

# Switching, protection, communication – the new NZM circuit-breaker series up to 1600 A



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**NZM circuit-breaker**

IZM circuit-breaker

Switchboard systems

## Product Information NZM circuit-breakers

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# The new range up to 1600 A – New ideas for better circuit- breakers

The new Moeller circuit-breakers cover a range from 15 to 1600 A with just four frame sizes. And they are optimally matched to one another. The wide application spectrum covers every requirement as Moeller has closely examined what every customer needs and implemented the appropriate solutions. Outstanding, for example, is the continuous switching power range – which extends from the smallest to the largest circuit-breaker or the modular system which can be matched without difficulty to suit the specific application. Thus, the circuit-breakers can be used universally – from the smallest of service distribution boards, to machine controls or motor starter combinations, up to large energy distribution systems with a short-circuit breaking capacity of up to 150 kA.

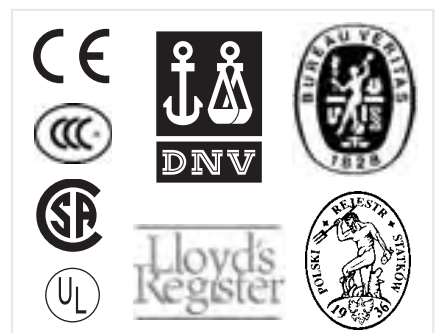


**3-pole circuit-breaker**

**“Moeller simply has the experience. This is evident with every single product, with the service you receive and the people.”**



**4-pole circuit-breaker**



### Circuit-breakers for use all over the world

All circuit-breakers fulfil the demands for world-wide use. This applies for the United States, Canada and the Chinese markets with the certification to UL, CSA and CCC (China Compulsory Certification).

In conjunction with the shipping classification authorities, Moeller also conducts testing in order to obtain the following certification: Lloyds Register of Shipping, Bureau Veritas, Det Norske Veritas, Polski Rejestr Statkow.

### Full performance up to 50 °C

All circuit-breakers and switch-disconnector's are designed to facilitate operation up to an ambient temperature of 50 °C under full load conditions without need to reduce the rated current (derate). This is a comfortable prerequisite for simple and practice relevant engineering with important safety components.



Circuit-breaker		NZM1	NZM2	NZM3	NZM4
Short-circuit breaking capacity	25 kA				
Icu to IEC/EN 60947	50 kA				
At 415 V	100 kA				
	150 kA <sup>1)</sup>				
Application range in A		15 – 160	15 – 250	125 – 630	315 – 1600
Number of poles		3/4	3/4	3/4	3/4
Rated voltage in V		690	690	690	690
Circuit-breakers for North America		NZM1-NA	NZM2-NA	NZM3-NA	NZM4-NA
Short-circuit breaking capacity	25 kA				
Icu to UL489	35 kA				
At 480 V	65 kA				
	100 kA				
Short-circuit breaking capacity	18 kA				
Icu to CSA 22.2 No. 5.1	25 kA				
At 600 V	35 kA				
	50 kA				
Application range in A		1 – 125	1.6 – 250	125 – 600	400 – 1200
Number of poles		3	3	3	3
Rated voltage in V		600	600	600	600
Dimensions in mm	Width 3/4-pole	90/120	105/140	140/185	210/280
	Height	145	184	275	401
	Depth	68	103	120.5	138

<sup>1)</sup> Applies for NZM4: 120 kA

### Wide range covered with just four devices

Four circuit-breakers with graduated and consecutive switching power stages – from the attractively-priced 25 kA version for smaller service distribution boards right up to 150 kA switching power for complex high-powered energy distribution systems – form an impressive range. The new 125 A circuit-breaker has an extremely compact design. It saves space as a main switch in machine controls, as an incomer switch in service distribution boards and as an outgoer switch in power distribution systems. Further device graduation stages are 250 A and 630 A in a particularly compact design as well as the 1600 A circuit-breaker.

# Excellent under load



Switch-disconnector 3-pole



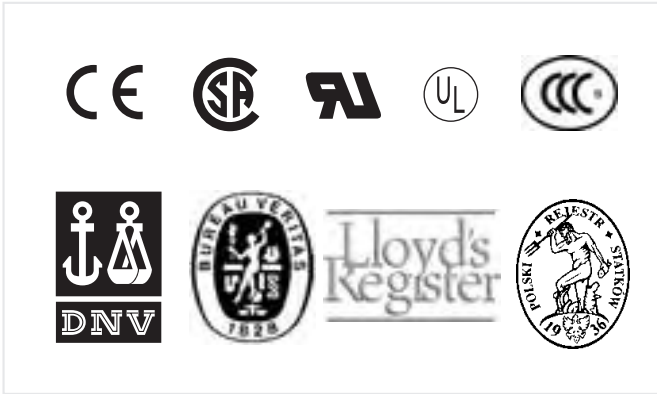
Switch-disconnector 4-pole

## Switch-disconnector's for safe switching under load

Even under load conditions the Moeller switch-disconnector operates safely. The reason: the 3- or 4-pole snap-action closing mechanism which is also applied with circuit-breakers. That's why the rated short time withstand current is so high and can handle currents up to 150 000 A. The long lifetime with up to 7 500 switching operations in AC3 mode enables usage as a motor switch, in order to switch large motors during operation. Application as a main switch with an emergency-stop function via a remote pushbutton is easily implemented in conjunction with the double early-make auxiliary contacts and undervoltage release. This in conjunction with the UL/CSA approvals is a prerequisite for use in process and processing machines which are destined for export.

*"Moeller circuit-breakers and switch-disconnectors are based on the same concept. Not only do the switch-disconnectors have the same range of accessories, they also have the same high motor switching capacities and long lifetimes."*



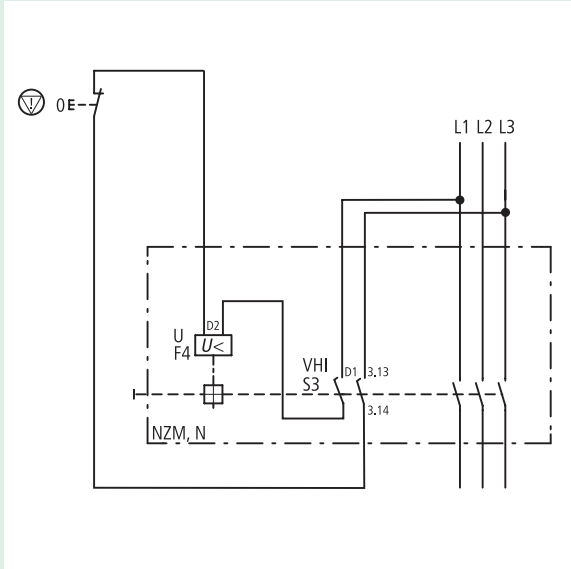


**Main switch application**

The main switch application with an emergency-stop function up to 1600 A conform to IEC/EN 60204-1, VDE 0113 Part 1 can be easily and cost-effectively implemented with the new Moeller products.

The voltage is switched off on all current conducting circuits are when the switch is switched off using the undervoltage release with two integrated early-make auxiliary contacts. Safety is guaranteed at all times in this manner when the switch is in the Off position.

The early-make auxiliary contacts can always be installed – even if the circuit-breaker is equipped with a toggle-lever or rotary drive.



