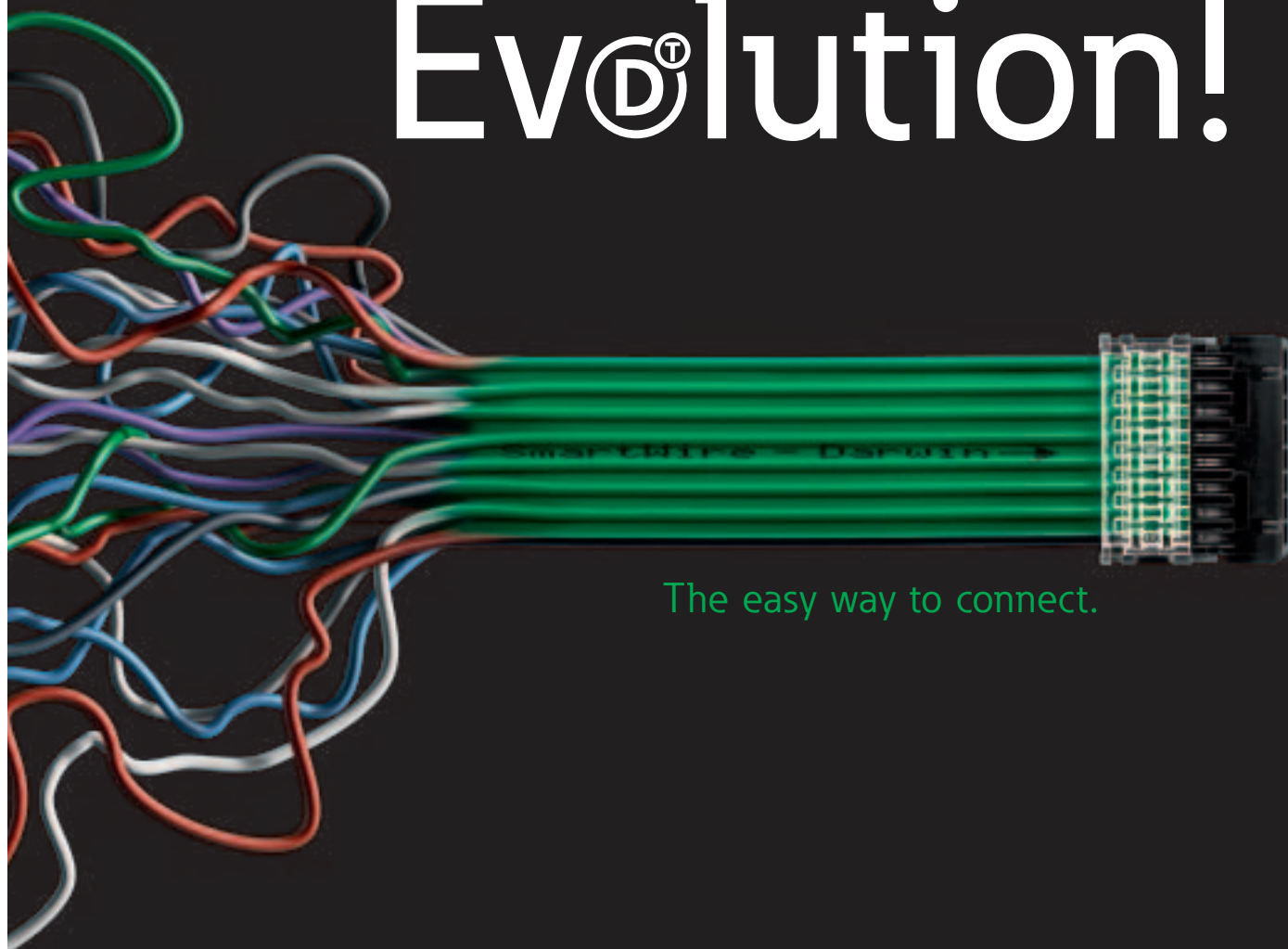


Ev[©]olution!



