

STATIC TRANSFER SWITCH UNB

(Incl. description UNB-WEB)

USER MANUAL



About this manual

IMPORTANT! Read this manual very carefully before installing and commissioning the specified module. This manual is a part of the delivered module. Familiarity with the contents of this manual is required for installing and operating the specified module. The rules for prevention of accidents for the specific country and the general safety rules in accordance with IEC 364 must be observed.

The function description in this manual corresponds to the date of publishing. Technical changes and changes in form and content can be made at any time by the manufacturer without notice. There are no obligations to update the manual continually.

The module is manufactured in accordance with applicable DIN and VDE standards such as VDE 0106 (part 100) and VDE 0100 (part 410). The CE marking on the module confirms compliance with EU standards 2006-95-EG (low voltage) and 2004-108-EG (electromagnetic compatibility) if the installation and operation instructions are followed.

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Revision history

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Date: 2012-11-06

Revision	Description of change	Writer	Date
01	First edition	RTH	2007-04-26
02	Layout change, minor text modifications, UNB30.0 inserted.	RTH	2008-01-14
03	Minor text modifications, "Remote switch ON" added.	RTH	2008-06-05
04	Minor text modifications at section 2.2 "Operating modes".	RTH	2010-05-14
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5.1	Heading line corrected	RTH	2012-01-12
6.0	UNB-WEB inserted	RTH	2012-02-07
6.1	Photos updated, pinning of connectors X1 & X2 (pin 9) of UNB30.0 & 40.0 corrected, minor text modification	RTH	2012-11-06

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1A. Safety instructions & notes to electronic waste disposal



Warning!

Because several components of operating electrical modules are charged by dangerous voltage, the improper handling of electrical modules may cause accidents involving electrocution, injury, or material damages.

- Operation and maintenance of electrical devices must be performed by qualified skilled personnel such as electricians in accordance with EN 50110-1 or IEC 60950.
- Install the device only in areas with limited access to unskilled personnel.
- Before starting work, the device must be disconnected from mains. Make sure that the device is earthed.
- Do not touch connector pins as they can be charged with dangerous voltage up to 30 seconds after disconnection.
- Only spare parts approved by the manufacturer must be used.

The correct disposal of electronic waste is the responsibility to recycle discarded electronic equipment and is necessary to achieve the chosen level to protect human health and the environment.

In the case of waste disposal of your discarded equipment we recommend to contact a professional waste management company.

2. General information about the UNB

Static transfer switches of the UNB model range are designed for nominal switching capacity of 5.0 kVA up to 40.0 kVA. They are used for nearly interruption free switching (<4 ms) between two AC sources (usually inverter and substitute-mains supply). The static transfer switch synchronises frequency and phasing of mains with the inverters. Basically it is intended for operation in combination with inverters of series UNV and PWS as well but it also works with inverters of series INV. Consequently AC consumers can be driven nearly without interruption if one of the two power sources fails. All operation and indication elements are user-friendly integrated in the front plate of the unit. The UNB is equipped with rear side connectors and is designed to be mounted in a 19" compatible mounting kit (see [section 3.1](#)).

NOTE: UNB modules are available with Ethernet interface on request (see section 3 "[Type list](#)" and section 3.6 "[UNB-WEB](#)" as well).

2.1 Example of use

Inverter system with integrated static transfer switch UNB.

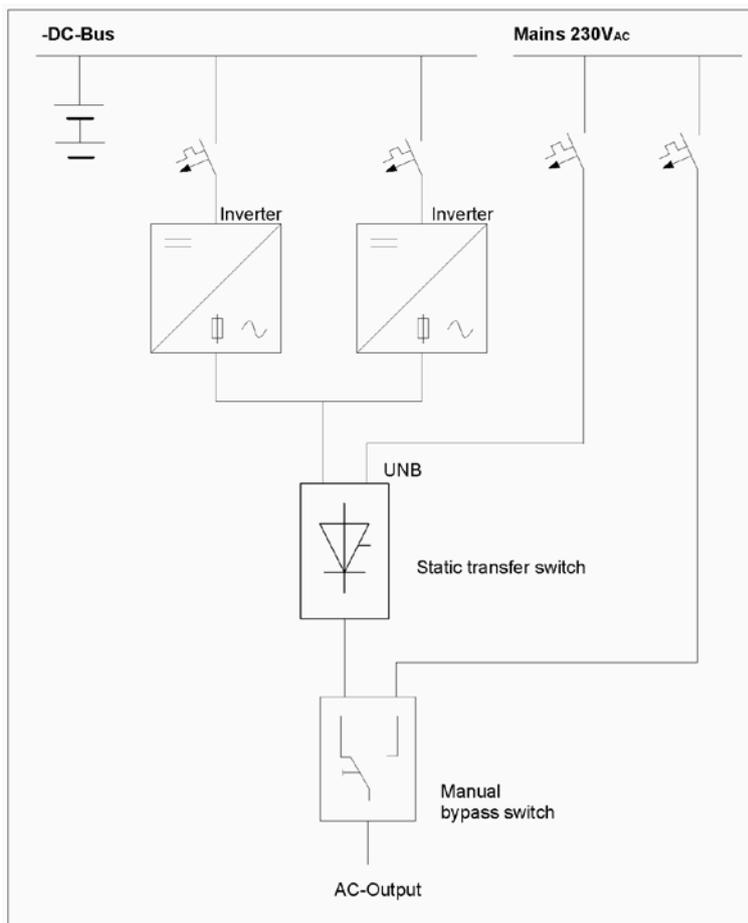


Figure 1) - Single line diagram "Example of use"

2.2 Operating modes

The static transfer switch UNB is designed for the operating modes “inverter priority” and “mains priority” alternatively.

Source 1 is defined as priority source, source 2 is defined as substitute source. Source 1 feeds the load as long as source 1 works faultlessly.

NOTE: The priority source is programmable using service menu 2 (see section 8 “Appendix”).

2.2.1 "Inverter priority" (factory default setting)

The unit's default setting is "Inverter priority". In this case the inverters are source 1 whereas mains is source 2. The UNB switches to source 2 if source 1 fails or is overloaded (i.e. distortions by short circuit behaviour or overload).

2.2.2 "Mains priority"

At operating mode “mains priority” AC mains works as source 1 and the inverter(s) as source 2. At this configuration the UNB remains at mains operation whereas the inverter remains synchronized to mains. If mains error occurs, the UNB switches to inverter operation.

Static Transfer Switch

UNB (incl. UNB-WEB)



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3. Type list and main data

UNB standard		UNB-WEB*		Battery voltage (V _{DC})	Rated switching capacity (kVA @ 230V _{AC})
Type designation	Material code	Type designation	Material code		
UNB5.0-24	600-050-411.00	UNB5.0-24-WEB	600-050-411.20	24	5.0
UNB5.0-48	600-050-511.00	UNB5.0-48-WEB	600-050-511.20	48	5.0
UNB5.0-60	600-050-611.00	UNB5.0-60-WEB	600-050-611.20	60	5.0
UNB5.0-110	600-050-711.00	UNB5.0-110-WEB	600-050-711.20	108	5.0
UNB5.0-220	600-050-811.00	UNB5.0-220-WEB	600-050-811.20	216	5.0
UNB12.5-24	600-125-411.00	UNB12.5-24-WEB	600-125-411.20	24	12.5
UNB12.5-48	600-125-511.00	UNB12.5-48-WEB	600-125-511.20	48	12.5
UNB12.5-60	600-125-611.00	UNB12.5-60-WEB	600-125-611.20	60	12.5
UNB12.5-110	600-125-711.00	UNB12.5-110-WEB	600-125-711.20	108	12.5
UNB12.5-220	600-125-811.00	UNB12.5-220-WEB	600-125-811.20	216	12.5
UNB23.0-24	600-230-411.00	UNB23.0-24-WEB	600-230-411.20	24	23.0
UNB23.0-48	600-230-511.00	UNB23.0-48-WEB	600-230-511.20	48	23.0
UNB23.0-60	600-230-611.00	UNB23.0-60-WEB	600-230-611.20	60	23.0
UNB23.0-110	600-230-711.00	UNB23.0-110-WEB	600-230-711.20	108	23.0
UNB23.0-220	600-230-811.00	UNB23.0-220-WEB	600-230-811.20	216	23.0
UNB30.0-24	600-300-411.00	UNB30.0-24-WEB	600-300-411.20	24	30.0
UNB30.0-48	600-300-511.00	UNB30.0-48-WEB	600-300-511.20	48	30.0
UNB30.0-60	600-300-611.00	UNB30.0-60-WEB	600-300-611.20	60	30.0
UNB30.0-110	600-300-711.00	UNB30.0-110-WEB	600-300-711.20	108	30.0
UNB30.0-220	600-300-811.00	UNB30.0-220-WEB	600-300-811.20	216	30.0
UNB40.0-24	600-400-411.00	UNB40.0-24-WEB	600-400-411.20	24	40.0
UNB40.0-48	600-400-511.00	UNB40.0-48-WEB	600-400-511.20	48	40.0
UNB40.0-60	600-400-611.00	UNB40.0-60-WEB	600-400-611.20	60	40.0
UNB40.0-110	600-400-711.00	UNB40.0-110-WEB	600-400-711.20	108	40.0
UNB40.0-220	600-400-811.00	UNB40.0-220-WEB	600-400-811.20	216	40.0

*UNB modules with WEB connectivity (Ethernet interface) are available on request.

