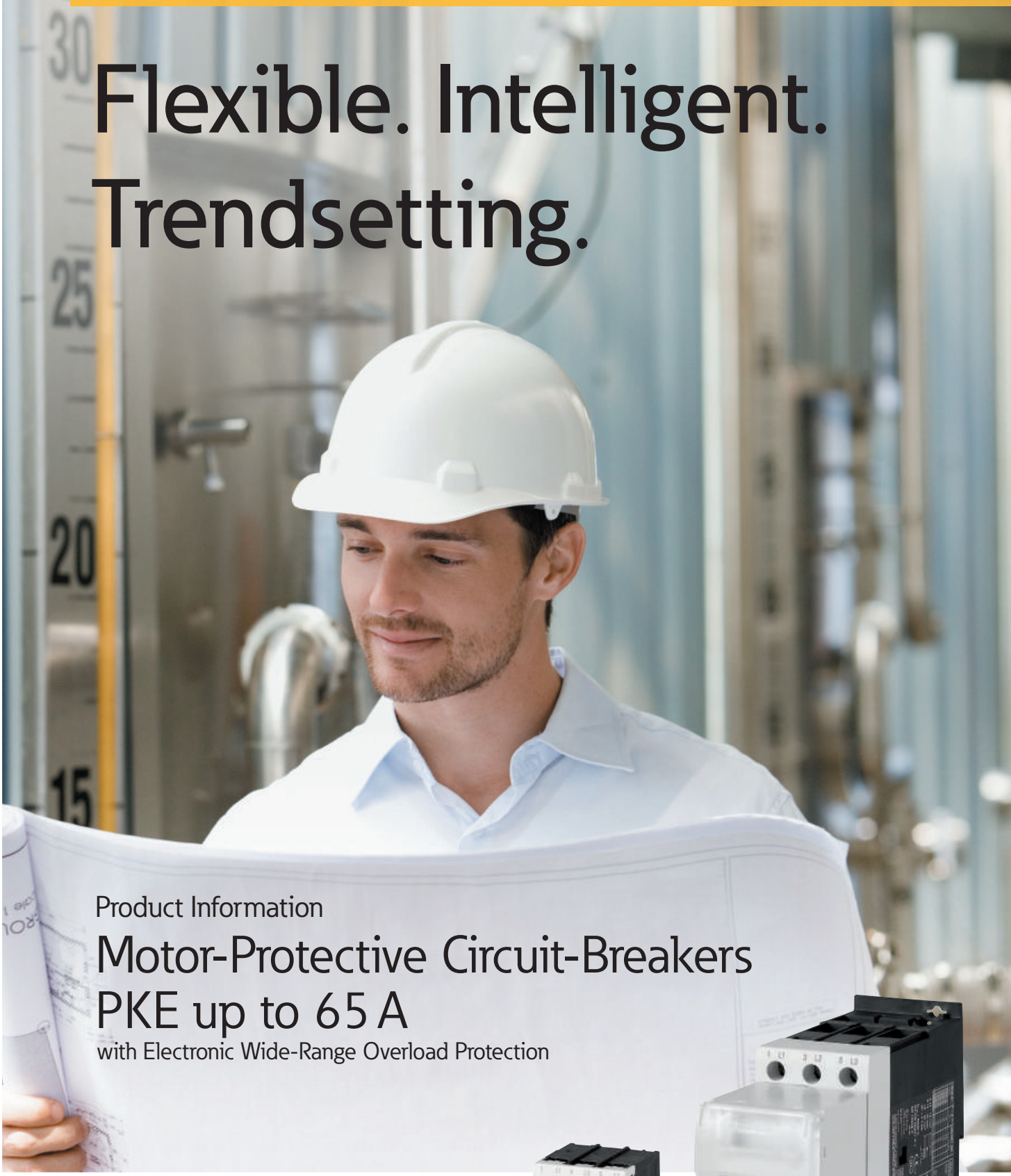
Motor-Protective Circuit-Breaker **PKE**
Moeller® series

Flexible. Intelligent. Trendsetting.



