Supplementary Instruction Manual

ALMEMO® 500

USB Driver for PC
Relay Bridge for Wifi Network
Function Channel MesR

V7 Technology
English
V3.4
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2 Explanation of Symbols

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☞   Notice

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3 How to install the USB driver on the PC

⚠️ Before inserting the USB cable, run the installation program.

☞ This installation instruction applies to all Windows versions from Windows XP upwards.

How to install the USB driver before connecting the USB data cable

1. Follow the Link below
   https://www.ahlborn.com/en_UK/service/downloads/drivers
2. In the field Drivers USB data cable ZA 1919 click on DOWNLOAD.
3. Click on Driver for Windows or Driver for Linux.
➢ The file is being downloaded.
4. Unzip the downloaded folder.
5. Open the folder and click on CP210xVCPInstaller_x64.exe or CP210xVCPInstaller_x86.exe.
6. Confirm that you want to install the driver.
7. Accept the licence agreement.
8. Click on Finish.
9. Connect the datalogger and the PC by using a USB cable.

Installation after accidentally connecting the USB data cable

1. Follow the Link below
   https://www.ahlborn.com/en_UK/service/downloads/drivers
2. In the field Drivers USB data cable ZA 1919 click on DOWNLOAD.
3. Click on Driver for Windows or Driver for Linux.
➢ The file is being downloaded.
4. Unzip the downloaded folder.
5. On the PC keyboard simultaneously press the Windows key and the R key.
➢ The dialog box Run will open.
6. Enter devmgmt.msc and press Enter.
➢ The dialog box Device manager will open.

7. In the section Other devices double-click on the device entitled Silicon Labs.

8. Click on Update driver.

9. Click on Browse my computer for driver software respectively confirm that you will search the driver software by yourself. Click on Browse.

10. Click on the downloaded, unzipped folder with the driver.

11. Click on OK.

12. Click on Next.

➢ The driver will be installed.

13. Connect the datalogger and the PC by using a USB cable.

How to read the Number of the COM port

1. On your PC keyboard, press the Windows key and the R key.

➢ The dialog box Run will open.

2. Enter devmgmt.msc and press Enter.

➢ The dialog box Device Manager will open.

3. Click on the arrow next to Connections (COM&LPT).

4. Note the COM port number next to Silicon Labs.

4 How to establish a connection to a WiFi network as relay bridge

4.1 How to reset the access point to its factory setting

! No Ethernet cable shall be connected to the data logger.

1. Switch the data logger on and wait until the device is ready for operation.

☞ See Instruction Manual ALMEMO® 500.

2. Press a navigation key until the menu "1) Network Conf." is displayed on the status display.
3. Press and hold the right one of the navigation keys.

➢ The menu "WLAN Module" will open.

4. Press the left one of the navigation keys to confirm with "YES".

➢ The access point will be reset.

☞ The reset process may take several minutes

➢ The status display of the data logger will show the message "Press any key".

5. Switch the data logger off and then on again in order to reboot it.

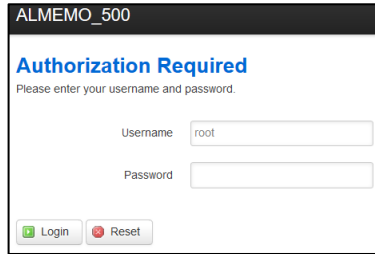## 4.2 How to configure the access point

4.2.1 Open the configuration page

! The data logger must be connected to the PC via Ethernet.

1. Open an Internet browser.
2. Enter the IP address of the access point of the ALMEMO® 500 (set by the factory to **192.168.1.1**) into the address line of the Internet browser.

3. Tap on ENTER.

➢ The Login screen of the access point will open.

4. Enter the user name (set by the factory to **root**) in the field next to

Username.

5. Enter the password (set by the factory to **Ahlborn2016**) in the field next to

Password.

6. Click on the `🔲 Login` button.

➢ The configuration page of the access point will open.

4.2.2 Check the OPKG setting

1. Click on System.
2. Click on Software.
3. Click on the tab Configuration.
4. Check whether the paths in section OPKG-Configuration contain the following paths:

OPKG-Configuration

General options for opkg

| Actions | Configuration |

```
dest root /
dest ram /tmp
lists_dir ext /var/opkg-lists
option overlay_root /overlay
src/gz barrier_breaker_base http://dhcom.lan/web/packages/base
src/gz barrier_breaker_luci http://dhcom.lan/web/packages/luci
src/gz chaos_calmer_base http://dhcom.lan/web/packages/base
src/gz chaos_calmer_luci http://dhcom.lan/web/packages/luci
```

5. Correct the paths if necessary.
6. Click on Submit.

4.2.3 Set the distribution feeds

1. Click on System.
2. Click on Software.
3. Click on the tab Configuration.
4. Scroll down to the section Distribution feeds.