Switch-disconnector	PN1/N1	PN2/N2	PN3/N3	N4
Application range in A	63 – 160	160 – 250	400 – 630	800 – 1600
Number of poles	3/4	3/4	3/4	3/4
Rated voltage in V	690	690	690	690
Switch-disconnectors for North America	N1-NA	N2-NA	N3-NA	N4-NA
Application range in A	63 – 125	160 – 250	400 – 600	800 – 1200
Number of poles	3	3	3	3
Rated voltage in V	600	600	600	600
Dimensions in mm	Width 3/4-pole	90/120	105/140	140/185
	Height	145	184	275
	Depth	68	103	120.5

# Protection flexibility: Systems, generators, motors



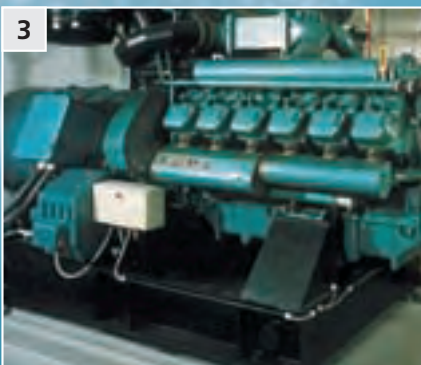
## 1 NZM protects systems

NZM circuit-breakers protect entire systems as well as cables and wiring on all levels, from the main distribution board right up to the loads. As the incoming circuit-breaker, the NZM will of course also provide secondary side overload protection for the transformer. A variant with modified short-circuit releases also enables a power network with time selectivity.



## 2 NZM protects motors

NZM circuit-breakers protect motors and cables against overloads and short-circuits. The short-circuit release of the NZM can be set to 12 to 14 times the rated motor current to ensure that starting current peaks are not shut down by the protective device. NZM circuit-breakers provide reliable and phase failure sensitive protection for motors from 15 A to 1400 A.



## 3 NZM protects generators

Even when the generators have difficulty generating two to six times the continuous current, it does not present a problem for the NZM. It can master shutdown of even the smallest short-circuit currents within a few milliseconds. A setting which ignores short-circuit currents for up to 1 s is possible for special tasks.



## 4 NZM protects with fault currents

The mains and auxiliary voltage independent residual current circuit-breaker trips as soon as the set rated fault currents are exceeded. The module is pulse current sensitive and also discriminative.

The  $I_{\Delta N} = 30 \text{ mA}$  in this function module also ensures personnel safety.



### Trip electronics featuring micro-processors enhance the operating continuity

The microprocessor controlled digital electronics determine r.m.s. values for the load current to be monitored. In contrast to analog electronics, any harmonics which may be in the power grid will be correctly evaluated and do not cause premature and unexpected trips. This prevents a standstill.

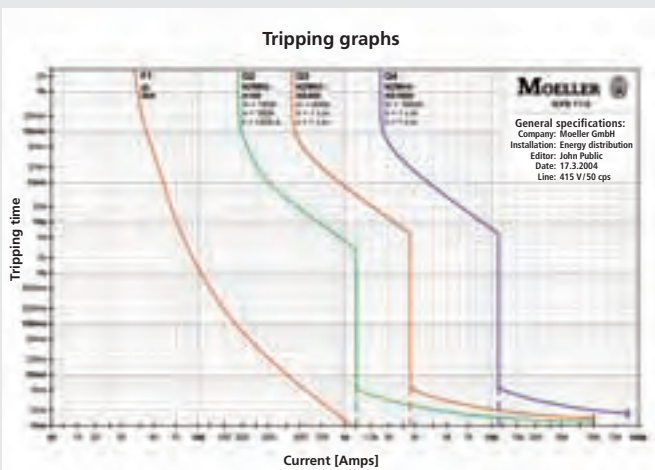
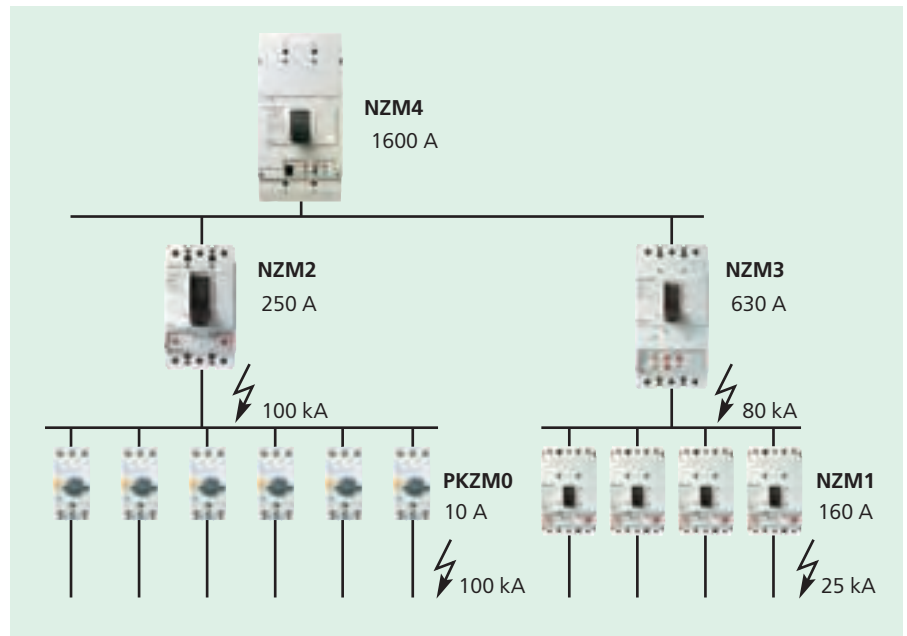
Special components simulate a thermal memory even when the switch trips during a currentless period due to a

load overload. Thus, safe protection of the connected equipment is guaranteed – even when the device is switched back on after a brief cooling off phase.

All electronics have been routinely tested and preaged in an oven. This corresponds to a real operating time of about six months. Thermocouples guarantee a safety-oriented trip of the circuit-breaker in the improbable case that an inadmissible overtemperature is due to the electronic components.

### Selectivity table

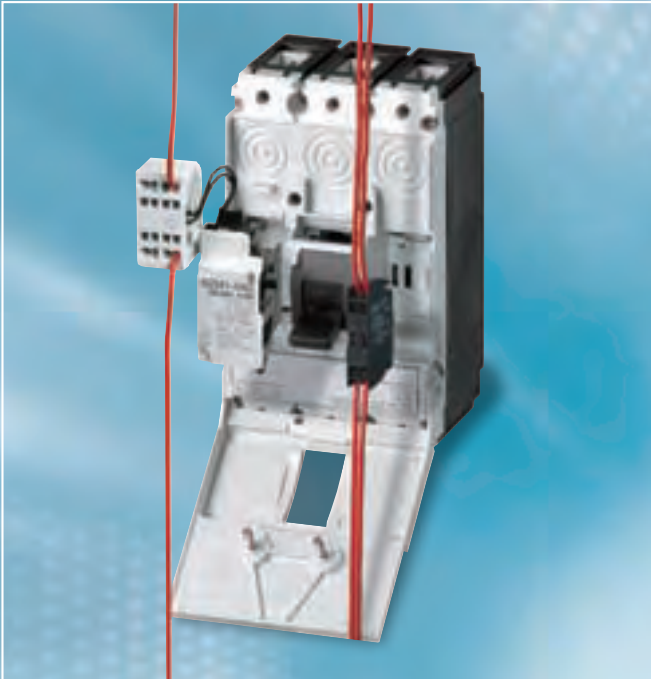
NZM circuit-breakers achieve selectivity during a short-circuit even without additional electronic short-time delayed devices. For example, the 1000 A circuit-breaker in combination with a 250 A outgoing circuit-breaker is fully selective up to a maximum existing short-circuit current of 100 000 A. Even two high energy incoming supplies of e.g. two parallel 2 000 kVA distribution transformers are cost-effective and are simple to engineer with high levels of supply reliability.



