



VMD460-NA

This quick start does not replace the manual!

You will find the manual on the website

www.bender.de

Make sure that the personnel has read this manual and understood all instructions relating to safety.



Scope of delivery

- One VMD460-NA
- Safety instructions
- This Quick start

Intended use

The voltage and frequency monitoring relay **VMD460-NA** is used for system and network protection (**NS protection**) of **CHPs, wind, hydroelectric and photovoltaic systems feeding power into the grid.**

If inadmissible voltage and frequency values occur on the supply side, the VMD460-NA has the task of disconnecting the power generation system from the distribution network by means of a coupling switch.

The voltage and frequency monitoring relay is to be installed and connected directly at the central meter panel.

The VMD460-NA utilises a separate supply voltage connection.

Safety instructions



Danger of electric shock!

Touching live parts will cause danger of electric shock with fatal consequences. All work activities on electrical installations as well as installation activities, commissioning activities and work activities with the device in operation may only be carried out by electrically skilled persons!



After commissioning, the essential settings of the VMD460-NA have to be protected against unauthorised changes by a password. If the password protection is not used, the device has to be sealed.



Overvoltage limit values $U_{>>}$ and $U_{10>} / U_{>}$

Overvoltage limit values and the nominal voltage parameter can be used to set limit values that are higher than the maximum voltages of the measuring circuit.

The user must ensure that these maximum voltages will not be exceeded.

Installing the device

Notes on mounting



Danger of electric shock!

Make sure that the installation area is disconnected from any electrical source.

Consider the data on the rated voltage and supply voltage as specified in the technical data!



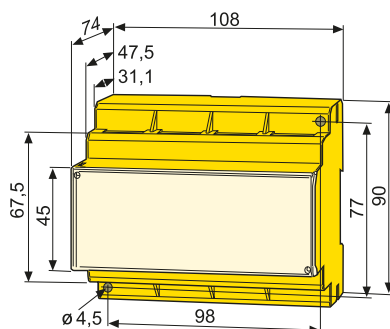
The length of the connecting cable of the device connections DG1/2, D1, D2, DG3/4, D3, D4, RTG and RT1 is to be limited to 3 m.



To ensure the VMD460-NA's functionality after a power failure, it is recommended to use an external UPS.

Gerät anschließen

Dimension diagram (dimensions in mm)



DIN rail mounting

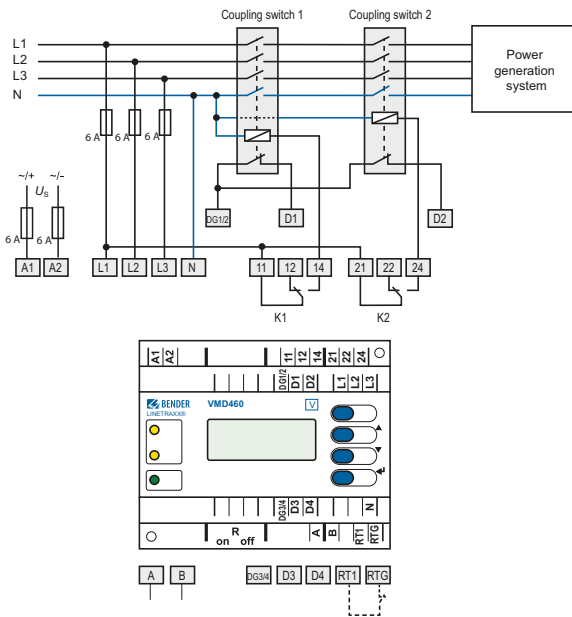
Snap the rear mounting clip of the device into place in such a way that a safe and tight fit is ensured.

Screw mounting

1. Use the tool to move the rear mounting clips (a second mounting clip required, see ordering information) to a position that it projects beyond the enclosure.
2. Then fix the device using two M4 screws.

VDE-AR-N 4105, BDEW, C10/11, G59/2, G59/3, G83/2, DIN V VDE V 0126-1-1

Wiring diagram



Single-fault safety

In order to ensure single-fault safety, the VDE-AR-N 4105 has to be realised for the power generation system. A single fault in the actuation circuit must not prevent a disconnection of the power generating system from the grid.

