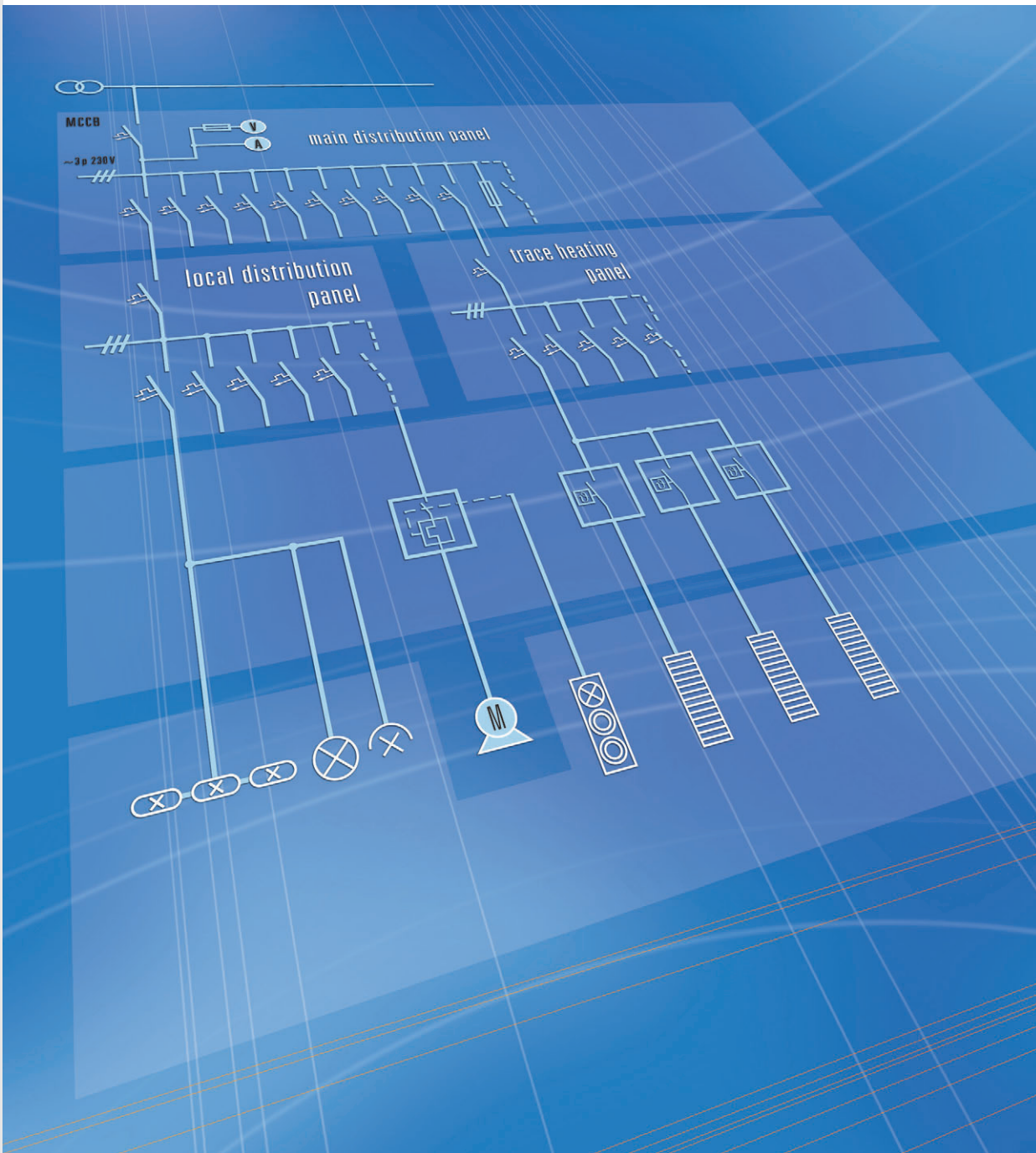


Energy Distribution Panels in Hazardous Areas of Zone 1 and Zone 2



14081E00

Circuit breakers up to 800 A
Load break switch / Main switch
Busbar systems for internal energy distribution
Miniature circuit breakers, residual current circuit breakers wired to terminals
Switched circuits for supplying light and heating circuits with power
Adjusted enclosure systems for all ambient conditions

