



# impulse

The Murrelektronik Customer Magazine

## CUBE67 DIAGNOSTICS GATEWAY

Diagnostics Made Easy

more on Page 04



## IO-LINK BY MURRELEKTRONIK

Easy to Use

more on Page 07



## MODLINK MSDD

More than 100,000 Combination Options

more on Page 07



## EDITORIAL



Dear Customer,

Machines and systems become more intensively integrated and networked. New processes in the smart factory require high transparency across the entire product life cycle.

We are pursuing the path to Industry 4.0 with our customers

by developing products and solutions which form the basis of revolutionary installation concepts. We supply modern components equipped with innovative functions and high-performance interfaces to enhance production modularization and flexibility.

In all that we do, we always focus on our customers' needs such as reliable and user-friendly installation, straightforward commissioning, comprehensive controlling down to the last sensor and actuator and, most importantly, consistent avoidance of downtimes.

A prime example is our new Mico Pro innovative current monitoring system with patented tripping characteristics. Its modular design enables the system to be customized, thus providing a very favorable cost-benefit ratio while preserving maximum flexibility.

And if an error occurs in a machine and system installation, we offer you a system that "speaks your language" with our new diagnostics gateway for Cube installations. Access to diagnostic data has never been easier!

This edition of our customer magazine informs you about these innovations and many other exciting features from Murrelektronik. Enjoy!

Stay connected!

*Luis Rauch*

Luis Rauch  
Vice Chairman of the Management Board



# 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 systems 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.



# Mico Pro®

**Power supply systems are the heart of machines and systems and provide the required energy. This is why they must not be shut down by overcurrents or short-circuits which result in machine downtime, production losses and high costs. Maximum reliability of the power supply systems is essential!**

Mico Pro from Murrelektronik guarantees reliable power supply systems. This intelligent current monitoring system from Murrelektronik monitors all load and control currents in a consistent manner and identifies critical moments at the right time. Mico Pro signals limit loads and switches defective channels off in a targeted manner to prevent total system crashes, and to assure a high level of machine availability. The tripping process has been patented, and applies the principle of “as late as possible, as early as necessary.” But Mico Pro also identifies “volatile” errors, such as a cable break in drag chains that only occurs at certain movement angles. Mico Pro identifies capacitive loads and starts them up in a controlled way.

### Modular design that saves space

Mico Pro is a modular system for 12 and 24 V DC operating voltages. The components can be selected for the particular application from numerous Mico Pro modules and connected without tools via a power module to form a closed system. You can select between modules with one, two, or four output channels. Their narrow width of 8, 12, or 24 millimeters enables significant savings in space. For example, a system with eight channels requires up to 65 percent less space than a system with circuit breakers. The more channels you use, the higher the percentage will be.

On the Flex modules, the tripping currents (2, 4, 6, 8, 10, and 16 A) are fixed which makes them a tamper-

proof solution. On the Flex modules, the tripping current can be adjusted at the touch of a button from 1 to 10 A or from 11 to 20 A. This increases flexibility (e.g. for machine and plant manufacturers with option management), while reducing the number of versions required. It is thus possible to configure a customized Mico Pro system for each application. The system assures flexibility at all times. If a single module needs to be replaced, for example due to the power requirement of a new machine component, this can be done without tools in a short time. This ensures an advantageous cost-benefit ratio.

### Significant simplification in switch cabinet wiring

Mico Pro has an integrated potential distribution concept for +24 (or +12) and 0 V that significantly simplifies switch cabinet wiring. There are connection options for +24 V and 0 V on each channel. External 0V terminals are now a thing of the past – the zero potential can now be connected directly by Mico Pro. This helps to declutter installations, significantly reduce the amount of wiring needed

and save not only space in the switch cabinet but also costs. Additional potential distributors enable connection of up to 2 x 12 potentials to each Mico channel.