The easy way to connect.

Product Information

SmartWire-Darwin

The cost-optimised
communication system
for switchgear



EATON

Powering Business Worldwide

MOELLER 

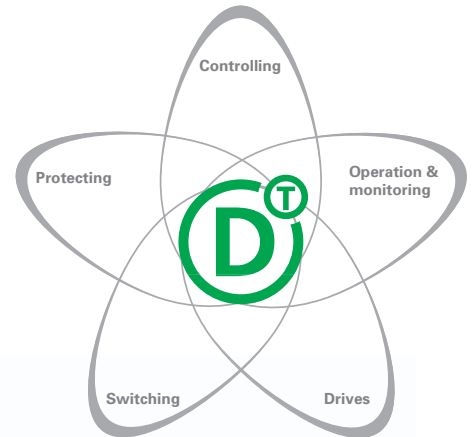
An Eaton Brand

SmartWire-Darwin.

Cost-optimized communication for switchgear

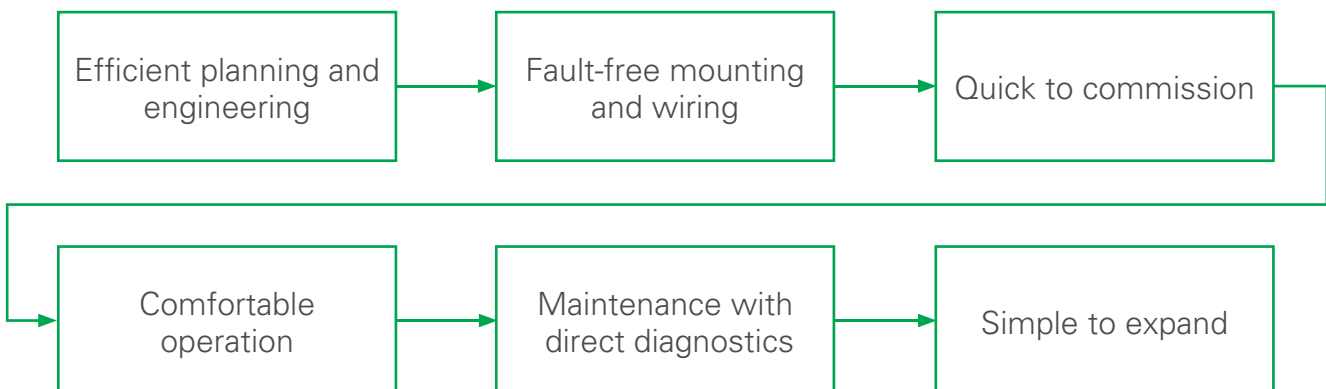
Manufacturers of machines and systems strive to achieve a balance between the maximum level of functionality and cost optimization. SmartWire-Darwin is a communication system for industrial switchgear based on the concept of continued development in the control panel and in the peripherals: from control through to protection and switching, and extending to driving, operation and monitoring.

A technology that benefits you, both now, and in the future.



SmartWire-Darwin: The easy way to connect.

SmartWire-Darwin reduces the wiring effort and expense with many switchgear systems by more than 60% and helps along the entire value-added chain – from the design to the construction, to the commissioning up to system expansion – in the reduction of costs. SmartWire-Darwin relies on the tried-and-tested Eaton Moeller industrial switchgear and grants intelligent communication features.



SmartWire-Darwin.

Award-winning cutting-edge technology



At the SPS/IPC/Drives 2009 in Nuremberg, the SmartWire-Darwin was voted by visitors into first place as the most significant innovation and presented with the Automation Award.