### Simpler visualisation, comparison and documentation of characteristic curves

The free-of-charge characteristic curve program supports documentation of the circuit-breakers which are used in completed switchgear systems. All setting parameters can be easily determined, graphically displayed and printed-out. A direct comparison of NZM circuit-breaker and IZM circuit-breaker in combination with h.b.c. fuses enables assessment of the selectivity for the overload and time-delayed over-current range.

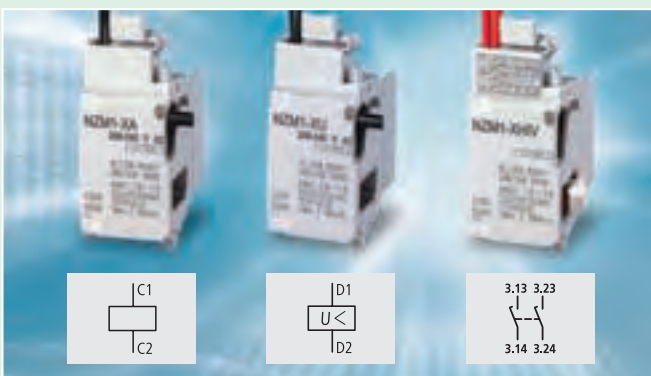
## System benefits – the universal accessory range



The method of functioning and fitting of the accessories is identical for every size. Contact elements from the RMQ-Titan® range of control circuit devices are used for the entire NZM range of circuit-breakers.

This has many advantages: it ensures a reduction in the variety of types, a decrease in ordering expense and effort and consequently, simpler inventory management. The contact elements can be simply clipped-on from the front. The position deter-

mines the function: signalling contact or trip-indicating auxiliary contact, and like all auxiliary contacts and releases, they are available with bolt connection or spring-loaded connection, for circuit-breakers or switch-disconnector's.



### The control circuit terminals – bolt- or spring-loaded connection

Effective shunt or undervoltage releases, combined also with early-make auxiliary contacts for Emergency-Stop functions or load-shedding circuits, offer elegant solutions for a wide range of functioning applications. All contact points are available with sturdy bolt connection or alternatively with spring-loaded connection throughout for all control circuit terminals. This saves time when wiring all control circuit terminals.



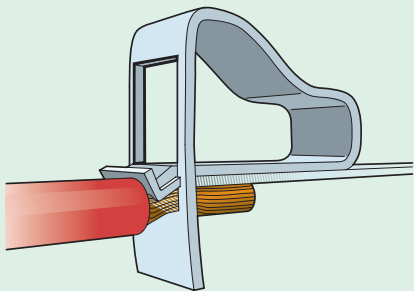
### All messages in detail – the Data Management Interface

It does not matter if the causes for a trip or a warning message with unbalance are required, or if all phase currents are to be displayed directly on-site and corrective actions are to be implemented with a critical load state. The Data Management Interface (DMI) always signals exact details. The relay outputs of the DMI signal up to 6 different messages. All trip causes are available as group signals and  $I_i$ ,  $I_r$ ,  $I_{sd}$ ,  $I^2t$ , and  $I_{dn}$  detail signals. The trip cause, phase state, switch setting as well as date and time can be accessed via the 4-line display. Representation of the actual phase currents can be in absolute or relative (%  $I_r$ ) terms. Warnings with regard to the load status are issued at 70 %, 100 % and 120 %  $I_r$ . Thus, the DMI is perfect for direct display on-site or for the integration in higher-level energy management concepts.



### Spring-loaded terminations – handling of the entire range with a single action

Moeller provides spring-loaded terminals universally for all control-line terminations. On contactors and motor-protective circuit-breakers they are also provided on the main circuit up to a rating of 16 A.



## Variable operation – toggle, turn, automatic operation



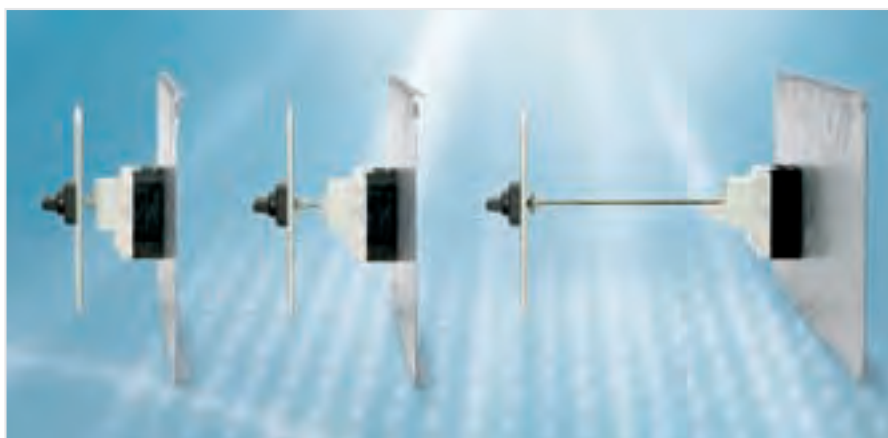
### The door coupling rotary handle – for uniform, flexible solutions

The base plate is the same for every door coupling rotary handle, this means faster fitting due to the identical drilling diagram. The switches can also be fitted vertically or horizontally in the control panel.

### Door coupling rotary handles – ergonomic switching

Four different shaft lengths enable device installation in various control panels and housings up to a depth of 600 mm. A cost-effective and simple to mounting solution is available for the narrowest component mounting where the switch makes direct contact with the cover.

*“Circuit-breakers and switch-disconnectors from Moeller impress me because of their wider range of installation and operating features.”*



### Application related locking

Multiple versions of the door coupling rotary handle provide individual solutions.

- The standard handle features automatic handle position locking, which facilitates comfortable locking of control panel doors even with differing switch positions.
- The second version can be locked with padlocks and automatically locks the doors when closed. This is the typical application for a main switch as the control panels can only be opened in the Off position.
- With the third version, there is an additional locking feature directly on the switch. For example, the switches can be locked individually in a complex energy distribution system.

Handles in red/yellow contrasting colours are available for the emergency-stop function.



