Operating, Parameter setting and Diagnostics

NZM-XPC-DTM
Device specific DTM for NZM

06/04 AWB2776-1547GB

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About This Manual

This manual describes the use and functions of the NZM-XPC-DTM software. This software is used in conjunction with an FDT container program and a PROFIBUS-DPV1 communication DTM. It is used for the monitoring, operating, parameter setting and diagnostics of Moeller NZM 2, NZM 3, NZM 4 circuit-breakers with electronic releases via PROFIBUS DPV1.

An overview of features and functions is provided in chapter 1.

Other manuals

- "Circuit-breaker communication system" manual (AWB1230-1441GB)
- "FDT Navigator" manual (AWB2776-1546GB)

An up-to-date version of the manuals in PDF format can be obtained from the Internet at http://www.moeller.net/support: Enter the AWB number as the search criterion.

Writing conventions

In order to provide greater clarity, the header of the left-hand page shows the chapter title, whilst the header of the right-hand page shows the title of the current section. This does not apply to the first page of a chapter and empty pages at the end of a chapter.

Symbols used in this manual have the following meanings:

▶ indicates actions to be taken.

indicates important instructions that you should observe without fail.

1 About NZM-XPC-DTM

Features and functions

NZM-XPC-DTM is a device-specific software driver with its own user interface for the monitoring, operating, parameter setting and diagnostics of Moeller NZM 2, NZM 3, NZM 4 circuit-breakers with an electronic release via PROFIBUS DPV1.

NZM-XPC-DTM can be used in different FDT containers in conjunction with a communication interface for PROFIBUS DPV1.

NZM-XPC-DTM provides the following functions:

- General functions of the DTM that you can call via the container menu functions:
  - Switching DTM online/offline
  - Page preview and printout of project and online data
  - Online/offline comparison (comparison of parameters in the DTM with the parameters in the device)
- Identification
  - Display of circuit-breaker ID data (e.g. type, function, serial number, firmware version of electronics)
  - Display of an optional expansion module (e.g. earth-fault release)
  - Display of the firmware versions of the Data Management Interface (DMI) and the PROFIBUS module (NZM-XDMI-DPV1)
- Configuration
  - Selecting and setting circuit-breaker type offline
  - Configuration of earth-fault release as optional add-on module
  - Configuration of remote operator
  - Setting of PROFIBUS address and circuit-breaker profile for cyclical data
- Actual circuit-breaker operating data
  - Display of circuit-breaker operating status (On/Off/Trip)

  - Display of phase status and phase currents
  - Display of cause of trip and acknowledgement of trips and motor protection alarms
  - Display of communication status and acknowledgement of a Discontinue
- Operator functions
  - On/off switching of circuit-breaker, sending trip commands
  - Setting of motor starter function: Motor on/anti-clockwise rotation, motor off, motor clockwise rotation
  - Status display of the DMI inputs and outputs and setting of DMI outputs
  - Date and time setting in the DMI
- Parameter functions
  - Display and setting of NZM parameters (display of the hardware settings on the circuit-breaker, display of parameters used, parameter setting)
  - Setting DMI parameters (standard display, Q allocation, motor starter function, Discontinue, display of absolute values, language, DMI password)
- Diagnostics function
  - Reading the last 10 circuit-breaker diagnostics messages saved
  - Display diagnostics as diagnostics overview and as a detailed display
  - Display diagnostics data: date/time of diagnostics event, phase status, cause of trip, parameters used at time of diagnostics event
- Data exchange
  - Loading of parameters from the device
  - Saving of parameters in the device
  - Exporting of project and online data to an XML file
  - Importing from an XML file.

Use of the NZM-DTM

The NZM-XPC-DTM is installed on the PC or laptop with its own setup program. Read chapter "Installation" for information about installing the DTM.

The NZM-XPC-DTM can only be used in FDT container applications that support FDT in compliance with Specification V1.2.

A communication DTM that provides a fieldbus connection via a PROFIBUS interface is also required if the FDT container application does not support this function itself.

In order to make use of the entire functionality of the NZM-DTM you should configure the fieldbus gateway and the communication DTM as a class 1 or class 2 PROFIBUS-DPV1 master.

The following figure shows a possible system configuration in which an NZM-DTM is used for the diagnostics and parameter setting of NZM circuit-breakers in conjunction with an FDT container program and a communication DTM as a class 2 PROFIBUS-DPV1 master.

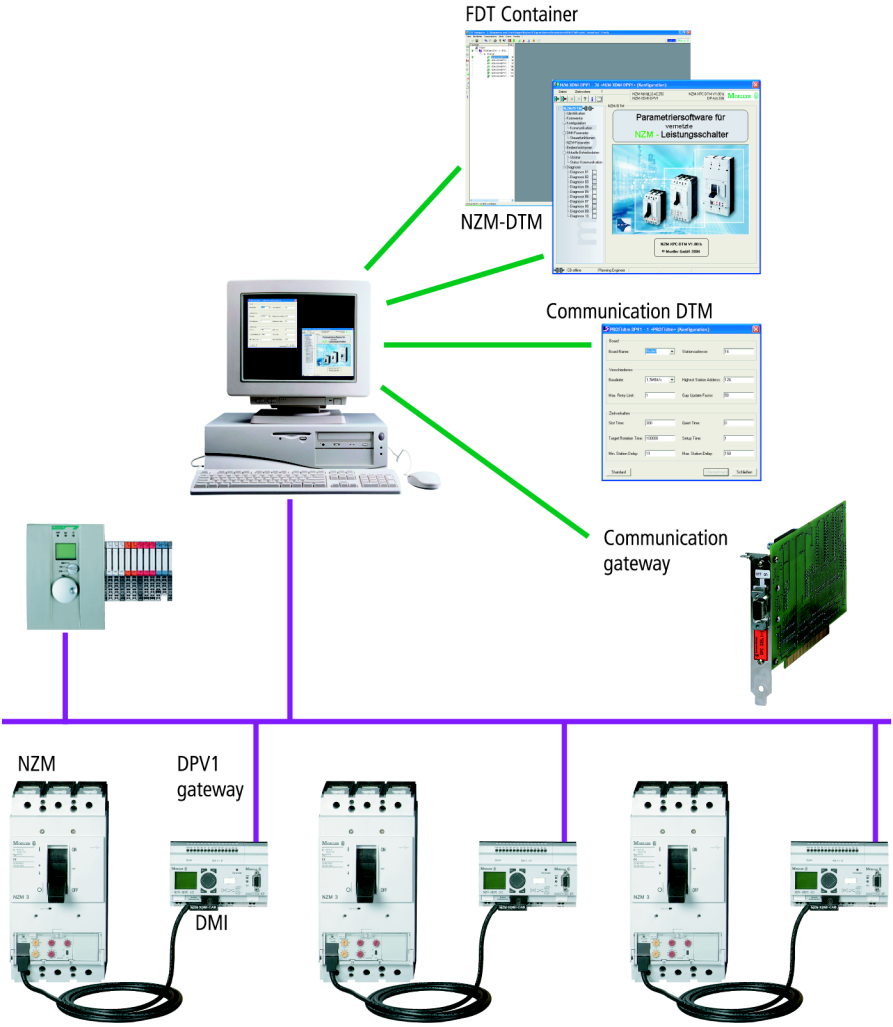


Figure 1: Example of a system for the parameter setting and diagnostics of NZM circuit-breakers

2 Installation

System requirements

The installation of NZM-XPC-DTM has the following requirements:

- PC with Pentium-III processor 600 MHz or higher
- Windows NT with Service Pack 6 or
  Windows 2000 with Service Pack 2 or
  Windows XP with Service Pack 1
- Free hard disk memory on C: approx. 30 MByte
- CD-ROM drive (for installation of CD-ROM)
- RAM: at least 128 MByte (512 MB RAM recommended)
- Graphic resolution: at least 1024 × 768 pixels
- Colours: ideally True Color (24-bit) – not a requirement!
- PROFIBUS interface (not an installation requirement)
- Internet Explorer 5.5 or higher (included on CD).

Installing NZM-XPC-DTM

Requirements

Administrator rights are required for installations on Windows NT/2000.

Procedure

▶ Close all programs.

▶ Insert the installation CD in your CD/DVD drive.

This will activate the start screen of the installation

▶ Follow the on-screen instructions of the installation program.

Proceed as follows if the installation does not start automatically:

▶ Click Run in the Start menu.

▶ Use the Browse... button to select the CD/DVD drive in which you have inserted the installation CD.

▶ Click the Setup.exe file and then Open.

▶ Click OK.

During the installation you are asked to enter a serial number for the NZM-DTM. This serial number is provided on a label on the product packaging.

NZM-DTM is automatically installed in the directory C:\Programs\Moeller Software\NZM-XPC-DTM. The language set in the NZM-DTM on startup is determined by the setting in the FDT container.

Uninstalling

▶ Uninstall NZM-XPC-DTM by restarting the setup program.

▶ Confirm the question "Do you really wish to remove the selected application and all associated components?" by clicking OK.

3 Incorporating the NZM-DTM in the FDT Container Project

The way a DTM is incorporated in a container project very largely depends on the FDT container used. The procedure is therefore described in this chapter using the Moeller FDT Navigator as an example.

Determining installed DTMs

The FDT Navigator firstly creates a list of all installed DTMs. There is an entry in the registry of the PC for every installed DTM. From this the Navigator creates a list with the manufacturer, the DTM name, the device name, the version, the supported bus protocol and other information.

▶ Choose Tools → Determine Installed DTMs.

Adding a new DTM

You can add new DTMs to the currently opened project if the list of installed DTMs is updated.

▶ In the topology window choose Add Device from the context menu (right mouse click on the project or a DTM). Select a DTM from the list displayed and confirm with OK.

The DTMs that can be selected are determined by the level in the project tree from which this command called:

- You can only add communication DTMs at the highest project level.
- You can add device DTMs underneath a communication DTM provided that these support the communication protocol (e.g. PROFIBUS-DP) of the Com DTM.

Setting a PROFIBUS address

Once you have added the NZM-DTM to the project topology, you first of all set the PROFIBUS address for this DTM. The new DTM added is assigned the standard address 126 which you then have to change to the actual device station address before you can switch it online. → section "Communication" on page 26.

Topology scan

The Moeller FDT Navigator offers a convenient method of adding device DTMs. As soon as you have added a communication DTM and switched it online, you can carry out a topology scan. This will determine all the devices present on the PROFIBUS (PROFIBUS slaves) and display them in a list. From this list you can add one or several DTMs directly into the project topology. In this case, a newly added DTM already has its actual PROFIBUS address.

- ▶ Start the topology scan by switching the PROFIBUS communication DTM online and then choosing the Scan Topology command from the context menu.
- ▶ After a topology scan, add a DTM to the topology by placing a tick next to the selected DTM and clicking Add.

4 Functional Elements of the NZM-DTM User Interface

The configuration user interface of the NZM-XPC-DTM essentially consists of a navigation tree in the left-hand pane and the parameter pages in the right-hand pane of the window. Clicking the individual entries in the navigation tree displays the appropriate parameter page.

Important DTM functions can always be accessed via the context menu in the topology tree of the FDT container as well as via the integrated pull-down menu and the toolbar in the configuration user interface.

The status bar of the configuration user interface displays the connection status, the user level and important messages.

The NZM type, the tag name, product name, version and the set DP address are shown in a display area that is always visible on the right of the menu bar and toolbar.

The window title of the configuration user interface displays the name of the DTM, the tag name and the entry from the DTM context menu {Configuration} by means of which the user interface was opened.

Navigation tree and parameter pages

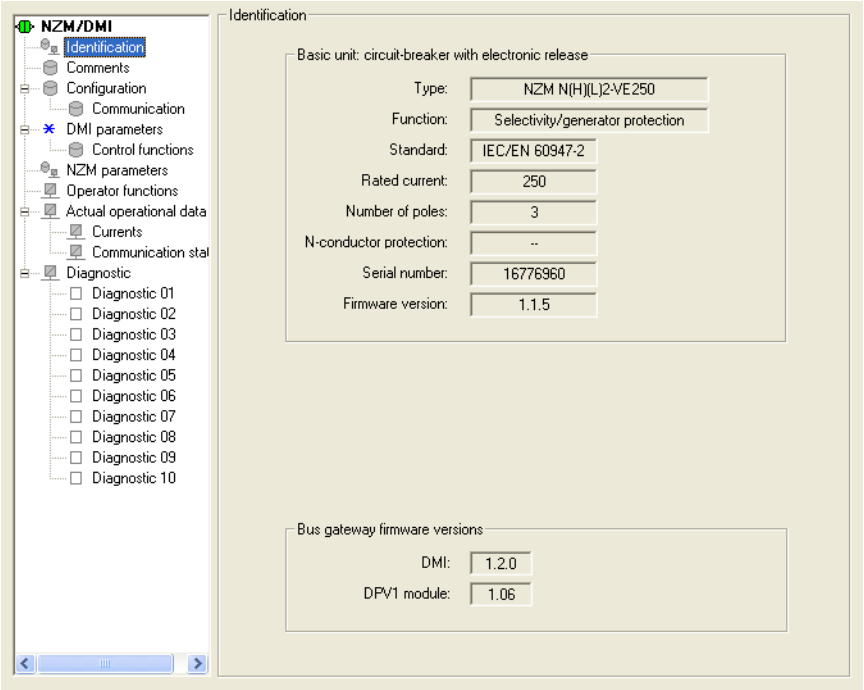


Figure 2: Navigation tree with parameter pages

Every entry in the navigation tree is assigned a parameter page of the NZM-DTM, i.e. selecting the entry will display the appropriate parameter page.