Energy Distribution

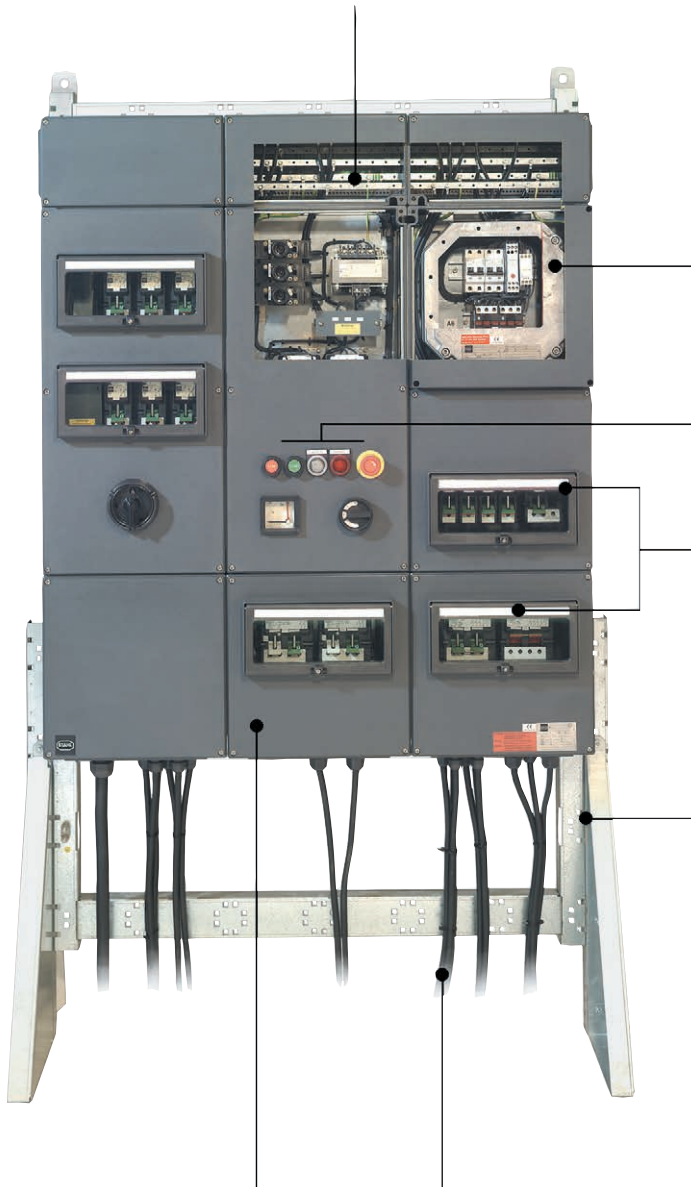
Power Distribution Panels - Selection Table