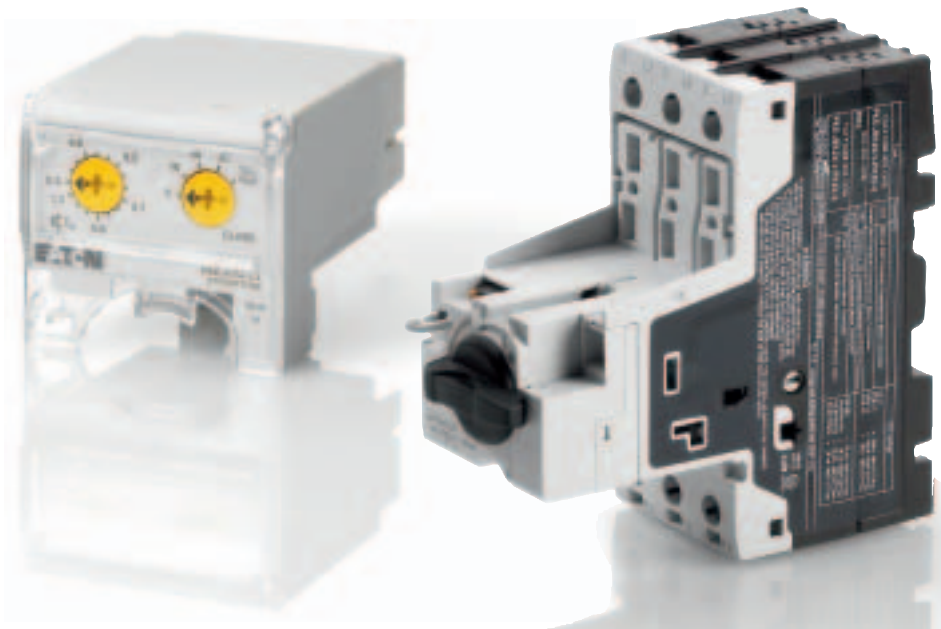
Product Information

Motor-Protective Circuit-Breakers PKE up to 65 A

with Electronic Wide-Range Overload Protection



EATON
Powering Business Worldwide



Obliged by Tradition

Moeller continues the development of the motor-protective circuit-breaker with the PKE. Moeller had already developed the motor-protective circuit-breaker PKZ in 1932. Our ideas and developments in the development center in Bonn have decisively influenced the trends in the protection of motors since then. The results are progressive concepts and marketable product innovations that again and again assume the role of international trendsetting, pioneering products.

It was Moeller who pioneered the integration of overload protection and short-circuit protection into a compact device thus abolishing the usual separation between both protective functions as used up to then.
The awareness of this long tradition in the motor protection field has helped establish and maintain a core competence, which has been continued through to today by Eaton. The term PKZ is not just the embodiment of quality, but also the generally used synonym by experts for motor-protective circuit-breakers.









Motor-Protective Circuit-Breaker PKE – Switch and Protect Motors up to 65 A with Electronic Wide-Range Overload Protection



Modular design. Highest level of flexibility. Highest level of performance.

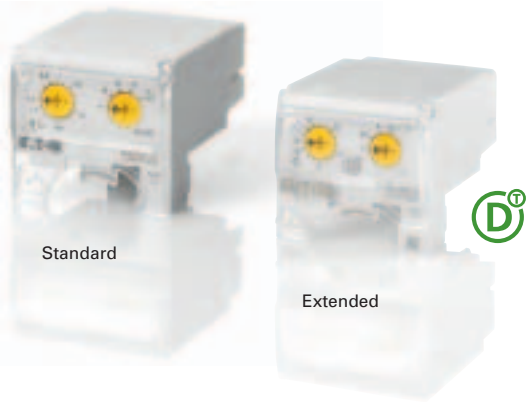
The functional safety and the service life of a motor depends mainly on the motor protection. Motor-protective circuit-breakers PKE with electronic wide-range overload protection offer an interesting alternative to the bimetal solutions here and complement the intelligent PKZ series from Eaton.

They provide the highest level of flexibility featuring a compact and modular design with its plug-in control unit. Control units are also available for system protection applications.

The PKE can be re-equipped in a single step for motor and system protection with various plug-in control units.

3 base units + 5 control units = current range up to 65 A





12 A (45 mm)
PKE 12



0.3 A — 12 A
0.09 - 5.5 kW (400 V)

32 A (45 mm)
PKE 32



1 A — 32 A
0.37 - 15 kW (400 V)

65 A (55 mm)
PKE 65



8 A — 65 A
4 - 30 kW (400 V)

5 plug-in control units up to 65 A in 2 versions.

0.3 A — 1.2 A
1 A — 4 A
3 A — 12 A
8 A — 32 A
16 A — 65 A

Motor-protective circuit-breaker PKE: The benefits at a glance

Efficient: Wide current setting ranges
→ Reduces the number of variants minimizing the engineering work and costs accordingly.

Flexible: Plug-in trip blocks up to 65 A
→ Improves the service-friendliness - short conversion times, fast commissioning

Simple: 100 kA at 400 V
→ Simplify engineering

Compatible: Integrated into the modular system xStart
→ Facilitates enhanced flexibility through the use of standard components

Intelligent: Interface to SmartWire-DT
→ Increases the levels of system availability by the transfer of process-relevant data
→ Saves time-consuming troubleshooting during commissioning and maintenance

Compact: Motor starter design from standard components
→ Provides safety with 2 independent separate contact systems in the motor starter

Systematic Solutions











The motor-protective circuit-breaker PKE has versatile, approved accessories available from the xStart range for safe and rational control panel construction.

Modular standard components optimally matched to one another and simple to combine fulfil the customer requirements for exchangeable "standard" devices.



System advantages at a glance:

Expandable: Flexible solutions for divergent demands
→ Uses the existing system accessories from the system xStart