The connection status of the DTM is indicated in the root of the navigation tree by means of a coloured plug symbol (→ table 3 on page 20).

A symbol in front of every tree entry indicates whether the data in this page can be saved in the project data memory of the container or whether it exclusively consists of online device data. Changes to the project-related data of the DTM are also indicated by means of a blue star.

The data on this page can be set, modified and stored in the project data memory of the container. It is therefore available again when the project is reopened, i.e. when the DTM is offline.

When online, the data can be refreshed on the DMI parameters and Control functions pages by reading the parameters from the device. The device parameters are thus transferred to the instance data of the DTM. If the instance data is modified, the symbol changes to the character indicating modified data (see below).

When the DTM is online, the data on this page is read cyclically from the device and refreshed as soon as the page is displayed.

If the DTM is then switched offline again after being switched online, the last online data read continues to be displayed. It cannot be stored in the project data memory of the container and is not yet therefore available after the project is opened.

The data on this page is only partly saved in the project data memory of the container. Another part of the data is not available until the DTM has been switched online.

The instance data of the DTM on this page has been modified, in comparison to the data in the project data memory. The first modification of a parameter on this page will cause this symbol to be shown.

If the project is saved, the symbol returns to the original character for data from the project data memory (see above).

For this read also the chapter "NZM-DTM Data" on page 35.

Menu bar and toolbar

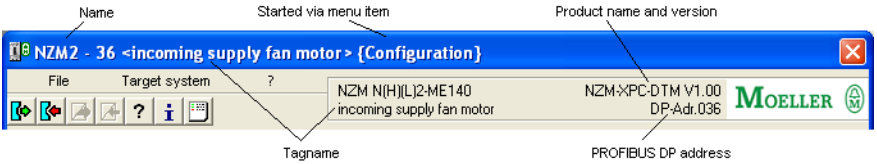


Figure 3: Menu bar and toolbar

The menu bar of the configuration user interface is divided into the main menu items File, Target System and ?. If the DTM is offline, some submenu items in the Target System menu will be dimmed and will be inaccessible. They are reactivated as soon as an online connection is established. In offline mode, both the Load From Device and the Write To Device buttons are disabled in the toolbar and are activated when the DTM is switched online.

Table 1: Meaning of the symbols in the toolbar and their corresponding menu command

Symbol	Menu command	Meaning
	Export XML file	Exports DTM data to an XML file
	Import XML file	Imports DTM data from an XML file (only available offline)
	Load from device	Loads all available parameters from the device to the DTM and refreshes the user interface (only available online)
	Save to device	Saves all project-related parameters for the device (only available online)
	Help	Calls the online Help of NZM-XPC-DTM
	About	Opens the information window of the NZM-XPC-DTM
	Display messages	Opens the window with the status messages

Table 2: Other menu commands

Menu	Menu command	Meaning
File	Close	Closes the configuration user interface. This does not change the connection status (online/offline) of the DTM
Target system commands	Switch on	Switches on the NZM (only available online) from the Off state
Target system commands	Switch off	Switches the NZM off (only available online) from the On or Trip state
Target system commands	Switch Trip	Trip command to the NZM (only available online) from the On state
Target system commands	Motor on/anti-clockwise	Switches the motor on with anti-clockwise rotation (command only available online with motor starter function activated) from the Motor off state
Target system commands	Motor off	Switches off the motor (command only available online and with activated motor starter function)
Target system commands	Motor clockwise	Switches the motor on with clockwise rotation (command only available online with motor starter function activated) from the Motor off state
Target system commands	Acknowledge trip	Acknowledges a trip (only available online)
Target system commands	Acknowledge Discontinue	Acknowledges a Discontinue operation (only available online)

Status bar

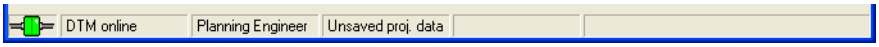


Figure 4: Status bar

The status bar is divided into six areas:

The first area from the left displays the connection status with a plug symbol. The meaning of the individual plug symbols is explained in table 3. Double-clicking on this area of the status bar will open the Status Messages window.

The second area displays the connection status in plain text. When online status is active, this can also be used to display a warning message such as for load unbalance.

The third area of the status bar displays the actual setting of the user level, e.g. planning engineer.

The fourth area indicates whether any project data needs to be saved. This message disappears once you have saved the data save.

The fifth and sixth areas are currently not used for displaying text messages.

Table 3: Meaning of the plug symbols in the toolbar

Plug symbol	Meaning
 (yellow)	The DTM is trying to establish a connection to PROFIBUS, no online data is available yet.
 (green)	The DTM has established a connection to PROFIBUS, online data is available.
 (red)	An error occurred during connection establishment. A connection to PROFIBUS could not be established. Switch the DTM offline, rectify the problem and try to switch online again.
 (grey)	The DTM is offline, the last online data read continues to be displayed but is no longer refreshed.
	The DTM is online, there is, however, a communication problem. Open the status messages if you wish to receive a detailed description of the problem.
	The DTM is online. There is also a warning message present. The message is displayed in abbreviated form in the second section of the status bar. Open the status messages if you wish to receive a detailed description of the message.

Tooltips

Tooltip texts offer a brief description or Help for the parameters and buttons shown on the DTM user interface.

If you require additional or more detailed information you can call the program Help (chapter "Help/Manual" on page 99) or refer to the manual.

This is how to display tooltips:

▶ Slowly position the cursor on the element of the DTM user interface for which you wish to display a tooltip. The tooltip window will appear above the mouse cursor after a delay of about two seconds.

→ No tooltip window is displayed if the user interface element does not have a tooltip text assigned to it or if the element (e.g. a button) is currently disabled.

Tooltip windows are closed after around 10 seconds. You can display the tooltips again by placing the mouse cursor briefly on another area of the user interface and then moving it to the required display element.

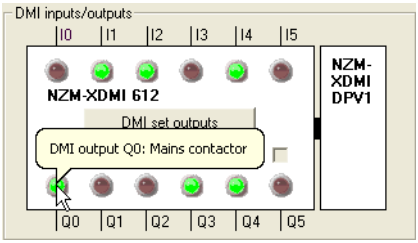


Figure 5: Tooltip for the DMI output Q0

5 Configuring NZM-DTM

Basic unit: NZM with electronic release

The NZM type can be preset offline on the Configuration page. All NZM types that are stored in the devicelist.xml file and are therefore known to the DTM are displayed in the list of all types. This list can be filtered according to different criteria so that the type to be set can be found more quickly.

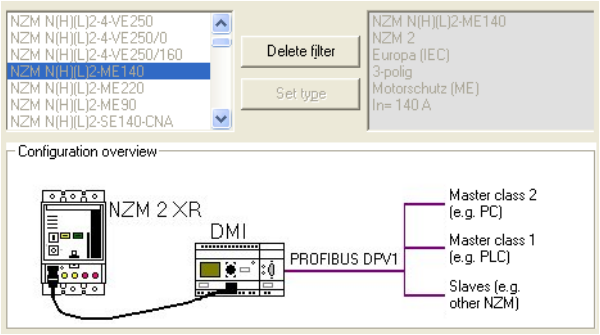


Figure 6: List of all NZM types

▶ Filter the list of all types by selecting the filter criteria from the groups Application range, Frame size, Standard, and No. of poles.

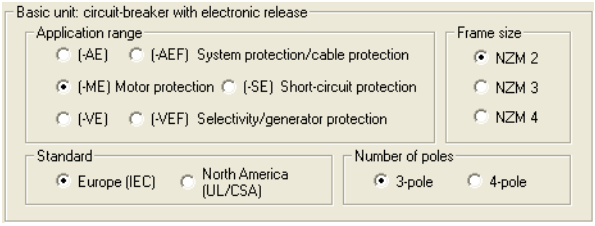


Figure 7: Filter function for selective searching

The individual filter groups are used to create a filter for this list. The list will be empty if an NZM type does not exist for this type.

▶ Remove all filter criteria by clicking the Delete filter button.

When you switch the DTM online, the configured type is compared with the online type. A mismatch will be indicated with a message. There are two options:

- The online type can be accepted in the configuration. In this case, the Configuration page is adapted, i.e. the online type is displayed in the window of the selected type.
- The online type cannot be accepted in the configuration. In this case, switch the DTM offline again and check once more the configuration or the PROFIBUS address.

As soon as the DTM is online, you can no longer change the configuration. Only the configuration of a remote operator is an exception.

The configuration belongs to the project-related Instance data (→ page 35) and can be saved in the project data memory of the FDT container. This gives you the capability of configuring your entire system offline before you have connected up the individual devices and commissioned the bus. If a different type is detected and transferred to the configuration when the DTM is switched online, the instance data is changed and has to be saved in the project once more.

Electronic expansion

Circuit-breakers with frame sizes 3 and 4 provide the option of using an electronic expansion of the electronic release for particular applications such as earth-fault releases.

▶ Activate the Earth-fault release for NZM 3/4 (IEC) option if you wish to use an earth-fault release in your circuit-breaker.

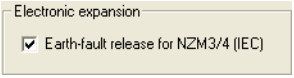


Figure 8: Activating the Earth-fault release option

The Earth-fault release for NZM 3/4 (IEC) option can only be selected offline. This option cannot be selected or is deactivated for circuit-breaker types that do not support an earth-fault release.

Remote operator

Suitable remote operators are available for all circuit-breaker types that support remote operation, such as via PROFIBUS.

A remote operator makes it possible to switch off the circuit-breaker from the configuration user interface of the NZM-DTM after a trip in order to switch it back on again. To do this, the Remote operator option must be set in the DMI.

▶ Activate the Remote operator option on the Configuration page or on the Control functions page in order to select the remote operator in the NZM-DTM.

Figure 9: Activating the Remote operator option

▶ Transfer the parameter settings for a remote operator to the DMI by choosing Target System → Save to Device or click the Write Control Functions button on the Control functions page.

→ The Write Control Functions button transfers all the parameters of the Control functions page. The Save To Device menu item writes all the currently set project-related parameters in the DTM to the device.

Communication

Setting a PROFIBUS address

The Communication page provides all the fields for setting the DTM station address (PROFIBUS address). This setting can only be carried out when the DTM is offline.

▶ Set the PROFIBUS address of the DTM by selecting an address from the list or entering an address in the text field of the list and pressing Enter.

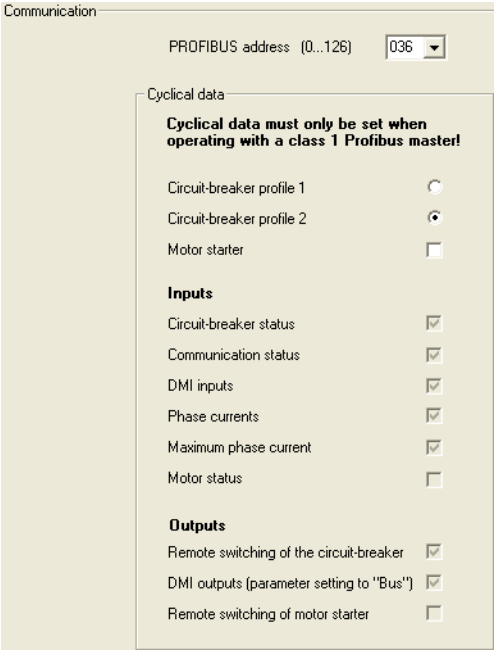


Figure 10: Setting the PROFIBUS address of the DTM

→ If there is no physical station at the address set here, the DTM cannot be switched online.

→ The physical address of the PROFIBUS slave (device station address) is not set here. This must set in addition for every new NZM (i.e. with every new DPV1 gateway) via the communication DTM or directly at the circuit-breaker via the menu of the DMI.

