

# MICO

## Solutions for Intelligent Power Distribution





## SOLUTIONS FOR INTELLIGENT POWER DISTRIBUTION



Complex power supply systems with many components require reliable load protection. Switch mode power supplies are the core of these systems since they electronically monitor output voltage and output current. If there is a short circuit or an overload, protective devices downstream (for example circuit breakers) react slower than the power supply and do not ensure selectivity. This can cause critical situations like voltage drops or even cable fires.

**Our compact MICO modules help eliminate these problems:** MICO is an essential component for protecting power supply systems!

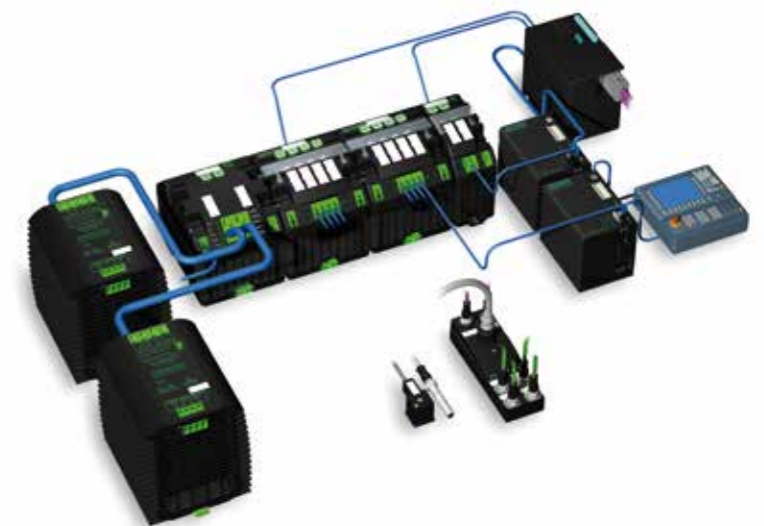
## VITAL TO YOUR SYSTEM

### THOUSANDS OF SATISFIED CUSTOMERS

- Control cabinet construction
- Machine tools
- Packaging industry
- Logistics
- Process automation
- Food & Beverage

### MURRELEKTRONIK OFFERS YOU...

- Mains filter
- Transformers
- Switch mode power supplies
- Intelligent power distribution
- Buffer module
- Redundancy modules



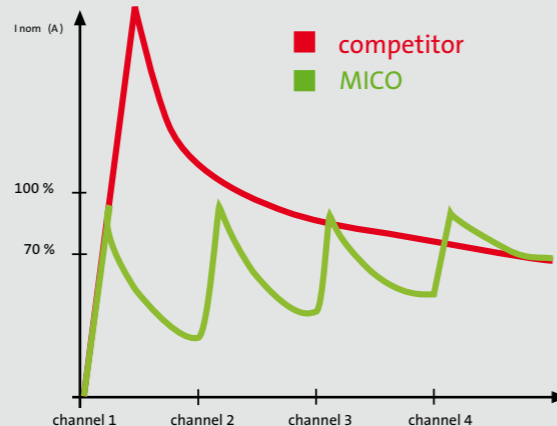
## MICO – SOLUTIONS FOR INTELLIGENT POWER DISTRIBUTION

Target-oriented protection is a big challenge for modern power supply systems. MICO is an intelligent power distribution system that meets this challenge! Errors are found quickly while availability remains high.

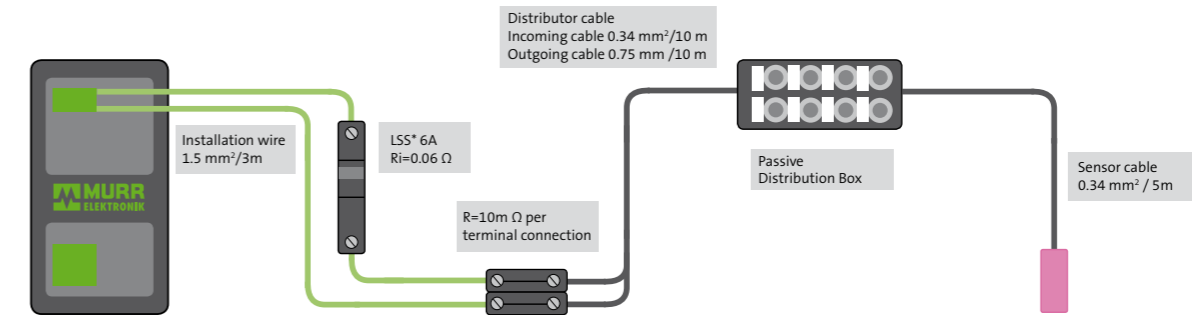
- **MICO Monitors Currents:** You can select a maximum, individual current value for each channel and MICO monitors this value. The LED is green when the current is OK.
- **MICO Indicates When Approaching the Maximum Load:** There is a visual alarm when 90% of the selected current load is reached. The LED blinks green.
- **MICO Detects Stress:** When there are short circuits or if the selected load current is exceeded, MICO switches the affected channel off. The LED blinks red.
- **MICO Provides Flexibility:** Each channel can be individually switched off by pressing a button. Here, the LED is red. Of course, you also can switch all channels on manually.

