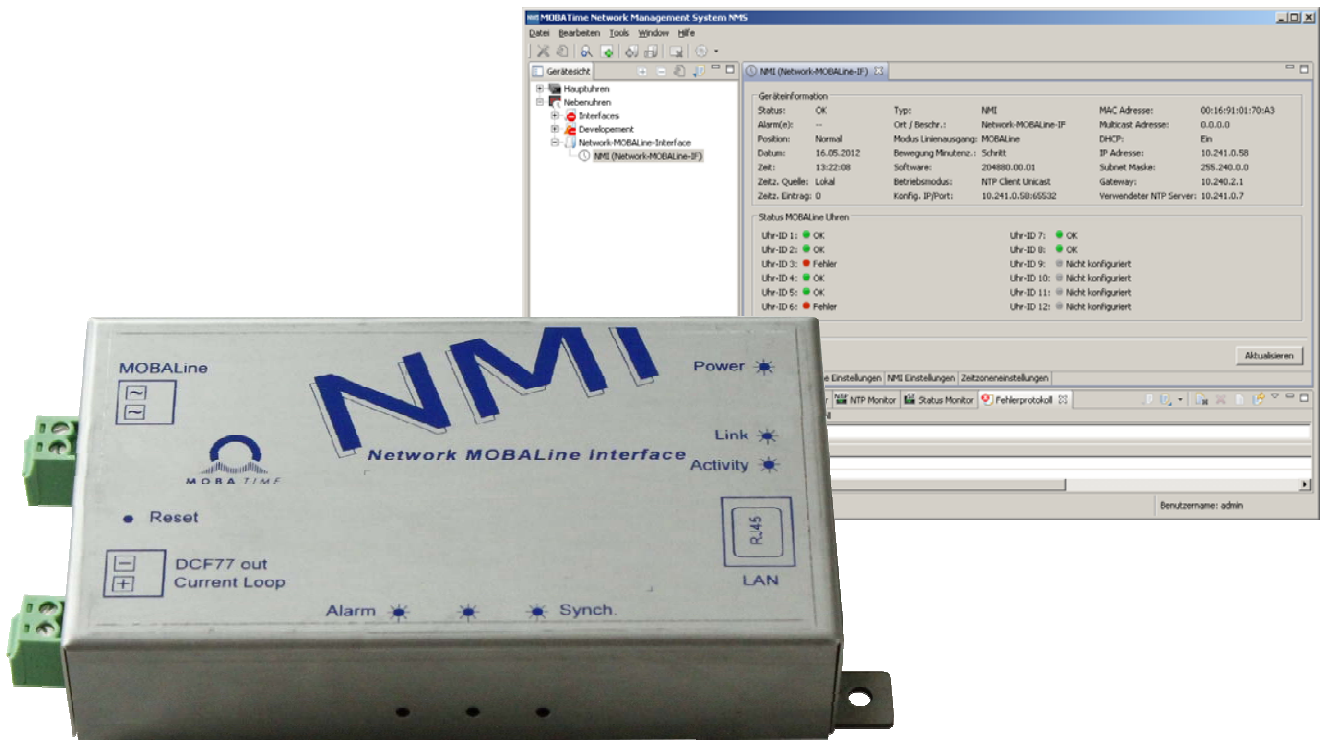# MOUNTING AND INSTRUCTION MANUAL

NMI – Network MOBALine Interface

Please study these instructions prior to installation.

Certification of the Producer

STANDARDS

$C\,E$

The Network MOBALine Interface NMI was developed and produced in accordance with the EU guidelines:

  2004 / 108 / EG
  96 / 48 / EG

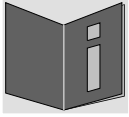**References to the Instruction Manual**

1. The information in this Instruction Manual can be changed at any time without notice.
   The current version is available for download on www.mobatime.com.
2. This Instruction Manual has been composed with the utmost care, in order to explain all details in respect of the operation of the product. Should you, nevertheless, have questions or discover errors in this Manual, please contact us.
3. We do not answer for direct or indirect damages, which could occur, when using this Manual.
4. Please read the instructions carefully and only start setting-up the product, after you have correctly understood all the information for the installation and operation.
5. The installation must only be carried out by skilled staff.
6. It is prohibited to reproduce, to store in a computer system or to transfer this publication in a way or another, even part of it. The copyright remains with all the rights with BÜRK MOBATIME GmbH, D-78026 VS-Schwenningen and MOSER-BAER AG – CH 3454 Sumiswald / SWITZERLAND.