Gas group	Module technology (Ex e)			Flameproof panels (Ex d)	
	IIC	IIC	IIB	IIB or IIB + H2	IIC
	8146, 8125 enclosure with frame Ex de IIC	GUBox as Module integrated in an Ex e enclosure	8261 as Module Integrated in an Ex e enclosure	8264 CUBEx System with Connection chamber	8220 Sheet steel or stainless steel IIC enclosure
Incoming Assembly					
Terminals	up to 240 mm ² / 690 V				
Isolater / Load disconnect switch	up to 160 A / 690 V AC			up to 630 A / 690 V	up to 800 A / 690 V
Incomming MCCB		up to 125 A / 690 V AC	up to 125 A / 690 V AC	up to 630 A / 690 V	up to 800 A / 690 V
Fuses	up to 63 A / 500 V	up to 125 A / 690 V AC	up to 125 A / 690 V AC		
Ammeter with ct and control switch				up to 630 A / 690 V	up to 800 A / 690 V
Ammeter with ct for each phase				up to 630 A / 690 V	up to 800 A / 690 V
Voltmeter with control switch	up to 690 V AC			up to 690 V AC	up to 690 V AC
Busbar Assembly					
Rated current	160, 200, 400, 630 A				
Rated voltage	up to 690 V AC				
Outgoing Assembly					
MCBs	B, C with 6, 10, 25 kA				
	D with 10 kA				
Maximum nominal current	32 A (40 A)			80 A	
Maximum nominal voltage	440 V			690 V	
Number of poles	1, 1 + N, 2, 3, 3 + N				
RCB (ELCB or ELB)	16, 25 and 40 A			80 A	
Rated leakage current	10, 30, 100, 300 or 500 mA				
Rated voltage	230 V (2 and 4 pole) and 400 V (4 pole)			230 V (2 and 4 pole) and 400 V (4 pole)	
RCBO (MCB / ELCB)	B, C with 6 kA and 10 kA				
Number of poles	1 + N, 2 pole			4 pole up to 32 A	
Rated leakage current	10, 30, 300 mA				
Nominal current	6 ... 32 A			1 pole + N up to 63 A	
MCCB	up to 22.5 A	up to 125 A / 690 V AC	up to 125 A / 690 V AC	160, 250, 400, 630 A / 690 V	up to 800 A / 690 V
Motor starter	up to 11 kW / 400 V AC 15 kW / 690 V AC	up to 45 kW / 400 V AC	up to 30 kW / 400 V AC		
Motor protection circuit breaker					
Operating current	0.1 ... 22.5 A / 690 V AC	up to 125 A / 690 V AC		up to 63 A / 690 V AC	
Rated nominal voltage	up to 690 V AC, 50/60 Hz	up to 690 V AC 50/60 Hz			
Fuses					
Fuses	up to 63 A / 500 V AC	up to 250 A / 690 V AC	125 A / 690 V AC	630 A / 690 V AC	
Air break contactors					
3 pole with auxilliary contacts	up to 11 kW / 400 V AC	up to 45 kW / 690 V AC	100 A AC 1 / 690 V		
	up to 15 kW / 690 V AC		30 kW / 400 V		
Control / Power transformer	100 VA up to 1600 VA			30 kVA	30 kVA
Primary voltage	up to 690 V AC, 50/60 Hz			up to 690 V AC, 50/60 Hz	up to 690 V AC, 50/60 Hz
Secondary voltage	12 ... 690 V			230 / 400 V AC	230 / 400 V AC
Installation Assembly					
Outgoing terminals					
Cable glands	See Series 8163 chapter xx				
Socket outlets					
	16 A extra low voltage, 2 or 3 pole				
	16 A, in 3, 4 or 5 pole				
	32 A, 63 A, 4 or 5 pole			125 A / 3, 4 or 5 pole versions	

1. Energy Distribution Panels

Busbar system

- For distribution of power in large control systems
- 690 V and 160 A maximum



Ex d enclosures

- Enclosures made of cast aluminium
- Installation of commercially available electrical equipment

Control devices

- Switches, indicating lamps
- Control and motor switches
- Ammeters and voltmeters
- Digital indicator module

Operating flaps

- Circuit breakers of series 8562 Ex de are operated from outside
- No opening of the enclosure cover required
- Switching position is displayed
- Padlockable by padlock

Support frame

- Suitable for free-standing and wall mounting
- Available with roof and lighting
- Combinable mounting system
- Adapted to enclosure Series 8146 and 8125

Connection chamber enclosure

- Cable glands
- Cable distribution using terminals

Cable entries

- Cable glands
- Cable entry glands
- Cable sealing ends
- Entry of unarmed and armed cables

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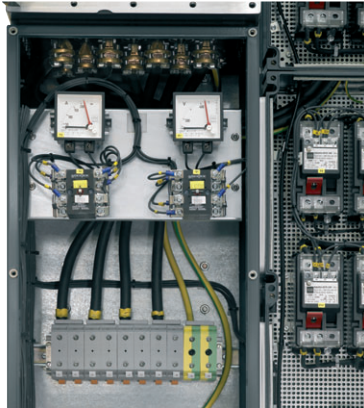
- A typical energy distribution panel can be divided into different functional assemblies. They are distinguished by the following features.