### CASCADING START

MICO eliminates start-up peaks with a time-delayed (cascading) start of individual current paths. Advantage: Now you can use power supplies with lower output current.



### EXAMPLE FOR A 6 A CIRCUIT BREAKER IN A 24 V DC SYSTEM



\* Circuit breaker

Specific resistance of copper (ρ)	= 0.0178 (Ω x mm² /m)
Wire resistance: $R = \frac{\rho \times l}{A}$	= $\frac{0.0178 \times (2 \times 3 \text{ m})}{1.5 \text{ mm}^2} = 0.07 \Omega$
Distributor cable resistance: $R = \frac{\rho \times l}{A}$	= $\frac{0.0178 \times (2 \times 10 \text{ m})}{(0.34 + 0.75 \text{ mm}^2)/2} = 0.65 \Omega$
Sensor cable resistance: $R = \frac{\rho \times l}{A}$	= $\frac{0.0178 \times (2 \times 5 \text{ m})}{0.34 \text{ mm}^2} = 0.52 \Omega$
Inner resistance of circuit breaker and connection terminals	= 0.08 Ω
<b>Total loop resistance</b>	<b>= 1.32 Ω</b>

Calculation of maximum possible current flow (limited by loop resistance)  $I = \frac{U}{R} = \frac{24 \text{ V}}{1.32 \Omega} = \underline{18.18 \text{ A}}$

Required tripping current of the 6 A circuit breaker Type C  
 $14 \times I_{\text{Nenn}} = 14 \times 6 \text{ A} = \underline{84 \text{ A}}$



Tripping current 84 A > Max. current flow 18,18 A

### THE PERFECT MICO FOR ANY APPLICATION

Characteristics	MICO Fuse	MICO Basic	MICO Classic	MICO +	Mico Pro®
Channels per module	8	4/8	2/4	4	1/2/4 and multiples
Output current up to 20 A					x
Fixed tripping current		x			x
Adjustable tripping current	x		x	x	x
90% warning with LED		x	x	x	x
90% warning as digital signal				x	x
Reset through control system		x	x	x	x
Remote deactivation				x	x
Individually expandable channels					x
Integrated potential distribution					x
Deactivation/activation of individual channels					x
Diagnosis of individual channels					x
Selective configuration					x



## MICO NEC CLASS 2 – MONITORING COMPONENTS WITHOUT UL APPROVAL

Class 2 circuits are energy-limited circuits: the maximum power is 100 VA. According to the NEC and UL definition, there is no danger of either electric shock or fire in these circuits due to the limited energy. UL certification is thus not required for switch cabinet components (according to UL508A) used in a Class 2 circuit.

MICO switch cabinet components certified according to NEC Class 2 for smart power distribution make it possible to realize compact NEC Class 2 circuits more quickly and with an overall reduction in costs. This simply requires a standard power supply unit (NEC Class 2 approval not mandatory) that, in combination with MICO, allows two, four or eight separate energy-limited circuits to be easily implemented.

### MICO WITH NEC CLASS 2 OUTPUTS

Art. No.	Description	Current range
9000-41042-0100400	MICO 2.4	1A/2A/3A/4A
9000-41034-0100400	MICO 4.4	1A/2A/3A/4A
9000-41084-0100400	MICO+ 4.4	1A/2A/3A/4A
9000-41064-0200000	MICO BASIC 4.2	2A
9000-41064-0400000	MICO BASIC 4.4	4A
9000-41068-0200000	MICO BASIC 8.2	2A
9000-41068-0400000	MICO BASIC 8.4	4A
9000-41068-0200600	MICO BASIC 5.2/3.6	5×2A; 3×6A

“The outputs of MICO Class 2 meet the Class 2 requirements according to UL1310 and NEC article 725”



## MICO+ – APPEALING FEATURES AND EVEN MORE OPTIONS

- **MICO+ saves energy:** MICO+ allows you to switch off all four output channels via controls input during non-production times. With this functionality, only required consuming components are supplied with energy. That saves energy, reduces losses, increases service life and therefore machine overall productivity. When the paused part of the system is required again, it can be quickly reactivated using MICO+.
- **Preventive maintenance with 90 percent predictive warning:** Current consumption often increases over time during operation due to the wearing of valves and motors, which is why MICO+ features a 90 percent predictive warning signal. This signal is transferred to the control, which issues an alarm so corrective troubleshooting actions can be taken at an early stage.
- **New terminals at the outputs:** For each channel, there are two connection options making it possible to connect two components to each channel. But features like single-channel monitoring can also be implemented very easily by connecting one wire to the component and the other wire to the control input – it couldn't be any easier!

