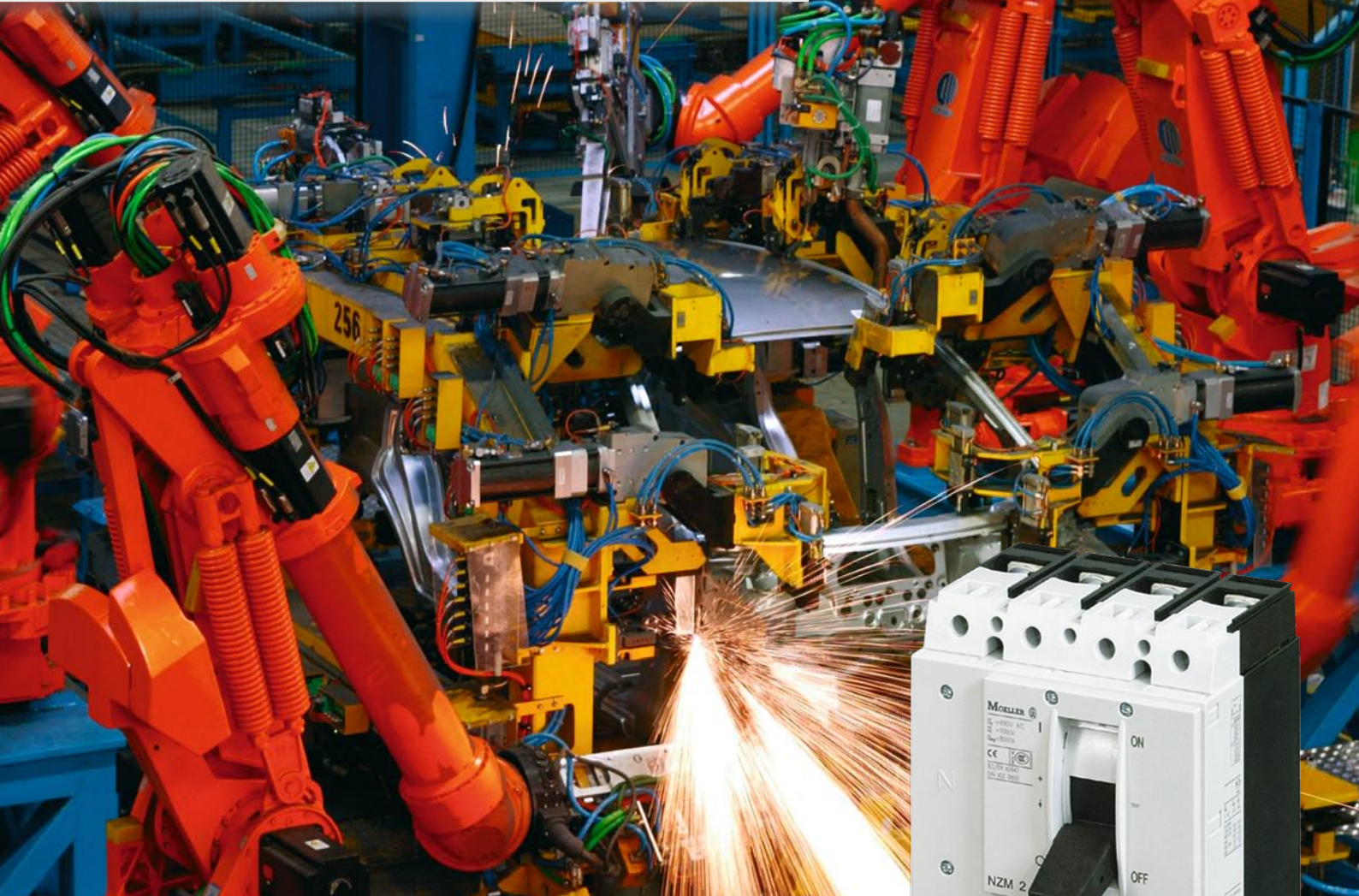


NZM Protects Persons and Systems for Spot Welding



Today's car body manufacturers still use resistance spot welding as a principal joining process. A modern car body therefore sometimes has over 5000 welding points, and a high volume model requires around 800 welding controls. For all these systems a high level of machine availability is essential, and the circuit-breaker is a key component in the welding control system. Moeller's NZM series circuit-breakers have earned a well-established reputation over several years in automotive production, as well as with international end customers and major machine suppliers.



Resistance welding with welding tongs is used for joining shaped sheet steel parts in body shell construction. Medium frequency welding equipment is commonly used. The welding transformers used for these, with operating frequencies up to 1200 Hz, are not as heavy as transformers with the same rating at 50 Hz. Medium frequency welding also offers a higher quality than welding using AC technology.