➢ The following distribution feeds will be listed:

Distribution feeds

Build/distribution specific feed definitions. This file will NOT be preserved in any sysupgrade.

```
src/gz chaos_calmer_base http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/base
src/gz chaos_calmer_luci http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/luci
# src/gz chaos_calmer_packages http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/packages
# src/gz chaos_calmer_routing http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/routing
# src/gz chaos_calmer_telephony http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/telephony
# src/gz chaos_calmer_management http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/management
```

5. Delete the first two rows.

➢ The following distribution feeds shall be displayed:

Distribution feeds

Build/distribution specific feed definitions. This file will NOT be preserved in any sysupgrade.

```
# src/gz chaos_calmer_packages http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/packages
# src/gz chaos_calmer_routing http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/routing
# src/gz chaos_calmer_telephony http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/telephony
# src/gz chaos_calmer_management http://downloads.openwrt.org/chaos_calmer/15.05.1/ar71xx/generic/packages/management
```

6. Click on Submit .

4.2.4 Install required supplementary programs

1. Click on System.
2. Click on Software.
3. Click on the tab Actions.
4. Click on Update lists .

5. In the field Download and install packages, enter the text relayd.

6. Click on OK .

➢ The supplementary program "relayd" has already been installed if the
   following message appears:

```
Package relayd (2015-03-13-2970ff60bac6b70ecb682779d5c776dc559dc0b9) installed in root is up to
date.
```

➢ The supplementary program "relayd" is being installed if the following
   message appears:

```
Installing relayd (2015-03-13-2970ff60bac6b70ecb682779d5c776dc559dc0b9) to root...
Downloading http://dhcom.lan/web/packages/base/relayd_2015-03-13-
2970ff60bac6b70ecb682779d5c776dc559dc0b9_ar71xx.ipk.
Configuring relayd.
```

7. In the field Download and install package, enter the text luci-proto-relay.

8. Click on OK .

➢ The supplementary program "luci-proto-relay" has already been installed if
   the following message appears::

```
Package luci-proto-relay (git-15.248.30277-3836b45-1) installed in root is up to date.
```

➢ The supplementary program "luci-proto-relay" is being installed if the
   following message appears:

```
Installing luci-proto-relay (git-15.248.30277-3836b45-1) to root...
Downloading http://dhcom.lan/web/packages/luci/luci-proto-relay_git-15.248.30277-3836b45-1_all.ipk.
Configuring luci-proto-relay.
```

4.2.5 Choose WiFi network and connect

1. Click on Network.
2. Click on Wifi.
3. Click on Scan .
➢ All available WiFi networks will be displayed.
4. Next to the desired WiFi network, click on Join Network .

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5. Enter the password of the WiFi network in the field next to WPA
passphrase.

6. In the section Create / Assign firewall-zone, click on LAN.

7. Click on Submit .

8. Click on Network.

9. Click on Interfaces.

➢ In the section Interface Overview, the LAN und WWAN will be displayed in
   green.

Interfaces

Interface Overview

Network	Status	Actions			
LAN br-lan	Uptime: 0h 12m 46s MAC-Address: 00:1F:7D:F0:7C:F1 RX: 629.38 KB (3923 Pkts.) TX: 1.21 MB (3921 Pkts.) IPv4: 192.168.1.1/24 IPv6: fdba:58e6:297d::1/60	Connect	Stop	Edit	Delete
WWAN Client "dev-net"	Uptime: 0h 0m 0s MAC-Address: 00:1F:7D:B0:7C:F1 RX: 0.00 B (0 Pkts.) TX: 36.79 KB (312 Pkts.)	Connect	Stop	Edit	Delete
WAN eth0.2	Uptime: 0h 0m 0s MAC-Address: 00:1F:7D:F0:7C:F1 RX: 0.00 B (0 Pkts.) TX: 87.61 KB (261 Pkts.)	Connect	Stop	Edit	Delete
WAN6 @wan	MAC-Address: 00:00:00:00:00:00 RX: 0.00 B (0 Pkts.) TX: 0.00 B (0 Pkts.)	Connect	Stop	Edit	Delete

10. Click on Save & Apply .

4.2.6 Generate an Interface BRIDGE

1. Click on Network.

2. Click on Interfaces.

3. Click on Add new interface... .

4. In the field next to Name of the new interface , enter the text BRIDGE.

5. In the field next to Protocol of the new interface, choose Relay bridge.

6. Click on Submit .

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7. In the tab General Setup next to Relay between networks tick the boxes next to LAN and WWAN.