### YOUR BENEFITS

- Save energy during idle times
- React early to creeping failures
- Create single channel diagnostics
- Ideal switch off behavior
- Flexibly adjustable current ranges
- Capacitive load per channel 20,000 µF
- Group alarm contact
- 90 % warning notice, shown by a blinking LED
- Unique bridge system
- Cascading start of individual current paths
- Non-volatile error memory
- Manual switch-off and -on by pressing a button



MICO+

MICO CLASSIC

MICO BASIC

MICO FUSE

MICO PRO

### MODEL OVERVIEW

Art.-No.	Description	Current ranges (adjustable)
9000-41084-0100400	MICO+ 4.4 (4 channels)*	1A/2A/3A/4A
9000-41084-0100600	MICO+ 4.6 (4 channels)	1A/2A/4A/6A
9000-41084-0401000	MICO+ 4.10 (4 channels)	4A/6A/8A/10A

\*NEC Class 2 Outputs

## MICO CLASSIC – TOP CLASS POWER DISTRIBUTION

- Perfect shut-down function: as early as necessary, as late as possible
- Allows remote start with 24 V DC signal
- Manually switch on each channel for start-up and shut-down
- LED status indication for each channel
- Potential-free alarm output
- Proven bridge concept connects several MICOs
- Minimum output resistance, almost no power loss
- Optimum labeling options, for device location and channels
- Maintenance-free with spring clamp terminals
- Adjustable current range for each channel
- Visual warning notice when 90 % of the load current set is reached
- Temperature does not affect MICO
- No current limits



### MICO reduces the number of different components and saves space

Until now, different models of each circuit breaker had to be stocked to safely switch off power supply systems. MICO replaces several different circuit breakers. Channel-specific current adjustment is possible, which reduces the number of different components and helps save space in the controls cabinet. MICO uses considerably less space for each channel than circuit breakers.

## MICO CLASSIC 4.10 SPEED-START – READY TO GO AT ANY TIME

With its optimized start-up behavior, MICO CLASSIC 4.10 Speed-Start powers very sensitive loads without any noticeable interruption, for example with: fieldbus systems,

industrial computers, controls or drive controls. This eliminates any problems that happen when loads are switched off automatically.

### DID YOU KNOW?

With MICO CLASSIC 4.10 Speed-Start, you can handle capacitive loads of up to 30,000 µF per channel. It can protect up to 15 drive controls per channel without any problems!

## MICO CLASSIC 4.4.10 ACTUATOR SENSOR – FOR ANY APPLICATION

MICO CLASSIC 4.4.10 Actuator-Sensor features two channels to protect sensors (current range 1 to 4 A) and two channels to protect actuators (4 to 10 A). It covers the complete current range from 1 to 10 A in one compact device!



### PERFECT FIT

MICO CLASSIC is available in a two channel and four channel version: The modules can be installed in any combination – also with MICO Basic – to ensure a cost-effective and space-saving system design. They are linked with a bridge set. This minimizes wiring efforts.

- 2 channels, width 36 mm
- 4 channels, width 70 mm

MICO+

MICO CLASSIC

MICO BASIC

MICO FUSE

MICO PRO

### MODEL OVERVIEW

Art. No.	Description	Current ranges (adjustable)
9000-41042-0100400	MICO CLASSIC 2.4 (2 channels)**	1 A/2 A/3 A/4 A
9000-41042-0100600	MICO CLASSIC 2.6 (2 channels)	1 A/2 A/4 A/6 A
9000-41042-0401000	MICO CLASSIC 2.10 (2 channels)	4 A/6 A/8 A/10 A
Art. No.	Description	Current ranges (adjustable)
9000-41034-0100400	MICO CLASSIC 4.4 (4 channels)* **	1 A/2 A/3 A/4 A
9000-41034-0100600	MICO CLASSIC 4.6 (4 channels)*	1 A/2 A/4 A/6 A
9000-41034-0401000	MICO CLASSIC 4.10 (4 channels)*	4 A/6 A/8 A/10 A
Art. No.	Description	Current ranges (adjustable)
9000-41034-0101000	MICO CLASSIC 4.4.10 Actuator-Sensor	2×1 A/2 A/3 A/4 A, 2×4 A/6 A/8 A/10 A
9000-41034-0401005	MICO CLASSIC 4.10 Speed-Start	4 A/6 A/8 A/10 A