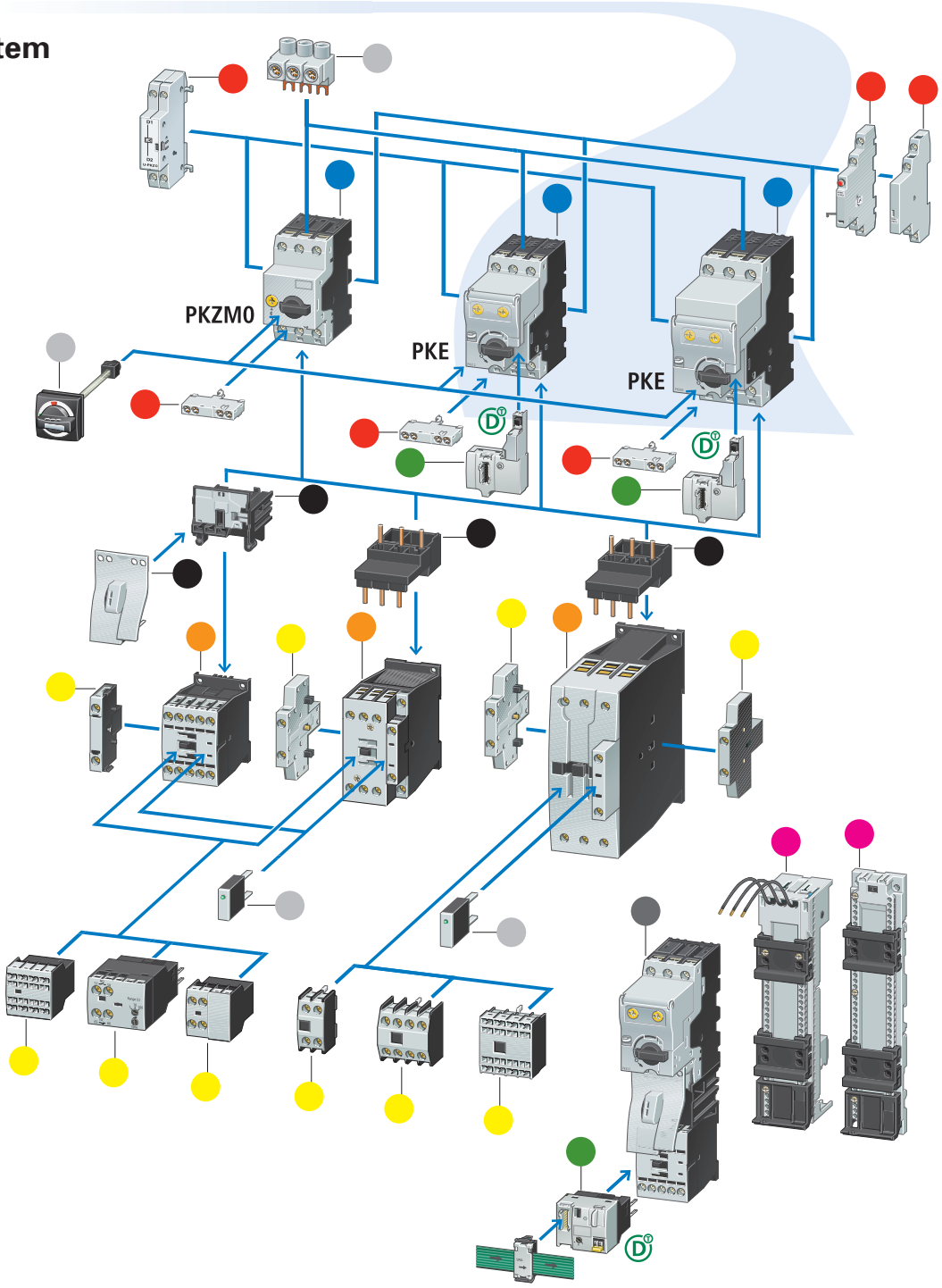
Modular (plug-in): Fast and cost-effective mounting and wiring
→ Configuration of motor-starter combinations up to 15A with plug-in main current wiring

International: No problems with export of machines and systems
→ Worldwide approved system components and accessories

Whether on or off, overload or short-circuit: The differential signalling always leads quickly to the cause of the trip release. The auxiliary contacts can be installed without tools and inform with control circuit reliability about every switching state.

Particularly comfortable, the optional auxiliary contact NHI-E, which can be installed at a later date in circuit-breakers that are already installed and wired.
Of course all auxiliary contacts and releases are devices for world markets with the conventional mains voltages.

PKE in System



The modular xStart system

Modular standard components for motor starter configuration, optimally matched to one another and simple to combine with the same accessories from the PKZ system, fulfil the customer requirements for exchangeable “standard” devices.

- Base units PKE/PKZ
- Auxiliary contacts and trip releases PKE/PKZ
- Connection technology for motor starter configuration PKE/PKZ
- Contactors DIL
- Auxiliary contacts DIL
- Top-hat rail adapter and busbar adapter
- Communication module SmartWire-DT
- Accessories
- Motor starter MSC



Perfect Start



One of the main tasks of low-voltage switchgear is to switch and protect motors. This is specifically the task of the motor starter, which is available from Eaton in different versions for diverse applications.
The short-circuit safely under control. Whether coordination type “1” or coordination type “2”. Motor starter combinations PKE with the proven circuit-breakers DILM master short-circuit currents of 100 kA /400V up to 32A and 50 kA at 400V /65A. They ensure the highest level of operational continuity. Standstill times are reduced to a minimum.

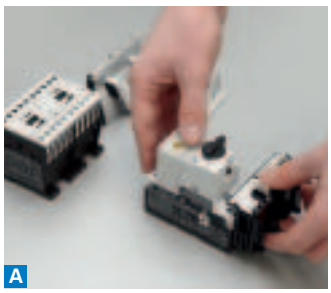




* In order to comply with the requirement profile for coordination type “2, the motor starter must be suitable for renewed operation after a shut-down due to a short-circuit without a need to replace parts. Motor starters of this type ensure the highest level of operational continuity.