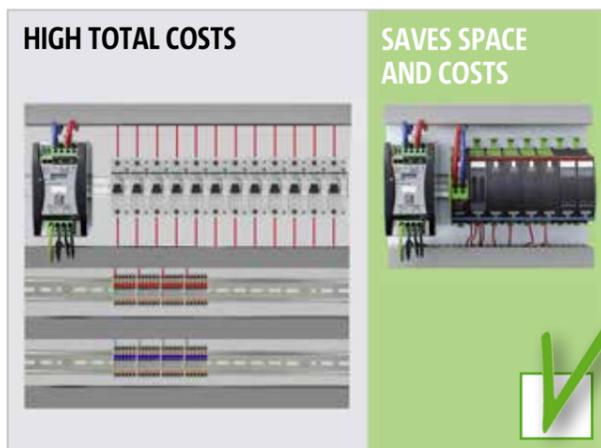
### Convenient handling

The innovative bridging system, which is used to connect individual components to a closed system is easy to handle. To mount the system designed for a total current of up to 40 A, you just have to trim two bars to the right length with standard side-cutting pliers and insert them in the provided fixtures from the front in one quick step. Signal contacting for diagnostic and control signals takes place via laterally integrated spring contacts. The individual cables can be wired without tools since all inputs and outputs of the system are provided with push-in spring clamp terminals. Thus, mounting can be done in very short time and no maintenance is required during operation. The front side of the Mico Pro is at no time hidden by cables or lines; the operator has a clear view of all markings, labels and the status of the LEDs.

### Diagnostics – on the module or via the controller

Great importance is attached to the diagnostic functions of Mico Pro. 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.

The status LED lights green as long as everything proceeds normally. Once a share of 90 percent of





## PRACTICAL FEATURES IN THE DETAILS

- Mico Pro monitors channel currents of up to 20 A in a modular system – an innovation in modular current monitoring systems
- Optimum label options to keep the switch cabinet layout clear and simple
- Measuring possibility for measuring diagnostic and status signals as well as outputs
- Non-volatile error memory: ideal for troubleshooting after a voltage reset
- High inrush capacities of up to 30 mF per channel, also at full load
- Operation now also possible with 5 A power supply units
- Minimum internal resistance, almost no power loss
- No temperature dependence
- Time delayed start of individual channels on multiple-channel modules to prevent current peaks.