See [section 7](#) for detailed technical data.

3.1 Optional equipment for UNB assembly:

Article	Article code	Suitable for:
Mounting set	880-MEC-MKT.01	UNB5.0 & UNB12.5 model range
Mounting set	880-MEC-MKT.03	UNB23.0, UNB30.0 & UNB40.0 model range

3.2 Front View and Operating Elements

3.2.1 Front view UNB5.0/12.5kVA

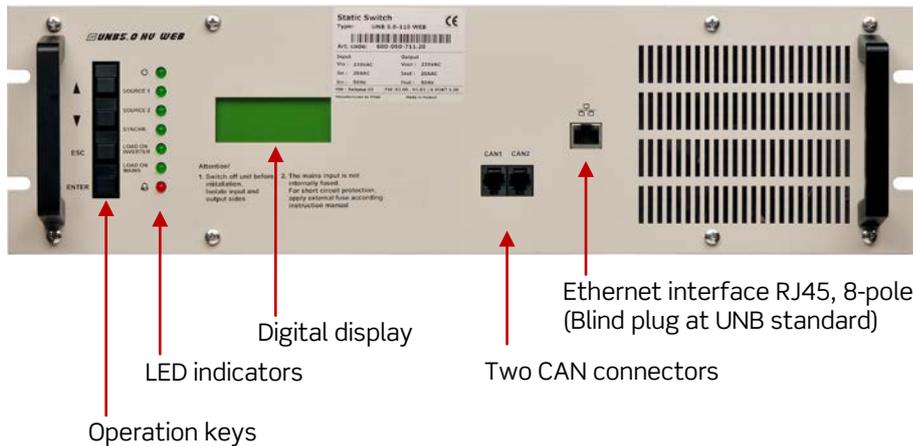


Figure 2) - Front view UNB 5.0/12.5 kVA with Ethernet interface

NOTE: The standard UNB is not equipped with an Ethernet interface. Instead of the RJ45 connector is there a blind plug.

Static Transfer Switch UNB (incl. UNB-WEB)

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3.2.2 Front view UNB23.0/30.0/40.0kVA

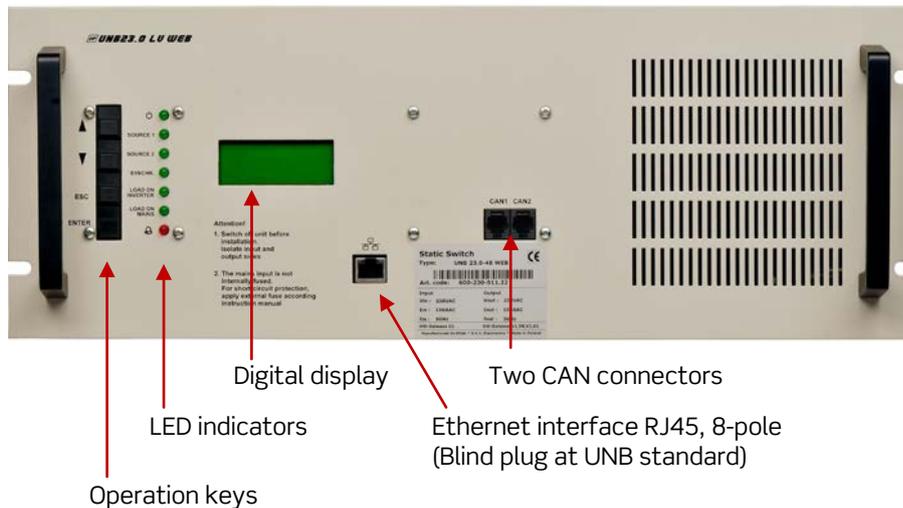


Figure 3) - Front view UNB 23.0/30.0/40.0 kVA with Ethernet interface

NOTE: The standard UNB is not equipped with an Ethernet interface. Instead of the RJ45 connector is there a blind plug.

All operating elements and indicators are located at the front of the modules:

- 4 operation keys: ▲ (up), ▼ (down), "ESC", "ENTER".
- 7 LED indicators: "STANDBY", "SOURCE 1", "SOURCE 2", "SYNCHRO.", "LOAD ON INVERTER", "LOAD ON MAINS", "ALARM".
- Digital display

For detailed information concerning operating elements, LED indicators, digital display and connectors please see the following chapters.

3.3 Electrical Connectors

3.3.1 Input terminals

The UNB is equipped with two AC inputs, one for the inverter and the other for the substitute-mains. Both sources must have the same frequency and the same nominal voltage level. Because there are no protection fuses integrated in the unit, both sources must be protected externally.

If several inverters are connected in parallel, the parallel connection of the inverter outputs has to be arranged externally.



NOTE: If inverters of series **PWS** are connected in parallel, one symmetry-choke per each individual inverter must be daisy-chained with the L-phase additionally.

The AC input connectors are located at the rear side of the unit. Because of the limited load capacity of the connector pins the UNB with an output power of 23.0 kVA is equipped with two connectors, the 30.0 & 40.0 kVA unit with three connectors with several contact pins connected in parallel accordingly. In that case the related contact pins require an identical cable diameter and length. This applies also to the AC output connection terminal which is described in the following.

Additional the UNB is equipped with a DC input for the connection to the battery of the system. The internal electronic circuit of the UNB is supplied by mains and additionally by the battery (redundancy). The voltage level of the battery is monitored by the UNB; the result is used for switching off the inverters in case of over/under voltage.

The UNB measures and monitors the voltage level of both input sources (real effective values) and additional the frequencies. The thresholds of those measuring values are programmable (factory setting, only practicable by skilled service personnel).

3.3.2 Output terminals

The unit is equipped with a plug-in AC output connection terminal. In case of short circuit, the short circuit power is transferred to the UNB input, which causes the fuse of source 1 or 2 to be blown. The UNB should be overloaded only for short-time (see technical data). In particular this is to be observed for the correct dimensioning of the pre-fuse. The pre-fuse must be dimensioned according to the nominal switching capacity of the UNB. If the pre-fuse is oversized, the resultant delayed fuse tripping may destroy the internal thyristors of the UNB.

Operation of UNB in combination with inverters of series **UNV**:

The UNB measures and monitors the current of the consumer load. In order to avoid a permanent overload of the inverters the UNB verifies the availability of the connected inverters and recalculates the allowed total current of the consumer load. If one of the inverters in parallel operation fails, the overload threshold value is automatically reduced accordingly.

