



VMD460-NA

Network and system protection (NS protection) for monitoring the network feed-in from generating plants

Software version, measurement technology: D398 V1.3x

Software version, display: D403 V2.4x



Quick-start guide

The quick-start guide does not replace the operating manual!

Source document manual:
VMD460-NA_D00001_0x_M_XXEN.pdf

Download at:
www.bender.de/en/service-support/downloads

Scope of delivery

- One VMD460-NA
- Safety instructions
- This quick-start guide

Intended use

The VMD460-NA voltage and frequency monitoring relay is used for system and network protection (NS protection) of CHPs, wind power stations, hydroelectric power stations and photovoltaic systems feeding power into the grid. If inadmissible voltage and frequency values occur on the supply side, the VMD460-NA disconnects the generating plant from the public network by means of a coupling switch. In order to meet the requirements of the applicable standards, adaptation to the system and operating conditions must be carried out on site. Please heed the limits of the area of application indicated in the technical specifications. Any other use than that described in this document is regarded as improper.

Safety instruction



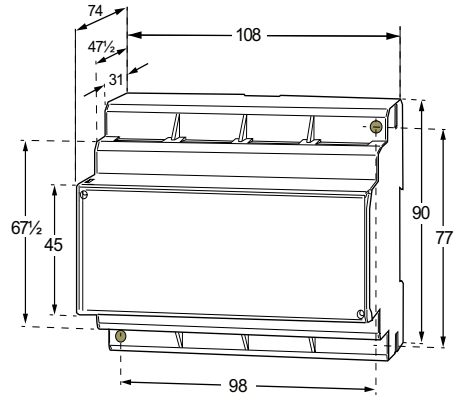
DANGER! Danger of electric shock.
Touching live parts of the system carries the risk of:

- An electric shock
- Damage to the electrical installation
- Destruction of the device

Before installing and connecting the device, make sure that the installation has been de-energised. The rules for working on electrical systems must be observed.

The standards and regulations of the respective location apply.

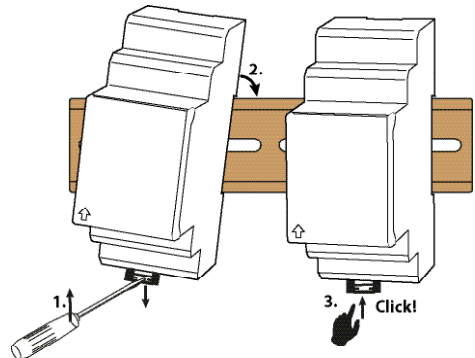
Dimensions



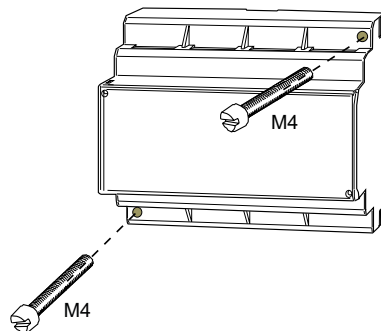
All dimensions in mm

Installation

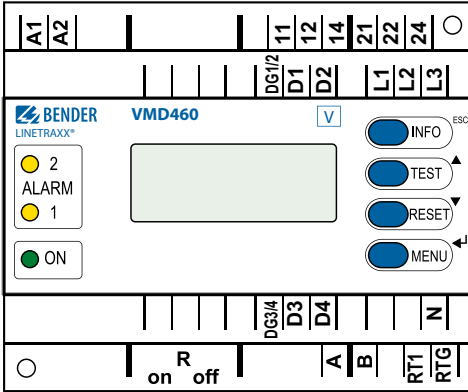
DIN rail (schematic diagram)