The visitors were just as impressed by SmartWire-Darwin as the expert jury, who nominated SmartWire-Darwin. In addition to the unbeatable advantages that enable a time-saving of more than 60% with control wiring, the simplicity and freedom from error of the system as well as the versatile communication and diagnostic possibilities of SmartWire-Darwin were convincing. Control circuit devices, contactors, motor-protective circuit-breakers, motor starters and circuit-breakers are directly interconnected with SmartWire-Darwin and coupled to the control via a gateway.

Yesterday

In the past, the classic control panel consisted of a central control with switchgear, sensors and actuators, which all had to be wired individually.

Conclusion: extensive wiring effort, large and expensive control panels, time-intensive commissioning, complex trouble-shooting, limited diagnostic features.

Today

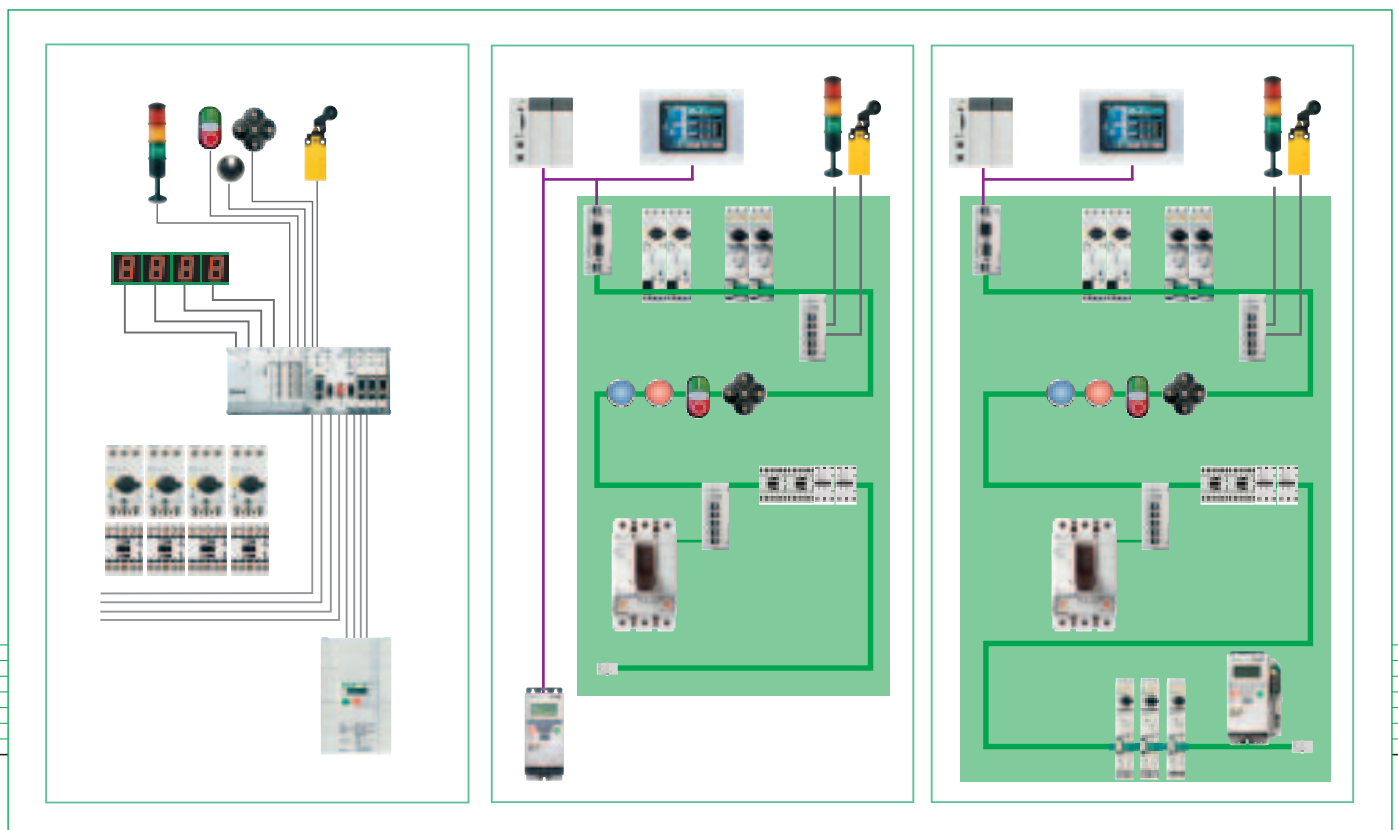
Switchgear is connected directly to SmartWire-Darwin and coupled via a gateway to the control. The control circuit wiring is reduced to a minimum.