Table of contents

1   Safety

1.1   Safety instructions

Read this chapter and the entire instruction manual carefully and follow all instructions listed. This is your assurance for dependable operations and a long life of the device. Keep this instruction manual in a safe place to have it handy every time you need it.

1.2   Symbols and signal words used in this instruction manual

⚡	**Danger!** Please observe this safety message to avoid electrical shock! There is danger to life!
⚠	**Warning!** Please observe this safety message to avoid bodily harm and injuries!
⚠	**Caution!** Please observe this safety message to avoid damages to property and devices!
ℹ	**Notice!** Additional information for the use of the device.

1.3   Intended use

The **Network MOBALine Interface** is a device which serves as an interface between NTP (Ethernet) and MOBALine. The interface receives the current time information from NTP and provides it to terminal devices using MOBALine.

A detailed function description can be found in chapter 3.3 Function description.

The technical data can be found in chapter 12 Technical data.

1.4   Observe operating safety!

Caution!

- Never open the housing of the device! This could cause an electric short or even a fire, which would damage your device. Do not modify your device!

- The device is not intended for use by persons (including children) with limited physical, sensory, or mental capacities or a lack of experience and/or knowledge.

- Keep packaging such as plastic films away from children. There is the risk of suffocation if misused.

1.5   Consider the installation site!

Caution!

- To avoid any operating problems, keep the device away from moisture and avoid dust, heat, and direct sunlight. Do not use the device outdoors.

- The device is designed for 19" racks and should only be operated installed in a 19" cabinet.

Danger! Make sure
that you wait before using the device after any transport until the device has reached the ambient air temperature. Great fluctuations in temperature or humidity may lead to moisture within the device caused by condensation, which can cause a short.

1.6   Please observe the electromagnetic compatibility!

Caution!

This device complies with the requirements of the EMC directives 2004/108/EC and 96/48/EC

2   Maintenance

2.1   Troubleshooting: Repairs

If you cannot rectify the problems, contact your supplier from whom you have purchased the device.

Any repairs must be carried out at the manufacturer's plant.

Disconnect the power supply immediately and contact your supplier, if …

- liquid has entered your device
- the device does not properly work and you cannot rectify this problem yourself.

2.2   Cleaning

- Please make sure that the device remains clean especially in the area of the connections, the control elements, and the display elements.
- Clean your device with a damp cloth only.
- Do not use solvents, caustic, or gaseous cleaning substances.

2.3   Disposing

Device
At the end of its lifecycle, do not dispose of your device in the regular household rubbish. Return your device to your supplier who will dispose of it correctly.

Packaging
Your device is packaged to protect it from damages during transport.
Packaging is made of materials that can be disposed of in an environmentally friendly manner and properly recycled.

3 General information – Introduction

3.1 Scope of delivery

Please check your delivery for completeness and notify your supplier within 14 days upon receipt of the shipment, if it is incomplete.

The package you received contains:

- 1 x NMI – Network MOBALine Interface
- 2 x 2-pole plug

3.2 Device description in this manual

This instruction manual is for the **Network MOBALine Interface.** Below, it will be referred to as **NMI** or **interface** for improved readability.

3.3 Function description

The NMI is a device which works as an interface between NTP (Ethernet) and MOBALine. For this purpose, the NMI evaluates NTP packages and generates a MOBALine signal for up to 12 slave clocks out of the received time information.

The NMI does not possess a configuration switch. The configuration takes place exclusively over MOBA-NMS (not included in delivery) or alternatively via SNMP or using DHCP parameters.

Using the NMI, MOBALine slave clocks (TREND only) can be completely monitored for the first time. The TREND clocks can report their correct functionality back to the NMI. The state of monitored clocks can be checked with MOBA-NMS.

The power supply is carried out via PoE (Power over Ethernet). The NMI reports to the switch as a class 2 device.

In addition, the NMI possesses a passive current loop interface. This can be used for synchronizing a slave clock (e.g. ETC) using NTP.

4 Configuration, displays and connections

4.1 Configuration

The NMI can be fully controlled and configured with MOBA-NMS. In addition, it is possible to give out parameters through DHCP or SNMP.

More detailed information about the configuration with MOBA-NMS, DHCP and SNMP can be found in the document BE-800793.

4.2 Reset push-button

The NMI possesses a reset push-button between the two 2-pole clamps. To restart the NMI (software reset), the push-button must be pressed for at least 4 seconds.

If the push-button is pressed for more than 20 seconds, the factory settings are loaded (see chapter 9 Factory settings).