Selecting cyclical data

The two profile variants 1 and 2 from the low-voltage switchgear profile of the PNO (Profibus user organisation) are offered as alternatives for the cyclical data selection. Motor starter can also be selected as an option. The transferred inputs and outputs are marked according to the selection made.

The cyclical data settings are only required and relevant if the DTM is run with an FDT container that has a class 1 PROFIBUS master and if its configuration is not made via the GSD file.

The FDT Specification V1.2. provides for a PROFIBUS DTM to also contain the contents of a GSD file and stipulates that it must be able to transfer this to the FDT container. This enables FDT to carry out the field device configuration without an explicit GSD file.

The PROFIBUS address setting and the circuit-breaker profile for cyclical data are part of the project-related Instance data (→ page 35) and can be saved in the project data memory of the FDT container.

6 Switching NZM-DTM Online

Communication connection via PROFIBUS DPV1

A communication connection for the NZM-DTM via PROFIBUS DPV1 has the following requirements:

- A PROFIBUS-DP communication adapter (e.g. PROFIboard PCI from Softing)
- A communication DTM in the topology of the FDT container that supports PROFIBUS-DP and is compatible with the communication adapter used (normally from the same manufacturer)
- Correct setting of the baud rate, the station address and other bus-specific settings in the configuration user interface of the communication DTM
- Correct setting of the DTM station address (identical to device station address, that is set directly on the device)
- Correct setting of the device station addresses of the individual devices on the bus (no double assignments)
- Correct setting of the bus terminating resistors on the PROFIBUS connector
- No more than one additional class 2 PROFIBUS master and one class 1 master is currently online.

The DTM can be switched on if all of the above requirements are fulfilled. This is a function of the DTM that is called up by the FDT container. The name of the particular menu item and the menu from which the command is called are therefore determined by the container in use. The call from the Moeller FDT Navigator is thus only described as an example.

▶ Switch the NZM-DTM online via the DTM context menu in the topology tree or in the FDT Navigator via Device → Switch Online.

▶ Switch all DTMs in the topology online by choosing the command Communication → All Online from the FDT Navigator menu.

Communication status

The current communication status in offline mode is displayed on the Communication status page under Actual operational data. Messages describing the actual status are output for the individual communication interfaces.

Communication interfaces are provided between:

- NZM and NZM-XDMI 612
- NZM-XDMI 612 and NZM-XDMI DPV1
- NZM-XDMI DPV1 and DP master

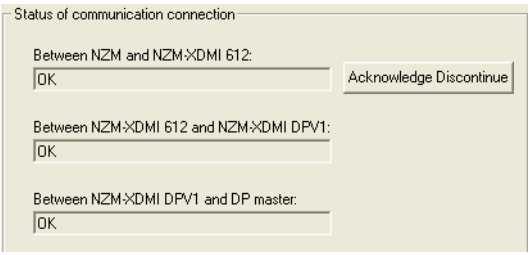


Figure 11: Status of the communication connection

The communication status belongs to the operational Instance data (→ page 35) and cannot be saved in the project data memory of the FDT container.

NZM – NZM-XDMI 612

NZM and DMI are linked by means of a special communication cable (NZM-XDMI-CAB). If the connector is not correctly plugged in on the terminal of the DMI or NZM, this may be a possible cause of errors.

If you are connecting the circuit-breaker to the DMI for the first time, the DMI may switch to Discontinue if you have selected this option in the DMI (→ section "Discontinue when new serial no. detected" on page 55).

If a Discontinue is activated while communication is being established, this can be acknowledged via the NZM-DTM. It should be ensured beforehand that the correct NZM is

connected to the DMI, and which parameters are to be transferred from the DMI to the NZM after communication is established.

▶ Click the Acknowledge Discontinue button if the DMI is in Discontinue status and you wish to allow the communication connection to the connected NZM (the parameters are transferred).

NZM-XDMI 612 – NZM-XDMI DPV1

If the communication between the DMI and DPV1 module is faulty, this is most likely due to the physical connection between the two devices. It may be necessary to exchange EASY-LINK-DS data plug.

Make sure on the DMI that EASY-LINK is active (‹Input Menu→ Com → Switch Off›).

→ "Circuit-breaker communication system" manual (AWB1230-1441GB)

NZM-XDMI DPV1 – DP master

The communication between the DPV1 module and the DP master is run via PROFIBUS DPV1 and may be faulty at several locations. You should first of all check that the DTM station address matches the device station address, then check all the PROFIBUS connectors. Also check whether the PROFIBUS line is provided with terminating resistors at both ends.

→ "Circuit-breaker communication system" manual (AWB1230-1441GB)

Status messages of the DTM

If warnings or faults occur during online communication, these are indicated by the DTM and can be displayed under Status messages.

▶ Open the Status messages window by double-clicking the plug symbol in the status bar of the DTM configuration user interface.

Alternatively you can display the status messages in the DTM configuration user interface via Target System → Display Messages or by clicking the Status Messages button in the toolbar.

If the status messages window is not displayed, check whether the window is already opened but is positioned in the background.

In the Moeller FDT Navigator open the context menu of the DTM in the device topology (right-click) and select the Display device messages option in order to open a window with the current status messages of the DTM. You can use this variant if the DTM configuration user interface is not opened.

A symbol, an error ID and the corresponding error text are displayed for every message.

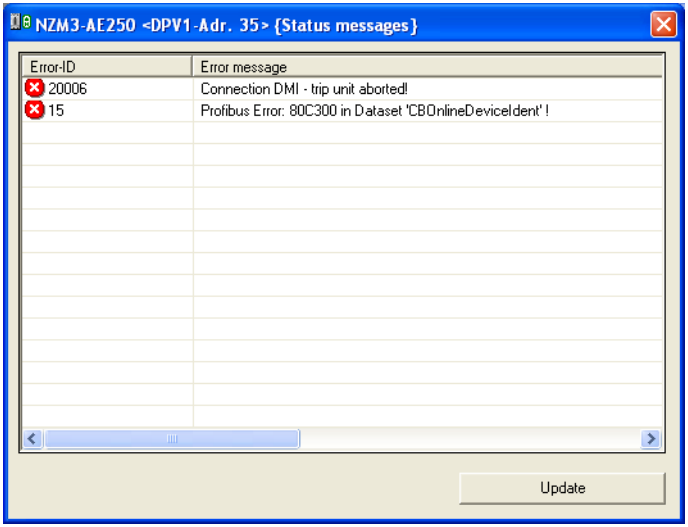


Figure 12: Status messages

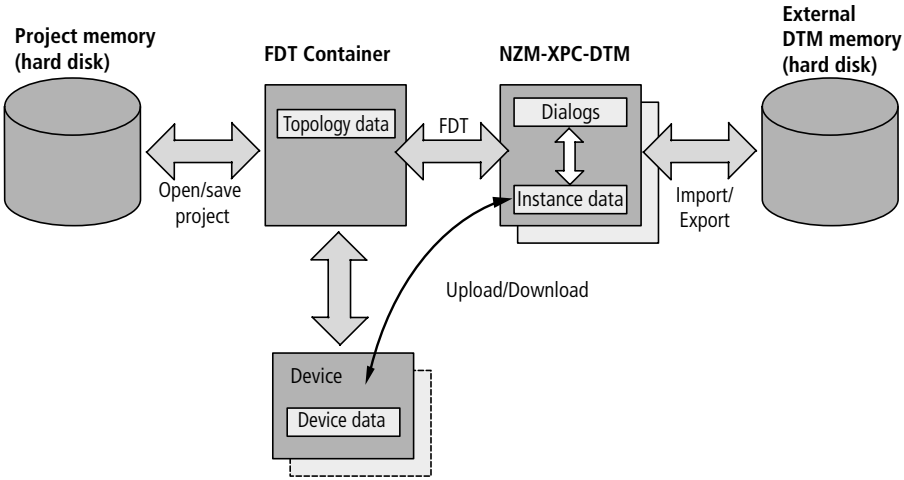
- ▶ Click the Update button if you have already opened the status messages window and wish to refresh the status messages.
- ▶ If you cannot read the entire text, drag the Error text area with the left mouse button depressed in order to enlarge it. A scroll bar will appear so that you can scroll the window section to the right.

Table 4: Meaning of the symbols in the status messages

Symbol	Meaning
	Warning: a warning message is being displayed.
	Error: a communication error has occurred. The cause of the error is indicated.

7 NZM-DTM Data

Overview of data



Project data

Project data is all the information that an FDT container stores for a particular project, such as the topology data. The project data is stored in the data memory of the FDT container (normally on the hard disk or in the network in the form of XML files or in a database).

Instance data

Adding a DTM instance (i.e. a new copy of the DTM) for a device to the topology of the FDT container automatically creates a data record (a so-called instance data record) for the DTM. This data record is displayed in the configuration user interface of the DTM and consists of project-related and operational instance data.

Project-related instance data
Project-related instance data is used for the configuration of a system and for the parameter definition of a device. It can be defined offline or online in the configuration user interface of the DTM and then loaded into the device. This operation will overwrite all the previous settings in the device. It is also possible to read the project-related data from the device first of all, change it in the configuration user interface and then load it back into the device. In this case, it is not necessary to reset all parameters.

Project-related instance data can be saved in the project data memory of the FDT container. When a project is opened, all DTMs present are assigned their relevant project-related instance data. Project-related instance data is indicated in the navigation tree of the DTM by the  symbol.

Operational instance data
Operational instance data is used for monitoring and representing online the actual status of the device or system. Apart from two exceptions (DMI outputs and DMI data/time) it is only displayed and cannot be saved in the project data memory. A "snapshot" of this data can be exported to a file (→ section "External data" on page 37). Operational instance data is indicated in the navigation tree of the DTM by the  symbol.

Device data

Device data is the actual data of the assigned device. If the DTM is switched online, this data can be read from the device and transferred to the instance data. Identification data, the NZM parameters used and the actual operational data of the NZM are updated cyclically when the DTM is online.

A detailed description of the device data transferred via PROFIBUS-DP is provided in the "Circuit-Breaker Communication System" manual (AWB1230-1441GB).

External data

The NZM-DTM export function allows you to "freeze" the actual project-related and operational data of a device for later use, i.e. you save a "snapshot" of the data in a file on the hard disk or in the network. This file can later be read in via the DTM import function, in order, for example, to analyse the data.

Exporting the data from the DTM is possible regardless of the container used and only concerns the data of a DTM instance, i.e. a device.

Load from device

The Load From Device command transfers the project-related data from the assigned device to the instance data of the DTM and displays it. This operation will overwrite all the previous settings in the DTM.

The command is only available online!

Operational data on the NZM parameters, Operator functions, Currents and Communication status pages is read cyclically from the device when online, transferred to the instance data of the DTM and displayed.

Diagnostics data is only read from the device on request via the Read All Diagnostic button on the Diagnostics page, transferred to the instance data of the DTM and displayed.

The Read DMI Parameters and Read Control Functions buttons on the DMI parameters and Control functions pages allow you to just read the data on these pages from the device, transfer it to the instance data of the DTM and display it.

Writing to the device

The Write To Device command transfers the project-related data from the instance data of the DTM to assigned device. This operation will thus overwrite all the previous settings in the device.

The command is only available online!

→ The Write Control Functions, Write DMI Parameters and Write NZM Parameters buttons on the Control functions, DMI parameters and NZM parameters pages allow you to just write the parameters on these pages to the device.

Export to XML file

The Export XML File command is used to save project-related and operational data from the instance data of the DTM to an XML file on the hard disk or in the network. When offline, the last device data read is saved and when online the actual device data. Switching offline allows you to "freeze" the actual device data and save it for later analysis or as a record.

Import from XML file

The Import XML File command is used to load project-related and operational data from an XML file on the hard disk or in the network to the instance data of the DTM.

This command is only available offline and overwrites the instance data of the current DTM.

Printing the data

The NZM-DTM provides the FDT container with printable documents for printing its related data. This allows you to print project data or the project data in conjunction with online data. Standard information can also be printed out for each DTM.

Before printing the online data, the DTM reads all data once more from the device so that always the actual data is printed.

The Page Preview, Print or Save as HTML Page functions can be called from the context menu or the Device menu of the FDT container.

Online/offline comparison

You can carry out an online/offline comparison for the NZM-DTM if the FDT container used supports this function. The online/offline comparison compares the parameter data of the NZM-DTM with the parameters actually set in the device. The DTM must be online for this to be possible.

The Moeller FDT Navigator supports online/offline comparison for an individual DTM and for all DTMs in the topology. The results of the online/offline comparison are displayed and can be printed out.

