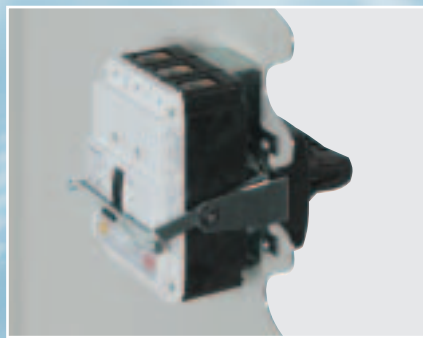


Reliable Protection for
systems, generators and
motors up to 1600 A



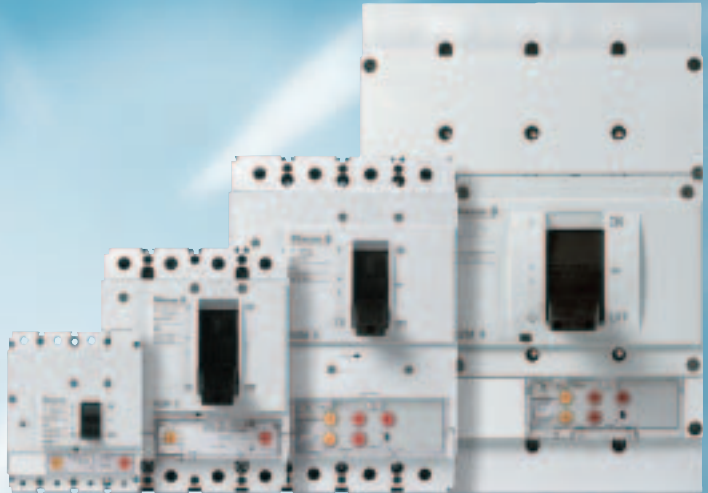
Product Information
Circuit-Breakers NZM, Switch-Disconnectors PN/N



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



3-pole circuit-breaker



4-pole circuit-breaker



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.

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.

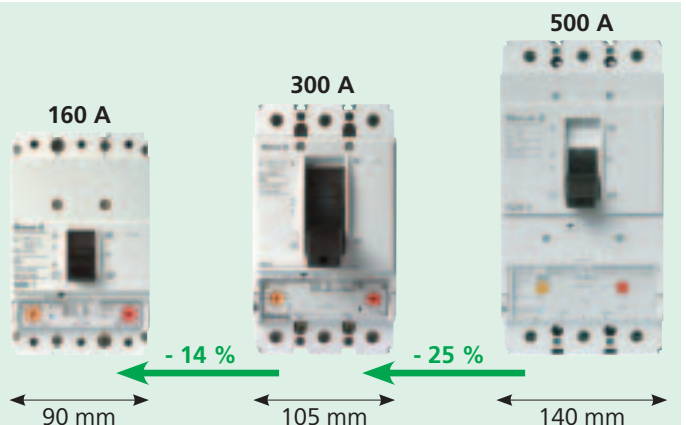


Circuit-breaker		NZM1	NZM2	NZM3	NZM4
Short-circuit breaking capacity	25 kA				
I_{cu} to IEC/EN 60947	36 kA				
At 415 V	50 kA				
	100 kA				
	150 kA				
Application range in A		15 – 160	15 – 300	125 – 630	315 – 1600
Nuber of poles		3/4	3/4	3/4	3/4
Rated voltage in V		690	690	690	690
Circuit-breakers for North America		NZM1-NA	NZM2-NA	NZM3-NA	NZM4-NA
Short-circuit breaking capacity	25 kA				
I_{cu} to UL489	35/42 kA				
At 480 V	85/100 kA				
Short-circuit breaking capacity	18 kA				
I_{cu} to CSA 22.2 No 5.1	25/35 kA				
At 600 V	50 kA				
Application range in A		1.2 – 125	1.6 – 250	125 – 600	400 – 1200
Nuber of poles		3	3	3	3
Rated voltage in V		480	600	600	600
Dimensions in mm	Width 3/4-polig	90/120	105/140	140/185	210/280
	Height	145	184	275	401
	Depth	68	103	120.5	138

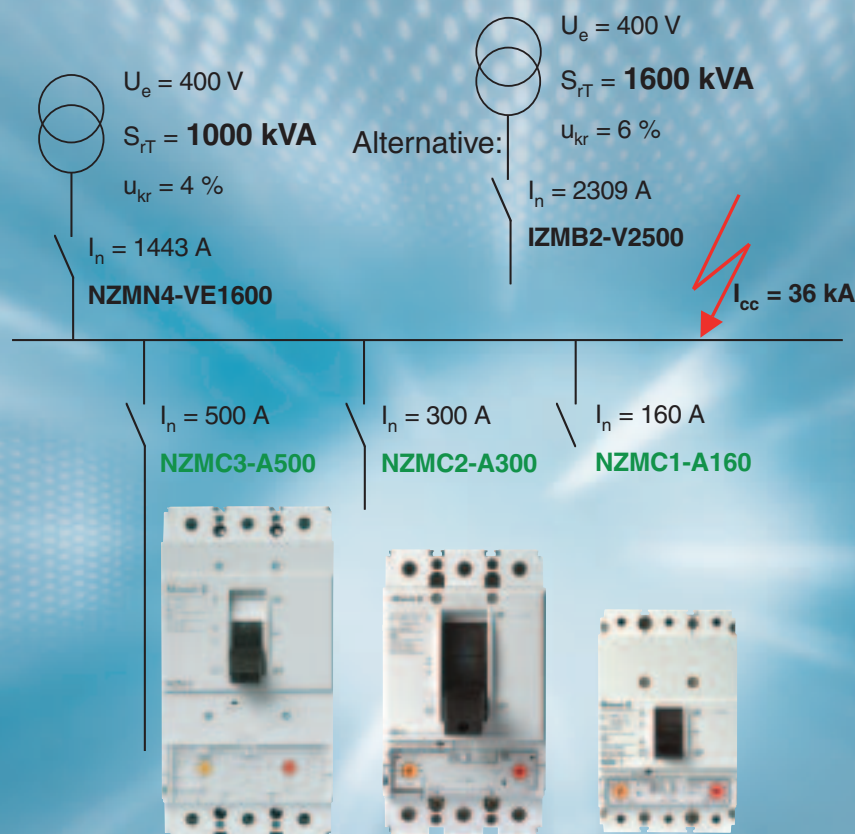
More power on the smallest space: NZM1 up to 160 A, NZM2 up to 300 A

Space in the control panel – and accordingly the costs – can be easily saved with the circuit-breakers NZM1 and NZM2. Instead of using the next larger size, now simply use the more compact further development from the NZM system series.

Two advantages at once:
same performance with up to 25% reduced space requirement and up to 20% cost savings.



Economically dimensioned. Circuit-breakers with 36 kA



Circuit-breakers from the new C series with 36 kA Short-circuit breaking capacity and nominal current from 20 - 500 A are the correct choice for the most frequently used standard applications. The decisive factor for the level of the short-circuit current in the most widely used low-voltage radial networks is the capacity of the low-voltage transformer.

With 36 kA breaking capacity, the highest short-circuit currents of the conventional 630 kVA transformer class – even with a double parallel connection – are mastered. Even for power networks with transformers up to 1600 kVA, the attractively-priced switches of the new C switch series are the first choice.

They are derived from the high-performance type of the modern Moeller NZM series and also feature their good system features and simple handling characteristics. The thermomagnetic releases can be adapted over a wide setting range to the permissible loading currents of the equipment to be protected. They can be equipped with accessories suited for every application in power distribution networks or for the equipment on electrical machines.



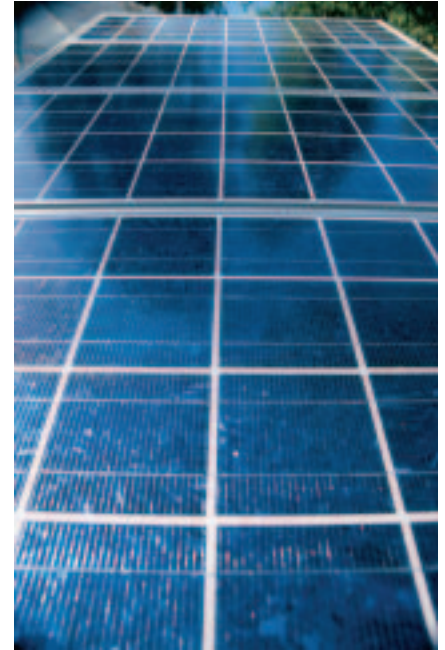
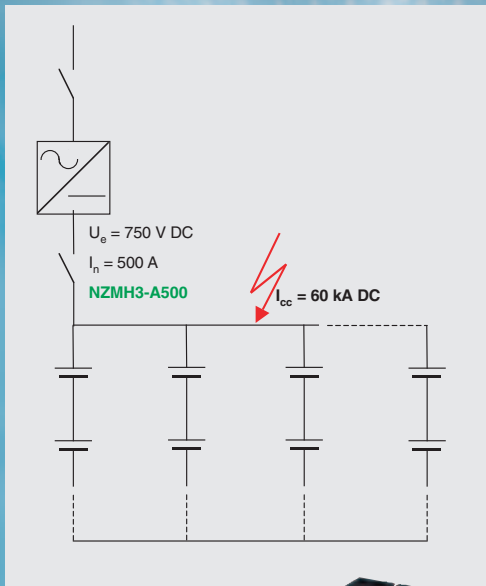
"In practice the short-circuit current is attenuated by about 10 % due to the cable connection between the transformer and main power distribution. Thus, the Comfort class is the perfect solution for transformers up to 1600 kVA."

Low-voltage power transformers

Rated Voltage U_n	400/230 V		6 %	
	Short-circuit voltage U_k	Rated current I_n A	Short-circuit current	
4 %			6 %	
Rated power S kVA		I_k'' A	A	
50		72	1 805	–
100		144	3 610	2 406
160		230	5 776	3 805
200		288	7 220	4 812
250		360	9 025	6 015
315		455	11 375	7 583
400		578	14 450	9 630
500		722	18 050	12 030
630		909	22 750	15 166
800		1 158	–	19 260
1 000		1 444	–	24 060
1 250		1 805	–	30 080
1 600		2 312	–	38 530

$\approx 36\text{ kA}$

Circuit-breakers for DC applications.



Based on their utilization category DC-3 the switches are suitable for universal use ranging from photovoltaic to emergency-generating unit batteries to sophisticated switching and protection of DC shunt-wound motors in reverse and jog mode.

The new NZM-A circuit-breakers are the ideal protective devices for DC current networks with up to 750 V operating voltage and operating currents up to 500 A. The equipment feature with thermomagnetic release systems guarantees an exact r.m.s

sensing of the operating and fault currents. The contacts featuring a double break system enable safe switching in high-energy networks with a short-circuit current of up to 70,000 A.