The monitoring circuit for grid disconnection of power generation systems is to be installed at the point of supply. The relays used K1 and K2 are to be connected according to the wiring diagram.

Key to wiring diagram

Element	Function
A1, A2	Supply voltage U_s (see ordering information)
L1, L2, L3, N	Power supply connection
K1, K2	Relay connections
DG1/2, D1, D2	Contact monitoring coupling switch DG1/2: GND; D1: feedback signal contact K1; D2: feedback signal contact K2 <i>(feedback signal contacts optionally NC/NO/off)*</i>
RTG, RT1	RTG: GND; RT1: Remote trip input <i>(optionally NC/NO/off)*</i>
A, B	Service interface
R _{on/off}	Activate or deactivate the terminating resistor of the service interface (120 Ω)
DG3/4, D3, D4	not to be used in accordance with VDE-AR-N 4105, BDEW, C10/11, G 59/2, G59/3, G83/2, DIN V VDE V 0126-1-1

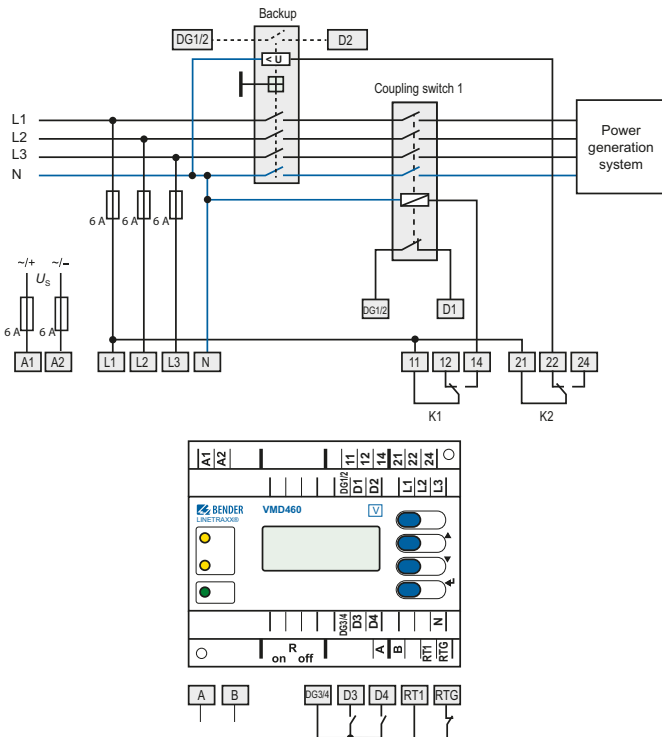
* Explanation: **NC** (in non-operating state closed)
NO (in non-operating state open)
off(switched off)

Use the contact monitoring function to prevent the sticking of contacts!

You only have to use redundant coupling switches K1 and K2 in accordance with VDE-AR-N 4105.

CEI 0-21

Wiring diagram



Key to wiring diagram

Element	Function
A1, A2	Supply voltage U_s (see ordering information)
L1, L2, L3, N	Power supply connection
DG1/2, D1, D2	Contact monitoring coupling switch DG1/2: GND; D1: feedback signal contact K1; D2: feedback signal contact K2 (Backup); <i>(optionally NC/NO/off) *</i>
K1, K2	Relay connections
DG3/4, D3, D4	Digital inputs (external monitoring) DG3/4: GND; D3: Local control (CEI 0-21 8.6.2.1.1)** D4: External signal (CEI 0-21 8.6.2.1.2)**; <i>(optionally NC/NO/off)*</i>
RTG, RT1	RTG: GND; RT1: Remote trip input <i>(optionally NC/NO/off)*</i>
A, B	Service interface
R _{on/off}	Activate or deactivate the terminating resistor of the service interface (120 Ω)

* Explanation: **NC** (in non-operating state closed)
NO (in non-operating state open)
off(switched off)