Conclusion: drastic reduction in the wiring, clear and compact control panels, short commissioning times and comprehensive diagnostic features reduce the standstill times and thus increase the availability.

Tomorrow

The range is continually being extended by new SmartWire-Darwin components. Next frequency inverters and soft starters will be connected to SmartWire-Darwin.

Conclusion: Eaton Moeller offers a modern and forward-looking interconnection system for industrial automation with SmartWire-Darwin.



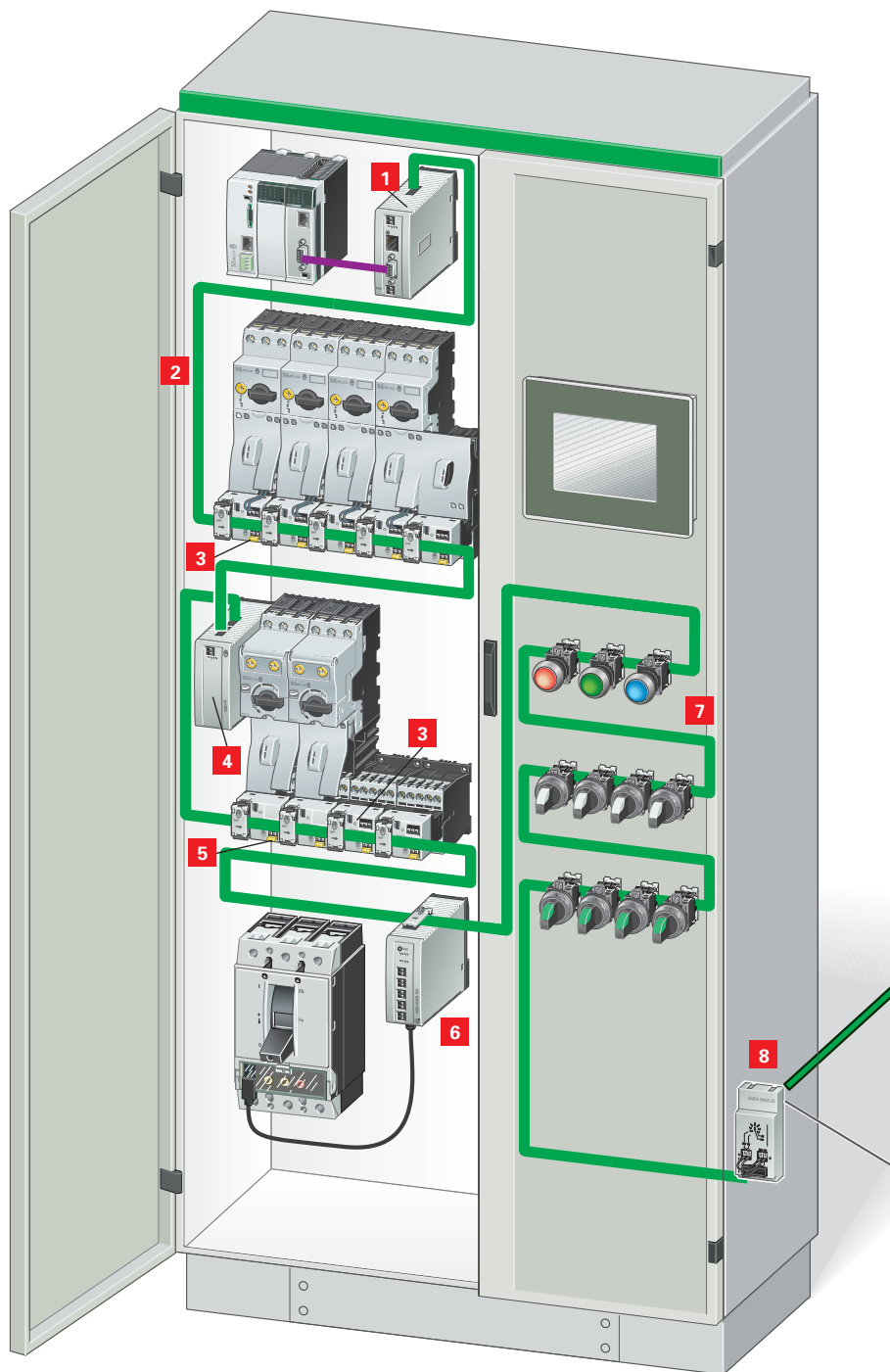
SmartWire-Darwin.

