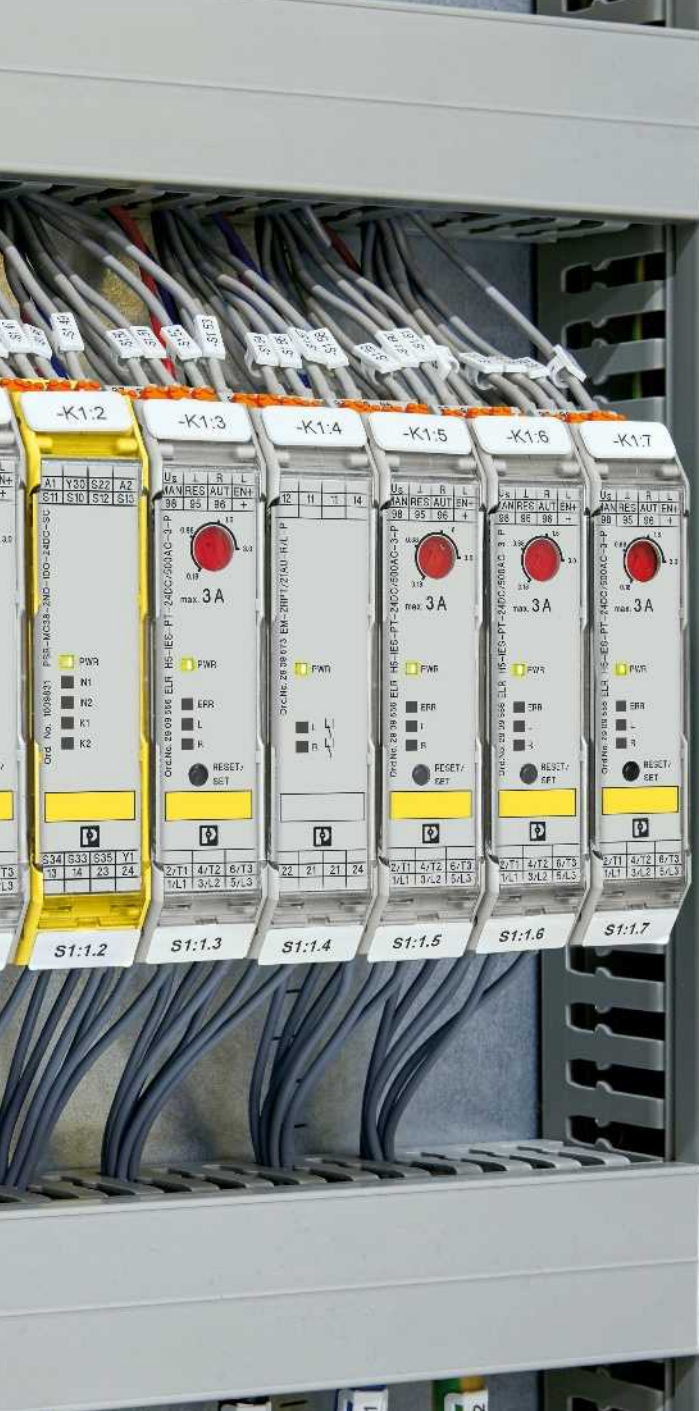


COMPLETE line



# Electronic switching devices and motor control

Reliable motor switching, protection and monitoring

# Intelligent switching, protection, monitoring and measurement

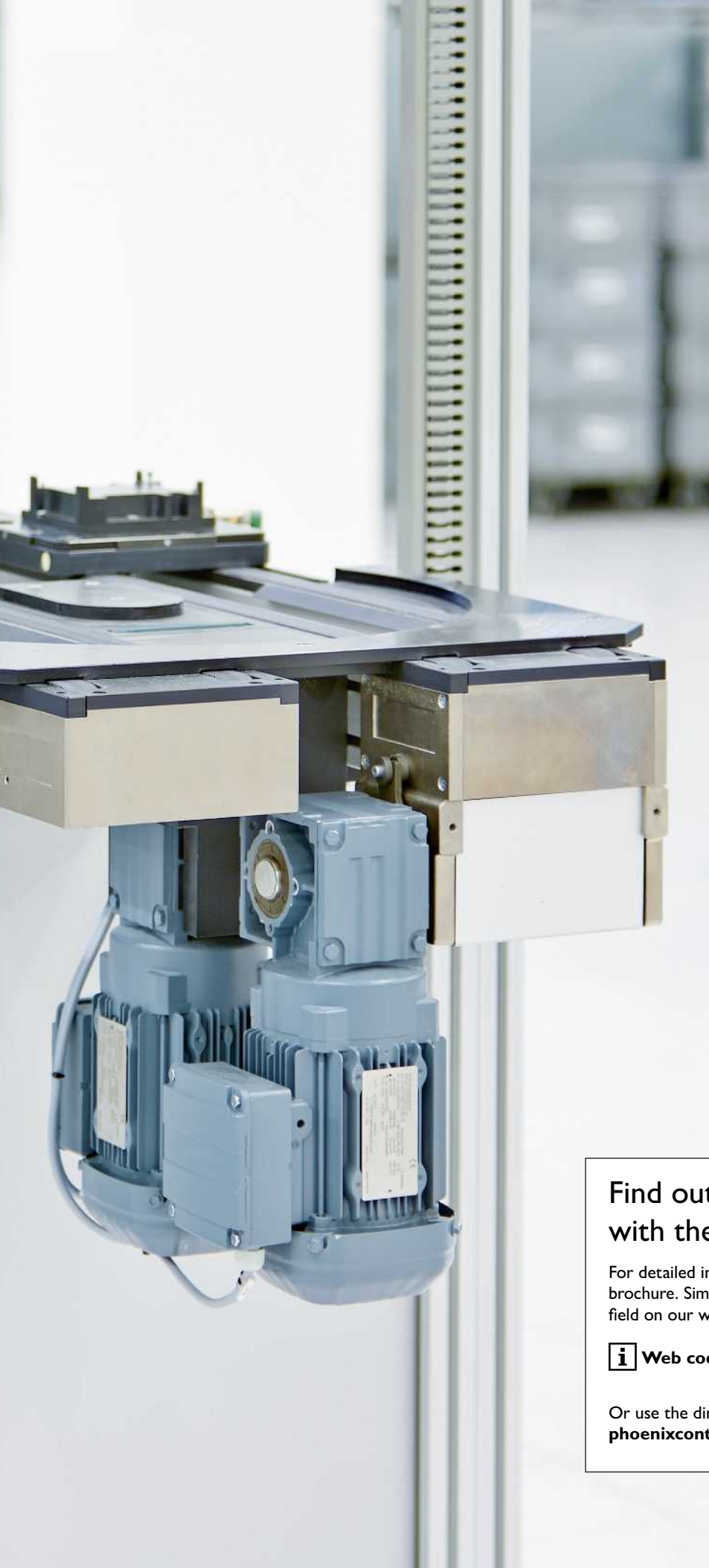
Electric motors are used in a variety of industrial applications for controlling movements. Motors are often started and reversed using classic, mechanical protective circuits. However, these require a great deal of space as well as a lot of wiring effort, and have a limited service life. Costly sensor technology is often required to collect important motor and process data. Phoenix Contact offers innovative and intelligent products for your application.

## The comprehensive solution for your control cabinet

The CONTACTRON product range is a part of the COMPLETE line. COMPLETE line is a system comprising coordinated hardware and software products, consulting services, and system solutions that help you optimize your processes in control cabinet manufacturing. Engineering, purchasing, installation, and operation become significantly easier for you. Further information is available on pages 36 to 37.



**COMPLETE line**



## Contents

---

CONTACTRON	
An advantage for your application	4

---

The CONTACTRON product portfolio	6
----------------------------------	---

---

CONTACTRON hybrid technology	8
------------------------------	---

---

CONTACTRON motor starters	10
CONTACTRON stand-alone	12
CONTACTRON modular	14
CONTACTRON network-capable	16

---

CONTACTRON motor and machine management	18
CONTACTRON motor manager	20
CONTACTRON machine manager	22

---

Interfacesystem	24
-----------------	----

---

CrossPowerSystem	
The power distribution board	26

---

Solid-state contactors	28
------------------------	----

---

Switch now	
Clever switching devices for every application	34

---

COMPLETE line –	
The comprehensive solution for the control cabinet	36

---

Worldwide service and support: We are there for you	38
---	----

---

### Find out more with the web code

For detailed information, use the web codes provided in this brochure. Simply enter # and the four-digit number in the search field on our website.

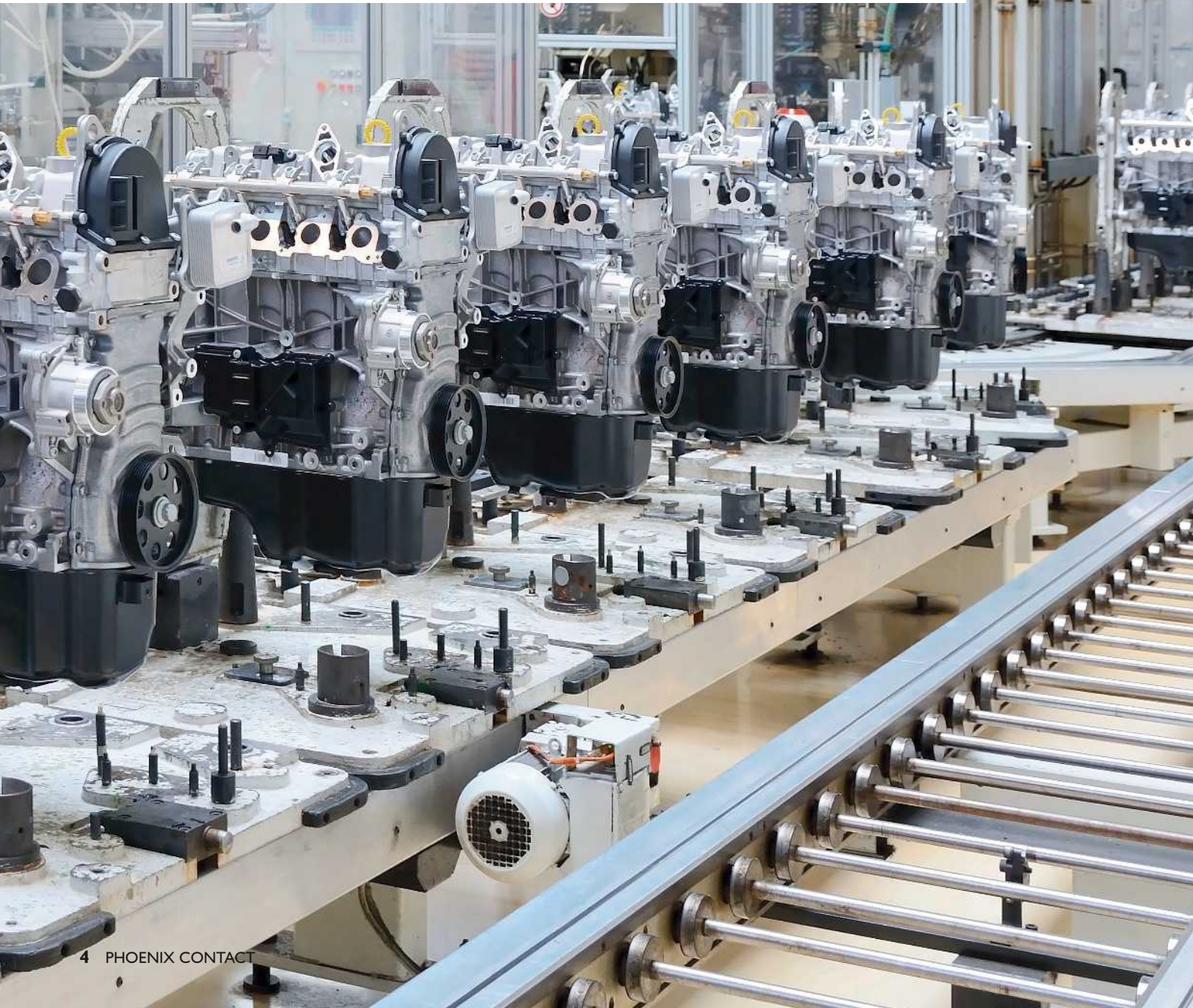
**i** Web code: #1234 (example)