3.3.3 Connectors UNB 5.0 and UNB 12.5kVA

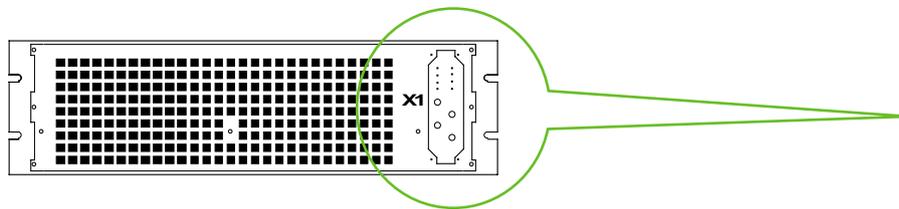


Figure 4) - Rear view UNB 5.0/12.5 kVA

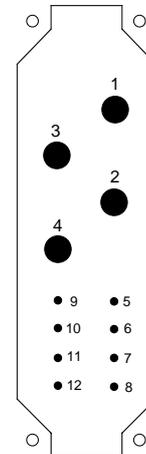


Figure 5) - Connector X1 (HAN-K4/8, socket outlet)

Pins (X1)	Function
1	Source 1 (inverter)/Phase L1
2	Source 2 (substitute mains)/Phase L1
3	Source 1 & 2/ neutral
4	UNB Output/Phase L1
5	DC-supply / L+ (24/48/108/216 VDC)
6	DC-supply / L- (24/48/108/216 VDC)
7	Synchronization / SYNC-SIG
8	Synchronization / SYNC-STAT
9	Remote switch ON (+24 V)
10	Indication relay general fault / NO
11	Indication relay general fault / COM*
12	Synchronization / SYNC-GND

*Function logic: OK = COM and NO closed
 (Is equal to the programming "not inverted")

NOTE: If the UNB works in combination with a single inverter or inverters in parallel operation it is necessary to connect through the synchronization bus (contacts SYNC-GND→ SYNC-GND, SYNC-SIG→ SYNC-SIG and SYNC-STAT→ SYNC-STAT) between the inverter(s) and the UNB.

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3.3.4 Connectors UNB 23.0kVA

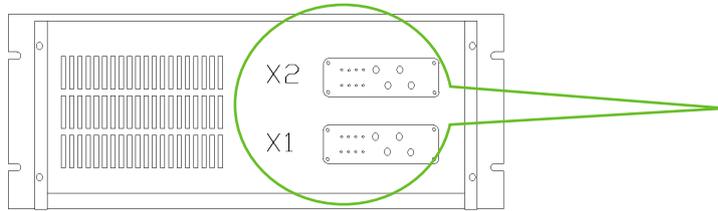


Figure 6) - Rear view UNB 23.0 kVA

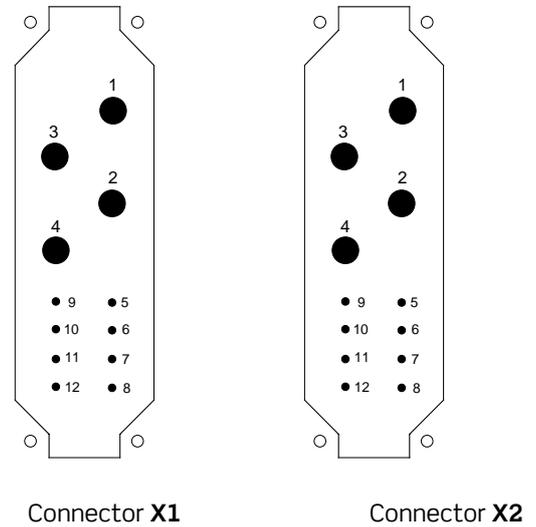


Figure 7) - Connectors UNB 23.0 kVA

Pins (X1)	Function	Pins (X2)	Function
1	Source 1 (inverter)/Phase L1	1	Source 1 (inverter)/Phase L1
2	Source 2 (substitute mains)/Phase L1	2	Source 2 (substitute mains)/Phase L1
3	Source 1 & 2/ neutral	3	No connection
4	UNB Output/Phase L1	4	UNB Output/Phase L1
5	DC-supply / L+ (24/48/108/216 VDC)	5	n/c
6	DC-supply / L- (24/48/108/216 VDC)	6	n/c
7	Synchronization / SYNC-SIG	7	n/c
8	Synchronization / SYNC-STAT	8	n/c
9	Indication relay general fault / NC	9	Remote switch ON (+24 V)
10	Indication relay general fault / NO	10	n/c
11	Indication relay general fault / COM*	11	n/c
12	Synchronization / SYNC-GND	12	n/c

*Function logic: fault = COM and NC closed
 OK = COM and NO closed
 (Is equal to the programming "not inverted")

NOTE: If the UNB works in combination with a single inverter or inverters in parallel operation it is necessary to connect through the synchronization bus (contacts SYNC-GND→ SYNC-GND, SYNC-SIG→ SYNC-SIG and SYNC-STAT→ SYNC-STAT) between the inverter(s) and the UNB.

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3.3.5 Connectors UNB 30.0kVA & UNB 40.0kVA

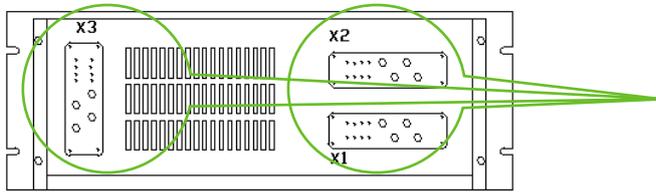
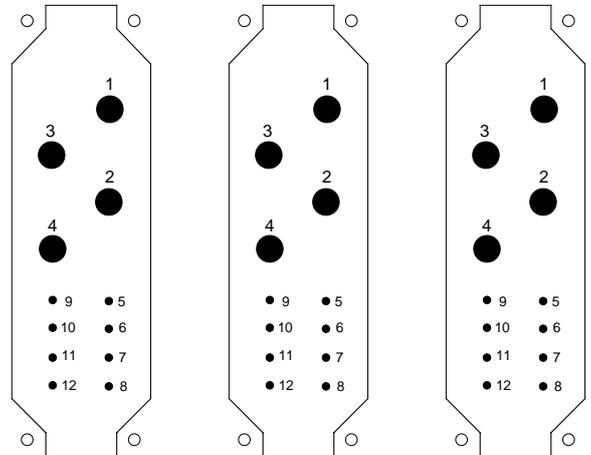


Figure 8) - Rear view UNB 30.0 & 40.0 kVA



Connector X1 Connector X2 Connector X3

Figure 9) - Connectors UNB 30.0 & 40.0 kVA

Pins (X1)	Function	Pins (X2)	Function
1	Source 1 (inverter) / Phase L1	1	Source 2 (substitute mains) / Phase L1
2	Source 1 (inverter) / Phase L1	2	Source 2 (substitute mains) / Phase L1
3	Source 1 (inverter) / Phase L1	3	Source 2 (substitute mains) / Phase L1
4	n/c	4	Source 1 & 2 / neutral
5	n/c	5	DC-supply / L+
6	Synchronization / SYNC-GND	6	DC-supply / L-
7	Synchronization / SYNC-SIG	7	n/c
8	Synchronization / SYNC-STAT	8	n/c
9	n/c	9	Remote switch ON (+24 V)
10	n/c	10	Indication relay general fault / COM*
11	n/c	11	Indication relay general fault / NO
12	n/c	12	Indication relay general fault / NC

*Function logic: fault = COM and NC closed
OK = COM and NO closed
(Is equal to the programming "not inverted")

NOTE: If the UNB works in combination with a single inverter or inverters in parallel operation, it is necessary to connect through the synchronization bus (contacts SYNC-GND→ SYNC-GND, SYNC-SIG→ SYNC-SIG and SYNC-STAT→ SYNC-STAT) between the inverter(s) and the UNB.

Pins (X3)	Function
1	UNB Output/Phase L1
2	UNB Output/Phase L1
3	UNB Output/Phase L1
4	n/c
5	n/c
6	n/c
7	n/c
8	n/c
9	n/c
10	n/c
11	n/c
12	n/c

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3.3.6 Pinning of the CAN bus connectors

The UNB is equipped with two CAN connectors (CAN1 and CAN2) at the front of the unit.

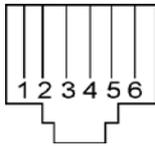


Figure 10a) - CAN bus connector (socket outlet RJ11, 6-pole)

Connection table:

Pin	Signals CAN1	Signals CAN2	Designation
1	CAN_V+	←	DC-Supply +8 to 15 V
2	CAN_V+	←	DC-Supply +8 to 15 V
3	CAN_H	←	Signal (high)
4	CAN_L	←	Signal (low)
5	CAN_V-	←	DC-Supply Ground
6	CAN_V-	←	DC-Supply Ground

3.3.7 Pinning of the front side Ethernet connector (RJ45)

Pin	Name	Designation
1	TX+	Tranceive Data +
2	TX-	Tranceive Data -
3	RX+	Receive Data +
4	n/c	Not used
5	n/c	Not used
6	RX-	Receive Data -
7	n/c	Not used
8	n/c	Not used

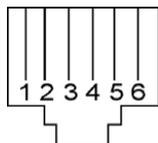


Figure 10b) - Front side Ethernet connector
(socket outlet RJ45, 8-pole)

3.4 Cooling/air flow direction

The unit is cooled by internal fan. The airflow is from the front to rear side. The fan is monitored and speed controlled dependent on module temperature. To provide sufficient air flow, a minimum space (see item "A" in figure 11) of 50 mm is required between the unit and the rear cabinet wall as well as an unobstructed supply of air to the front of the module.