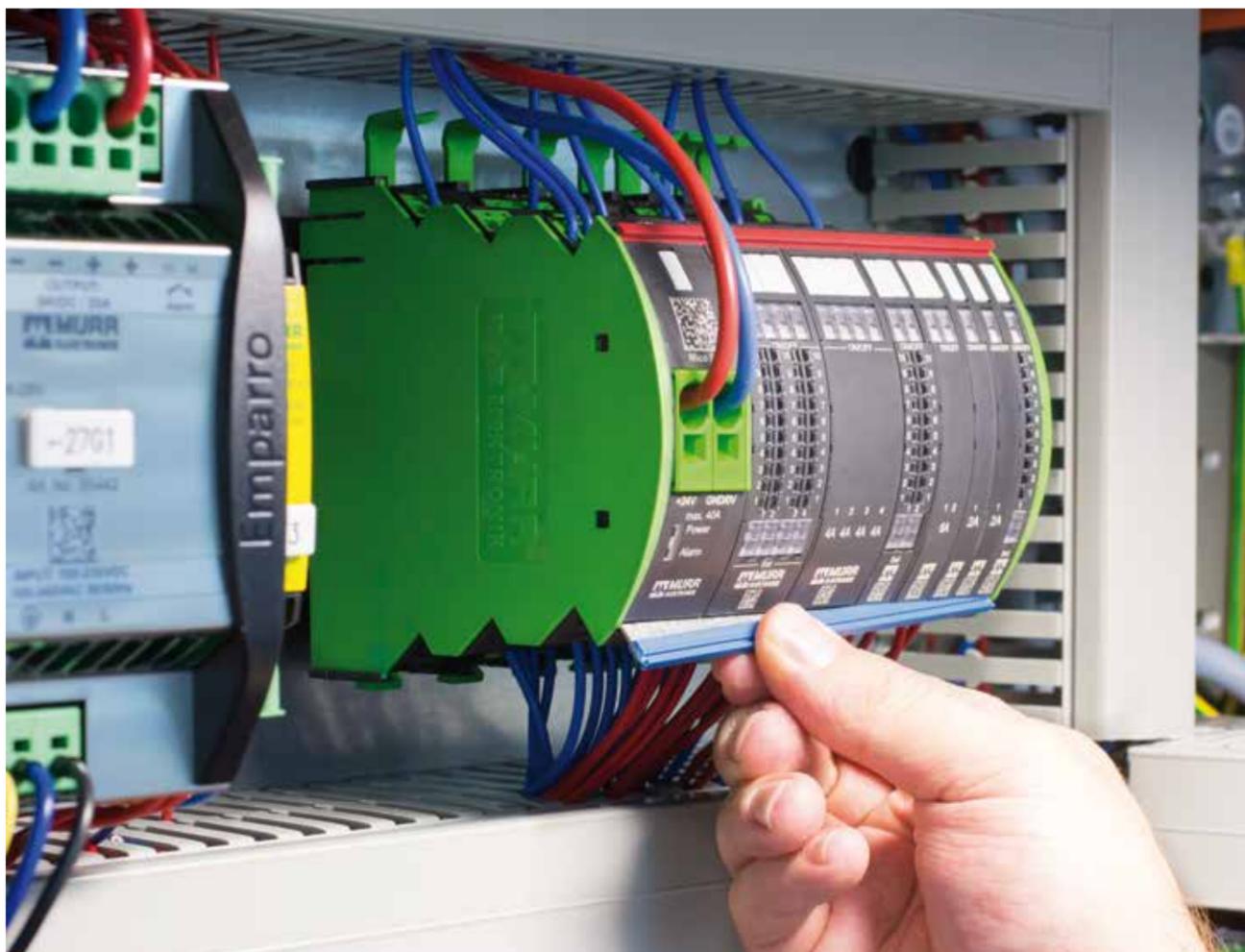
the preset or predefined tripping current has been reached, the LED flashes green to signal that the limit range ('90 percent early warning') has been reached. This may occur if additional consumers are connected, or the power consumption of already connected consumers increases, e.g. due to wear. When installing, the early warning may help to immediately identify incorrectly dimensioned current paths. Mico Pro triggers an additional digital status signal in such a case.

If the tripping current is exceeded, Mico Pro immediately switches the concerned channel off in a targeted manner. The LED flashes red and in this case, too, a status signal is sent. The operator may reactivate the channel by pressing a button on the module or via a PLC signal. For maintenance purposes, channels may also be switched off manually.

Then the LED is lit red permanently and remote switch-on option is deactivated.

### Mico Pro replaces the coupling plane

A channel-specific switching function via a PLC signal allows the Flex modules to switch system components on and off without any additional contactors, relays, or optocouplers. This solution can be used to replace the coupling level. Not only short switching frequencies (of up to 10 Hz) but also longer frequencies can be realized, for example to switch certain machine areas to the standby mode during non-production times. In this case, the LED of the affected channel lights orange.



Mico Pro can be cascaded. This means: 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. The savings in money and installation work are considerable, especially in the case of applications with a decentralized switch cabinet concept as they do not require an additional power supply device.

CUBE67 DIAGNOSTICS GATEWAY

# DIAGNOSTICS MADE EASY

**Murrelektronik's Cube fieldbus system offers extensive diagnostic options. A new diagnostics gateway makes access to this data even easier. This solution is easy to implement, provides clear information in case of failure and speeds up troubleshooting, resulting in maximum availability of machines and systems.**

The Cube system from Murrelektronik is a high-performance, decentralized fieldbus system that is used in many machines and systems. It has a modular structure and customized installation concepts can be realized with a large variety of input modules, output modules, mixed modules, and a wide range of function modules (e.g. IO-Link, RS 485, etc.). A one cable system transfers both communication data and supply voltages, whereby up to 32 modules can be connected to the four branches of each bus node. The major plus points of the Cube system are the one cable system, fully molded modules, multifunctional channels and comprehensive diagnostic options.