4.3 Connections and displays

The interface features the following connections and displays:
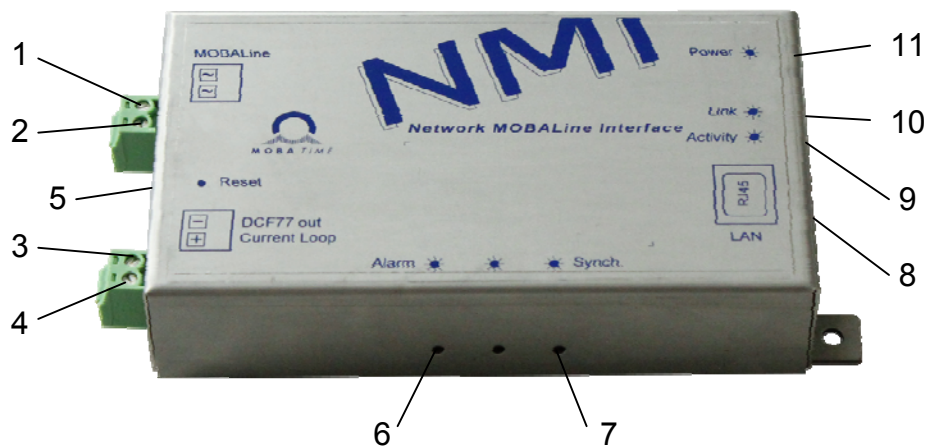
No.	Group	Meaning and function
1	MOBALine out	MOBALine output signal, connection b
2		MOBALine output signal, connection a
3	DCF77 out current loop	negative connection (- DCF out)
4		positive connection (+ DCF out)
5	Reset push-button	pressed for > 4 seconds, device restarts pressed for > 20 seconds, device resets to factory settings
6	Alarm LED (red)	ON: at least 1 alarm active
7	Synch. LED (green)	ON: NTP synchronization OK
8	LAN socket (RJ45)	Ethernet connection
9	LAN activity LED (yellow)	blinks: active network traffic
10	LAN link LED (green)	ON: Ethernet link OK
11	Power LED (green)	ON: PoE supply OK

For time synchronization, two operation modes are available, unicast or multicast.

4.4.1 Unicast

The interface is synchronized from an NTP server to UTC (coordinated world time).

This operation mode supports the monitoring and configuration of the NMI via the network connection. The configuration can take place automatically through a DHCP server or manually using the software MOBA-NMS.

For monitoring and configuration with MOBA-NMS, one of the group addresses (multicast IP) 239.192.54.0 or 239.251.34.0 for IPv4 resp. FF38::EFC0:3600 or FF38::EFFB:2200 for IPv6 or the IP address is used.

In this operation mode, the interface will try to obtain the following network parameters from a DHCP server (see also chapter 7.2):

- IP address
- gateway address
- subnet mask
- NTP server address(es) / time zone server address
- SNMP manager address

In this operating mode, the clock will try to obtain the following network parameters in an IPv6 network from a DHCPv6 server (see also chapter 7.4):

- IP address
- NTP server address(es) / time zone server address
- SNMP manager address

The NTP server addresses must be configured as a DHCP option by the network administrator. If an address is sent to the NMI, the latter will request NTP and time zone packages from the former. The request interval can be configured using the software MOBA-NMS.

4.4.2 Multicast

The interface is synchronized to UTC (coordinated world time) by an NTP server. The configuration can only be carried out using the software MOBA-NMS.

For monitoring and configuration with MOBA-NMS, one of the multicast group addresses (multicast IP) is used. The group address is an IP address in the multicast range (224.0.0.0 to 239.255.255.255), addresses selected by Moser-Baer AG from a freely available range:
-IPv4:239.192.54.x and 239.251.34.x, whereat x = 1..15
With IPv6, the ranges mentioned above are implemented as follows:
-IPv6:FF3y::EFC0:360x and FF3y::EFFB:220x, whereat x = 0x1..0xF and y=scope

E.g.:   239.192.54.5 → FF38::EFC0:3605 or 239.251.34.10 → FF38::EFFB:220A
        For scope, the following values are possible: 2 = Link Local Scope
                                                       5 = Site Local Scope
                                                       8 = Organization Local Scope
                                                       14 = Global Scope

Contrary to unicast mode, the interface receives multicast addressed NTP and time zone packages from an NTP server on a fixed group address (multicast IP). The standard port numbers are 123 (NTP) and 65534 (time zone). The operation mode multicast poses the smallest configuration effort for a network administrator.