** For evaluation of the inputs D3 and D4, the mode has to be set accordingly in the menu:

Connection **D3**, menu: „local“ (D4 will not be evaluated)

D3: local control	f [Hz]	Discon. time	Norm CEI0-21
open	49.5...50.5	0.1 s	81.S1
closed	47.5...51.5	0.1 s	81.S2

Connection **D4**, menu: „extern“ (D3 will not be evaluated)

D4: external signal	f [Hz]	Discon. time	Norm CEI0-21
open	49.5...50.5	0.1 s	81.S1
closed	47.5...51.5	4 s; 1 s	81.S2

In the case of a failure of the coupling switch 1 (K1), the contact monitoring function will cause the backup relays to switch (K2).

Initial commissioning

When commissioning the device for the first time

- Select a **language** (English, German, Italian).
- Select a **standard** (VDE-AR-N 4105, CEI 0-21, BDEW, C10/11, G59/2, G59/3, G83/2, DIN V VDE V 0126-1-1).
- In addition, you have to set the date and the time.

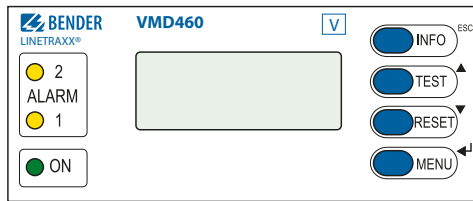
You can only change settings in the menus after settings listed above have been carried out.

i The **contrast of the LC display** can be adjusted to any ambient brightness. Select the contrast ratio from an infinite loop display. After reaching a black display, the contrast setting process starts again with a white display. Simultaneously press and hold down the buttons "INFO" and "MENU" until the display text is clearly readable.

i When switching to another application standard, the associated factory settings will be loaded.

Existing user-defined settings will not be saved when switching from one standard to another.

User interface



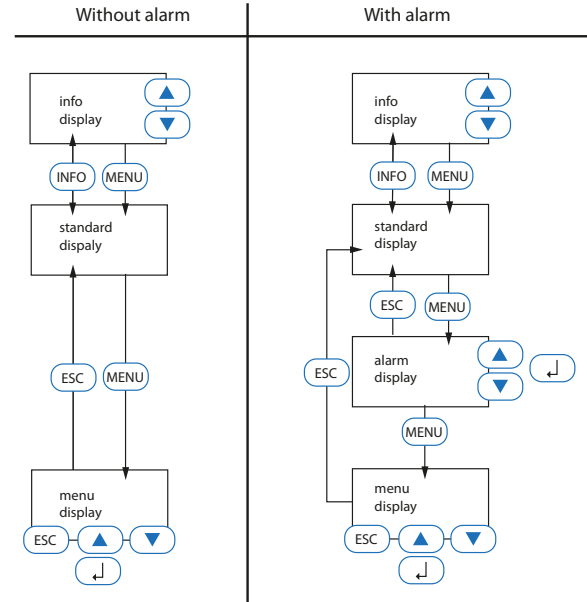
Key to user interface

Element	Funktion
ON	Power On LED, green; lights when the power supply is available and the device is in operation; flashes in case of system fault alarm
ALARM1 and ALARM2	Generation system disconnected: Both LEDs light (yellow) in the case of limit value violation of voltage, frequency, remote disconnection df/dt (optional), asymmetry (optional); Both LEDs flash (yellow) in the case of an internal device error or a contact monitoring fault; Only ALARM 1 lights: Delay time for connection t_{on} active
	Backlit LC display
INFO ESC	Standard display: Toggling between standard display and device information Menu display: To exit the parameter setting menu without storing; to go to the next higher menu level
TEST ▲	Standard display: A manual test is carried out using the test button (> 1.5 s), during which both alarm relays are triggered (trigger test for testing the coupling switches). In addition, fault simulation will be carried out (disconnection time documented) Menu display: Arrow up button for parameter change and scrolling
RESET ▼	Standard display: (> 1.5 s) Acknowledgement of fault messages from contact monitoring Menu display: Arrow down button for parameter change/ scrolling
MENU ←	Standard display: Toggling between standard, menu and alarm display Menu display: ← button: Jump to parameter settings; saving the changed parameters

Toggleing between the displays

You can toggle between the different displays by using the four device buttons. Depending on the type of display (standard display, alarm display, menu display, info display), the meaning of the buttons is different. The picture below illustrates which button is to be pressed for accessing the individual display.

