



ModuCon



SafeEnergy MCC

Safest power distribution system with maximum mechanical design and constructive accidental arc fault protection.

Modu  on

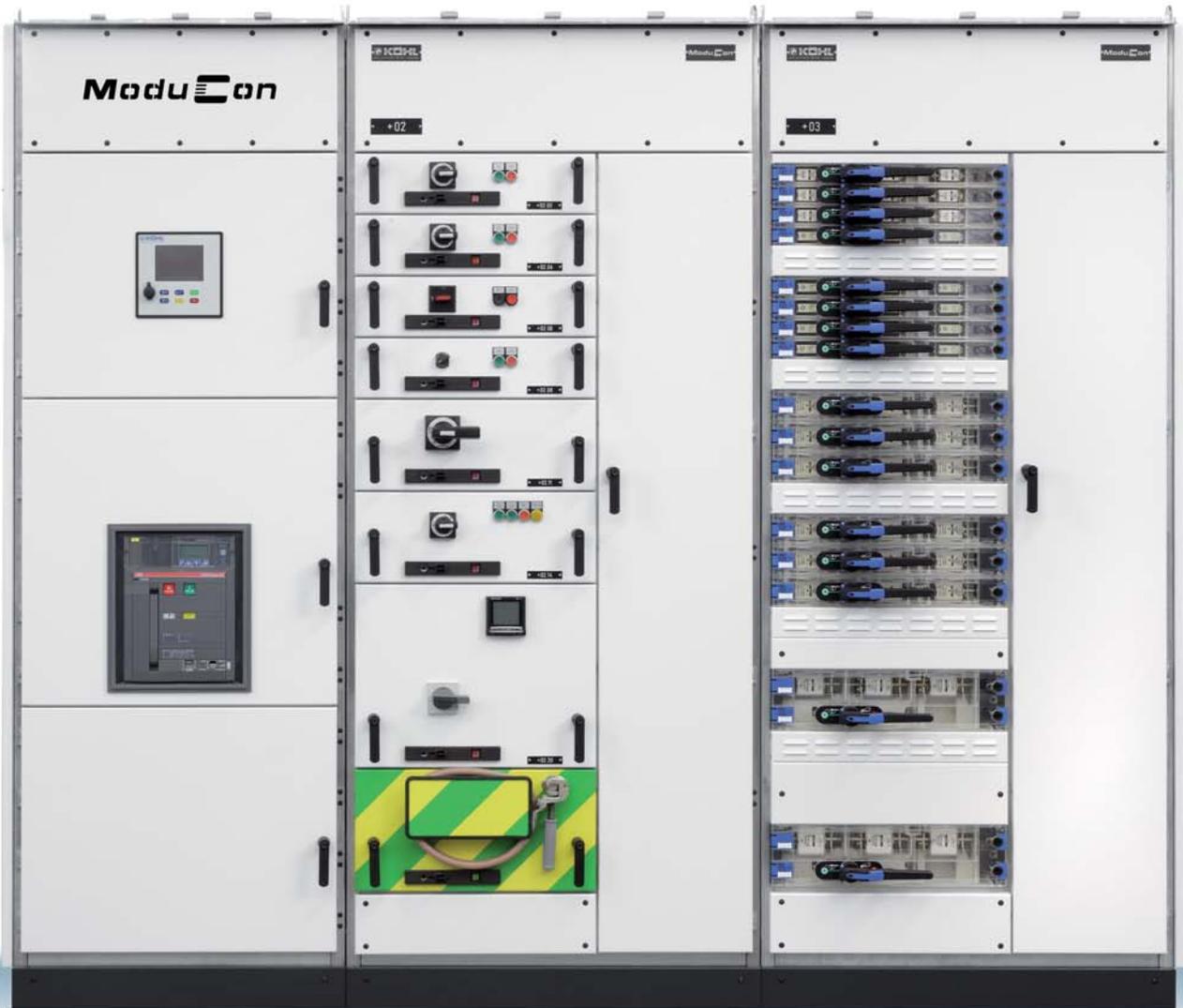
+ T  R

+  art

= Safety 3

ModuCon

The safest power distribution – worldwide!



ModuCon is the only low-voltage switchgear system worldwide which has passed accidental arc testing under strict conditions and with an open cable terminal compartment. The control indicators **in the neighbours function and equipment installation rooms** did not ignite during testing.

ModuCon has been designed to the highest customer standards. Our highest priority was the safety aspect. Our customer DuPont, one of the world's largest chemical corporations and a pioneer when it comes to personal and occupational safety, was involved in the innovative development of the modular safety motor control center from the beginning.

ModuCon is a type-tested switchgear combination with the highest operating and operator safety.