Compact switch now up to 2000 A

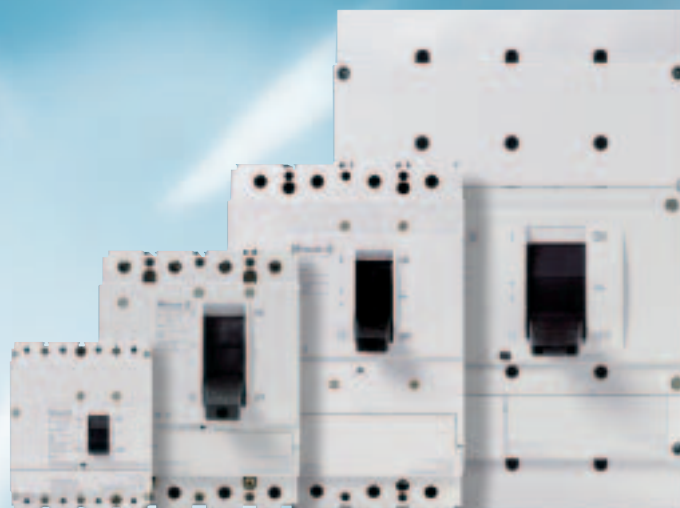
The new 2000 A switch is particularly suitable for restricted mounting spaces in wind turbines, where an open ACB requires too much depth as well as when operation via a large rotary handle through the control panel door is required. In comparison to an open ACB it is an attractively priced offer, equipped with a time-discriminating universal control unit for comprehensive protection of wind turbines.

Excellent under load –
Switch-disconnector's for safe
switching under load

xEnergy



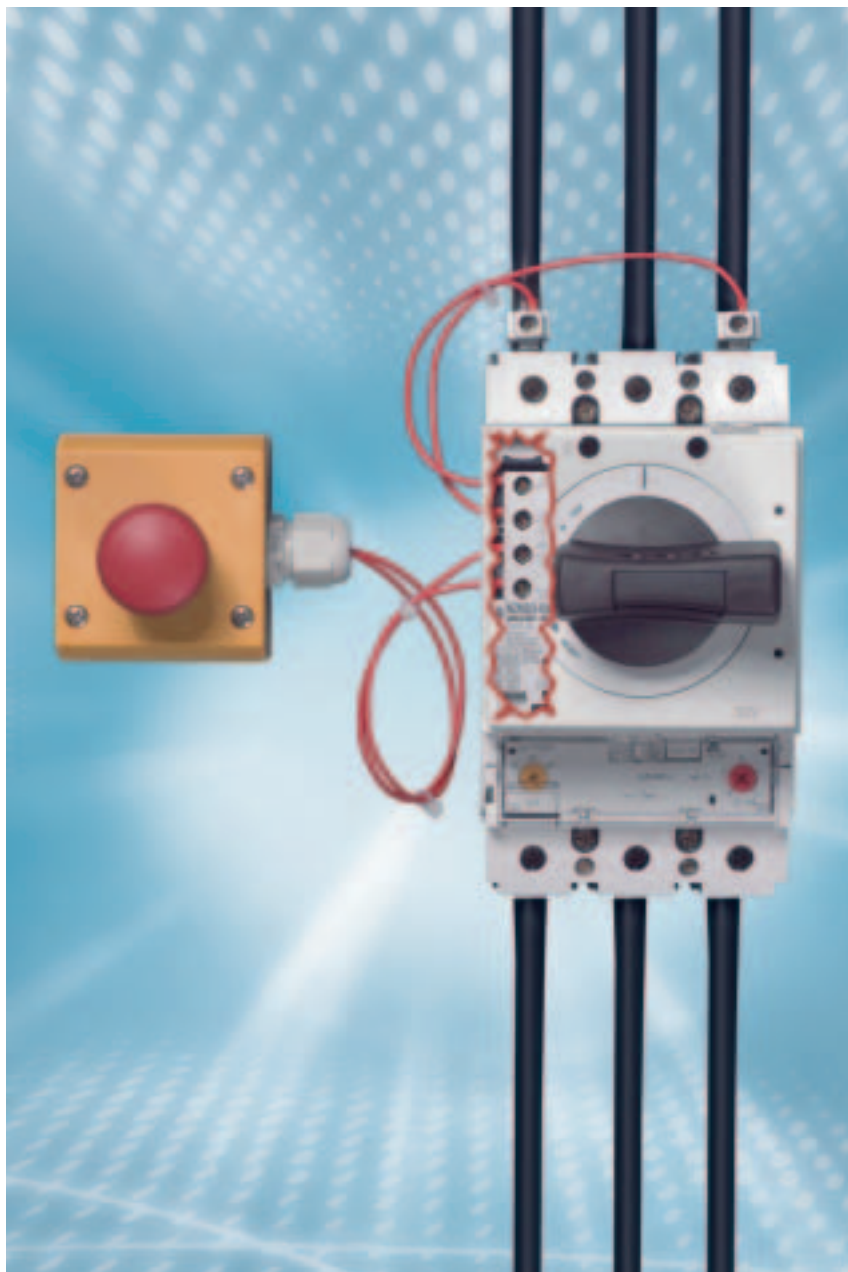
Switch-disconnector 3-pole



Switch-disconnector 4-pole



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.

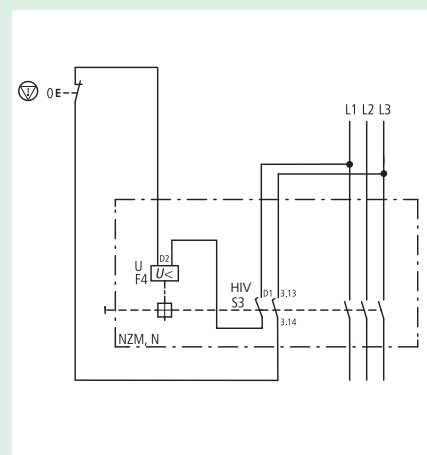


Main switch application

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.



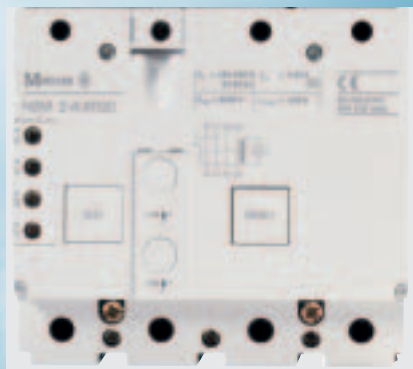
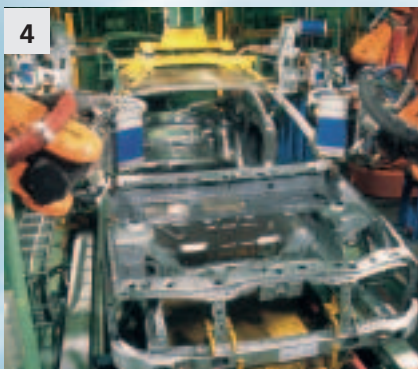
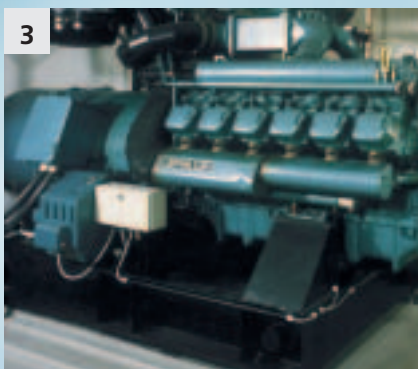
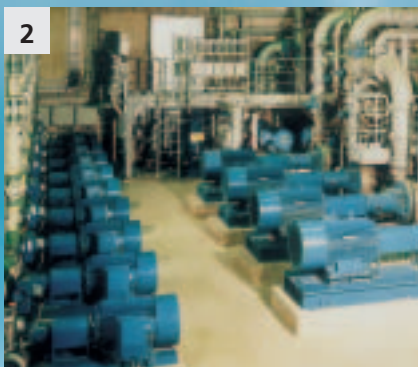
Switch-disconnector	PN1/N1	PN2/N2	PN3/N3	N4
Application range in A	63 – 160	160 – 250	400 – 630	800 – 1600
Number of poles	3/4	3/4	3/4	3/4
Rated voltage in V	690	690	690	690
Switch-disconnectors for North America				
	NS1-NA	NS2-NA	NS3-NA	NS4-NA
Application range in A	63 – 125	160 – 250	400 – 600	800 – 1200
Number of poles	3	3	3	3
Rated voltage in V	480	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

New in the range:

Specially for the North American market: Molded Case switches featuring a short-circuit release for self-protection.

Thus, the use of a back-up fuse is no longer required in many applications, e.g. as a main switch.

Protection flexibility: Systems, generators, motors



1 NZM protects systems

Circuit-breakers NZM 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

Circuit-breakers NZM 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. Circuit-breakers NZM 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.

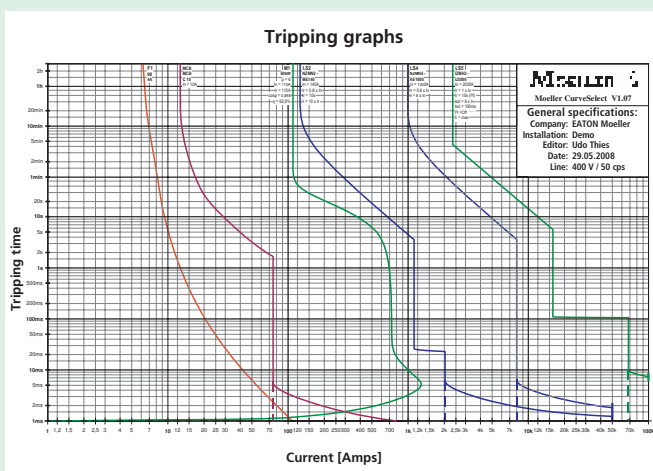
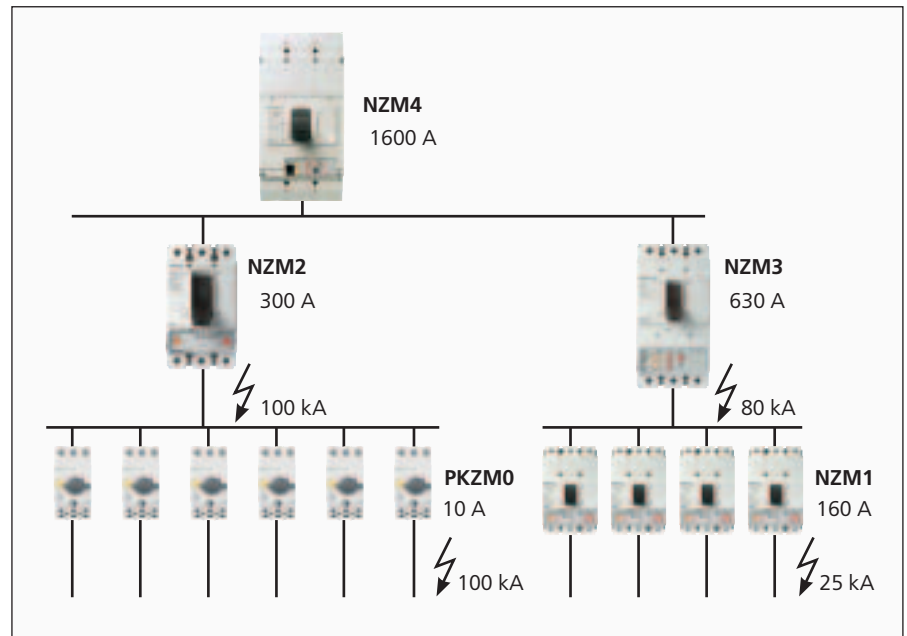
Special components simulate a thermal memory even when the switch trips during a currentless period due to a

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

Circuit-breakers NZM 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 300 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.



