclamation mark ⚠ is blinking. Use of device is no longer possible due to safety reason.	Replace device.
	PLUG IN PLUG IN will be shown on the 7-segment display and the exclamation mark ⚠ is blinking. Device is configured for an external sensor but no external sensor is detected.	Connect an external sensor or check if sensor is correctly connected.
	SENSOR ERROR SENS:ERR will be shown on the 7-segment display and the exclamation mark ⚠ is blinking. Connected sensor is defective.	Replace external sensor.

	<p>MANUAL SYNC MANUAL SYNC will be shown on the 7-segment display, the cloud symbol crossed out circle is displayed ☁️ and USB and Bluetooth sign 📶 is blinking. Configuration is needed.</p>	<p>Load configuration. Press quickly 3 times the multifunctional button Or check if a configuration is available for that device in Berlinger SmartView software (version 6.0 and higher). if no communication to SmartView Cloud is possible, configuration needs to be loaded manually</p>
	<p>Manual SYNC ⚡ Manual SYNC ⚡ will be shown on the 7-segment display as a ticker information and at the cloud symbol crossed out circle is displayed ☁️. Manual upload of data is needed.</p>	<p>Manual upload with USB or Bluetooth is needed. Upload the data manually to Berlinger SmartView software (version 6.0 and higher). Upload via Bluetooth will be available in a later version.</p>
	<p>LOW --°C LOW --°C will be shown on the 7-segment display and the exclamation mark ⚠️ is blinking.</p>	<p>The measured temperature is out of specified temperature range of SmartMonitor SHIP L device.</p>
	<p>FLY:ON Device will send no real time data and on 7-segment display shows FLY:ON</p>	<p>Flight mode is activated. To deactivate Flight mode press 5 times short the multifunctional button</p>

On the back of the device is a 3D-code which links to the Berlinger website where more information about this device is available.

If more help is needed, contact Berlinger support at support@berlinger.com.

18 Disposal

Electronic devices are recyclable and do not belong in household waste. At the end of its lifetime, dispose of the product in accordance with the law according to your country or return it to Berlinger according Berlinger RMA process.

19 Certification

SmartMonitor SHIP L device has following certifications:

- CE / RED
- RTCA DO-160
- FCC / ISED

19.1 Specific Information for North America (FCC/ISED)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s) and complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage.
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications made to this equipment not expressly approved by Berlinger & Co. AG may void the FCC authorization to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Radiofrequency radiation exposure Information:

This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas être placé au même endroit ou utilisé simultanément avec un autre transmetteur ou antenne.

20 Standards

This equipment has been tested and found to comply with the limits for:

- IEC 62368-1
- EN 12830
- GAMP5
- FDA 21 CFR Part 11