Compared to conventional low-voltage distribution boards, **ModuCon** offers substantial improvements in regards to the safety of people. This results in high-availability for your permanent productivity.

ModuCon

First class energy distribution

SAFE.

- ▶ **ModuCon** has exceeded the highest test requirements according to customers' and the new standard IEC/DIN 61439-2 and IEC/DIN 60439-1 part 2.
- ▶ In the highest safety version, **ModuCon** limits the effects of an accidental arc to the compartment in which it originated. This ensures maximum personal protection.
- ▶ By guiding the accidental arc through special pressure release ducts (with automatically closing pressure relief dampers), **ModuCon** prevents the accidental arc from affecting or jumping over to adjacent functional compartments.
- ▶ **ModuCon** has a withdrawable unit design equipped with a dual-movable contacting system and a special operating key. This excludes any accidents due to human error while inserting the withdrawable unit into the plant.

UPGRADE.

- ▶ **TOR** - the innovative "Thermo Observation via RFID" monitors the load condition of power distribution systems caused by heat stress. It facilitates main-tenance measures and is designed to be retrofitted.
- ▶ **PART** - the new KÖHL arc fault protection system short-circuits the busbar if it is activated by the Multimaster detection and analysis unit. This is achieved by the light sensor technology and shortens the arc life to a few milliseconds.

FLEXIBEL.

- ▶ **ModuCon** offers flexibly equipped functional units and is designed for internal separation up to form 4b. **ModuCon** can be designed completely arc-base free.
- ▶ Thanks to its modular design, **ModuCon** can be equipped according to individual customer demands. The individual sections are available in degrees of protection IP 31-41 and can be combined in any way required.
- ▶ **ModuCon** can be extended to the right and left side and individual sections can be replaced without major cost or effort at any time.

USER-FRIENDLY.

- ▶ **ModuCon** convinces through its operator and operating safety. Inspection work and cleaning can be easily carried out.



> Safe equipment installation room



> Power circuit breaker additionally shield



> Cable terminal compartment with blazing filter



> Cable terminal compartment

SAFETY

- ▶ High personal protection directly in front of the plant and during operations in the cable terminal compartment

TESTING

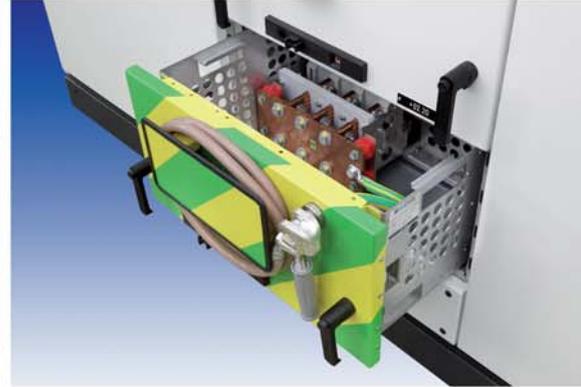
- ▶ Tests (heating, short-circuit, accidental arc ...) performed by independent accredited institutes (IPH-Berlin, AIT-Wien and I²PS-Bonn) have been successfully completed and passed even with substantially increased test requirements.

FUNCTIONAL COMPARTMENTS

- ▶ With the internal separations to up form 4b and with further compartmentalisation mechanisms in the highest possible safety version, the accidental arc is limited to the compartment in which it originates if a fault occurs.



- > Pressure relief dampers
- > Shutter made out of strong fiber glass



- > Earthing withdrawable unit rated current I_{cw} : 35kA/1s bzw. 50kA/150ms



- > Busbar with special W-profile

AVAILABILITY

- ▶ Fast emergency operation thanks to a modular system and an insertion of the arc-tested bridge
- ▶ Shutdown of the outgoing load feeders of a section (in the event of a fault or modification measures) by fast dismantling of the multi-terminal busbar connection. Personal protection continues to exist in this case.
- ▶ Modular design of the withdrawable sections means different withdrawable part sizes can be implemented.
- ▶ Thanks to the favourable constructive and design position of the busbar at the top, switchgear extensions can be quickly added to the left or right.
- ▶ The "main busbar"- package remains as an independent functional unit.

