

***ENS31NA
Centralized Network and System Protection
complying with regulation VDE AR-N-4105
and Automatic Isolation Unit
complying with standard DIN V VDE V 0126-1/A1***

***Installation and
Operating Manual***

UfE Umweltfreundliche Energieanlagen GmbH
Joachim-Jungius-Straße 9
D - 18059 Rostock

Tel.: +49 3 81 / 405 97 05
Fax: +49 3 81 / 405 97 03
E-mail: post@ufegmbh.de
web: www.ufegmbh.de



Note

If you have any queries and need to contact UfE GmbH, always have the serial number close to hand in order to make reference to it. We do not claim the documentation is free of errors and mistakes. Please inform UfE GmbH of any errors found in the documentation.

© Copyright

This operating manual is the copyright of UfE GmbH.

This manual is intended for the operator and electrician. It contains instructions and information which must not be copied, distributed or transferred by technical data methods nor used for the purpose of competition, either as an entirety or as extracts, without the necessary authorisation.

Contravention could lead to prosecution and obligation to pay damages.

All rights reserved, particularly in the case of patent application or other registrations.

We reserve the right to make technical modifications without notice.



Note

The ENS31NA and the measuring method are protected by patent.

We

UfE Umweltfreundliche Energieanlagen GmbH
Joachim-Jungius-Straße 9
D - 18059 Rostock

declare in sole responsibility that the product

Type: centralized NA-Protection ENS31NA

fulfils the applicable health and safety requirements in the EU Directives

89/336/EEC (Electromagnetic Compatibility EMC) and
73/23/EEC (low voltage guidelines)

and the law reorganising the safety of technical apparatus and consumer products (law on equipment and product safety), as well as the requirements stipulated in other applicable, harmonised European Norms.

In addition, the following directives are also fulfilled:

89/391/EEC (employee safety and health protection)
VDE-AR-N-4105 (Generators connected to the low-voltage distribution network)
DIN V VDE V 0126-1-1/A1 (Automatic disconnection device between a generator and the public low-voltage grid)

Klaus-Wilhelm Köln
Manager

Table of Contents

1	Safety	6
	1.1 General information	6
	1.2 Safety symbols used in this operating manual	6
	1.3 Obligations.....	7
	1.3.1. Obligations of the proprietor	7
	1.3.2. Obligation of personnel.....	7
	1.4 Guarantee and liability.....	7
	1.5 Accident prevention regulations	8
	1.6 Intended use.....	9
	1.6.1 Exclusive purpose.....	9
	1.6.2 Observe information and regulations	9
	1.7 Installation and connection	10
	1.8 Operation.....	10
	1.9 Rating plate and CE symbol.....	11
2	Connections and Indicators	12
	2.1 Connections.....	12
	2.2 LCD display and LEDs	13
3	Mechanical Installation	14
	3.1 Transport and unpacking.....	14
	3.2 Conditions for installation	14
	3.3 Preparing the electrical/meter cabinet.....	15
	3.4 Mounting on the top hat rail.....	15
	3.5 Removing from the top hat rail	16
4	Electrical Connections	17
	4.1 Basic configuration	17
	4.2 Demands of the switching elements.....	17
	4.2.1 Complying with regulation VDE AR-N-4105	17
	4.2.2 Complying with standard DIN V VDE V 0126-1-1/A1 ..	17
	4.3 Circuitry	18
	4.4 Disconnection.....	19
5	System Description	20
	5.1 Principles of functioning.....	20
6	LCD Displays	21
	6.1 Switching the system on.....	21
	6.2 Menus and menu navigation	21
	6.2.1 LCD Overview and default menu.....	22



Table of Contents

	6.2.2 LCD Fault menu	23
	6.2.3 LCD Version menu	24
7	Operation	26
	7.1 LED indicators during the power-on routine	26
	7.2 LCD displays during operation	26
	7.3 Switching the system off	26
8	Troubleshooting	27
	8.1 General information	27
	8.2 Error indications in the LCD	27
	8.2.1 Fault messages of the overview menu	27
	8.2.2 Fault messages of the fault list	29
	8.2.3 Error indication through LEDs	30
9	Technical Data	31
10	Declaration concerning the Requirements of the VDE-AR-N 4105	32

1 Safety

1.1 General information

This chapter contains information on safety and rules of conduct. It is essential to observe the information and rules so that any residual risks represented by the product do not lead to a fault or an accident.

The device must be connected to the local power supply. Therefore, all the normal risks involved in the use of electrical power are present here, too.

1.2 Safety symbols used in this operating manual

The following symbols are used at the relevant points throughout this manual. Pay strict attention to the information provided in these sections and proceed with the utmost care.

Meaning of the safety symbols:



Danger

This symbol indicates the risk of fatal or personal injury if certain rules of conduct are disregarded. When this symbol appears in the operating manual, take all the necessary safety precautions.