Or use the direct link:  
**[phoenixcontact.net/webcode/#1234](https://phoenixcontact.net/webcode/#1234)**

# CONTACTRON

## An advantage for your application

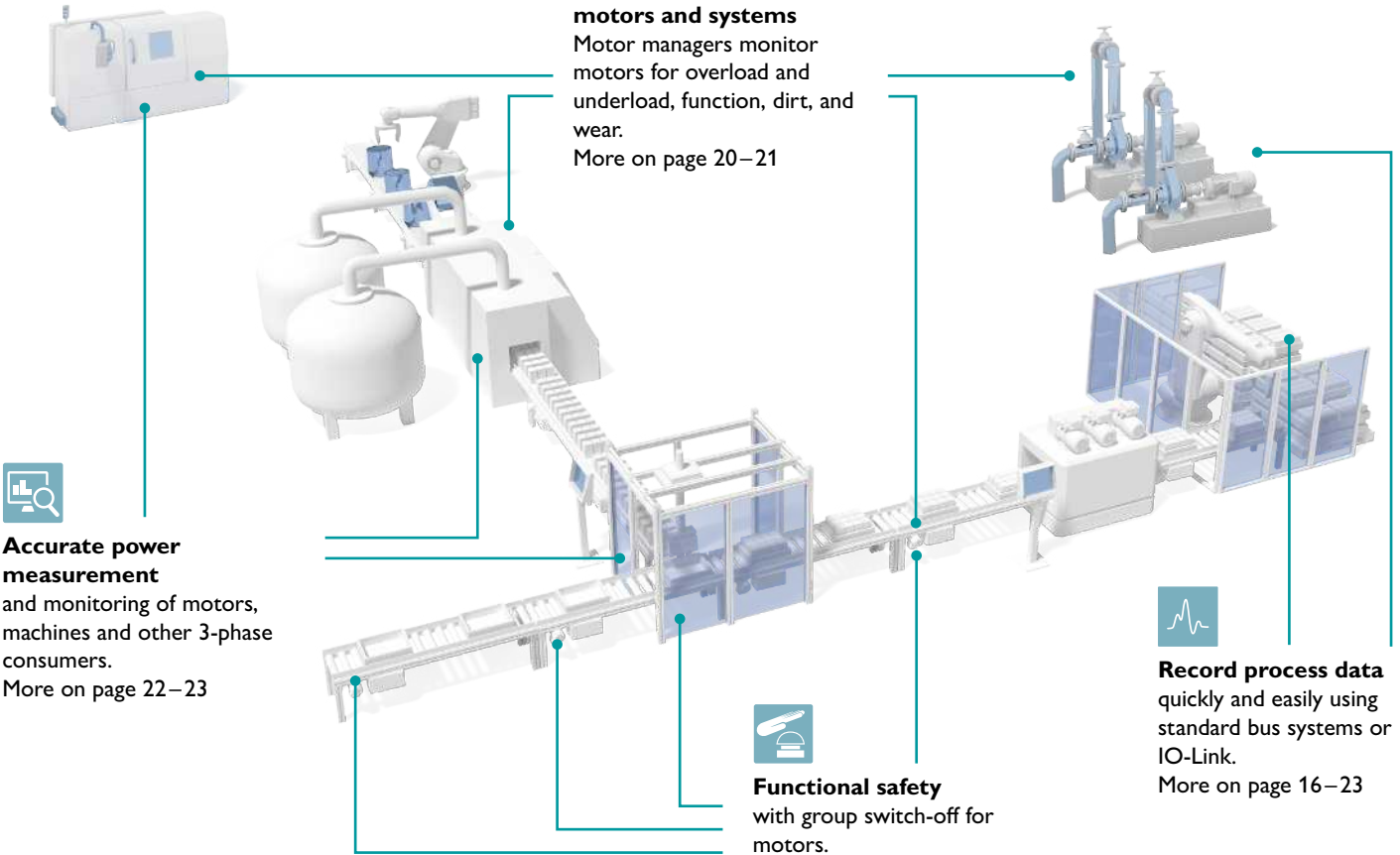
CONTACTRON hybrid motor starters consisting of direct and reversing starters with various functions such as emergency stop and motor protection. Motor manager for protecting motors and systems and electronic machine management for monitoring motors and machines.





### Protecting and monitoring motors and systems

Motor managers monitor motors for overload and underload, function, dirt, and wear.  
More on page 20–21



**Accurate power measurement**  
and monitoring of motors, machines and other 3-phase consumers.  
More on page 22–23



**Functional safety**  
with group switch-off for motors.  
More on page 14–15



**Record process data**  
quickly and easily using standard bus systems or IO-Link.  
More on page 16–23



**Switch and protect motors intelligently**  
with hybrid motor starters.



**Save time**  
Up to 75% less wiring effort in comparison to conventional solutions.



**Save space**  
Up to 89% space saving in comparison to conventional switching devices.

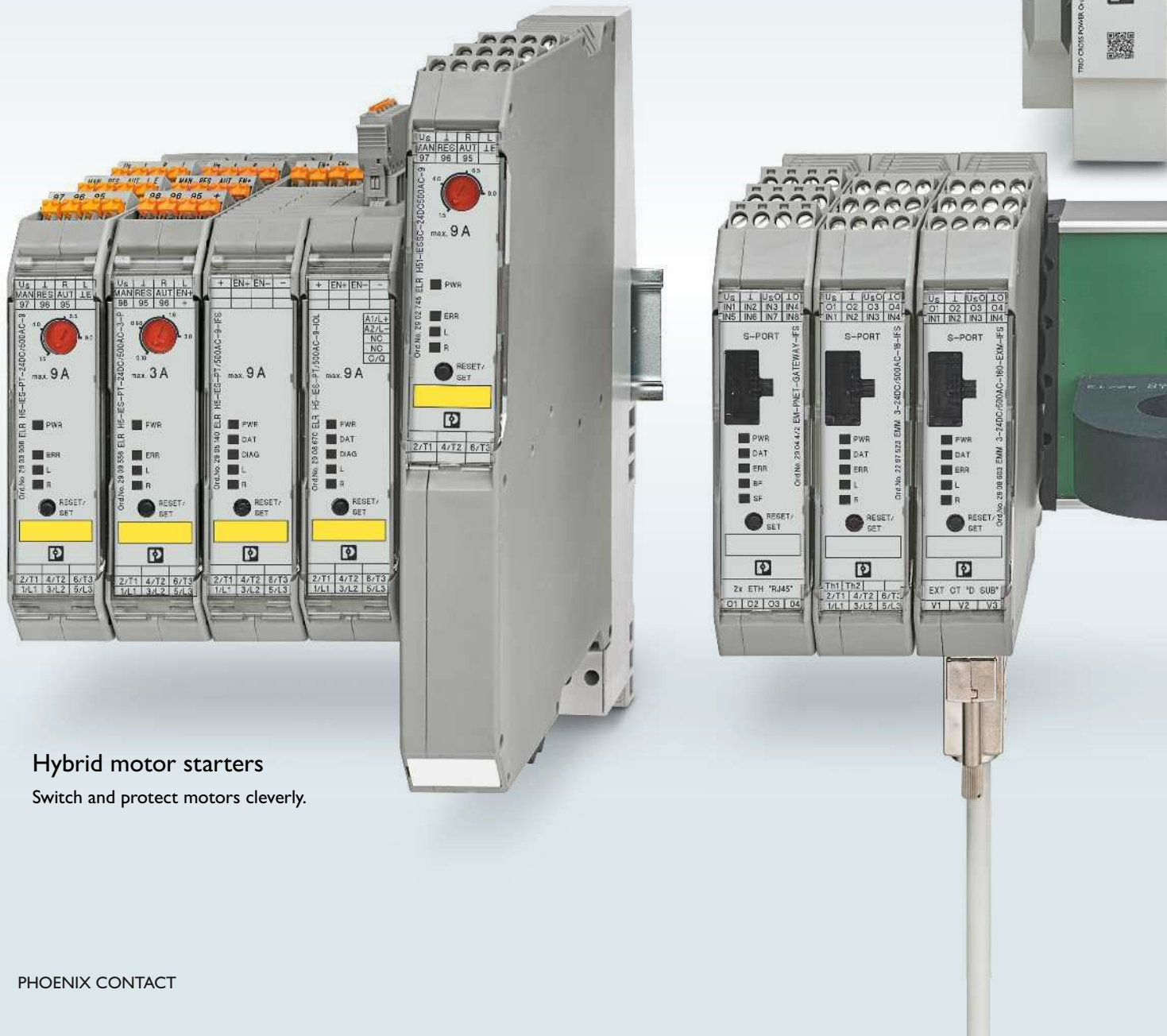


**High system availability**  
Service life is ten times longer, thanks to low-wear switching with CONTACTRON hybrid technology.

More on page 8–9

# The CONTACTRON product portfolio

Take advantage of the broad portfolio of electronic switching devices, economical motor and machine managers, and modular power distribution board from Phoenix Contact. Whether you are optimizing your production and operating costs, your maintenance, or your energy management: we will support you in meeting the challenges of digitalization and Industrie 4.0.



Hybrid motor starters  
Switch and protect motors cleverly.

## CrossPowerSystem

The DIN rail with built-in power distribution that can be extended modularly.



## IFS-CONF software

Configuration and monitoring.



## Motor and machine management

Protect and monitor motors and systems, and accurately measure the energy of motors, machines and other 3-phase consumers.



## Solid-state contactors

Silent and reliable for every AC voltage network.