### The main switch types – the side operator

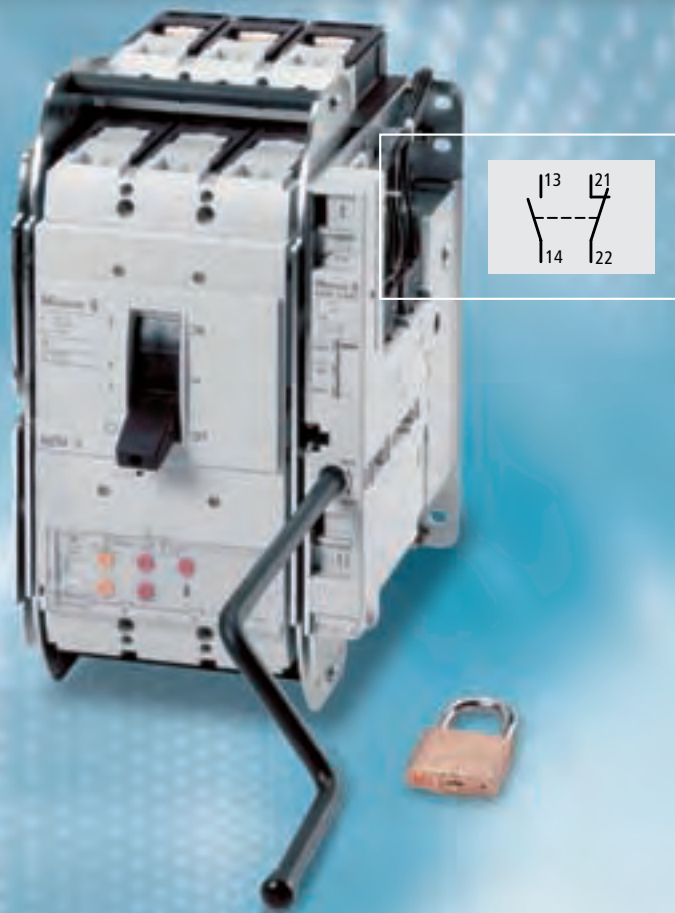
Up to 630 A, the side wall operator enables the switch to be operated from the right or left hand side as desired. Optional fitting of our mounting bracket results in optimum use of space in the control panel. The mounting plate can thus be used for other machine control elements.

### Mesh network switch provides enhanced trip security

Moeller offers two solutions for the mesh network switch application: a shunt which functions as specified in a range from 10 to 110 % of the control voltage, and a special shunt release which also provides trip security in conjunction with a capacitor unit, if up to 12 hours have elapsed since the power loss.



## Safe to operate, easy to handle



### The withdrawable unit – signalling of states

As usual, Moeller offers plug-in and withdrawable units in addition to the fixed mounted option. It makes it easier to quickly adapt to malfunctions or increases in the rated current range and thus avoid long downtimes. Uniform racking handle operation for withdrawable units enhances operating safety and ensures a test position for function testing without having to switch the main contacts.

The “Inserted”, “Test” and “Retracted” positions can be remotely signalled using RMQ auxiliary switch contacts.



### The remote operators – simple, uniform operation

The concept of uniform functions brings about simpler operation for all remote operators. The spring-powered actuator permits closing delays of 60 or 100 ms, thereby also allowing application in the field of synchronization. Short function sequences and fewer parts ensure a high degree of stability and a long service life. Safety is also emphasized here by the sealing option for the Auto function and by the facility for padlocking the remote operator.



### The plug-in unit – open to possibilities

The plug-in feature enables rapid and uncomplicated exchange of circuit-breakers without having to shutdown the entire system. The same widths for the fixed and withdrawable circuit-breakers ensure simple engineering during the system design phase.

A very visible isolating distance can be implemented in addition to the isolating characteristics by the use of plug-in breakers. The open plug-in contacts are finger-proof (IP2X).

If the system is to be modified at a later date, the use of plug-in sockets for reserve outgoers is recommended.

### Switches in enclosures – certified safety

The transparent enclosures available with protection degrees up to IP 65 provide mechanical protection with impact resistant polycarbonate. The 3- and 4-pole switches are equipped ready for installation with rotary handles or alternatively with toggle lever actuation. Additional isolated terminations for a 4th or 5th conductor are also available.



### Busbar adapter

Busbar adapters featuring space-saving contacts enable installation of many devices in confined spaces. They can be used universally on every 60 mm busbar system. The three frame sizes for 125, 250 as well as 630 A can be snapped on.



### Interlocking and parallel operation: reasoned technology

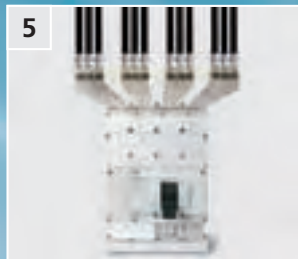
Mechanical interlocking components enable interlocking of two or three switches, which can also have different frame sizes. The Bowden cable technology enables free installation of the switches in differing positions. The switches can be installed up to 1 m apart – e.g. in different control panel sections.

Parallel drives for switches up to 630 A enable simultaneous switching with just a single action – e.g. with main or auxiliary circuits. In this manner the main and auxiliary circuits can be switched simultaneously with process and processing machines.

**“You realise the competence of the people working for Moeller with every solution. All the features you require are implemented.”**



# Clever mounting and connection increases economy



## 1 Easy to connect

NZM circuit-breakers and PN, N switch disconnectors can be connected with and without cable lugs, braided copper bands or copper busbars. And there's another special feature: Special narrow cable lug versions are available for bolt connection of round conductors up to 240 mm.

## 2 Screw terminal

The screw terminal is the most attractively priced solution for the connection of cable-lugs, flat drilled metal strip or copper busbars.

## 3 Box terminal for copper cable

Box terminals guarantee secure contact for the direct connection of 1–2 flexible copper conductors or flat strip. With NZM2 and NZM3, the top of the box terminal can be opened for easy insertion.

## 4 Terminal for aluminium and copper cables

The terminal area of these special terminals is tunnel-shaped to prevent the typical "flow-properties" of aluminium under great pressing power. Up to four copper or aluminium conductors can be connected depending on the type.

## 5 Connection preparation for multiple conductors

It enables the connection of up to six conductors with cable lugs per phase. Auxiliary busbars are no longer required.

## 6 Rear connection

This method of connection allows busbars or round conductors to be connected at the rear. Partitioning of the switch area, terminal area and operator area is carried out without difficulty.

## 1 Control circuit terminals

The control circuit terminals are simply screwed onto the respective connection type. The tap-offs for voltage meters, control transformers and undervoltage releases are implemented quickly.

## 2 Back of hand or finger-proof

Cable-lug, box-terminal or tunnel terminal, it does not matter as covers will always ensure that they are back-of-hand proof.

Fingerproof to IP2X, conform to IEC/EN 60204-1 for main switches is fast and easy to implement. The new additional covers can be matched to every cross-section.



### The spacer – saving time and expense

All switches including the accessories fitted on them were designed with the grid spacing of the spacer. Different depths of switch are evened-out simply by means of inexpensive, rapidly fitted spacers.