Attention

This symbol indicates the risk of property damage as well as financial and legal disadvantages (e.g. loss of rights to claims under the terms of guarantee, liability, etc.).



Note

This symbol indicates important information on working efficiently, economically and ecologically.

1.3 Obligations

1.3.1. Obligations of the proprietor

The proprietor is obliged only to allow suitably trained personnel to work with the ENS31NA isolation unit who

- re familiar with the basic regulations on safety and accident prevention
- have read the operating manual, the chapter on safety and the safety symbols, have understood them and confirmed this with their signature.

The proprietor must always ensure the entire product documentation is at the disposal of operating personnel.



Danger

The proprietor bears the responsibility for safety. This responsibility cannot be delegated.

1.3.2. Obligation of personnel

Personnel must:

- be in possession of a license to connect electronic equipment to the public electricity supply,
- always ensure for themselves that third-parties and the equipment are safe,
- maintain the safety and connection regulations of the power supply provider,
- have read and understood the operating instructions, the chapter on safety and warning labels,
- observe the applicable regulations concerning industrial safety and accident prevention.



Danger

This concerns the safety of yourself and other persons in the vicinity of the ENS31NA as well as safety when working with the mains electricity supply.

1.4 Guarantee and liability

Our "General Terms of Sale and Delivery" apply. The proprietor has claim to these on conclusion of the contract at the latest. Rights to claims under the terms of guarantee and liability in respect of persons and property are considered void when they are the result of one or more of the following causes:

- Unintended use of the ENS31NA
- Improper start up, operation and service of the ENS31NA

- Failure to observe information in the overall documentation in respect of
 - installation, connection
 - starting up
 - operation
 - cleaning/servicing
- Unauthorised constructional modifications to the ENS31NA
- Damage through overvoltage, overload, short circuit, mechanical interference, moisture
- Case of catastrophe caused by foreign body or Act of God.

**Attention**

No modification may be carried out on the ENS31NA without the approval of the manufacturer.

**Attention**

Never attempt to repair the device yourself. All rights to claims under the terms of guarantee are annulled in the case of tampering.

1.5 Accident prevention regulations

Any faults which occur that affect safety must be eliminated immediately. The ENS31NA may not be operated until the fault has been cleared.

**Danger**

Solar modules conduct electricity as soon as they are exposed to daylight. Observe this when laying and connecting the cables and take the necessary precautions.

**Danger**

It is forbidden to open the unit. The box can continue to conduct dangerous residual voltage some minutes after being switched off.

**Danger**

The ENS31NA connects an autonomous power generator to the grid. Autonomous power generators are voltage or current sources which may be under voltage even with a switched off grid. Therefore the grid as well as the generator must be de-energized at the connecting switch!

1.6 Intended use

The ENS31NA has been built according to state-of-the-art technology and accepted safety regulations.

However, when the unit is used, there remains a risk of fatal and personal injury to the user and third-parties as well as impairment of the unit and other property damage.

1.6.1 Exclusive purpose

The NA protector is responsible for switching off the power generator from the grid in case of improper voltage and frequency values (refer to DIN VDE 0100-551). Thus an accidental supply by the power generator into a separated part of the grid as well as the supply of faults into the grid shall be prevented.

The ENS31NA is exclusively intended for monitoring voltage, frequency and impedance of the electricity network at the feeding point of a power generating system. On detecting over- and undervoltages, frequency deviation or an inadvertent creation of a network splitting, the ENS31NA disconnects the feeding point from the public electricity supply by means of contactors. Any other use is considered unintended use. The manufacturer is not liable for any consequential damage in such cases.

1.6.2 Observe information and regulations

Intended use also includes

- observing all information provided in this operating manual and
- maintaining the connection and installation conditions prescribed by the manufacturer.

1.7 Installation and connection

For installation and connection of the ENS31NA please observe chapters 2 to 5.



Danger

It is forbidden to open the unit. The unit can continue to conduct dangerous residual voltage some minutes after being switched off.

1.8 Operation

Operation of the ENS31NA is impermissible:

- for monitoring tasks for which the unit is not designed,
- when using accessories which have not been approved by the manufacturer,
- when the proprietor has made constructional modifications.

Functional faults must be analysed immediately. If necessary, the proprietor must request specialist assistance. The equipment may only be put into operation again when there is no doubt about its safety.