8. Click on   Save & Apply .

➢ The changes will be saved and the Interface Bridge will be displayed in the Interface Overview.

Interfaces

Interface Overview

Network	Status	Actions			
BRIDGE Relay "BRIDGE"	**Uptime:** 0h 35m 39s **RX**: 1.73 MB (8041 Pkts.) **TX**: 1.89 MB (7047 Pkts.)	Connect	Stop	Edit	Delete
LAN br-lan	**Uptime:** 0h 35m 39s **MAC-Address:** 00:1F:7D:F0:7F:FD **RX**: 1.37 MB (6790 Pkts.) **TX**: 1.75 MB (5617 Pkts.) **IPv4:** 192.168.1.1/24 **IPv6:** fdba:58e6:297d::1/60	Connect	Stop	Edit	Delete
WWAN Client "dev-net"	**Uptime:** 0h 22m 41s **MAC-Address:** 00:1F:7D:B0:7F:FD **RX**: 362.73 KB (1251 Pkts.) **TX**: 133.03 KB (1430 Pkts.) **IPv4:** 192.168.7.66/24	Connect	Stop	Edit	Delete
WAN eth0.2	**Uptime:** 0h 0m 0s **MAC-Address:** 00:1F:7D:F0:7F:FD **RX**: 0.00 B (0 Pkts.) **TX**: 243.22 KB (716 Pkts.)	Connect	Stop	Edit	Delete
WAN6 @wan	**MAC-Address:** 00:00:00:00:00:00 **RX**: 0.00 B (0 Pkts.) **TX**: 0.00 B (0 Pkts.)	Connect	Stop	Edit	Delete

9. In the line BRIDGE, cklick on   Edit .

10. Click on the tab Firewall Settings.

11. In the section Create / Assign firewall-zone, click on LAN.

12. Click on   Save & Apply .

➢ The changes will be saved and the Interface BRIDGE will be displayed in green in the Interface Overview.

Interfaces

Interface Overview

Network	Status	Actions
BRIDGE 📷 (🖧 🌐) Relay "BRIDGE"	**Uptime:** 0h 23m 23s **RX:** 1.25 MB (8359 Pkts.) **TX:** 3.86 MB (8538 Pkts.)	🔁 Connect ⛔ Stop 📝 Edit ❎ Delete
LAN 🖧 (🖧) br-lan	**Uptime:** 0h 23m 23s **MAC-Address:** 00:1F:7D:F0:7F:E2 **RX:** 1.19 MB (8142 Pkts.) **TX:** 3.81 MB (8132 Pkts.) **IPv4:** 192.168.1.1/24 **IPv6:** fdba:58e6:297d::1/60	🔁 Connect ⛔ Stop 📝 Edit ❎ Delete
WWAN 📶 Client "dev-net"	**Uptime:** 0h 2m 45s **MAC-Address:** 00:1F:7D:B0:7F:E2 **RX:** 55.27 KB (217 Pkts.) **TX:** 48.68 KB (406 Pkts.) **IPv4:** 192.168.7.55/24	🔁 Connect ⛔ Stop 📝 Edit ❎ Delete
WAN 🖧 eth0.2	**Uptime:** 0h 0m 0s **MAC-Address:** 00:1F:7D:F0:7F:E2 **RX:** 0.00 B (0 Pkts.) **TX:** 159.43 KB (471 Pkts.)	🔁 Connect ⛔ Stop 📝 Edit ❎ Delete
WAN6 🖧 @wan	**MAC-Address:** 00:00:00:00:00:00 **RX:** 0.00 B (0 Pkts.) **TX:** 0.00 B (0 Pkts.)	🔁 Connect ⛔ Stop 📝 Edit ❎ Delete

4.2.7 Set the WWAN firewall

1. Click on Network.
2. Click on Interfaces.
3. In the line WWAN, click on 📝 Edit.
4. Click on the tab Firewall Settings.
5. In the section Create / Assign firewall-zone, click on LAN.
6. Click on Save & Apply.

4.2.8 Restart the data logger

1. Switch the data logger off.
2. Switch the data logger on and wait until the device is ready for operation.

☞ See Instruction Manual ALMEMO® 500.

➢ In the menu "1) Network Conf.", the status display lists an IP address that has been assigned by the DHCP server of the chosen WiFi network.

