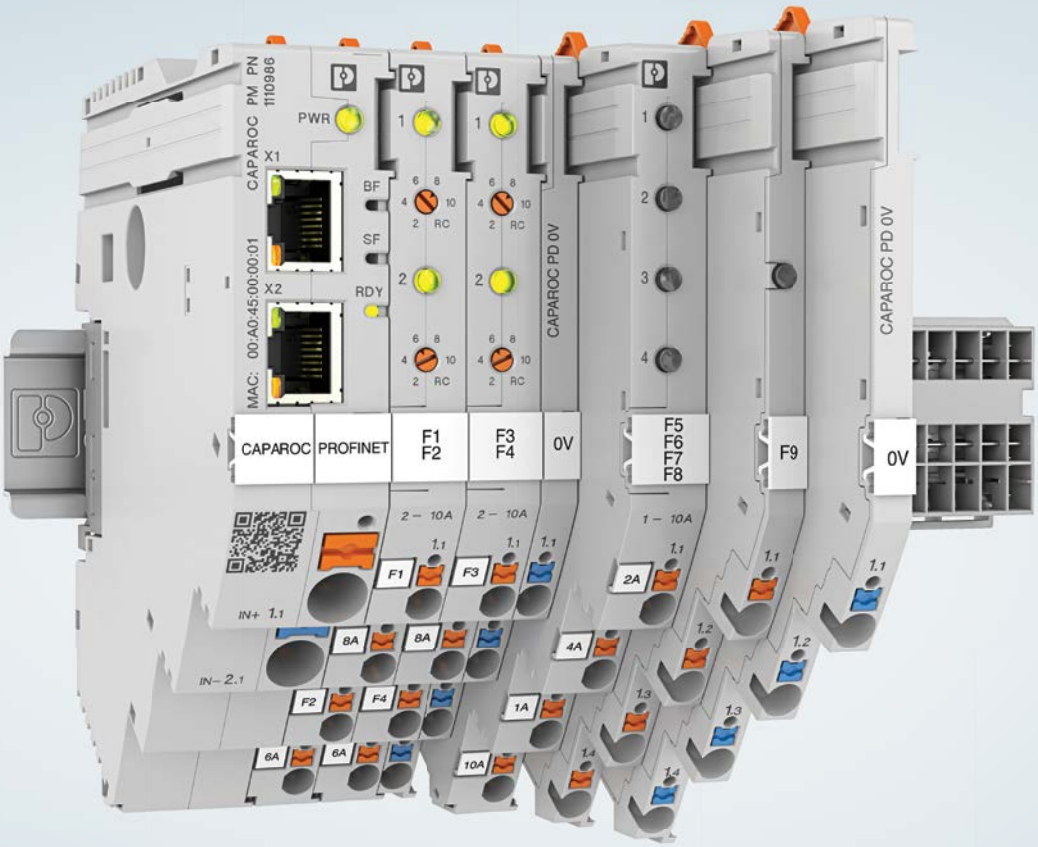
COMPLETE line



CAPAROC overcurrent protection

Customizable circuit breaker system

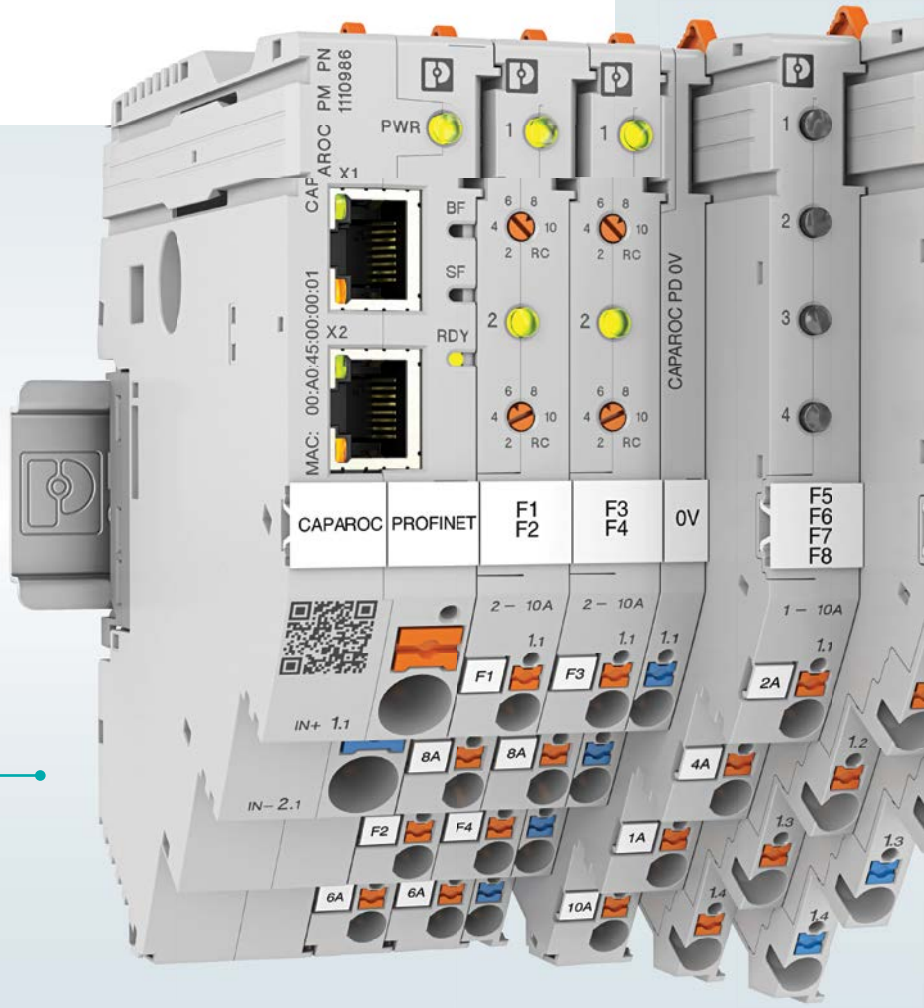
PHOENIX CONTACT
INSPIRING INNOVATIONS

Customizable standard

CAPAROC is your individual modular system for overcurrent protection. With versatile combination options, easy operation, and rapid design-in, CAPAROC is a fully tailored benchmark in device protection. Using this system, you are perfectly positioned for the future.

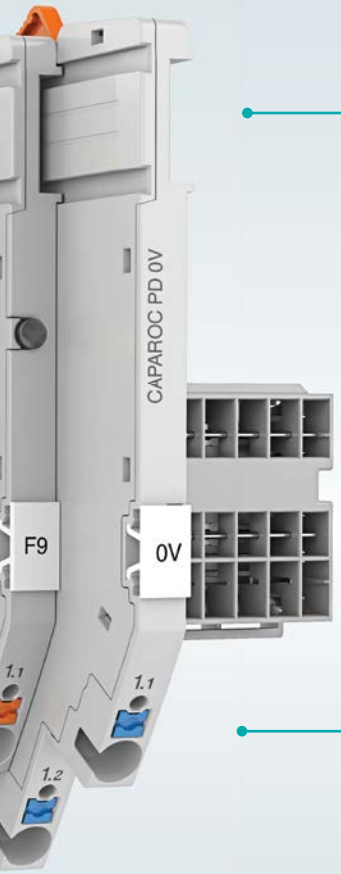
COMPLETE **line**

The new standard for the control cabinet.
More information on pages 26 and 27.



Particularly easy operation for everyone

Tool-free assembly, uninterrupted installation, and transparent operating state.



Exceptionally easy design-in

Extensive support from selection to digital services.

The benchmark that you can tailor

A wide range of possible combinations in this future-proof modular system.

Contents

What is it?

Phoenix Contact eXtended Reality

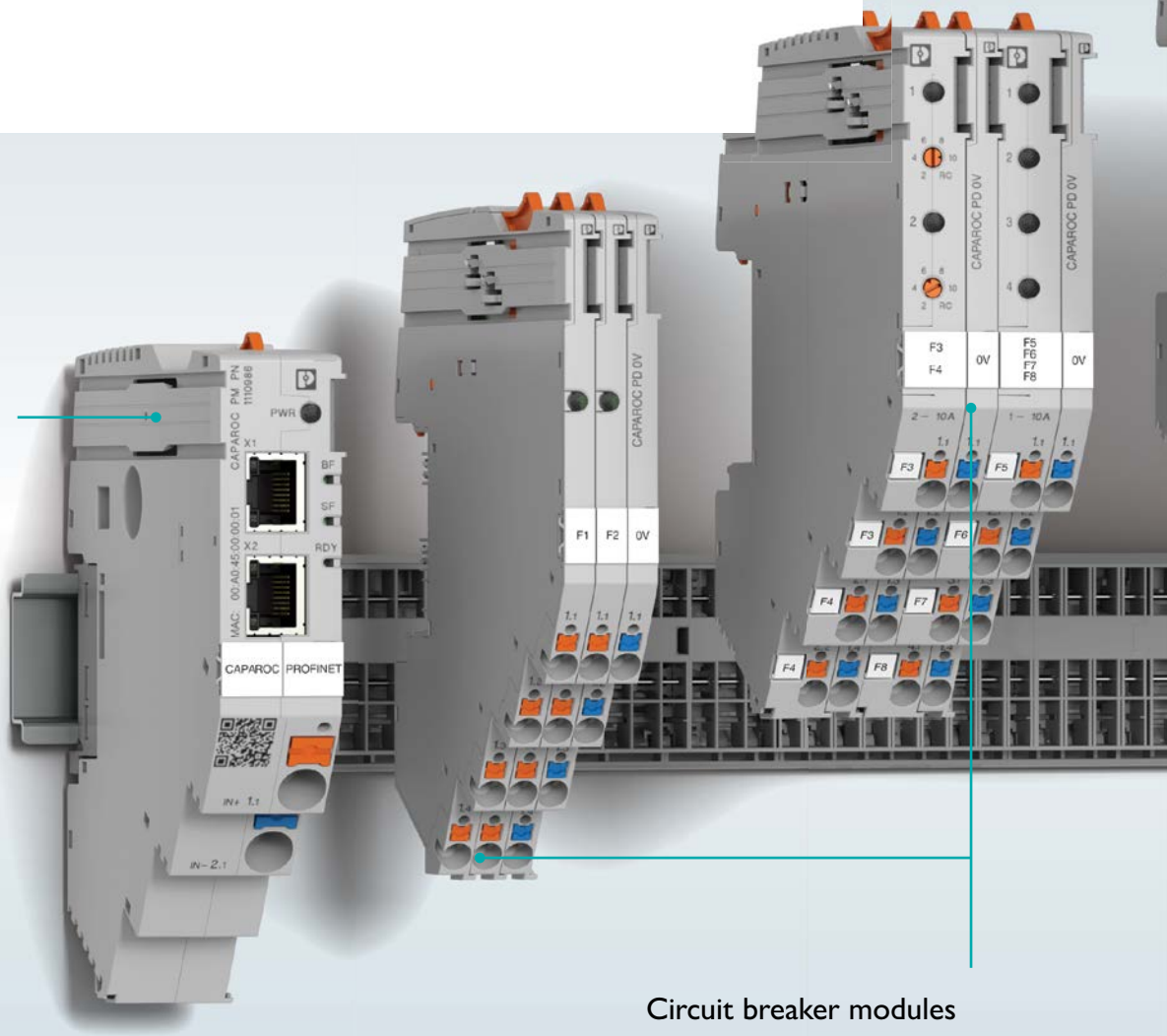
Using PXR
Scan QR codes located throughout this document with your mobile device camera or QR code reader to launch **PXR**.