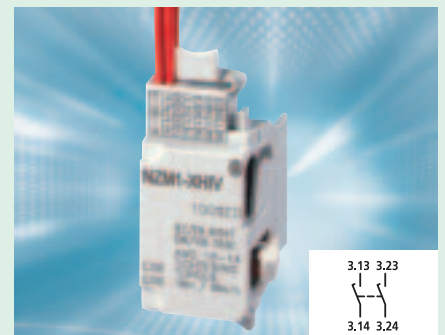
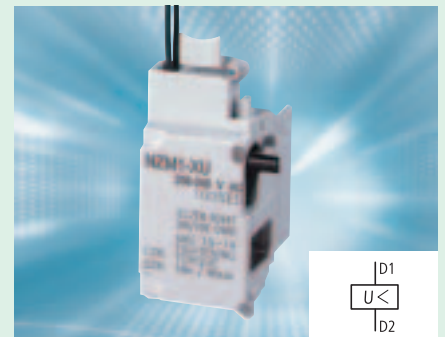
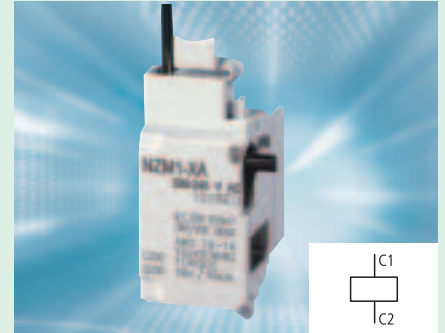
Simpler visualisation, comparison and documentation of characteristic curves

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 circuit-breaker NZM and circuit-breaker IZM in combination with h.b.c. fuses enables assessment of the selectivity for the overload and time-delayed overcurrent range. Motor starting characteristics can be created which assist in the selection and adjustment of the corresponding protection device.



www.moeller.net/curves

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 determines the function: signalling contact or trip-indicating auxiliary

contact, and like all auxiliary contacts and releases, they are available with terminal bolts or spring-loaded connections, for circuit-breakers or switch-disconnector's. The new twin contacts provide twice as many auxiliary and signalling contacts in the same amount of space. They feature spring-loaded terminal connections.

Flexible solutions for safety and interlock functions

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.



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_r , 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.



A single tool for all screws

The heads on all screws used in the circuit-breakers – with the exception of the main connection screws – feature a plus-minus profile. The advantage is that a fast screw driving machine can be used with the single Posidriv 2 screwdriver tool, or alternatively, a flat-bladed screwdriver can also be used. This applies for all fixing screws, auxiliary connection terminals, as well as hinged flaps and covers and also all setting buttons.



The plus-minus slot can be used like the Pozidriv slot to apply a high torque and provides improved centring performance and a lower high loading pressure to an area. Furthermore, it can be used with several tool designs and is particularly suitable for high-maintenance devices.

Variable operation – toggle, turn, automatic operation



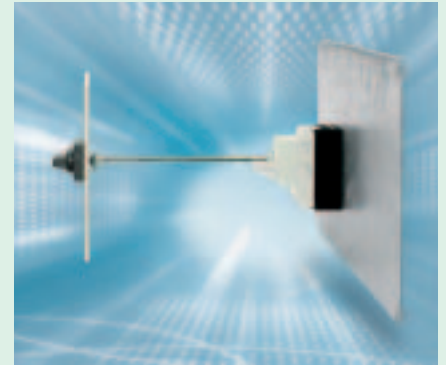
Circuit-breaker NZM2: Rotary handle for main switches of machine controls in North America

The North American user guidelines prescribe that the actuating device must be permanently connected to the switch. This also applies when the control panel door is open. The new door coupling handle developed by Moeller, with additional handle on the switch, complies with this requirement. The new handle complies with the latest NFPA79 and UL508A standards in terms of a deliberate action.

The deliberate action is based on the presumption that the additional handle must initially be rotated by about 15° (1), so that it is subsequently pressed (2) and rotated (3) simultaneously to switch on the switch. The most important safety attributes, such as the actuation options, switch position indication and interlocking features, are provided twofold, both externally on the door coupling rotary handle as well as internally on the switch.

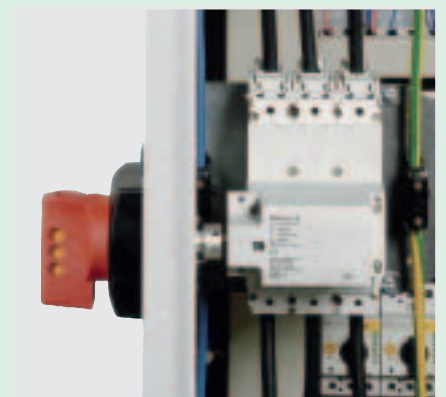
Door coupling rotary handles – ergonomic switching

Shaft lengths which can be cut to suit 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.



The main switch types – the side operator

Up to 1600 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.



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.

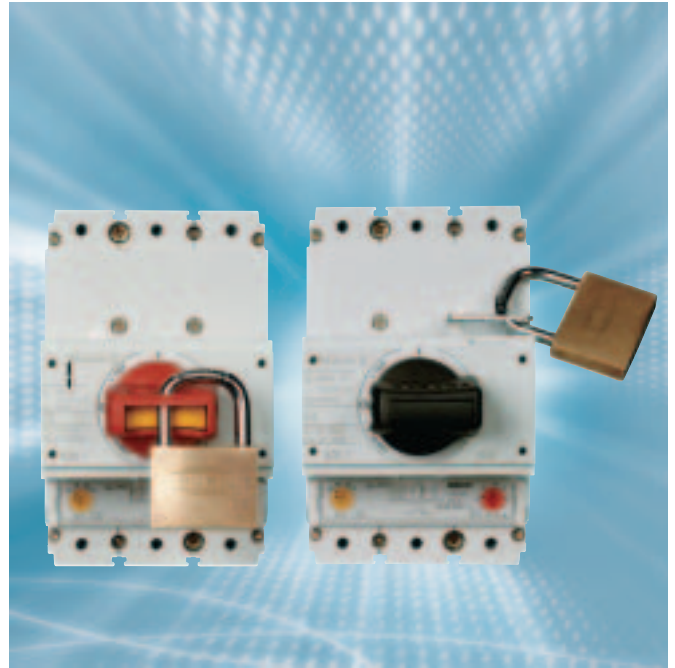


Application related locking

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.



Operator on rear for switches up to 300 A rated current

If a power disconnecting device with door coupling rotary handle is to be used in a confined space: up to 300 A rated current can be quickly mounted using the compact mechanical features and comfortably operated using the solid rotary handle. All switch variants from the NZM1 and NZM2 range – regardless of if they are circuit-breakers or switch-disconnectors – can be combined with a rear operator.



The economic remote operator for standard tasks for NZM2 to NZM4

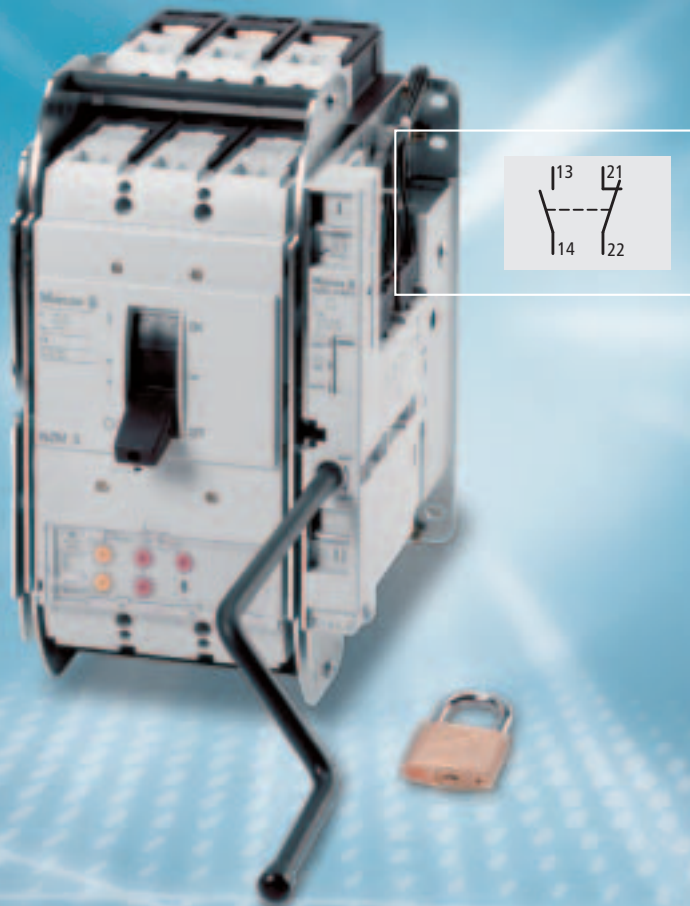
The switching time of the new remote operator is a max. of just 170 ms and can thus be used with standard applications for automated or remote operated energy control. The folding mounting plate enables a quick inspection of the installed auxiliary contacts and voltage releases. The narrow construction design of the remote operator requires no additional mounting area. It is equipped with a selector switch which guarantees a secure differentiation of the connected positions. Furthermore, the switches can be securely locked in the 0 setting using padlocks.

The comfortable remote operator for synchronisation tasks for NZM2 to NZM4

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.



Safe to operate, easy to handle



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 outgoing is recommended.



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 auxiliary switch contacts RMQ.

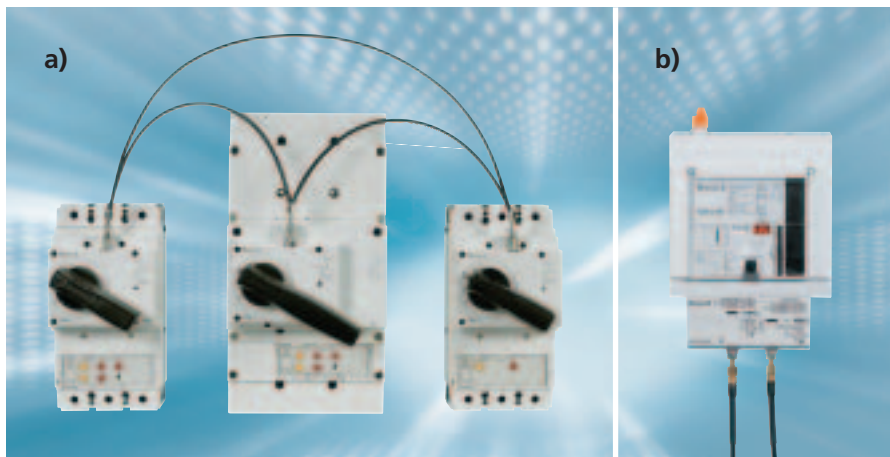


Mesh network switch provides enhanced trip security

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.