- Input terminals for the connection of conductors to the input leads
- Input assembly, such as fuses, circuit breakers or load break switches
- Internal distribution of the energy with conductor rails or wiring to delta or star conductors
- Outgoing circuits with overcurrent protection or motor starters
- Output terminals for the connection of conductors to the outgoing installation cables
- Cable entries and cable glands for maintaining the type of protection and the required IP degree of protection
- Flange sockets

- These functional assemblies will be presented below and described in the range of services and in the application. The exact technical data of the components used can be found in chapter "E9 Components for system technology". The detailed data sheet can be accessed on the Internet by entering the WebCode.

Energy Distribution

2. Input Terminals



11721E00

Wiring to terminals

For indirect cable entry, the installation cable is connected to terminals outside the flameproof enclosure.

The wiring to the flameproof chamber is established by means of type-approved cables and cable glands.

Thus, the function of the flameproof enclosure does not depend on correct installation or selection of the cable, and functions safely and type-approved.

The cost-saving effect of this technology is produced by simple and quick cable selection and installation.

In addition, maintenance of this indirect cable entry by means of defined individual components is easy to do.

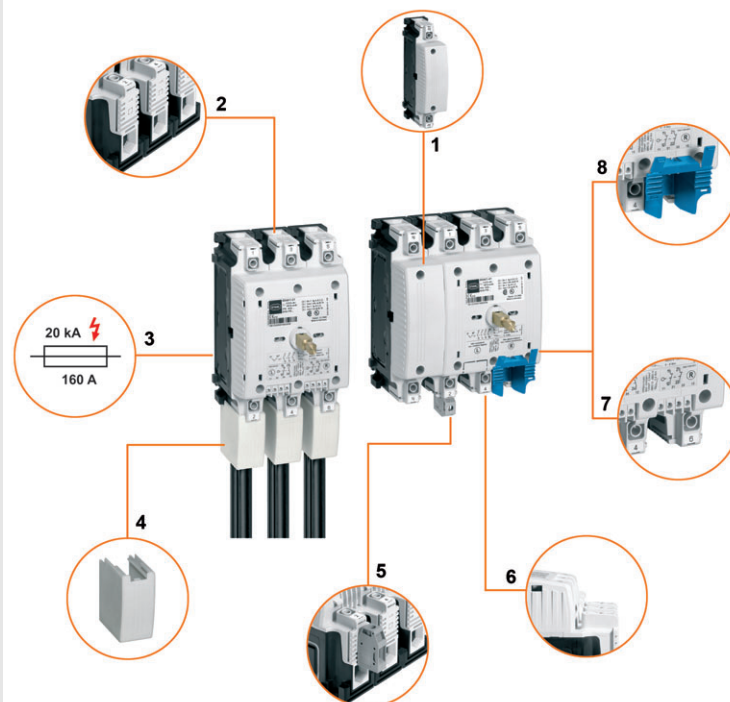
The flameproofness of the cable interior and cable sheath has not been proven by means of a type test.

3. Main Switch / Load Break Switch

Solution of up to 180 A via 8544 and 8549 with terminals or direct wiring to switches

The design of the new flameproof modules integrates Ex e connection terminals (IP20), which can be marked with separate terminal references. This allows the wiring on input terminals to be omitted. This advantage saves a further terminal position.

The cost benefits are the direct result of the compacter design, the saving of connection terminals and the saving of additional input wiring work. The expandability of the switches allows auxiliary contacts to be configured at a later stage.



14092E00

- 1. N/PE terminal
- 2. Connection terminals at the same level
- 3. Short-circuit protection
- 4. IP20 cover of the cable lug connection

- 5. Alligator clip
- 6. Integrated cable duct
- 7. Auxiliary contact
- 8. Ex i isolators

3. Main Switch / Load Break Switch

Solution greater than 180 A with flameproof enclosure on connection terminals of up to 240 mm²



11720E00

Combining "increased safety" enclosure systems with "flameproof enclosure" systems results in additional options for meeting the requirements of energy distribution panels. Thus, it is possible to build load break switches or circuit breakers of up to 800 A into flameproof enclosures.