Evaluation and use of diagnostic data were only possible with time-consuming programming. Very often, the same steps had to be completed for each new system, because different controls require different diagnostic concepts. So it has not been possible until today to reach maximum utilization of the diagnostic functions of various controls. The resulting problem: Errors could not be identified quickly enough, leading to long downtimes in the worst case. This costs time, money, and nerves.

**No more of that!**

The new Cube67 Diagnostics Gateway is a practical module that provides an easy and fast method to read diagnostic data from the Cube system and to make this data available to the user.

Its robust design and the tried and tested fully molded modules make the Diagnostics Gateway suitable for use in rugged industrial conditions. It is integrated in the cable between the Cube fieldbus node and the (maximum) four branches. A standard Ethernet interface connects the Diagnostics Gateway to the communication level.



**Complete topology view**

When starting the Cube system, the Diagnostics Gateway reads the complete topology and also the entire process communication and all diagnostic messages. The module visually prepares this data and displays all information, independently of the control and without additional software, in each browser and, regardless of the platform, in the same way. Any user with access authorization to the communication network may access this data, for example via the HMI, a tablet or the locally installed computer in the control station.

The arrangement of the modules is automatically displayed as a clear topology and in tabular form on the screen. There the complete process data is output, for example the switching states of the individual inputs and outputs. The system's diagnostic messages are displayed in the topology as well as in a clear tabular form.

A major advantage of the tool is the diagnostics memory (logbook). It stores

transient errors, which means errors that only occur temporarily, such as when a cable breaks in a drag chain or 'overheating' of the sensor due to direct sunlight occurring repeatedly at a certain point of time. In a control, a transient error that is no longer acute will not be displayed anymore. This error is considered to be 'corrected'. This is very bad, since such an error is often a prewarning for a more serious problem.

**Module designations and error messages in plain text**

The tool provides a clear table for download in CSV format. This table contains an overview of the modules and components as well as of all inputs and outputs of the read installation solution. In this table, you can assign names to the components and maintain designations for all possible errors in plain text. This table will be imported again to allow the tool to access these names and designations.

Thus the topology view and the table no longer provide the user with cryptic error messages but with clear information such as 'short circuit on the hydraulic unit' or 'wire break on the analog sensor of slot two of the transport unit.' This information helps find errors quickly!

To enable fast elimination of the errors, you may also import instructions for precise solutions via the CSV file into the systematics, for example 'close valve' or 'replace cable'. In the ideal case, the article number of the replacement part has already been specified in the table. This speeds up troubleshooting.

The log data of the Cube67 Diagnostics Gateway can be stored for dispatch or for statistical studies. This makes it possible, for example, to count the switching cycles of inputs and outputs and to use this



**THE CUBE67  
DIAGNOSTICS GATEWAY  
IS THE TOOL THAT SPEAKS  
YOUR LANGUAGE!**



Michael Engel  
Product Manager Automation

## IPROTEC GMBH

# EFFECTIVE CONNECTION OF SENSORS AND ACTUATORS



The mechanical engineering company iPROtec GmbH uses Murrelektronik's Cube system for the electric installation of its new rotary indexing machine for the manufacture of glass. Actuators and sensors are effectively integrated in the installation concept.

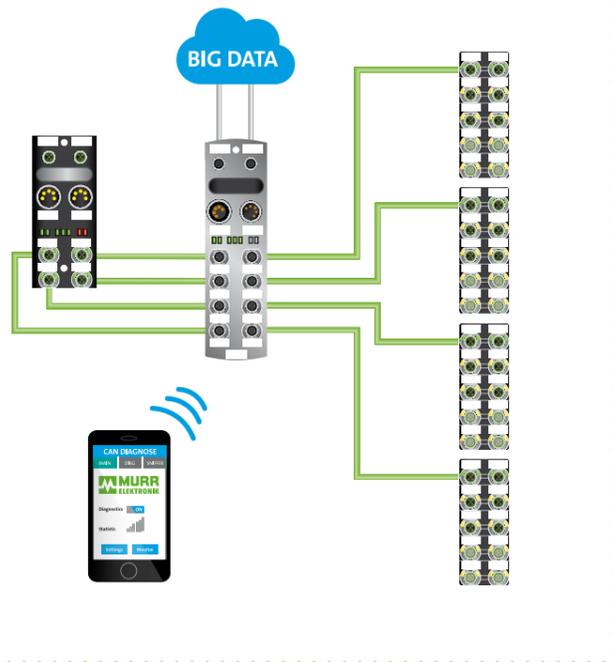
The specialist for non-standard machinery from Zwiesel, a health resort in the Bavarian Forest known all over the world for its manufacture of glass, has its core competence in the production of complete plants for the glass industry. They provide services to their customers - from the initial discussion via development, construction, manufacturing and mounting through to commissioning.