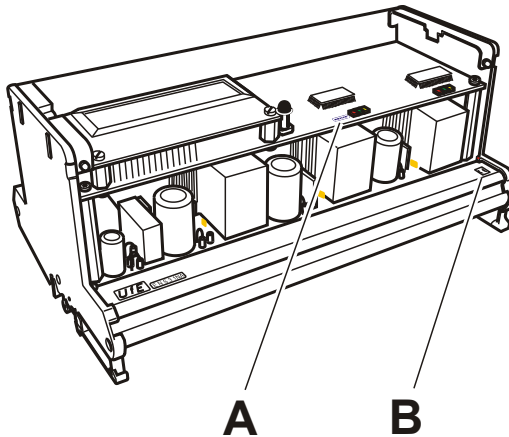
The ENS31NA is intended for operation at room temperatures between - 20 °C and + 40 °C (also refer to Chapter 9).

Contact a suitably trained electrician or the manufacturer in the following cases:

- connection cable is damaged,
- liquids or foreign bodies have got inside the unit,
- the unit has been exposed to water or rain,
- the unit has fallen down or is mechanically damaged,
- the unit behaves in a way indicating a fault (e.g. indicator on the LCD, constant switching).

1.9 Rating plate and CE symbol

The manufacturer has provided the following information on the ENS31NA at the positions indicated:



A Serial number

The manufacturer's serial number for the ENS31NA is provided at this point.

B CE-symbol

The CE symbol is located at the bottom right corner of the front side.



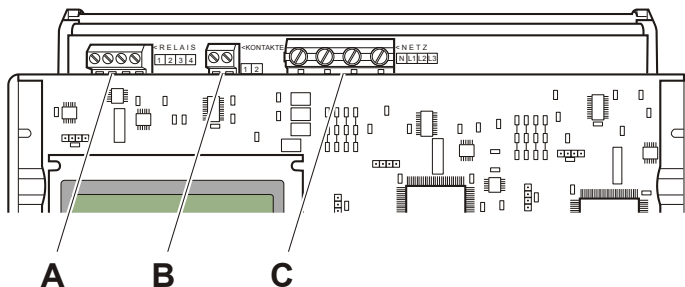
Note

Always make reference to the ENS31NA serial number in the case of inquiries, orders and contracts. This simplifies communication with the manufacturer and prevents errors when processing requests.

2 Connections and Indicators

2.1 Connections

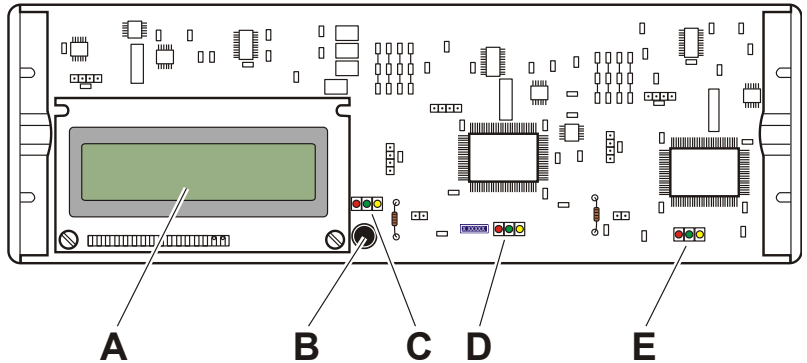
The following connections are provided at the top edge of the ENS31NA:



- A** 4 connection terminals for contactor control, potential-free; designation from left to right: R1, R2, R3 and R4
- B** 2 connection terminals to connect positively driven auxiliary contacts; designation from left to right: K1 and K2
- C** 4 connection terminals to connect three phases and the neutral conductor; designation from left to right: N, L1, L2 and L3

2.2 LCD display and LEDs

The following indicators are mounted on the front side of the ENS31NA:



A) LCD display

The unit and mains power status are shown on a 2-line LC display. Each line can display 16 characters.

B) Pushbutton for LCD display

Pushbutton is used to navigate between the main menus.

Any short actuation of the pushbutton switches to the next main menu. If the pushbutton is hold for 4 s the submenu of the actual main menu will be opened or the submenu switches to the main menu.

C) to E) LEDs

In addition to the LCD, the unit and mains power status are also indicated by three LEDs (red, green, yellow):

C = LED display for phase 1 (L1)

D = LED display for phase 2 (L2)

E = LED display for phase 3 (L3).



Note

The meaning of the indicators is described in chapter 7 and chapter 8.

3 Mechanical Installation

3.1 Transport and unpacking

When transporting the ENS31NA isolation unit, pay attention that it is always protected against contact with dirt and damage through impacts and setting down too hard.

Remove the ENS31NA from the transport packaging and pull off the protective foil, if necessary.

After transport and before installation, check that the ENS31NA isolation unit is in a perfect condition.

3.2 Conditions for installation

The ENS31NA is intended for installation on a top hat rail in an electrical cabinet or in a meter cabinet. It cannot be installed anywhere.

If the ENS31NA is used as a central NA protection the system is to be installed within the electricity meter cabinet.