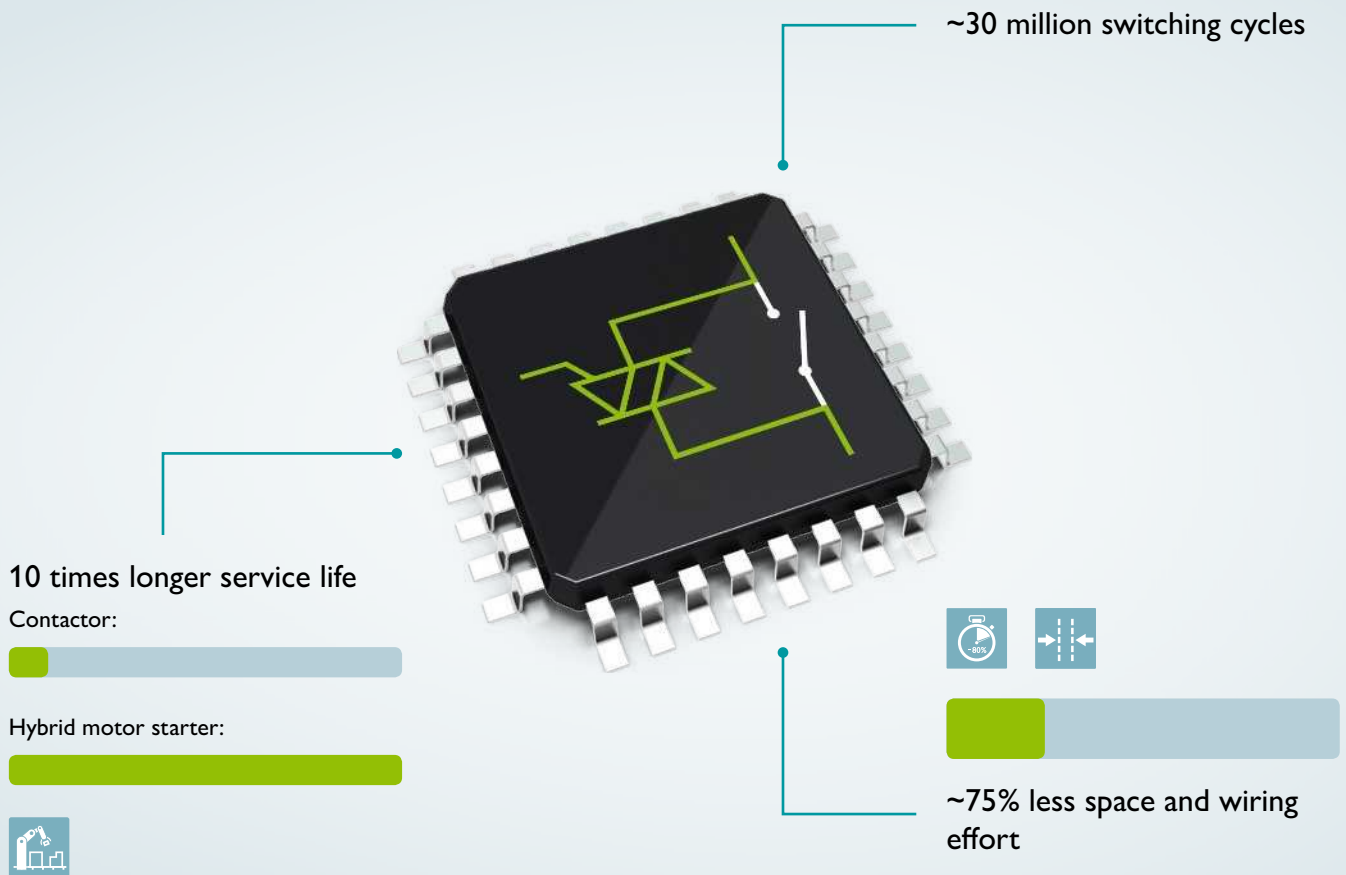
# CONTACTRON

## Hybrid technology

CONTACTRON hybrid technology is a microprocessor-controlled combination of wear-free solid-state technology and robust relay technology. The semiconductors execute the wear-prone on and off switching procedures, while the relays only conduct low-loss current. This enables soft switching and considerably reduces the load on the relay contacts.

### CONTACTRON Hybrid Technology

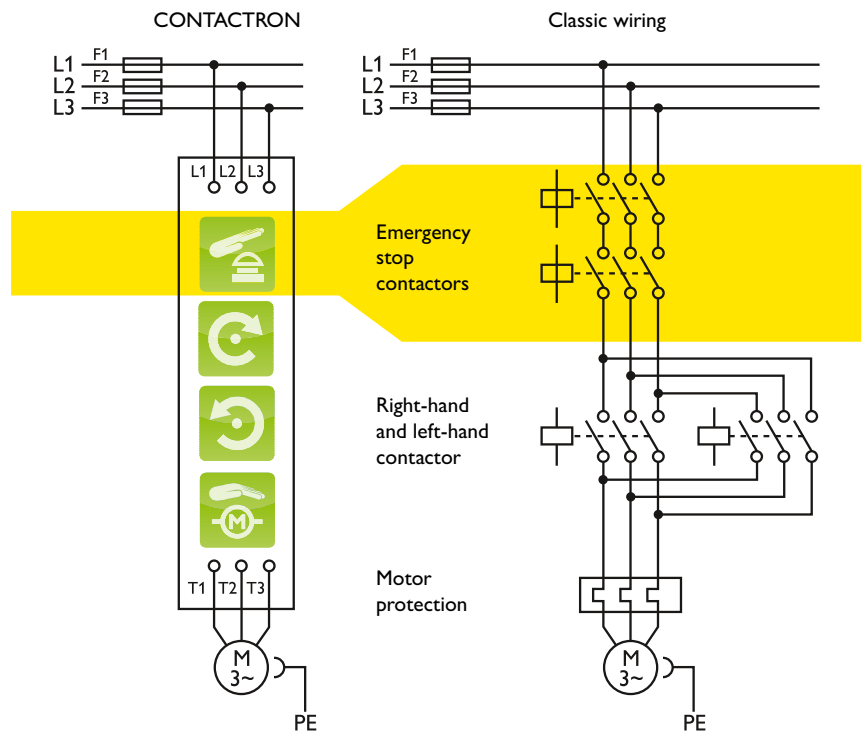
Designed by PHOENIX CONTACT





## CONTACTRON compared to traditional solutions

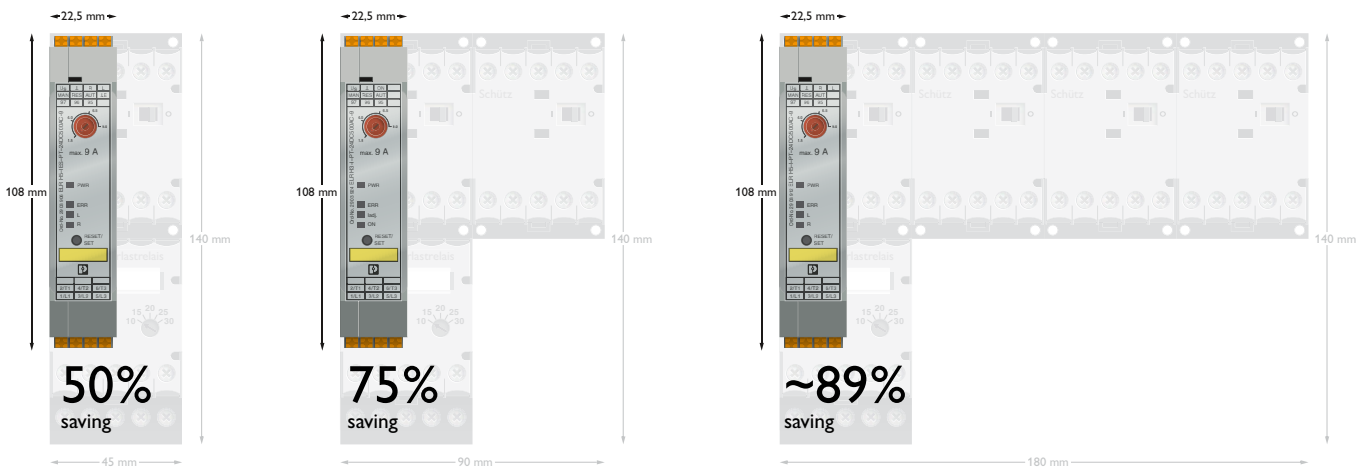
- CONTACTRON integrates the functions of a conventional reversing contactor, including safety function, into a single device up to Cat.4 / PL e, SIL 3 depending on the module
- Internal load and locking circuits enable clear wiring
- The locking circuit is certified in accordance with UL 508a and UL 60947-1



## Less space required in comparison to standard switching devices

Using the CONTACTRON hybrid motor starter, device combinations that would previously take up a lot of space in the

control cabinet can now be replaced with one single device.



# CONTACTRON

## Motor starters

Switch motors safely and reliably with compact standalone, modular, and network-capable hybrid motor starters. The devices can be used wherever three-phase asynchronous motors, from 50 W to 3 kW, need to be reversed and protected. The product range of hybrid motor starters consists of direct and reversing starters available with various functions such as emergency stop and motor protection.



### Hybrid motor starters – Stand-alone

The hybrid motor starter product range consists of direct and reversing starters available with various functions such as emergency stop and motor protection.

#### Versions with short-circuit protection:

With the integrated fuses, the motor starters meet coordination type 2 in accordance with IEC/EN 60947-4-2. These devices can be mounted flexibly on standard DIN rails or on 60 mm power busbars.

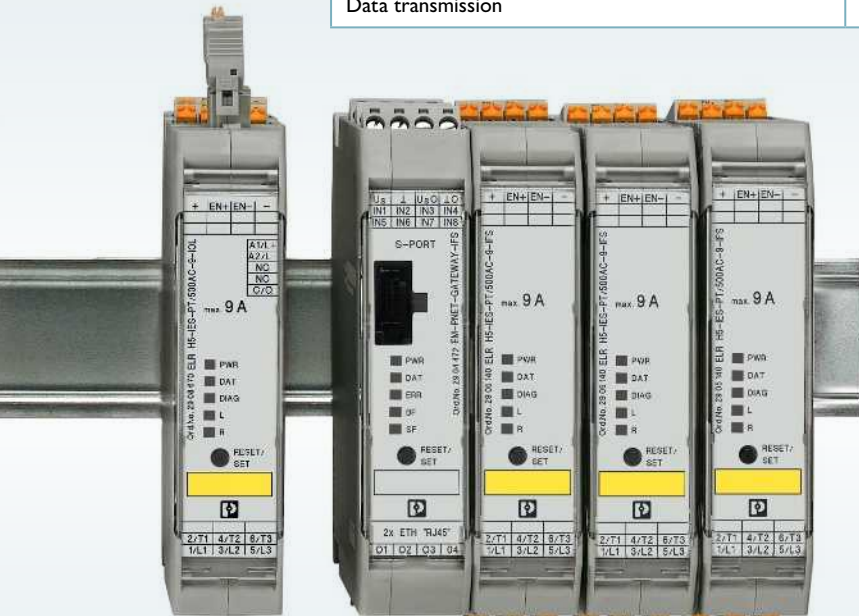
### Hybrid motor starters – Modular

CONTACTRON pro is the new version of the CONTACTRON product range offering simple safety integration and modular extension options. All based on hybrid technology – for an increased level of simplicity in functional safety, high system availability, and easy handling.

CONTACTRON	Stand-alone	Modular	Network-capable
Direct and reversing starter*	•	•	•
Motor protection and emergency stop*	•	•	•
Short-circuit protection	•		
Modular expansion possible		•	•
Network-capable			•
<b>Diagnostic functions</b>			
1 checkback contact	•	•	
Error code display**	•	•	•
Additional relay module for status checkback		•	
Early warning in the case of overload			•
<b>DIN rail connector</b>			
Group switch-off		•	
24 V power supply		•	•
Data transmission			•

\* Available in different combinations

\*\* On the device: overload, underload, symmetry, etc.



## CONTACTRON Hybrid Technology

Designed by PHOENIX CONTACT

### Hybrid motor starters – Network-capable

Integration into fieldbus systems is realized via the INTERFACE system connection.

Corresponding gateways are available for all common fieldbus systems.

The IO-Link versions enable you to benefit from consistent communication between the field and control level, thereby enabling the easy transfer of process data.



# CONTACTRON

## Hybrid motor starters – Stand-alone

Switch motors safely and reliably with compact hybrid motor starters. The devices can be used wherever three-phase asynchronous motors, from 50 W to 3 kW, need to be reversed and protected. The product range of hybrid motor starters consists of direct and reversing starters which are available with various functions such as emergency stop and motor protection.



### CONTACTRON Hybrid Technology

Designed by PHOENIX CONTACT



### Your advantages

- ✓ Less space required, thanks to the slim design: 22.5 mm overall width
- ✓ Easy wiring, thanks to integrated locking circuit and load wiring
- ✓ Service life up to 10 times longer, thanks to gentle switching with CONTACTRON hybrid motor starter technology
- ✓ Adjustable motor protection with bimetal function up to 9 A
- ✓ Safe shutdown, thanks to integrated safety function up to SIL 3 and PL e

# Clever switching and reliable protection



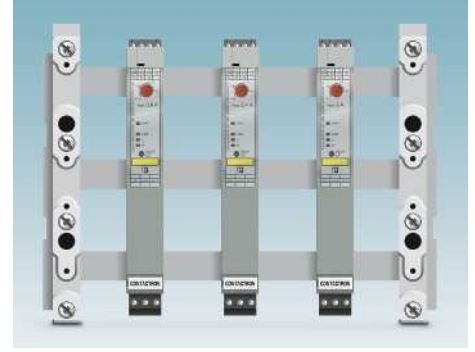
## Easy diagnostics

The device visualizes the operating states with a total of four LEDs (overload, underload, symmetry, etc.) thus ensuring simple diagnostics.



## Integrated short-circuit protection

With the integrated fuses, the motor starters meet coordination type 2 in accordance with IEC/EN 60947-4-2. These devices can be mounted flexibly on standard DIN rails or on 60 mm power busbars.