Screw mounting



Connections

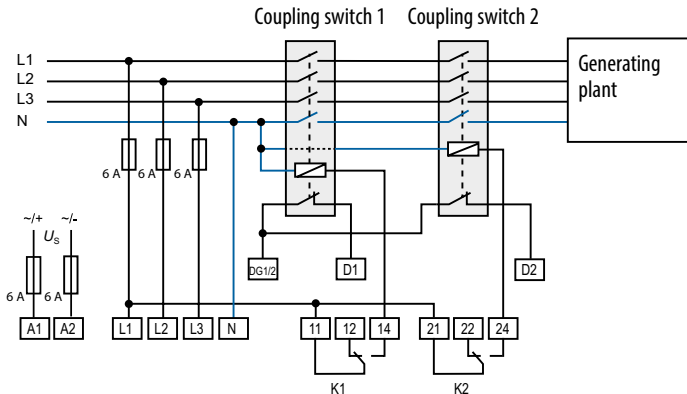


| | |
|---------------|--|
| A1, A2 | Supply voltage U_s |
| L1, L2, L3, N | Power supply connection |
| K1, K2 | Relay connections |
| DG1/2, D1, D2 | Contact monitoring coupling switch DG1/2: GND D1: Feedback signal contact K1 D2: Feedback signal contact K2 |
| RTG, RT1 | RTG: GND RT1: remote trip input |
| A, B | Service interface |
| Ron/off | Terminating resistor of the service interface (120 Ω) |
| DG3/4, D3, D4 | Digital inputs |

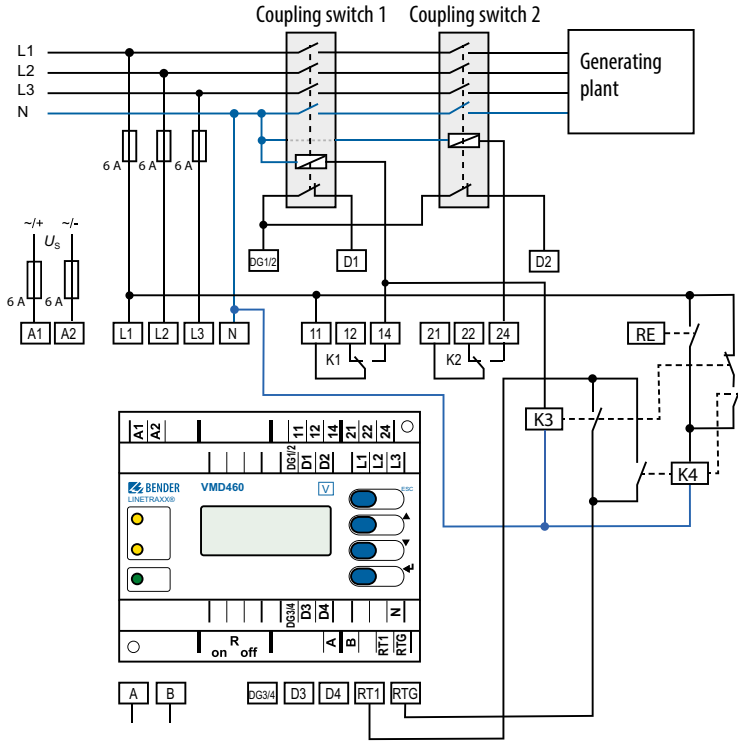
Application standards

| Standard/Application guideline | Name on the display |
|---|---------------------|
| VDE-AR-N 4105:2018-09 | 4105_2 |
| VDE-AR-N 4105:2011-08 | 4105_1 |
| VDE-AR-N 4110:2018-11 | 4110 |
| BDEW technical guideline 2008 with amendments until 01.2013 | BDEW |
| DIN V VDE V 0126-1-1:2006-02/A1:2012-02 | 0126 |
| CEI 0-21:(2012-06, :V1:2012-12, :V2:2013-12, :2014-09, :V1:2014-12) | CEI 021 |
| C10/11:2012-06 | C10/11 |
| G98:2018-05 | G98 |
| G83/2:2012 and G59/3:2013 | G83/2 |
| G99:2018-05 | G99 |
| G59/2:(2010, -1:2011) | G59/2 |