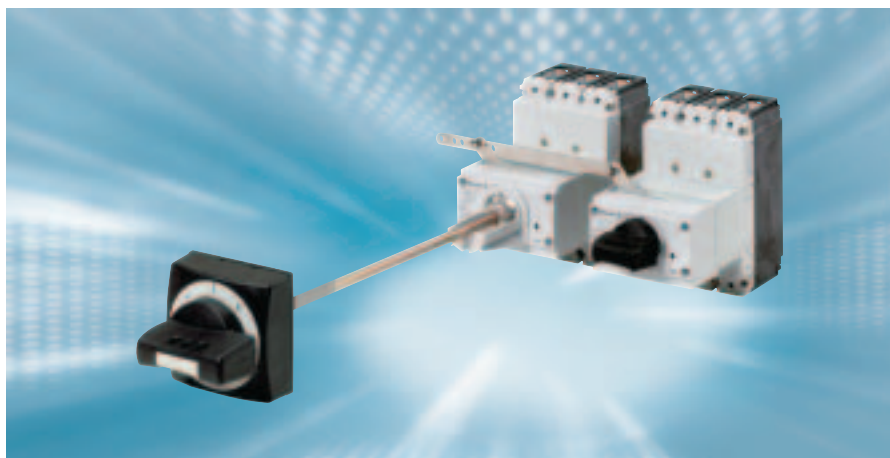
Interlock with Bowden cable technology

Mechanical interlock components enable the interlocking of two or three switches, equipped with rotary handles (a) or remote operators (b), which can also feature 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.



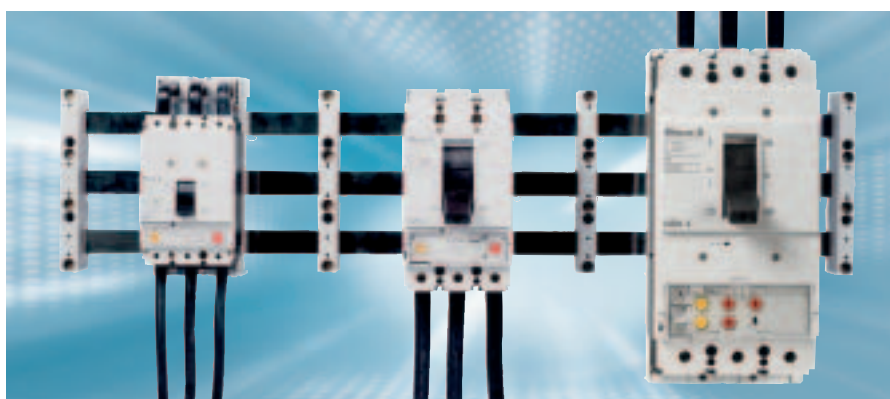
Parallel operation: smart technology

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.



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 160, 250 as well as 550 A can be snapped on.



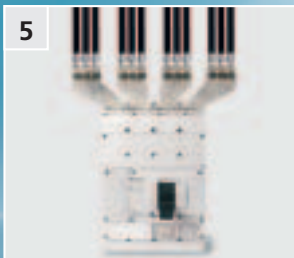
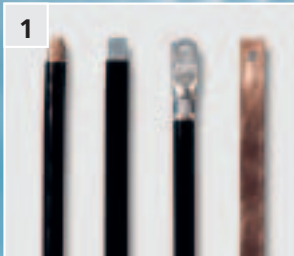
Switches in enclosures – certified safety

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. Additional isolated terminations for a 4th or 5th conductor are also available.



“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

Circuit-breakers NZM and switch disconnectors PN, N 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.

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.



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.

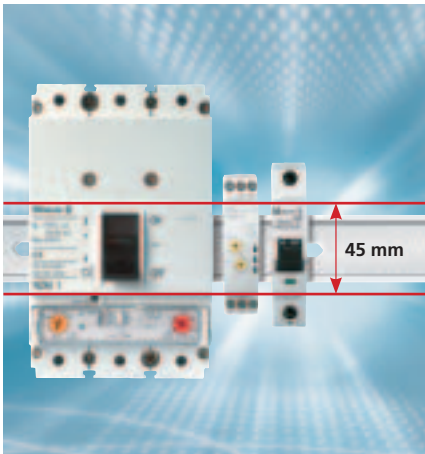
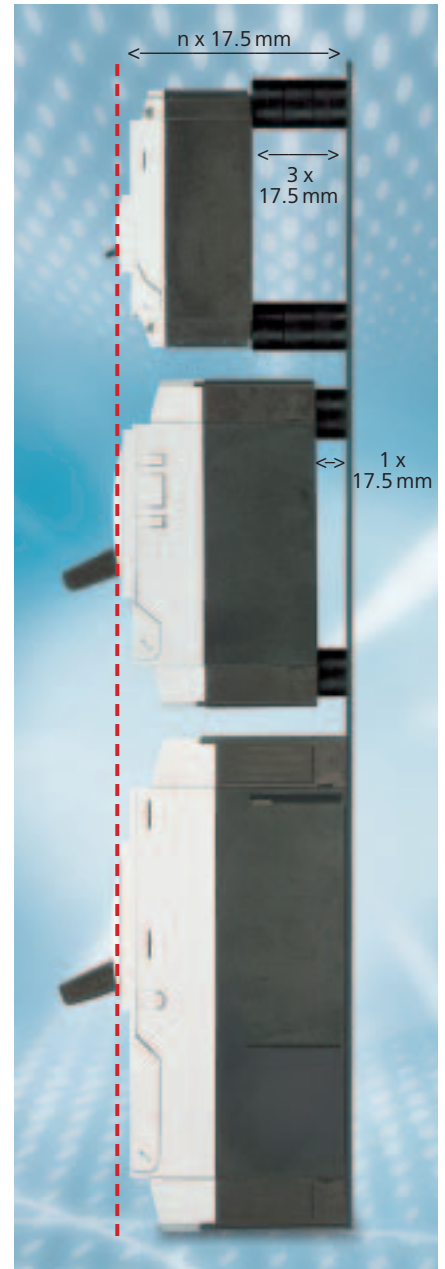


The spacer – saving time and expense

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.



The insulating surrounds have IP 40 degree of protection and the inscription labels can be simply clipped in.

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.

Insulating surround XBR5 for the toggle lever

Narrow design for space-saving side by side mounting.

Diagnostics included! NZM circuit-breakers



NZM circuit breakers provide on-site diagnostics – easily accessed from its clever electronic trip unit

NZM circuit breakers protect people, installations and power supply networks. Faults are immediately recognised and reliably disconnected – but the following must be clarified in order to quickly re-establish the power supply safely.

- Was there an overload or short-circuit?
- Which phases were affected?
- Which chain of events led to the trip?
- Have settings been adjusted in the meantime?
- Is it possible – and more importantly – *is it safe* - to re-close the circuit breaker and restore power?

In such events NZM circuit breakers from Moeller provide valuable insight with diagnostic information that's quickly and easily accessible with a standard PC.

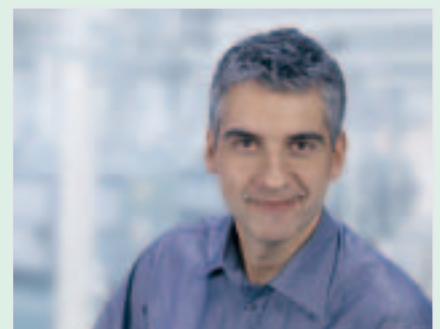


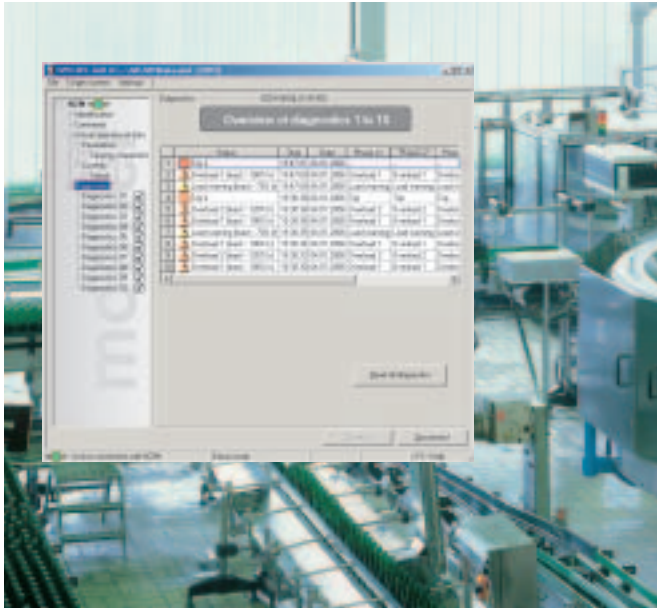
NZM provides the quick overview – directly onsite

NZM delivers all the necessary diagnostics information via an integrated interface directly to a PC or laptop. Configuration in advance is not necessary.

The connection is quickly established: Simply plug the connection cable into the front of the intelligent electronic trip unit – and you are ready to go. This diagnostics access is possible at any time, regardless of if the system is operational or not.

“System diagnostics was never so easy to implement. That’s what I call real Plug & Work!”



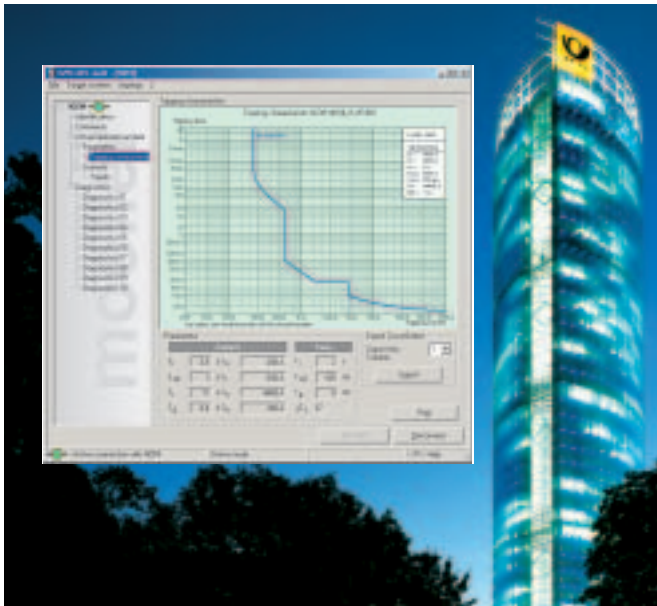


NZM provides diagnostic analysis after a fault that eliminates ambiguity and error!

The cause of a trip is documented by the clever circuit-breaker NZM in its internal memory. Ten events are logged in detail which enables the source of the fault to be quickly identified based on hard facts. The information is clearly and unambiguously displayed onsite with the NZM-XPC-SOFT software. It can be saved as a file, printed and sent for the purpose of analysis.