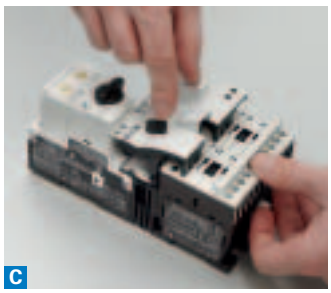
A reversing starter can be configured in just a few simple steps from a contactor DIL, a motor-protective circuit-breaker PKE and a wiring set.

A Snap-in mechanical plug-in connector.





B Push on the contactor.



C Plug on the electrical connectors and jumpers. Ready to go!

Lean solution: Motor starters from standard components

Up to 15 A, comfortable motor starters utilizing tool-less plug connection are on offer, requiring only a top-hat rail. A connector for direct-on-line and reversing starters is available for motor starters with rated motor current from 17 A to 65 A. Whether as a completed motor-starter combination MSC or assembled from individual components by the user, you are always on the safe side with tested motor-starters from Eaton. Motor starters with PKE and DILM up to 65 A are available in 3 narrow widths. Contactor DILM and circuit-breaker PKE always have the same compact width. No precious millimetre of control panel space is wasted.

→ Motor starter configuration from standard components enables a unique assignment of the protective devices PKE and switching device DIL M and enhances the safety with 2 independent separate contact systems in the motor starter.

→ Modular configuration principle facilitates the fast and cost-effective exchange of worn components instead of the complete motor starter.

Motor and System Protection



PKE as a circuit-breaker to IEC 60947-2

In addition to use as a motor-protective circuit-breaker, the PKE can also be used as a circuit-breaker to IEC/EN 60947-2.

With the corresponding trip blocks of type PKE-XTUCP-…, the PKE can also be used for protecting cables and wiring up to rated currents of 65 A. In contrast to motor protection, when a PKE is used as a circuit-breaker, an unsymmetrical loading due to different loads is possible. The additional adjustability of the electronic short-circuit release facilitates reliable protection with various cable lengths and cable cross-sections.

The advantages at a glance

Versatile: Flexible protection

→ Use as a circuit-breaker or motor-protective circuit-breaker using various trip blocks

Adaptable: For heavy starting duty also

→ Adjustable short-circuit releases, time-lag class settings for individual contactor characteristics

Robust: Safe shut-down

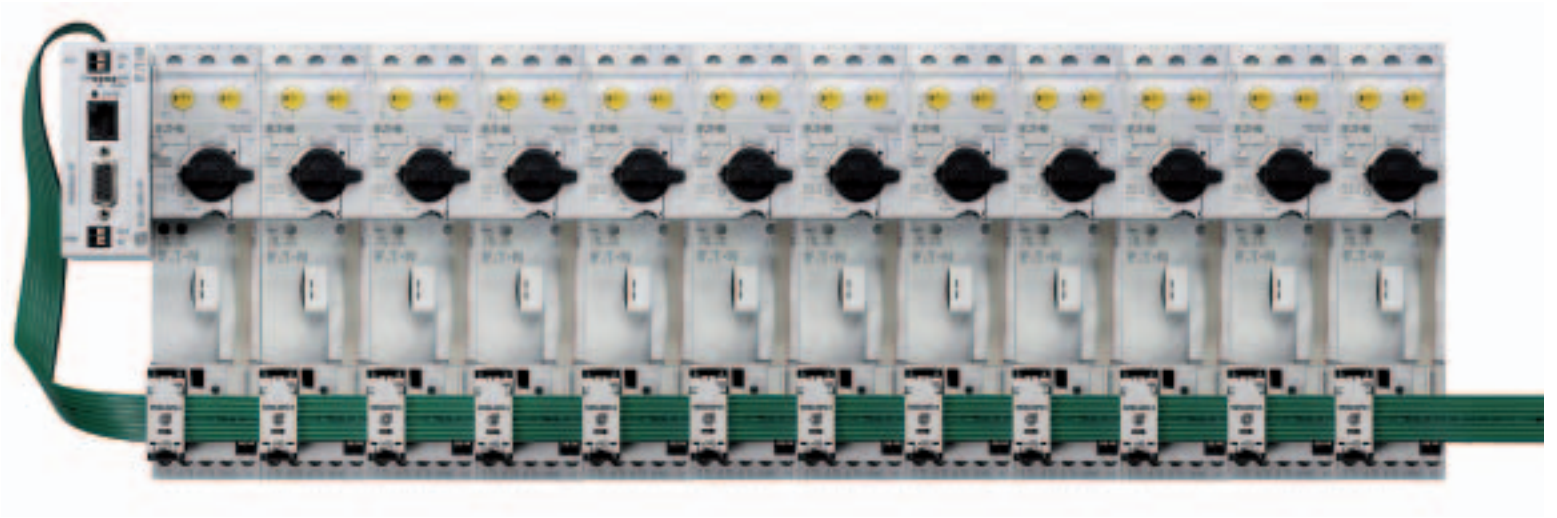
→ High short-circuit breaking capacity 100kA/400V

Economic: Guarantee availability

→ Fast exchange of individual components through the modular system concept

Safe: Even after long periods of operation

→ Configuration of motor-starter combinations with two separate contact systems



Everything at a Glance

SmartWire-DT is the innovative and intelligent connection technology for the control panel. Without control wiring, without distributed I/O level, without laborious addressing via DIP switch. Simply connect and work.