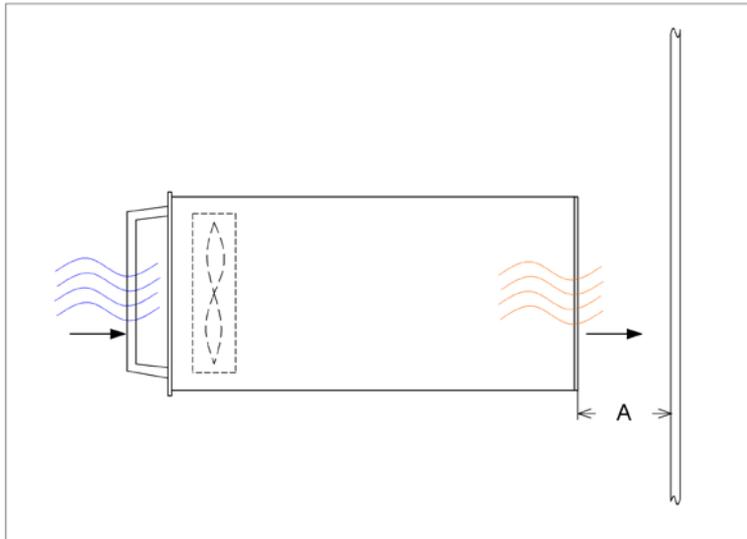


Figure 11) - Cooling/air flow direction

3.5 CAN-Bus communication interface

The UNB is equipped with serial data interface according to CAN (= Controller Area Network)-specification. Two CAN-Bus connectors are integrated in the front plate of the unit. The UNB communicates via CAN-Bus with the connected inverters and a possibly implemented supervision monitoring device of the UPC model range or MU1000C).

Following information is available via CAN-Bus:

- Status information of the UNB
- Availability of the connected inverters
- Availability of the substitute mains
- Output current of the UNB
- Device temperature
- Battery-voltage at the UNB
- Frequency of source 1 and source 2
- Input- and output values of the connected inverters as follows:
 - Input current
 - Input voltage
 - Output current
 - Output voltage
 - Output frequency
 - Device status (okay/not okay)

(The values are measured at regular intervals via CAN-Bus and can be selected at the display using the operation keys).

If the signal to one of the connected inverters is interrupted, the failure message “CAN failure” is indicated and the number of the particular inverter is shown. The numbering of the inverters automatically follows the CAN addresses in ascending order which have been adjusted at the inverters.

The output voltage of the connected inverters is controlled by the UNB via CAN-Bus according to the adjusted value “mains voltage” in the service menu 1 (factory setting, only practicable by skilled service personnel).

If the CAN-Bus connection is inactive for more than five seconds, the inverters switch automatically back to the internally stored default values.

The inverters are switched off by the UNB if $V_{batt} > V_{max}$ (default value= $2.5V \times \text{number of cells}$) or $V_{batt} < V_{min}$ (default value= $1.7V \times \text{number of cells}$) is detected by the UNB.

NOTE: The internally stored value (output voltage of the inverter V_o) must be the same for all of the inverters which are connected in parallel and the same value must be adjusted at the UNB. Detailed information regarding the adjustment of “ V_o ” can be found in the user manuals of the particular inverters.

The CAN bus is not relevant for the synchronization of the inverters. For safety reasons, the synchronization takes place via the hard-wired synchronization bus between inverters and UNB (please see section 3.3.3 “[connectors](#)” et seq.).

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3.6 UNB-WEB with ethernet (net connection)

The UNB is available on request with front side Ethernet interface (10/100 MB) for remote control via HTTP (WEB server), SNMP, SMTP und STNP.

The UNB can be directly configured via PC. Furthermore, extensive remote control can be realized.

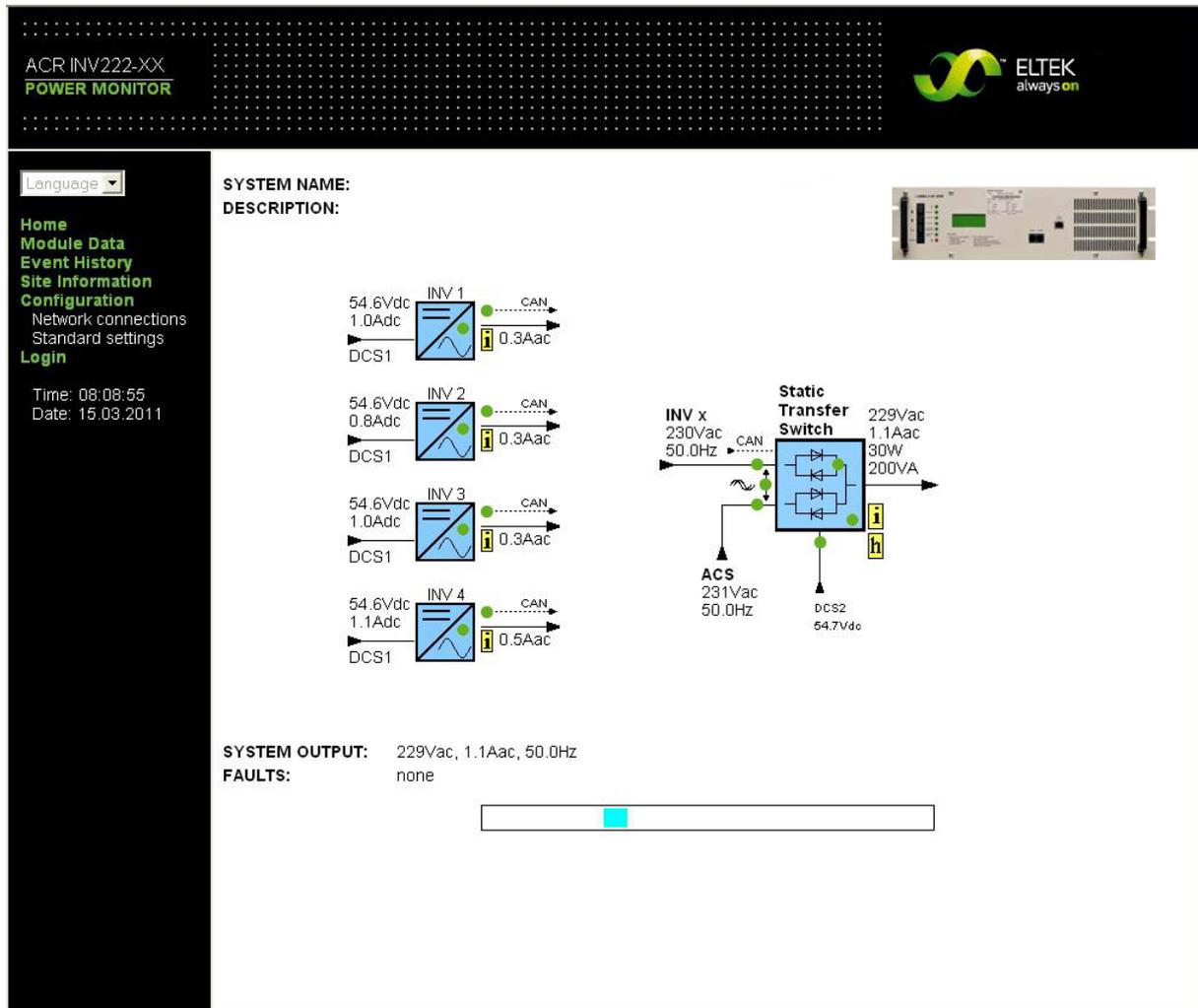


Figure 12) - Sample screenshot "Net Connection"

NOTE: A specific manual "Net Connection" is separately available.