\* GL approval    \*\* NEC Class 2 Outputs

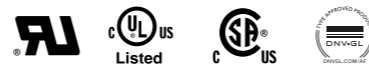
### ACCESSORIES

Art. No.	Description	Other
9000-41034-0000002	Bridge set	1 set
9000-41034-0000001	Bridge set	10 sets
9000-41034-0000003	Shortened button	4 buttons

## MICO BASIC – INTELLIGENT SWITCH OFF

As early as necessary, as late as possible – MICO BASIC features intelligent switch off characteristics! The modules are suitable for any application that requires protection of a great number of sensors and actuators with similar demands. The current ranges for the individual circuits are fixed. The compact modules secure either four or eight channels with 2, 4, or 6 A. LEDs show the operating conditions of the individual channels and, when blinking, indicate that a maximum load of 90 % is reached. If there is an overload or short circuit, MICO BASIC switches the affected channel off and the LED blinks red. A group alarm contact sends the current status to the control.

- Switch off supported by microprocessor
- Preset tripping currents (the same for all channels), 2 A, 4 A, 6 A
- 4 channels, width 36 mm
- 8 channels, width 70 mm
- Less space required compared to conventional solutions
- Spring clamp terminals with bridging option on the left side (24 V and GND)
- Group alarm contact through digital output
- 20.000 µF maximum capacitive load per channel
- Labeling options for each channel and for the module
- Visual warning notice when 90 % of the load current set is reached
- Cascading start of the individual current paths



## MICO FUSE – COST-EFFECTIVE MONITORING WITH GLAS TUBE FUSES

Protecting sensors and actuators is very important. However, using individual safety terminals requires time-consuming efforts. Now MICO FUSE makes this protection more convenient! The compact module features eight sockets for glass tube fuses that can be accessed from the front. It protects eight channels.

MICO FUSE 24 LED has additional LEDs that indicate the operating condition of each channel in red and green. A group alarm contact sends the current status to the control.

- 8 Sockets for glass tube fuses (5 x 20 mm), accessible from the front
- Minimum space required per channel
- MICO FUSE 24 LED
  - Operating voltage: 24V DC
  - Channel-specific LED indicator, green = fuse OK, red = fuse defective
  - Group alarm contact through digital output
- MICO FUSE 250, Operating voltage: 0...250V AC/DC
- Common voltage for all channels, reduces wiring efforts
- Max. total current 40 A
- Spring clamp terminals, maintenance-free and vibration proof
- Labeling options for each channel and for the module



MICO+

MICO CLASSIC

**MICO BASIC**

MICO FUSE

MICO PRO

MICO+

MICO CLASSIC

MICO BASIC

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MICO PRO

### MODEL OVERVIEW

Art. No.	Description	Current range (preset)
9000-41064-0200000	MICO BASIC 4.2 (4 channels)*	2 A
9000-41064-0400000	MICO BASIC 4.4 (4 channels)*	4 A
9000-41064-0600000	MICO BASIC 4.6 (4 channels)	6 A
Art. No.	Description	Current range (preset)
9000-41068-0200000	MICO BASIC 8.2 (8 channels)*	2 A
9000-41068-0400000	MICO BASIC 8.4 (8 channels)*	4 A
9000-41068-0600000	MICO BASIC 8.6 (8 channels)	6 A
9000-41068-0200600	MICO BASIC 5.2/3.6 (8 channels)*	5×2A; 3×6A
9000-41068-0100304	MICO BASIC 2.1/3.2/3.4 (8 channels)	2×1A; 3×2A; 3×4A

\* NEC Class 2 Outputs

### MODEL OVERVIEW

Art. No.	Description	Other
9000-41078-0600001	MICO FUSE 24 LED	Delivered without fuses With LED indicator and alarm contact
9000-41078-0600002	MICO FUSE 250	Delivered without fuses Universal model from 0...250V AC/DC

### ACCESSORIES

Art. No.	Description	Other
9000-41078-0000002	MICO FUSE Spare fuse – 2A*	8 pcs.
9000-41078-0000004	MICO FUSE Spare fuse – 4A*	8 pcs.
9000-41078-0000006	MICO FUSE Spare fuse – 6A*	8 pcs.
9000-41078-0000010	MICO FUSE Fuse socket cover	8 pcs.