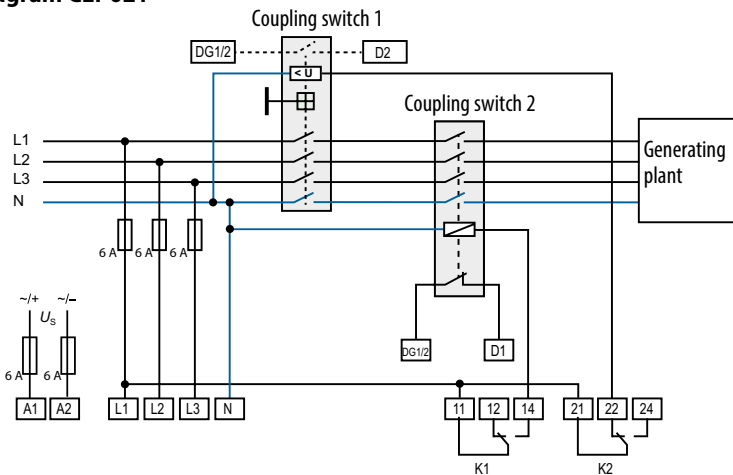
Wiring diagram 4105_1, 4105_2, BDEW, C10/11, G59/2, G59/3, G83/2, G98, G99, 0126

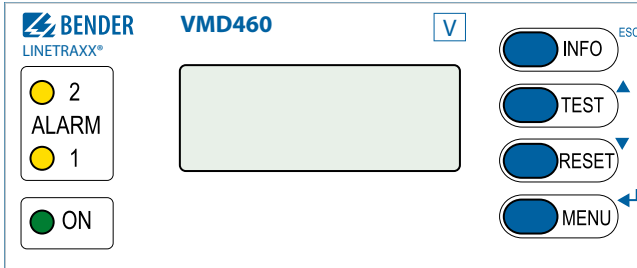


Wiring diagram 4110 (suggestion)



Wiring diagram CEI-021



Operating elements


| Element | Function |
|------------------|--|
| ON | Power On LED (green): lights when the voltage supply is available and the device is in operation; flashes when the device is being started or when an internal device error has occurred |
| ALARM1 ALARM2 | System switched off: Both LEDs light (yellow): In case of a limit value violation of voltage or frequency, remote switch-off (remote trip, optional), df/dt (optional), vector shift detection (optional), unbalance (optional); Both LEDs flash (yellow): In case of an internal device error or contact monitoring error Only ALARM 1 lights: Connectivity requirements met. t(ON) running |
| | Backlit LC display |
| INFO ESC | Standard display: Standard display and device information Menu display: Exit the parameter setting menu without saving; Go to next higher menu level |
| TEST ▲ | Standard display: The TEST button (> 1.5 s) is used to start a manual self test which triggers both output relays (trigger test to check the coupling switches). In addition, the disconnection times are documented. Menu display: Arrow-up button for parameter change and scrolling |
| RESET ▼ | Standard display: (> 1.5 s) Acknowledge error messages from contact monitoring Menu display: Arrow-down button for parameter change and scrolling |
| MENU ⏏ | Standard display: Toggle between standard, menu and alarm display Menu display: Go to setting parameters; save changes |

Navigation

| Button | Navigation | Function |
|--------|------------|--|
| INFO | ESC | Jump back one menu level |
| TEST | ▲ | Menu item selection (previous); parameter selection (previous) Value increase |
| RESET | ▼ | Menu item selection (next); parameter selection (next) Value decrease |
| MENU | ⏏ | Confirm entered value |

Menu structure (MENU)