- > Terminal cable compartment
 - Control plug cover screwed from metal
 - Coverage for free metal slots



FUSE BLOCK SECTION

- ▶ Defined assembly specification through unalterable forced ventilation louvered plate adapter

MECHANICAL SYSTEM

- ▶ High stability in the mechanical components
- ▶ Door hinges, withdrawable part fasteners as well as CNC milled components made from specially selected metals
- ▶ Grease-free mechanical function

COMPONENTS

- ▶ Component selection independent from manufacturer
- ▶ Different switchgear manufacturers' are used during tests
- ▶ Type verifications are available in different component configurations

MAINTENANCE

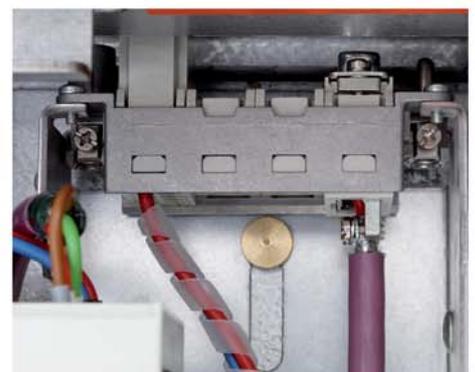
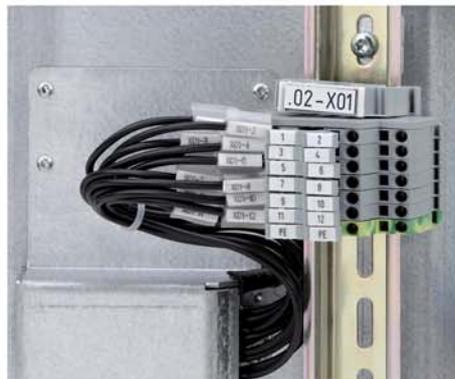
- ▶ Low-maintenance system (recommended maintenance cycles according to BGV A3 DA § 5 Abs. 1 Nr. 2)
- ▶ Visual inspections performed on main busbars, also possible with wall installations since busbars are located at the top of the plant



WITHDRAWABLE PARTS

(identical in construction to **ModuPro** and interchangeable in both systems)

- ▶ User-friendly and smooth to handle
- ▶ Degree of protection maintained even during tests and in disconnected position
- ▶ Solid latch locking with two handles
- ▶ Mechanical coding options
- ▶ Control and main contacts can be moved separately or jointly





UPGRADE YOUR SAFETY: with the new safety systems designed by the specialist for arc fault protection!

TOR

The innovative “Thermo Observation via RFID” monitors and supervises the load condition of the plant caused by heat stress. Furthermore, it facilitates maintenance measures, is designed to be retrofitted and essentially represents the most advanced solution for energy efficiency.

TOR has been successfully developed in cooperation with the Institute Fraunhofer IPMS. Designed as a TAG and equipped with an integrated high-performance chip as well as an appropriate reader and DiPol antenna/aerial **TOR** sends accurate information regarding thermal energy and potential error sources occurring within the plant to the operator. This information can then be conveniently retrieved with the help of the KÖHL App by using a cell phone, for example.



TOR was created in successful cooperation with:

 **Fraunhofer**
IPMS

Part

The new arc protection system **PART** short-circuits the busbar of a low-voltage distribution board if activated by the Multi-master detection and analysis unit. This is achieved by means of light sensor technology when the arc flash is created. Paired with the rapid current increase in the short-circuit case, the two parameters are rounded off and signalled to the short-circuiters.

The ARCON[®] arc fault extinction system or the DEHNshort K short circuiter especially developed by KÖHL shorten the arc life to a few milliseconds and as a result increase personal and plant protection.



An overview of the technology

GENERAL

Standards and requirements

IEC/DIN EN 60439-1:1999+A1:2004

IEC/DIN EN 60439-1:1997, Supplement 2

IEC/DIN EN 60439-1:2009, Supplement 2

IEC/DIN EN 61439-1:2009

IEC/DIN EN 61439-2:2009

Rated operational voltage

U_e 690 V AC

Rated insulation voltage

U_i 1000 V

Rated surge voltage resistance

U_{imp} 8 kV

Degree of contamination

3

Overvoltage category

III

Protection type (in acc. w. IEC/EN 60529)

IP 31/41

Internal subdivision

up to 4b

FAULT ARC TEST

Test voltage

U_p 725 V

Unaffected short circuit

AC I_{cp} 65 kA

Configured test duration

t_i 300 ms

MAIN BUS BAR

Max. rated operating current main bus bar

I_e 2500 A

Max. rated continuous current at 35°C with 24h median

I_u 2500 A

Rated short-term current resistance main bus bar

I_{cw} 80 kA/1s

Rated surge voltage resistance main bus bar

I_{pk} 176 kA

Rated frequency

50 Hz

DISTRIBUTION BAR INSERT FIELD

Rated continuous current at 35°C with 24h median

I_u 1500 A

Rated short-term current resistance

I_{cw} 80 kA/1s

Rated frequency

50 Hz

DISTRIBUTOR BAR FUSE TERMINAL FIELD

Rated continuous current at 35°C with 24h median

I_u 1700 A

Rated short-term current resistance

I_{cw} 80 kA/1s

Rated frequency

50 Hz

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Additional information