4. Handling

4.1 Storage

The UNB must be stored in a dry, dust free environment with a storage temperature according to specified data (see [section 7](#)).

4.2 Before commissioning

1. Battery system: The static transfer switch UNB is delivered with factory-configured defaults according to lead acid batteries with cell numbers according to nominal DC input voltage (see the table below) of the device. If other battery systems with different cell numbers should be used, the UNB must be reconfigured before.

Device name	Nominal DC input voltage	UNB is factory-configured for:
UNBxxx-24	24 V	Lead acid battery, 12 cells
UNBxxx-48	48 V	Lead acid battery, 24 cells
UNBxxx-60	60 V	Lead acid battery, 30 cells
UNBxxx-110	108 V	Lead acid battery, 54 cells
UNBxxx-220	216 V	Lead acid battery, 108 cells

2. Number of used inverters and output power per one inverter must be configured in any case. The adjustment of the number of inverters has to be done in the Customer menu (see [section 4.5.1](#)). If inverters of the PWS family should be used, the number of inverters must be set to "0". The nominal output power of one inverter has to be configured in Service menu 1 (see [section 8.1](#)).

The factory preset defaults and threshold values and their adjustment ranges/steps as well are listed in the **Service Menus** (please see [section 8](#), [„Appendix“](#)). If necessary, reconfiguration of the UNB can be carried out using the adjustment keys. Operation using adjustment keys and menu navigation as well is described in the following sections.

Adjustments at the UNB can be carried out if either the related DC voltage is connected to the DC input or AC voltage is connected to the AC input of the UNB.

4.3 Commissioning

NOTE: Before commissioning make sure that the AC voltage and frequency as well of substitute mains and DC input voltage (battery) as well corresponds to the specification as specified on the type plate. Make sure that the UNB is correctly configured according to the used battery system (see [section 4.2](#) above "Before commissioning").



A mounting-kit according to [section 3.1](#) "[Optional equipment...](#)" is necessary to mount the UNB into a 19" compatible cabinet.

After unpacking the unit put it upon the rails and slide in the unit carefully over the rails until the module connector gets in touch with the backplane connector. Increase the pressure until the unit fits in completely. Please avoid too much pressure. If the unit does not fit in please start again with the complete slide-in process.

Mount the unit with 4 screws (M4x12).

CAUTION: The unit is delivered without internal fuses. Therefore the unit must be fused externally at the input source "mains" to protect the internal thyristors against damages in case of short circuit. The pre-fuse must be dimensioned according to the nominal switching capacity of the UNB. In case of inverters in parallel operation, the output of each inverter must be fused.



Connect the unit to the system according to [section 3.3](#) "[Electrical connectors](#)".

4.4 Operation

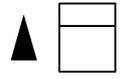
The operation and adjustment respectively of the unit takes place with keys located at the front side of the unit. All main functional parameters and measuring values are displayed on the front side LCD panel (text indicator) as well as by LED indications. They are described in the following.

4.4.1 LED indication

LED	Indication	Colour	Operation mode
	STANDBY	green	The UNB is switched on and operational
	SOURCE 1	green	Voltage and frequency of source 1 (priority source) are within allowable range
	SOURCE 2	green	Voltage and frequency of source 2 (substitute source) are within allowable range
	SYNCHR.	green	Inverters are synchronised with mains by UNB
	LOAD ON INVERTER	green	Load fed by inverter
	LOAD ON MAINS	green	Load fed by mains
	ALARM	red	General Alarm (the assignment of the individual alarm messages is programmable)

4.4.2 Operation keys

The adjustment takes place with four front keys as described in the following:

Front keys	Indication	Function
	Up	<ul style="list-style-type: none"> ➤ during menu item selection: change to previous item (parameter) ➤ during adjustment mode: increase value
	Down	<ul style="list-style-type: none"> ➤ during menu item selection: change to next item (parameter) ➤ during adjustment mode: decrease value
	Escape	<ul style="list-style-type: none"> ➤ leave the menu without changing
	Enter	<ul style="list-style-type: none"> ➤ call menu ➤ leave menu with changing ➤ save parameter

4.4.3 LCD panel / Indication of measuring values & alarm messages

At initial state the display shows the measuring values of the input sources (AC output voltage of inverter, mains voltage, output current, date and time, additional frequencies of inverter and mains and battery voltage as well as the total DC-current).

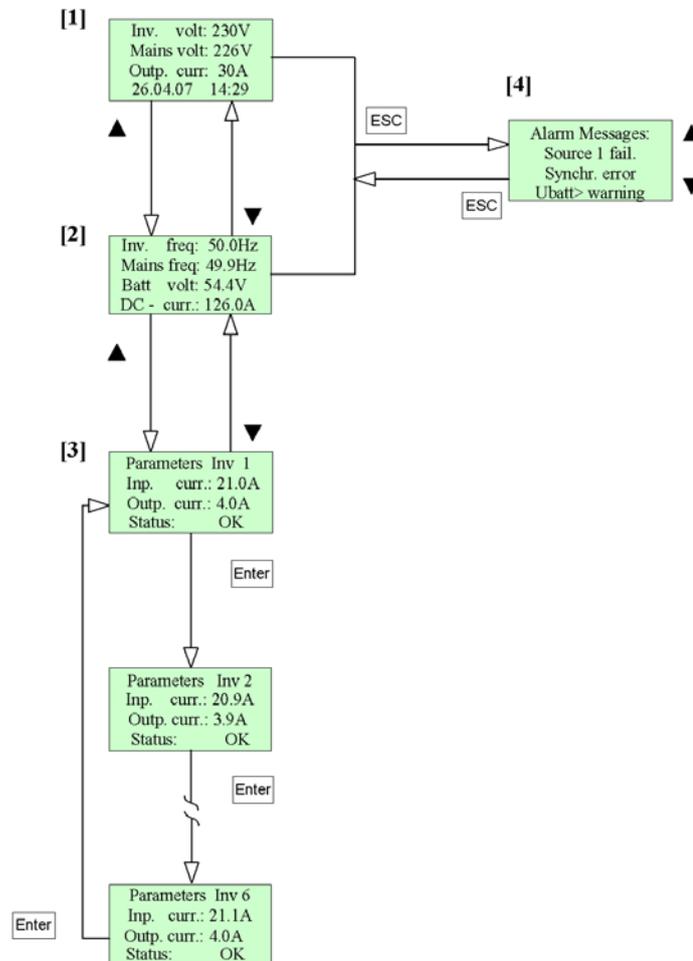


Figure 13) - LC Display: Indication of measured values & alarm messages

Display [1] shows the initial state (basic display). The plain text of the basic display becomes visible after successful start-up procedure. According to the diagram above (see figure 13) you can select the displays [1], [2] and [3] by pushing the keys ▲ or ▼:

- If no inverter is registered, display [3] is not available.
- If exactly one inverter is registered, display [3] is visible without inverter number.
- If more than one inverter is registered, it is possible to call the parameters (input current, output current and status) of all connected inverters in succession by pressing “ENTER”. The inverter number is shown in the first line of the display.

The display automatically reverts to display [1] if no key is pressed for a period of more than 30 seconds.

Display [4] “Alarm messages” indicates the current alarm status. It can be selected from display [1] or [2] by pressing “ESC”.

By pressing the keys ▲ or ▼ you are able to leaf through the list of alarm messages if more than three entries are present there. The display “Alarm messages” can be quit by pressing “ESC” again.

Basically (factory setting) all individual failures according to “list of the selectable individual collective failures” (please see section 4.5.1) are enabled and therefore they are visible on the display in case of failure. The alarm messages which shall **not** be visible on the display in case of failure have to be disabled in the customer menu (please see the diagram “Customer menu”).

4.5 Parameter adjustments

The static switch UNB is delivered with factory-configured defaults according to lead acid batteries with cell numbers according to nominal DC input voltage of the device (see section 4.2 “[Before commissioning](#)”). If other battery systems with different cell numbers should be used, the UNB must be reconfigured before. In this case reconfiguration takes place using service menu 1 and 2 (see section 8 „[Appendix](#)“).

ATTENTION!	Configuration should be carried out only by qualified and skilled service personnel.	
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In the following sections the adjustable parameters in the **customer menu** (accessible to each customer) are described. Those are general adjustments such as number of used inverters, indicated display language, time delay values, content of collective failure signal etc.