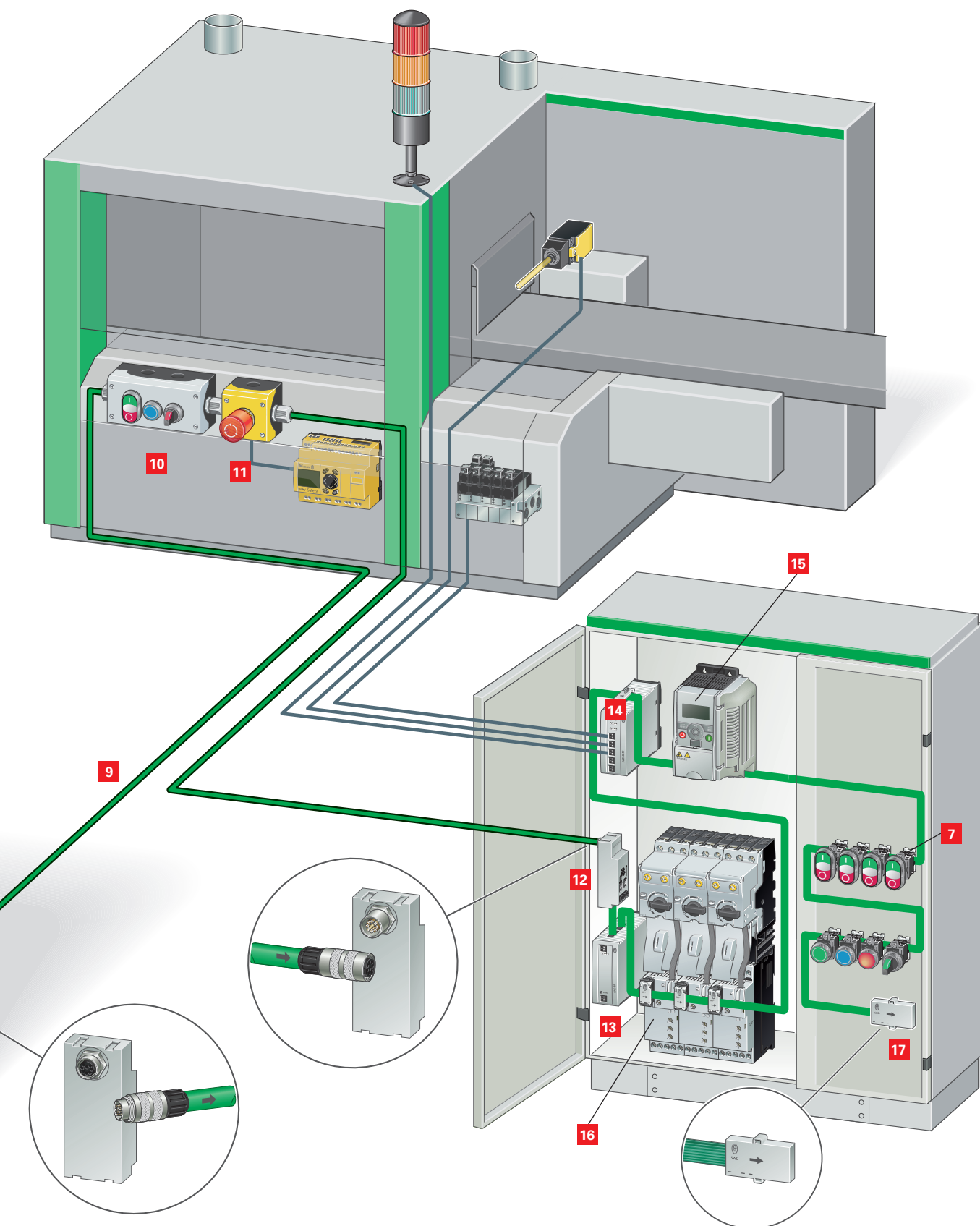
From the control panel to the peripherals.