The NZM event protocol eliminates ambiguities and "human error" of keeping notes during the entire lifecycle of the circuit-breaker and the low-voltage installation. Even replacement circuit-breakers can be identified and traced based on their serial number.

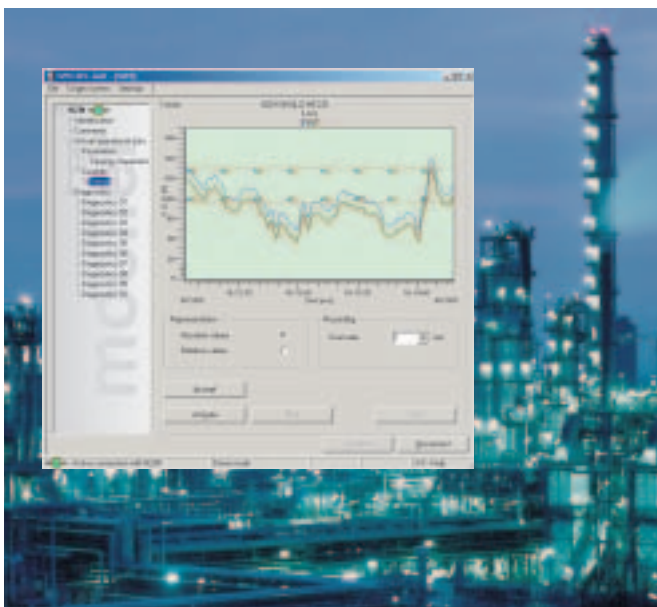
The NZM-XPC-SOFT supports nine languages for maximum safety and operating availability world-wide.



NZM validates protection settings at a glance

With NZM a power disruption can be limited to the areas which are directly affected by the fault using a selective design concept. The effects and costs of a malfunction are minimised without making any compromises in safety.

The active tripping curve and the planned selectivity can be exactly represented in the NZM-XPC-SOFT based on the selected switch settings and tripping characteristic. Selection of the optimum protective parameters and validation of the desired selectivity is supported during the commissioning phase by a direct comparison of the upstream and downstream protective devices. Possible fault sources are immediately indicated by a visual comparison of the individual breaker settings. Later modifications are clearly illustrated. Even the matching of the protection settings of a specific motor characteristic is illustrated by graphic optimisation of the inrush-, starting- and operating current of the motor.



NZM load analysis for valuable resource management

Electrical energy is a valuable and critical resource. Each clever NZM is capable of being transformed into a load analysis tool with the help of NZM-XPC-SOFT. Simply plug-in the PC connection cable at the electronic trip block and both graphical and data-logging trend measurement commences.

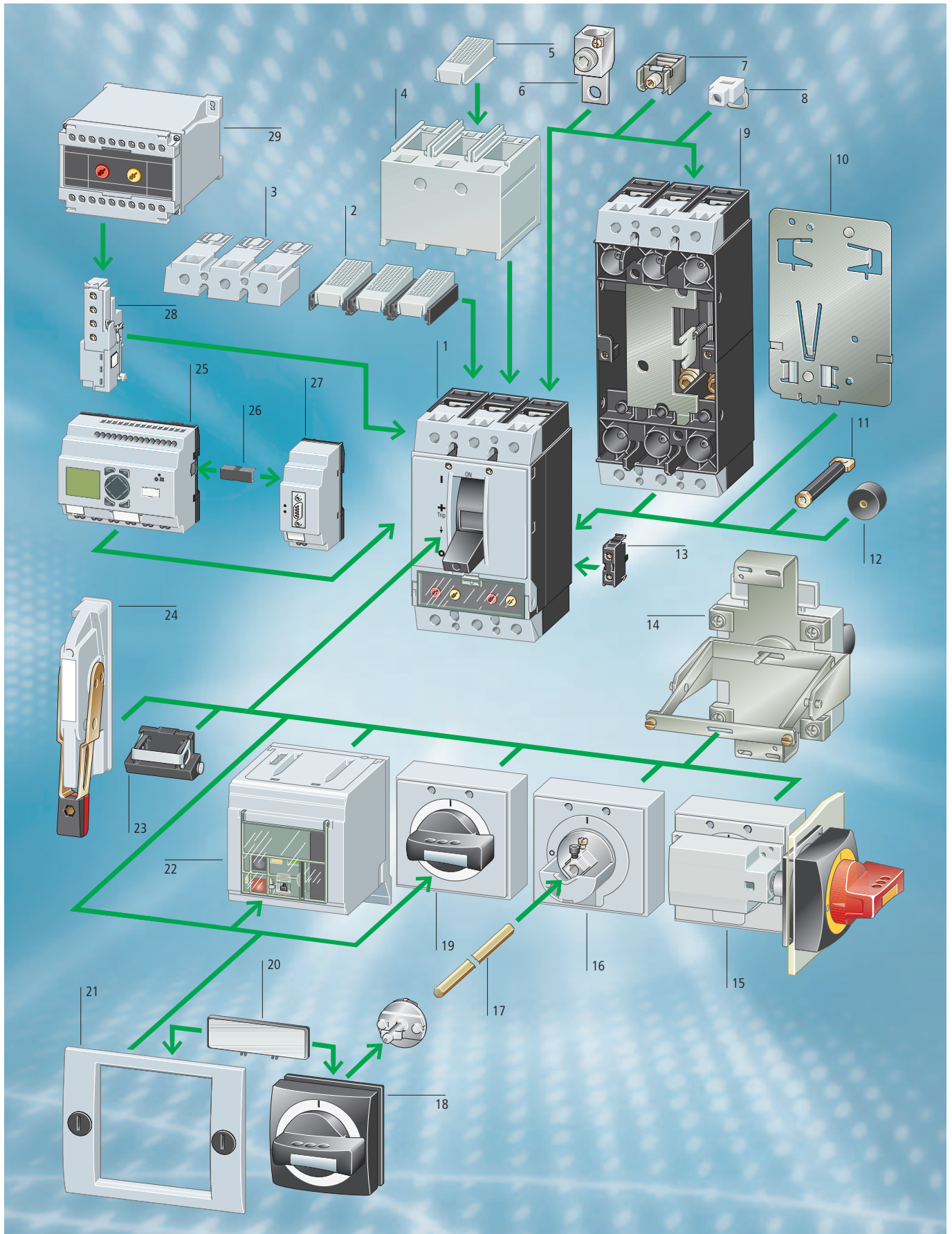
The effective values of all phases can be recorded over the time periods of minutes, hours or even days. Power distribution is therefore transparent.

Measurements and trends over defined periods can be compared or processed further using the protocol function to generate files for MS Excel®.

Evaluating the performance of manufacturing processes and assessing preventative maintenance of motors are examples of important resource management functions easily carried out with this simple software.

System Overview

Circuit-Breakers, Switch-Disconnectors



Circuit-breakers, switch-disconnectors

Circuit-breakers, switch-disconnectors	1
IP2X finger proof For box terminals	2
Terminal shroud, knockout	3
Connection shroud Protection against direct contact with connection of cable lugs, busbars or when tunnel terminals are used	4
IP2X finger proof For cover	5
Tunnel terminals for Al and Cu cables Standard with control circuit terminal	6
Box terminals Standard feature of frame size 1 Mounting within the switch enclosure	7
Control circuit terminal For two connection positions top or bottom	8
Plug-in and withdrawable unit	9
Clip plate	10
Rear side connection	11
Spacer	12

Standard auxiliary contact Switches with the main contacts. Performs signalling and interlock tasks	13
Trip-indicating auxiliary contact General trip indication with trip due to overload or short-circuit as well as voltage release	13
Rear operator	14
Main switch rotary handle for side panel mounting	15
Door coupling rotary handle • lockable • with door interlock	16, 18
Extension shaft Can be cut to required length	17
Rotary handle • lockable	19
External warning/designation label	20
Insulating surround For use on the enclosure with lead through toggle lever, rotary drive and remote operator	21
Remote operator For switch on/off and reset by permanent or three-wire control	22

Toggle level locking device	23
Side lever handle In preparation	24
Data Management Interface (DMI Module) • Access to diagnostics and operational data • Detection of current values • Parameterisation and control of the circuit-breaker with electronic releases	25
EASY-LINK-DS data plug	26
PROFIBUS DP/CANopen/ DeviceNet interface	27
Early-make auxiliary contact For interlock and load shedding circuits as well as for early-make switching of the undervoltage release with main switch/ Emergency-Stop applications	28
Voltage release 25 Undervoltage release • non-delayed • off-delayed Shunt release	28
Time delay unit for undervoltage releases	29

IEC/EN 60947-2 UL 489

Switch- Disconnectors	3-pole IEC		4-pole IEC		IEC 3-pole UL/CSA	
	2 switch positions ¹	3 switch positions ²	2 switch positions ¹	3 switch positions ²	rated current = Rated uninterrupted current $I_n = I_u$ A	3 switch positions ²
Terminals standard Terminal screws as accessories						
63	PN1-63	N1-63	PN1-4-63	N1-4-63	63	NS1-63-NA
100	PN1-100	N1-100	PN1-4-100	N1-4-100	100	NS1-100-NA
125	PN1-125	N1-125	PN1-4-125	N1-4-125	125	NS1-125-NA
160	PN1-160	N1-160	PN1-4-160	N1-4-160		
Terminals standard Terminal screws as accessories						
200	PN2-200	N2-200	PN2-4-200	N2-4-200	160	NS2-160-NA
250	PN2-250	N2-250	PN2-4-250	N2-4-250	200	NS2-200-NA
400	PN3-400	N3-400	PN3-4-400	N3-4-400	250	NS2-250-NA
630	PN3-630	N3-630	PN3-4-630	N3-4-630	400	NS3-400-NA
800	–	N4-800	–	N4-4-800	600	NS3-600-NA
1000	–	N4-1000	–	N4-4-1000	800	NS4-800-NA
1250	–	N4-1250	–	N4-4-1250	1000	NS4-1000-NA
1600	–	N4-1600	–	N4-4-1600	1200	NS4-1200-NA

¹ I, 0 ; Cannot be remotely operated

² I, +, 0 ; Can be remotely operated with U/A voltage release



New in the range

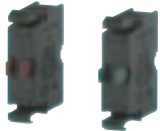
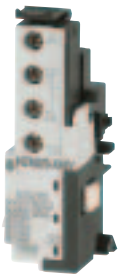