4.5   Time signal outputs

The NMI is equipped with two time signal outputs: MOBALine and DCF current loop.

4.5.1 MOBALine

B A

- frequency modulated MOBALine time signal for self-setting slave clocks. (TREND, SEM40/SAM40, SAM 00)
- output format: local time
- electrical properties: 20V / 50Hz

4.5.2 DCF 77 current loop

- +

- synthetic DCF time signal for synchronizing sub-master clocks (e.g. ETC).
- output format: local time
- electrical properties: passive current loop output
                                        opto-coupler:
                                        U_{max}=30V, I_{on}=10..15mA, I_{off}=2mA @ 20V.

5   Monitoring TREND clocks

Using an NMI and MOBA-NMS, up to **max. 12 TREND** clocks can be monitored. Detailed instructions for configuration and monitoring can be found in the TREND clock manual (BE-800913).

6   Mounting and commissioning

In order to mount the NMI and to launch it for the first time, the following process can be used:

1. Mount NMI to desired spot
2. Connect Ethernet cable with PoE supply
3. Configure using MOBA-NMS
4. Connect MOBALine slave clocks to line input
5. Alternatively, connect DCF current loop, if a sub-master clock shall be synchronized
6. If desired, configure TREND clocks for monitoring (see chapter 5)
7. After a short period of time, the alarm LED (red) should go out and the sync LED (green) should light up

Notice: The NMI must be synchronized before TREND clocks can be configured!

7   Operating behavior

7.1   Power supply

The NMI can be supplied by PoE (Power over Ethernet) from a switch. The PoE performance class is class 2.
As an alternative to the PoE switch, a PoE injector or midspan can be used.
The two PoE supply variants, phantom power and spare-pair power, are supported.

7.2   DHCP

In the operation mode unicast, the NMI tries to obtain the network configuration from a DHCP server in the network. The DHCP options are automatically evaluated.

The precise description can be found in the manual BE-800793 Description MOBA-Time network clocks.

It is the task of the network administrator to configure the DHCP options accordingly.

7.3   IPv6

IPv6 allows for up to 4 parallel IP addresses, prioritized in decreasing order:
-address given by DHCPv6
-fix address
-address calculated with auto-config (SLAAC / RA)
-link local address

It is possible to deactivate DHCPv6 and / or auto-configuration.

Calculation of the link local address from the MAC address:
fe80::2[2nd part MAC]:[3rd part MAC]ff:fe[4th part MAC]:[5th part MAC][6th part MAC]

Example: MAC: 00:16:91:12:34:56

IPV6: fe80::216:91ff:fe12:3456

7.4   DHCPv6

In the unicast operating mode, the NPR tries to get the network configuration from a DHCPv6 server in the IPv6 network. The DHCP options are automatically evaluated.

A detailed description can be found in the manual BE-800793 Description MOBATIME network clocks.

The network administrator is responsible for configuring the DHCP options accordingly.

7.5   Autokonfiguration / SLAAC

In the unicast operating mode, the NPR tries to calculate the network configuration from the information of a router (RA) in the IPv6 network: IPv6 address.
A detailed description can be found in the manual BE-800793 Description MOBATIME network clocks.

7.6   SNMP

For the integration into a monitoring system, the NMI supports SNMP notifications (traps) (SNMP version 2c). As an SNMP agent, the NMI can send alarm and alive traps to an SNMP manager in the network (e.g. network management tool HP OpenView or similar). For this purpose, the IP address of the SNMP manager must be configured (with DHCP or PC tool MOBA-NMS). The trap structures are defined in an MIB file (for details, see document BE-800793). Alarm traps are used to inform the SNMP manager about errors. Alive traps are sent periodically and signal the availability and the status of the device to the SNMP managers. The interval of the alive traps can be set with the PC tool MOBA-NMS.

7.7   Local time calculation

The NMI is synchronized to UTC (coordinated world time). In order to calculate and display the local time, the NMI requires additional information in the shape of a time zone entry. The NMI can save 1 time zone entry which can be edited over the network using the PC tool MOBA-NMS.

The local time setting can only be configured using MOBA-NMS.

Alternatively, the calculation of the local time based on the time zone entry of a time zone server is supported. In the unicast mode, it requests the entry from the configured NTP server. In the multicast mode, it receives the corresponding entry on the config-ured group address.

7.8   Accuracy / Loss of synchronization

The deviation in the synchronized state is usually smaller +/-50 ms.