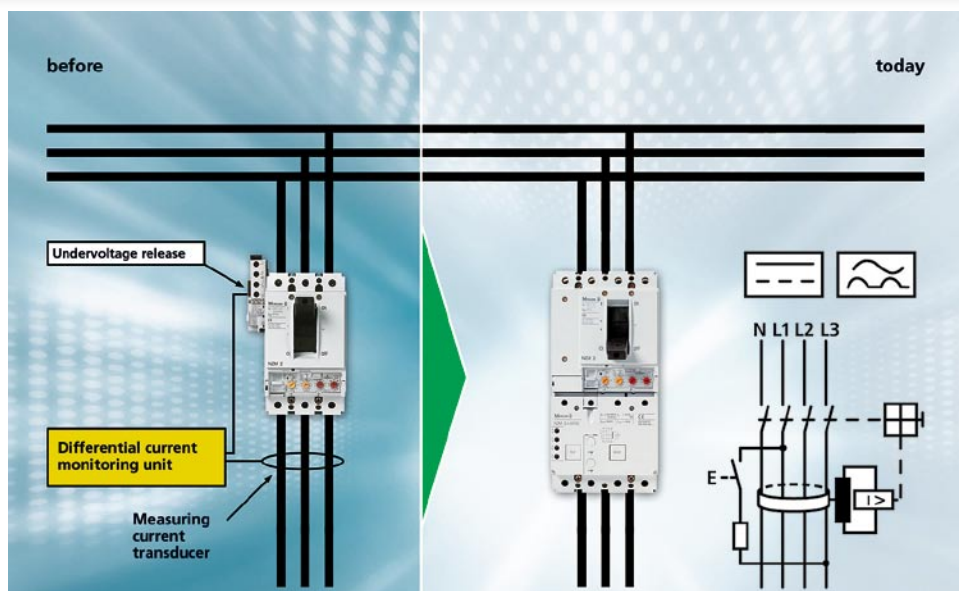
Circuit-breaker protection

Switch-disconnectors and circuit-breakers are the most important switching and protective devices used with welding equipment. Virtually all reputable manufacturers of welding controls use Moeller's NZM circuit-breakers or PN/N switch-disconnectors. With a switching capacity of up to 150 kA, these switching devices require very little space. Furthermore, the innovative switching technology with a double-break contact system have very short switching times. Through the special design and use of selected materials, magnetic repulsion forces are produced in the event of a short-circuit which open the contacts in a fraction of a sinusoidal wave.

The advantage of fuseless protection using circuit-breakers is the fact that service can be restored quickly. Other benefits include the possibility of disconnection on all poles, the differentiated indication of the cause of tripping and the possibility of remote switching through the use of motor operators.

In welding control applications, circuit-breakers are used as main switches (supply disconnecting device) with or without a protective function. The switches feature all the main switch characteristics specified by IEC/EN 60204 and the isolation properties required by IEC/EN 60947, VDE 0660. With their lockable handles they are suitable for this type of use in accordance with IEC/EN 60 204-1, VDE 0113 Part 1. When used as an emergency-stop switch, red rotary handles must be used on a yellow background. The door coupling handle can be secured with padlocks for special protection during maintenance, and can lock the door automatically when closed.

Moeller's circuit-breakers and switch-disconnectors also come with UL and CCC certification as well as that of other international standards. A large number of automotive manufacturers have included NZM circuit-breakers in their specifications and lists of approved suppliers. Not just for technical reasons but also for financial considerations. After all, the new NZM generation offers a perfectly matched and therefore streamlined range of accessories. The inexpensive auxiliary contacts from the RMQ-Titan range of control circuit devices can be used without any restrictions.



Personnel protection in welding systems

In addition to system protection, personnel protection is also particularly important. As protection against electric shock, personnel protection is provided by the fast and automatic disconnection of dangerous contact voltages. IEC 364-4-41 / VDE 0100 part 410 distinguishes between protection against direct and indirect contact. Protection against indirect contact requires automatic disconnection of the power supply in the event of a fault. For this a residual current monitor is used in the welding controls and this actuates the NZM breaker via an undervoltage release.

Residual current releases can be fitted to NZM1 and NZM2 for simpler mounting and space saving. The residual current module does not depend on the mains and auxiliary voltages, and trips as soon as the adjustable rated residual current is exceeded. The module is pulse current and AC/DC sensitive (based on the total current principle in the range 0-100 kHz) and its selectivity can also be adjusted. With $I_{\Delta N} = 30 \text{ mA}$ and a mains voltage dependent evaluation circuit, this function module offers reliable personnel protection in accordance with IEC/EN 60947-2 Annex B and EN 61009-1 (VDE 0664-20).

Electronic releases

Switches with electronic releases use a microprocessor controlled digital electronic unit. This determines the r.m.s. values of the load current monitored. Unlike analog electronic systems, any harmonics occurring in the welding network are evaluated correctly and do not lead to any nuisance tripping.

The electronic releases of the NZM also come with powerful diagnostics functions already integrated: all important information can be detected, displayed locally and passed on to higher-level systems. The circuit-breaker stores ten sets of diagnostics data in a history. An optional data management interface (DMI) also enables this information to be indicated locally and converted to digital output signals. Preventative maintenance work can therefore be planned easily thanks to integrated service hours and switch operations counters. In a further expansion stage, users can also connect the DMI to a fieldbus system or network.

Quicklink ID:

MS1407

CONCLUSION

Welding controls have to date been an indispensable part of body shell manufacturing. Continuous manufacturing with a high level of system availability requires the use of optimised and proven components. NZM circuit-breakers have proven ability in the safe switching and protection required in welding controls. Thanks to its simple handling, advanced diagnostics functions, standard communication and integrated residual current releases, the switch is ideally suited for use in the global world of automotive production.

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