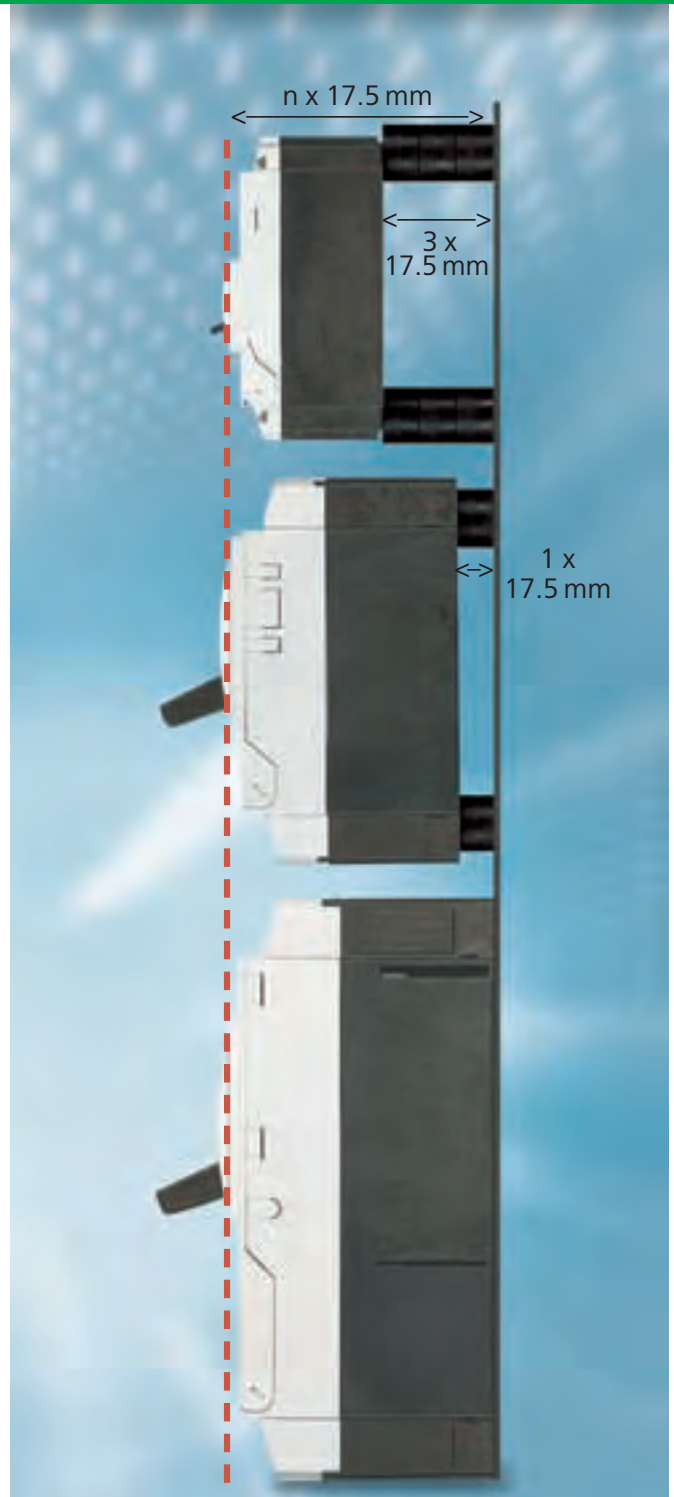
The result is a cost-effective alternative to the door coupling rotary handle with extension shaft for external operation of the circuit-breaker.

This worldwide innovation gains time and saves expense.

### Clever installation and terminations

Fast and efficient top-hat rail installation with the use of a clip plate. Just simply attach the clip plate from the rear onto the circuit-breaker and clip it onto the top-hat rail. No need to drill holes in the mounting plate.

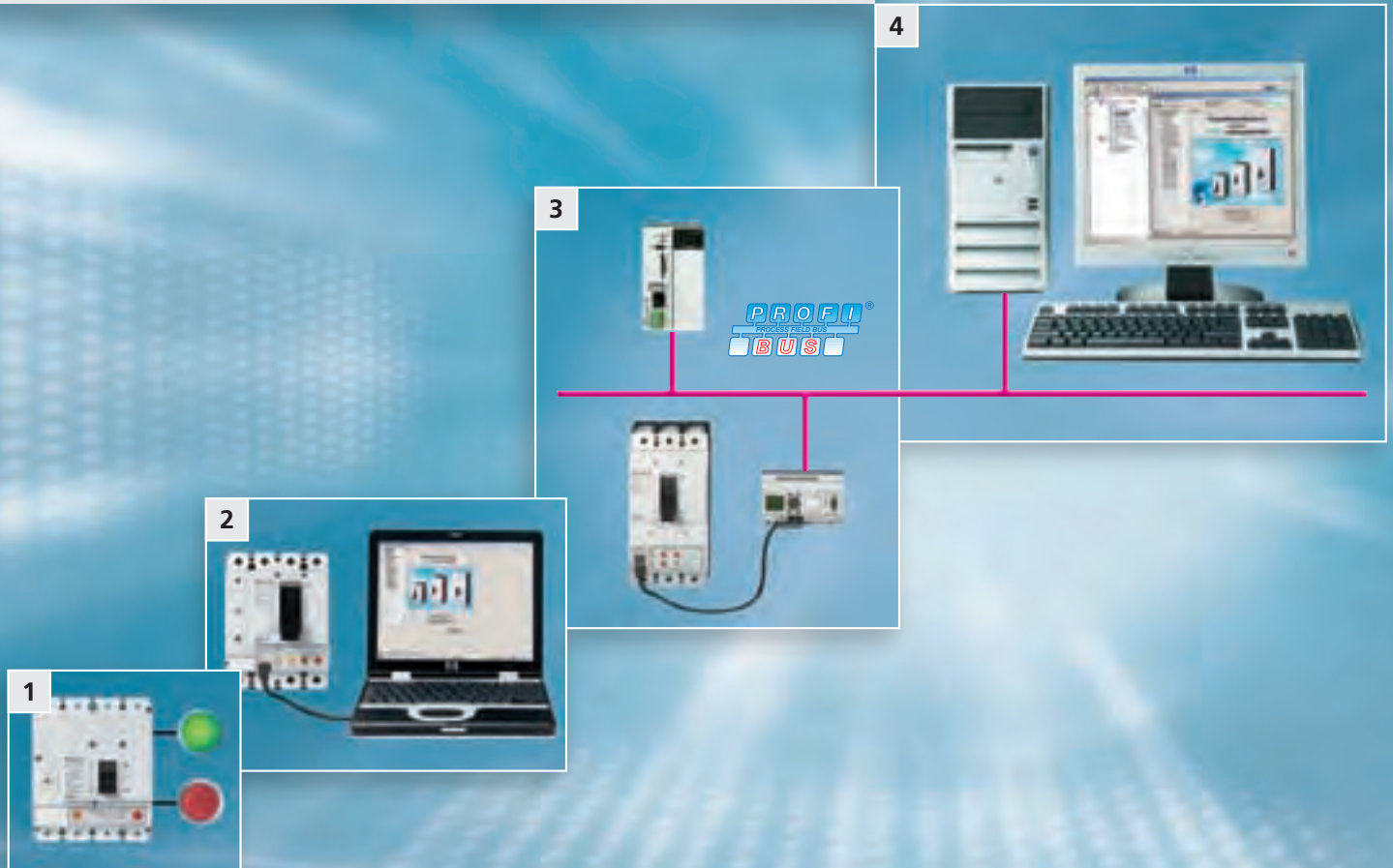
The particular advantage of the small NZM1: the "standard dimension" enables side-by-side installation with miniature circuit breakers in service distribution boards.