Interact with the 3D model of the product. Click the "View product list" button to see listings or "View in my space" to project the model into your area (AR experience).

Scan the above QR code to get started!

Customizable standard

The system for the future: Thanks to a wide range of individual modules and many combination options, you can create a completely customized solution with CAPAROC. The modular system is flexible, always technologically up-to-date, and extendable at any time – even during operation.



Power modules

Various versions – from simple to advanced communication.

- Status message and remote reset
- PROFINET communication

Circuit breaker modules

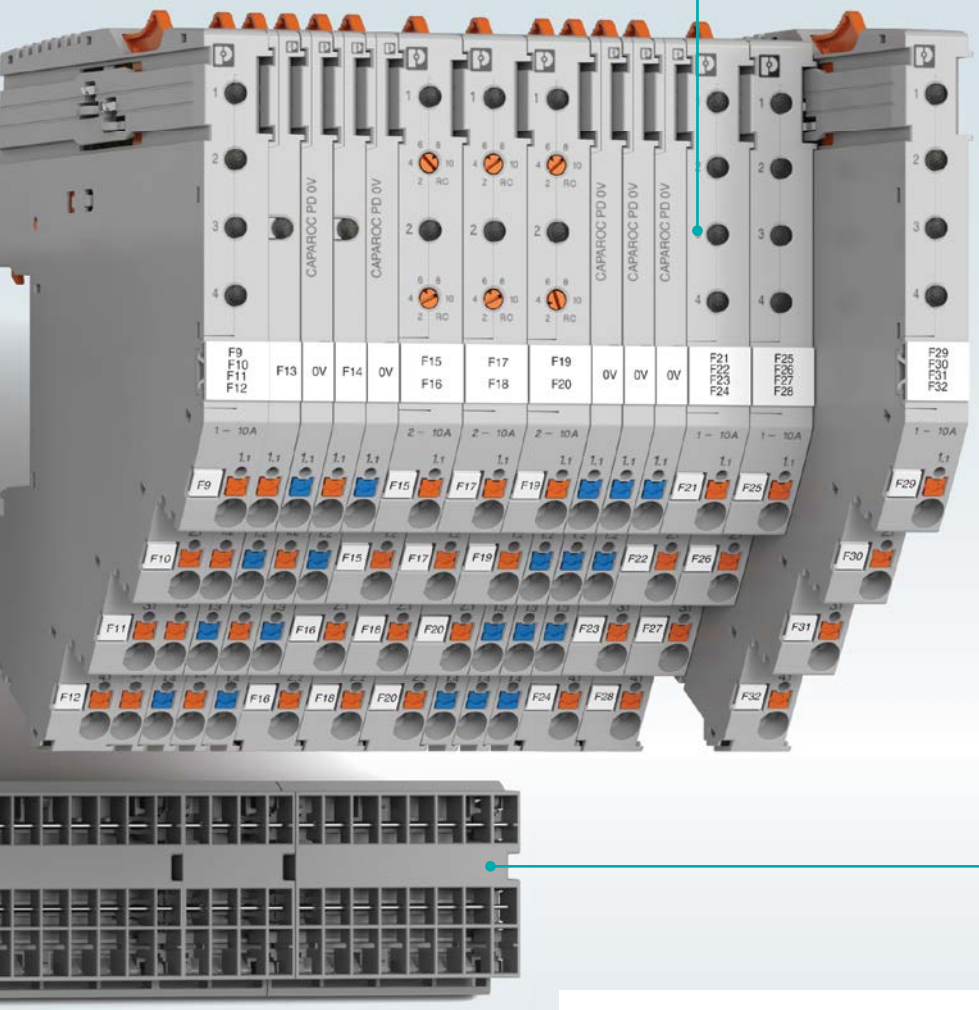
Ideal protection with a tailored selection of circuit breaker modules.

- 1-, 2-, and 4-channel
- Adjustable or fixed nominal current values

Potential distribution modules

Tailored integration straight into the system.

- Easily marshal common return wires



Current rail

Uninterruptible supply with the innovative rear-side current rail.

- Customizable
- Can be extended at any time
- Easy plug-and-play design

Future-proof system

The CAPAROC system can be extended at any time and even new modules will always be compatible without limitation. This allows you to quickly upgrade an originally simple solution to create an intelligent solution with communication interface at any time. Whatever adjustments you decide to make in the future, this system is fully flexible and technologically state of the art.

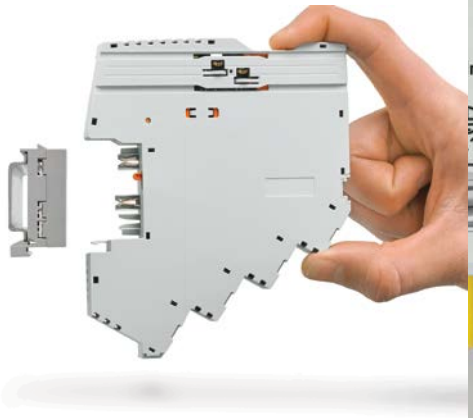
Easy operation

Use CAPAROC and experience easy operation through tool-free assembly, uninterrupted installation, and a transparent operating state: The modules can easily be snapped on, even when assembled. The simple nominal current setting and the clear identification of connections and potentials ensure intuitive operation.

Low maintenance

You can perform maintenance work at any time without interrupting operation. Unplugging individual modules cuts off their power and only the circuit on which maintenance work is to be performed is interrupted. The rest of the system continues to operate and does not shut down. This means that modules can be replaced quickly and easily.

The test points on each connection simplify interactive troubleshooting within the system as well as system function testing.

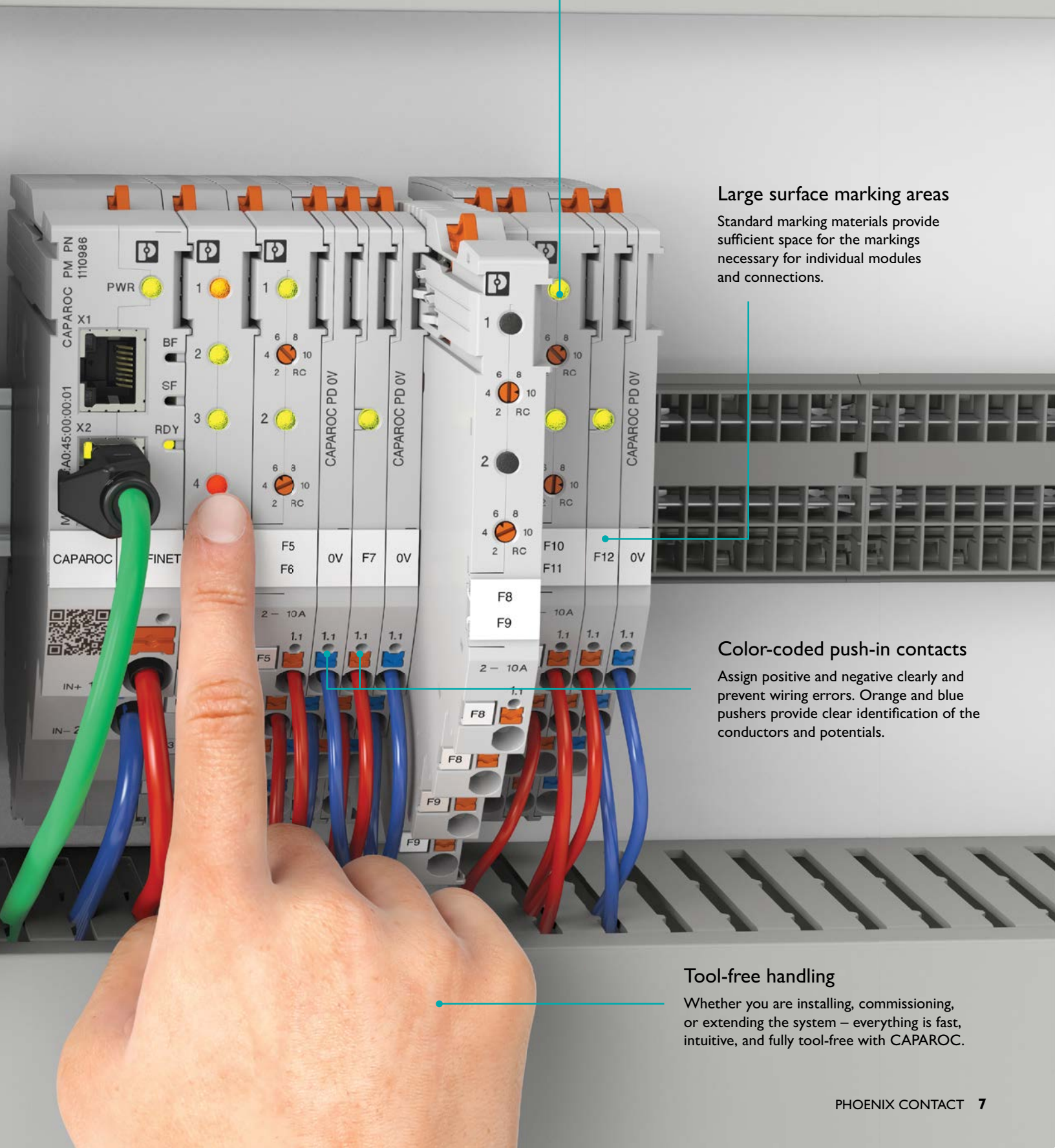


Plug and play

The system does not have to be assembled in the control cabinet, it can be prepared on a workbench and then installed in the control cabinet as one block.