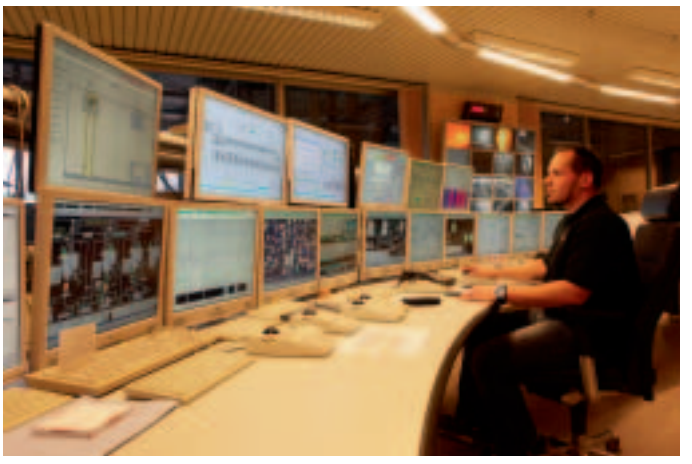
SmartWire-DT is continued in the peripherals directly on the machine and transforms standard switchgear to intelligent and communicative automation devices. RMQ-Titan control circuit devices are also connected with just a single cable.

SmartWire-DT is the optimum extension to the motor starter combinations PKE.
It offers all the necessary information without complex wiring.



Innovative exhaust air system in the chemistry department

The exhaust air system in the buildings of the chemistry department of a major German university was re-conceived using SmartWire-DT, motor starters PKE and Eaton Touch Display controls. Around 500 Eaton PKE motor starters with a SmartWire-DT interface were used to control the exhaust air system. Compared to conventional HVAC building solutions, the new solution is based on high-performance standard components and offers verifiable cost savings using standard components, reduced wiring requirement, simple commissioning without complex troubleshooting. The data transparency significantly increases the efficiency and operational reliability of the system.



Data transparency for every motor

SmartWire-DT with PKE controls the conveyor system for transporting cement clinker at Holcim (Deutschland) AG. The data provided enables increased transparency in manufacturing processes to the early detection of critical states or failures right through to preventative maintenance management.



Universal networking

The plug-in networking solution PKE-SWD-SP enables integration of the motor-protective circuit-breaker PKE into the system SmartWire-DT. In an instant, a motor-protective circuit-breaker is created with communication capability that signals both simple status data as well as the switching state, trip causes and switch settings as well as analog information such as the actual current value and thermal motor image. This provides a better insight into the system and optimization of processes and facilitates prevention of process failures. The combination of the function element PKE-SWD-SP can be undertaken with the PKE base units. This results in a universal networking solution for the current range from 0.3 A to 65 A.



Networked PKE motor-starter combination up to 32 A

The function element PKE-SWD-32 enables the integration of PKE motor starter combinations up to 32 A into the system SmartWire-DT. The function element is plugged directly onto the contactor of the motor-starter combination and connected via an additional connection to the PKE motor-protective circuit-breaker. The integrated interface to the contactor coil enables the control of the motor-starter combination and reports its state. The control wiring required up to now as well as the respective digital input/output level of the PLC are no longer required. The measuring and state data of the circuit-breaker and the motor to be monitored are transferred via the connection to the PKE motor-protective circuit-breaker. With the assistance of the resulting data transparency, far-reaching possibilities exist for optimization of the manufacturing process.

Information at your fingertips thanks to SmartWire-DT

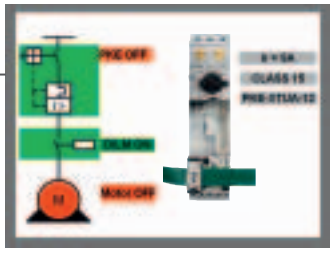
Through the integration of the the motor-protective circuit-breaker PKE to SmartWire-DT, all switching states and status messages, which were only accessible using additional equipment up to this point, are transferred to the control. This reduces the wiring effort of the motor connector and simultaneously provides enhanced transparency. The additional transfer of process data such as the actual motor current and thermal motor loading indicate potential process failures in advance. This improves the service-friendliness and availability of the system.

The advantages at a glance

- → Recording of switching states without the use of auxiliary contacts
- → Integrated current measurement and transfer without the use of additional measurement sensors and evelauation electronics
- → Facilitates avoidance of process failures with motor overloads
- → Monitoring of switch settings enables preventative motor protection
- → Refined tripping indication simplifies troubleshooting
- → Substitution of the control wiring and the digital I/O level by the SmartWire-DT concept

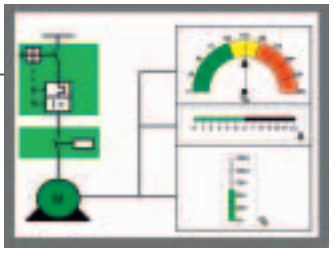
Status

– Switch position PKE, contactor
– Set rated current
– Set time-lag class



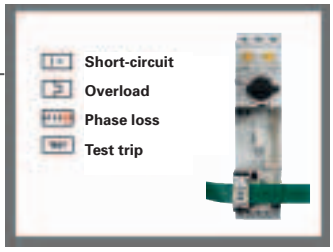
Current / capacity utilization

– Relative motor current value
– Thermal motor loading



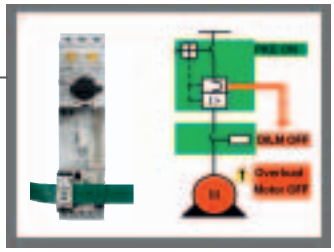
Diagnostics

– Overcurrent (short-circuit), phase loss, overload, test



Additional functions

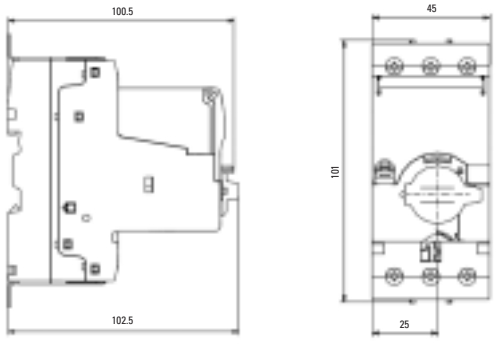
– Overload relay function (contactor is switched off at overload)
– Manual / automatic operation via rotary switch