A new rotary indexing machine for a glass manufacturer in the Czech Republic which features 24 stations for different process steps is equipped with many actuators and sensors. The electrical engineers opted for a Cube decentralized electrical installation solution with both IP67 modules designed for use in rugged industrial conditions and IP20 modules for the control cabinet.

In the control cabinets, the high packaging density of the IP20 modules is a great advantage, since a large number of signals can be housed on rather limited space on the DIN rail. When it comes to the industrial field, the Cube67 system cable transfers both supply voltages and communication data in a single cordset. The Cube67 modules are installed close to the process, so sensors and actuators can be connected with Murrelektronik's short, preconfigured cables. The high temperatures required in glass production reveal the importance of heat-resistant cables.

Plug-in connections are very practical when individual stations of the rotary indexing machine need to be replaced during maintenance operations. All that needs to be done then is to plug the cables into the mounted modules – the production can be resumed without additional implementation.

The use of the Cube system offers extensive diagnostic options, including fast and easy error diagnosis on site and remote maintenance. The fieldbus system also allows system expansion without the need for any particular modification of the installation solution.



information for structured maintenance at cyclic intervals. An exchange format allows the data to be used also for other systems and to be integrated directly in different applications such as ERP or cloud systems.

### Different fields of application

Different process parties involved in the life cycle of machines and systems benefit from the Cube67 Diagnostics Gateway:

- The start-up person who uses the Diagnostics Gateway to examine the topology and to detect weak points such as short circuits or topology errors (i.e. differences between the nominal and actual configuration) at an early stage. The module is also very useful for IO tests.
- The service personnel of the machine or plant who, by integrating the Diagnostics Gateway, is able to identify and eliminate errors quickly, thus guaranteeing maximum machine availability. Permanent integration is also interesting in order to get remote access to the machine or system and to guide, for example, the electrician in the field.
- The operator of a machine or system who incorporates the Diagnostics Gateway permanently in order to be able to react to potential problems in time. In the best case scenario, instructions for troubleshooting have already been implemented in the systematics allowing the installer to bring the required spare part right with them when they comes for repair.

## THE NEW EMPARRO® 3~ FOR AS INTERFACE APPLICATIONS

# EXTREMELY RELIABLE, EXTRAORDINARILY EFFICIENT



**Murrelektronik's Emparro® 3-phase switch mode power supplies enable the creation of optimum power supply systems – now also for AS interface applications**

Murrelektronik's Emparro® 3-phase switch mode power supplies are tried and tested components in premium power supply systems. They are extremely reliable, extraordinarily efficient and particularly compact. The latest Emparro® version has been designed for use in AS interface applications with an operating voltage of 30.5 V.

Murrelektronik offers an extensive product line for high-performance AS interface systems including a variety of IO modules, the perfectly matching connection technology and gateways for embedding in master fieldbus systems. The Emparro® switch mode power supply for AS interface applications rounds off this portfolio.

The use of three phases brings about a considerable simplification as the structure becomes more transparent. Three-phase switch mode power supplies are thus very attractive for AS interface applications and Emparro® is the clear first choice.

Because Emparro® provides an MTBF value of approximately 1,000,000 hours. A gas discharge tube protects the switching power supply from interfering pulses up to 6 kV. An efficiency rating of not less than 92.5 percent reduces power loss. In the case of an error, the corresponding information can be transferred to the controller via an alarm contact.