First, it is necessary to determine whether an alarm exists or not.



Menu structure

The following table shows the menu structure, which can be reached via the device buttons.

Alarm/meas.values	U(1-N): Value, U(2-N): Value, U(3-N): Value U10LN: Value, U10LL: Value U(1-2): Value, U(2-3): Value, U(3-1): Value Frequency: Value df/dt: Value Status* t (ON): Value Unbalance: Value Vect.shift**: Value Phase sequ.: Value t(OFF)TOTAL: Value t(OFF)DEVICE: Value
History	Line 1: Event number Line 2: Event start: Date/time Line 3: Acknowledgement of the event: Date/time Line 4: Event end: Date/time
Settings	The menu structures in the settings contain different entries for each individual standard.
System	History delete history Language English / Deutsch / Italiano Clock Format / Date / Time/ CEST Password Password / Status Interface master addr. 1...90; slave addr. 2...90 Alarm addresses address 1...150 TEST TEST will be carried out RESET RESET will be carried out Test communication 1st ...12th channel External devices list of the devices connected Service Bender service menu, blocked Factory setting restore factory settings
Info	Device type Current date, current time Address BMS-Bus Software version (measurement technique) Date of software (measurement technique) Software version (display) Date of software (display) Manufacturer of the device Address of the manufacturer Internet address of the manufacturer