The cabinet must be sufficiently large to house the ENS31NA, providing the necessary contactors and protect the unit from moisture, dust, dirt and heat.

If there is not enough space in the cabinets available, a separate electrical cabinet must be mounted to accommodate the ENS31NA and contactors.



Attention

Never position the electrical cabinet containing the ENS31NA above or in the vicinity of a heater. Ensure sufficient ventilation.

The ENS31NA should be mounted as near as possible to the mains power outlet and as far as possible from the electricity feeding source.



Note

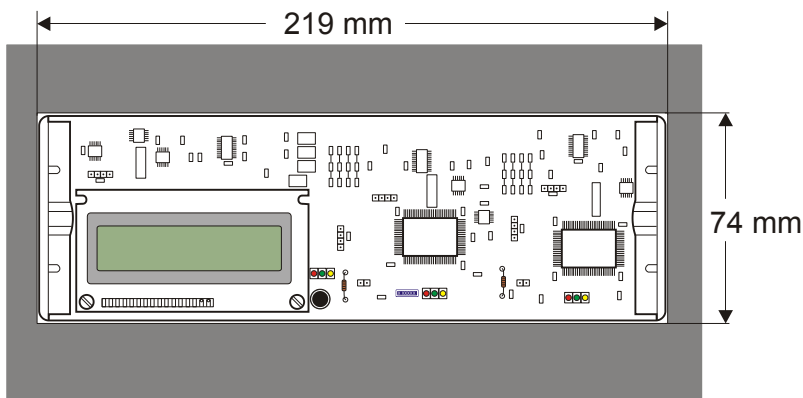
These measures reduce the effect of voltage increase by the current source.

3.3 Preparing the electrical/meter cabinet

Determine the installation position of the ENS31NA on the top hat rail.

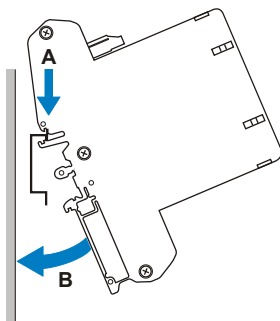
Saw a cut-out in the cabinet cover at the installation position of the ENS31 so that you can see the ENS31NA and its indicators (LCD and LEDs) without opening the cabinet.

The cut-out must have the following dimensions:



3.4 Mounting on the top hat rail

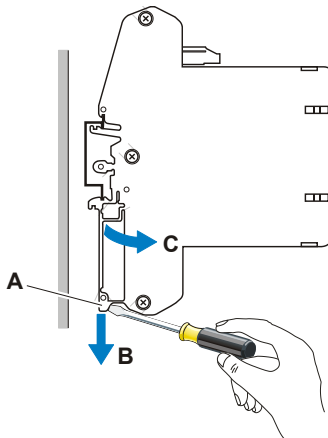
Set the ENS31NA with its top housing holder (A) on the top hat rail and turn it downwards against the top hat rail (B). Use a little force to press on the bottom housing section until the housing holder engages in the top hat rail.



3.5 Removing from the top hat rail

The ENS31NA kann von der Hutschiene wieder abgezogen werden.

Insert the tip of a screwdriver in the grooves (A) in the clamps at the ends of the housing. Pull the clamps downwards (B). The ENS31NA is released. Remove the ENS31NA by turning it a little (C) away from the top hat rail.



Attention

Never remove the ENS31NA from the top hat rail using brute force. This could damage the housing holders.

4 Electrical Connections

4.1 Basic configuration

The switching elements of the automatic isolating device or connecting switches (e.g. contactors) are not enclosed with the unit and must be brought by the installation technician. The technician decides on the switching elements most suitable.

**Danger**

The installation technician must ensure that the power generator is only connected to the mains via the two switching elements assigned to the ENS. Risk of accident!

The ENS31NA must be protected by pre-fuses in the mains feed circuit (min. 6 A, max. 25 A). Observe the circuit diagram.

4.2 Demands of the switching elements

4.2.1 Complying with regulation VDE AR-N-4105

The connecting switches consists of two electrical switching components (contactors or motor switches) connected in series. For power values of 100 kVA or more only motor switches are permitted. The switching elements must be short-circuit proof and disconnect all phases. The dimension of the switching capability shall at least meet the trigger value of the upstream fuse.