4. Residual Current Monitoring Relay with Summation Current Transformer

Residual current monitors (RCM) with built-in summation transformers are used for monitoring residual currents. Combining them with circuit breakers or contacts allows the residual current circuits to be switched off upon reaching the switch-off threshold. It is possible to generate a message, which allows errors in the system to be detected at an early stage. The display and switch-off threshold of the units can be freely programmed. This increases system availability, making the system more economical, as an unscheduled switch-off takes place less frequently. In combination with Ex e energy distribution panels, flameproof IIC or IIB enclosures are used. In their standard version, incoming or outgoing circuits of up to 100 A can be easily implemented. The response range of the units ranges from 10 mA to 10 A of residual current.

5. Measuring Equipment / Current Transformers / Current Transformer Changeover Switch / Voltmeter Changeover Switch

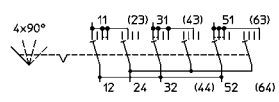


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To measure currents in incoming and outgoing circuits, current transformers are built into flameproof enclosures. The ammeters are built into the Ex e connection chamber or also in flameproof enclosures. When built into flameproof enclosures, the ammeters and voltmeters are mounted behind windows, thus allowing them to be read from outside.

8403

	11	(23)	31	(43)	51	(63)
0°/360°	X	X	X	X	X	X
90°	X	X	X	X	X	X
180°	X	X	X	X	X	X
270°	X	X	X	X	X	X
360°/0°	X	X	X	X	X	X
	12	24	32	(44)	52	(64)



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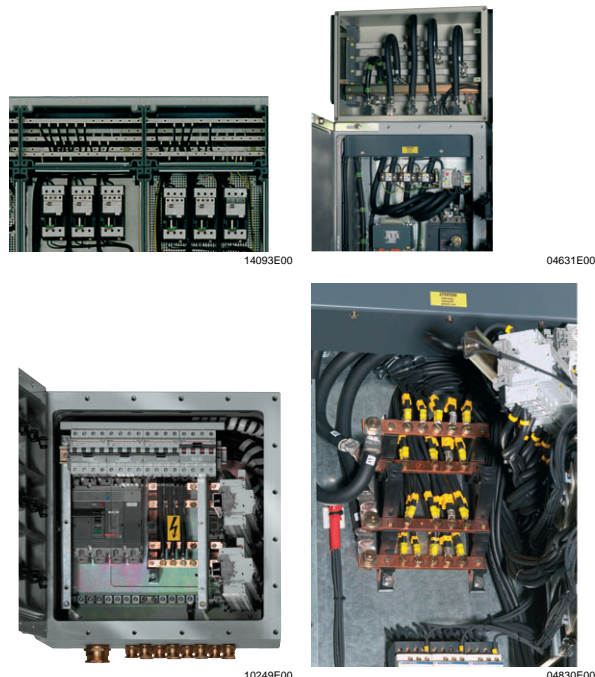
8006 Switching arrangement

Energy Distribution

6. Busbars

Solution as busbar system Series 8188 with 160, 200, 400 and 630 A

The advantage of busbars in Ex e technology is the lower price of the enclosures and the high length of the busbars used. This produces an economical solution, which substantially simplifies the assembly of energy distribution panels in Ex e and Ex d technology.



The component Series 8188 has been approved as current distribution system and can be used in Ex e enclosures in Zone 1. A special feature of explosion protection is the rating of the maximum rated short-circuit current. This also establishes the temperature class under short circuit conditions, in addition to the heating produced by the rated current. The maximum back-up fuse and the resulting rated short-time current are established in connection with the temperature class and specified in the equipment documentation. This ensures that the electrical equipment presents no hazards due to ignition sources in the event of a short circuit.

Solution integrated into CUBEx. If the Ex d technology with direct cable entry is used, the conductor rail can also be integrated into the flameproof enclosure. The enclosure systems have been specifically designed and approved for compact assembly of switchgears. This enables the assembly of the electrical equipment on several levels. Hinged mounting rails or plates can be used, and even the enclosure cover itself can be equipped on the inside with electrical equipment and wired. The advantage of this technology lies in the complete use of the enclosure interior.