8 Identification of the Circuit-Breaker

The Identification page contains the most important identification data of the device assigned to the DTM, and is divided into the areas Basic unit: circuit-breaker with electronic release, Electronic expansion, Bus gateway firmware versions.

When adding a new DTM to the topology of the FDT container, the NZM type "Unknown" is the standard setting and the Identification page does not show any data. As soon as you set an NZM type on the Configuration page, the identification data of this type is displayed. The serial number and the firmware version cannot be displayed until the DTM has been switched online.

Another way of configuring the DTM is by importing an XML file with configuration data.

When you switch the DTM online, it compares the type configured offline with the NZM that is actually present. A message will be displayed if the actual device does not match the type configured. The online type can be accepted in the configuration. Otherwise the connection is aborted and the configuration can be checked once more.

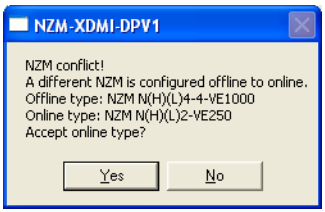


Figure 13: Message after an online/offline comparison

▶ Click Yes if you wish to accept the online type into the configuration.

→ If you do not wish to include the online type in the configuration, you must switch the DTM offline by acknowledging the message with 'No' before you can switch it online again.

→ If the DTM is switched online, the identification data can be read cyclically from the device. When the DTM is offline, this data will continue to be displayed and can be saved, apart from the NZM serial number and the firmware versions, in the project data memory of the container.

Basic unit: NZM with electronic release

The Basic unit: circuit-breaker with electronic release area shows all the important device data of the circuit-breaker: (NZM) type, function, standard, rated current, number of poles, N conductor protection serial number and firmware version.

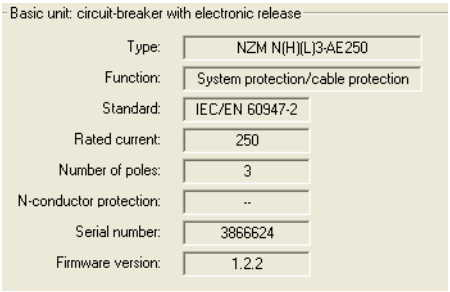


Figure 14: Device data of a circuit-breaker with electronic release

If the DTM is switched online, this is the data of the circuit-breaker that is actually connected.

When offline, this is the data of the configured circuit-breaker. If you have already switched on the DTM once, and have not changed the configuration since, the configured type and the actual type present will match.

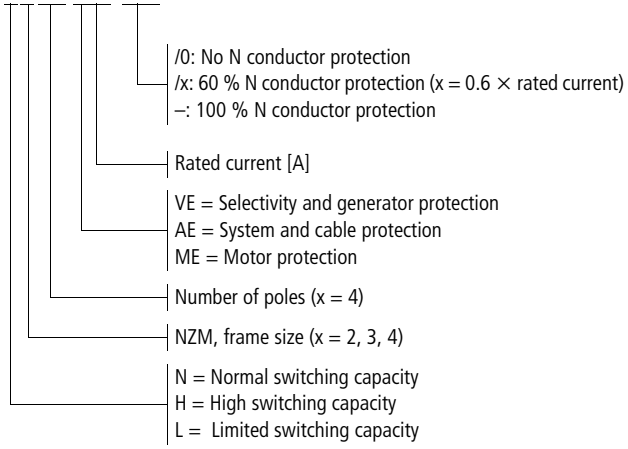
The type reference of the circuit-breaker provides different coded information which is partly displayed in plain text on the Identification page.

Table 5: Type reference depending on application range

Application range	IEC	UL/CSA
System/cable protection	-AE	-AE, -AEF
Selectivity and generator protection	-VE	-VE, -VEF
Motor protection	-ME	
Short-circuit protection		-SE

Type reference for IEC devices

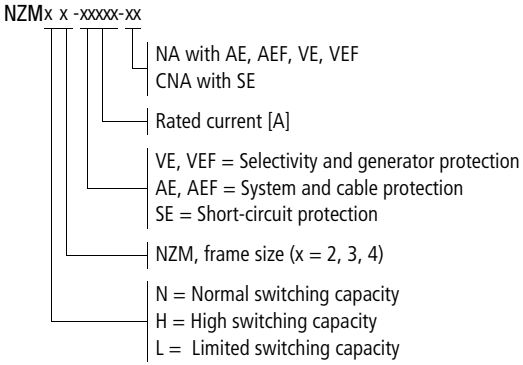
NZM xx [-x]-xxxxx [/xxx] Entries in square brackets may exist for particular types.



Examples:

- NZMx2-4-VE250 (x = N, H, L)
  - NZM frame size 2
  - Number of poles 4
  - Selectivity and generator protection
  - Rated current 250 A
  - 100 % N conductor protection
- NZMx2-4-VE250/160 (x = N, H, L)
  (as above, also: /160 = 60 % N conductor protection)
- NZMx2-4-VE250/0 (x = N, H, L)
  (as above, also: /0 = % No N conductor protection)
- NZMx3-4-AE400 (x = N, H, L)
  - NZM frame size 3
  - Number of poles 4
  - System and cable protection
  - Rated current 400 A
  - 100 % N conductor protection
- NZMx4-ME1400 (x = N, H)
  - NZM frame size 4
  - Number of poles 3
  - Motor protection
  - Rated current 1400 A

Type reference for UL/CSA devices



Examples:

- NZMx2-VE250-NA (x= N, H)
  - NZM frame size 2
  - Number of poles 3
  - Selectivity and generator protection
  - Rated current 250 A
  - Switches for North America

- NZMx3-SE220-CNA (x= N, H, L)
  - NZM frame size 3
  - Number of poles 3
  - Short-circuit protection
  - Rated current 220 A
  - North American switches, C = Component[1] (Ir = fixed value)

1) As a component in the overall system, the circuit-breaker is only responsible for short-circuit protection. Additional devices are required for overload protection and earth fault protection.

- NZMx4-AEF1000-NA (x= N, H)
  - NZM frame size 4
  - Number of poles 3
  - System and cable protection, fixed device (Ir = fixed value)
  - Rated current 1000A

Electronic expansion

The Electronic expansion area displays the device data of an optional expansion module. This data consists of the type (e.g. earth-fault release for NZM3/4 (IEC)), the hardware version and the firmware version. The entries for hardware and firmware version are not available for every expansion module.

Electronic expansions are only available for frame sizes NZM 3 and NZM 4.

Figure 15: Electronic expansion

Bus gateway

The Bus gateway area displays the firmware versions of the Data Management Interface (NZM-XDMI 612) and the PROFIBUS-DPV1 gateway (NZM-XDMI DPV1). This information is only available once you have switched the DTM online at least once.

Figure 16: Firmware version of the bus gateway

9 Comments

The Comments page enables you to enter additional information on the circuit-breaker. This information can be saved in the DTM and in the project. The following entries are possible:

- Description/Tagname
- Distribution circuit ID
- Author
- Other user information.

The current date and time of the last change is also saved. The tag name is also shown in the header area and in the title bar, as well as being transferred to the FDT container.

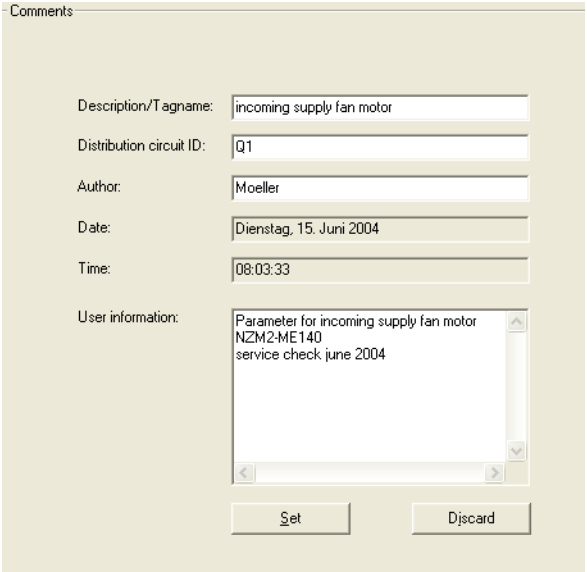


Figure 17: Comment entries for the circuit-breaker

- ▶ Enter here the Description/Tagname, Distribution circuit ID, author and other user information. Save your entries in the DTM by clicking the Set button.
- ▶ Undo your entries by clicking the Discard button or moving to another parameter page.

Up to 30 characters each can be entered for Description/ tagname, Distribution circuit ID and author. You should use line breaks for the user information text.

Your comment entries are only saved in the DTM if you click the Set button. The date and time of saving are then saved and displayed.

- ▶ Save the project in the FDT container if you wish to save the comment entries and other modifications to the DTM permanently.

10 DMI Parameters

Use the parameters on the Control functions and DMI parameter pages to configure the functions and the display of the DMI.

The parameters on these pages are included in the project-related Instance data (→ page 35), i.e. they can be saved in the project data memory of the FDT container. The settings in the display do not necessarily represent the actual status of the parameters in the device (DMI) since they are not read cyclically online (exception: DMI firmware version).

The Read Control Functions and Read DMI Parameters buttons allow you to read the actual parameter data on this page from the device (DMI) and transfer it to the instance data of the DTM.

The Write Control Functions and Write DMI Parameters buttons are used to transfer the parameters on this page to the device (DMI).

There are two fundamental procedures for defining the parameters of the DMI. These depend on the current state of the parameters in the DMI:

- Set all the parameters on the Control functions, DMI parameters and NZM parameters pages and then write the parameters to the device. This operation will overwrite all the previous settings in the DTM.
- Read the parameters from the device first of all, only change the parameters required and then write them back to the device.

Reading and transferring parameters from the DMI

▶ Use the Load from device menu command in the Target System menu if you wish to read all project-related parameters from the device and transfer it to the instance data of the DTM.

Transferring parameters to the DMI

▶ Use the Save to device menu command in the Target System menu if you wish to transfer all project-related parameters to the device (DMI).

Firmware

The DMI area on the DMI Parameters page shows the firmware version of the DMI as soon as you switch the DTM online.

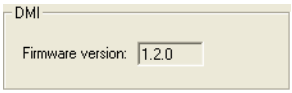


Figure 18: Firmware version of the DMI

Firmware version V.1.2.0 or higher is required for operation as a PROFIBUS-DPV1 slave in conjunction with the NZM-XDMI-DPV1 module

The firmware of the DMI can only be updated with the NZM-XPC-Soft software, and also requires an up-to-date DMI firmware file.

→ "NZM-XPC-Soft" manual (AWB 1230-1459GB)

Standard display

The DMI standard display appears automatically in the display if you have not pressed any buttons on the DMI within 30 seconds. Four lines are always displayed. Two other lines can also be accessed with the cursor buttons.

→ "Circuit-breaker communication system" manual (AWB1230-1441GB).

The configuration user interface of the DTM enables you to set the standard display for the DMI display of lines 1 to 6 individually and transfer the settings to the DMI:

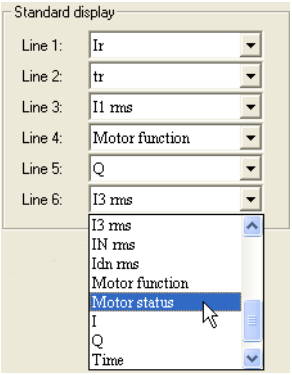


Figure 19: Standard display for the DMI display

▶ Open the list box and select the required value from the list:

Table 6: Settings for the DMI standard display

Display	Description of the display
I_r	Current setting value for the overload release
I_i	Current setting value for the short-circuit release
I_{sd}	Current setting value for the short-time delayed release
I_{dn}	Current setting value for the earth-fault release
t_r	Response delay of overload release
t_{sd}	Response delay of short-time delayed release
t_{vdn}	Response delay of earth-fault release
I^2t	I^2t characteristic activated/deactivated (switching the short-circuit protection characteristic for improved selectivity with downstream fuses)
$I_{1\ rms}$	r.m.s. current in phase 1
$I_{2\ rms}$	r.m.s. current in phase 2
$I_{3\ rms}$	r.m.s. current in phase 3
$I_{N\ rms}$	r.m.s. current in N conductor
$I_{dn\ rms}$	r.m.s. value of the leakage current
Motor function	Set motor starter function (only with motor protection (-ME) circuit-breakers)
Motor status	Set motor status and direction (only with motor protection (-ME) circuit-breakers)
I:	Status of the inputs in 000000 format
Q:	Status of the outputs in 000000 format
Time	Current time set in DMI
Date	Current date set in DMI
Empty	No entry starting from this line

- ▶ Select the Empty entry if you do not wish the DMI to display anything else in the standard display from this line.
- ▶ Transfer your settings to the DMI by clicking the Write DMI Parameters button or by choosing Target System → Save To Device.