Colored LEDs

The instantly recognizable and clear color-coded illustration of the various states saves time and ensures a rapid overview.



Large surface marking areas

Standard marking materials provide sufficient space for the markings necessary for individual modules and connections.

Color-coded push-in contacts

Assign positive and negative clearly and prevent wiring errors. Orange and blue pushers provide clear identification of the conductors and potentials.

Tool-free handling

Whether you are installing, commissioning, or extending the system – everything is fast, intuitive, and fully tool-free with CAPAROC.

Intuitive design-in

Strikingly simple: The online configurator helps you design a system that precisely meets your needs, and with your personal solution ID, you can access your account in the future to modify and make updates. A variety of digital services are available to support you, including customized marking, data sheets, and access to your individual data from the 3D model.

Digital services

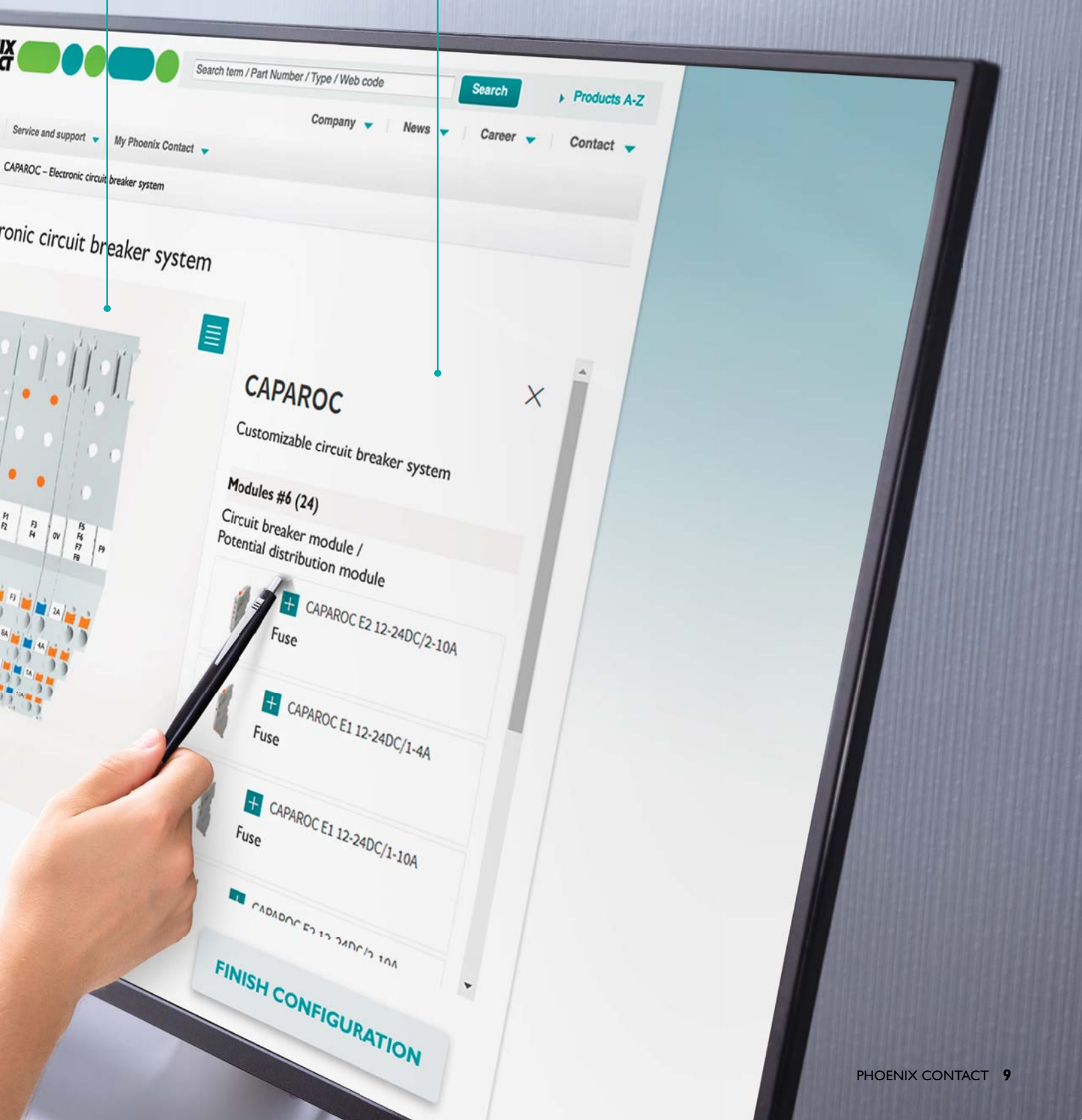
A broad range of digital services create an individually tailored system.

- System data sheet
- 2D and 3D data
- Marking data
- EPLAN data

Easy configuration

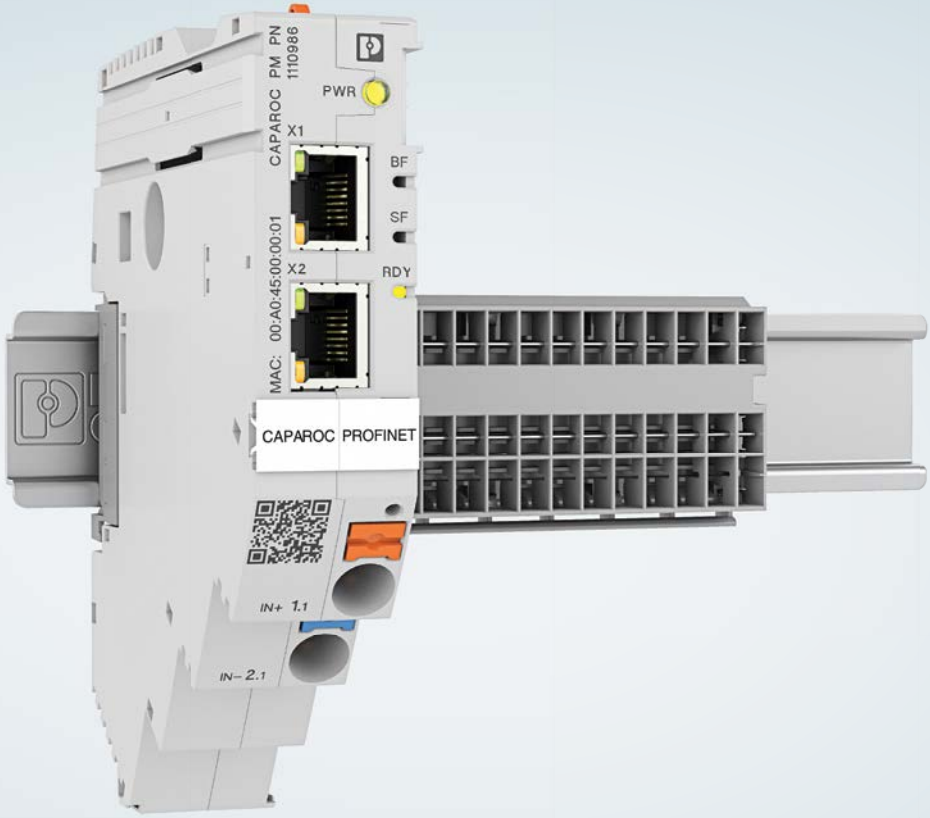
Combine system components to create a tailored solution.

- Easy selection with configuration assistants
- Detailed planning in intuitive detail mode
- Individual solution ID provided for each project created



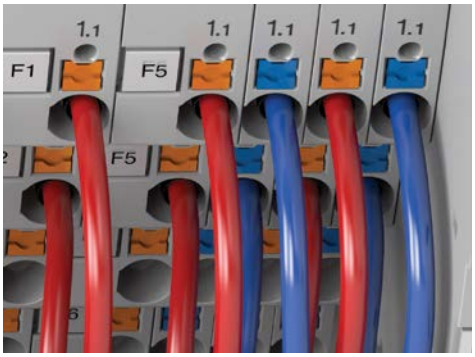
Supply and communicate centrally

System design starts with the power module. The central power supply and communication are managed here. All additional modules are supplied directly via the rear-side current rail. With automatic module addressing in the system, no further effort is needed. All system information is collected via the power module and forwarded to the provided interface for evaluation. This ensures that you have transparency for the entire 24 V supply grid.



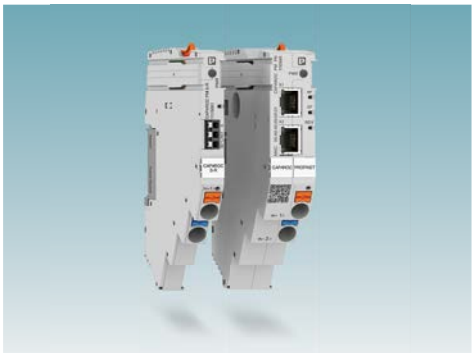
Launch

System advantages



Installation

The clearly color-coded connections practically rule out wiring errors. A secure connection with up to 45 A in the system is made with tool-free push-in connection technology.



Communication

The power module is the nerve center of the system. All data and signals are collected here and issued via the status output. The output I >80% issues a signal if the load on a channel reaches at least 80%. You can therefore respond before a failure occurs. You can also remotely reset tripped channels.