The NMI signals a loss of synchronization after 24 hours through putting out the 12 o'clock command. The deviation after 24 h without synchronization is typically smaller +/-2 s (quartz accuracy: 20 ppm at room temperature).

Notice: The mentioned deviations depend on the accuracy and performance of the time source (NTP server). The NTP reception can be influenced by the network load and devices (hub, switch, router, firewall, etc.).

7.9   Redundant time source

The availability of NTP servers as time source can be improved through a redundant operation in the network. Depending on the operation mode of the NMI, the following strategy is provided (also works for time zone servers):

7.9.1 NTP client unicast

As a DHCP option or through manual configuration (MOBA-NMS), up to four different NTP server addresses can be announced to the interface. If three time requests in a row are not answered by the current server, the interface switches to the next server (if available). The duration until the change is dictated by the set request interval (default: 3 x 10 seconds). After a restart of the interface, the request begins at the first server.

7.9.2 NTP client multicast

Two servers which send NTP packages from the same group address (multicast IP) are to be installed. The sending intervals of the two servers have to be set so that the primary server is the synchronization source in normal operation. The synchronization

from the secondary server only occurs if the primary server shows an error. The ratio of the number of sent packages between primary and secondary server should be at least 4:1:

- sending interval primary server: 1 package / 1 minute
- sending interval secondary server: 1 package / 4 minutes

The choice of server thus depends on the dominance of the server which sends out more NTP packages per time unit. Consequently, if the primary server falls out, the secondary server dominates.

7.10   MOBA-NMS (MOBATime Network Management System)

MOBA-NMS is a Java-based PC program used for configuration and status requests of NTP clocks. This software allows for all configurations for one or several devices to be carried out centrally.

Further information, manuals and the software itself can be found on our website http://www.mobatime.com. If desired, it can also be sent out on a USB stick (must be ordered separately).
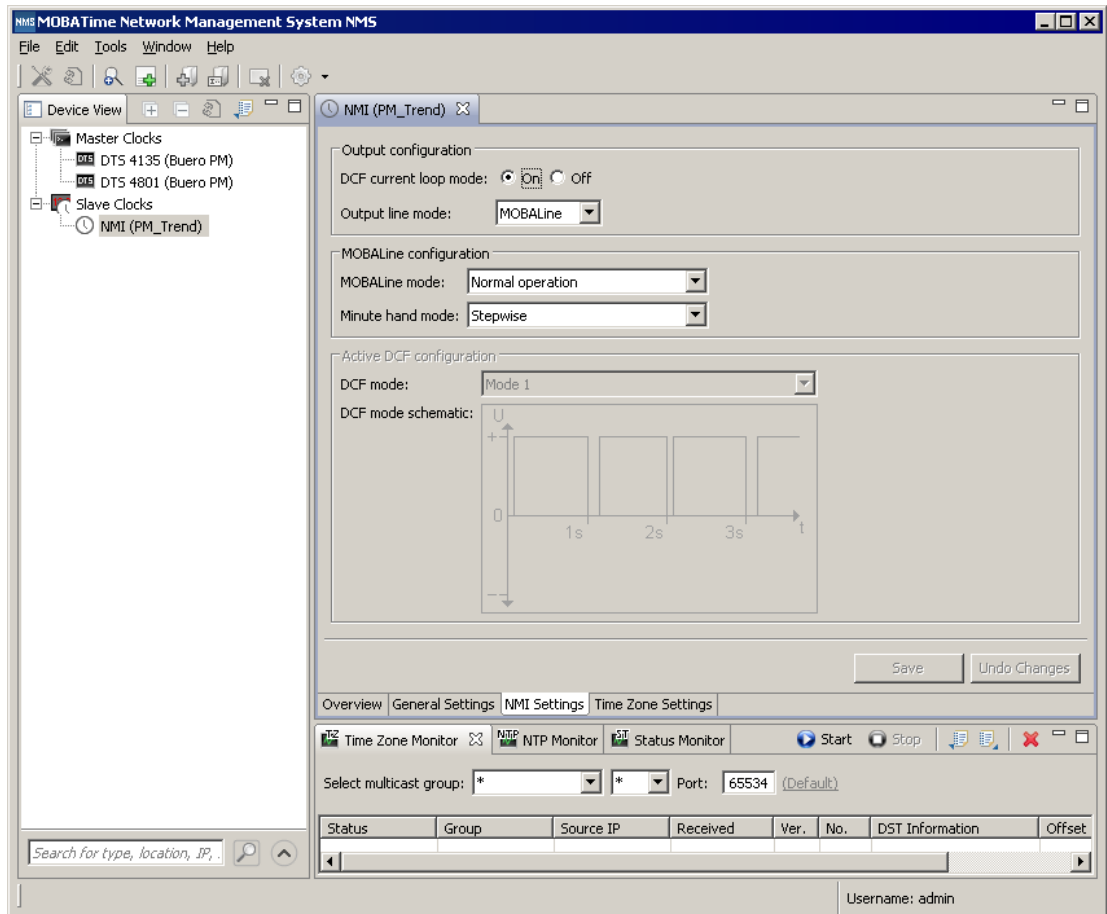
In the register card "NMI Settings", the various NMI parameters can be edited.