The Write DMI Parameters button only transfers parameters from the DMI parameters page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

Password

The DMI password function is designed to protect the entry menu in the DMI. A value between 0001 and 9999 is accepted as a password. The number sequence 0000 deletes the current DMI password.

After entering the last number, you will automatically enter the Repeat password field.

The Repeat password field is used to confirm the password in order to exclude entry errors. An appropriate message appears if the DMI password and the Repeat password entries are not identical. You can then re-enter the password in the Repeat password field or abort the step. In the last case, the previous password is restored.

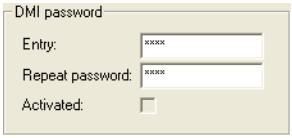


Figure 20: Password for DMI entry menu

- ▶ Enter a new password between 0001 and 9999.
- ▶ Repeat the password in the Repeat password field.
- ▶ Transfer the new password to the DMI by clicking the Write DMI Parameters button or by choosing Target System → Save To Device.

→ The Write DMI Parameters button only transfers parameters from the DMI parameters page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

A tick is displayed next to the Activated option box if a password has been set in the DMI.

Discontinue when new serial no. detected

A parameter in the DMI can be used to control the startup behaviour when connecting to a circuit-breaker. If the Discontinue parameter is set, and the serial number set in the DMI is not identical to the NZM connected, the communication establishment to the circuit-breaker is aborted, i.e. the NZM parameters are not transferred.

→ "Circuit-breaker communication system" manual (AWB 1230-1441GB).

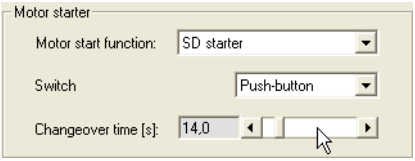


Figure 21: Discontinue activated

- ▶ Activate the Discontinue when new serial no. detected: parameter if you wish to ensure that incorrect parameters cannot be transferred when a new circuit-breaker is connected.
- ▶ At NZM serial no. enter the number of the circuit-breaker that will be connected or is already connected and to which the parameters apply.
- ▶ Transfer the settings to the DMI by clicking the Write DMI Parameters button or by choosing Target System → Save To Device.

→ The Write DMI Parameters button only transfers parameters from the DMI parameters page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

Language selection

The DMI menu has a language selection function that offers the languages German, English, French, Italian and Spanish. You can set the language setting for the DMI in the configuration user interface of the DTM and write it into the DMI.

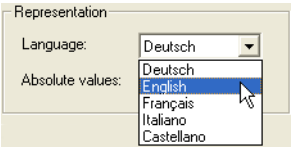


Figure 22: Language setting for the DMI user interface

- ▶ Select the required language from the list.
- ▶ Transfer the settings to the DMI by clicking the Write DMI Parameters button or by choosing Target System → Save To Device.

→ The Write DMI Parameters button only transfers parameters from the DMI parameters page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

Absolute value display

Parameters and currents on the DMI display can either be displayed as a relative value in the format "n × I_x" or as absolute values with a unit of measure. The relative value display is the default display setting in the DMI. You can set the absolute value setting for the DMI in the configuration user interface of the DTM and write it to the DMI.

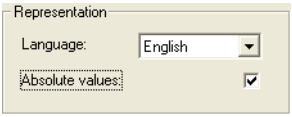


Figure 23: DMI display as absolute values

- ▶ Activate the Absolute values option if the parameters and currents are to be displayed in the DMI as absolute values.
- ▶ Transfer the settings to the DMI by clicking the Write DMI Parameters button or by choosing Target System → Save To Device.

→ The Write DMI Parameters button only transfers parameters from the DMI parameters page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

Motor starter function

In addition to its normal functions, the DMI can also provide motor protective functions when used in conjunction with the NZM circuit-breaker and additional contactors.

When the motor starter function is selected, the DMI activates an overload disconnection by means of contactors. If the DMI receives the Motor prot. alarm message from the NZM, it resets the outputs required for the function concerned. In this way, the connected contactors are deactivated and the motor switches off. If the NZM still detects the overload condition 100 ms later, it will itself trip.

You can set the motor starter function of the DMI on the Control functions page of the DTM configuration user interface and transfer it to the DMI.

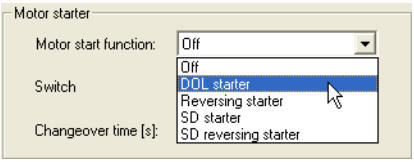


Figure 24: DMI with motor starter function

▶ Select the required motor starter function from the drop-down list box.

→ You can only set a motor starter function if you are using a circuit-breaker suitable for motor protection (-ME). This selection is disabled if a different type was set under Configuration, or if a different type is connected online.

The following motor starter functions can be implemented and selected here via the DMI:

- Direct-on-line starter
- Reversing starter
- Star-delta starter
- Reversing star-delta starter.

The Clockwise, Anti-clockwise and Stop functions are activated either via PROFIBUS-DP or via the external switch element on the inputs I1 to I3 of the DMI.

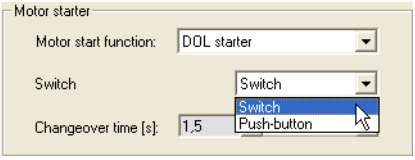


Figure 25: Selecting a switch element

▶ Select the external switch elements required for the motor starter function from the drop-down list box:
  – Switch (signal actuation)
  – Pushbutton actuator (edge actuation)

The DMI uses the inputs I1 to I3 and the digital outputs Q0 to Q3 for the motor starter functions according to the function and the switch elements selected.

You can use two additional displays for the standard DMI display specially for the motor starter function:

- Motor function (display of the motor starter function)
- Motor status (display of the status and rotation direction).

For the star-delta changeover, you can set the changeover time between 0.1 – 99.9 s in 0.1 s steps and transfer the setting to the DMI.

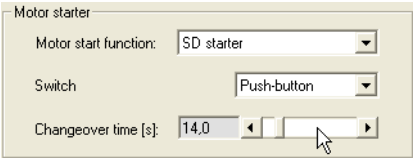


Figure 26: Setting the changeover time

▶ Set the changeover time in 0.1 s increments by clicking the ◀ or ▶ of the scroll bar.

▶ Adjust the changeover time in 1 s increments by moving the white areas left and right of the scroll bar button.

▶ Transfer the settings for the motor starter function to the DMI by clicking the Write Control Functions button or by choosing Target System → Save To Device.

→ The Write Control Functions button only transfers the parameters of the Control functions page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

→ You cannot changes the motor starter function parameters whilst the motor is running. If, however, you try to do this, the DMI will ignore the changed parameters (→ chapter "Operator Functions", section "Motor", on page 79).

If you have set a motor starter function, the required assignment of the DMI inputs and outputs is displayed on the Control functions page.

Table 7: Direct-on-line starter

Inputs			
	Switch	I1	On/off
	Pushbutton actuators	I1	On
		I2	Off
Outputs		Q0	Mains contactor

Table 8: Reversing starter

Inputs			
	Switch	I1	Anti-clockwise rotation
		I3	Clockwise rotation
	Pushbutton actuators	I1	Anti-clockwise rotation
		I2	Off
		I3	Clockwise rotation
Outputs		Q0	Mains contactor, anti-clockwise
		Q1	Mains contactor, clockwise

Table 9: Star-delta starter

Inputs		
Switch	I1	On/off
Pushbutton actuators	I1	On
	I2	Off
Outputs	Q0	Mains contactor
	Q2	Star contactor
	Q3	Delta contactor

Table 10: Reversing star-delta starter

Inputs		
Switch	I1	Anti-clockwise rotation
	I3	Clockwise rotation
Pushbutton actuators	I1	Anti-clockwise rotation
	I2	Off
	I3	Clockwise rotation
Outputs	Q0	Mains contactor, anti-clockwise
	Q1	Mains contactor, clockwise
	Q2	Star contactor
	Q3	Delta contactor

Remote operator

The NZM circuit-breaker can be operated remotely from the NZM-XPC-DTM via PROFIBUS DPV1. This has the following requirements:

- The circuit-breaker must also be fitted with a remote operator.
- In addition to having its own power supply, the remote operator must be wired with the DMI outputs Q4 and Q5.
- The Remote operator option must be set in the DMI.
- The DTM must be online.

▶ Wire the outputs Q4 and Q5 of the DMI with the remote operator of the circuit-breaker (→ table 7).

▶ Select the Remote operator option on the Configuration page or Control functions page of the DTM.

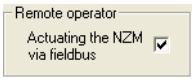


Figure 27: Remote actuation of the NZM activated

▶ Transfer your settings to the DMI by clicking the Write Control Functions button or by choosing Target System → Save To Device.

→ The Write Control Functions button only transfers the parameters of the Control functions page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

▶ If you have selected the Remote operator option, the required assignment of the DMI inputs and outputs is displayed on the Control functions page.

Table 11: Assignment of the outputs for the remote operator

Outputs	Q4	Remote operator off
	Q5	Remote operator on

→ chapter "Operator Functions", section "NZM" on page 77.

Acknowledge input

The input I0 of the DMI can be used as an acknowledgement input. This makes it possible to acknowledge trips and motor protection alarms via a pushbutton actuator.

- ▶ Wire up an acknowledge pushbutton actuator (make contact) to the DMI input I0.
- ▶ Select the Acknowledgement of Trips/motor protection option on the Control functions page of the NZM-DTM.

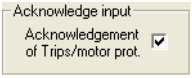


Figure 28: Acknowledge input

- ▶ Transfer the parameters to the device by clicking the Write Control Functions button or by choosing Target System → Save To Device.

→ The Write Control Functions button only transfers the parameters of the Control functions page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

If you have activated the Acknowledgement of Trips/motor protection option in the DMI, a 1 signal at input I0 of the DMI will acknowledge any trip or motor protection alarm signals present. An acknowledgement causes the following:

- The appropriate LED for Trip/motor protection alarm goes out in NZM-XPC-DTM.
- An output configured on the DMI for this trip/motor protection alarm is reset.
- The alarm indication on the DMI display is cleared.
- The corresponding Trip indication is cleared in the PROFIBUS-DP data.

The Actual operational data page of the DTM configuration user interface indicates a trip or a motor protection alarm until it is acknowledged. This acknowledgement can be carried out in several ways.

- Pressing the ESC button on the DMI
- Setting the acknowledge input I0 on the DMI to 1
- Switching off the circuit-breaker (from Trip position to Off position); manually or using a remote operator
- Clicking the Acknowledge button on the Actual operational data page of the NZM-DTM
- Sending an acknowledge signal via PROFIBUS (PLC).

Setting DMI outputs (Q assignment)

You can assign specific functions to the six digital outputs Q0 to Q5 on the DMI. A DMI output will switch to 1 if the condition assigned to it is fulfilled, such as when the circuit-breaker indicates a Trip Ir.

Set the conditions for setting the outputs (Q assignment) for the DMI outputs Q0 to Q5 on the Control functions page.

▶ Select the condition for setting a DMI output from the list box.

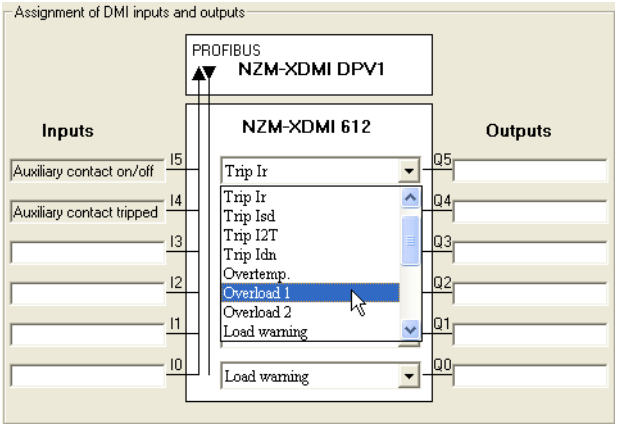


Figure 29: Condition for setting a DMI output

▶ Transfer your settings to the DMI by clicking the Write Control Functions button or by choosing Target System → Save To Device.