Complete transparency

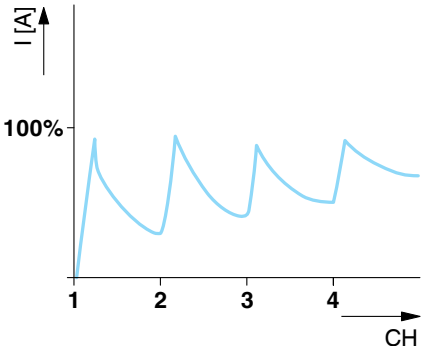
Know what's happening throughout your entire supply system. All data can be queried via the integrated PROFINET interface. Configure the channels and keep an eye on the current flowing. You can read off past events from the error log. This reduces troubleshooting times considerably.

CAPAROC starts your load with full control

Supplies in the 24 V DC range are highly complex and becoming ever more important in industry. Each component is precisely coordinated with the others and all components are dependent upon each other. An interruption, or in the worst case a failure, can be very expensive. Appropriate overcurrent protection is therefore of paramount importance. Wherever possible, various circuits should be designed to be modular, and therefore separately protected. To ensure that the power supply can safely start all necessary loads without adversely affecting parallel circuits, the startup behavior of all channels must be coordinated.

Cascaded channel start
CAPAROC cascades the start of all channels sequentially with a standard delay of 50 ms between the individual channels. This ensures that the load on the power supply is controlled and that all loads can be started safely. Regardless of which circuit breaker module is used, the channels are started sequentially in ascending order with a short time offset. This offset can be adjusted to the individual requirements via the communication interface. This means CAPAROC can be adjusted perfectly for every application.

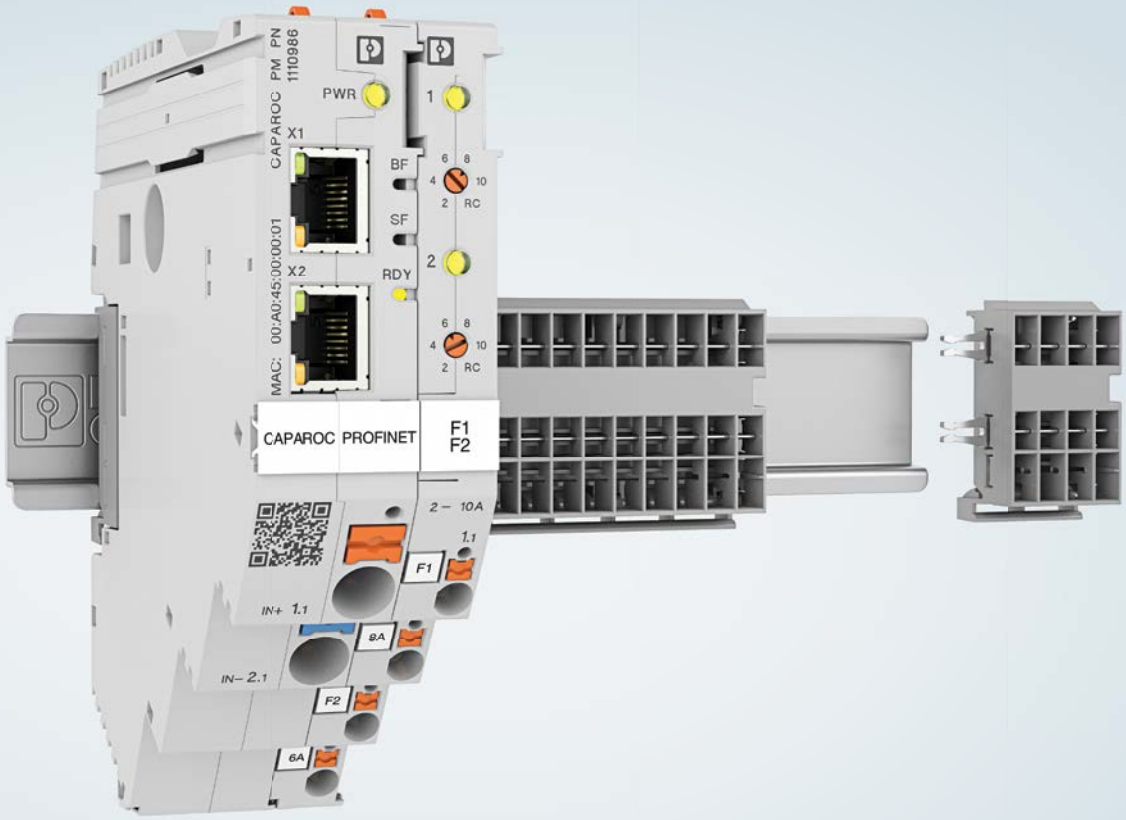
Total current monitoring with intelligent load shedding
CAPAROC supplies all loads with up to 45 A from one system. The integrated CAPAROC total current monitoring function ensures that long-lasting overloads do not occur. If an overload lasts longer than 2 minutes, the modules are disconnected sequentially, starting with the last to be connected. Therefore, simply position higher-priority modules as close to the power module as possible.



Cascaded connection of four channels

Convenient protection for two channels

The 2-channel circuit breaker modules in the CAPAROC system are intuitive and easy to configure. They allow you to easily read the set nominal current directly on the device at any time. Moreover, the active current limitation function ensures the more targeted utilization of the upstream power supply.



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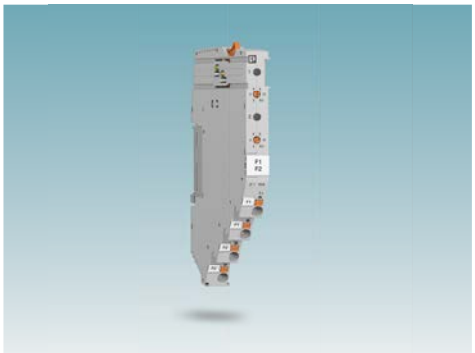
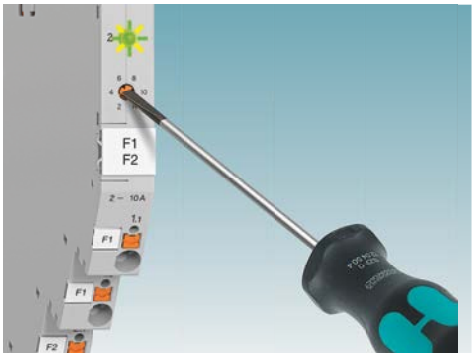
System advantages



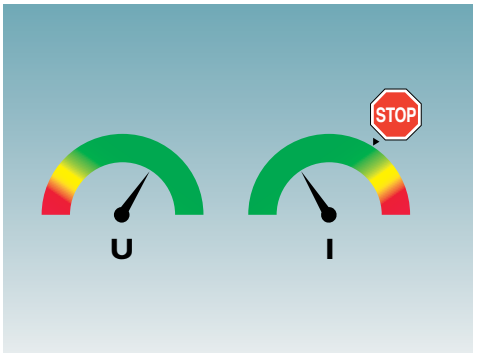
Configuration and visualization

Set the current incrementally based on the application – via an incremental selection of currents up to 10 A, supplemented with remote setting via RC remote control. The three-color LED buttons are used to switch the modules on and off, and also to signal the various states.



Easy configuration

The nominal current assistant makes configuration exceptionally easy. It allows the nominal current setting to be adjusted to your specific application. Simply turn the rotary switch until the optimum current has been found. The LED indicates when the appropriate setting has been reached. It could not be easier to configure the circuit breaker modules.



Active current limitation

The active current limitation restricts short circuit and overload currents to a value that is 1.5 to 2 times the nominal current. This protects the power supply against excessively high currents and prevents output voltage dips. In addition, longer cable paths between the power supply and load are possible without negatively impacting the shutdown behavior.

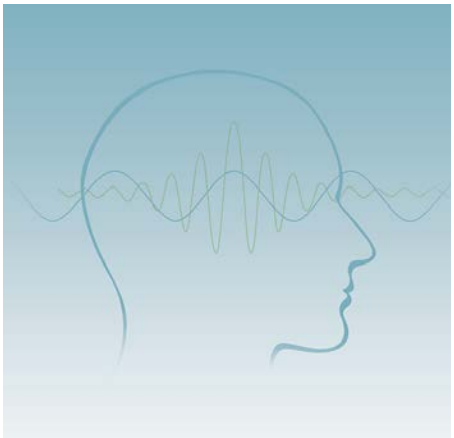
Intelligent electronic circuit breaker load recognition

Intelligent software is the core of an electronic circuit breaker. The software differentiates between operating currents and residual currents and responds rapidly via the electronics. This is because it has to ensure that faults are detected and shut down as quickly as possible while not shutting off an inrush current or normal operating current.

The error detection function runs through the following steps

- Measurement: To monitor the ongoing situation, all electrical variables are measured continuously.
- Analysis: The measured values are analyzed to determine a course of action.
- Classification: The currents are evaluated and classified.
- Protect and switch: Depending on the class of the analyzed current, the load is started or shut down. The rest of the system remains in operation and unaffected.
- Signaling: The operating states of all circuits are transmitted continuously to the system operator. If an event occurs, it is detected immediately and reported.