4.2.9 Deactivate the DHCP server
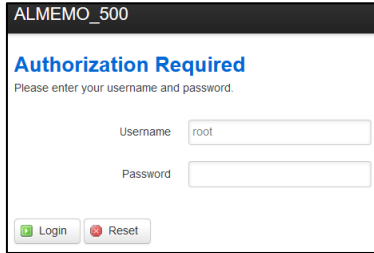
1. Enter the IP address of the access point of the data logger into the address line of the Internet browser.

☞ Refer to your system administrator for the IP address of the access point. The IP address is assigned by the DHPC server of the WiFi network the data logger is connected to.

2. Tap on ENTER.

➢ The Login screen of the access point will open.

3. Enter the user name (set by the factory to **root**) in the field next to
Username.

4. Enter the password (set by the factory to **Ahlborn2016**) in the field next to
Password.

5. Click on `🔲 Login`.

➢ The configuration site of the access point will open.

6. Click on Network.

7. Click on Interfaces.

8. In the line LAN, click on `✏️ Edit`.

9. Scroll down to the section DHCP server.

10. In the tab General Setup, tick the check box next to Disable DHCP for this
interface.

11. Click on `Save & Apply`.

➢ The DHCP server of the access point of the ALMEMO® 500 will no longer assign IP addresses.

12. In the line LAN, click on `✏️ Edit`.

13. In the tab General Setup next to Protocol, select the protocol DHCP Client.

14. Click on `🔲 Switch protocol`.

15. Click on `Save & Apply`.

4.3 Information regarding the subsequent login to the app

☞ The tablet must be connected to the same WiFi network the data logger is connected to.

☞ The data logger will now receive an IP address from the DHCP server of the connected network. Note down the IP address from the status display and enter the IP address - after starting the app – in the network settings in the field IP address (see Instruction Manual ALMEMO® 500).

5 How to activate a function channel MesR

5.1 Information regarding the function channel MesR

5.1.1 Usage of the function channel MesR

☞ Thanks to the function channel MesR it is possible to use the measured value of a measuring channel that is marked with the function abbreviation *R in its channel designation throughout all measuring circuit boards. It is also possible to use measured values of different measuring circuit boards in one arithmetic channel.

☞ The function channel MesR can only be configured in a V5 or V6 plug.

☞ Arithmetic channels that shall use the measured values of the function channel MesR can only be configured in a V5 or V6 plug.

☞ The function channel MesR and the measuring channel marked with the channel abbreviation *R must not be located on the same measuring circuit board.

☞ The sensor, in which the function channel MesR is set, must be on a measuring circuit board featuring a higher measuring circuit board address than the sensors, to which the function abbreviation *R has be designated.

☞ Do not reconnect the sensors after you have assigned the function abbreviation *R and configured the function channel MesR.

5.1.2 Example regarding relative humidity in a climatic chamber

☞ In the present Supplementary Instruction Manual, the following example will be described:

The relative humidity shall be calculated by the arithmetic channel tdUw.

To do so, the dew point from a measuring channel featuring the range td will be used. The function abbreviation *R will be assigned to

this measuring channel.

The arithmetic channel tdUw will be adjusted on a measuring circuit board featuring a higher measuring circuit board address.

The arithmetic channel tdUw receives the measured data from the function channel MesR. The function channel MesR receives the measured data from the measuring channel featuring the function abbreviation *R.

5.1.3 The update rate of the function channel MesR

The measured value of the function channel MesR is updated approximately every two seconds. The update rate depends on the number of active measuring channels and on the storage cycle (scanning cycle respectively output cycle).

5.2 How to assign the function abbreviation *R

! You must be logged into the app.

! The current measurement must be stopped.

☞ See Instruction Manual ALMEMO® 500.

1. Connect the sensor, in which you want to assign the function abbreviation *R to a measuring circuit board with a lower measuring circuit board address than the sensor you want to use for establishing the function channel MesR.

2. In the home screen of the app, tap on the button ✖.

3. Tap on the arrow **>** next to Device lists.

4. Tap on the arrow **>** next to measuring circuit board connected to the sensor, in which you want to assign the function abbreviation *R.

☞ Assign the function abbreviation *R to a measuring channel, whose measured value shall be used by an arithmetic channel on another measuring circuit board.

In the example presented here, the dew point (td) shall be provided.

5. Tap on the arrow **>** next to Sensor overview ✎.

➢ All sensors connected to the measurement circuit board will be displayed.

6. Tap on the arrow **>** next to the sensor in which you want to assign the function abbreviation *R.

7. Tap on the arrow **>** next to Sensor channels.

8. Tap on the arrow **>** next to the measuring channel to which you want to assign the function abbreviation *R.

9. Tap on the arrow **>** next to Range selection.

10. Untick the checkbox next to Locking level 1.

11. Tap on the field next to Range.

12. Tap on the desired measuring range.

☞ In the example presented here, td respectively DT,td °C shall be selected.