4.2.2 Complying with standard DIN V VDE V 0126-1-1/A1

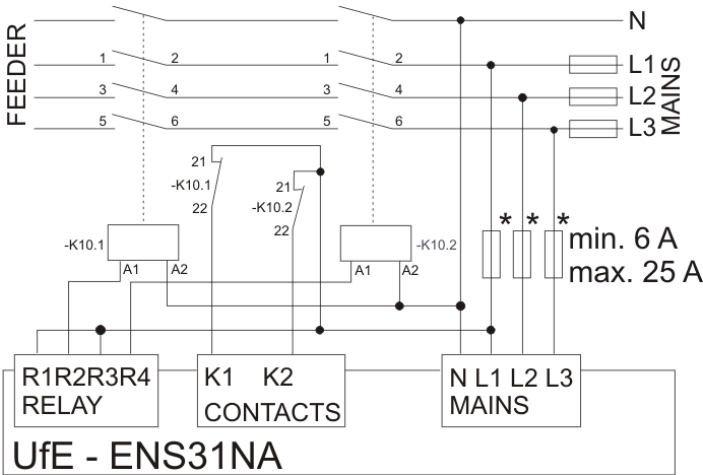
Two contactors with positively driven auxiliary contacts are required for mains disconnection. The feedback contacts must be connected in the correct sequence (refer to circuit diagram).

The contactors must be designed for the nominal output of the current inverter or the system at AC3. The decisive factor for dimensioning is the phase with the highest load

4.3 Circuitry

Check that the mains power lines and power feed lines are not conducting electricity.

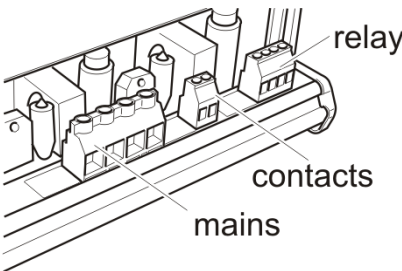
Switch the power generator (feeder), ENS31NA and contactors as follows (**note the turning direction**):



Note

The additional pre-fuse () is only necessary if the direct mains power fuse protection exceeds 25 A.*

The terminals on the ENS31NA are arranged as follows:





Attention

*The ground conductor should always bypass the unit. **The neutral conductor MUST be connected to the ENS31NA** otherwise the unit may be damaged.*

If the ENS31NA is switched on and off by means of a system control unit, the L1 connection of the ENS31NA can be switched by means of a relay.



Note

When switching on via L1, the delay until the contactors are activated can be up to 60 seconds because the ENS31NA must test the power feed conditions again.

4.4 Disconnection

Switch off the power supply to the mains power lines and lines from the power generator (feeder).

Wait until the ENS31NA has removed all the residual voltages.



Danger

The ENS31NA can still conduct dangerously high residual voltage some minutes after being switched off. Risk of accident!

Disconnect the mains power lines, contactor lines and relay lines.

Insulate bare contacts from mains power lines, contactor lines and relays (e.g. using insulation tape).

The ENS31NA can then be removed from the top hat rail (also refer to Chapter 3.5).

5 System Description

5.1 Principles of functioning

The ENS31NA is an automatic switch which is used to connect decentralised electricity generators to the public electricity supply.

In the event of faults in the mains supply, the ENS31NA interrupts the feeding of electricity into the mains to prevent an island effect.

The following deviations are monitored:

- overvoltage and undervoltage
- frequency deviation
- accidental network splitting (complying with standard DIN V VDE V 0126-1-1/A1)

The ENS31NA replaces an otherwise prescribed manual isolation unit to which (for units up to 30 kVA) the power supply authorities must have permanent access.

**Note**

Further information on the principles of functioning is available on our Internet site at www.ufegmbh.de.

6 LCD Displays

6.1 Switching the system on

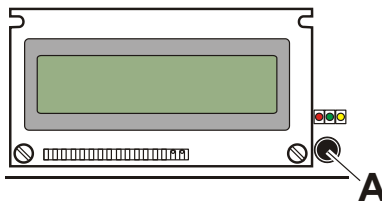
Switch the mains supply on first and then the power generator (feeder).

The ENS31NA starts up automatically after switching on the mains supply.

When the voltage, frequency and mains impedance are in the permissible range for at least 60 seconds, the contactors are triggered and power feed in the public electricity supply begins. The mains power is then monitored.

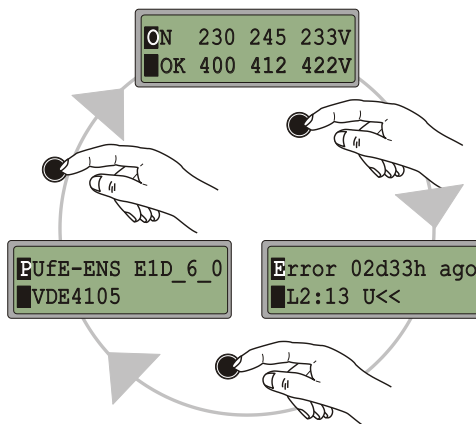
6.2 Menus and menu navigation

After power on a short activation of the pushbutton (A) beside the LCD display switches between the three main menus.



These menus are:

- LCD overview and default menu
- LCD fault menu
- LCD version menu



Within these menus the first character of the upper line is inverted.