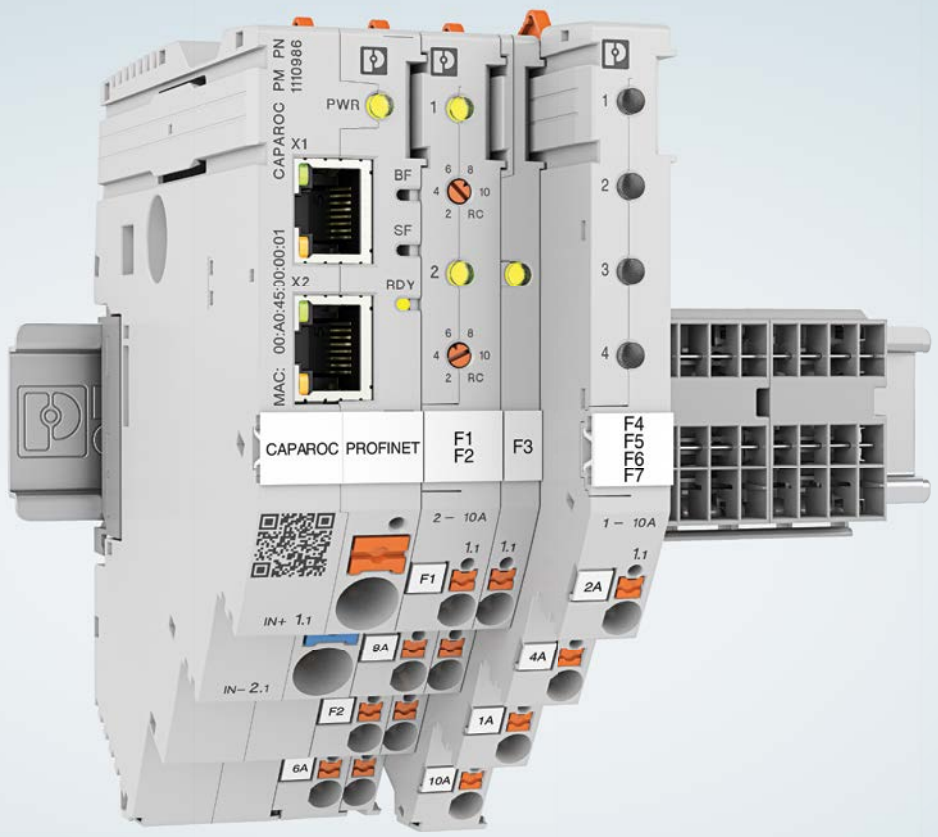
This approach limits the period of any potential voltage dips to a minimum. Despite the event, the system voltage remains stable. In the event of an overload current or a short circuit, the system quickly switches the circuit off.



Intelligent protection takes every detail into account.

Space-saving protection for up to four channels

The 1- and 4-channel circuit breaker modules are integrated into the system in a channel-specific manner. With fixed and adjustable nominal currents, they can be adjusted perfectly to any application – from maximum compactness with an overall width of just 3 mm per channel, to four integrated potential distributor terminals with a connection cross-section of up to 4 mm².



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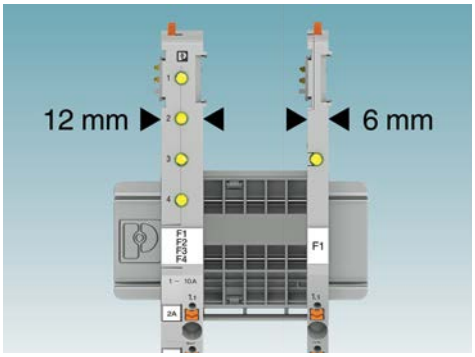
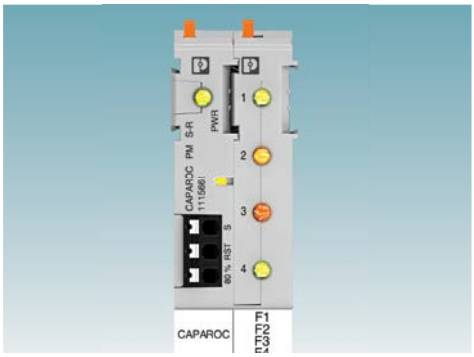
System advantages



Protection in a confined space

The individual combination options of the system ensure the ideal solution from an overall width of 3 mm per channel. Moreover, you can select between modules with fixed or adjustable nominal currents. The 1- and 4-channel circuit breaker modules are adjusted via intuitive single-button operation.



Transparent operating state

Multi-colored LEDs ensure that the system state is transparent. The multi-functional buttons do much more than provide the option of programming the circuit breaker. They also indicate the operating state of the product and connected devices via three status colors.

NEC Class 2 circuits

The versions up to 4 amps are approved in accordance with NEC Class 2. You can therefore easily configure energy-limited circuits with CAPAROC. Instead of an NEC Class 2 power supply, you can simply install your high-performance standard power supply.

CAPAROC provides protection against manipulation

The reliable and uninterrupted operation of machines and systems is of paramount importance. However, every now and then, errors still lead to malfunctions and even shutdowns. It is not uncommon for the set current of an electronic breaker to be adjusted to a higher setting for a quick fix. In this case, the underlying issue is not addressed and the channel no longer trips when needed. This can cause further damage in the machine.

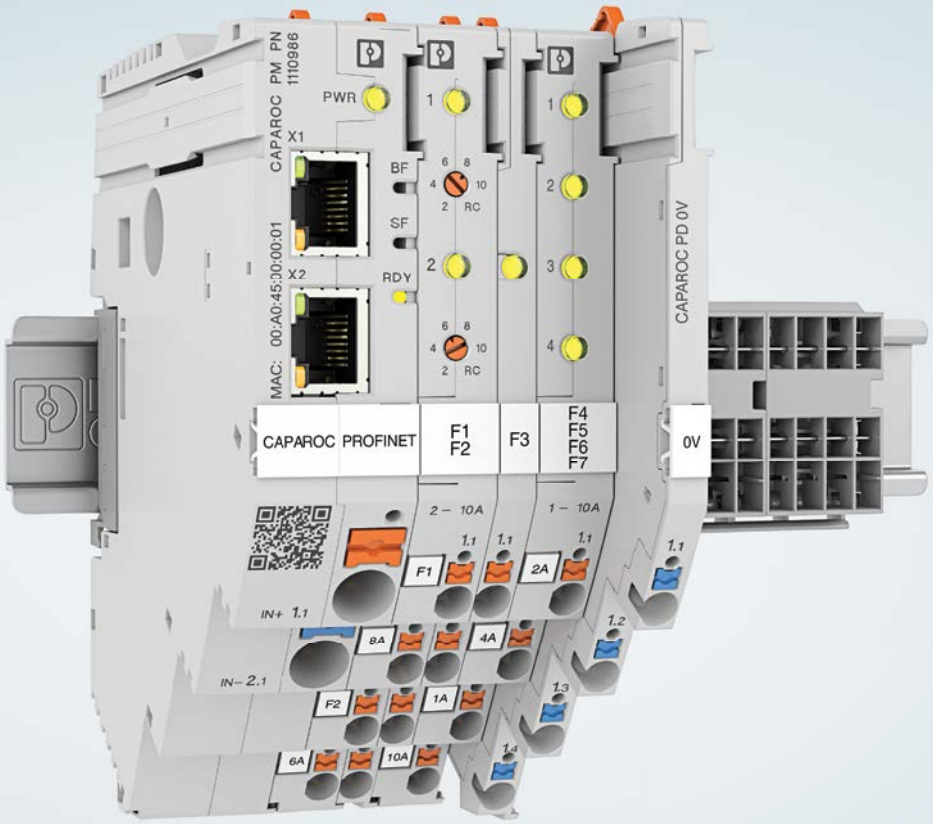
For this reason, CAPAROC is equipped with an electronic interlock for protecting the nominal current settings. This makes it necessary to acknowledge a change to the nominal setting prior to it taking effect. This is accomplished by pressing and holding down the channel button. Therefore, changes have to be made much more deliberately.

The set currents can also be locked against changes via the PWR LED button on the power module. Pressing and holding the button down for a few seconds will put the CAPAROC system in a mode that blocks changes from being made. The block must be removed before settings can be made again. To do this, it is necessary to press and hold down the button again for more than 3 seconds. The PWR LED clearly signals whether the block is enabled or disabled.

By using an interface in the CAPAROC system, such as PROFINET, the settings and block can be done remotely via the controller. Even the button function, if desired, can be completely disabled.

Reliable power distribution

The current rails are the elementary blocks of the CAPAROC system. They ensure the supply of all modules in the system. Modules can be added or removed without further installation work. The potential distributors are the ideal extension alongside every circuit breaker module for positive and 0 V load supply.



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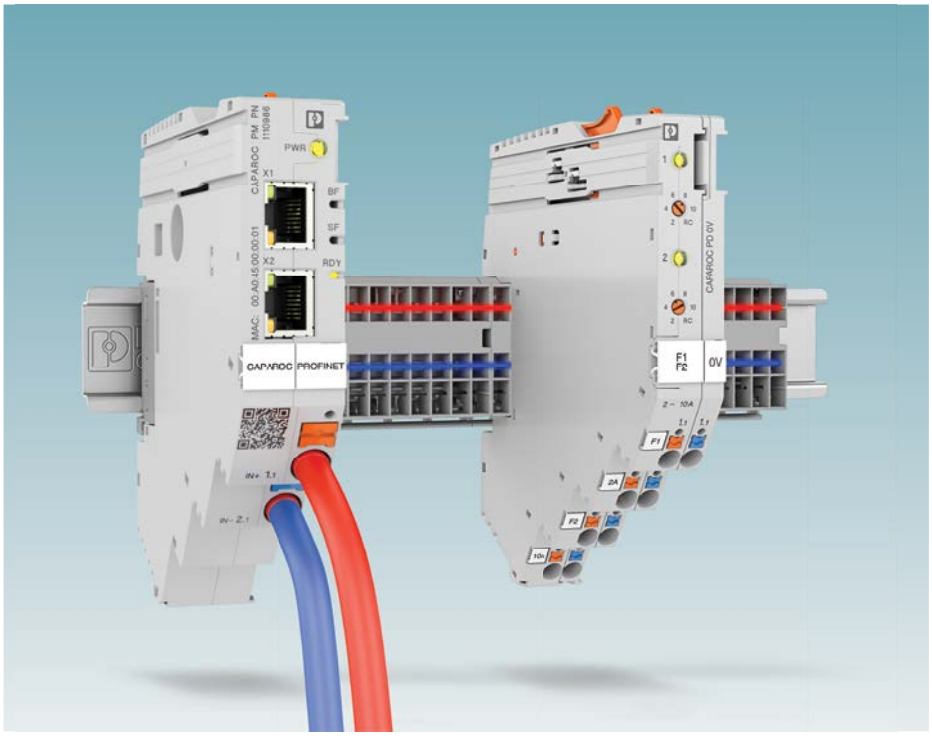
Reliably supply and distribute potentials

Central supply

The current rails of the CAPAROC system are used to supply all modules reliably. By connecting the supply line for positive and negative to the power module, the current rails are also supplied directly.

This reduces the amount of installation work and also eliminates installation errors between the feed-in and the connections of each protective module. The current rails connect the power module with every single module in the system.