## Assembly adapters for power busbars

Hybrid motor starters can be flexibly mounted using an assembly adapter. This provides many advantages:

- Mounting directly on a standard DIN rail or power busbar
- Safe disconnection of motor outputs
- Safely disconnected from the mains voltage: by simply removing the switching device from the assembly adapter, for maintenance and servicing

## Cost-efficiency, thanks to needs-based function selection



### Forward running

Easy control directly via 24 V PLC output cards or 230 V AC signal.



### Reverse running

Optional: reversing function including locking circuit and load wiring.



### Motor protection

Convenient protection, thanks to the electronic motor protection relay with automatic and remote reset function.



### Emergency stop

The integrated safety function enables use in safety-related emergency stop applications.

# CONTACTRON

## Hybrid motor starters – Modular

CONTACTRON pro is the new version of the CONTACTRON product range offering simple safety integration and modular extension options. All based on hybrid technology – for an increased level of simplicity in functional safety, high system availability, and easy handling.



### CONTACTRON Hybrid Technology <sup>®</sup>

Designed by PHOENIX CONTACT



### Your advantages

- ✓ Easy group shutdown via DIN rail connectors after an emergency stop, thanks to an upstream safety relay
- ✓ High system availability, thanks to a service life that is 10 times longer with hybrid technology
- ✓ Easy to handle: With the economical DIN rail connector, you save on wiring effort, which means you save money as well
- ✓ Reliable feedback on the status of the motor via optional relay module

# Simplicity in functional safety



## Easy group shutdown

The upstream safety relay guarantees a secure stop of the connected motors after an emergency stop up to performance level e. Our TÜV-certified modules make functional safety very easy for you.



## Easy handling

With the economical DIN rail connector, you save on wiring effort, which means you save money as well: Reap the benefits of easy signal loop-through (24 V power supply, ground and enable) plus expansions with checkback contacts.

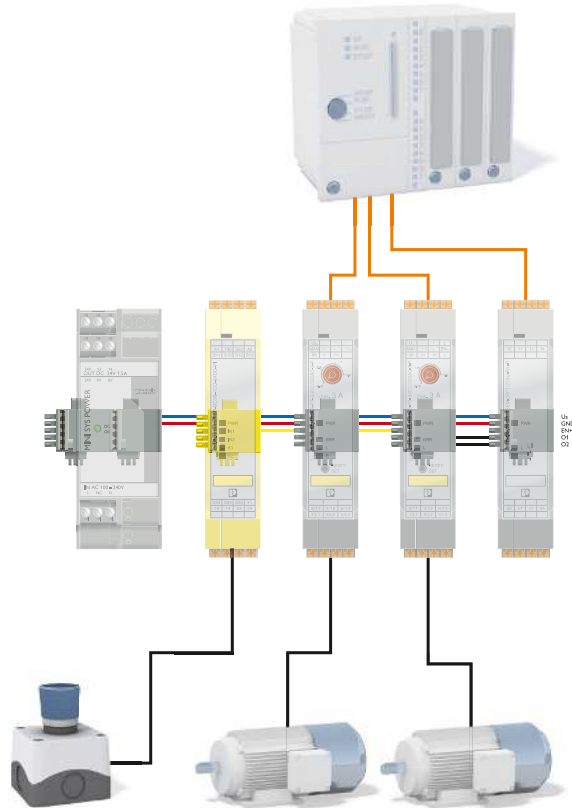


## Reliable feedback

Additional feedback on the motor status you can rely on: Thanks to an optional relay module you can reliably capture the status of the motor, e.g. forward or reverse running.

## Application example

Using the DIN rail connector, you can perform an emergency stop group shutdown of all the downstream hybrid motor starters without the need for additional wiring. In addition, all modules can be supplied from the system power supply. The optional response module makes it possible to monitor the motor function.



# CONTACTRON

## Hybrid motor starters – Network-capable

Integration into fieldbus systems is realized via the interface system connection. Corresponding gateways are available for all common fieldbus systems. Transfer your process data easily and network your devices quickly using both the interface system (IFS) and the available IO-Link versions.

Not only do you benefit from space and wiring savings, you also get the advantage of diagnostic functions. Custom process data linking helps you meet your application requirements – and that includes digitalization and Industrie 4.0.



### CONTACTRON Hybrid Technology <sup>IQ</sup>

Designed by PHOENIX CONTACT



### Your advantages

- ✓ Flexible and straightforward fieldbus connection with a suitable gateway
- ✓ Simple 24 V power supply to IFS devices without additional wiring effort
- ✓ Fast connection of other IFS devices, thanks to the DIN rail connector latching concept
- ✓ I/O cards no longer required (controller), thanks to the 8 digital inputs and 4 digital outputs on the gateway

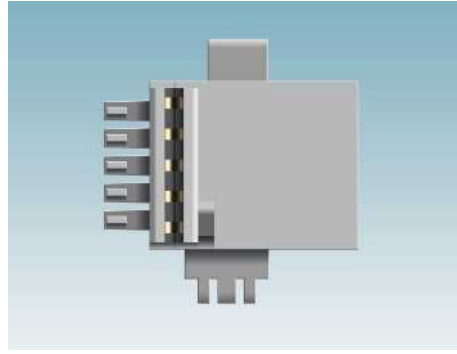


# Easy networking



## Gateway

Up to 32 IFS devices can be easily integrated into conventional fieldbus systems and save bus addresses for field devices. Gateway configuration by means of intuitive IFS-CONF software.



## DIN rail connector

The easy-to-assemble solution for networking, communication, data transmission, and 24 V power supply.



## Easy diagnostics

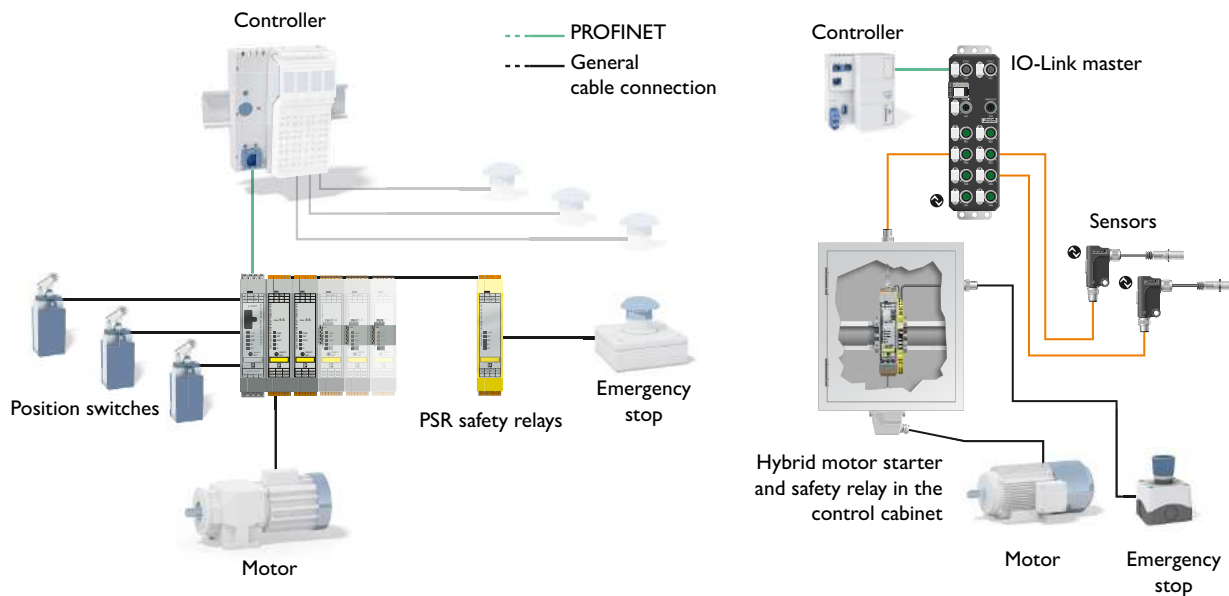
Transfer of status messages to the controller, e.g. overload, underload advance warning, symmetry, etc.

## Consistent networking via the interface system or IO-Link

The new network-capable versions enable consistent communication between the field and control level. Integration into all

common fieldbus systems is realized via the interface system or IO-Link.

**i** Web code: #1994

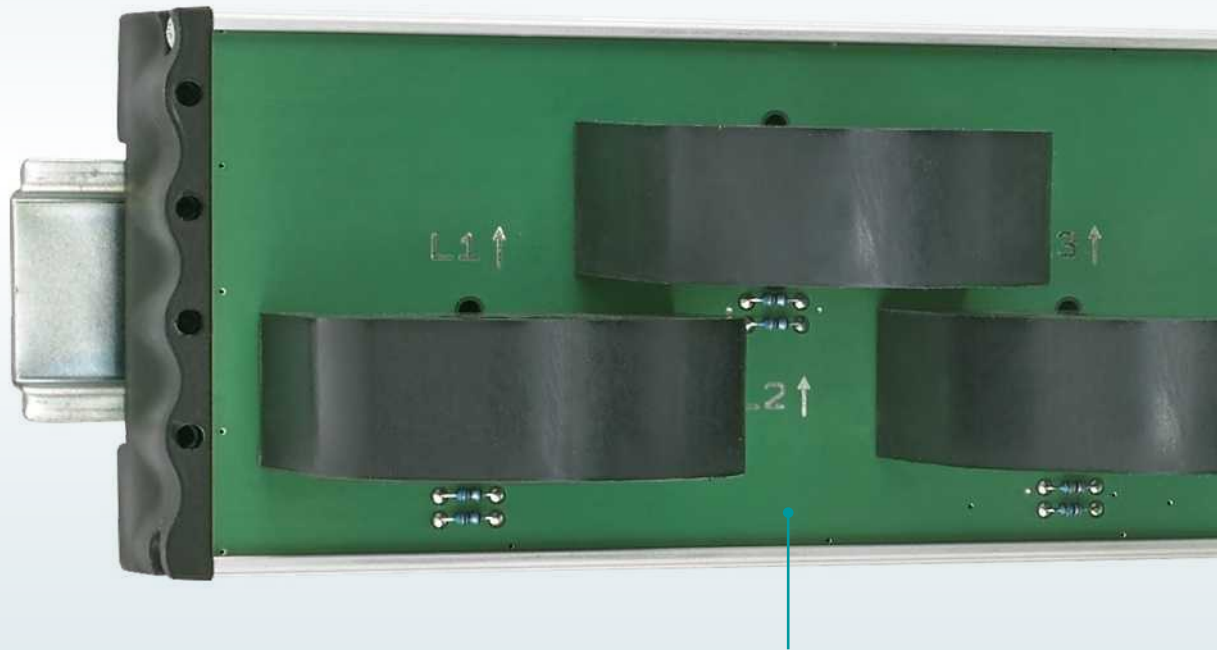


# CONTACTRON

## Motor and machine management

**Protect your motors and systems:** The motor manager from Phoenix Contact combines overload and underload detection in a single device. In the event of an emergency, it protects the motor and shuts down the drive.

**Monitor your motors and machines:** Electronic machine management combines precise energy measurement with the display and monitoring of important parameters of motors, machines or other 3-phase consumers.