8   Update

The firmware resp. the bootloader of a clock can be updated using MOBA-NMS. However, depending on the reason for change the settings on the clock are lost. The protocol TFTP UDP Port 69 is used.

In the multicast operating mode, an update is carried out sequentially on multiple clocks. In the unicast operating mode, this is done parallel.

Attention: For the update, a DHCP server in the network is required.

The update window is opened by right-clicking on the device ➔ Commands ➔ Firmware Update…:

Firmware update

Bootloader update

Attention: The newest versions of the firmware and bootloader are available at *www.mobatime.com* ➔ *Customer Area* ➔ *Product Resources* in the respective product folder. If the delivered device contains newer software than displayed in this manual, please check the settings.

8.1 Bootloader update

A bootloader update is only necessary if the respective alarm is displayed:

In case of a bootloader alarm, the selection field for the firmware (application) is deactivated and only made available after a successful bootloader update:

Important: The bootloader file must be a .zip file.

9   Factory settings

The NMI is delivered with the following standard configuration. This can be recreated on the device (see chapter 4.2).

Factory settings:

Name (20 digits)	Network-MBL-IF
IP mode	IPv4 and IPv6 on
DHCP IPv4	on
IPv4 IP address	1.255.255.253
IPv4 subnet mask	255.255.255.0
IPv4 gateway address	1.255.255.252
IPv6 fix address/prefix	0::0/64
IPv6 link local address	see calculation in chapter 7.3
DHCPv6	on
IPv6 autoconfiguration (RA, SLAAC)	on
Host name	MOBATIMExxxxxx, with the last 6 digits corresponding to the last 6 digits of the MAC address. e.g. MAC 00:16:91:12:34:56 → MOBATIME123456
DNS Server (for NTP server only)	0.0.0.0 / 0::0
NTP server address 1	0.0.0.0
NTP server address 2	0.0.0.0
NTP server address 3	0.0.0.0
NTP server address 4	0.0.0.0
Request interval NTP [s] (10...999s)	10
Time zone entry 1	UTC
Port number for configuration	65532
Port number for time zone client	65534
DHCP on/off	on
SNMP manager address 1	0.0.0.0 / 0::0
SNMP manager address 2	0.0.0.0 / 0::0
Interval SNMP alive traps [min] (1…1440)	30
DCF current loop	off
Mode line output	MOBALine
MOBALine movement minute hand	step

The interface can also be reset using MOBA-NMS.

10 Time zone table

Time zone entries standard season table (version 10.1).