With potential distributors that can be integrated into the system, the return conductor from every circuit can be connected in the system ideally. The color-coded pushers also integrated here make it easy to see what function the respective connections have. This helps to prevent wiring errors. Further terminal blocks are not necessary.

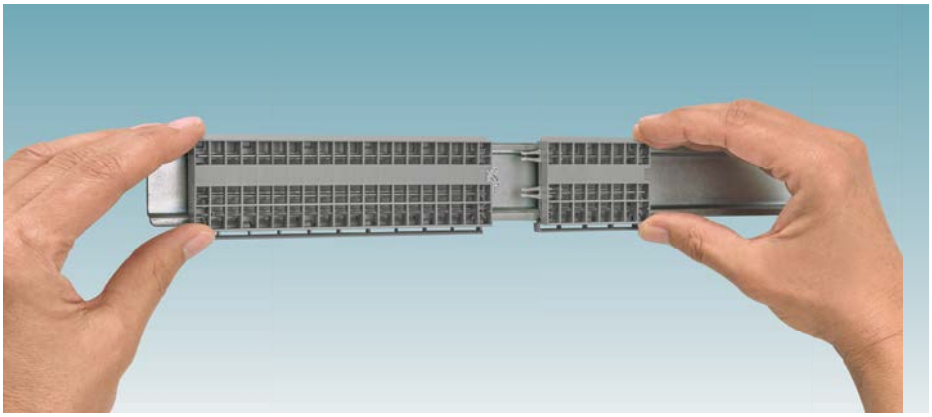


Power distribution via the current rails

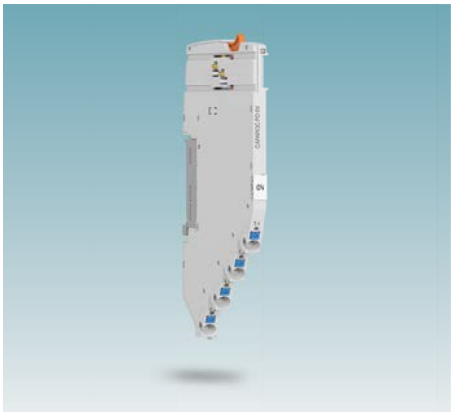
CAPAROC – fully modular and intuitive

In contrast to conventional systems, the structure of a CAPAROC system starts with the installation of an initial current rail with 8 or 20 slots. The individual modules are plugged onto this current rail and snapped into place. If the length is insufficient, the system can be extended with extension rails without the need for tools. Here, the additional rail simply has to be pushed together with the already installed rail.

The connection is established directly, and positive and negative are safely routed to the rear side of each module. This innovative supply means that system maintenance and operational adjustments can be performed without interrupting operation. Potential distribution modules simplify installation even further. They allow the 0 V potential to be fed back directly via the CAPAROC system. Separate 0 V distribution is no longer necessary. The blue pushers make it easier to clearly identify the potentials.



Simply push together, contact, and extend



Potential distribution modules for integration

Availability and performance for every application

Society expects a high degree of availability in all industries. In this respect, automated processes with state-of-the-art technology are basic components and their proper function must always be ensured. With tailored solutions for practically any application, the new and unique CAPAROC circuit breaker system is making a huge contribution to system availability.

Easy integration into various applications

Machine building and systems manufacturing

Production machines are the heart of a value-adding operation.

Durability and reliability are important attributes for these machines. Malfunctions or changes occurring in the ongoing process can lead to an enormous challenge.

With the systematic approach of the CAPAROC circuit breakers, rapid error localization as well as short-term adjustments or changes in the process sequence are no longer difficult challenges.

The fact that the channels of the different circuit breakers can be set individually means that there is a high degree of flexibility. In addition, the entire circuit breaker system can be extended easily, whether through communication options that increase the transparency of the system or additional channel protection for additional loads. The systematic CAPAROC approach allows the easy, future-proof design of systems and machines.

With CAPAROC, make adjustments easily, without system downtime.

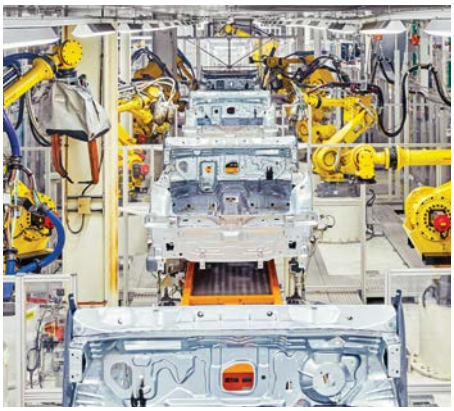
Automotive industry

It is not just the car itself and the associated driving experience that have been becoming increasingly digital in the last few years. Digitalization in production plants is also continuing to advance. The challenges are increasing due to increased complexity in combination with a high degree of flexibility in the production process.

The CAPAROC circuit breaker system allows you to face these challenges head on.

The easy-to-understand and intuitively manageable system with communication options provides a constant overview of the status of your system. Potential sources of interference can therefore be identified in advance and eliminated proactively. If, despite this, an overcurrent occurs, the system allows rapid troubleshooting, localization, and elimination.

This means that downtimes can be kept to a minimum, allowing uninterrupted production sequences.



24/7, 365 days a year – operations without malfunctions with CAPAROC

Process industry

In process technology and process engineering, system availability, modularization, and digitalization are key factors in keeping pace with increasing competition. Whether in the chemical and pharmaceutical industry or the oil and gas industry, highly complex process plants must satisfy the growing demands on system availability and flexibility.

The CAPAROC circuit breaker system helps to eliminate downtime and allows you to achieve high levels availability.

The controller functions allow various loads to be switched on and off across longer distances. It is also possible to reset a channel that has tripped. This eliminates the need for on-site maintenance if no ongoing fault has occurred.

The circuit breaker system products have been tested and approved in accordance with a comprehensive range of the latest approvals.

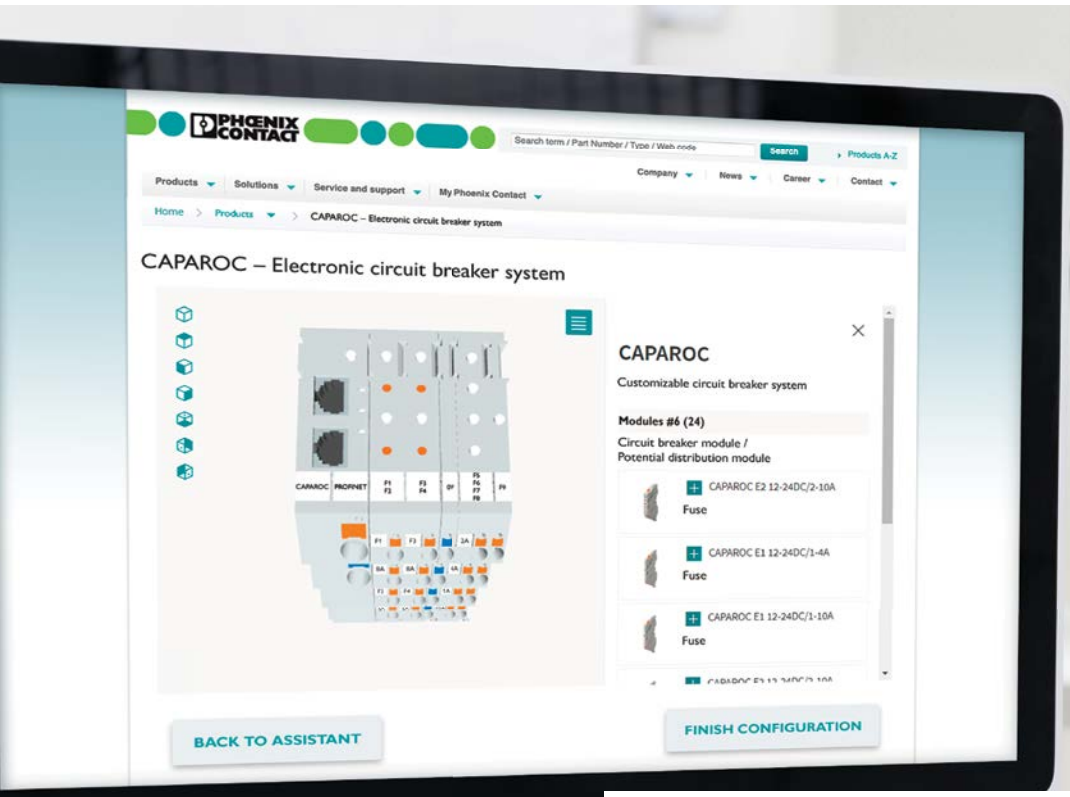
Monitoring and controlling device protection in complex systems – with CAPAROC

Configure and order online

Our online configurator supports you in the process of quickly creating your individual solution, tailored to your specific application. The intuitive user interface also simplifies error-free configuration. Go ahead and try it out!

For further information on the CAPAROC configurator, simply enter the web code in the search field on our website.

Web code: #2835

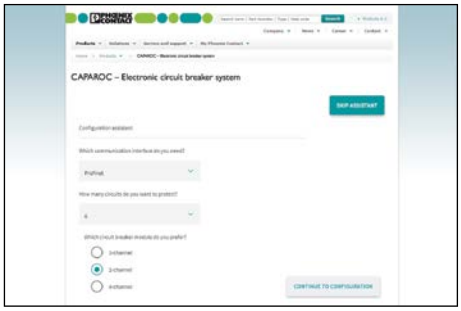


clipx ENGINEER

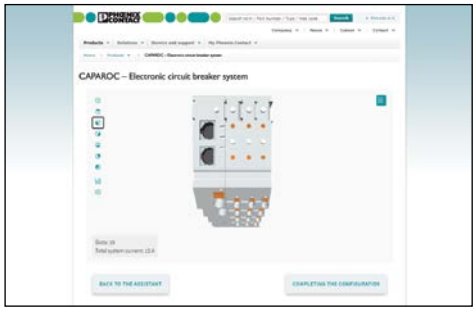
Do you already use the Phoenix Contact planning tool? You can start up the CAPAROC system configurator straight from clipx ENGINEER and receive everything from a single source. The combination of this tool along with your configured solution allows you to work on your data easily.