→ The Write Control Functions button only transfers the parameters of the Control functions page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

Function	Output switches, if ...
Trip I_i	a short-circuit trip has occurred
Trip I_r	an overload trip has occurred (long-delayed)
Trip I_{sd}	a short-time delayed trip has occurred (without I^2t monitoring activated)
Trip I^2t	if a short-time delayed trip has occurred due to I^2t characteristics (with I^2T function activated)
Trip I_{dn}	The permissible fault current was exceeded and has caused a trip (only with earth-fault release)
Overtemp.	the permissible operating temperature was exceeded and has therefore caused a trip
Overload 1 (> 100 % Ir)	the current in at least one phase has exceeded the permissible value by 100 %
Overload 2 (> 120 % Ir)	the current in at least one phase has exceeded the permissible value by 120 %
Load warning (> 70 % Ir)	the current in at least one phase has exceeded the permissible value by 70 %
Load unbal.	a circuit-breaker for motor protection (-ME) has detected an unbalanced load on the phase currents (load unbalance is detected by the NZM, if the current of at least one phase is less than approx. 50% of the r.m.s. value of the maximum current of the three phases. The condition is removed when the actual current goes above approx. 75% of the maximum current)
Parameters	the parameters set on the NZM are different to the DMI parameter settings
Trip	the circuit-breaker has tripped, regardless of the cause
Alarm	the circuit-breaker has reported an alarm, irrespective of the cause of the alarm
Motor protection	the circuit-breaker (type -ME) detects an overload and asks the DMI to disconnect the motor. If the overload continues, the circuit-breaker will trip.
Bus	the output can be controlled via the fieldbus. This requires the use of a fieldbus module.
Off	the DMI output is permanently deactivated
On	the DMI output is permanently activated

Outputs that were set in the event of a warning message (Load Warning, Overload 1, Overload 2, Load unbalance, Parameters, Alarm) are reset when the warning message is no longer present.

Outputs which are set in the event of a circuit-breaker trip or motor protection function stay set until the message is acknowledged.

An acknowledgement can be carried out by:

- Pressing the ESC button on the DMI
- Setting the acknowledge input I0 on the DMI to 1
- Switching off the circuit-breaker (from Trip position to Off position); manually or using a remote operator
- Clicking the Acknowledge button on the Actual operational data page of the NZM-DTM
- Sending an acknowledge signal via PROFIBUS (PLC).

→ When the motor starter function is set, the outputs Q0 to Q3 may be permanently assigned depending on the set function.

Outputs Q4 and Q5 are reserved if the remote operator option is selected.

Indication of the circuit-breaker status

Proceed as follows in order to implement the transfer of the circuit-breaker status via the PROFIBUS-DP fieldbus:

- ▶ Install the auxiliary contact (standard auxiliary contact, tripped auxiliary contact) in the circuit-breaker. Observe the mounting instructions provided (AWA1230-....).
- ▶ Wire the auxiliary contacts with the DMI inputs I4 and I5.

The DMI inputs I4 and I5 are permanently reserved for this function and must not be used for other purposes.

Table 12: Auxiliary contact

Inputs	I4	Auxiliary contact tripped (break contact)
	I5	Auxiliary contact on/off (make contact)

Assignment of the free DMI inputs/outputs

The DMI inputs and outputs that are not assigned to the functions listed above can be used for scanning and controlling other components (e.g. other auxiliary contacts, indication elements, contactors).

On the Control functions page you can also assign the free DMI inputs and outputs with a label text which can also be saved in the project and printed out.

The label text is restricted to 50 characters. Use the arrow buttons to scroll the entry if it is larger than the visible area. If you enter spaces in your texts, they are formatted automatically and distributed over several lines in the printout.

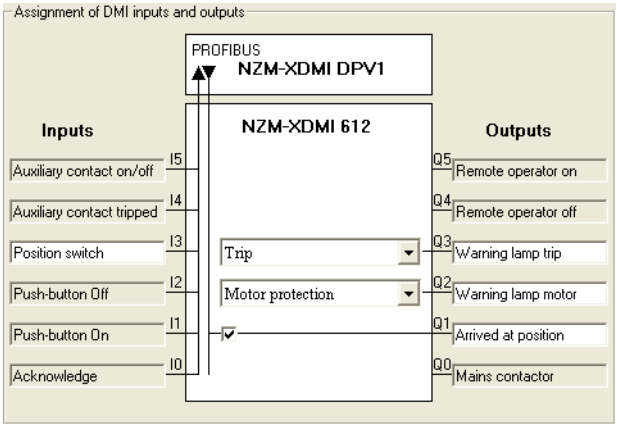


Figure 30: Example of an assignment of the free inputs/outputs

11 NZM Parameters

General

The trip parameters of the NZM can be set in several different ways:

- Setting directly on the circuit-breaker using the setting elements on the electronic release unit (switch values)
- Parameter entry via DMI. You can set the DMI parameters directly on the DMI by choosing Input menu → Parameters or via PROFIBUS DP (e.g. via NZM-DTM or PLC).

If you are using several methods to set parameters, e.g. from the PLC and from the NZM-DTM, the most recent setting will overwrite a previous setting in the DMI.

The DMI continuously transfers the set parameters to the circuit-breaker (exception: → section "Discontinue when new serial no. detected" on page 55). The circuit-breaker compares the switch values or the values set via the DMI and always works with the lower values, i.e. more critical values (used parameters).

Decide which methods you wish to use to control the parameters:

- The parameter settings on the circuit-breaker should apply.
- The parameter setting should be carried out via the DMI or via PROFIBUS-DPV1 communication (e.g. from NZM-DTM or from a PLC).
- The parameter setting should be carried out via the DMI or via PROFIBUS-DPV1 communication (e.g. from NZM-DTM or from a PLC). However, the parameters should be restricted to the values that are set directly on the electronic release unit.

If it is necessary to ensure that always the switch values apply, smaller values should not be transferred by means of communication. This can be carried out via the NZM-DTM or via another communication station (PLC). If smaller

parameters are not to be set from the NZM-DTM, set the slide adjuster on the NZM Parameter page to the setting "n.def".

- ▶ Set the setting elements on the electronic unit to the maximum value if you wish to enter the parameters over the entire setting range via the DMI.
- ▶ Set the setting elements to a particular value if you wish to ensure that larger values cannot be entered via the DMI.

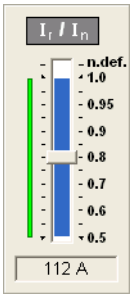
The NZM preset values in the DTM (setting via the slide adjuster, tick for I2t) are part of the project-related Instance data (→ page 35) and can be saved in the project data memory of the FDT container. This makes it possible to define parameters offline.

The NZM parameters used and the switch values (green bars) are part of the operational Instance data (→ page 35). They are updated cyclically and cannot be saved in the project data memory of the FDT container. The current state of these parameters can be printed out or exported to a file (→ section "External data" on page 37).

Graphic symbols and control elements

The graphic symbols and control elements used on the NZM parameters page have the following meaning:

Table 13: Graphic symbols and control elements on the NZM parameters page



Green bar	Parameter value set on the circuit-breaker (position of setting elements)
Blue bar	Currently used parameter value in the circuit-breaker
Slide adjuster	Parameter setting by moving the slide adjuster. The settings are written to the device by clicking the Write NZM Parameters button.
Text field underneath slide adjuster	Parameter setting as absolute value, the display corresponds to the current position of the slide adjuster.
Green LED	Setting of the I^2t parameter on the circuit-breaker
Blue LED	Setting of the I^2t parameter used
Check box	Parameter setting of the I^2t parameter by placing a tick in the check box
Write NZM Parameters button	The parameter settings of the slide adjuster and check box are written to the device. After a successful write operation the used values (blue bars) are adjusted to the slide adjuster or to the switch values (green bars).

Parameters used

The parameters used are parameters with which the circuit-breaker really operates.

If the circuit-breaker has been assigned different parameter values via the DMI or PROFIBUS, the circuit-breaker will always work with the lower (more critical) values. If the parameters are different, the Parameter LED will flash on the DMI and a parameter warning will be output in the NZM-DTM.

The most recent parameters used are not stored retentively in the circuit-breaker.

The NZM operates with the last parameters used for as long as the power supply to the electronic release unit is still ensured (current flow ≧ approx. 30 % I_n) or the power is fed via the DMI. If the power supply to the electronic unit is not sufficient, e.g. when the connection to the DMI is interrupted and the circuit-breaker has been switched off at the same time, tripped or the current flow is too low, the most recent parameters used are lost. After the power supply to the electronic release unit is restored, the switch values are used as parameters first of all. As soon as connection is established with the DMI, the parameter values stored in the DMI are automatically transferred again to the NZM. These become operative if they are lower than the switch values.

Parameter setting

The parameters of the NZM can be set in three different ways:

- Directly on the electronic release unit (setting elements)
- On the DMI via Input menu → Parameters
- Via PROFIBUS-DP (NZM-DTM or PLC)

The circuit-breaker always works with the lower (more critical) values!

▶ Change the parameter settings by setting the required value with the slide adjuster or activating the check box for I^2t.

▶ Transfer the settings to the DMI by clicking the Write NZM Parameters button or by choosing Target System → Save To Device.

The Write NZM Parameters button only transfers parameter settings from the NZM parameters page. The Save To Device menu item transfers **all** the currently set parameters in the DTM to the device.

Once you have successfully transferred the changed parameters to the DMI, the blue bars (used values) are adjusted to the value of the slide adjusters. If the parameter values set on the circuit-breaker are smaller than the defined values, the blue bars are adjusted to the green bars of the switch values.

Permanently set parameters

Certain electronic types have internal parameters that are permanently set or are permanently set to customer specifications at the factory.

Permanently set parameters cannot be changed. The blue bars in the configuration user interface then show the fixed values used. The switch values (green bars) in this case are then set to n.def.

12 Operator Functions

General

The Operator functions page shows an overview the operating functions of the circuit-breaker, a motor and the DMI outputs. The date and time can also be set in the DMI.

The operator functions are only available if the DTM is switched online.

The operating data displayed on the Operator functions page is part of the operational Instance data (→ page 35). It is updated cyclically and cannot be saved in the project data memory of the FDT container.

→ Bear in mind that other communication stations such as PLCs can also use the same operator functions. Design the entire installation accordingly.

NZM

On/off switching, Trip

The buttons in the Switch area can be used to switch the NZM on and off by means of a remote operator or to trip it for testing purposes. Only one or two buttons are accessible depending on the status of the switch (On, Off, Trip).

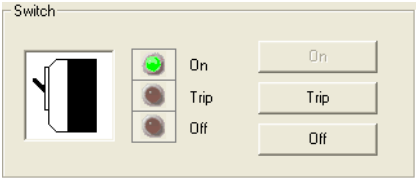


Figure 31: Switch operator function

Requirements for the remote operation of the circuit-breaker via PROFIBUS (from the configuration user interface of the NZM-DTM or from a PLC):

- A remote operator must be installed and wired with the DMI outputs Q4 and Q5.
- The Remote operator option must be set in the DMI.

The NZM auxiliary contact must be installed and wired with DMI inputs I4 and I5 in order to display the status of the circuit-breaker.

A test trip via the Trip button can only be carried out reliably if the circuit-breaker is run with at least 40 % of the rated current, as only then is sufficient power available for the release coil.

The LEDs and switch graphic display the actual switch status that is monitored by the NZM auxiliary contacts. The LEDs have different colours depending on the status of the switch.

Table 14: LED colours for the switch status

LED	Colour
On	Green
Off	Yellow
Trip	Red

Motor

On/off/anti-clockwise/clockwise

The switch elements in the Motor area can be used to switch the motor remotely.

Requirement:

- A type ME circuit-breaker must be connected for motor protection.
- A motor starter function must be set in the DMI.

Only one or two buttons are accessible depending on the status of the motor (on/anti-clockwise, Off, clockwise).

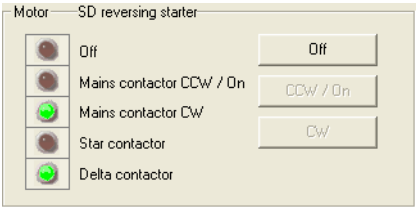


Figure 32: Status display of the motor starter contactors

The LEDs are used to indicate the status of the motor starter contactors. The LED for the Off state is bright red. All LEDs for the operating status are green.

→ section "Motor starter function" on page 58.

DMI

Display of inputs/outputs

The actual status of the inputs I0 to I5 and outputs Q0 to Q5 of the DMI is indicated via LEDs in the DMI inputs/outputs area. A light green LED indicates that the corresponding input or output is in the On state.

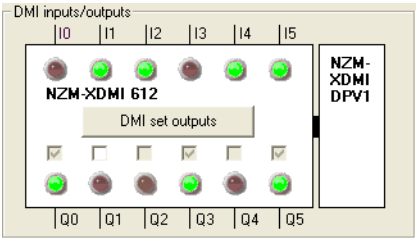


Figure 33: Status indication of the DMI inputs/outputs

- Display of DMI inputs

The signals physically present are displayed apart from the inputs I1 to I3 when a motor starter function is set. In this case, an internal request to operate the motor starter is also displayed. This can be implemented using a button or switch or via PROFIBUS-DP, both in the cyclical data and with an acyclical command (e.g. from the NZM-DTM). I1 and I3 then show that On/anti-clockwise or Clockwise was requested. I2 is always on because a break contact is used as an Off pushbutton actuator for safety reasons. If Off was requested, I1 and I3 are off.