\* Slow blow



## MICO PRO® – CURRENT MONITORING MODULARIZED TO THE MAXIMUM EFFECT

Mico Pro is the new and innovative current monitoring system from Murrelektronik. The modular system enables you to adapt installations precisely to suit specific applications – offering a favorable cost-benefit ratio while also being economical in their use of space. The patented tripping process assures optimum machine availability. An additional benefit: an integrated concept for potential distribution that significantly declutters the switch cabinet wiring.

- **Convenient handling:** The individual cables can be wired without tools since all inputs and outputs of the system are provided with push-in spring clamp terminals. Signal contacting for diagnostic and control signals takes place via laterally integrated spring contacts.
- **Space savings:** The integrated potential distribution concept simplifies the circuit wiring. The ability to connect +24 V and 0 V at every channel makes terminal blocks unnecessary. With the potential distributor module, a channel can be compactly multiplied 23 times. The installation is less cluttered as well as less time-consuming. The broad product range supports modularity right down to the last channel. The system can be precisely adapted to the specific requirements.
- **Channel-specific diagnosis:** Each channel is equipped with an LED for status indication on the device and digital status signals can be transferred to the controller. The Mico Pro power module provides group diagnostics for the entire system and the adjustable Flex modules offer channel-specific diagnostic signals.



- **High-current variant up to 20 A:** A fixed 16 A module and a flexibly configurable module are available for higher current requirements. With the configurable variant, the rated current can be selected in 1 A steps from 11 A to 20 A.
- **Selectivity:** On a Mico channel with a tripping current of more than 10 A, another Mico Pro station can be connected. If its channels are all provided with a tripping current of up to 10 A, full selectivity is guaranteed, and the channels affected by short-circuits or overloads are still triggered accurately.
- **Online configurator:** At [micopro.murrelektronik.com](http://micopro.murrelektronik.com), you can assemble your Mico Pro system according to your needs in just a few clicks. At a glance, you can see the configured total current and the width of the system, allowing you to plan your control cabinet. You can save a preview of the system as a PDF and export a parts list in Excel format. After creating your project, you can save it to be loaded again and modified later.



➤ Mico Pro customized to your needs  
 The online configurator from Murrelektronik





MICO+

MICO CLASSIC

MICO BASIC

MICO FUSE

MICO PRO

## MODEL OVERVIEW

Art. No.	Description	Tripping current
9000-41190-0000000	Mico Pro power module, 24 V DC	max. 40 A

Art. No.	Description	Tripping current (pre-fixed)
9000-41011-0200000	Mico Pro fix 1.2	2 A
9000-41011-0400000	Mico Pro fix 1.4	4 A
9000-41011-0600000	Mico Pro fix 1.6	6 A
9000-41011-0800000	Mico Pro fix 1.8	8 A
9000-41011-1000000	Mico Pro fix 1.10	10 A
9000-41011-1600000	Mico Pro fix 1.16	16 A
9000-41012-0200000	Mico Pro fix 2.2	2 A
9000-41012-0400000	Mico Pro fix 2.4	4 A
9000-41012-0600000	Mico Pro fix 2.6	6 A
9000-41014-0200000	Mico Pro fix 4.2	2 A
9000-41014-0400000	Mico Pro fix 4.4	4 A
9000-41014-0600000	Mico Pro fix 4.6	6 A

Art. No.	Description	Tripping current (adjustable)
9000-41091-0101000	Mico Pro flex 1.10	1-2-3-4-5-6-7-8-9-10 A
9000-41091-1102000	Mico Pro flex 1.20	11-12-13-14-15-16-17-18-19-20 A
9000-41092-0101000	Mico Pro flex 2.10	1-2-3-4-5-6-7-8-9-10 A
9000-41094-0101000	Mico Pro flex 4.10	1-2-3-4-5-6-7-8-9-10 A

## ACCESSORIES

Art. No.	Description	Other
9000-41000-0000212	Mico Pro PD2x12	Potential distributor, max. 20 A
9000-41190-0000000	Mico Pro plug-in link 2x blue	Continuous jumper, 50 cm
9000-41000-0000001	Mico Pro plug-in link 2x red	Continuous jumper, 50 cm
9000-41000-0000002	Mico Pro plug-in link 1x blue, 1x red	Continuous jumper, 50 cm
996078	Identification sign	5 x 10 mm, white, 64 count





*stay connected*

 [www.murrelektronik.com](http://www.murrelektronik.com)

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