7. Outgoing Circuits

Circuit breakers

Miniature circuit breakers



Miniature circuit breakers (MCB)

Rated current and characteristic

The miniature circuit breakers are available with uniform tripping characteristics B, C and D according to IEC/EN 60898, K and Z according to IEC/EN 60947-2.

B characteristic

Rated current range from 0.5 A to 40 A. Thermal response limit 1.13 to 1.45 times the rated current. Magnetic response limit 3 to 5 times the rated current. MCBs with B characteristic are used mainly for line protection in light, socket and control circuits.

C characteristic

Rated current range from 0.5 A to 40 A. Thermal response limit 1.13 to 1.45 times the rated current. Magnetic response limit 5 to 10 times the rated current. MCBs with C characteristic are used as overload and short-circuit protection for protecting equipment from high start-up currents (e.g. motors, lights and transformers).

D characteristic

Rated current range from 0.5 A to 40 A. Thermal response limit 1.05 to 1.2 times the rated current. Magnetic response limit 10 to 20 times the rated current. MCBs with D characteristic are used mainly for line protection for power transformers and other highly inductive loads.

K characteristic

Rated current range from 0.5 A to 40 A. Thermal response limit 1.05 to 1.2 times the rated current. Magnetic response limit 8 to 14 times the rated current. MCBs with K characteristic are used mainly for line protection in motor circuits and for protecting transformers and consumers that have high current peaks.

Z characteristic

Rated current range from 0.5 A to 40 A. Thermal response limit 1.05 to 1.2 times the rated current. Magnetic response limit 2 to 3 times the rated current. MCBs with Z characteristics are used mainly for line protection and protection of semiconductor voltage converters and DC control circuits.

7. Outgoing Circuits

Residual current circuit breakers

Residual current circuit breakers (RCCB)

Residual current circuit breakers protect from dangerous contact voltages, but have no integrated protection from overload and short circuit. They can be used for pulsating direct currents and alternating currents.

Residual current circuit breakers with overcurrent protection



14098E00

Residual current circuit breakers with overcurrent trip (RCBO)

The RCBO circuit breaker is the perfect protection against earth short-circuit, overload and short circuit. The RCBO circuit breaker contains a residual current measuring and tripping device and the switching MCBs containing the proven design features and triggering characteristics. They replace the previously used single components "Residual current circuit breaker" (RCCB) and "Miniature circuit breaker" (MCB), thus reducing assembly expenditure and assembly room.

Reset key for alarm signalling contacts

In the accessories, a reset function for alarm signalling contacts is available for some components (Type "8562/54-2475-160-4" C16 A 10 kA, IDN 0.03 A). The advantage of this function lies in its practical application to energy distribution. When the circuit breaker of a switchgear combination has been tripped, the error is signalled via the alarm signalling contact.

The maintenance personnel can be sent selectively to the faulty circuit. In most cases, the user cannot open live enclosures, in order to investigate the error. The error is documented, and this part of the system does not have to be switched off, if the circuit is not critical. The error message is reset by pressing the Reset key. This reactivates the monitoring function for the remaining circuits.

Fuse



14096E00

Fuse elements

Fuses can be used in Ex e enclosures for protection against overload and short circuit. The fuses cover the rated current range from 0.2 to 25 A (Neozed) and 2 to 63 A (Diazed).

Motor protection circuit breakers



14095E00

Circuit breakers for motor protection

The motor protection circuit breakers (Series 8523/8) are equipped with a non-adjustable fast short-circuit trip and a thermal overcurrent trip adjustable at the switch (rated current from 0.1 to 22.5 A). The switches are suitable for protecting motors of type of protection Ex e and Ex d. The circuit breakers are actuated by an actuator, which also displays the switching position. The circuit breaker meets the criteria from IEC 60079-14 and is equipped, accordingly, with phase failure sensitivity. The trip-free mechanism ensures a safe function of the overload disconnection even when the actuator is held. When using a shortened rotary actuator, the circuit breaker fulfills the isolating characteristics. It can be used main switch or EMERGENCY STOP switch if the rotary actuator was selected accordingly. The trip characteristic of the circuit breaker corresponds to the K characteristic. This makes additional line protection unnecessary.