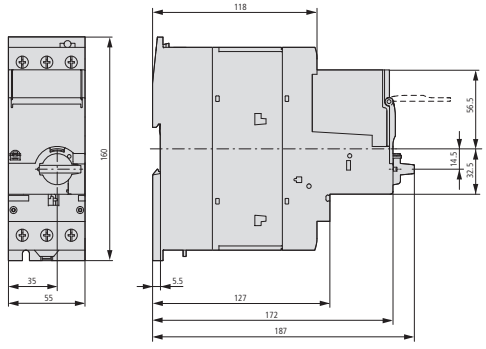
		Motor-protective circuit-breakers PKE 12 and PKE 32	Motor-protective circuit-breaker
General			
Standards and regulations		IEC/EN 60947-4-1, VDE0660 UL 508, CSA C22.2 No.14	IEC/EN 60947-4-1, VDE0660 UL 508, CSA C22.2 No.14 in test
Climatic proofing		Damp heat, constant, to IEC 60068-2-78 Damp heat, cyclic, to IEC 60068-2-30	Damp heat, constant, to IEC 60068-2-78 Damp heat, cyclic, to IEC 60068-2-30
Ambient temperature	Storage	-25…80°C	-25…80°C
	Open	-25…55°C	-25…55°C
	Enclosed	-25…40°C	-25…40°C
Direction of incoming supply		any	any
Degree of protection	Device	IP20	IP20
	Terminals	IP00	IP00
Touch protection to EN50274		Finger- and back-of-hand-proof	Finger- and back-of-hand-proof
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27		25g	10 g on top-hat rail 15 g on mounting plate
Altitude		max. 2000m	max. 2000m
Screw terminal conductor cross-section	Solid	1 x (1–6) mm² 1 x (1–6) mm²	1 x (0.75–16) mm² 1 x (0.75–16) mm²
	Stranded with ferrule to DIN 46228	1 x (1–6) mm² 1 x (1–6) mm²	1 x (0.75–35) mm² 1 x (0.75–35) mm²
	Solid or stranded	18–10 AWG	14–2 AWG
Main conductor		1.7 Nm	3.3 Nm
Auxiliary conductor		1 Nm	1 Nm
Main circuit			
Rated impulse withstand voltage	U_{imp}	6000 V AC	6000 V AC
Overvoltage category / pollution degree		III/3	III/3
Rated operational voltage	U_e	690V	690V
Rated uninterrupted current = rated output current	$I_u = I_e$	32A or setting value of the overcurrent release	65A or setting value of the overcurrent release
Rated frequency		40–60 Hz	40–60 Hz
Current heating losses (3-pole at operating temperature)		6W	11W
Lifespan, mechanical	Operations	0.05 x 10	0.05 x 10
Lifespan, electrical (AC-3 at 400 V)	Operations	0.05 x 10	0.05 x 10
Maximum operating frequency	Operations/h	60 ops./h	60 ops./h
Motor switching capacity AC	AC-3 up to 690 V	32	65
Trip release			
Temperature compensation			
to IEC/EN 60947, VDE 0660		-25…55 °C	-25…55 °C
Operating range		-25…55 °C	-25…55 °C
Temperature compensation residual error for T > 40°C		-	-
Overload release setting range		0.25–1	0.25–1
Short-circuit release tolerance		+ 20%	+ 20%
Single-phasing sensitivity		IEC/EN 60947-4-1, VDE 0660 part 102	IEC/EN 60947-4-1, VDE 0660 part 102