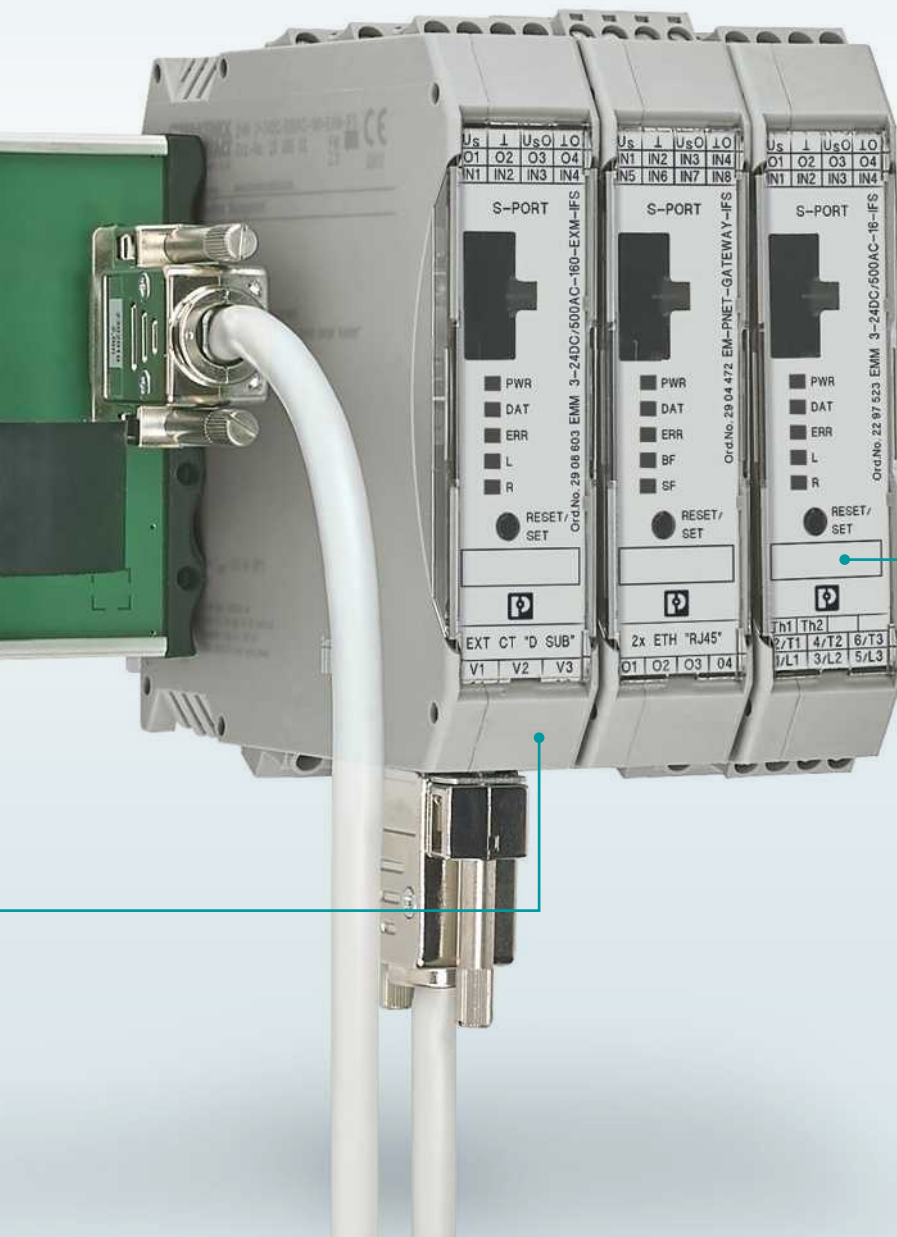
### Machine manager

By combining the electronic machine manager and an external current transformer, you can cost-effectively monitor motors, machines, and 3-phase consumers. Two versions are available with current ranges up to 90 A and 160 A.

	Motor manager	Machine manager
Measure electrical parameters (U, I, P, cos phi, S, Q, f)*	•	•
Monitor sinusoidal loads (e.g. asynchronous motors)	•	•
Monitor mixed loads (FU-controlled motors, complete systems)		•
Process data-based preventive maintenance (motors)	•	•
Process data-based preventive maintenance (systems)		•
Measuring range (max.)	5,000 A**	160 A
Measuring accuracy	2%	0.50%
Monitored values (incl. message and error message)	8	8
<b>Meters</b>		
Total energy meter	•	•
Operating hours counter	•	•
<b>Measuring instrument</b>		
Internal current transformers	up to 16 A	
Use of external current transformers	•	•
<b>Motor outputs</b>		
Motor output configuration (signal)	•	•

\* Voltage, current, real power, cos phi, apparent power, reactive power, frequency

\*\* Depending on the converter used



## Motor manager

Motor managers from Phoenix Contact monitor motors for overload and underload, function, dirt, and wear. You can therefore provide permanent protection for pumps, actuating drives, fans, conveyor belts and machine tools, for example.

# CONTACTRON

## Motor manager

With the motor manager, you can detect all the critical load states throughout the system and benefit from the advantages of modern real power monitoring. If required, the motor manager switches the drive off and thereby protects the motor and system. The motor manager is configured via the intuitive IFS-CONF software from Phoenix Contact.



### Your advantages

- ✓ Integrated full motor protection, thanks to bimetal function and thermistor evaluation
- ✓ Protection of high-quality system parts, thanks to freely configurable signaling and switching thresholds
- ✓ Production data and energy data acquisition without the need for complex sensors
- ✓ Process data such as performance values, operating hours, and switching cycles are safely transmitted between field and control level
- ✓ Easy configuration and diagnostics
- ✓ Connection to controller via bus gateway

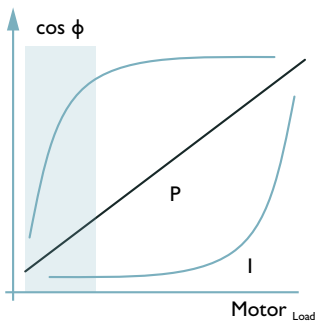
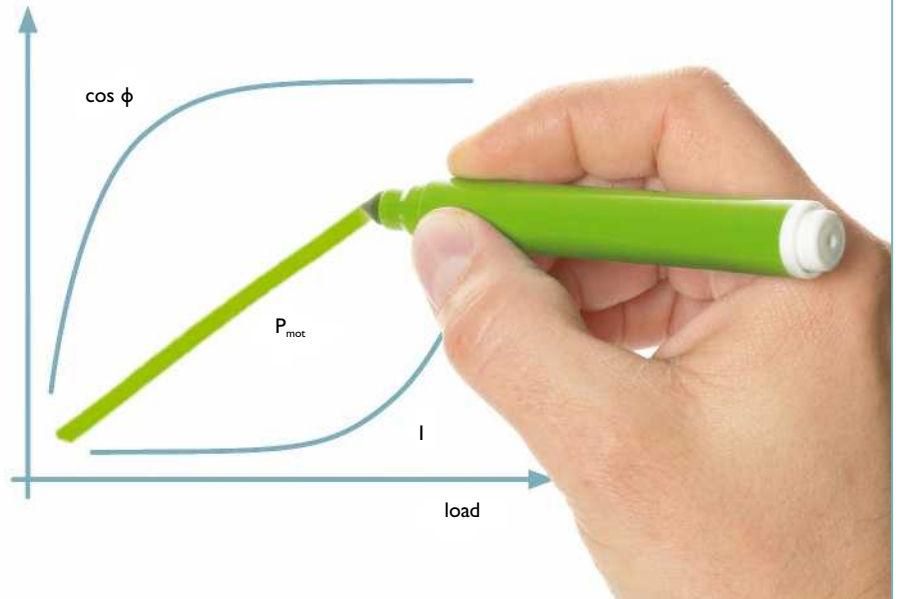
# Application examples

## Reliable monitoring – Exact and fast control

Motor managers from Phoenix Contact monitor motors for overload and underload, function, dirt, and wear. You can therefore provide permanent protection for pumps, actuating drives, fans, and machine tools, for example. The monitoring is realized by freely configurable switching and signaling thresholds. Identical or separate settings can be made for the thresholds for both directions of rotation. The real power consumed, calculated from three currents, voltages, and the phase angle, is used for parameterization. As it is independent of voltage fluctuations and drive load, the real power is thus much more precise than when only the current is taken into consideration.

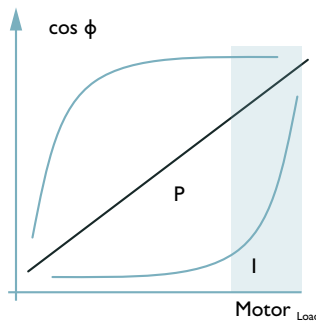
### System protection requires real power measurement

While a cos-phi monitor only detects underload states, and a motor protection relay only detects overload states, real power measurement detects all critical load states of the motor.



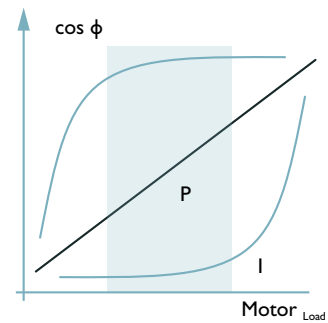
### Monitoring “lower motor load range”

The overload or underload of a motor or drive that is operated in the lower load range is optimally monitored with a cos-phi monitor.



### Monitoring “optimum motor load range”

An ampere meter will suffice for monitoring the upper load range as the motor or drive is operated at an optimum cos-phi. The motor or drive should ideally be designed in this way.

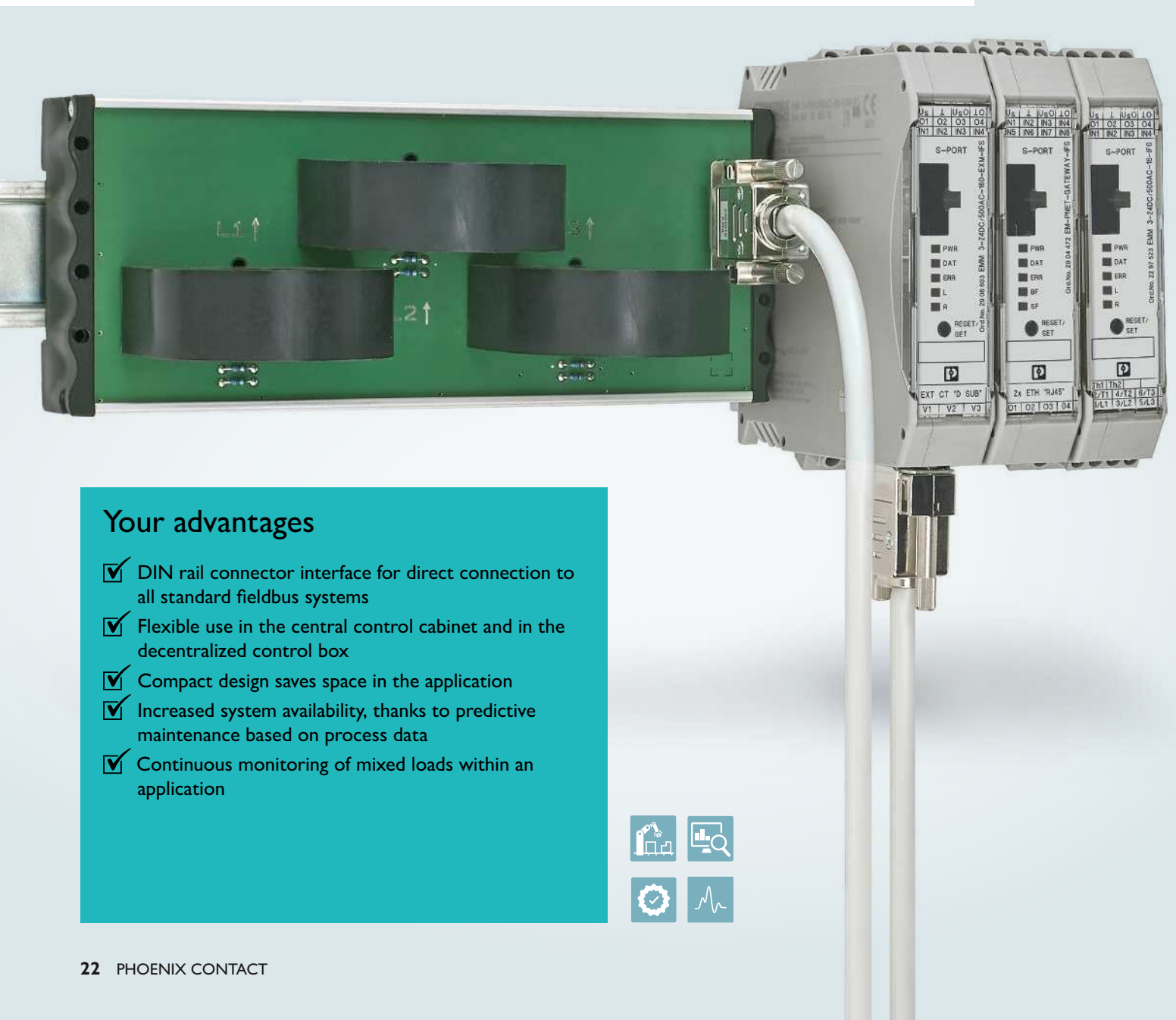


### Monitoring “middle motor load range”

However, 80% of all motors or drives operate in the middle range in which there is hardly any change to the current or cos-phi. An overload or underload is only detected reliably by a change to the recorded real power. In comparison to a current or cos-phi measurement, the real power contains all of the relevant electrical parameters.