Factory settings at a glance

Menu	Parameter	4105	CEI 0-21	BDEW	C10/11	G59/2	G59/3, G83/2	0126
1. General	coupling	3N AC	3N AC	3N AC	3N AC	3N AC	3N AC	3N AC
	$U_{(L-N)} / U_{(L-L)}$	U(L-N) 230 V	U(L-N) 230 V	U(L-N) 230 V	U(L-N) 230 V	U(L-N) 230 V	U(L-N) 230 V	U(L-N) 230 V
	Modus	*	off	*	*	*	*	*
	$t_{\text{SHORT INT.}}$	3,00 s	off	off	3,00 s	off	off	3,00 s
	$t_{\text{(ON) SHORT INT.}}$	5,00 s	--	--	5,00 s	--	--	5,00 s
	$t_{\text{(ON) NORMAL}}$	60 s	70 ms	30 s	60 s	180 s	20 s	30 s
	Remote Trip	off	N/C	off	off	off	off	off
2. Voltage	$U_{>>}$	115 %	115 %	120%	115 %	115 %	119 %	115 %
	$t_{\text{(OFF)}}$	100 ms	200 ms	100 ms	100 ms	500 ms	500 ms	100 ms
	$U_{>}$	110 %	110 %	108 %	110 %	110 %	114 %	110 %
	$t_{\text{(OFF)}}$	100 ms	3,00 s	60 s	100 ms	1,00 s	1,00 s	100 ms
	$U_{\text{(ON) MAX}}$	off	off	off	off	off	off	off
	$U_{\text{(ON) MIN}}$	85 %	off	95 %	85 %	off	off	off
	$U_{<}$	80 %	85 %	80 %	80 %	87 %	87 %	80 %
	$t_{\text{(OFF)}}$	100 ms	400 ms	2,40 s	100 ms	2,50 s	2,50 s	100 ms
	$U_{<<}$	off	40 %	45 %	off	80 %	80 %	off
	$t_{\text{(OFF)}}$	--	200 ms	300 ms	--	500 ms	500 ms	--
3. Frequency	$f_{>>}$	off	off	off	off	52,00 Hz	52,00 Hz	off
	$t_{\text{(OFF)}}$	--	--	--	--	500 ms	500 ms	--
	$f_{>}$	51,50 Hz	50,50 Hz	51,50 Hz	51,50 Hz	51,50 Hz	51,50 Hz	51,50 Hz
	$t_{\text{(OFF)}}$	100 ms	100 ms	100 ms	100 ms	90 s	90 s	100 ms
	$f_{\text{(ON) MAX}}$	50,05 Hz	off	50,05 Hz	50,05 Hz	off	off	off
	$f_{\text{(ON) MIN}}$	off	off	off	off	off	off	off
	$f_{<}$	47,50 Hz	49,50 Hz	47,50 Hz	47,50 Hz	47,50 Hz	47,50 Hz	47,50 Hz
	$t_{\text{(OFF)}}$	100 ms	100 ms	100 ms	100 ms	20 s	20 s	100 ms
	$f_{> (81>.S2)}$	*	51,50 Hz	*	*	*	*	*
	$f_{< (81<.S2)}$	*	47,50 Hz	*	*	*	*	*
	$T_{\text{Ic (off) (81>.S2)}}$	*	100 ms	*	*	*	*	*
	$T_{\text{Ic (off) (81>.S2)}}$	*	100 ms	*	*	*	*	*
	$T_{\text{ex (off) (81>.S2)}}$	*	1,00 s	*	*	*	*	*
	$T_{\text{ex (off) (81<.S2)}}$	*	4,00 s	*	*	*	*	*
$f_{<<}$	off	off	off	off	47,00 Hz	47,00 Hz	off	
$t_{\text{(OFF)}}$	--	--	--	--	500 ms	500 ms	--	
4. df/dt	Function	off	off	off	ein	off	off	off
	Resp. value	1,00 Hz/s	1,00 Hz/s	1,00 Hz/s	1,00 Hz/s	1,00 Hz/s	1,00 Hz/s	1,00 Hz/s
	Hysteresis	20,0 %	20,0 %	20,0 %	20,0 %	20,0 %	20,0 %	20,0 %
	Meas. window	200 ms	200 ms	200 ms	200 ms	200 ms	200 ms	200 ms
	$t_{\text{(OFF)}}$	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms
	$t_{\text{(ON)}}$	off	30 s	off	off	off	off	off
5. Vect.shift	1. Function	off	off	off	off	off	off	off
	2. Resp. value	8,0 °	8,0 °	8,0 °	8,0 °	8,0 °	8,0 °	8,0 °
	3. t_{START}	2,00 s	2,00 s	2,00 s	2,00 s	2,00 s	2,00 s	2,00 s
	4. $t_{\text{(ON)}}$	off	30 s	off	off	off	off	off
6. Unbalance.	1. Function	off	off	off	off	off	off	off
	2. Resp. value	5,0 %	5,0 %	5,0 %	5,0 %	5,0 %	5,0 %	5,0 %
	3. Hysteresis	20,0 %	20,0 %	20,0 %	20,0 %	20,0 %	20,0 %	20,0 %
	4. $t_{\text{(OFF)}}$	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms
7. Relay	1. Relay mode	K1: N/C K2: N/C	K1: N/C K2: N/O	K1: N/C K2: N/C	K1: N/C K2: N/C	K1: N/C K2: N/C	K1: N/C K2: N/C	K1: N/C K2: N/C
	1. Mode	D1: N/C D2: N/C D3: — D4: —	D1: N/C D2: off D3: N/O D4: N/O	D1: off D2: off D3: — D4: —	D1: N/C D2: N/C D3: — D4: —	D1: N/C D2: N/C D3: — D4: —	D1: N/C D2: N/C D3: — D4: —	D1: N/C D2: N/C D3: — D4: —
8. Digital Input	2. t_{START}	D1: 500 ms D2: 500 ms D3: — D4: —	D1: 500 ms D2: — D3: — D4: —	D1: — D2: — D3: — D4: —	D1: 500 ms D2: 500 ms D3: — D4: —	D1: 500 ms D2: 500 ms D3: — D4: —	D1: 500 ms D2: 500 ms D3: — D4: —	D1: 500 ms D2: 500 ms D3: — D4: —

Explanation table: * display is skipped in standard; — not used in standard