- Display of DMI outputs

The signals physically present at the outputs are displayed.

DMI outputs that were set to Bus (→ section "Setting DMI outputs (Q assignment)" on page 65) can be set via PROFIBUS. This can be carried out from the configuration user interface of the NZM-DTM or from a PLC. If a class 1 PROFIBUS master (PLC) accesses the DMI outputs, they are disabled for the class 2 master (NZM-DTM). In this case, a warning message will be output if you try to set the outputs.

Outputs set to Bus are indicated by the fact that the option field is not dimmed and is therefore not disabled.

▶ Activate the tick in the option field of the DMI output you wish to set and click the Set DMI Outputs button if you wish to switch on the DMI output.

Displaying/changing date and time

The DMI date/time area displays the current date set in the DMI. You can enter a new time and a new date or accept the setting from the PC.

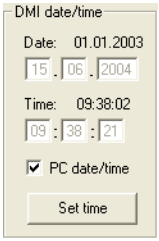


Figure 34: Display of the currently set date and time in the DMI

- ▶ Enter a new date and a new time and click the Set Time button if you wish to update the date and time in the DMI.
- ▶ Activate the tick in the PC date/time option field and click the Set Time button if you wish to adjust the date and time in the DMI to the PC setting.

→ If you set the DMI time, there will be a delay of a few seconds depending on the bus load, i.e. the DMI clock is a few seconds slower.

→ When the NZM saves diagnostics events, the date and time currently set in the DMI is stored in the diagnostics data record as the NZM itself does not have its own timer.

13 Actual NZM Operating Data

When the DTM is online, the Actual operational data page shows the following :

- Actual circuit-breaker status
- Cause of tripping (a trip) or a motor protection message
- Actual currents and phase states
- Parameters used by the circuit-breaker
- Additional statistics information.

You can use the Acknowledge button to acknowledge the trips or motor protection messages present.

The currents are also displayed graphically on the Currents page.

The data displayed on the Actual operational data page and Currents page is part of the operational Instance data (→ page 35). It is updated cyclically and cannot be saved in the project data memory of the FDT container. The current state of this data can be printed out or exported to a file (see section on NZM Data).

Status of the NZM

The Switch area displays the actual status of the circuit-breaker. The display features an image of the circuit-breaker and three LEDs. The display of the circuit-breaker status is identical to the display of the Operator functions page.

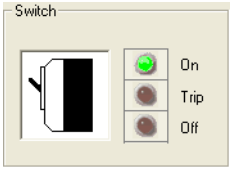


Figure 35: Status display of the circuit-breaker

If you switch the DTM online, the display is updated and is identical to the Operator functions page. If you switch it offline, the Actual operational data page displays the most recent circuit-breaker status recorded. In offline status the Operator functions page no longer displays the circuit-breaker status.

Cause of trip

After a circuit-breaker has tripped, a bright red LED indicates the cause of trip in the Cause of trip area. This display is active until the trip is acknowledged.

If the NZM sends the Motor protection signal, this is indicated by a bright red LED in the same way as with a trip. The indication can be cleared by clicking the Acknowledge button.

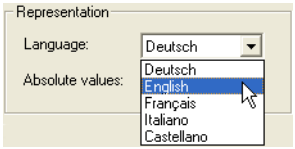


Figure 36: Cause of circuit-breaker trip

Table 15: Alarms and causes of trip

I_i	Short-circuit trip
I_{sd}	Short-time delayed short-circuit trip
I_r	Overload trip
I_{dn}	Earth-fault release trip
I^2t	Trip by I^2t
Command	Trip caused by a Trip command
Temperature	Trip caused by overtemperature
Motor protection	Motor protection alarm via NZM

Acknowledge

An acknowledgement causes the following:

- The corresponding LED for Trip/motor protection alarm will go out in the NZM-DTM.
- An output configured on the DMI for this trip/motor protection alarm is reset.
- The alarm indication on the DMI display is cleared.
- The corresponding Trip indication is cleared in the PROFIBUS-DP data.

The acknowledgement can be initiated in the following ways:

- By clicking the Acknowledge button in NZM-DTM
- By pressing the ESC button on the DMI
- By setting the acknowledge input I0 if this input is configured as an acknowledge input.
- By switching the circuit-breaker to Off.
- By sending an acknowledge command via PROFIBUS-DP (for example, from a PLC).

After a trip, first of all switch the circuit-breaker to the Off state. This also counts as an acknowledge. Only then is it possible to switch the circuit-breaker on again.

Currents and phase status

The Currents and phase status area displays the r.m.s. current for the phases (L_1, L_2, L_3, N) present as a relative value – in relation to the overload current I_r or the rated current I_n (for NZMx-AEF, -VEF, -SE) – and as an absolute value in Amps. An LED also indicates the status of the phases.

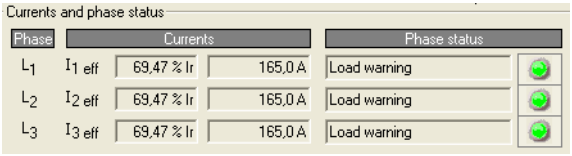


Figure 37: Display of currents and phase states

Table 16: Plain text entries in the phase status and LED indication

Plain text phase status	LED colour
OK	Green
Load warning (load > 70 Ir)	Green
Overload1 (load > 100 Ir)	Yellow
Overload2 (load > 120Ir)	Yellow
Trip	Red

If an earth fault module is used, the fault current I_{dn} is also displayed as a relative value in relation to the rated current I_n and as an absolute value in Amps.

With ME type circuit-breakers for motor protection a load unbalance in the three phases is additionally indicated by a yellow LED. Load unbalance is indicated if the current in one phase drops below 50 % of the maximum current on all three phases.

The rms currents I_{1rms}, I_{2rms}, I_{3rms}, I_{Nrms} and I_{dnrms} are indicated graphically on the Currents parameter page in addition to the display of currents and phase states on the Actual operational data page. The currents I_{Nrms} and I_{dnrms} are displayed or hidden depending on the NZM type (3-pole or 4-pole) or whether an optional earth-fault release is used.

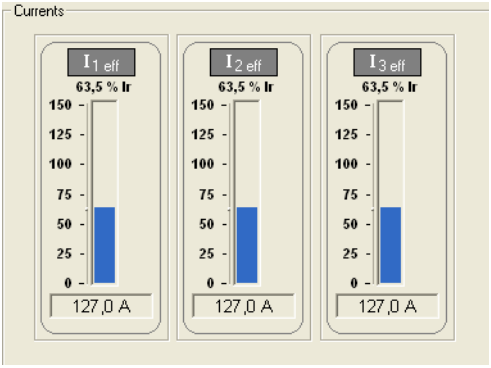


Figure 38: Display of r.m.s. currents

The display in the bargraph covers a value range from 0 to 150 % I_r and I_n (for NZMx-AEF, -VEF, -SE). Values greater than 150 % I_r and I_n, are indicated by a full bar and an upward pointing arrow. The exact current value can be read as a relative value in the text field above the bar. The absolute values of the currents are displayed in Amps below the bargraph.

Parameters

The Parameter area displays the actual working parameters of the circuit-breaker electronics. The current parameters are displayed as % values of the overload current I_r or the rated current I_n and as absolute values in Amps. The delay times are displayed in seconds or milliseconds.

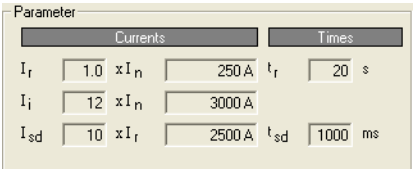


Figure 39: Working parameters of the circuit-breaker electronics

Statistics

The Statistics area displays the following information:

- Operating hours of the NZM (in hours)
- Operating hours of the DMI (in hours)
- Operations of the NZM (number of operations)

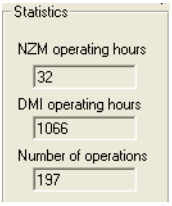


Figure 40: Number of operating hours and operations

This statistical information is collected in the DMI and provided for evaluation via PROFIBUS.

Operating hours

The operating hours of the NZM are counted if there is a communication connection to the NZM.

→ The operating hours are reset to 0 if you connect a new circuit-breaker to the DMI.

The operating hours of the DMI are incremented continuously.

Operations

The operations are counted with every on or off operation of the circuit-breaker (On → Trip, On → Off, Off → On) as long as there is a communication connection to the NZM.

14 Diagnostics Data of the Circuit-Breaker

Diagnostics memory

The electronic release stores the status data (trip, alarm), the parameter settings, the phase states, as well as date and time in a diagnostics memory every time there is a change in the status of the circuit-breaker.

The most recent diagnostics data is assigned the number 01 in the diagnostics memory, the second most recent diagnostics data is assigned the number 02, and the oldest diagnostics data the number 10. The memory operates as a ring buffer, i.e. if new diagnostics data is saved, all previously saved diagnostics data is shifted one position further back and the oldest diagnostics data on position 10 is deleted. This ensures that the memory always contains the ten most recent diagnostics states.

These last ten diagnostic events can be read and displayed with the DMI or an NZM software (NZM-XPC-Soft, NZM-XPC-DTM).

Reading diagnostics

When the DTM is online, the saved diagnostics can be read from the circuit-breaker and displayed for evaluation.

▶ Open the Diagnostics page and click the Read All Diagnostics button if you wish to scan and display the current state of the diagnostics buffer.

All the diagnostics data from the electronic release is read that is currently present in the memory. Diagnostics messages that are present are marked with a symbol in the navigation tree and are entered in the diagnostics overview.

Table 17: Diagnostics status symbols in the navigation tree and in the diagnostics overview

	The phase status has changed, a load warning (Load > 70% I_r) has been detected in at least one phase or a load imbalance warning is present.
	The phase status has changed, an overload 1 (Load > 100% I_r) or overload 2 (Load > 120 % I_r) has been detected in at least one phase.
	The circuit-breaker has tripped or a motor protection message has been output to disconnect the contactors (with circuit-breakers for motor protection).
	The phase status has changed, a load warning (Load > 70% I_r) is no longer present.

→ Status changes that occur when you are reading diagnostics are not recorded and displayed until the next read operation. This is because the most recent diagnostics data is read first of all.

→ Diagnostics data is operational Instance data (→ page 35) and is not stored in the project data memory of the FDT container. You can, however, export the diagnostics data to a file (→ section "Export to XML file" on page 39) for later analysis. The import function of the NZM-DTM can be used to load this data into a DTM for analysis offline.

Displaying diagnostics

After a read operation the diagnostics overview on the Diagnostic page shows the 10 diagnostics data records in a table. At a glance you can see whether the status of the circuit-breaker in the individual phases has changed within a specific period. A detailed diagnostics display is provided on the pages Diagnostic 01 to Diagnostic 10.

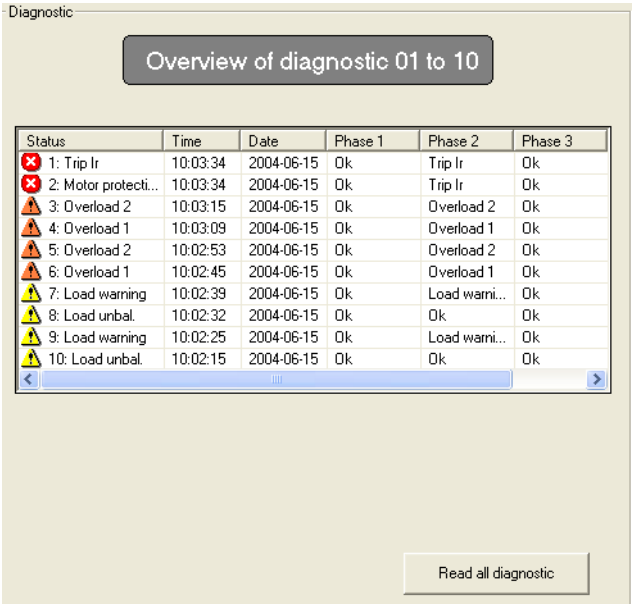


Figure 41: Diagnostics overview

▶ For a detailed display of diagnostics information double-click the appropriate line in the overview or click the appropriate entry in the navigation tree.

Diagnostic time signature

A diagnostics data record is stored in the NZM diagnostics buffer when there is a change in status, for example, if the load current increases and exceeds 70 % of the rated current. The time at which the diagnostics event occurs is very important for later evaluation and is therefore stored as well.