Thermomagnetic release

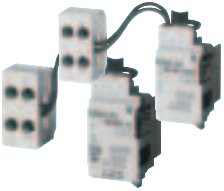

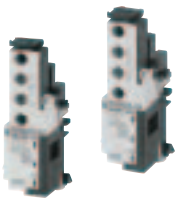
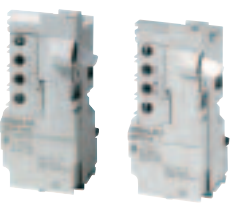
Rated current = rated uninterrupted current $I_n = I_u$ A	Setting range overload release I_r A	Short-circuit release adjustable	Circuit-breaker with Basic switching capacity 25 kA at 415 V 50/60 Hz	
			Part No. 3-pole	Part No. 4-pole
Standard terminals, terminal screws as accessories				
20	15-20	350	NZMB1-A20	NZMB1-4-A20
25	20-25	350	NZMB1-A25	NZMB1-4-A25
32	25-32	350	NZMB1-A32	NZMB1-4-A32
40	32-40	320-400	NZMB1-A40	NZMB1-4-A40
50	40-50	300-500	NZMB1-A50	NZMB1-4-A50
63	50-63	380-630	NZMB1-A63	NZMB1-4-A63
80	63-80	480-800	NZMB1-A80	NZMB1-4-A80
100	80-100	600-1000	NZMB1-A100	NZMB1-4-A100
125	100-125	750-1250	NZMB1-A125	NZMB1-4-A125
160	125-160	1280	NZMB1-A160	NZMB1-4-A160
Terminal screws standard				
20	15-20	350	-	-
25	20-25	350	-	-
32	25-32	350	-	-
40	32-40	320-400	-	-
50	40-50	300-500	-	-
63	50-63	380-630	-	-
80	63-80	480-800	-	-
100	80-100	600-1000	-	-
125	100-125	750-1250	-	-
160	125-160	960-1600	NZMB2-A160	NZMB2-4-A160
160	125-160	960-1600	-	NZMB2-4-A160/100 ³⁾
200	160-200	1280-2000	NZMB2-A200	NZMB2-4-A200
200	160-200	1280-2000	-	NZMB2-4-A200/125 ³⁾
250	200-250	1500-2500	NZMB2-A250	NZMB2-4-A250
250	200-250	1500-2500	-	NZMB2-4-A250/160 ³⁾
300	240-300	2000-2500	NZMB2-A300	NZMB2-4-A300
300	240-300	2000-2500	-	NZMB2-4-A300/200 ³⁾
Standard terminals				
20	15-20	350	-	-
25	20-25	350	-	-
32	25-32	350	-	-
40	32-40	320-400	-	-
50	40-50	300-500	-	-
63	50-63	380-630	-	-
80	63-80	480-800	-	-
100	80-100	600-1000	-	-
125	100-125	750-1250	-	-
160	125-160	960-1600	NZMB2-A160-BT	-
200	160-200	1280-2000	NZMB2-A200-BT	-
250	200-250	1500-2500	NZMB2-A250-BT	-
300	240-300	2000-2500	NZMB2-A300-BT	-
Terminal screws standard				
320	250-320	1920-3200	-	-
320	250-320	1920-3200	-	-
400	320-400	2400-4000	-	-
400	320-400	2400-4000	-	-
500	400-500	3000-5000	-	-
500	400-500	3000-5000	-	-
Standard terminals				
320	250-320	1920-3200	-	-
400	320-400	2400-4000	-	-
500	400-500	3000-5000	-	-
Electronic releases, terminal screws standard, terminals as accessories				
630	315-630	1260-5040	-	-
630	315-630	1260-5040	-	-
800	400-800	1600-9600	-	-
800	400-800	1600-9600	-	-
1000	500-1000	2000-12000	-	-
1000	500-1000	2000-12000	-	-
1250	630-1250	2500-15000	-	-
1250	630-1250	2500-15000	-	-
1600	800-1600	3200-19200	-	-
1600	800-1600	3200-19200	-	-

1) Applies for NZM1, 2) applies for NZM2 and NZM3, 3) 60% release on neutral pole

Circuit-breaker with Comfort switching capacity 36 kA at 415 V 50/60 Hz		Circuit-breaker with Normal switching capacity 50 kA at 415 V 50/60 Hz		Circuit-breaker with High switching capacity 100 ¹⁾ /150 ²⁾ kA at 415 V 50/60 Hz	
Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
3-pole	4-pole	3-pole	4-pole	3-pole	4-pole
NZMC1-A20 NZMC1-A25 NZMC1-A32 NZMC1-A40 NZMC1-A50 NZMC1-A63 NZMC1-A80 NZMC1-A100 NZMC1-A125 NZMC1-A160	NZMC1-4-A20 NZMC1-4-A25 NZMC1-4-A32 NZMC1-4-A40 NZMC1-4-A50 NZMC1-4-A63 NZMC1-4-A80 NZMC1-4-A100 NZMC1-4-A125 NZMC1-4-A160	NZMN1-A20 NZMN1-A25 NZMN1-A32 NZMN1-A40 NZMN1-A50 NZMN1-A63 NZMN1-A80 NZMN1-A100 NZMN1-A125 NZMN1-A160	NZMN1-4-A20 NZMN1-4-A25 NZMN1-4-A32 NZMN1-4-A40 NZMN1-4-A50 NZMN1-4-A63 NZMN1-4-A80 NZMN1-4-A100 NZMN1-4-A125 NZMN1-4-A160	NZMH1-A20 NZMH1-A25 NZMH1-A32 NZMH1-A40 NZMH1-A50 NZMH1-A63 NZMH1-A80 NZMH1-A100 NZMH1-A125 NZMH1-A160	NZMH1-4-A20 NZMH1-4-A25 NZMH1-4-A32 NZMH1-4-A40 NZMH1-4-A50 NZMH1-4-A63 NZMH1-4-A80 NZMH1-4-A100 NZMH1-4-A125 NZMH1-4-A160
- - - - - - - - - - NZMC2-A160 - NZMC2-A200 - NZMC2-A250 - NZMC2-A300 -	- - - - - - - - - - NZMC2-4-A160 NZMC2-4-A160/100 ³⁾ NZMC2-4-A200 NZMC2-4-A200/125 ³⁾ NZMC2-4-A250 NZMC2-4-A250/160 ³⁾ NZMC2-4-A300 NZMC2-4-A300/200 ³⁾	- - - - - - - - - - NZMN2-A160 - NZMN2-A200 - NZMN2-A250 - NZMN2-A300 -	- - - - - - - - - - NZMN2-4-A160 NZMN2-4-A160/100 ³⁾ NZMN2-4-A200 NZMN2-4-A200/125 ³⁾ NZMN2-4-A250 NZMN2-4-A250/160 ³⁾ NZMN2-4-A300 NZMN2-4-A300/200 ³⁾	NZMH2-A20 NZMH2-A25 NZMH2-A32 NZMH2-A40 NZMH2-A50 NZMH2-A63 NZMH2-A80 NZMH2-A100 NZMH2-A125 NZMH2-A160 - NZMH2-A200 - NZMH2-A250 - NZMH2-A300 -	NZMH2-4-A20 NZMH2-4-A25 NZMH2-4-A32 NZMH2-4-A40 NZMH2-4-A50 NZMH2-4-A63 NZMH2-4-A80 NZMH2-4-A100 NZMH2-4-A125 NZMH2-4-A160 NZMH2-4-A160/100 ³⁾ NZMH2-4-A200 NZMH2-4-A200/125 ³⁾ NZMH2-4-A250 NZMH2-4-A250/160 ³⁾ NZMH2-4-A300 NZMH2-4-A300/200 ³⁾
- - - - - - - - - - NZMC2-A160-BT NZMC2-A200-BT NZMC2-A250-BT NZMC2-A300-BT	- - - - - - - - - - - - - -	- - - - - - - - - - NZMN2-A160-BT NZMN2-A200-BT NZMN2-A250-BT NZMN2-A300-BT	- - - - - - - - - - - - - -	NZMH2-A20-BT NZMH2-A25-BT NZMH2-A32-BT NZMH2-A40-BT NZMH2-A50-BT NZMH2-A63-BT NZMH2-A80-BT NZMH2-A100-BT NZMH2-A125-BT NZMH2-A160-BT NZMH2-A200-BT NZMH2-A250-BT NZMH2-A300-BT	- - - - - - - - - - - - - -
NZMC3-A320 - NZMC3-A400 - NZMC3-A500 -	NZMC3-4-A320 NZMC3-4-A320/200 ³⁾ NZMC3-4-A400 NZMC3-4-A400/250 ³⁾ NZMC3-4-A500 NZMC3-4-A500/320 ³⁾	NZMN3-A320 - NZMN3-A400 - NZMN3-A500 -	NZMN3-4-A320 NZMN3-4-A320/200 ³⁾ NZMN3-4-A400 NZMN3-4-A400/250 ³⁾ NZMN3-4-A500 NZMN3-4-A500/320 ³⁾	NZMH3-A320 - NZMH3-A400 - NZMH3-A500 -	NZMH3-4-A320 NZMH3-4-A320/200 ³⁾ NZMH3-4-A400 NZMH3-4-A400/250 ³⁾ NZMH3-4-A500 NZMH3-4-A500/320 ³⁾
NZMC3-A320-BT NZMC3-A400-BT NZMC3-A500-BT	- - -	NZMN3-A320-BT NZMN3-A400-BT NZMN3-A500-BT	- - -	NZMH3-A320-BT NZMH3-A400-BT NZMH3-A500-BT	- - -
- - - - - - - - - -	- - - - - - - - - -	NZMN3-AE630 - NZMN4-AE800 - NZMN4-AE1000 - NZMN4-AE1250 - NZMN4-AE1600 -	NZMN3-4-AE630 NZMN3-4-AE630/400 NZMN4-4-AE800 NZMN4-4-AE800/500 NZMN4-4-AE1000 NZMN4-4-AE1000/630 NZMN4-4-AE1250 NZMN4-4-AE1250/800 NZMN4-4-AE1600 NZMN4-4-AE1600/1000	NZMH3-AE630 - NZMH4-AE800 - NZMH4-AE1000 - NZMH4-AE1250 - NZMH4-AE1600 -	NZMH3-4-AE630 NZMH3-4-AE630/400 NZMH4-4-AE800 NZMH4-4-AE800/500 NZMH4-4-AE1000 NZMH4-4-AE1000/630 NZMH4-4-AE1250 NZMH4-4-AE1250/800 NZMH4-4-AE1600 NZMH4-4-AE1600/1000