Energy Distribution

7. Outgoing Circuits

Motor starter



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Advantage obtained by screw fastening

Modules for motor starters

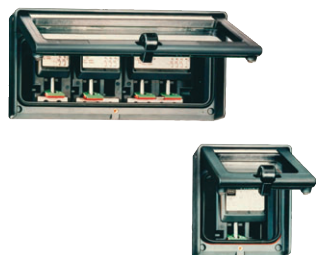
From the series of modules (Series 8510), numerous functions for assembling typical motor starters from contactors, time relays and motor protection relays are available. For motor powers greater than 15 kW, solutions are integrated into flameproof enclosures.

Fastening

In module technology, all circuit breaker units are fastened vibration-resistant by means of screws. Since safety in Ex e technology does not allow any compromises, we consistently use this fastening method.

The components remain safely positioned even when vibrations occur during transport or in the system. This makes the wiring less susceptible to mechanical stress. Their robust design results in lower maintenance costs and higher availability in the system.

8. Circuit Breaker Flap



14097E00

Actuation flap

An actuation flap installed in the enclosure cover allows the circuit breakers to be switched from outside in live condition, without opening the enclosure cover. The position of the circuit breaker is visible from outside. The actuation flap can be locked by means of a padlock.

Accessories and features

All design versions of the MCBs, RCCBs and RCBOs can optionally be equipped with auxiliary switches. A special version is the error signalling contact, which is only switched when tripping due to an error takes place. The switch lever has a 2-colour design and is additionally used as switching position indicator. The circuit breaker can be secured against being switched on again individually by locking it with a padlock. The connection terminals are designed finger- and back-of-hand-proof.

9. Rotary Actuator in the Cover



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14100E00

Manually actuated switchgears are installed by using actuators. Rotary actuators are equipped with locking devices upon request. They couple the circuit breaker, miniature circuit breakers and load break switches directly through the cover or the enclosure wall. Mains connection switches of any size can be coupled to a positive interlocking cover lock.

For the use of flameproof enclosures that require a rotary drive for the circuit breaker units installed in the cover, the connection to the rotary actuator in the cover is established by means of an axle bushing.

10. Terminals

The cable glands are inserted according to the order. Cable entries made of plastic or metal and cable entries according to British Standard can be used. For metal cable entries, a brass plate is mounted additionally for earthing. For large cable cross-sections, cable entry plates with rubber grommets are available. Metal cable glands are connected to the earthing system via metal plates.

11. Flange Socket / Energy Distributor



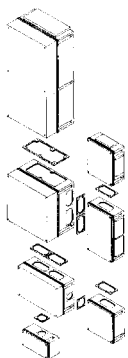
Flange socket

For installation in the enclosure wall, a flange socket can be used. This makes it possible to install switch sockets directly in connection with the protection components of a switchgear combination.

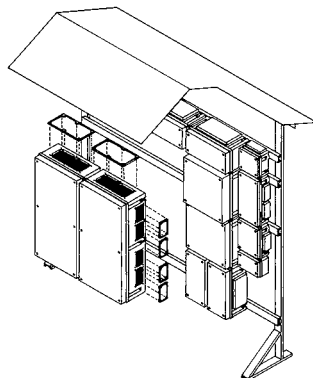
12. Enclosure Systems

Ex e enclosure systems 8146 and 8125

The enclosures of Series 8146 (polyester resin) and 8125 (galvanised sheet steel, stainless steel) are designed in the type of protection "Increased safety" Ex e. All built-in components are designed explosion-protected in the types of protection "Flameproof enclosure" Ex d or "Increased safety" Ex e. The modular system of both enclosure series allows any combination of these components within their series. The explosion protection of the combination is ensured by installing a sealing frame between the enclosures.