Time zone	City / State	UTC Offset	DST Change	Standard → DST	DST → Standard
00	UTC (GMT), Monrovia, Casablanca	0	No		
01	London, Dublin, Edinburgh, Lisbon	0	Yes	Last Sun. Mar. (01:00)	Last Sun. Oct. (02:00)
02	Brussels, Amsterdam, Berlin, Bern, Copenhagen, Madrid, Oslo, Paris, Rome, Stockholm, Vienna, Belgrade, Bratislava, Budapest, Ljubljana, Prague, Sarajevo, Warsaw, Zagreb	+1	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
03	Athens, Istanbul, Helsinki, Riga, Tallinn, Sofia, Vilnius	+2	Yes	Last Sun. Mar. (03:00)	Last Sun. Oct. (04:00)
04	Bucharest, Romania	+2	Yes	Last Sun. Mar. (03:00)	Last Sun. Oct. (04:00)
05	Pretoria, Harare, Kaliningrad	+2	No		
06	Amman	+2	Yes	Last Thu. Mar. (23:59)	Last Fri. Oct. (01:00)
07	UTC (GMT)	0	No		
08	Kuwait City, Minsk, Moscow, St. Petersburg, Volgograd	+3	No		
09	Praia, Cape Verde	-1	No		
10	UTC (GMT)	0	No		
11	Abu Dhabi, Muscat, Tbilisi, Samara	+4	No		
12	Kabul	+4.5	No		
13	Adamstown (Pitcairn Is.)	-8	No		
14	Tashkent, Islamabad, Karachi, Yekaterinburg	+5	No		
15	Mumbai, Calcutta, Madras, New Delhi, Colombo	+5.5	No		
16	Astana, Thimphu, Dhaka, Novosibirsk	+6	No		
17	Bangkok, Hanoi, Jakarta, Krasnoyarsk	+7	No		
18	Beijing, Chongqing, Hong kong, Singapore, Taipei, Urumqi, Irkutsk	+8	No		
19	Tokyo, Osaka, Sapporo, Seoul, Yakutsk	+9	No		
20	Gambier Island	-9	No		
21	South Australia: Adelaide	+9.5	Yes	1st Sun. Oct (02:00)	1st Sun. Apr. (03:00)
22	Northern Territory: Darwin	+9.5	No		
23	Brisbane, Guam, Port Moresby, Magadan, Vladivostok	+10	No		
24	Sydney, Canberra, Melbourne, Tasmania: Hobart	+10	Yes	1st Sun. Oct. (02.00)	1st Sun. Apr. (03:00)
25	UTC (GMT)	0	No		
26	UTC (GMT)	0	No		
27	Honiara (Solomon Is.), Noumea (New Caledonia),	+11	No		
28	Auckland, Wellington	+12	Yes	Last Sun. Sep. (02:00)	1st Sun. Apr. (03:00)
29	Majuro (Marshall Is.), , Anadyr	+12	No		

30	Azores	-1	Yes	Last Sun. Mar. (00:00)	Last Sun. Oct. (01:00)
31	Middle Atlantic	-2	No		
32	Brasilia	-3	Yes	3rd Sun. Oct. (00:00)	3rd Sun. Feb. (00:00)
33	Buenos Aires, Santiago	-3	No		
34	Newfoundland, Labrador	-3.5	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
35	Atlantic Time (Canada)	-4	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
36	La Paz	-4	No		
37	Bogota, Lima, Quito, Easter Island, Chile	-5	No		
38	New York, Eastern Time (US & Canada)	-5	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
39	Chicago, Central Time (US & Canada)	-6	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
40	Tegucigalpa, Honduras	-6	No		
41	Phoenix, Arizona	-7	No		
42	Denver, Mountain Time	-7	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
43	Los Angeles, Pacific Time	-8	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
44	Anchorage, Alaska (US)	-9	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
45	Honolulu, Hawaii (US)	-10	No		
46	Midway Islands (US)	-11	No		
47	Mexico City, Mexico	-6	Yes	1st Sun. Apr. (02:00)	Last Sun. Oct. (02:00)
48	Adak (Aleutian Is.)	-10	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
49	UTC (GMT)	0	No		
50	UTC (GMT)	0	No		
51	UTC (GMT)	0	No		
52	UTC (GMT)	0	No		
53	UTC (GMT)	0	No		
54	Scoresbysund, Greenland	-1	Yes	Last Sun. Mar. (00:00)	Last Sun. Oct. (01:00)
55	Nuuk, Qaanaaq,Greenland	-3	Yes	Last Sat. Mar. (22:00)	Last Sat. Oct. (23:00)
56	Qaanaaq, Greenland (old)	-4	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
57	Western Australia: Perth	+8	No		
58	Caracas	-4.5	No		
59	CET standard time	+1	No		
60	Santiago, Chile (old)	-4	Yes	2nd Sun. Oct. (00:00)	2nd Sun. Mar. (00:00)
61	Chile, Easter Island (old)	-6	Yes	2nd Sat. Oct. (22:00)	2nd Sat. Mar. (22:00)
62	Baku	+4	Yes	Last Sun. Mar. (04:00)	Last Sun. Oct. (05:00)
63	UTC (GMT)	0	No		
64	UTC (GMT)	0	No		

In countries where the DST switch date changes annually (e.g. Iran, Israel), the time zone has to be defined manually in the user time zone table (entries 80 – 99).

Legend:
UTC: Universal Time Coordinate, equivalent to GMT
DST: Daylight Saving Time
DST Change: Daylight Saving Time changeover
Standard → DST: Time change from Standard time (Winter time) to Summer time
DST → Standard: Time change from Summer time to Standard time (Winter time)
**Example:**
2nd last Sun. Mar. (02:00)   Switch over on the penultimate Sunday in March at 02.00 hours local time.