The Emparro® 3-phase switching power supply for AS interface applications offers the same high efficiency as all the other Emparro® switching power supplies. It has a built-in power reserve. A direct benefit for electrical engineers: If additional loads have to be connected to a machine or a system, the Emparro® 3-phase power supply offers the required reserve.

An advantage in the installation: The Emparro® 3-phase for AS interface applications is extremely compact and only occupies 50 mm on the DIN rail. Push-in connection terminals make connecting cable installation tool-free.

No separate decoupling component is required since the Emparro® 3-phase switching power supplies for AS interface applications separate data from power.

## EMPARRO67 HYBRID

# A NEW DIMENSION OF DECENTRALIZED POWER SUPPLY

**The innovative Emparro67 Hybrid switch mode power supply unit is an all-rounder with many powerful features: it not only relocates power supply from the control cabinet to the industrial field, but it also monitors currents using two integrated channels for 24 VDC load circuit monitoring, to ensure high operational reliability. An IO-Link interface permits extensive and transparent communication.**

The fully encapsulated IP67 power supplies of the Emparro67 line with robust metal housing impress with their high energy efficiency – up to 93.8 percent of the energy applied can be used. The great advantage of this decentralized solution: The voltage conversion from 230 V AC to 24 V DC no longer takes place in the cabinet, but directly at the load. Thus, power loss is reduced to a minimum. Smaller cabinets can be used, and in some applications it may even be possible to completely get rid of them.

The new Emparro67 Hybrid switching power supply unit has two integrated MICO channels for electronic current monitoring of, for example, separate system components, sensors, actuators, or in particular of fieldbus modules. In this way, both sensor- and module voltage and actuator voltage of the connected fieldbus systems can be monitored separately. This guarantees maximum operational reliability. The MICO channels for monitoring the two 24 V DC load circuits can be adjusted to different current values. The tripping process applies the principle of “as late as possible, as early as necessary.”



The Emparro67 Hybrid is equipped with an IO-Link interface (M12 connection) and is able to communicate as device with a superior IO-Link master. It is thus possible to use the Emparro67 Hybrid in fully-networked intelligent applications. A concrete application is the monitoring of the device's life span. Companies in the plant construction and mechanical engineering sector can use such predictive maintenance functions for the development of new business models.

## MODLINK MSDD

# MORE THAN 100,000 COMBINATION OPTIONS

Murrelektronik's Modlink MSDD front panel interfaces provide convenient access to the control when diagnostic or service work is needed. Great advantage: They allow you to keep the control cabinet closed, so the components inside continue to operate within the specified protection class. This makes sure that the safety regulations for the operation of electrical systems are always complied with.

Modlink MSDD is a modular system based on standard frames (single and double frames) with many different inserts to plug in. This variety allows more than 100,000 combination options. Because the mounting dimensions are the same no matter which combination is used, a design engineer's job is made easier and export-oriented companies are in a position to quickly react to country-specific requirements. The housing does not have to be reworked. They just install the country-specific insert. Modlink MSDD is a tried and tested solution, well-engineered to the smallest detail.

The single frame inserts that provide space for both an outlet and a data connector make for a compact solution. A key feature is the shielding plate to increase EMC protection and directly prevent interference that reduces the negative electromagnetic influence on the data quality, an essential factor in secure communications.



Modlink MSDD in use

▶ [youtube.com/Murrelektronik](https://youtube.com/Murrelektronik)