Rapidly configure the right system

Just two steps to a solution proposal with the configuration assistant

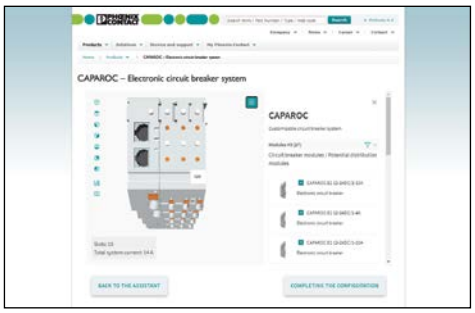


Step 1
First, select the desired properties, such as the communication interface or the type of circuit breaker modules.

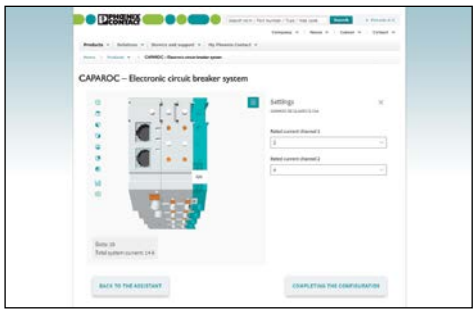


Step 2
Check the configuration and then place your order.
Here, you have the option to make additional configuration decisions.

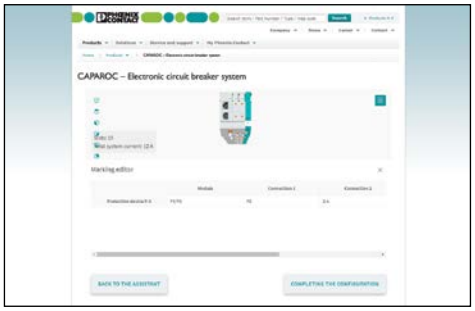
Additional configurations



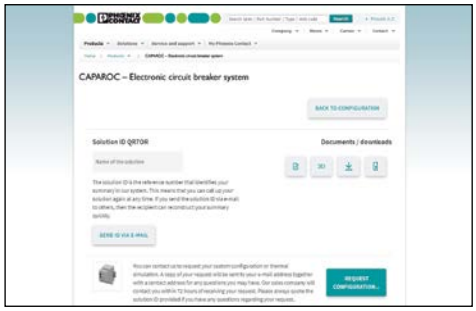
Do you need potential distributors for your system? Integrate them directly into your CAPAROC system using the corresponding modules. Simply place them in the appropriate position using drag-and-drop.



Set the nominal currents for each channel and we will determine if the system is properly dimensioned. This ensures that your system is perfectly designed and will run smoothly.



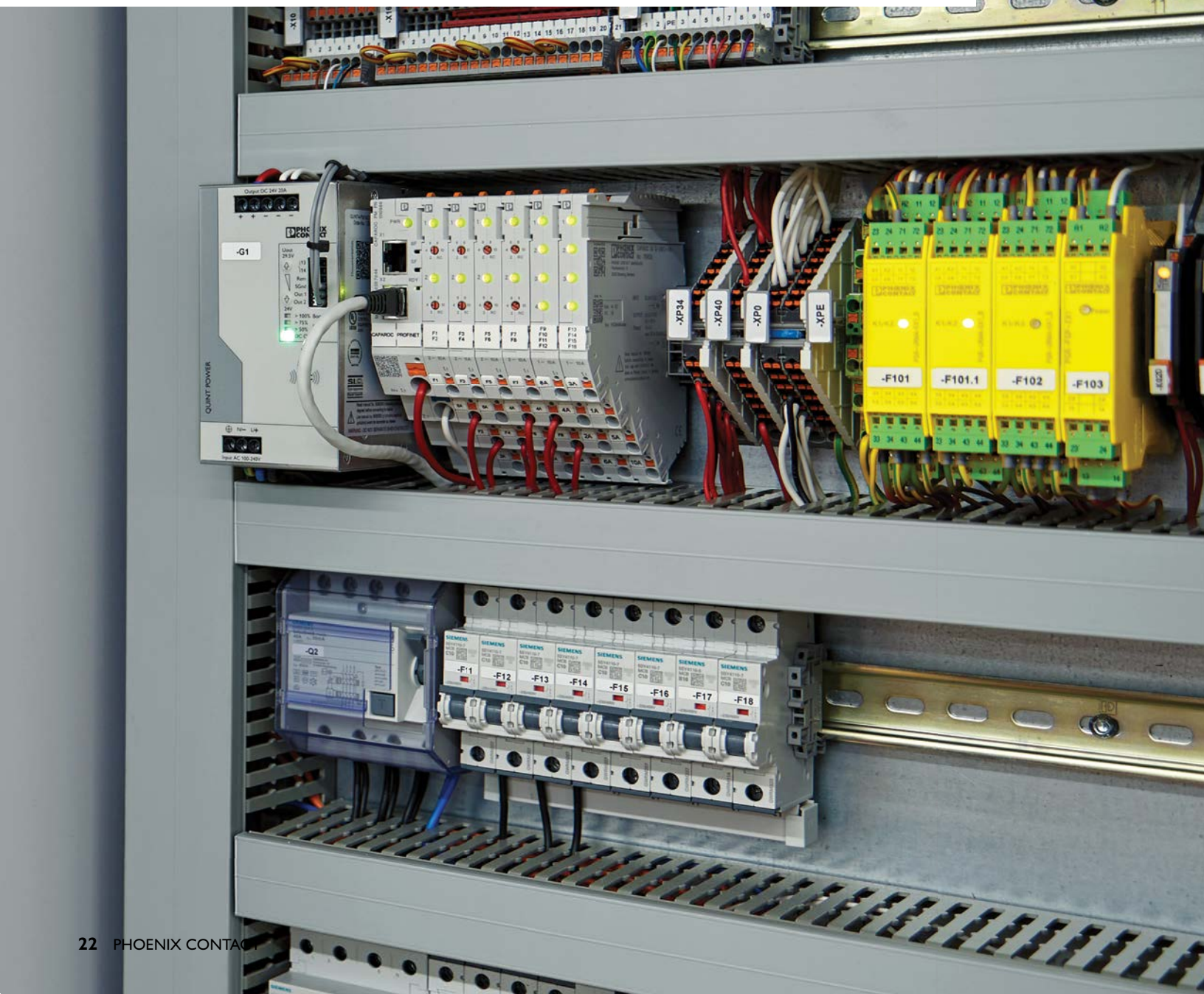
Would you like to equip the modules with customized printing? No problem. Simply enter the appropriate marking. You will then receive the corresponding printing file or, upon request, we will even supply your system fully marked.



You will receive all relevant data as a download package once configuration is completed. This consists of a system data sheet, technical data, and various diagrams. Each project is provided a detailed bill of materials and unique solution ID, making it possible to re-enter the project to make changes or additions.

CAPAROC –
The right solution for every application

The versatility of CAPAROC allows you to tailor individual benchmarks for each specific application. This allows you to quickly develop the benchmarks that are required for the respective requirement, ranging from systems where space is tight, to integrated potential distributors, all the way to communicative protection systems.



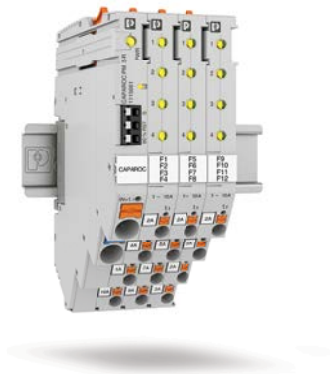
Slim, exceptionally modular solutions

The streamlined system

Space is always a very important feature when selecting a product. The modularity of CAPAROC allows multi-channel circuit breaker systems to be assembled, saving considerable space without having to accept any limitations to the system. Therefore, all operators can assemble systems tailored to their specific application and remain flexible in terms of maintenance and extendibility.

One system with an overall width of just 50 mm reliably protects 12 circuits. The system is comprised of the narrow CAPAROC PM S-R power module and three 4-channel circuit breaker modules. Here, an overall width of just 4 mm is required for each protected output. Each channel can be configured as required via the single-button operation and setting functions. This ensures the appropriate protection for every single channel.

In addition, the outputs for I >80% and state monitoring ensures that the status of the 24 V supply system is clear to see. Channels that have been switched off can also be switched back on remotely via the reset input.



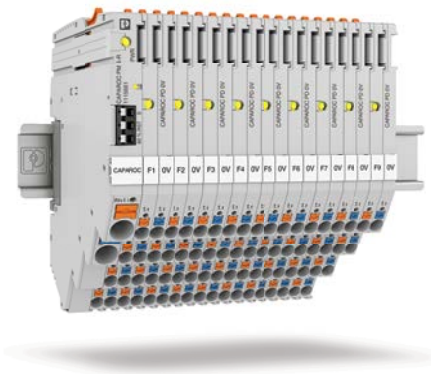
The streamlined system with potential distribution

In conventional installations, additional separate blocks are installed in the control cabinet for the return conductor, with terminal blocks for negative. This makes the installation more complex and requires significantly more space.

With the option of a tailored modular assembly, potential distribution is now also integrated conveniently into the system. At the same time, additional space is saved elsewhere.

With the 1-channel circuit breaker modules in combination with the 0 V potential distributor modules, positive and 0 V are set up in pairs. Color-coded Push-in connections provide visual support and, with a diameter of 4 mm², provide sufficient space for larger cross-sections. Installation and commissioning is therefore quick and error-free.

Nine circuits with positive and 0 V are created, taking up a width of just 124 mm. Moreover, the quick and clear connection of all load circuits is ensured.



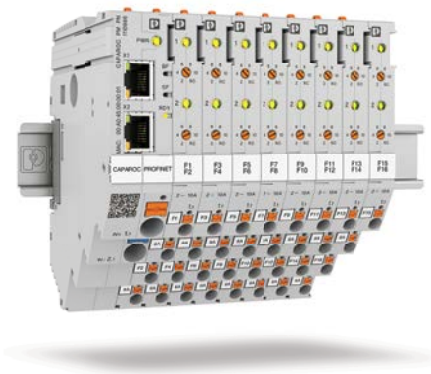
The communicative system: making system information transparent

Each CAPAROC system can be upgraded easily with a PROFINET power module. This allows system data to be read off and set conveniently. It is also possible to block this if required, preventing tampering.