Notice: As usual, the time table is adapted each year. You can download the newest time table from our homepage: *www.mobatime.com* ➔ *Downloads* ➔ *Moba-Software* ➔ *Time Zone Table*. If the delivered device contains a newer version as showed in this manual, it's recommended to check the time zone entries.

11   Measurements
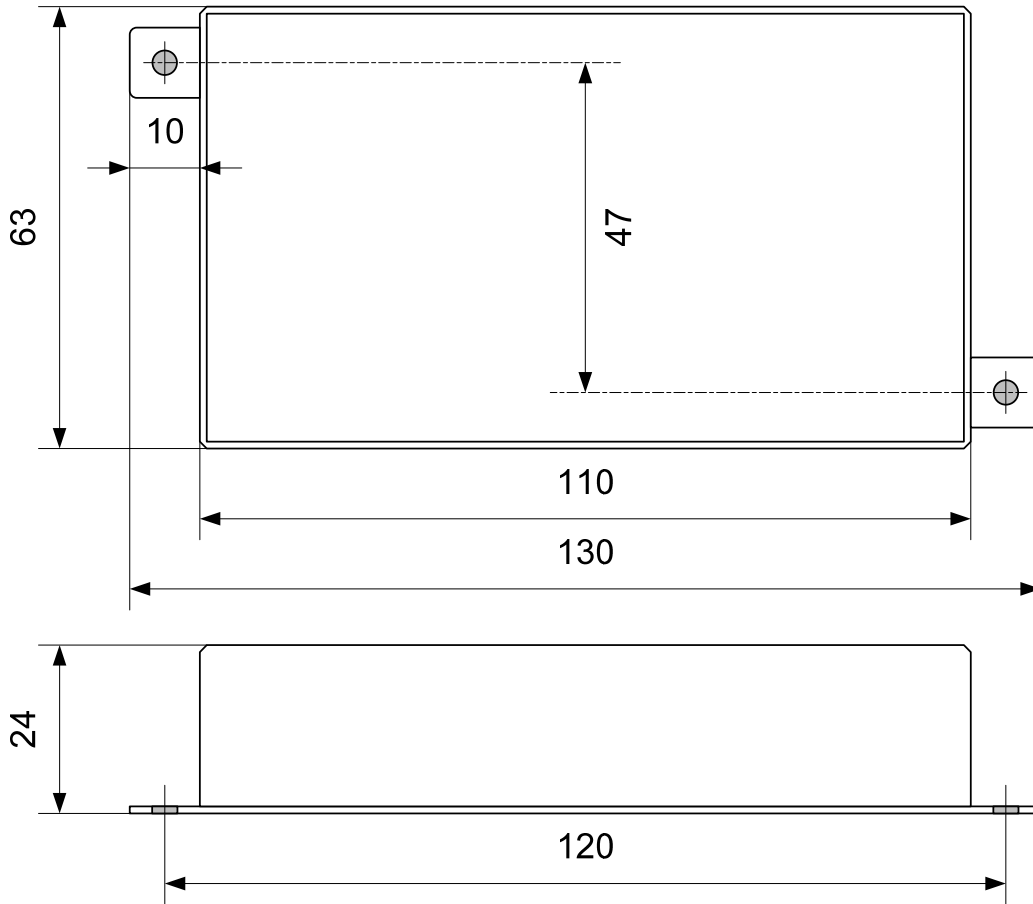
All specifications in mm

12   Technical data

Network interface	10/100 Mbit/s Ethernet controller, RJ45 plug Only shielded cable permitted
Network	IPv4 and / or IPv6 with: IPv4: static or DHCP IPv6: static, SLAAC and / or DHCPv6
Synchronization	Network Time Protocol (NTP), UTC
Time code outputs	MOBALine: output for up to 12 clocks local time, 20V / 50Hz max. 100mA DCF: passive power supply interface
Operation	Full operation through MOBA-NMS
Monitoring	status request of the interface with PC software MOBA-NMS. SNMPv2 alarm and alive traps for integration into a network management system.
Displays (LEDs)	power green LAN link green LAN activity yellow alarm red synch. green
Power supply	Power over Ethernet, 802.3af, class 2, < 6.5 Watt phantom or spare-pair power
Accuracy	deviation typically <+/-50 ms in synchronized state
Loss of synchronization	MOBALine: output 12 o'clock command after 24 h DCF: output stop of DCF77 telegram deviation typically <+/-2 s after 24 h
Protection class	IP 30
Temperature area	-20 °C … +60 °C
Housing	measurements (l x w x d): 130 x 63 x 22.5 mm clips for wall mounting
Weight	180 g