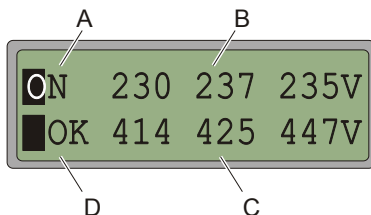
From two menus respective submenus may be opened by pressing the pushbutton (A) for a longer time:

- from the LCD fault menu to the LCD fault protocol menu = more than 3 sec
- from the LCD version menu to the LCD parameter menu = more than 3 sec

Within the submenus the first character of both lines are inverted.

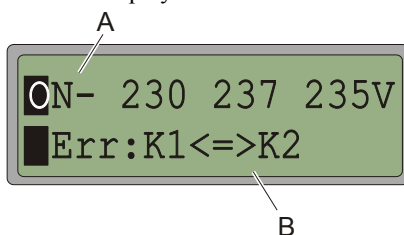
6.2.1 LCD Overview and default menu

If a fault is active the following LCD display will be shown:



Pos.	Meaning
A	Operating mode of the NA protection (N)
B	Mains voltage of individual phases L1 = left, L2 = middle, L3 = right
C	ENS31NA has switched the contactors und displays the intermediate voltages: L12 = left, L23 = middle, L31 = right
D	Condition of the grid is OK.

The LCD display shows the status and the error source if a fault was detected:



Pos.	Meaning
A	Operating mode of the NA protection (N), contactors are open (-)
B	Fault message (refer to table in chapter 8.2.1)

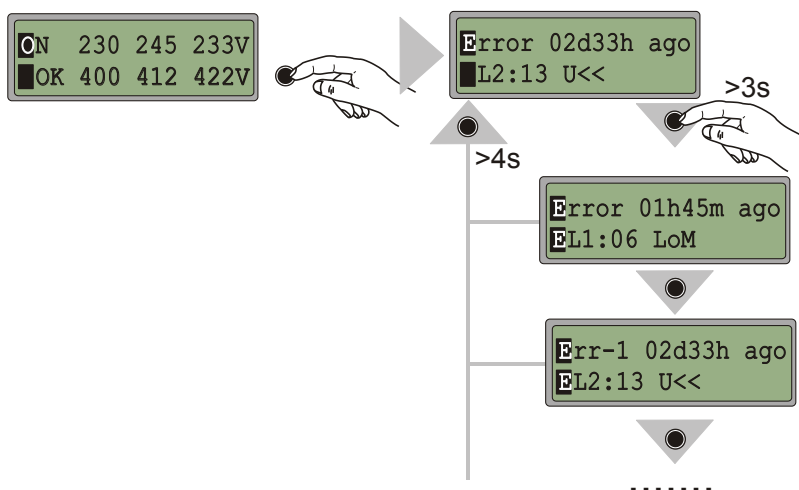
6.2.2 LCD Fault menu

Shortly press the pushbutton to change from the overview menu to the fault menu. The last fault is displayed.

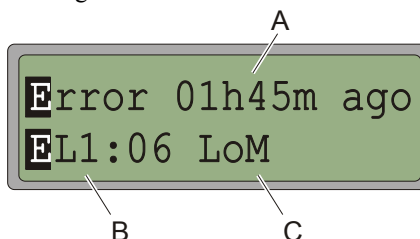
The last 9 faults are stored. Press the pushbutton for more than 3 sec. to open the fault list.

Shortly press the pushbutton to navigate within the fault list. The faults are accessible within a loop (i. e. after fault 9 the display starts with fault 1 again).

To return from any point of the list to the fault menu the pushbutton has to be pressed for more than 4 sec.



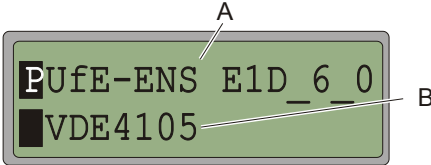
Meaning of the fault indication:



Pos.	Meaning
A	Fault occurred 1 hour and 45 minutes ago.
B	Phase on which the fault occurred.
C	Fault message (refer to table in chapter 8.2.2)

6.2.3 LCD Version menu

Shortly press the pushbutton twice to change from the overview menu to the version menu.

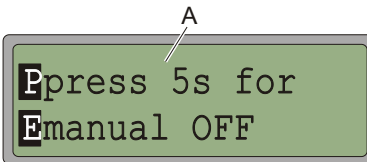


Pos.	Meaning
A	Designation of the ENS and version of the software
B	respective standard

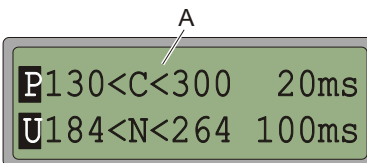
Press the pushbutton for more than 3 sec to open the parameter list.