# CONTACTRON Machine manager

Monitor your motors and machines: electronic motor and machine management combines precise energy measurement with the display and monitoring of important parameters of motors, machines, or other 3-phase consumers. As an option, can be networked with all common fieldbus systems via a gateway.

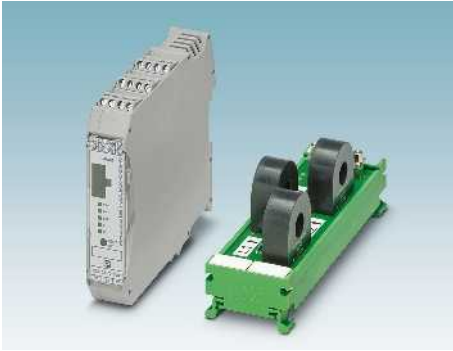


## Your advantages

- ✓ DIN rail connector interface for direct connection to all standard fieldbus systems
- ✓ Flexible use in the central control cabinet and in the decentralized control box
- ✓ Compact design saves space in the application
- ✓ Increased system availability, thanks to predictive maintenance based on process data
- ✓ Continuous monitoring of mixed loads within an application



# Efficient machine management



## Accurate measurements

Two versions are available with an external current transformer with current ranges up to 90 A and 160 A.



## Easy configuration

Benefit from the flexibility of freely configurable switching and signaling thresholds for all relevant measured variables. Configuration is via the IFS-CONF software from Phoenix Contact.



## Reliable monitoring

Display of important operating parameters:

- Real power
- Apparent power
- Reactive power
- Energy meter
- cos phi
- Current
- Voltage
- Frequency

## Application example

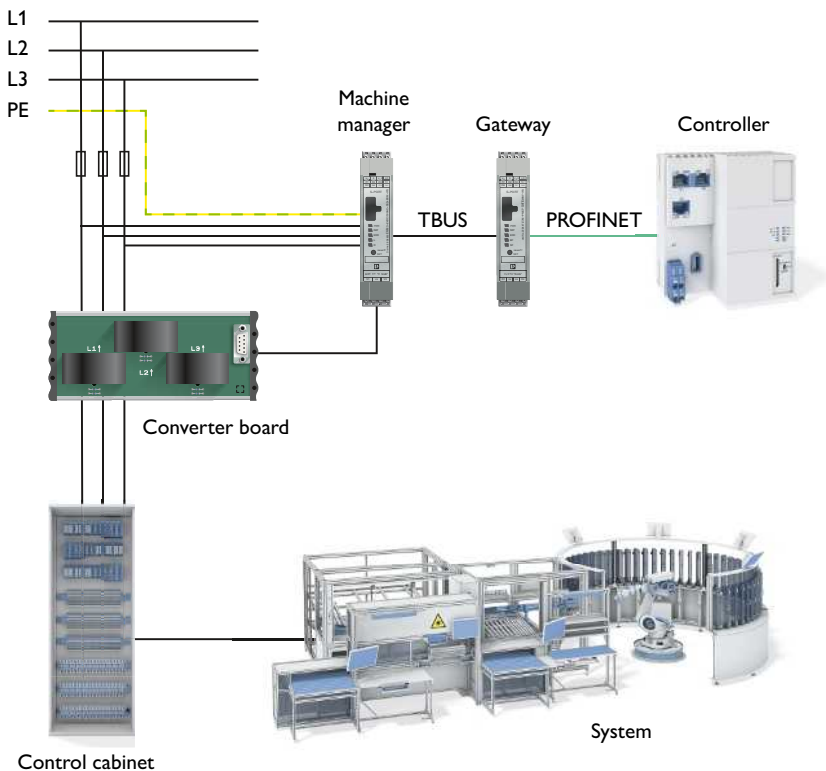
Monitoring of important machine parameters, networked via Gateway controlled using PROFINET.

### Cost-effective energy measurement

By combining the electronic machine manager and an external current transformer, you can cost-effectively monitor motors, machines, and 3-phase consumers, including frequency converters and mixed loads.

### Easy and consistent communication

Network the machine manager with all popular fieldbus systems (PROFIBUS, PROFINET, Modbus/TCP, Ethernet, CANopen®, DeviceNet™) via a gateway. Consistent communication for Industrie 4.0, thanks to optional data transmission via OPC UA.



# Interface system – Continuous overview of movements thanks to digitalization and networking

The interface system consists of devices which can be connected to each other via the DIN rail connector. As the usual parallel wiring is redundant, the wiring effort is reduced.

Thanks to the flexible and modular design, the interface system always adapts to your requirements. The networking options provide an excellent basis to meet the requirements of the Internet of Things (IoT).

## Gateway for integration in the fieldbus environment

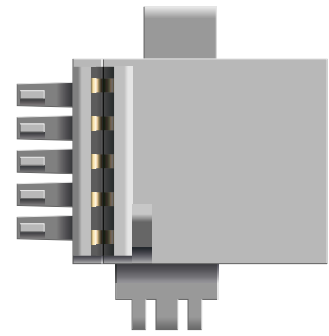
A gateway enables up to 32 devices to be networked in a fieldbus environment. In addition to protocol conversion and the coordination of devices, it serves as a data interface to the higher-level controller or cloud solution.





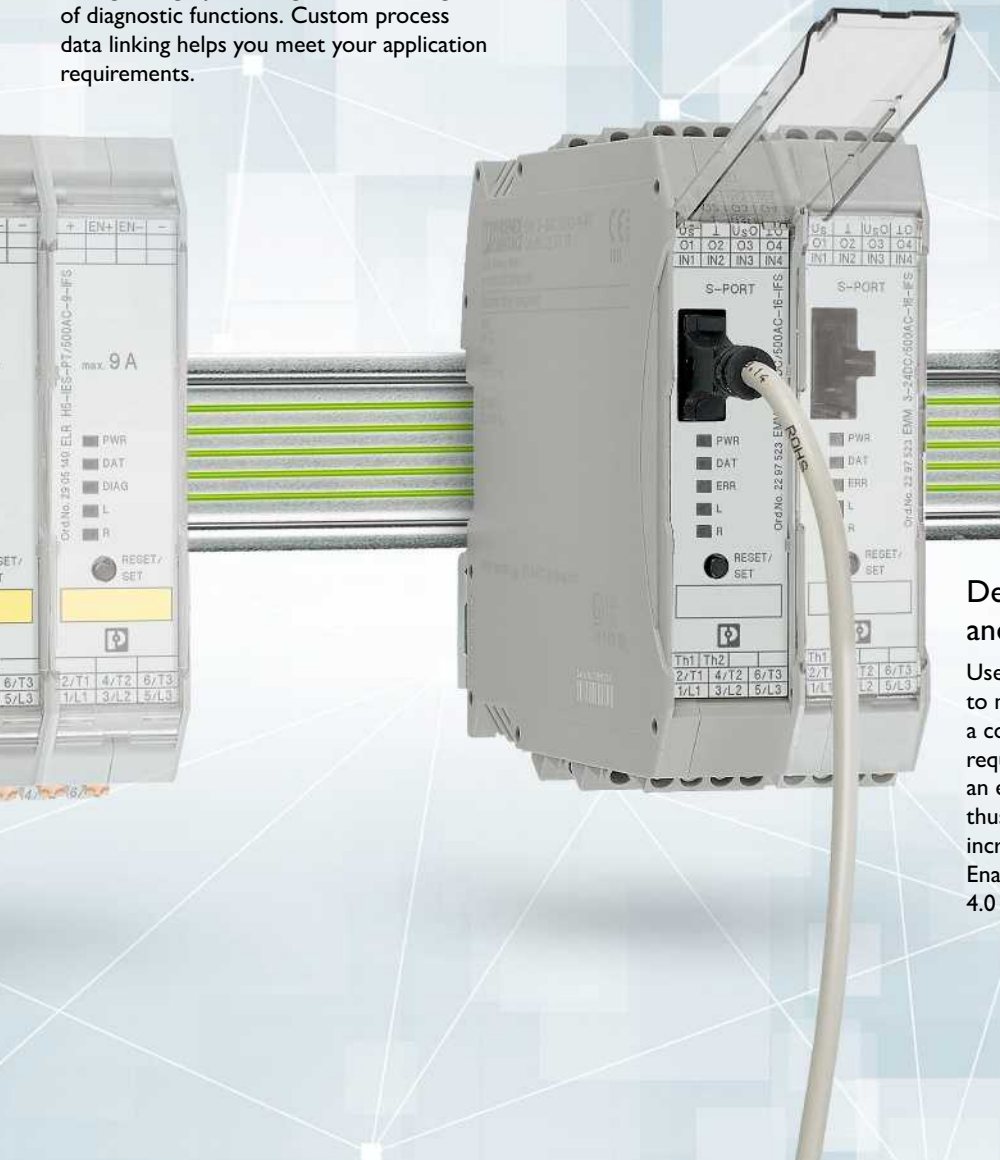
## Transfer your process data easily and network your devices quickly

The DIN rail connector (T-BUS) is the core of the interface system. It oversees the networking, communication and power supply of the devices.



## CONTACTRON hybrid motor starters

Not only do you benefit from space and wiring savings, you also get the advantage of diagnostic functions. Custom process data linking helps you meet your application requirements.



## Detect all load states of motors and systems reliably

Use important motor and system data to monitor your application and maintain a continuous overview of your energy requirements. Detect critical load states at an early stage without using additional sensors thus optimizing maintenance cycles and increasing system availability. Enabling you to meet your specific Industrie 4.0 requirements.

# CrossPowerSystem

## The power distribution board

Not only can you set up motor starters reliably with the power distribution board, you can also implement modular and functional solutions. Wherever necessary, simple modifications can be made or extensions can be added to adapt to new requirements.



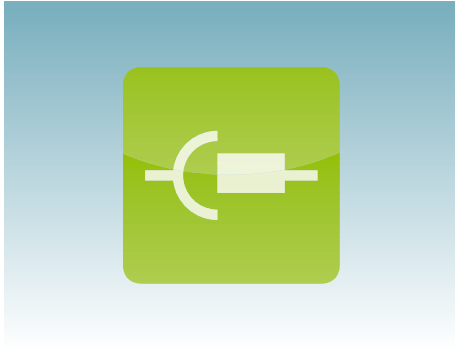
### Your advantages

- ✓ No need for separate 3 AC feed-in per device – no phase shift is possible
- ✓ Quick, complete out-of-the-box system
- ✓ Compact construction in comparison to classic power distribution

CONTACTRON Hybrid Technology <sup>®</sup>

Designed by PHOENIX CONTACT

# The perfect connection



## Switching technology and power distribution

Time is money – this is particularly true in the construction of machines and systems. Thanks to the combination of power distribution and switching devices, mounting is even faster. Furthermore, the integrated reverse pole protection prevents errors and ensures even simpler startup.