Auxiliary contacts				
Version	For use with	Max. number of auxiliary contacts per switch	Contacts	Part no.
<p>Standard auxiliary contact (HIN) Switching with the main contacts Used for indicating and interlocking tasks</p>  <p>With bolt connection</p> <p>With cage clamp connection.</p>	<p>NZM1(-4), 2(-4), 3(-4), 4(-4) PN1(-4), 2(-4), 3(-4) N(S)1(-4), 2(-4), 3(-4), 4(-4)</p> <p>NZM1(-4), 2(-4), 3(-4), 4(-4) PN1(-4), 2(-4), 3(-4) N(S)1(-4), 2(-4), 3(-4), 4(-4)</p>	<p>N(S)1, PN1, NZM1: 1 N(S)2, PN2, NZM2: 2 N(S)3, PN3, NZM3: 3 N(S)4, NZM4: 3</p>	<p>1 N/O – – 1 N/C</p> <p>1 N/O 1 N/C 2 N/O – – 2 N/C</p>	<p>M22-K10 M22-K01</p> <p>M22-CK11 M22-CK20 M22-CK02</p>
<p>Early-make auxiliary contacts For interlock and load-shedding circuits, as well as for early-make switching of the undervoltage release with main switch / emergency-Stop applications</p> <p>With clamp terminal on the left-hand switch side.</p> <p>With clamp terminal on the right-hand switch side.</p> <p>With 3 m connecting cables instead of bolt connection.</p> <p>With bolt connection</p> 	<p>NZM1(-4) PN1(-4) N(S)1(-4)</p> <p>NZM1(-4) PN1(-4) N(S)1(-4)</p> <p>NZM1(-4) PN1(-4) N(S)1(-4)</p> <p>NZM2(-4), 3(-4) PN2(-4), 3(-4) N(S)2(-4), 3(-4)</p> <p>NZM4(-4) N(S)4(-4)</p>	<p>N(S)1, NZM1: 1 N(S)2, NZM2: 1 N(S)3, NZM3: 1 N(S)4, NZM4: 2</p>	<p>2 N/O –</p> <p>2 N/O –</p> <p>2 N/O –</p> <p>2 N/O –</p> <p>2 N/O –</p>	<p>NZM1-XHIV</p> <p>NZM1-XHIVR</p> <p>NZM1-XHIVL</p> <p>NZM2/3-XHIV</p> <p>NZM4-XHIV</p>
<p>Trip indicating auxiliary contact (HIA)¹⁾ General trip indication "+" with trip by voltage release, overload release or short-circuit release</p>  <p>With bolt connection</p> <p>With cage clamp connection.</p>	<p>NZM1(-4), 2(-4), 3(-4), 4(-4) N(S)1(-4), 2(-4), 3(-4), 4(-4)</p> <p>NZM1(-4), 2(-4), 3(-4), 4(-4) N(S)1(-4), 2(-4), 3(-4), 4(-4)</p>		<p>1 N/O – – 1 N/C</p> <p>1 N/O 1 N/C 2 N/O – – 2 N/C</p>	<p>M22-K10 M22-K01</p> <p>M22-CK11 M22-CK20 M22-CK02</p>


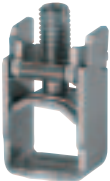
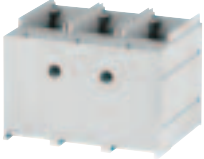



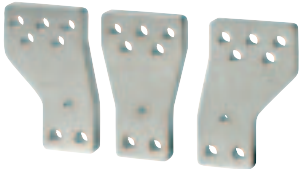
¹⁾ not in conjunction with switch-disconnector PN

Release		Undervoltage release ¹⁾		Overvoltage release ²⁾	
Version	For use with	Without auxiliary contact		Without auxiliary contact	
		Rated control voltage U_s V	Part no.	Rated control voltage U_s V	Part no.
With clamp terminal on the left-hand switch side. 	NZM1(-4), N(S)1(-4)	24 V 50/60 Hz 110 V – 130 V 50/60 Hz 208 V – 240 V 50/60 Hz 380 V – 440 V 50/60 Hz 12 V DC 24 V DC 110 V – 130 V DC 220 V – 250 V DC	NZM1-XU24AC NZM1-XU110-130AC NZM1-XU208-240AC NZM1-XU380-440AC NZM1-XU12DC NZM1-XU24DC NZM1-XU110-130DC NZM1-XU220-250DC	12 V AC/DC 24 V AC/DC 110 V – 130 V AC/DC 208 V – 250 V AC/DC 380 V – 440 V AC/DC	NZM1-XA12AC/DC NZM1-XA24AC/DC NZM1-XA110-130AC/DC NZM1-XA208-250AC/DC NZM1-XA380-440AC/DC
With 3 m connection cable instead of screw termination. 	NZM1(-4), N(S)1(-4)	24 V 50/60 Hz 110 V – 130 V 50/60 Hz 208 V – 240 V 50/60 Hz 380 V – 440 V 50/60 Hz 12 V DC 24 V DC 110 V – 130 V DC 220 V – 250 V DC	NZM1-XUL24AC NZM1-XUL110-130AC NZM1-XUL208-240AC NZM1-XUL380-440AC NZM1-XUL12DC NZM1-XUL24DC NZM1-XUL110-130DC NZM1-XUL220-250DC	12 V AC/DC 24 V AC/DC 110 V – 130 V AC/DC 208 V – 250 V AC/DC 380 V – 440 V AC/DC	NZM1-XAL12AC/DC NZM1-XAL24AC/DC NZM1-XAL110-130AC/DC NZM1-XAL208-250AC/DC NZM1-XAL380-440AC/DC
With clamp-type terminals 	NZM2(-4), N2(-4), NZM3(-4) N(S)3(-4)	24 V 50/60 Hz 110 V – 130 V 50/60 Hz 208 V – 240 V 50/60 Hz 380 V – 440 V 50/60 Hz 12 V DC 24 V DC 110 V – 130 V DC 220 V – 250 V DC	NZM2/3-XU24AC NZM2/3-XU110-130AC NZM2/3-XU208-240AC NZM2/3-XU380-440AC NZM2/3-XU12DC NZM2/3-XU24DC NZM2/3-XU110-130DC NZM2/3-XU220-250DC	12 V AC/DC 24 V AC/DC 110 V – 130 V AC/DC 208 V – 250 V AC/DC 380 V – 440 V AC/DC	NZM2/3-XA12AC/DC NZM2/3-XA24AC/DC NZM2/3-XA110-130AC/DC NZM2/3-XA208-250AC/DC NZM2/3-XA380-440AC/DC
With clamp-type terminals 	NZM4(-4), N(S)4(-4)	24 V 50/60 Hz 110 V – 130 V 50/60 Hz 208 V – 240 V 50/60 Hz 380 V – 440 V 50/60 Hz 12 V DC 24 V DC 110 V – 130 V DC 220 V – 250 V DC	NZM4-XU24AC NZM4-XU110-130AC NZM4-XU208-240AC NZM4-XU380-440AC NZM4-XU12DC NZM4-XU24DC NZM4-XU110-130DC NZM4-XU220-250DC	12 V AC/DC 24 V AC/DC 110 V – 130 V AC/DC 208 V – 250 V AC/DC 380 V – 440 V AC/DC	NZM4-XA12AC/DC NZM4-XA24AC/DC NZM4-XA110-130AC/DC NZM4-XA208-250AC/DC NZM4-XA380-440AC/DC

¹⁾ non-delayed shut down of circuit-breaker NZM or switch-disconnector N with drop of the control voltage below 35 – 70% U_s .
For use with Emergency-Stop devices in conjunction with Emergency-Stop button.

²⁾ switches are tripped by a voltage pulse or by the application of uninterrupted voltage

Door coupling rotary handles		
Version	For use with	Part no.
<p>Door coupling rotary handle Complete including rotary drive and coupling parts With the NZM...-XTVD... as well as NZM...-XTVD...60 types, an additional extension shaft is required. Degree of protection IP66/NEMA 4X Standard, black/grey</p> 	NZM1(-4), PN1(-4), N(S)1(-4) NZM2(-4), PN2(-4), N(S)2(-4) NZM3(-4), PN3(-4), N(S)3(-4) NZM4(-4), N(S)4(-4)	NZM1-XTVD NZM2-XTVD NZM3-XTVD NZM4-XTVD
<p>Lockable on handle and switch. Can be locked in 0 position, with adequate modification also in I position. Lockable door as additional feature, locking facility on circuit-breaker in 0 position.</p> 	NZM1(-4), PN1(-4), N(S)1(-4) NZM2(-4), PN2(-4), N(S)2(-4) NZM3(-4), PN3(-4), N(S)3(-4) NZM4(-4), N(S)4(-4)	NZM1-XTVDV NZM2-XTVDV NZM3-XTVDV NZM4-XTVDV
<p>Red-yellow for Emergency-Stop Lockable on handle and switch. Can be locked in 0 position, with adequate modification also in I position. Lockable door as additional feature, locking facility on circuit-breaker in 0 position.</p> 	NZM1(-4), PN1(-4), N(S)1(-4) NZM2(-4), PN2(-4), N(S)2(-4) NZM3(-4), PN3(-4), N(S)3(-4) NZM4(-4), N(S)4(-4)	NZM1-XTVDVR NZM2-XTVDVR NZM3-XTVDVR NZM4-XTVDVR
<p>Extension shaft 400 mm Max. mounting depth</p>  <p>600 mm Max. mounting depth</p>	NZM1(-4), PN1(-4), N(S)1(-4) NZM2(-4), PN2(-4), N(S)2(-4) NZM3(-4), PN3(-4), N(S)3(-4) NZM4(-4), N(S)4(-4) NZM1(-4), PN1(-4), N(S)1(-4) NZM2(-4), PN2(-4), N(S)2(-4) NZM3(-4), PN3(-4), N(S)3(-4) NZM4(-4), N(S)4(-4)	NZM1/2-XV4 NZM3/4-XV4 NZM1/2-XV6 NZM3/4-XV6

Connection types



 



	For use with	Conductor type	Conductor cross-section (applies for 3-pole and 4-pole switches)				Part no. O=fitted at top U=fitted at bottom
			mm ²	AWG/kcmil	Cu-Band mm	Copper strip mm	
	Box terminal NZM2, PN2, N(S)2 3-pole ≤ 160 A NZM2, PN2, N(S)2 200 A, 250 A NZM2-4, PN2-4, N2-4 4-pole ≤ 160 A NZM2-4, PN2-4, N2-4 200 A, 250 A max. 500 A, and 400 A UL/CSA NZM3, PN3, N(S)3 3-pole NZM3-4, PN3-4, N3-4 4-pole 630 A	Cu cables Cu cable Cu cables Cu cable	1 x 4 – 185 2 x 4 – 70 1 x 35 – 240 2 x 16 – 120	1 x 12 – 350 1 x 2 – 500	≥ 2 x 9 x 0.8 min. 6 x 16 x 0.8 max. 10 x 24 x 1.0 10 x 24 x 1.0 + 5 x 24 x 1.0	+NZM2-160-XKCO +NZM2-160-XKCU +NZM2-250-XKCO +NZM2-250-XKCU +NZM2-4-160-XKCO +NZM2-4-160-XKCU +NZM2-4-250-XKCO +NZM2-4-250-XKCU +NZM3-XKCO +NZM3-XKCU +NZM3-4-XKCO +NZM3-4-XKCU	
	Shroud NZM2, PN2, N(S)2 3-pole NZM3, PN3, N(S)3 NZM2-4, PN2-4, N2-4 4-pole NZM3-4, PN3-4, N3-4					NZM2-XKSA NZM3-XKSA NZM2-4-XKSA NZM3-4-XKSA	
	Screw terminal Standard equipment max. 1250 A NZM4, N(S)4 3- and NZM4-4, N4-4) 4-pole 1600 A	Cu lugs	1 x 120 – 185 4 x 50 – 185	1 x 250 – 350 4 x 0 – 350	(2 x) 10 x 50 x 1.0	(2 x) 50 x 10	
	Module plate max. 1250A 1-hole NZM4, N(S)4 3-pole NZM4-4, N4-4 4-pole max. 1400A 2-hole NZM4, N(S)4 3-pole NZM4-4, N4-4 4-pole max. 1500A	Cu lugs Cu lugs	1 x 120 – 300 2 x 95 – 300 2 x 95 – 185 4 x 35 – 185	1 x 250 – 600 2 x 000 – 600 2 x 000 – 350 4 x 2 – 350	(2 x) 10 x 40 x 1.0 (2 x) 10 x 50 x 1.0 (2 x) 10 x 50 x 1.0	(2 x) 40 x 10 (2 x) 50 x 10 (2 x) 50 x 10	NZM4-XKM1 NZM4-4-XKM1 NZM4-XKM2 NZM4-4-XKM2
	Module plate max. 1250A 2-hole NZM4, N(S)4 3-pole NZM4-4, N4-4 4-pole 1600A 2-hole NZM4, N(S)4 3-pole NZM4-4, N4-4 4-pole	Cu lugs	2 x 95 – 300	2 x 000 – 600	(2 x) 10 x 50 x 1.0	(2 x) 50 x 10	NZM4-XKM2S-1250 NZM4-4-XKM2S-1250 NZM4-XKM2S-1600 NZM4-4-XKM2S-1600
	Connection width extension 630 A NZM3, PN3, N(S)3 3-pole NZM3-4, PN3-4, N3-4 4-pole 1600 A NZM4, N(S)4 3-pole NZM4-4, N4-4 4-pole	Cu-lugs Al lugs Cu lugs	2 x 300 4 x 300 6 x 95 – 240	2 x 500 4 x 600 6 x 000 – 500	(2 x) 10 x 50 x 1.0 max. (2 x) 10 x 80 x 1.0	(2 x) 10 x 50 max. (2 x) 80 x 10	NZM3-XKV70 NZM3-4-XKV70 NZM4-XKV95 NZM4-XKV110 NZM4-4-XKV95 NZM4-4-XKV120