➢ The measuring channel now has the correct measuring range.

13. Tap on the button Back once.

14. Tap on the arrow **>** next to Channel designation, function abbreviation.

15. Tap on the button ⬤ next to Provide measured value as global operand (*R).

➢ The function abbreviation *R will be registered in the channel designation. The measured value will be provided as global operand.

5.3 How to set up the function channel MesR

☞ The function channel is used to acquire operands from other measuring circuit boards. The function channel must be set up in a sensor with a V5 or a V6 plug that is connected to the measuring circuit board, to which the sensor with the arithmetic channel is connected.

1. In the home of the app, tap on the button ✕.

2. Tap on the arrow **>** next to Device list.

3. Tap on the arrow **>** next to the measuring circuit board, to which the sensor you want to use to set up the function channel MesR is connected.

4. Tap on the arrow **>** next to Sensor overview .

➢ All sensors connected to this measuring circuit board will be displayed.

5. Tap on the arrow **>** next to the sensor in which you want to set up the function channel MesR.

6. Tap on the arrow **>** next to Sensor channels.

7. Tick the checkbox next to the measuring channel, in which you want to set up a function channel MesR.

8. Tap on the arrow **>** next to Range selection.

9. Untick the checkbox next to Locking level 1.

10. Tap on the field next to Range.

11. Tap on the measuring range MesR.

➢ The function channel MesR has now been set up.

12. Tap on the field next to Dimension.

13. Enter the dimension of the measured values you receive via the function channel MesR.

☞ In the example presented here, °C shall be entered.

➢ The measuring channel is now provided with a dimension.

☞ The measured values used by the function channel MesR are acquired from the measuring channel with the function abbreviation *R.

In case several measuring channels within one measuring device have received the function abbreviation *R, it will always be the measured value received from the measuring channel with the function abbreviation *R with the next lower channel number that will be used.

5.4 How to scale the measured value

☞ The measured value is transmitted from the function channel as a plain numeric value without decimal point. The correct point position is set in the function channel MesR with the exponent.

☞ To identify the scaling necessary, compare the displayed measured value received from the measuring channel with the function abbreviation *R with the one received from the function channel MesR.

Using the exponent, the point can be shifted to the left (-1, -2, -3…) or to the right (+1, +2, +3…).

1. Follow the steps 1 to 6 in chapter 5.3.
2. Tap on the arrow **>** next to the function channel MesR.
3. Tap on the arrow **>** next to Scaling values.
4. Tap on the field next to Exponent.
5. Enter the desired exponent.

☞ By modifying the exponent, the point can be shifted to the left (using a negative number) or to the right (using a positive number).

5.5 Use of the function channel MesR as a reference channel to an arithmetic channel

☞ The sensor, in which an arithmetic channel shall be set up and that shall use the measured values of the function channel MesR must have a V5 or a V6 plug.

1. In the home screen of the app, tap on the button .
2. Tap on the arrow **>** next to Device list.
3. Tap on the arrow **>** next to the measuring circuit board, to which the sensor, in which you want to establish an arithmetic channel, is connected.
4. Tap on the arrow **>** next to Sensor overview .

➢ All sensors connected to the measuring circuit board will be displayed.

5. Tap on the arrow **>** next to the sensor, in which you want to establish an arithmetic channel.

6. Tap on the arrow **>** next to Sensor channels.

7. Tap on the arrow **>** next to the measuring channel that you want to set as an arithmetic channel.

8. Tap on the arrow **>** next to Range selection.

9. Untick the checkbox next to Locking level 1.

10. Tap on the field next to Range.

11. Tap on the desired range of calculation.

☞ In the example presented here, tdUw shall be selected.

12. Tap on the field next to Reference channel 1.

13. Tap on the desired reference channel.

☞ In the example presented here, the channel, in which the temperature is measured in °C, shall be set as reference channel 1.

14. Tap on the field next to Reference channel 2

15. Tap on the desired reference channel.

☞ In the example presented here, the function channel MesR shall be set as reference channel 2.

➢   The arithmetic channel uses the reference channel to generate a measured value.

☞ In the example presented here, the arithmetic channel tdUw generates a humidity value by using the temperature and the dew point.

Notes

Notes

Despite greatest diligence, the possibility of
incorrect information cannot be excluded.
Subject to technical modifications without prior notice.

You will find the present and further Instruction Manuals, as well as the ALMEMO® Manual on **www.ahlborn.com** under the tab SERVICE on DOWNLOADS.

PLEASE KEEP THIS INSTRUCTION MANUL FOR
FURTHER REFERENCE