Five parameter lists are provided. The parameter lists are accessible within a loop (i. e. after list 4 the display starts with list 1 again).

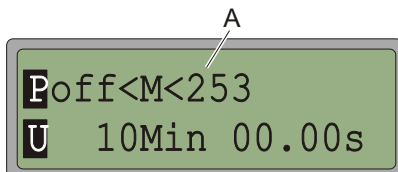
To return from any point of the parameter list to the version menu the pushbutton has to be pressed for more than 4 sec.



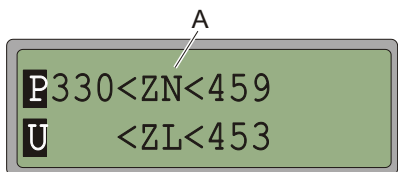
Pos.	Meaning
A	Press the pushbutton for more than 5 sec. to trigger the contactors.



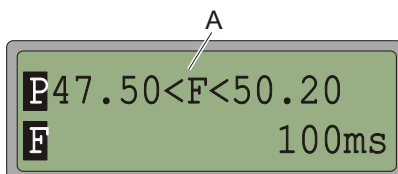
Pos.	Meaning
A	Trigger limit and average time for fast response (one period) and normal trigger time (100 ms) due to voltage



Pos.	Meaning
A	Trigger limit and average time for slow response due to voltage (10 minutes average value)



Pos.	Meaning
A	Trigger limit of the intermediate voltages for normal and slow response due to voltage






Pos.	Meaning
A	Trigger limit and average time for response due to frequency (100 ms)

7 Operation

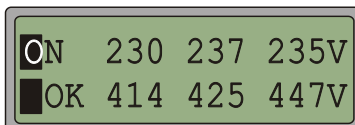
7.1 LED indicators during the power-on routine

LEDs are provided for each individual phase and light up as follows during the power-on routine:

Anzeige	Meaning
	All LEDs light up to begin with.
	After approx. 1 sec., a running light is activated.
	The mains power is in order and the ENS31NA switches it on. During operation, the yellow LED can flash or light up continually.

7.2 LCD displays during operation

After a successful selftest and a successful test of the grid the LCD display shows:



This indication is displayed during the operation, as long as no fault is detected. If a different menu or submenu was selected, the unit switches to this display after an hour of inactivity (no pushbutton activated).



Attention

Regularly check the function of the ENS31NA. If (for example) the red LED will illuminate permanently the ENS31NA may be defective and no current will be feeded (see also chapter 8).

7.3 Switching the system off

The ENS31NA cannot be switched off. The unit switches to an idling state if no voltage is supplied. It resumes its tasks as soon as sufficient power is available.

8 Troubleshooting

8.1 General information

In the case of repeated problems with the mains supply (e.g. frequent deactivation due to mains overvoltage or undervoltage), contact the public electricity supply authority and have the mains power quality checked at the feeding point.

A frequent disconnection from the mains power supply can be observed particularly in rural areas and areas with strong power fluctuations due to the proximity of industrial plants.

8.2 Error indications in the LCD

8.2.1 Fault messages of the overview menu

LCD display	Meaning
Err:K1=0V K2=0V	<p>0V at both feedbacks even with deactivated contactors (voltage should be present at the NC aux contacts of the contactors).</p> <ul style="list-style-type: none"> – no feedback or no contactors connected – no NO aux contacts are used – contacts of both contactors are welded
Err:K2=0V Err:K1=0V	<p>0V at feedback of contactor 1 or 2, even with deactivated contactors (voltage should be present at the NC aux contacts of the contactors).</p> <ul style="list-style-type: none"> – no feedback or no contactors connected – no NO aux contacts are used – contacts of both contactors are welded
Err:K1<=>K2	<p>At switching on of first contactor the voltage of the first feedback should decrease. Happens only at the feedback of the second contactor.</p> <ul style="list-style-type: none"> – feedback of contactors are inverted
Er:Rel.1 defective	<p>Feedback remains at mains voltage after switching of relay 1:</p> <ul style="list-style-type: none"> – relay 1 does not operate – feedback is connected to mains voltage

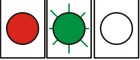
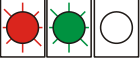
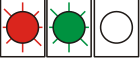

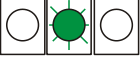



LCD display	Meaning
Er:Rel.2 defective	Feedback remains at mains voltage after switching of relay 2: <ul style="list-style-type: none"> – relay 2 does not operate – feedback is connected to mains voltage
N- 230 234 180V E 50.00 120!240	A frequency fault occurred. A symbol in front of the frequency value indicates the type of error (see following table).
N- 230 234v180V Er 400 480^402V	A voltage error occurred. A symbol in front of the voltage value indicates the type of error (see following table).
HD1Err 14 03 02 HD2Err 47 13 02 HD4Err 04 03 02	A hardware fault is detected. Please call the manufacturer. When calling have the fault number at hand.