## The new DIN rail with in-built power distribution

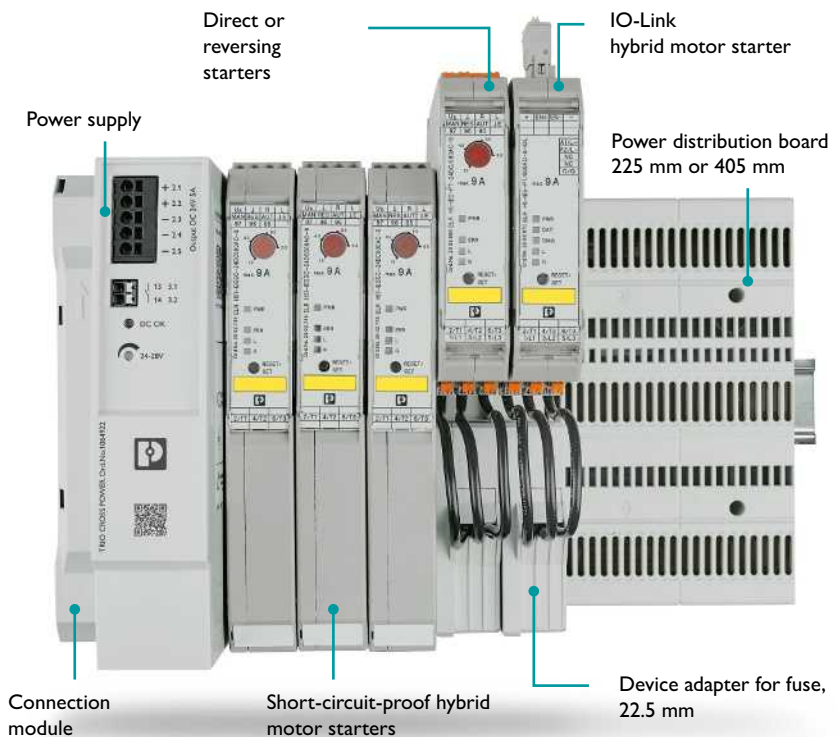
The CONTACTRON hybrid motor starter is mounted on the board without tools with just a click, and simultaneously safely electrically connected to the three phases – all in just one step.

## Power supply

The new TRIO CROSS POWER power supply for the CrossPowerSystem power distribution board is perfectly adapted for use in machine building. All functions and the space-saving design are tailored to the stringent demands in this area. The Push-in connection enables quick and easy connection of a 24 V DC control voltage.

## Implementing modular and functional solutions

Now, reduce your wiring costs with the new 5 A power supply. This can be used to supply power to all hybrid motor starters on the board at the same time. Furthermore, to generate motor-relevant data for system monitoring, simply use the network-capable solution alongside the classic motor starters via IO-Link. A 225 mm and 405 mm version of the power distribution board is available.



# Solid-state contactors

Solid-state contactors are far superior to mechanical contactors in terms of switching speed, service life, and robustness. This is because they also work reliably and with stable switching times in dusty or chemically aggressive atmospheres. They switch resistive and inductive loads silently and without wear. The solid-state contactors from the CONTACTRON series are available for single and three-phase networks and, depending on the type, also provide a reversing function.



## Your advantages

- ✓ Reliable and fast switching, thanks to wear-free electronics
- ✓ Robust: resistant to shocks and vibrations
- ✓ Easy wiring, thanks to integrated locking circuit and load wiring
- ✓ Switching capacity up to 18.5 kW
- ✓ Direct start and reversing of three-phase asynchronous motors

# Wear-free switching



## Forward running and reverse running

Easy control via a 24 V DC or 230 V AC signal. Locking circuit and load wiring included.



## 1-phase solid-state contactors

Wear-free starting of 1-phase AC loads up to 660 V AC/50 A, e.g. in the following applications:

- Production machines and heating systems
- Lighting systems
- 1-phase motors



## 3-phase solid-state contactors

Wear-free starting or reversing of 3-phase AC motors 575 V AC/3 x 37 A, e.g. in the following applications:

- Conveying systems and machine tools
- Pumps and fans
- Mixers and much more

## Applications with high switching frequency and switching rate

Solid-state contactors are particularly suitable for high switching frequencies, such as boilers, temperature controllers or light and lighting systems.











Solid-state contactors can also be used to switch production machines, conveyor systems, machine tools, sliders, pumps, fans, separators or ship steering gear.

### Switching large AC loads










Error-free switching in the power supply network: solid-state contactors from Phoenix Contact only switch in zero crossing mode. This means that no high-frequency disturbing pulses are generated.









# Product overview

Hybrid motor starters												
		Functions							Connection technology			
		Direct starter	Reversing starter	Motor protection	Emergency stop <sup>1</sup>	Can be networked	ATEX	Modular	Short-circuit protection	Screw	Push-in	
Maximum load current	Input voltage											
<b>Stand-alone</b>												
0.6 A	24 V DC	•		•	•		•			2900566	2903914	
		•	•	•	•		•			2900582	2903902	
		•	•	•	•		•		•	2902746		
		•		•	•					2900542	2903920	
		•	•	•	•					2900573	2903908	
2.4 A	24 V DC	•		•	•		•			2900567	2903916	
		•	•	•	•		•			2900414	2903904	
		•	•	•	•		•		•	2902744		
		•		•	•					2900543	2903922	
	230 V AC	•		•	•		•			2900574	2903910	
		•		•	•		•			2900568		
		•	•	•	•		•			2900420		
		•	•	•	•					2900544		
9 A	24 V DC	•		•	•		•			2900569	2903918	
		•	•	•	•		•			2900421	2903906	
		•	•	•	•		•		•	2902745		
		•		•	•					2900545	2903924	
		•	•	•	•					2900576	2903912	
		•		•	•					2900530		
	230 V AC	•		•	•		•			2900538		
		•		•	•		•			2900570		
		•	•	•	•		•			2900422		
		•	•	•	•					2900546		
		•		•	•					2900578		
		•	•	•	•					2900531		
<b>Modular (optional accessories on page 32)</b>												
3 A	24 V DC	•		•				• <sup>2</sup>		2908696	2909563	
		•	•	•				• <sup>2</sup>		2908695	2909562	
		•		•	•			• <sup>2</sup>		2908700	2909570	
		•	•	•	•			• <sup>2</sup>		2908699	2909569	
		•		•	•		•	•			2909557	
		•	•	•	•		•	•			2909556	
9 A	24 V DC	•		•				• <sup>2</sup>		2908694	2909561	
		•	•	•				• <sup>2</sup>		2908693	2909560	
		•		•	•			• <sup>2</sup>		2908698	2909568	
		•	•	•	•			• <sup>2</sup>		2908697	2909567	
		•		•	•		•	•			2909555	
		•	•	•	•		•	•			2909554	
<b>Network-capable (gateway required, see page 33)</b>												
0.6 A	24 V DC	•		•	•	•	•			2905154	2905141	
		•	•	•	•	•	•			2905151	2905138	
		•		•	•	•				2905162	2905148	
		•	•	•	•	•				2905157	2905144	
3 A	24 V DC	•		•	•	•	•			2905155	2905142	
		•	•	•	•	•	•			2905152	2905139	
		•		•	•	•				2905163	2905149	
		•	•	•	•	•				2905159	2905146	

1) Dependent on the application up to PL e / SIL 3 2) Module without underload detection



Hybrid motor starters											
		Functions							Connection technology		
		Direct starter	Reversing starter	Motor protection	Emergency stop <sup>1</sup>	Can be networked	ATEX	Modular	Short-circuit protection	Screw	Push-in
Maximum load current	Input voltage										
9 A	24 V DC	•	•	•	•	•	•		2905156	2905143	
		•	•	•	•	•	•		2905153	2905140	
		•	•	•	•	•	•		2905164	2905150	
		•	•	•	•	•	•		2905160	2905147	


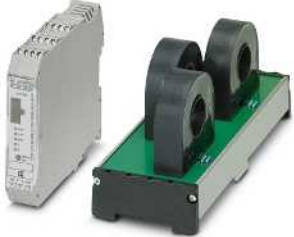
Solid-state contactors					
		Functions			
		Direct starter	Reversing starter	Single-phase	
Maximum load current	Input voltage				
2 A	24 V DC	•			2297196
		•	•		2297293
		•			2297206
9 A	230 V AC	•			2297303
		•	•		2297219
		•			2297316
20 A	24 V DC	•			2297222
		•	•		2297329
		•			
30 A	230 V AC	•			1032919
		•			1032920
37 A	24 V DC	•			1032921
		•	•		1032922
50 A	230 V AC	•			
		•	•		2297277
		•			2297374
50 A	24 V DC	•			2297280
		•	•		2297387
50 A	230 V AC	•			1032926
		•			1032927

Electronic load relays for controlling DC motors							
		Functions			Connection technology		
		Reversing starter	Switching delay	Overall width	Screw	Push-in	
Maximum load current	Input voltage						
2 A <sup>3</sup>	24 V DC	•	80 ms	6.2 mm	2980539		
		•	80 ms	6.2 mm		1069556	
		•	80 ms	12.5 mm	2963598		
6 A	24 V DC	•	80 ms	12.5 mm	2982090		
		•	1 ms	12.5 mm	2982757		
10 A	24 V DC	•	80 ms	62 mm	2964306		







3) Please observe the derating information in the documentation when selecting products.

## Product overview

Motor manager						
		Applications				
		Motor protection	Monitoring	Internal converter	External converter	
Maximum load current	Input voltage					
<16 A	24 V DC	•	•	•		<a href="#">2297523</a>
	230 V AC	•	•	•		<a href="#">2297536</a>
>16 A	24 V DC	•	•		•	<a href="#">2297497</a>
	230 V AC	•	•		•	<a href="#">2297507</a>




Machine manager		
		
Description	90 A machine management	160 A machine management
Measuring range	0.5 A ... 90 A	0.5 A ... 160 A
Int. diam. of converter	11 mm	23 mm
Type	EMM 3-24DC/500AC-90-EXM-IFS	EMM 3-24DC/500AC-160-EXM-IFS
Order no.	<a href="#">2908602</a>	<a href="#">2908603</a>






Accessories selection guide for hybrid motor starters, electronic motor and machine managers					
		Gateway	Bridges	PSR	Relay module
Hybrid motor starter	Stand-alone	–	Optional	–	–
	Modular	–	Optional	Optional	Optional
	Network-capable	Required	Optional	–	–
Motor and machine manager		Optional	Optional	–	–

Accessories for hybrid motor starters, electronic motor and machine managers, with screw connection						
						
Description	PROFINET gateway	EtherNet/IP™ gateway	PROFIBUS gateway	CANopen® gateway	Modbus/TCP gateway	Digital expansion module
Order no.	<a href="#">2904472</a>	<a href="#">2901988</a>	<a href="#">2297620</a>	<a href="#">2901504</a>	<a href="#">2901528</a>	<a href="#">2904473</a>




Accessories for modular hybrid motor starters			
	Connection technology		
	Screw	Push-in	
Safety relay	1009831	1009832	
Relay expansion module	2908701	2909573	
System power supply	2866983	–	
DIN rail connector	2203861		

Additional accessories			
			
<b>Description</b>	<b>DIN rail connector</b>	<b>Data cable</b>	<b>Bridge for all hybrid motor starters (2x)</b>
Order no.	2201937	2320500	2900746
			To loop through the 3-phase supply

CrossPowerSystem	Accessories				
					
<b>Description</b>	<b>Power distribution board, 225 mm</b>	<b>Power distribution board, 405 mm</b>	<b>Connection module</b>	<b>Connection module</b>	<b>Device adapter for fuse, 22.5 mm*</b>
Nominal current	–	–	63 A	125 A	16 A (3-pos. for fuse)
Designation	EM-CPS-225	EM-CPS-405	EM-CPS-TB3/63A	EM-CPS-TB3/125A	EM-CPS-DA-22,5F/16A
Order no.	1002634	1002635	1002633	1070299	1002668