## EXACT12 ATEX

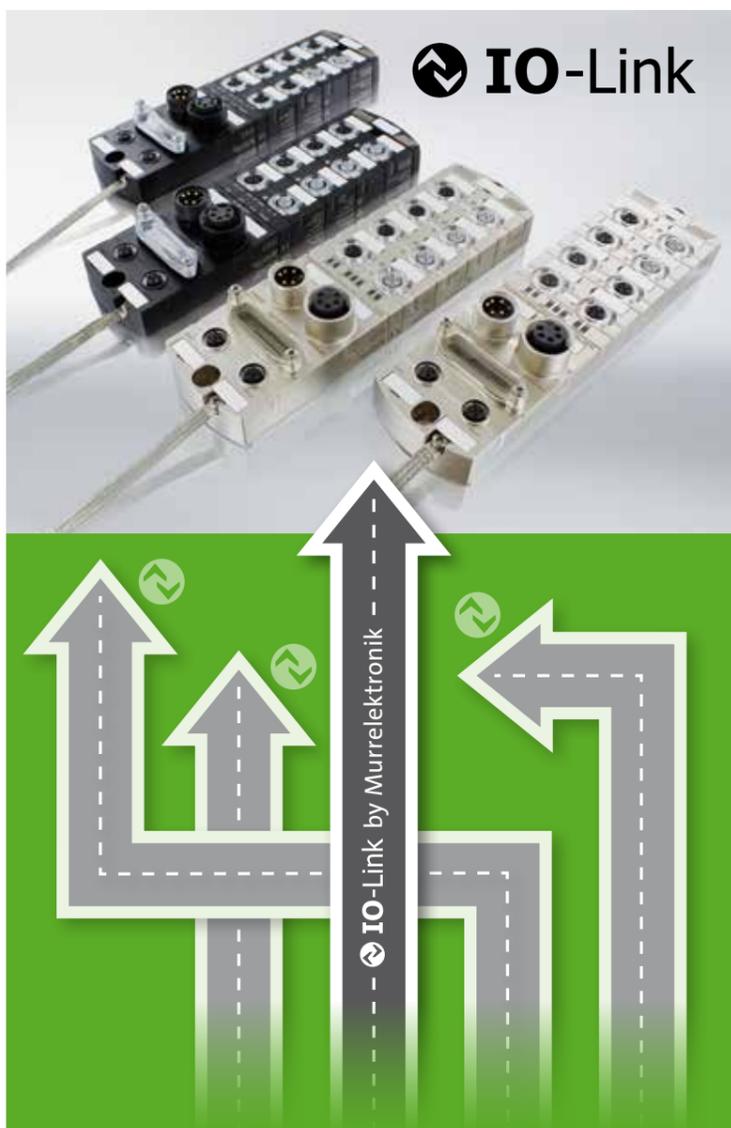
# AVOID EXPLOSIONS

Murrelektronik's Exact12 ATEX distribution boxes are ideal for use in potentially explosive atmospheres such as those in powder coating, painting facilities, wood processing plants or flour mills.



The robust distribution boxes with four or eight slots (with two signals each) are approved according to the current ATEX EU Directive 2014/34/EU. The distribution boxes have been tested with regard to temperature, impact, heating and tightness. The side circuit consisting of high-quality and halogen-free PUI is permanently connected. The perfectly adapted and specially designed cage ensures clear visibility of all LEDs and designation plates and protects the distribution box.

**Ultra practical:** The O-ring seal of the Exact12 ATEX is integrated in the housing and thus undetachable, even in case of mechanical mishaps. On other ATEX distribution boxes, a damaged seal would require the entire distribution box to be replaced for safety reasons.



## IO-LINK BY MURRELEKTRONIK

# EASY TO USE

**MKV Metal and Impact67 IO-Link fieldbus modules take you directly to where you want to go. They are ideal for integrating IO-Link devices into installation solutions. The advantages: fast integration, brief commissioning times, yet maximum flexibility.**

The basic feature of this easy integration is 'IODD On Board', an innovative technology by Murrelektronik. The sensor and actuator parameter data stored in the IODD (IO Device Description) are directly incorporated into the GSDML files of the Murrelektronik MKV Metal and Impact67 fieldbus modules. If these devices, for example IO-Link sensors or valve terminals, are connected, you can access this stored data directly and very conveniently via your control software, with no need for manual parameter setting or special tools.

This greatly simplifies matters, as to date every new IO-Link device had to be integrated into the software individually, a time-consuming process. All of this is proof that it is best to store parameter data in the control. For series machines, this benefit can be multiplied because once created, configurations can be copied & pasted many times to other systems and machine controls.