### Insulating surrounds – always the right fit

The insulated surround always fits. Regardless of if the circuit-breaker is equipped with a toggle-lever, rotary drive or remote operator. It is unnecessary to keep differing insulating surrounds in stock. It is the cost-effective method to operate circuit-breakers externally when the control panel door is closed. The insulating surround has IP 40 degree of protection and the inscription labels can be simply clipped in.

# Diagnostics included! From contact to control system



The NZM electronic circuit-breaker offers a comprehensive range of on-board diagnostic functions for all versions. All important information can be recorded, displayed on-site and passed onto higher level systems.

System transparency is enhanced and the reaction times to critical states, e.g. over current, phase unbalance or phase failure can be reduced. Detailed event protocols enable quick diagnosis of fault causes. Operating time and switching operation counters facilitate planning of preventative maintenance activities.

Protocol functions support the documentation of status, diagnostic messages and parameter setting. The modularity guarantees the necessary level of flexibility with expansion and retrofitting to react to changing demands.

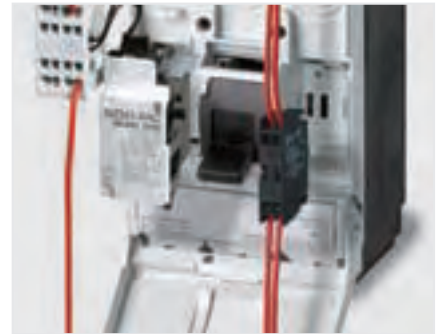


“Diagnosis of a system was never so easy up to now. That's what I call real Plug & Works!”



### 1 Direct signalling – simply snap on from the front!

Immediately recognise critical situations. Warnings at 70 %, 100 % and 120 % loading are indicated directly by the electronic release. Loading of the system at critical limits is immediately recognizable on-site without additional accessories. The complete NZM circuit-breaker contact elements of the RMQ-Titan® control-circuit device range are used for display of the status and the release. Alternatively, simply clip-on from the front with screw connections or spring-loaded contact technology – identical for every frame size.



### 2 Checked on-site – simply plug in a laptop or DMI into the switch!

The detailed cause of a trip or warning is reported by the electronic release with the reason for the trip, the phase status as well as the switch setting. Ten historic diagnosis records are saved directly in the circuit-breaker. All data is available directly on site for mobile diagnostics and protocolling using a laptop. The DMI data management interface is available for stationary display of all signals, measurements, switching operations, operating hours as well as diagnostics records with time stamps.



### 3 Fieldbus control – simply snapped on and coupled!

Complete coupling of all functions to the automation level is now possible via PROFIBUS DP or CanOpen. All status and measurement information can be monitored and protocollated. Exceeding of threshold values can be coupled to higher level controls. Interfacing is very simple via PROFIBUS: the data is available in a common format and structure using the standard profile of the PROFIBUS user organization. The DP-V1 enables access to all messages, diagnostics and parameter data as well as motor starter functions.



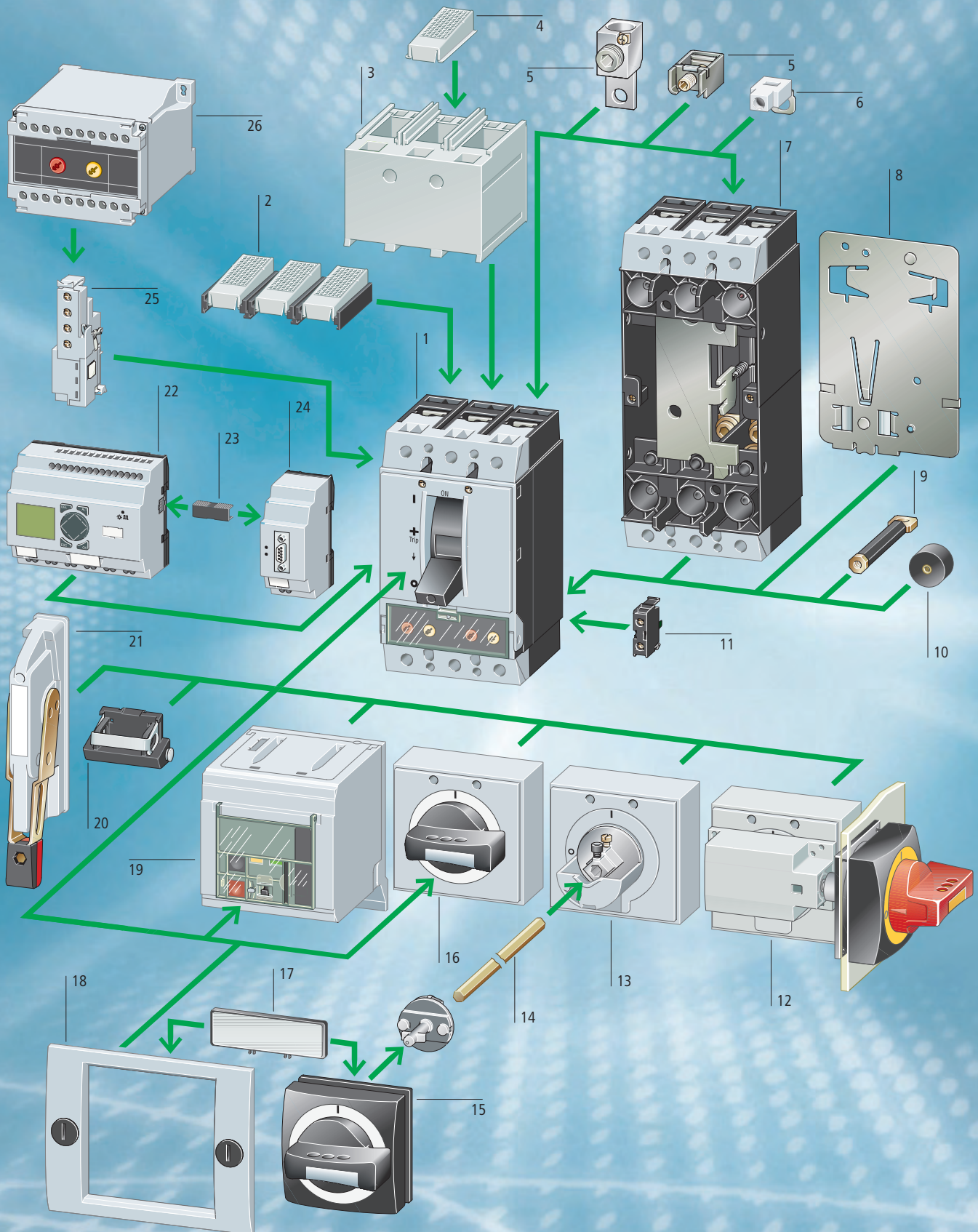
### 4 Remote monitoring – just a click away!

In order to receive full transparency with all switches up to now, complex programming of controls and visualization systems was necessary. The new FDT navigator now enables simple implementation of a complete service control station: for remote switching and observation of networked switchgear, for diagnosis of all events and maintenance information as well as the parameterization of all device functions. The feature is as easy as installing a printer driver where no knowledge of automation is required.