Motor-Protective Circuit-Breakers

	Setting range Overload release I_r A	Base unit Part no. Article no.	Control option Standard Part no. Article no.	Control option Advanced Part no. Article no.	Motor-protective circuit-breakers Standard Complete devices Part no. Article no.
Motor-protective circuit-breaker PKE, Coordination type "1" and "2"					
	0.3...1.2 A	**PKE12** 121721	**PKE-XTU-1,2** 121723	**PKE-XTUA-1,2** 121727	**PKE12/XTU-1,2** 121731
	1...4 A	**PKE12** 121721	**PKE-XTU-4** 121724	**PKE-XTUA-4** 121728	**PKE12/XTU-4** 121732
	3...12 A	**PKE12** 121721	**PKE-XTU-12** 121725	**PKE-XTUA-12** 121729	**PKE12/XTU-12** 121733
	8...32 A	**PKE32** 121722	**PKE-XTU-32** 121726	**PKE-XTUA-32** 121730	**PKE32/XTU-32** 121734
	8...32 A	**PKE65** 138258	**PKE-XTUW-32** 138261	**PKE-XTUWA-32** 138262	**PKE32/XTUW-32** 138517
	16...65 A	**PKE65** 138258	**PKE-XTU-65** 138259	**PKE-XTUA-65** 138260	**PKE65/XTU-65** 138516
Motor-protective circuit-breaker PKE with lockable handle					
	0.3...1.2 A	**PKE12/AK** 158241	**PKE-XTU-1,2** 121723	**PKE-XTUA-1,2** 121727	**PKE12/AK/XTU-1,2** 158242
	1...4 A	**PKE12/AK** 158241	**PKE-XTU-4** 121724	**PKE-XTUA-4** 121728	**PKE12/AK/XTU-4** 158244
	3...12 A	**PKE12/AK** 158241	**PKE-XTU-12** 121725	**PKE-XTUA-12** 121729	**PKE12/AK/XTU-12** 158243
	8...32 A	**PKE32/AK** 158245	**PKE-XTU-32** 121726	**PKE-XTUA-32** 121730	**PKE32/AK/XTU-32** 158246
	8...32 A	**PKE65/AK** 158247	**PKE-XTUW-32** 138261	**PKE-XTUWA-32** 138262	**PKE32/AK/XTUW-32** 158249
	16...65 A	**PKE65/AK** 158247	**PKE-XTU-65** 138259	**PKE-XTUA-65** 138260	**PKE65/AK/XTU-65** 158248
Motor-protective circuit-breaker PKE for cable and line protection					
	15...36 A	**PKE32** 121722	**PKE-XTUCP-36** 153164	–	–
	30...65 A	**PKE65** 138258	**PKE-XTUCP-65** in preparation	–	–



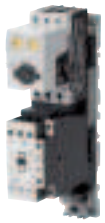
Motor-protective circuit-breaker PKE12/32
with trip block PKE-XTU …

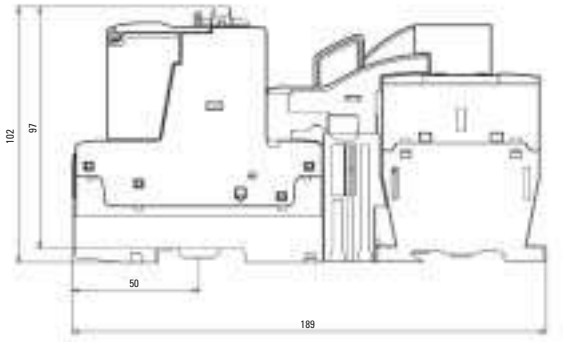


Motor-protective circuit-breaker PKE65
with trip block PKE-XTU …

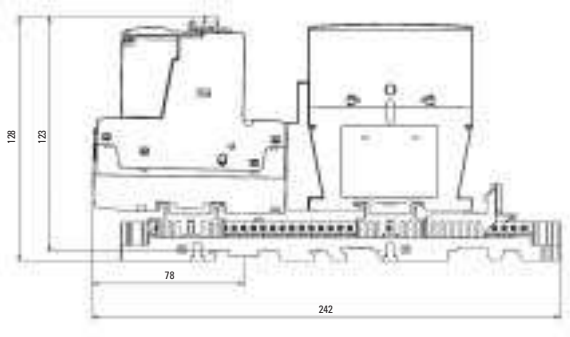
SmartWire-DT communication circuit for PKE12/32/65		Part no. Article no.:
	Function element for PKE	**PKE-SWD-SP** 150614

Motor Starters

	Motor data Rated short-circuit current		Setting range Overload release	Motor starter Actuating voltage 230 V 50 Hz		Motor starter Actuating voltage 24 DC	
	380–415 V Coordination type "1" I_q kA	380–415 V Coordination type "2" I_q kA	I_r A	Part no.	Article no.	Part no.	Article no.
Complete device MSC-DE							
	100	–	0.3–1.2	**MSC-DE-1,2-M7(230V50HZ)**	121735	**MSC-DE-1,2-M7(24VDC)**	121736
	100	–	1–4	**MSC-DE-4-M7(230V50HZ)**	121737	**MSC-DE-4-M7(24VDC)**	121738
	100	–	3–12	**MSC-DE-4-M7(230V50HZ)**	121739	**MSC-DE-12-M7(24VDC)**	121740
	100	–	3–12	**MSC-DE-4-M7(230V50HZ)**	121741	**MSC-DE-12-M7(24VDC)**	121742
	100	–	3–12	**MSC-DE-4-M7(230V50HZ)**	121743	**MSC-DE-12-M7(24VDC)**	121744
	100	100	3–12	**MSC-DE-12-M17(230V50HZ)**	121745	**MSC-DE-12-M17(24VDC)**	121746
	100	100	8–32	**MSC-DE-32-M17(230V50HZ)**	121747	**MSC-DE-32-M17(24VDC)**	121748
	100	100	8–32	**MSC-DE-32-M25(230V50HZ)**	121749	**MSC-DE-32-M25(24VDC)**	121750
	100	100	8-32	**MSC-DE-32-M32(230V50HZ)**	121751	**MSC-DE-32-M32(24VDC)**	121752
Complete device MSD-DEA							
	100	–	0.3–1.2	–	–	**MSC-DEA-1,2-M7(24VDC)**	121753
	100	–	1–4	–	–	**MSC-DEA-4-M7(24VDC)**	121754
	100	–	3–12	–	–	**MSC-DEA-12-M7(24VDC)**	121755
	100	–	3–12	–	–	**MSC-DEA-12-M7(24VDC)**	121756
	100	–	3–12	–	–	**MSC-DEA-12-M7(24VDC)**	121757
	100	100	3–12	–	–	**MSC-DEA-12-M17(24VDC)**	121758
	100	100	8-32	–	–	**MSC-DEA-32-M17(24VDC)**	121759
	100	100	8-32	–	–	**MSC-DEA-32-M25(24VDC)**	121760
	100	100	8-32	–	–	**MSC-DEA-32-M32(24VDC)**	121761