One particularly interesting aspect is that device parameterization can already be done on the computer in the office and no longer needs to be performed during machine commissioning on the shop floor. The parameter data is displayed in plain text (and not as HEX value) – this makes it easy to keep track of your data. This also facilitates the validation of machines and systems.

However, the freely configurable modules offer considerable time savings for non-standard machinery as well. The auto-configuration mode makes speedy commissioning a reality, since setting parameters for digital inputs and outputs is eliminated, the channels do as the control system commands.

**In practical terms:** The IODD of the new Em-parro67 hybrid power supply unit from Murrelektronik makes it possible to parameterize the current values of the Mico channels and to exchange a variety of diagnostic data with the control – Murrelektronik's IO-Link master and devices are easy to use.

## SAFETY FOR AUTOMOTIVE APPLICATIONS

# OPTIMUM PROTECTION FOR HUMANS AND MACHINE

With the push-pull module of the MVK metal series and its MVP12 metal distribution box, Murrelektronik presents an attractive solution for automotive applications that, in the event of a failure, makes it possible to switch the IO-Link supply off safely in combination with a safety relay.

The compact and robust MVK IO-Link master module is ideal not only for connecting digital sensors, actuators and, IO-Link devices (Class B) but also for integrating them into fieldbus systems based on PROFINET IRT and RT.

Due to the galvanically isolated sensor and actuator voltages in the master module, the outputs can be switched off safely. The same applies to the dig-

ital outputs in the MVP12 Metal IO-Link hub, which are also galvanically isolated from the inputs and switched off together in a safety-oriented manner if they are connected to a IO-Link port of the new MVK Metal master module.

In this way, safety-related solutions up to Performance Level d can be created. Cost-efficient safety-related installation is thus possible for many applications in the bodyshop in automotive production.

PROFINET IRT guarantees cycle times of up to 31.25  $\mu$ s. This allows, in addition to digital actuators and IO-Link devices, synchronous drives to be integrated into the network.



## TREE MANAGED

# MANAGED SWITCHES FOR REMOTE ACCESS AND MONITORING



Murrelektronik has expanded its TREE switch product line in the IP20 and IP67 area with managed switches. Entirely in line with Industry 4.0, these new switches of the TREE series (TREE M-4TX, TREE M-5TX IP67 and TREE M-6 TX) enable reliable internet-based remote access to machines and systems through VPN. Our managed switches have an implemented openVPN client that automatically connects to the VPN server of the system network. The switches are pre-configured for PROFINET and are delivered with LLDP and DCP enabled. This maintains a consistent and monitorable topology in your network. With the supported versions of the Simple Network Management Protocol (SNMP v1, v2c, and v3) and with LLDP enabled, the topology can be monitored through SNMP traps.

IP20 switches for DIN rail mounting feature a wide supply voltage range (9.5...56 V DC). The TREE M-6 TX also has an external relay output used to signal a cable break in the system's network for example. All Murrelektronik managed switches are provided with a very clear and powerful web-interface and are easy to configure. The robust IP67 housing and M12 connections make the TREE M-5TX IP67 a highly compact switch and thus particularly suitable for field use.

**In practical terms:** The switches enable reliable VPN remote maintenance access to the new Cube67 diagnostics gateway from Murrelektronik.

## EMERGENCY STOP BUTTON WITH ILLUMINATED RESET BUTTON



# MULTI-COLORED LIGHT EFFECTS

The EMERGENCY STOP and RESET buttons from Murrelektronik are integrated in electronic installations using preconfigured M12 standard cables. A time-saving solution that reduces the risk of faulty wirings. The 'Plug & Play' feature makes integrating the command devices in machines and systems faster.

They are used whenever individual command and signaling devices are included in decentralized systems, for example on protective fences or at production stations. The versions with an ultra-compact width of 42 mm are perfect to connect to standard aluminum profiles.

New! Now Murrelektronik has a version of the EMERGENCY STOP button with an illuminated RESET button in the housing. It can be integrated into the installation solution in such a way that the button is illuminated when a restart is possible. Five colored button caps are included in each packaging which allow you to create the desired colored lighting effect.