Type of fault	Meaning
.	Value is initialized.
/	The average value of a full wave is too high (20 ms average value).
–	The average value of a full wave is too low (20 ms average value).
^	The value exceeds the allowed zone (200 ms average value).
v	The value falls below the allowed zone (200 ms average value).
M	The long time value is too high (10 minutes average value).
m	The long time value is too low (10 minutes average value).
!	The value left the allowed zone (too high or too low).
j	The value showed an unauthorized jump.
	The value is within the permissible zone.

8.2.2 Fault messages of the fault list

ID	Code	Meaning
01 to 07	LoM	Network splitting detected (Lost of Main)
06 to 07	LoM?	Network splitting detected or hardware fault for a longer time
8	U>>>	Voltage of the 20 ms average value is too high (fast disconnection)
9	U<<<	Voltage of the 20 ms average value is too low (fast disconnection)
10	U>>	Intermediate voltage of 100 ms average value is too high
11 to 12	U>>	Voltage of the 100 ms average value is too high
13	U<<	Intermediate voltage of 100 ms average value is too low
14 to 15	U<<	Voltage of the 100 ms average value is too low
16 to 17	U>	Voltage of the 10 minutes average value is too high
18	U<	Intermediate voltage of the 10 minutes average value is too low
19	U<	Voltage of the 10 minutes average value is too low
20	F<	Frequency of the 100 ms average value is too low
21	F>	Frequency of the 100 ms average value is too high
66	ManuelOff	Relay has been triggerd manually
30 to 84	HD1=10*	Register of the hardware faults Display of register and content. Please provide the display content if you call back. *) Example of a display content

8.2.3 Error indication through LEDs

LED indication	Cause	Recommended action
 Red lights up, green flashes	Frequency error	Wait until the mains is switched on again. Contact the public electricity authority in the case of longer power failures.
 Red and green flash simultaneously	Voltage error	
 Red and green flash alternately	Impedance error	
 Green lights up with short interruptions	Measured value(s) outside the factory tolerance	Mains power is ok.
 Green flashes rapidly	ENS31NA waiting for acknowledgement from inverse rectifier	Mains power is ok.
 or 	Display of impedance jump threshold value: lights up briefly = 0.1 ohm lights up longer = 0.5 ohm. short, short, long = $0.1 + 0.1 + 0.5 = 0.7 \text{ Ohm}$ LED continually on: threshold is set to 1 ohm or more.	
 Red lights up	Measuring error or ENS31NA has failed	If the LED lights up longer than 1 minute with mains available, the ENS31NA is defective. Have the ENS31NA replaced by a specialist workshop.

9 Technical Data

Switched power (max.)	Dependent on the contactors assigned
Own consumption	3.5 W
Housing	Plastic, suitable for assembly on the top hat rail
Overall dimensions (W x H x D)	220 mm x 111 mm x 80 mm
Cut-out dimensions (W x H)	220 mm x 73 mm
Ambient conditions	- 20 °C to + 40 °C, 10 to 90 % relative humidity, non-condensating
Nominal current of power feeder	According to max. switching power of the contactors
The unit disconnects the mains under the following defined conditions (complying with regulation VDE-AR-N-4105 and standard DIN V VDE V 0126-1-1/A1):	
Overvoltage (fast shutdown)	> 300 V (response time 20 ms)
Overvoltage	> 264 V (response time 100 ms)
Overvoltage	230 V + 10% over 10 minutes
Undervoltage	< 184 V (response time 100 ms)
Frequency deviation	+ 1.5 Hz / - 2.5 Hz (response time 100 ms) optional: + 0.3 Hz / - 1.5 Hz statistically distributed - 2.5 Hz (response time 100 ms)
Impedance jump detection	> 0,5 Ohm (Reaktionszeit 500 ms)



Umweltfreundliche Energieanlagen

UfEGmbH JoachimJungius-Str. 9 18059 Rostock

Declaration concerning the Requirements

**of the VDE-AR-N 4105 „Generators connected to the low-voltage distribution network“
NA protection, type: ENS31NA**

The above mentioned grid and system protection meets the requirements of the VDE-AR-N-4105.

The setup values and switch off times are according to item 5.5 of the VDE-AR-N-4105.

The functional safety has been checked and meets at least the requirements according annex A „to 5.1 General requirements, single fault safety“ of the VDE-AR-N-4105.

The software version in use is: ENS E1D_6

Rostock, 07.09.2011

Klaus-Wilhelm Köln
Manager

Manager: Klaus Köln
J.-Jungius-Str. 9,18059 Rostock
HRB 8987, AG Rostock
Ust.-IdNr: DE 173735470
St.-Nr.: 11 079 121 04502