4.5.1 Table “Adjustable Parameters” (customer menu)

In the customer menu the parameters can be adjusted according to the table as follows:

Menu item	Functions	Range	Default value (factory setting)
INV-count	Key in the number of the connected inverters*	0- 15	0
Time/Date	Adjustment of the real time clock		
Configuration CF	Selection (switching active/inactive) of individual failures for the collective failure signalisation= General Alarm (LED and Relay)	All individual failures**	All enabled
Delay LED CF	LED time delay of the collective failure signal	1- 60 sec	30
Delay Relay CF	Time delay of the collective failure relay	1- 60 sec	30
LCD-contrast	Contrast adjustment of the display	0- 255	220
LCD backlight	Background illumination	On / off	On
Language	Selection of the language	English, German, Polish, Swedish, Italian	English
Softw. version?	Shows the current firmware version	Read only	

* If the UNB works together with inverters of type PWS, the INV-count must be set to “0” because the PWS is not equipped with CAN interface. Otherwise, the failure message “Inverter fail.” would be generated.

**List of the selectable individual collective failures (CF):

Alarm message	Meaning
Source 1 fail.	Voltage or frequency of source 1 not OK
Source 2 fail.	Voltage or frequency of source 2 not OK
Synchr. Error	Mains and INV voltage are not synchronous
Inverter fail.	Inverter error
UNB overtemp.	UNB over temperature
UNB overload	UNB output current too high
INV overload	The output current exceeds the inverter power
DC voltage low	Battery voltage low
DC voltage high	Battery voltage high
Ubatt < warning	Battery voltage < warning level
Ubatt > warning	Battery voltage > warning level

5. Maintenance

In general, the device is maintenance-free. Exclusively the fan is a component consisting of moving parts. Although it may be expected that the operating life of the fan is more than five years it is recommended to exchange the fan every five years.

By way of precaution a yearly inspection with following checks is recommended:

- Mechanical/visual inspection
- Removal of dust and dirt, especially on radiator surfaces
- Check for internal dust or humidity

Attention!

Dust combined with moisture or water may influence or destroy the internal electronic circuits. Dust inside the unit can be blown out with dry compressed air. Avoid using too high air pressure.

The interval between the checks depends on ambient conditions of the installed module.

6. Trouble shooting

If a failure occurs in the system, the LED “Alarm” is illuminated according to the adjustments in the customer menu, item “Configuration of Collective Failures” (see diagram “[customer menu](#)”).

The failures are shown in clear text modus in the display “Alarm messages”.

The display “Alarm messages” can be entered from the basic display by pressing ESC (please also see section [4.4.3](#)).

Basic display

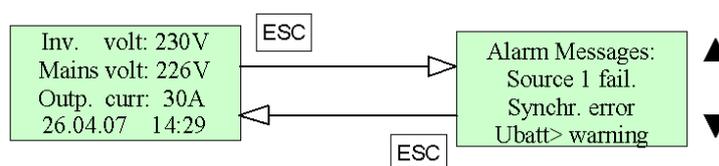


Figure 16) - Display “Alarm messages”

Alarm messages	Possible reason	Corrective action
Source 1 fail.	Mains voltage or frequency not ok	Check mains voltage/inverter output voltage
Source 2 fail.	Inverter voltage or frequency not ok	Check inverter output voltage/mains voltage
Synchr. Error	Inverter voltage is not synchronous to mains	No mains voltage available or frequency of mains voltage is not stable (out of frequency tolerance range)
Inverter fail.	Inverter failure	CAN communication with one or more Inverters failed. Inverter failure detected via CAN
UNB overtemp	UNB over temperature	Check the air flow Check admissible ambient temperature
UNB overload	UNB output current to high	Reduce load current
INV overload	Actual output current exceeds the combined INV power	Reduce load current or increase INV power by additional inverter
DC-voltage low	Battery voltage low	Check DC voltage system
DC-voltage high	Battery voltage high	Check DC voltage system
Ubatt < warning	Battery voltage < warning level	Check DC voltage system
Ubatt > warning	Battery voltage > warning level	Check DC voltage system

7. Technical Specifications

Type designation	Please see section 3 " Type List/Main Data "
Material code	Please see section 3 " Type List/Main Data "
AC input:	
Nominal input voltage source 1 + 2	220/230/240 V _{AC} , adjustable
Input voltage tolerance	±20 %
Input frequency range	48 to 52Hz/58 to 62 Hz, adjustable
Synchronization range	±2 Hz (in combination with inverters of series PWS the range must be adjusted to ±0.5 Hz).
Efficiency	≥ 99 %
DC Voltage input:	
Nominal battery voltage	Please see section 3 " Type List/Main Data "
AC Output:	
Nominal output voltage	220/230/240 V _{AC} , adjustable, switch over threshold ±5 to ±20 %, adjustable
Nominal output power	Please see section 3 " Type List/Main Data "
Overload capability	1000 % for 10 ms
Output frequency	acc. to the input frequency
Switch transfer time	≤3 ms
Fusing	External with rated current, character gL
Standard Features:	
Monitoring functions	voltage/frequency of sources 1 and 2; synchronization mains/ inverter; over temperature; CAN communication lost; battery voltage
LED indications	Operation (green), source 1 OK (green), source 2 OK (green), load on mains (green), load on inverter (green), synchronization (green), collective alarm (red)
Alphanumeric display	LCD (4 x 16 characters), background lighted
Control keys	▲ , ▼, ESC, ENTER
Fault signalization	Text message on LCD; in addition 1 programmable isolated collective failure (alarm) relay, max. contact load: <0.25 A _{DC} @ V _{max} < 150 V _{DC} ; <0.5 A _{DC} @ V _{max} <100 V _{DC}
Communication interface	CAN-Bus for communication with inverters of type UNV and INV UNB with Ethernet interface (available by request): One RJ45 for remote control via HTTP (Web server), SNMP, SMTP and SNTP.
Remote switch ON	available
Environmental:	
Ambient temperature	operation: -20 °C to +55 °C; storage: -40 °C to + 85 °C
Climatic conditions	acc. to IEC 721-3-3 class 3K3/3Z1/3B1/3C2/3S2/3M2
Dust	<1 mg/m ³
Max. installation altitude	1500 m
Audible noise	≤45 dBA at 1 m distance

Static Transfer Switch UNB (incl. UNB-WEB)



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Mechanical:

Type of construction	19"- compatible rack acc. to DIN 41494
Cooling	forced cooling with internal fan (temperature regulated; monitored)
Surfaces	powder coating RAL 7035 (front panel only), black print; constructive parts: anodized metal
Dimensions (W/H/D)	UNB 5kVA + 12.5kVA: 483/133/360 mm (3HU) UNB 23kVA + 30kVA + 40kVA: 483/177/460 mm (4HU)
Weight	UNB 5kVA + 12.5kVA: approx. 12.6 kg UNB 23kVA: approx. 13.2 kg UNB 30kVA: approx. 15.8 kg UNB 40kVA: approx. 16.9 kg
Electrical connectors	Front side: 2 x CAN-Bus (RJ11); UNB with Ethernet interface: 1 x socket outlet RJ45, 8-pole Rear side: AC inputs/output, DC input and signalization; UNB 5kVA + 12.5kVA: 1 x HAN-K4/8; UNB 23kVA: 2 x HAN-K4/8; UNB 30kVA + 40kVA: 3 x HAN-K4/8

Applicable standards:

Type of enclosure/protection class	IP20 (front panel) /1 acc. to EN 60950 (electr.)
CE conformity	yes
Compliance to EMC standards	EN55011/55022 class "B"; EN61000-4 part 2-5)
Compliance to safety standards	acc. to EN60950-1; VDO0100 T410; VDO0110; EN60146

Static Transfer Switch UNB (incl. UNB-WEB)

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7.1 Dimensional Drawings UNB5.0/12.5 kVA:

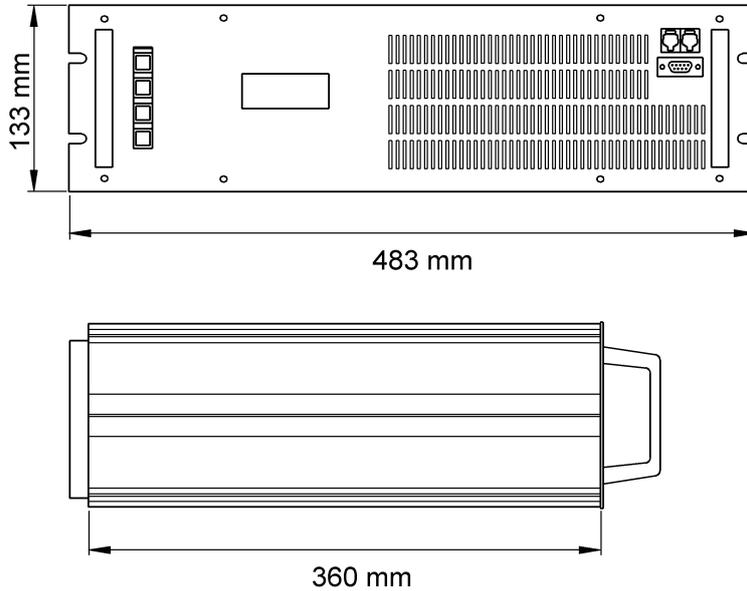


Figure 17) - Dimensions UNB5.0/12.5kVA

7.2 Dimensional Drawings UNB23.0kVA, UNB30.0kVA & 40.0 kVA:

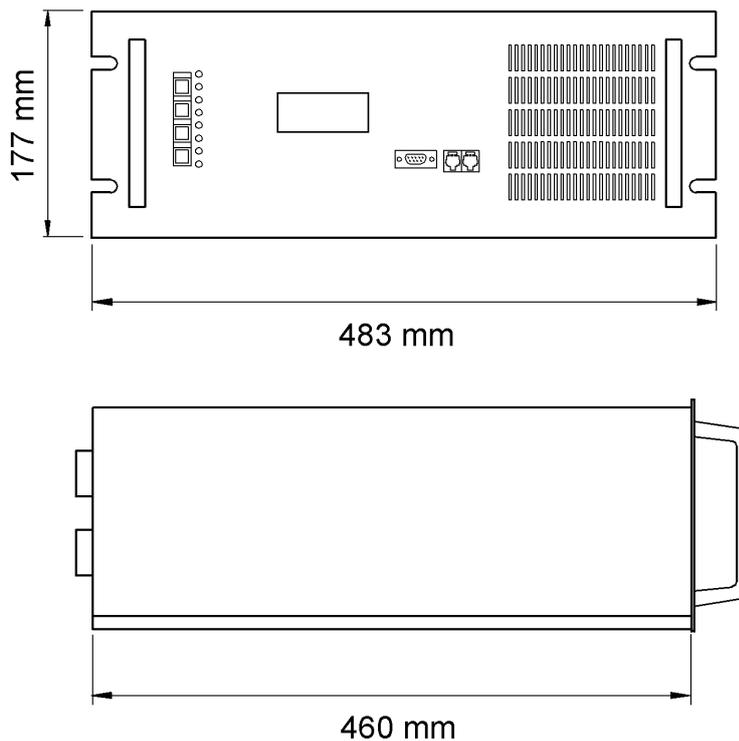


Figure 18) - Dimensions UNB23.0 to 40.0kVA

Static Transfer Switch UNB (incl. UNB-WEB)

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7.3 Photo UNB5.0/12.5kVA

See first cover page please.

7.4 Photo UNB23.0/30.0/40.0kVA



Figure 19) - Photo UNB23.0 to 40.0kVA

8. Appendix (service menus)

8.1 Service menu 1

8.1.1 Table “Adjustable parameters” (service menu 1)

Menu item	Function	Adjustable range	Adjustment steps	Default values
INV-nom. power.	Key in the nominal output power per inverter	1.0 to 5.0 kVA	0.1 kVA	2.5 kVA
Mains voltage	Key in the mains voltage value	200 to 250 V AC	1.0 V	230 V
Mains frequency	Set the mains frequency	50 or 60 Hz		50 Hz
Frequency range	Key in the tolerance range for synchronisation	±0.1 Hz to ±2.0 Hz	0.1 Hz	±0.5 Hz
UNB current	Key in the nominal UNB current	1- 250 A	1.0 A	Dependent on the type
Batt. cellcount ¹⁾	Key in the number of battery cells	12 to 200	1	Dependent on the type, see table below
Voltage/cell ²⁾	Key in the voltage per cell	1.2 V (NiCd), 2.0 V (Pb)		2.0 V
CAN-Status M/S ²⁾	Key in the CAN-Status “Master” or “Slave”	0= Master, 1 to 31= Slave	1	0
configur. rel.2	Without function	---	---	---
function relay 2	Without function	---	---	---
Delay relay 2	Without function	---	---	---
Default-values?	Reset the UNB to default values ³⁾	yes/no		no

¹⁾Cell count of the battery (Pb).

²⁾This menu item is inoperable

³⁾With the exception of calibrated values.

Factory-configured number of battery cells at the UNB:

Device name	Nominal DC input voltage	UNB is factory-configured for
UNBxxx-24	24 V	Lead acid battery, 12 cells
UNBxxx-48	48 V	Lead acid battery, 24 cells
UNBxxx-60	60 V	Lead acid battery, 30 cells
UNBxxx-110	108 V	Lead acid battery, 54 cells
UNBxxx-220	216 V	Lead acid battery, 108 cells

8.1.2 Flow chart “Service menu 1”

NOTE: “Service Menu 1” is code protected¹. 

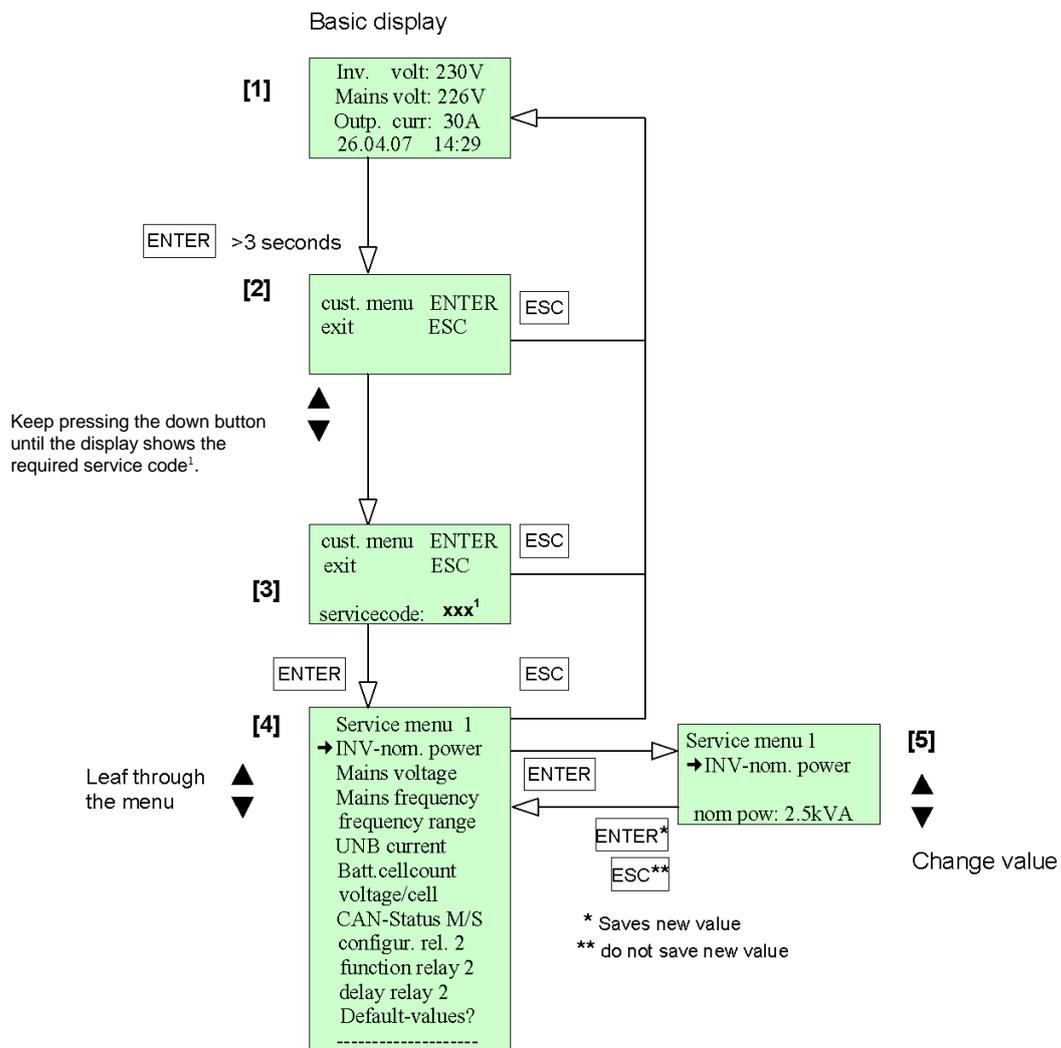


Figure 20) - Flow chart “Service menu 1”