The 2-channel circuit breaker modules allow nominal currents to be set conveniently and read off. The rotary switch with six stages can be used to regulate and read off the nominal currents at any time, regardless of the voltage.

The multi-level characteristic curve is supported by intelligent load detection in order to detect every load start-up and to safely disconnect errors. The colored status LEDs display the status of every single channel. Therefore, on-site operators can see whether the system is running seamlessly.

With two outputs per channel, two circuits can be protected at the same time. This means that a very compact, communicative system that takes up a width of just 124 mm and that can be adapted with modular components can be assembled – all at a width of less than 8 mm per channel.



Product overview

Power modules

		
	Status output and reset input	**PROFINET communication interface**
Operating voltage	12 V DC … 24 V DC	
Total current	45 A	
Space requirement on the current rail	2 slots	4 slots
Dimens. W x H x D [mm]	12.4 x 132.4 x 111.3	24.8 x 132.4 x 111.3
Designation	CAPAROC PM S-R	CAPAROC PM PN
Order No.	1115661	1110986

Potential distribution modules

	
	4x 0 V connections
Operating voltage	12 V DC … 24 V DC
Total current	–
Space requirement on the current rail	1 slot
Dimens. W x H x D [mm]	6.2 x 132.4 x 111.3
Designation	CAPAROC PD 0V
Order No.	1110987

Circuit breaker modules, 1-channel

				
	1 A … 4 A	1 A … 10 A	1 A	2 A
Operating voltage	12 V DC … 24 V DC			
Space requirement on the current rail	1 slot			
Dimens. W x H x D [mm]	6.2 x 132.4 x 111.3			
Designation	CAPAROC E1 12-24DC/1-4A	CAPAROC E1 12-24DC/1-10A	CAPAROC E1 12-24DC/1A	CAPAROC E1 12-24DC/2A
Order No.	1115415	1115649	1157288	1157290
	4 A	6 A	8 A	10 A
Operating voltage	12 V DC … 24 V DC			
Space requirement on the current rail	1 slot			
Dimens. W x H x D [mm]	6.2 x 132.4 x 111.3			
Designation	CAPAROC E1 12-24DC/4A	CAPAROC E1 12-24DC/6A	CAPAROC E1 12-24DC/8A	CAPAROC E1 12-24DC/10A
Order No.	1157285	1157286	1157279	1157284

Circuit breaker modules, 2-channel

		
	1 A … 4 A	2 A … 10 A
Operating voltage	12 V DC … 24 V DC	
Space requirement on the current rail	2 slots	
Dimens. W x H x D [mm]	12.4 x 132.4 x 111.3	
Designation	CAPAROC E2 12-24DC/1-4A	CAPAROC E2 12-24DC/2-10A
Order No.	1115655	1110984

Circuit breaker modules, 4-channel

		
	1 A … 4 A	1 A … 10 A
Operating voltage	12 V DC … 24 V DC	
Space requirement on the current rail	2 slots	
Dimens. W x H x D [mm]	12.4 x 132.4 x 111.3	
Designation	CAPAROC E4 12-24DC/1-4A	CAPAROC E4 12-24DC/1-10A
Order No.	1115657	1115658

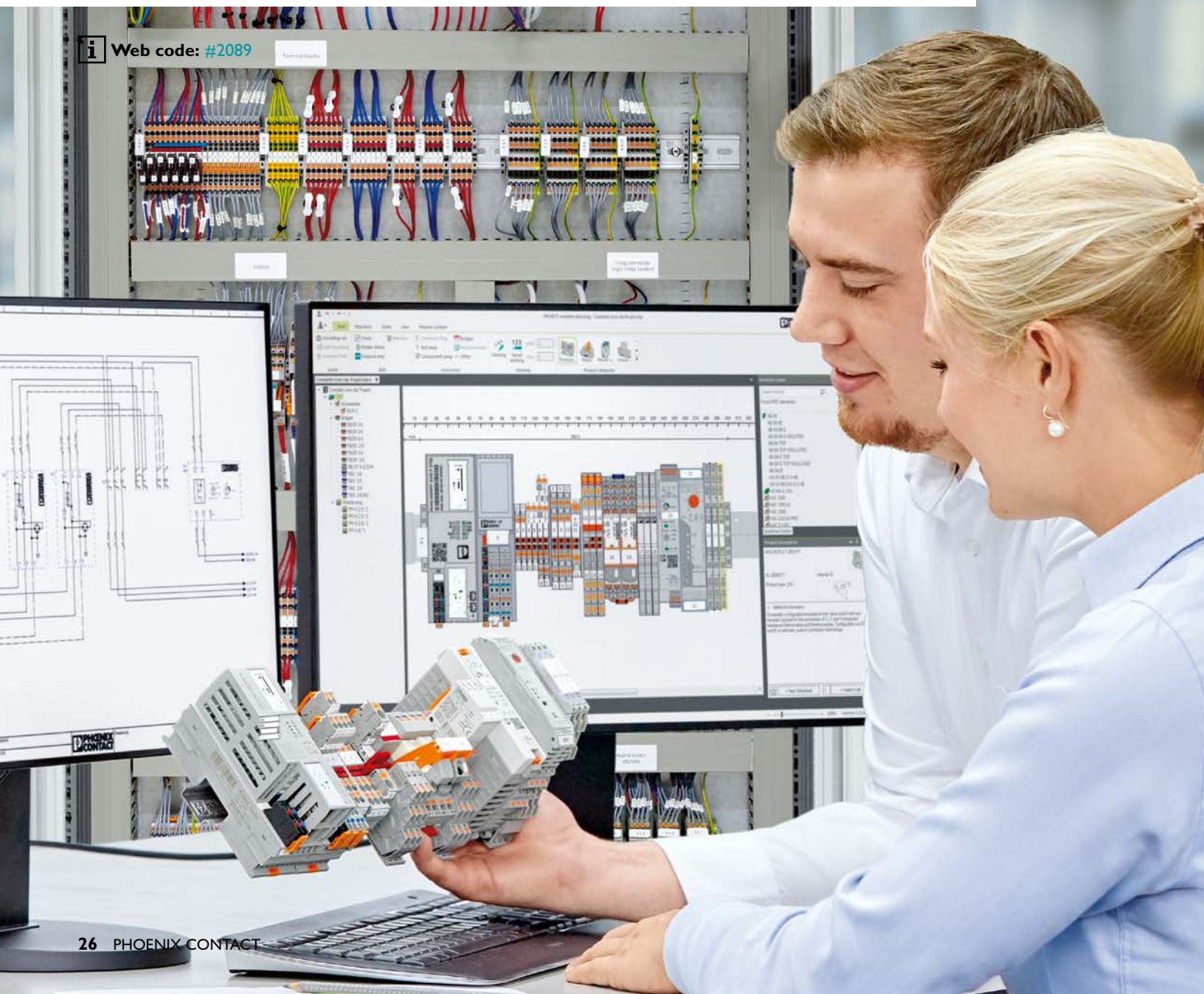
Current rails

		
	Initial current rails	
Length	124 mm	49.6 mm
Slots	20	8
Total current	45 A	
Designation	CAPAROC CR 20	CAPAROC CR 8
Order No.	1110989	1115672

			
	Extension current rails		
Length	124 mm	49.6 mm	24.8 mm
Slots	20	8	4
Total current	45 A		
Designation	CAPAROC CR EXT20	CAPAROC CR EXT8	CAPAROC CR EXT4
Order No.	1115674	1110990	1110991

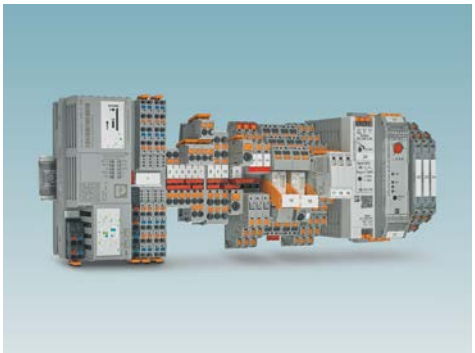
COMPLETE line – The comprehensive solution for the control cabinet

COMPLETE line is a system comprised of 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.



Web code: #2089

Your advantages in detail:



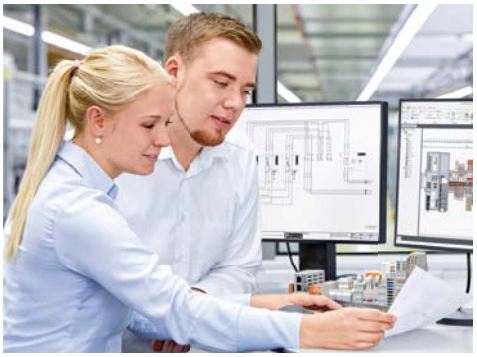
Comprehensive product portfolio

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

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

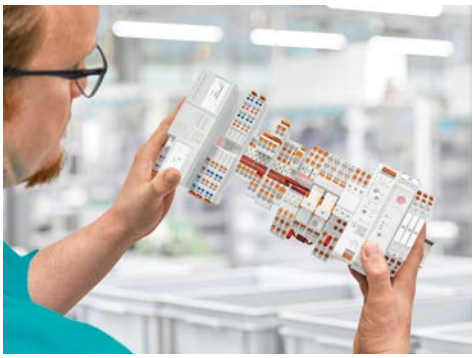
Intuitive handling

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



Save time throughout 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 allows the individual planning, automatic checking, and direct ordering of terminal strips.



Reduced logistics costs

Standardized marking, bridging, and testing accessories reduce the variety of parts needed. 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 efficiently as possible. This is how your customized concept for optimizing your processes in control cabinet manufacturing is 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.

COMPLETE **line**

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.

Ongoing communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. We are known for our future-oriented components, systems, and solutions in the fi elds of electrical engineering, electronics, and automation. With a global network reaching across more than 100 countries with over 17,400 employees, we stay in close contact with our customers, something we believe is essential for success.

Our wide variety of innovative products makes it easy for our customers to fi nd future-oriented solutions for multiple applications and industries. We focus predominantly on the fields of energy, infrastructure, process, and factory automation.