Residual-current protection module up to 250 A rated current



The residual-current protection modules can be connected to the bottom of the circuit-breaker NZM1 and NZM2, and on the NZM1 also on the right hand side with the same contour design. A compact and mounting-friendly solution. An external auxiliary voltage is not required. The residual-current protection module of the NZM2 is independent of the mains voltage and can thus be used for personnel protection in Germany. It is available in pulse current sensitive and also in AC/DC current sensitive devices. In almost every mains configuration 3-pole and 4-pole variants as well as rated fault currents from 30 mA to time-discriminating 3 A are on offer. During a fault the rising fault current will initially be indicated by an LED on the RCCB for the NZM1. The circuit-breaker trips via the residual-current release only after the set fault current is exceeded, i.e. the main contacts will be opened. The cause of the fault is indicated mechanically on the device with the NZM1 and 2. Optional auxiliary contacts can be clipped on in order to remotely indicate the trip. The circuit-breaker and the residual-current release must be reset and switched back on in order to restore the power supply.



Fault current trip			3-pole	4-pole
Version	Rated uninterrupted current	Rated fault current delay time	Part no.	Part no.
Pulse current sensitive	max 125A	$I_{\Delta n} = 0.03 \text{ A}$	NZM1-XFI30R	NZM1-4-XFI30R
	max 100A		NZM1-XFI30U	NZM1-4-XFI30U
	max 125A	$I_{\Delta n} = 0.3 \text{ A}$	NZM1-XFI300R	NZM1-4-XFI300R
	max 100A		NZM1-XFI300U	NZM1-4-XFI300U
	max 125A	$I_{\Delta n} = 0.03 - 0.1 - 0.3 - 0.5 - 1 - 3 \text{ A}$ $t_v = 10 - 60 - 150 - 300 - 450 \text{ ms}$	NZM1-XFIR	NZM1-4-XFIR
	max 100A		NZM1-XFIU	NZM1-4-XFIU
AC/DC sensitive	max 250A	$I_{\Delta n} = 0.03 \text{ A}$	-	NZM2-4-XFI30
	max 250A	$I_{\Delta n} = 0.1 - 0.3 - 1 - 3 \text{ A}$ $t_v = 60 - 150 - 300 - 450 \text{ ms}$	-	NZM2-4-XFI
	max 250A	$I_{\Delta n} = 0.03 \text{ A}$	-	NZM2-4-XFIA30
Mounted at bottom			-	NZM2-4-XFIA

NZM 2 with RCCB module for welding applications



- Suitable for use in three-phase systems
- Rated operational voltage 400V/ 50/60 Hz
- Rated fault current $I_n = 0.03 A$
- Built-in power supply $U_e = 50 - 400 V$
- Pulse current sensitive
- Non-UL/CSA approved

The 3-pole circuit-breaker with residual-current release for equipment with power electronics such as inverters and frequency inverters is particularly suitable for welding applications. The RCCB module is pulse current sensitive and operates according to the core-balance principle in a range from 0 – 100 kHz. Unwanted trips due to transient, pulse-shaped errors of the operating current are prevented. The function is mains voltage independent.

Circuit-breaker with residual-current release			
Rated current = rated uninterrupted current $I_n = I_u$ A	Overload release I_r A 	Short-circuit release I_i A 	Part no. Typical high switching capacity 150 kA at 415 V 50/60 Hz
160	125...160	960...1600	NZMH2- A160-FIA30
200	160...200	1200...2000	NZMH2- A200-FIA30
250	200...250	1500...2500	NZMH2- A250-FIA30

Circuit-breakers and switch-disconnectors for applications up to 1000 V



The special series for up to 1000 V 50Hz rated operational voltage further extends the area of application for circuit-breakers and switch-disconnectors. They are particularly suitable for use under special environmental conditions such as mines, street tunnels, refineries, chemical plants and electric railways. Typical applications include higher power drives and general industrial power supply with long power lines.

The switch-disconnectors also feature a snap-action mechanism for safe switch on and off and the additional installation of position and trip-indicating auxiliary contacts as well as shunt or undervoltage releases.

Circuit-breaker 3-pole for 1000 V

With main switch characteristics to IEC/EN 60204 and isolating characteristics to IEC/EN 60947, VDE 660

Switching capacity	Protection of systems and cables			Selectively-opening circuit-breakers		Motor protection	
	10 / 0.5	15 / 0.5	20 / 0.3	10 / 0.5	20 / 0.3	15 / 0.5	20 / 0.3
1000 V $kA/\cos \phi I_{cu}$							
rated uninterrupted current I_u = rated current I_n	I_u	I_u	I_u	I_u	I_u	I_u	I_u
ambient temperature at 100% I_u min./max. -25 / +50	A	A	A	A	A	A	A
	NZMH2-A...-S1 20 - 250	NZMH3-AE...-S1 250 - 630	NZMH4-AE...-S1 630 - 1000	NZMH2-VE...-S1 100 - 250	NZMH4-VE...-S1 630 - 1600	NZMH3-ME...-S1 220 - 450	NZMH4-ME...-S1 550 - 1400

Flexible fault current protection up to 1800 A current rating



Protection against the dangers of electrical energy with insulation faults

The new Moeller relay/transducer combination covers operating currents in a range from 1 to 1800 A. The wide spectrum of applications ranges from general power distribution tasks to individual motor controls. The fault currents which are detected and processed by the relay range from 30 mA to 5 A. The adjustable relay provides a pre-warn function which alerts before the set fault current is exceeded. The pre-warning allows preventative action to be taken to prevent shutdown of the electrical energy.

The application range of the relay/transducer combinations extend – depending on the regulations which apply – from

personnel protection to fire protection, and even extends up to protection of systems for 1 to 4 pole power grids. The current relay signals that the set fault current has been exceeded with a changeover contact. Depending on the application, the contact signal can be subsequently processed in the controls, as well as by the shunt or undervoltage releases of a circuit-breaker which initiate the trip. The relay and transducer can be combined with every circuit-breaker. The compact ring-type transducer with no particular space requirement is placed at a suitable position on the cable run. The relay simply requires a free electrical cable connection.

Compact, safe, adaptable ...

... just as it should be, the fault current protection which is particularly suited for cramped spaces such as for example in service distribution systems.

Ring-type transducers which are arranged in a space saving manner on the cabling run and the measuring relay which is simply snapped onto the DIN mounting rail, combine to form a functional unit.

After a critical fault current has been exceeded, the output signal can be optionally channelled to an acoustic/optical signalling device, upstream control or directly to the shunt or undervoltage release of a motor-protective circuit-breaker/circuit-breaker for instantaneous shutdown.

Three different relay variants are available for different protective tasks: 30 mA as well as 300 mA sensitivity with a fixed setting and 30 mA to 5 A adjustable in fixed steps, which can be combined with a time delay of 20 ms to 5 s. The non-delayed standard devices are particularly suited for protection of systems. The time-delayed variants are intended for discriminative series connection of multiple switch/relay combinations. This ensures, that only the switch in the direct vicinity of the fault will trip.





Two colour LED's signal operating and fault states

Possible wiring faults between relay and transducers are indicated by illumination of both LED's. Diagnostics function with adjustable PFR-5 relay: If the set fault current is exceeded by more than 25, 50 or 75%, the red LED will flash at different frequencies. This alert feature ensures that trouble-shooting for the cause of the fault can commence before a critical state is reached.

Two pushbuttons enable test and reset of the relay

Test: The function of the relay electronics is tested and the trip signal can be used to control the shunt or undervoltage release of the connected circuit-breaker. This test checks the operation of the entire function chain comprised of measured value input, processing, signal routing as well as switch release.

Reset: The release signal is reset regardless of if it is received from a fault current or by operation of the test button.

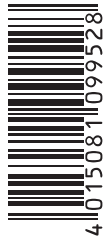
Residual current relay with ring-type transducer			
		Part no.	
Residual current relay Pulse current sensitive 	Rated control voltage: $U_c = 230V$ A.C. (50/60 Hz) Integrated auxiliary switch (1 changeover contact)		
	Rated fault current $I_{\Delta n} = 0.03$ A	PFR-003	
	Rated fault current $I_{\Delta n} = 0.3$ A	PFR-03	
	Rated fault current $I_{\Delta n} = 0.03...5$ A Adjustable fault current and delay time Fault current prewarning by flashing red LED	PFR-5	PFR-5: Adjustable fault current: 0.03 - 0.1 - 0.3 - 0.5 - 1 - 3 - 5 A Adjustable delay time: 0.02 - 0.1 - 0.3 - 0.5 - 1 - 3 - 5 s
Ring-type transducer 	Internal diameter 20 mm	PFR-W-20	PFR-W-20 and PFR-W-30 incl. attachment clip for DIN top-hat rail
	Internal diameter 30 mm	PFR-W-30	
	Internal diameter 35 mm	PFR-W-35	PFR-W-35 and all larger transducers incl. screw fitting
	Internal diameter 70 mm	PFR-W-70	
	Internal diameter 105 mm	PFR-W-105	
	Internal diameter 140 mm	PFR-W-140	
	Internal diameter 210 mm	PFR-W-210	<i>Engineering note:</i> The transducer diameter must be selected to be 1.5 times larger than the diameter of the conductor lead through (see Technical Data).

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