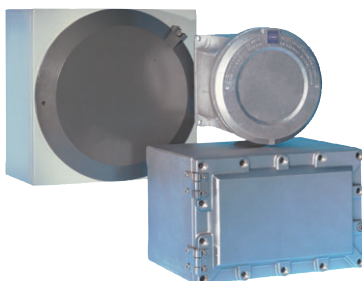
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Ex d enclosure systems

The CUBEx enclosures (Series 8264 made of aluminium or stainless steel), Series 8261 (made of aluminium), GUBox enclosures (Series 8265 made of aluminium) and sheet steel enclosures (Series 8225) are used for the installation of industrial switchgears. Combining them with the corresponding Ex e enclosures can be easily done via matching dimensions in the modular system.

The Ex d enclosure technology allows single enclosure solutions and enclosure combinations in pure Ex d technology or in connection with Ex e technology to be achieved. Typical dimensions for use in energy distribution panels are up to 730 mm x 730 mm x 560 mm.

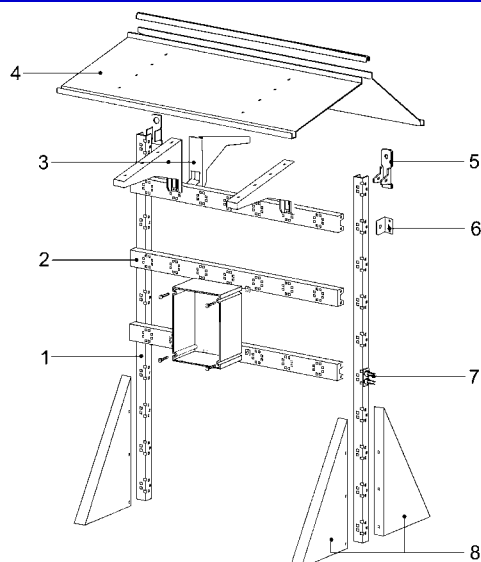
13. Installation Outdoors

Protective roof

When the enclosures are installed outdoors, a sun protection roof is recommended. These protection roofs are fastened to the frame system.

Energy Distribution

14. Frame Systems



02472E00

- 1 Support
- 2 Carrier
- 3 Bracket
 - To secure roof
 - Can be used to attach C-LUX lights (see Catalogue Part E2)
- 4 Roof
 - To protect control unit from environmental effects
- 5 Fishplate
 - Shipping brace
 - Wall mounting (can be mounted at top and bottom)
- 6 Mounting bracket
 - Wall mounting (lateral mounting)
- 7 Earth connection
- 8 Retaining bracket
 - Free-standing
 - Can be fixed to the floor

15. Breathing Glands

Breathing gland

In the event of widely varying ambient temperatures or during extreme ambient conditions, the formation of condensates is reliably prevented by a breathing gland. The breathing gland ensures pressure equilibration between the environment and the enclosure interior. If the breathing gland is attached to the bottom of the enclosure, any water formed is reliably drained.

Enclosure heater

Anti-condensation heater

In the event of widely varying ambient temperatures accompanied by high humidity, the installation of an enclosure heater prevents the formation of condensates.

Minimum temperature

The thermal trips of typical protection devices in energy distribution panels have a temperature-dependent behaviour. At low temperatures, the tolerances of the trip characteristics are exceeded. If the ambient temperature is too low, the enclosure heater can be used to ensure safe operation of the electric equipment.

16. Energy Distribution Panel for Use at Low Temperatures



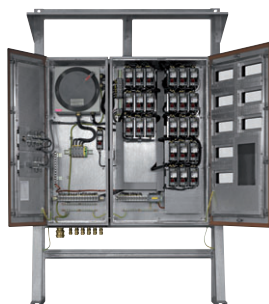
14122E00



14123E00



12000E00



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Equipment

- distribution panels for heat tracing and lighting:
 - incomer 400 V/230 V, current 50 A to max. 2 x 225 A, 4 pole MCCB's with motor drive
 - short circuit current capability 20 kA
 - feeder cables up to 240 mm²
- accessories as cable glands for armoured cables

Special features

- window flaps included at the doors of the Ex e main housings
- free standing mounting racks with canopy
- each panel with space heater and thermostat
- special sealing at the doors for low temperatures

We reserve the right to make alterations to the technical data, dimensions, weights, designs and products available without notice. The illustrations cannot be considered binding.