8.1.3 Selection of “Service menu 1”

To attain Service Menu 1 please follow the steps according to the flow chart (see figure 20):

1. Based on the basic display [1] press and hold ENTER (for approx. three seconds) until the display shows “cust. menu” [2].
2. Press the down button ▼ and keep pressing until you get “servicecode: xxx¹” [3].
3. Tip ENTER. You are then in service menu 1 [4]. Pressing the buttons ▲ or ▼ you are able to leaf through the menu. The arrow (→) shows the menu item which is selectable by pressing ENTER. The flow chart (see figure 13) shows the selected menu item “INV-nom. power” [5].
4. Change the values pressing ▲ or ▼.
5. Tip ENTER to save the new values; if you tip ESC, the new values are not saved.
6. Tip ESC to return to the basic display.

For details concerning the adjustable parameters please see the table above “Adjustable Parameters (Service menu 1)”.

¹Please ask your system supplier if the code is required.

8.2 Service menü 2

8.2.1 Table “adjustable parameters” (service menu 2)

Menu item	Function	Adjustable range	Adjustment steps	Default values
Operation mode	Key in the priority source	“Inverter-“ or “mains priority”		Inverter priority
Source 1 >	Upper tolerance range of source 1 voltage	+5 to +20 %	1 %	+15%
Source 1 <	Lower tolerance range of source 1 voltage	-5 to -20 %	1 %	-15%
Time delay S1	Key in the time delay of source 1	0.5 to 4.0 ms	0.5 ms	2.0 ms
Source 2 >	Upper tolerance range of source 2 voltage	+5 to +20%	1 %	+20%
Source 2 <	Lower tolerance range of source 2 voltage	-5 to -20%	1 %	-20%
Time delay S2	Key in the time delay of source 2	0.5 to 4.0 ms	0.5 ms	4.0 ms
Uimax	Key in the over voltage switch-off value	2.00 to 3.00 V/cell	0.01 V	2.50 V/cell*
Uimin 1 ¹⁾	Key in the under voltage switch-off value	0.70 to 2.50 V/cell	0.01 V	1.70 V/cell*
Uimin 2 ¹⁾	Key in the under voltage switch-on again value	0.60 to 2.50 V/cell	0.01 V	1.90 V/cell*
Ubatt >	Key in the over voltage warning value	2.20 to 2.50 V/cell	0.01 V	2.35 V/cell*
Ubatt <	Key in the under voltage warning value	1.70 to 2.10 V/cell	0.01 V	1.90 V/cell*
Load on mains ²⁾	Key in: Switch load stationary on mains?	Yes/no		no

*Number of cells is set at service menu 1.

¹⁾Please note: Uimin 1 < Uimin 2 (hysteresis)!

²⁾Only suitable for service. Not stored in EEPROM!

8.2.2 Flow chart „Service menu 2“

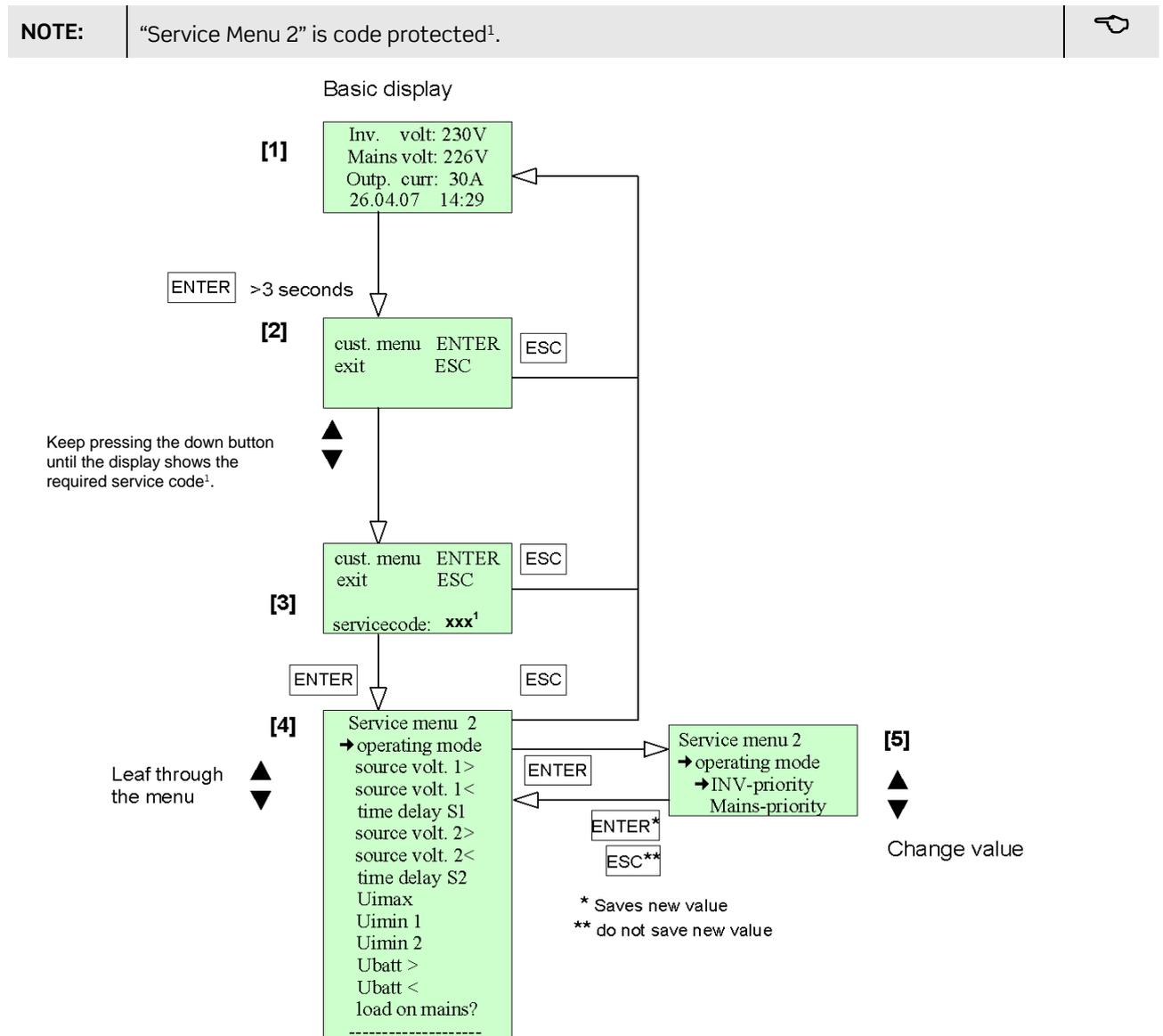


Figure 21) - Flow chart "Service menu 2"

8.2.3 Selection of "Service menu 2"

To attain Service Menu 2 please follow the steps according to the flow chart (see figure 21):

1. Based on the basic display [1] press and hold ENTER (for approx. three seconds) until the display shows "cust. menu" [2].
2. Press the down button ▼ and keep pressing until you get "servicecode: xxx¹" [3].
3. Tip ENTER. You are then in service menu 2 [4]. Pressing the buttons ▲ or ▼ you are able to leaf through the menu. The arrow (→) shows the menu item which is selectable by pressing ENTER. The flow chart (see figure 14) shows the selected menu item "operating mode" [5].
4. Change the values pressing ▲ or ▼.
5. Tip ENTER to save the new values; if you tip ESC, the new values are not saved.
6. Tip ESC to return to the basic display.

For details concerning adjustable parameters see the table above "Adjustable Parameters (Service menu 2)".

¹Ask your system supplier if the code is required.



Supplier:

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