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|--|---------------|----------|--------------------------|-------|------------------------------|----------|----------------|-----------|--------------------------------------|-----------------|-----------------|------|----------|-------|---------------|--------------------|-----------------|------------------|---------------------------|------------------|--------------------------|---------------------------|
| Alarm/meas. values | U(1-N); U(2-N); U(3-N); U10LN; U10LL; U(1-2); U(2-3); U(3-1); frequency; df/dt; state; $t_{(ON)}$; unbalance; vect.shift**; rotating field; $t_{(OFF)}$ TOTAL; $t_{(OFF)}$ DEVICE | Specification of the parameter and the corresponding VALUE in each case See manual, chapter 5.4.2 | | | | | | | | | | | | | | | | | | | | | | |
| History | Line 1: Event number Line 2: Start of the event: Date/time Line 3: Acknowledgement of the event: Date/time Line 4: End of the event: Date/time | See manual, chapter 5.4.3 | | | | | | | | | | | | | | | | | | | | | | |
| Settings | The menu structures in the settings contain different entries for each standard. | See manual, chapter 6 | | | | | | | | | | | | | | | | | | | | | | |
| System | <table border="0"> <tr><td>History</td><td>Clear history</td></tr> <tr><td>Language</td><td>English/Deutsch/Italiano</td></tr> <tr><td>Clock</td><td>Format/date/time/summer time</td></tr> <tr><td>Password</td><td>Password/state</td></tr> <tr><td>Interface</td><td>Address; master 1...90; slave 2...90</td></tr> <tr><td>Alarm addresses</td><td>Address 1...150</td></tr> <tr><td>TEST</td><td>Run TEST</td></tr> <tr><td>RESET</td><td>Perform RESET</td></tr> <tr><td>Test communication</td><td>1...12. channel</td></tr> <tr><td>External devices</td><td>List of connected devices</td></tr> <tr><td>Factory settings</td><td>Restore factory settings</td></tr> </table> | History | Clear history | Language | English/Deutsch/Italiano | Clock | Format/date/time/summer time | Password | Password/state | Interface | Address; master 1...90; slave 2...90 | Alarm addresses | Address 1...150 | TEST | Run TEST | RESET | Perform RESET | Test communication | 1...12. channel | External devices | List of connected devices | Factory settings | Restore factory settings | See manual, chapter 5.4.4 |
| History | Clear history | | | | | | | | | | | | | | | | | | | | | | | |
| Language | English/Deutsch/Italiano | | | | | | | | | | | | | | | | | | | | | | | |
| Clock | Format/date/time/summer time | | | | | | | | | | | | | | | | | | | | | | | |
| Password | Password/state | | | | | | | | | | | | | | | | | | | | | | | |
| Interface | Address; master 1...90; slave 2...90 | | | | | | | | | | | | | | | | | | | | | | | |
| Alarm addresses | Address 1...150 | | | | | | | | | | | | | | | | | | | | | | | |
| TEST | Run TEST | | | | | | | | | | | | | | | | | | | | | | | |
| RESET | Perform RESET | | | | | | | | | | | | | | | | | | | | | | | |
| Test communication | 1...12. channel | | | | | | | | | | | | | | | | | | | | | | | |
| External devices | List of connected devices | | | | | | | | | | | | | | | | | | | | | | | |
| Factory settings | Restore factory settings | | | | | | | | | | | | | | | | | | | | | | | |
| Info | Device name Current date and time BMS bus address Software version, measurement technology Software date, measurement technology Software version, display Software date, display Manufacturer of the device Address of the manufacturer Internet address of the manufacturer | See manual, chapter 5.4.5 | | | | | | | | | | | | | | | | | | | | | | |

Commissioning steps

| | | |
|----------|--|--|
| 1 | Select a language (English, German, Italian) | Menu 4.2 : 4. SYSTEM → 2. Language |
| 2 | Set date and time additionally. | Menu 4.3 : 4. SYSTEM → 3. Clock |
| 3 | Select a standard. | Menu 3.1.1 : 3. SETTINGS → 1. General → 1. Standard |

After commissioning, the parameters of the VMD460-NA can be changed.

- i** *Unauthorised changes. 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.*
- Display contrast. Simultaneously press and hold down the buttons "INFO" and "MENU" until the display text is clearly readable.*
- Change of standard. Existing user-defined settings are not saved when the user standard is changed.*

Technical data
Insulation coordination acc. to IEC 60664-1/IEC 60664-3

| | |
|--|---------|
| Rated voltage | 400 V |
| Rated impulse voltage | 6 kV |
| Pollution degree | 2 |
| Overvoltage category | III |
| Voltage test according to IEC 61010-1: (N, L1, L2, L3) - (A1, A2), (11, 12, 14, 21, 22, 24) | 3.32 kV |

Supply voltage

| | |
|-------------------------------------|---------------------------------------|
| Nominal supply voltage U_s | AC/DC 100 ... 240 V; DC/50/60 Hz |
| Operating range U_s | AC/DC 75 ... 300 V DC/40 ... 70 Hz |
| Power consumption at AC 230 V | < 7.5 VA / < 3.5 W max. 9 VA/3.5 W |