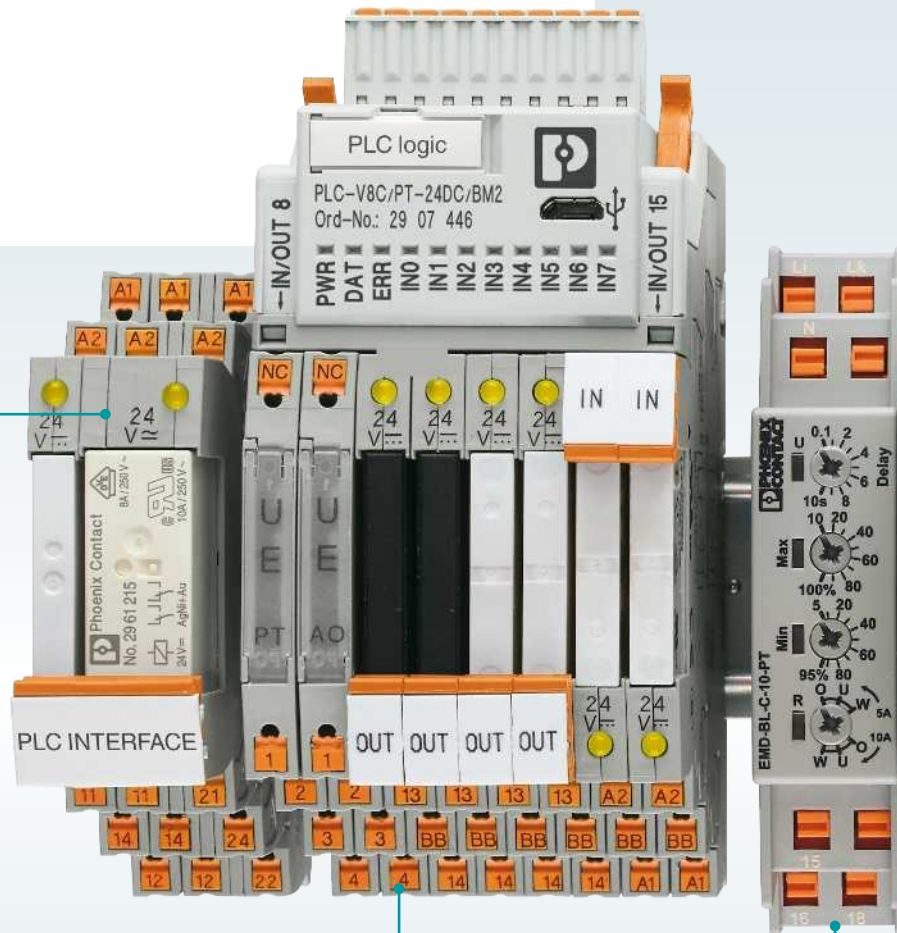
\* Fuses are not supplied as standard

TRIO CROSS POWER			
			
<b>Description</b>			
Nominal current	5 A		
Designation	EM-CPS-PS/3AC/24DC/5A		
Order no.	1064922		

# Switch now

## Clever switching devices for every application

Discover our cutting-edge technological products and master any challenge. The wide range of switching devices from Phoenix Contact offers you the ideal solution for every application.



### High-performance and at a great price

Whatever the required application or industry for your relay modules, you will find the best solution with PLC-INTERFACE.

**i** Web code: #0688

### Extremely compact control and switching

PLC logic combines relay and analog modules with logic functions and intuitive software.

**i** Web code: #1104

### For high system availability

Detect deviations in important system parameters early with EMD monitoring relays.

**i** Web code: #1105

## Easy handling

You can realize all standard relay applications with RIFLINE complete.

**i** Web code: #0695

## Proven safety

Innovative and reliable technology, tried and tested over many years. Our PSR safety devices guarantee functional safety.

**i** Web code: #0494



## Intelligent motor switching

Switch and reverse motors quickly and reliably with compact CONTACTRON hybrid motor starters.

**i** Web code: #0568

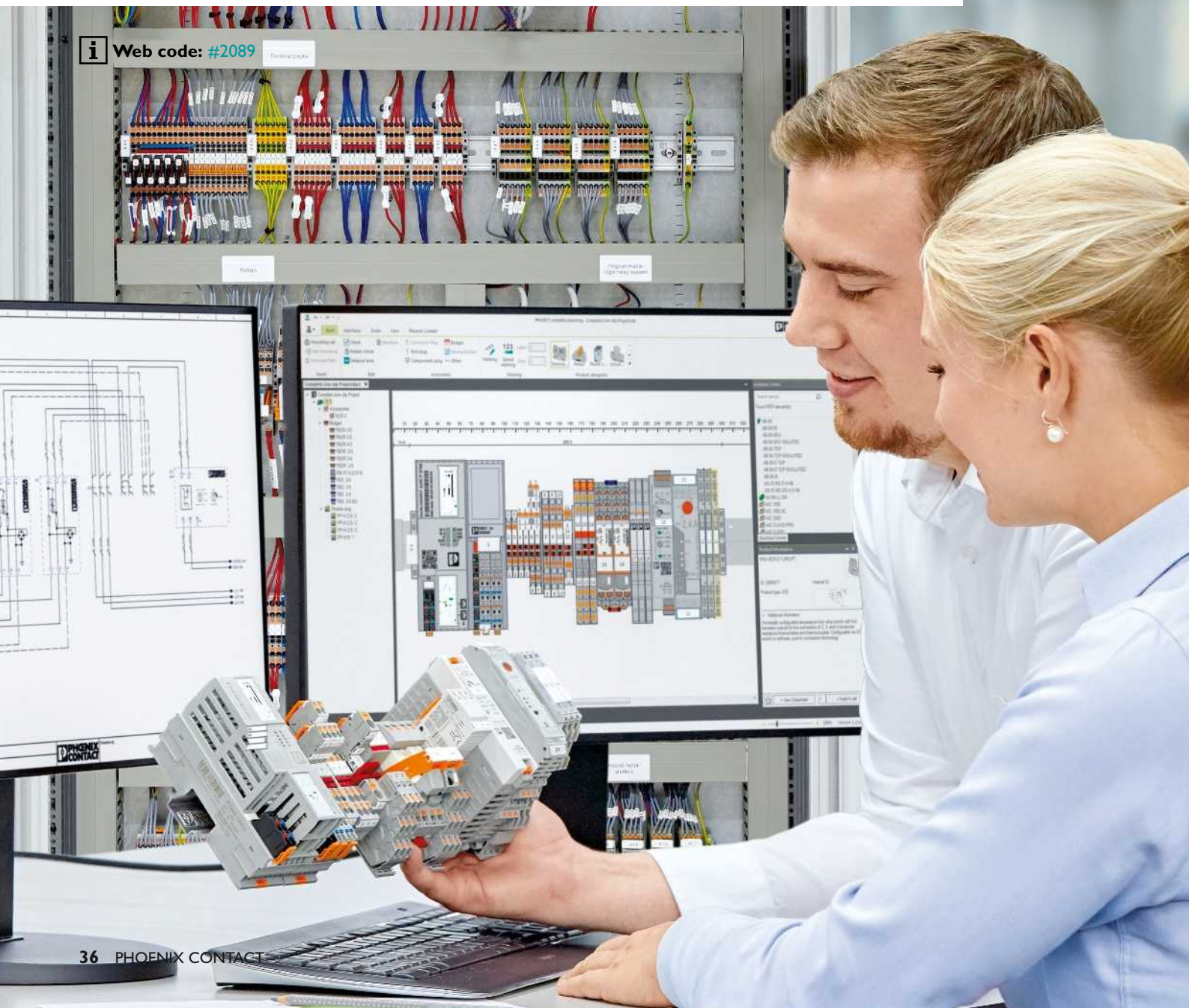
## Perfect timing

ETD time relays ensure optimum time sequences.

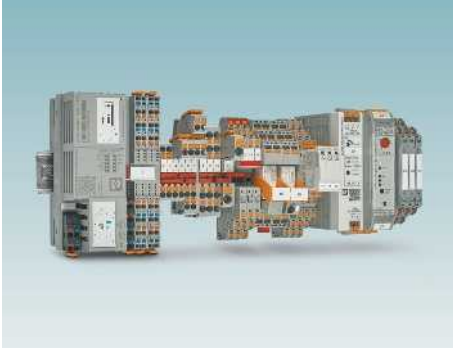
**i** Web code: #1106

# COMPLETE line – The comprehensive solution for the control cabinet

COMPLETE line is a system comprising technologically leading and coordinated hardware and software products, consulting services, and system solutions that help you optimize your processes in control cabinet manufacturing. Engineering, purchasing, installation, and operation become significantly easier for you.



## Your advantages in detail:



### Comprehensive product portfolio

With COMPLETE line, we offer a complete product portfolio of technologically leading products. This includes:

- Controllers and I/O modules
- Power supplies and device circuit breakers
- Terminal blocks and distribution blocks
- Relay modules and motor starters
- Signal conditioners
- Safety technology
- Surge protection
- Heavy-duty connectors



### Intuitive handling

Thanks to the simple, intuitive handling of the coordinated hardware components, you will save time during installation, startup, and maintenance. Push-in connection technology enables you to wire applications quickly – without using tools. The broad, technologically leading product portfolio will always provide you with the right product for standard or special applications.



### Time savings across the entire engineering process

The PROJECT complete planning and marking software supports the entire process of control cabinet manufacturing. The program features an intuitive user interface that enables the individual planning, automatic checking, and direct ordering of terminal strips.



### Reduced logistics costs

Reduced variety of parts, thanks to standardized marking, bridging, and testing accessories. The COMPLETE line system coordinates products, design, and accessories so that you benefit from maximum reusability and thus reduce your logistics costs.



### Optimized processes in control cabinet manufacturing

COMPLETE line supports you, from engineering through to manufacturing, in designing your control cabinet production as efficient as possible. Your customized concept for optimizing your processes in control cabinet manufacturing is thus created. Our terminal strip production helps you to flexibly manage order peaks or to supply your control cabinet production with fully assembled DIN rails just in time.



### The new standard for the control cabinet

Discover the extensive COMPLETE line product portfolio and find out more about COMPLETE line and your comprehensive solutions for the control cabinet.

Visit our website:  
[phoenixcontact.com/completeline](https://phoenixcontact.com/completeline)

# Worldwide service and support: We are there for you

At Phoenix Contact, the focus is always on you, the customer. With over 50 subsidiaries across the world and more than 30 agencies, we are always close by. As a result, you receive verified, first-hand advice and benefit from fast and timely delivery of a complete package consisting of high-grade, optimally coordinated components. Our expertise and the high levels of production depth also allow customized solutions tailored to you. We will also support you after the purchase with comprehensive after-sales services.

 Web code: #1256



## Comprehensive after-sales services

We are there for you – not just before the sale, but also afterwards, with our extensive after-sales services. These include our repair service, exchange service, and replacement parts service.



### Comprehensive training program

From the basics to specialist expertise: we provide you with the skills you need in line with your specific requirements.



### Product sets and junction boxes

We pre-assemble product sets, equip and wire up terminal strips as per your specifications, and integrate these into the matching junction box.



### Cable assembly

We assemble your specific cable solutions in accordance with your specifications. For this purpose, use our online configurators or get in touch with your local contact person.

## In dialog with customers and partners worldwide

Phoenix Contact is a globally present, Germany-based market leader. Our group is synonym for future-oriented components, systems, and solutions in the fields of electrical engineering, electronics, and automation. A global network across more than 100 countries, and 17,400 employees ensure a close proximity to our customers, which we believe is particularly important.

The wide variety of our innovative products makes it easy for our customers to find future-oriented solutions for different applications and industries. We especially focus on the fields of energy, infrastructure, process and factory automation.



You will find our complete product range at:  
[phoenixcontact.com](http://phoenixcontact.com)

PHOENIX CONTACT GmbH & Co. KG  
Flachmarktstraße 8  
32825 Blomberg, Germany  
Phone: +49 52 35 3-00  
Fax: +49 52 35 3-4 12 00  
E-mail: [info@phoenixcontact.com](mailto:info@phoenixcontact.com)  
[phoenixcontact.com](http://phoenixcontact.com)