As the electronic release of the NZM does not have its own timer, date and time can only be saved in the diagnostics data if the circuit-breaker was connected to the DMI when the data record was saved. If this is not the case, for example, if the connection is aborted due to a cable break or the removal of the plug, the diagnostics data record will be provided with a blank date and time entry and displayed in the NZM-DTM as 00:00:00 2000-00-00.

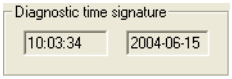


Figure 42: Time signature of the diagnostics event

Cause of trip

The Cause of trip area of diagnostics 01 to 10 indicates the cause of trip or a motor protection alarm of the circuit-breaker with a bright red LED.

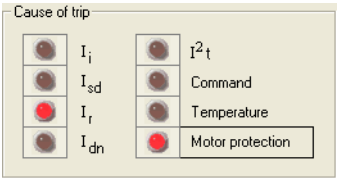


Figure 43: Cause of circuit-breaker trip

Every trip of the circuit-breaker is stored in a diagnostics data record as a status change. This enables you to determine the cause and time of a trip at a later time by reading out the diagnostics data.

With ME type circuit-breakers for motor protection, a motor protection alarm is also a status change and is saved as a diagnostics data record.

Table 18: Alarms and causes of trip in the diagnostics data

I_i	Short-circuit trip
I_{sd}	Short-time delayed short-circuit trip
I_r	Overload trip
I_{dn}	Earth-fault release trip
I^2t	Trip caused by I^2t
Command	Trip caused by a Trip command
Temperature	Trip caused by overtemperature
Motor protection	Motor protection alarm via NZM

Phase status

The Phase status area of diagnostics 01 to 10 displays in plain text the phase status for the phases (L1, L2, L3, N) present at the time of the status change. A coloured LED also indicates the status.

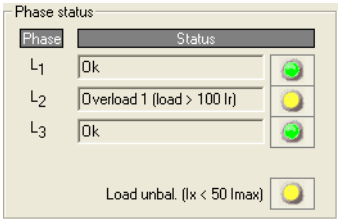


Figure 44: Phase status at the time of the status change

At the time of a status change, the states of the individual phases are stored in the diagnostics data record. This makes it possible to trace the changes in phase status over a specified period by reading out the diagnostics data from the circuit-breaker.

Table 19: Phase status and LED indication in the diagnostics data

Plain text phase status	LED colour
OK	Green
Load warning (load > 70Ir)	Green
Overload1 (load > 100Ir)	Yellow
Overload2 (load > 120Ir)	Yellow
Trip	Red

Parameters

The Parameter area of diagnostics 01 to 10 displays the working parameters of the circuit-breaker electronic release at the time of the status change (diagnostics). The current parameters are displayed as % values of the overload current I_r or the rated current I_n (for NZMx-AEF, -VEF, -SE) and as absolute values in Amps. The delay times are displayed in seconds or milliseconds.

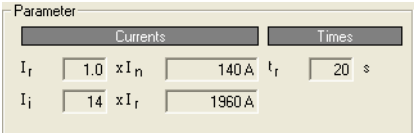


Figure 45: Working parameters of the circuit-breaker electronics at the time of a status change

At the time of a status change, the working parameters of the circuit-breaker are stored in the diagnostics data record. You can therefore read the diagnostics data to determine the parameter settings that may have possibly led to an overload or a trip in the circuit-breaker.

15 Help/Manual

The program is provided with an extensive Help system with Content, Index, Find and Favourites functions.

- ▶ Start the DTM Help system by clicking the menu item required in the ? menu. Alternatively you can click the ? button in the toolbar.
- ▶ Start the context-sensitive help for a group of parameters by right-clicking the frame of this group on the parameter page. This opens a context menu with the Help menu item. Click the entry to activate Help.

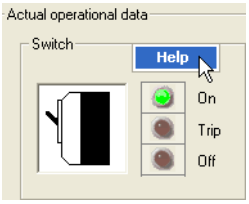


Figure 46: Calling the context menu for a group of parameters

- ▶ Start the Help for the Parameter page by right-clicking the required entry in the navigation tree to open the context menu and clicking Help.

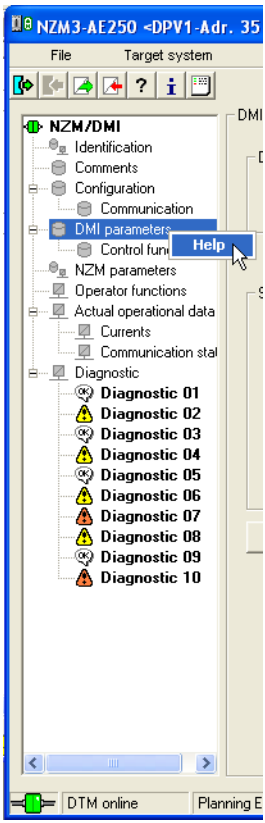


Figure 47: Calling the context Help for the Parameter page

This manual is also provided as a pdf file in addition to the Online Help. It is copied to your program directory when the NZM-DTM is installed.

▶ Open the DTM manual by clicking Manual in the ? menu.

16 Information About NZM-DTM

The About window provides information about the NZM-DTM.

A brief description, the version and the current build version are displayed in the upper area.

The middle section displays the manufacturer's address including telephone, e-mail and web address, as well as license information. Clicking on the blue e-mail address and web address immediately activates your e-mail program or the Moeller home page via your Internet browser.

The lower area displays the version of the devicelist.xml file that is copied to the program directory C:\Programs\Moeller Software\NZM-XPC-DTM\Documentation when the NZM-DTM is installed.

The firmware versions of the DMI and the individual frame sizes of the NZM that are supported by the NZM-DTM are also displayed. This information is stored in the device file.

▶ Open the About window for the DTM by clicking About... in the ? menu. Alternatively, click the "i" button in the toolbar.

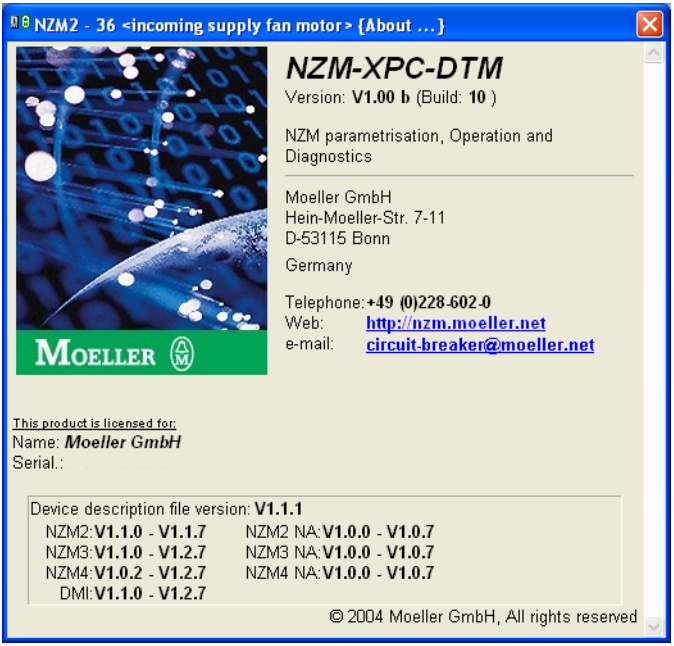


Figure 48: Information window, NZM-DTM

Appendix

Glossary

Term or abbreviation	Meaning
FDT	**F**ield **D**evice **T**ool – Specification for the description of interfaces for multivendor use of DTMs and frame applications (FDT containers).
FDT container	Frame software based on the FDT specification. It can manage and call the installed DTMs on a system and start their user interfaces (ActiveX controls) for accessing the devices assigned to them.
DTM	Device Type Manager – corresponding software component for field devices (device DTM) or communication systems (communication DTM) that is based on the FDT specification. A DTM can only run in conjunction with an FDT frame application (FDT container).
Communication DTM	Communication driver that implements the appropriate communication protocols and provides one or several communication channels for data exchange with the field devices. It contains the bus parameters required, that can normally be set via their own user interfaces.
Device DTM	Field device driver that provides all device-specific functions and dialogs, including the user interface for parameter definition, configuration, diagnostics and maintenance of the device.
PROFIBUS DPV1	Fieldbus that is particularly used in industry for networking different devices (slaves) with a PLC or PC (master)
PROFIBUS address	Unique address between 0 and 126 of a station (master or slave) on the PROFIBUS
ActiveX control	Software module that can run more or less as a complex user interface in a frame application supporting these kinds of modules. A DTM can provide one or several ActiveX controls as user interfaces.
NZM	Moeller circuit-breaker, available in several frame sizes with different releases, that is used for a wide range of applications in the field of system and cable protection, motor protection, as well as in selective and generator protection.

Term or abbreviation	Meaning
DMI	**D**ata **M**anagement **I**nterface Add-on device for the NZM that is used for the operating, display and parameter functions on a circuit-breaker, as well as for scanning and controlling other components such as auxiliary contacts and contactors for motor starters.
DPV1 module	Add-on device for the DMI that is used as a coupling module for linking an NZM–DMI system to PROFIBUS as a DPV1 slave.
HTM (HTML)	Hypertext Markup Language; language for showing data, images etc. on a web page using web browsers.
XML	Extensible Markup Language; language for the structured writing of data in text format; can be interpreted by XML parsers.
XSL	Extensible Stylesheet Language; language for the transformation and formatted display of XML files.
Earth-fault release	Optional add-on module for earth-fault protection, can be used for IEC circuit-breakers with frame sizes 3 and 4. With protective devices that respond in the milliampere range, these are called residual current devices (personnel protection). With protective devices that respond in the ampere range (1 to 1200A), these are called earth fault protection devices (system protection, fire protection).
Remote operator	Optional add-on device for the NZM in different frame sizes, which enables more convenient local and remote operation of the circuit-breaker.
$I_{1\ rms} – I_{3\ rms}, I_{N\ rms}$	RMS current of phase 1 – 3, N-conductor in relation to the set overload current I_r or the rated current I_n (at NZMx-AEF, -VEF, -SE)
I_{dn}	Response value of the earth-fault release
$I_{dn\ rms}$	RMS value of fault current
I_i	(i=instantaneous) response value of the non-delayed short-circuit release
I_n	Rated current
I_r	Setting value for an overload release
I_{sd}	(sd=short-time delayed) response value of the short-time delayed short-circuit release
I^2t	Switching the short-circuit protection characteristic for improved selectivity with downstream fuses.

Term or abbreviation	Meaning
Command	Trip of the circuit-breaker by means of a software command (from DMI, NZM-XPC-Soft, NZM-DTM, PLC)
Load warning	Warning message with a load > 70 % I_r and I_n (with NZMx-AEF, -VEF, -SE)
Motor protection	Signal from a circuit-breaker for motor protection (-ME) to the DMI 100 ms before an overload release. The DMI then disconnects the contactors. If the overload condition is still present 100 ms later, the circuit-breaker itself will trip.
N conductor	Neutral conductor
L1, L2, L3	Phase 1, 2, 3
Temperature	Trip by temperature monitoring (inside NZM)
t_r	Response delay of overload release
trip	Trip
t_{sd}	Response delay of short-time delayed short-circuit release
t_{vdn}	Response delay of earth-fault release
Overload 1	Warning message with a load > 100 % I_r and I_n (with NZMx-AEF, -VEF, -SE)
Overload 2	Warning message with a load > 120 % I_r and I_n (with NZMx-AEF, -VEF, -SE)
Load unbal.	Warning message with a current in a phase of less than approx. 50% of the r.m.s. value of the maximum current on the three phases. The condition is removed when the actual current goes above approx. 75 % of the maximum current.
n.def.	Parameter not defined, NZM is using local setting
I0 – I5	Digital inputs (digital inputs, 24 V DC)
Q0 – Q5	DMI outputs[1] (digital outputs, relays)
Discontinue	Option in the DMI that can be set if the DMI is to close down communication when a new circuit-breaker is connected. The parameters are then not sent to the NZM. The communication can be continued if the new serial number is accepted.

Term or abbreviation	Meaning
NZM serial no.:	Serial number of the NZM for the Discontinue test with a new serial number.
Line 1 – 6	Display line 1 – 6 on the DMI display (standard display)[2]

1) If you have selected a motor starter function, 1 to 4 outputs (Q0, Q1, Q2, Q3) are no longer available for use with circuit-breaker alarms or trips. Outputs Q4 and Q5 are reserved if the remote operator is connected.

2) Parameters that do not exist for the connected NZM type are not displayed in the DMI, i.e. this line is missing.

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