# Circuit-Breakers

## Switch-Disconnectors



## Circuit-breakers, Switch-disconnectors

<b>Circuit-breakers, switch-disconnectors</b>	<b>1</b>
<b>IP2X finger proof</b> For box terminals	<b>2</b>
<b>Connection shroud</b> Protection against direct contact with connection of cable lugs, busbars or when tunnel terminals are used	<b>3</b>
<b>IP2X finger proof</b> For cover	<b>4</b>
<b>Tunnel terminals for Al and Cu cables</b> Standard with control circuit terminal	<b>5</b>
<b>Box terminals</b> Standard feature of frame size 1 Mounting within the switch enclosure	<b>5</b>
<b>Control circuit terminal</b> For two connection positions top or bottom	<b>6</b>
<b>Plug-in and withdrawable unit</b>	<b>7</b>
<b>Clip plate</b>	<b>8</b>
<b>Rear side connection</b>	<b>9</b>
<b>Spacer</b>	<b>10</b>

<b>Standard auxiliary contact</b> Switches with the main contacts. Performs signalling and interlock tasks	<b>11</b>
<b>Trip-indicating auxiliary contact</b> General trip indication with trip due to overload or short-circuit as well as voltage release	<b>11</b>
<b>Main switch rotary handle for side panel mounting</b>	<b>12</b>
<b>Door coupling rotary handle</b> • lockable • with door interlock	<b>13, 15</b>
<b>Extension shaft</b> Can be cut to required length	<b>14</b>
<b>Rotary handle</b> • lockable	<b>16</b>
<b>External warning/designation label</b>	<b>17</b>
<b>Insulating surround</b> For use on the enclosure with lead through toggle lever, rotary drive and remote operator	<b>18</b>
<b>Remote operator</b> For switch on/off and reset by permanent or three-wire control	<b>19</b>

<b>Toggle level locking device</b>	<b>20</b>
<b>Side lever handle</b> In preparation	<b>21</b>
<b>Data Management Interface (DMI Module)</b> Access to diagnostics and operational data Detection of current values Parameterisation and control of the circuit-breaker with electronic releases	<b>22</b>
<b>EASY-LINK-DS data plug</b>	<b>23</b>
<b>PROFIBUS-DP interface</b>	<b>24</b>
<b>Early-make auxiliary contact</b> For interlock and load shedding circuits as well as for early-make switching of the undervoltage release with main switch/ Emergency-Stop applications	<b>25</b>
<b>Voltage release</b> Undervoltage release • non-delayed • off-delayed Shunt release	<b>25</b>
<b>Time delay unit for undervoltage releases</b>	<b>26</b>

## Switch-disconnectors

With main switch characteristics to IEC/EN 60204 and isolating characteristics to IEC/EN 60947, VDE 0660 **without** overload and short-circuit release



Rated uninterrupted current  $I_u$  = rated current  $I_n$

**Type N triggering with U/A voltage release**

	63 – 160		160 – 250		400 – 630		800 – 1600
	PN1-...	N1-...	PN2-...	N2-...	PN3-...	N3-...	N4-...
Rated short-circuit making capacity $I_{cm}$ kA	2.8	2.	5.5	5.5	25	25	53
Rated short-time withstand current $I_{cw}$ (1s current <sub>rms</sub> ) kA	2	2	3.5	3.5	12.5	12.5	25

With main switch and isolating characteristics **without** overload and short-circuit release

**UL/CSA approved conform to UL 489, CSA 5 as well as IEC 60947**

Rated uninterrupted current  $I_u$  = rated current  $I_n$

	63 – 125		160 – 250		400 – 600		800 – 1200
	N1-...-NA	N2-...-NA	N3-...-NA	N4-...-NA	N3-...-NA	N4-...-NA	N4-...-NA
Rated short-circuit making capacity $I_{cm}$ kA	2.8	5.5	25	53	25	53	53
Rated short-time withstand current $I_{cw}$ (1s current <sub>rms</sub> ) kA	2	3.5	12.5	25	12.5	25	25

## Circuit-breaker, 3/4-pole

With main switch characteristics  
to IEC/EN 60204 and  
isolating characteristics to  
IEC/EN 60947, VDE 0660



### Thermomagnetic release

	Distribution circuit and line protection				Motor protection			
	$I_u$	$I_u$	$I_r$	$I_i$	$I_u$	$I_u$	$I_r$	$I_i$
Rated uninterrupted current $I_u =$ Rated current $I_n$	A	A	A	A	A	A	A	A
Adjustable overload release $I_r$								
Adjustable short-circuit release $I_i$								
Delayed short-circuit release $I_{sd}$								
Ambient temperature at 100 % $I_u$ min./max. -25/+50 °C	20 25 32 40 50 63 80 100  125 160  200 250	20 25 32 40 50 63 80 100  125 160  200 250	0.8 – 1 × $I_n$	350	20 25 32 40 50 63 80 100  125 160  200 250	20 25 32 40 50 63 80 100  125 160  200 250	0.8 – 1 × $I_n$	350
				8 – 10 × $I_n$ 6 – 10 × $I_n$				8 – 14 × $I_n$
								NZM1: 8 – 12.5 × $I_n$ NZM2: 8 – 14 × $I_n$ 8 – 14 × $I_n$ 8 – 12.5 × $I_n$
<b>Basic switching capacity</b>	<b>NZMB1-A...</b>	<b>NZMB2-A...</b>			<b>NZMB1-M...</b>	<b>NZMB2-M...</b>		
400/415 V kA/cos φ	25 0.25	25 0.25			25 0.25	25 0.25		
440 V kA/cos φ	25 0.25	25 0.25			25 0.25	25 0.25		
525 V kA/cos φ	15 0.30	15 0.30			15 0.30	15 0.30		
<b>Normal switching capacity</b>	<b>NZMN1-A...</b>	<b>NZMN2-A...</b>			<b>NZMN1-M...</b>	<b>NZMN2-M...</b>		
400/415 V kA/cos φ	50 0.25	50 0.25			50 0.25	50 0.25		
440 V kA/cos φ	35 0.25	35 0.25			35 0.25	35 0.25		
525 V kA/cos φ	20 0.30	25 0.25			20 0.30	25 0.25		
690 V kA/cos φ	10 0.50	20 0.30			10 0.50	20 0.30		
<b>High switching capacity</b>	<b>NZMH1-A...</b>	<b>NZMH2-A...</b>			<b>NZMH2-M...</b>			
400/415 V kA/cos φ	100 0.20	100 0.20			100 0.20			
440 V kA/cos φ	35 0.25	65 0.20			65 0.20			
525 V kA/cos φ	20 0.30	40 0.25			40 0.25			
690 V kA/cos φ	10 0.50	20 0.30			20 0.30			
<b> Limiter switching capacity</b>		<b>NZML2-A...</b>			<b>NZML2-M...</b>			
400/415 V kA/cos φ		150 0.20			150 0.20			
440 V kA/cos φ		130 0.20			130 0.20			
525 V kA/cos φ		50 0.25			50 0.25			
690 V kA/cos φ		20 0.30			20 0.30			