Motor starter MSC-DE ... -M7 to MSC-DE...-M12

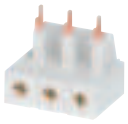


Motor starter MSC-DE ... -M17 to MSC-DE...-M32

SmartWire-DT communication circuit for PKE12/32, MSC-DEA		Part no. Article no.:
	Function element MSC-DEA	**PKE-SWD-32** 126895

Accessories

Incoming terminal

			Part no. Article no.:
	For PKE32 use and rated currents exceeding 32 A	For three-phase commoning link protected against accidental contact U_e = 690 V, I_u = 63 A For conductor cross-sections: 2.5–25 mm² stranded 2.5–16 mm² flexible with ferrules For use on terminals 2, 4, 6	**BK25/3-PKZ0-U** 292886

Fixing bracket

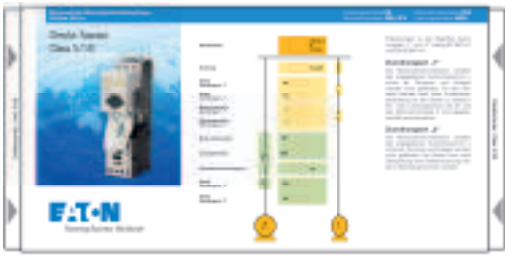
			Part no. Article no.:
	For screw fixing to mounting plate		**PKE32-XMB** 134837

Door coupling handle

				Part no. Article no.:
Protection type IP65, UL/CS Type 4X/Type12 	For use as main switch to IEC/EN 60204	black	Plug-in extension shaft PKZ0-XAH can be cut to desired length for mounting depths of 100…240 mm Carrier with extension shaft included in delivery. With ON/OFF switch position and "+" (tripped), lockable with 3 padlocks, 4 – 8 mm hasp.	**PKE-XH** 142416
	For use as main switch with Emergency-Stop function to IEC/EN 60204	red-yellow		**PKE-XRH** 142417
	For use as a main switch to EN 60204 in MCC power distribution systems and with PKE installed when rotated by 90°	black		**PKE-XH-MCC** 142418
	For use as a main switch to EN 60204 in MCC power distribution systems and with PKE installed when rotated by 90°	red-yellow		**PKE-XRH-MCC** 142419

Motor connect plug for motor starter combinations

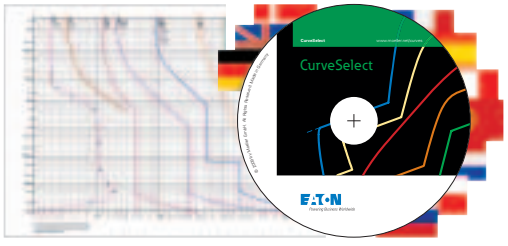
			Part no. Article no.:
Motor plate with PE module without contact plate 	PKZM0/PKE + DILM(C)7 PKZM0/PKE + DILM(C)9 PKZM0/PKE + DILM(C)12 PKZM0/PKE + DILM(C)15 MSC-D(E)-…-M7… MSC-D(E)-…-M9… MSC-D(E)-…-M12… MSC-D(E)-…-M15…		**DILM12-XMCP/T** 121770



Engineering tool for motor starters and energy distribution

Selector slide for motor starter combinations

As a simple tool, the Eaton selection slider facilitates the dimensioning of different motor starter types taking the required coordination types for short-circuit coordination into consideration.



CurveSelect – Characteristics program for protection devices

CurveSelect is a free-of-charge tool that offers evaluation of tripping characteristics of several protective devices on the same time and current scale. The assessment of the interaction of the circuit-breakers of the NZM and IZM series, as well as motor-protective circuit-breakers PKE and PKZ, overload relay ZB and miniature circuit-breakers as well as low-voltage high-breaking-capacity fuses is made significantly easier.

www.moeller.net\curves

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges.

Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority. For more information, **visit www.eaton.com/electrical.**

To contact an Eaton salesperson or local distributor/agent, please visit www.eaton.eu/electrical/customersupport

Changes to the products, to the information contained in this document, and to prices are reserved; so are errors and omissions. Only order confirmations and technical documentation by Eaton is binding. Photos and pictures also do not warrant a specific layout or functionality. Their use in whatever form is subject to prior approval by Eaton. The same applies to Trademarks (especially Eaton, Moeller, Cutler-Hammer). The Terms and Conditions of Eaton apply, as referenced on Eaton internet pages and Eaton order confirmations.

Eaton Industries GmbH
Hein-Moeller-Str. 7–11
D-53115 Bonn/Germany

© 2012 by Eaton Corporation
All rights reserved
Printed in Germany 01/12
Publication No.: W1230-7613en
ip March 2012
Article No.: 128851

Eaton is a registered trademark of Eaton Corporation

All other trademarks are property of their respective owners.

SmartWire-DT™ is a trademark of Eaton Corporation.

Powering Business Worldwide