Measuring circuit

| | |
|--|----------------|
| Nominal system voltage U_n (r.m.s. value) (L-N) | AC 0 ... 300 V |
| Nominal system voltage U_n (r.m.s. value) (L-L) | AC 0 ... 520 V |
| Rated frequency f_n ($U_n > 20$ V) | 45 ... 65 Hz |

Response values

| | |
|---------------------------------------|--|
| System type | 1AC: 230 V, 50 Hz 3(N)AC: 400/230 V, 50 Hz |
| Relative uncertainty, voltage | $U \leq 280$ V: $\leq \pm 1$ $U > 280$ V: ± 3 % |
| Resolution of setting, voltage | 1 % |
| Nominal frequency | 50/60 Hz |
| Relative uncertainty, frequency | $\leq \pm 0.1$ % |
| Resolution of setting f | 0.05 Hz |

Time response

| | |
|--|------------------|
| Delay time for connection t_{on} | 40 ms ... 60 min |
|--|------------------|

Digital inputs

Monitoring of potential-free contacts or voltage inputs: ..closed
= low; 0 ... 4 V; $I_{in} < -5$ mA

| | |
|--|----------------------------------|
| | open = high; > 6 ... ≤ 30 V |
| D1 | feedback signal contact K1 |
| D2 | feedback signal contact K2 |
| D3 | local control (mode) |
| D4 | external signal (mode) |
| RT1 | remote trip |
| DG1/2, DG3/4, RTG | GND |
| Max. length of the connecting cables of digital inputs | 3 m |

Displays, memory

| | |
|--|--|
| Display | LC display, multi-functional, illuminated |
| Display range, measured value | AC/DC 0 ... 520 V |
| Operating uncertainty, voltage | $U \leq 280$ V: $\leq \pm 1$ % $U > 280$ V: ± 3 % |
| Operating uncertainty, frequency | $\leq \pm 0.1$ % |

Switching elements

| | |
|-------------------------------------|-------------------------------|
| Number of changeover contacts | 2 x 1 (K1, K2) |
| Operating mode | N/C operation / N/O operation |

Environment/EMC

| | |
|-----------------------------|--------------------------|
| EMC | DIN EN 60255-26/CEI 0-21 |
| Operating temperature | -25 ... +55 °C |

Classification of climatic conditions acc. to IEC 60721

(except condensation and formation of ice)

| | |
|---|-----|
| Stationary use (IEC 60721-3-3) | 3K5 |
| Transport (IEC 60721-3-2) | 2K3 |
| Long-term storage (IEC 60721-3-1) | 1K4 |

Classification of mechanical conditions acc. to IEC 60721

| | |
|---|-----|
| Stationary use (IEC 60721-3-3) | 3M4 |
| Transport (IEC 60721-3-2) | 2M2 |
| Long-term storage (IEC 60721-3-1) | 1M3 |

Connection

Connection type.... screw-type terminals or push-wire terminals

Connection properties:

| | |
|-------------------------|---|
| rigid | 0.2 ... 4 mm ² (AWG 24 ... 12) |
| flexible | 0.2 ... 2.5 mm ² (AWG 24 ... 14) |
| Stripping length | 8 ... 9 mm |
| Tightening torque | 0.5 ... 0.6 Nm |

Other

| | |
|--|---------------------------|
| Operating mode | continuous operation |
| Mounting | any position |
| Degree of protection, internal components (DIN EN 60529) | IP30 |
| Degree of protection, terminals (DIN EN 60529) | IP20 |
| Flammability class | UL94 V-0 |
| DIN rail mounting acc. to | IEC 60715 |
| Screw mounting | 2 x M4 with mounting clip |
| Documentation number | D00001 |

(*) = Factory setting

Ordering details

| Type | Supply voltage U_s | Art. No. |
|----------------------------------|-------------------------------------|-----------|
| VMD460-NA-D-2 | AC/DC 100 ... 240 V/ DC 50/60 Hz | B93010045 |
| Mounting clip for screw mounting | | B98060008 |

optec

energie ist messbar

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