**Notes** The stated switching capacity values are rated ultimate short-circuit breaking capacities ( $I_{cu}$ )

## Circuit-breaker, 3/4-pole



### Electronic release

#### Distribution circuit protection, line protection, time selectivity and generator protection

#### Motor protection

$I_u$	$I_u$	$I_u$	$I_r$	$I_{sd}$	$I_i$	$I_u$	$I_r$	$I_i$
A	A	A	A	A	A	A	A	A
100	250	630	$0.5 - 1 \times I_n$	$2 - 10 \times I_r$	$2 - 12 \times I_n$	90	$0.5 - 1 \times I_n$	$2 - 14 \times I_r$
160	400	800				140		
250	630	1000				220		
		1250				350		
		1600				450		
						550		
						875		
						1400		

NZMN2-...VE	NZMN3-...E	NZMN4-...E	NZMN2-ME...	NZMN3-ME...	NZMN4-ME...
50 0.25	50 0.25	50 0.25	50 0.25	50 0.25	50 0.25
35 0.25	35 0.25	35 0.25	35 0.25	35 0.25	35 0.25
25 0.25	25 0.25	25 0.25	25 0.25	25 0.25	25 0.25
20 0.30	20 0.30	20 0.30	20 0.30	20 0.30	20 0.30
NZMH2-...VE	NZMH3-...E	NZMH4-...E	NZMH2-ME...	NZMH3-ME...	NZMH4-ME...
100 0.20	100 0.20	100 0.20	100 0.20	100 0.20	100 0.20
65 0.20	65 0.20	65 0.20	65 0.20	65 0.20	65 0.20
40 0.25	40 0.25	40 0.25	40 0.25	40 0.25	40 0.25
20 0.30	20 0.30	35 0.25	20 0.30	20 0.30	35 0.25
NZML2-...VE	NZML3-...E	NZML4-...E	NZML2-ME...	NZML3-ME...	NZML4-ME...
150 0.20	150 0.20	120 0.20	150 0.20	150 0.20	120 0.20
130 0.20	130 0.20	85 0.20	130 0.20	130 0.20	85 0.20
50 0.25	65 0.20	65 0.20	50 0.25	65 0.20	65 0.20
20 0.30	35 0.25	50 0.25	20 0.30	35 0.25	50 0.25

A selection of circuit-breakers, switch-disconnectors and accessories as well as technical data and characteristics can be found in the NZM circuit-breaker section in the main catalogue HPL0211-2004/2005.

## Circuit-breakers for North America, 3-pole

UL/CSA approved conform to UL 489, CSA 5  
as well as IEC 60947



		Thermomagnetic release					
		Overload release					
		fixed		adjustable		without	
		$I_u$		$I_u$		$I_r$	
		A		A		A	
		NZM1	NZM2	NZM1	NZM2	NZM1	NZM2
		15 –	15 –	20 –	20 –	$0.8 - 1 \times I_n$	1 –
		125	250	125	250	100	200
<b>Rated uninterrupted current <math>I_u</math> = Rated current <math>I_n</math></b>							
<b>Adjustable overload release <math>I_r</math></b>							
<b>Adjustable short-circuit release <math>I_i</math></b>							
<b>Delayed short-circuit release <math>I_{sd}</math></b>							
<b>Basic switching capacity<sup>1)</sup></b>		<b>NZMB1-...-NA</b>			<b>NZMB2-...-NA</b>		
NEMA Test Procedure	240 V 60 Hz	sym. rms kA	35		35		
	480 V 60 Hz	sym. rms kA	25		25		
	600 V 60 Hz	sym. rms kA	–		18		
IEC 60947	400/415 V	kA/cos $\varphi$	25	0.25	25	0.25	
	440 V	kA/cos $\varphi$	25	0.25	25	0.25	
	525 V	kA/cos $\varphi$	15	0.30	15	0.30	
<b>Normal switching capacity<sup>1)</sup></b>		<b>NZMN1-...-NA</b>			<b>NZMN2-...-NA</b>		
NEMA Test Procedure	240 V 60 Hz	sym. rms kA	85		85		
	480 V 60 Hz	sym. rms kA	35		35		
	600 V 60 Hz	sym. rms kA	–		25		
IEC 60947	400/415 V	kA/cos $\varphi$	50	0.25	50	0.25	
	440 V	kA/cos $\varphi$	35	0.25	35	0.25	
	525 V	kA/cos $\varphi$	20	0.30	25	0.25	
	690 V	kA/cos $\varphi$	10	0.50	20	0.30	
<b>High switching capacity<sup>1)</sup></b>		<b>NZMH2-...-NA</b>					
NEMA Test Procedure	240 V 60 Hz	sym. rms kA			100		
	480 V 60 Hz	sym. rms kA			65		
	600 V 60 Hz	sym. rms kA			35		
IEC 90947	400/415 V	kA/cos $\varphi$			100	0.20	
	440 V	kA/cos $\varphi$			65	0.20	
	525 V	kA/cos $\varphi$			40	0.25	
	690 V	kA/cos $\varphi$			20	0.30	
<b>Limiter switching capacity<sup>1)</sup></b>							
NEMA Test Procedure	240 V 60 Hz	sym. rms kA					
	480 V 60 Hz	sym. rms kA					
	600 V 60 Hz	sym. rms kA					
IEC 90947	400/415 V	kA/cos $\varphi$					
	440 V	kA/cos $\varphi$					
	525 V	kA/cos $\varphi$					
	690 V	kA/cos $\varphi$					

**Notes** <sup>1)</sup> Switches conform to UL/CSA as well as IEC standards  
IEC switching capacity values included on the name plate

## Circuit-breakers for North America, 3-pole



### Electronic release

#### Overload release

fixed adjustable

without

fixed

adjustable

without

fixed

adjustable

#### Short-circuit release

Distribution circuit

protection

Motor

protection

$I_u$	$I_u$	$I_r$	$I_u$	$I_u$	$I_u$	$I_r$	$I_u$	$I_u$	$I_u$	$I_r$	$I_{sd}$	$I_i$	$I_i$
A	A	A	A	A	A	A	A	A	A	A	A	A	A
150 – 250	100 – 250	$0.5 - 1 \times I_n$	90 – 220	250 – 600	250 – 600	$0.5 - 1 \times I_n$	220 – 450	600 – 1200	800 – 1200	$0.5 - 1 \times I_n$	$2 - 10 \times I_r$	$2 - 12 \times I_n$	$2 - 14 \times I_r$

### NZMN2-...E...-NA

85

35

25

50 0.25

35 0.25

25 0.25

20 0.30

### NZMN3-...E...-NA

85

35

25

50 0.25

35 0.25

25 0.25

20 0.30

### NZMN4-...E...-NA

85

35

25

50 0.25

35 0.25

25 0.25

20 0.30

### NZMH2-...E...-NA

100

65

35

100 0.20

65 0.20

40 0.25

20 0.30

### NZMH3-...E...-NA

100

65

35

100 0.20

65 0.20

40 0.25

20 0.30

### NZMH4-...E...-NA

100

65

35

100 0.20

65 0.20

40 0.25

35 0.25

### NZML3-...E...-NA

150

100

50

150 0.20

130 0.20

65 0.20

35 0.25

### NZML4-...E...-NA

150

100

50

120 0.20

85 0.20

65 0.20

50 0.25

A selection of approved circuit-breakers, switch-disconnectors and accessories as well as technical data and characteristics can be found in the NZM circuit-breaker section in the main catalogue HPL0211-2004/2005.

The approved switches are devices suitable for world-wide use.

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