The conventional control wiring is replaced by SmartWire-Darwin. SmartWire-Darwin does not just provide interconnection of the components in the control panel, but also the interconnection of distributed operating panels or the coupling of control circuit devices or service distribution boards, that are distributed on the machine.

The SmartWire-Darwin networked control panel

- 1 Fieldbus gateway: Connection to the higher-level control
- 2 Flat cable
- 3 Function element for contactor DIL and motor starter MSC with PKZ
- 4 Powerfeed 1 (optional 24 V DC power supply)
- 5 Function element for motor starter MSC with PKE
- 6 Function element for circuit-breaker NZM
- 7 Function element front: control circuit devices RMQ Titan for front installation
- 8 Control panel feed-through socket
- 9 Round cable
- 10 M22-I... Surface mounting enclosure with circuit board, 3 installation positions
- 11 M22-PV... EMERGENCY-STOP surface mounting enclosure with circuit board, 1 installation position
- 12 Control panel feed-through plug
- 13 Powerfeed 2 (optional 15 V DC and 24 V DC power supply)
- 14 I/O module: connection of digital actuators / sensors
- 15 Frequency inverter M-Max
- 16 Soft starter DS 7
- 17 Bus terminator





SmartWire-Darwin.

Interconnect 99 devices over 600 m.

One system, countless possibilities: Independently of the selected bus system of the higher-level control, up to 99 devices can be interconnected with the new SmartWire-Darwin line up to a maximum overall total length of 600 m. The SmartWire-Darwin line always commences with a fieldbus gateway. From here the "green" cable originates and interconnects the devices inside and outside the control panel right up to the termination resistor. The gateway assumes the co-ordination of the SmartWire-Darwin line and the data coupling to the higher-level control.



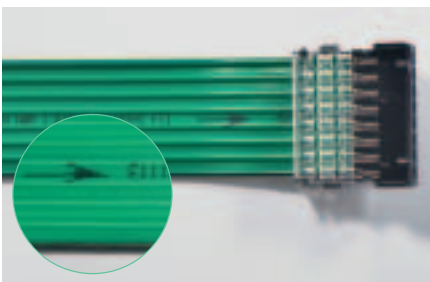
Addressing of the SmartWire-Darwin devices is undertaken automatically at the push of a button on the gateway in the sequence in which they are mounted.

The cable

The "green" eight-pole flat or round cables are the lifeline of the SmartWire-Darwin and interconnect from the gateway to the termination resistor. In addition to the data lines, the supply voltages for the devices (15 V DC) and the control (24 V DC) of the contactors are included in the cable.

The gateway

Profibus-DP and CANopen gateways are available for the exchange of data with the higher-level controls. Thus the most important fieldbus connections for the conventionally available controls is provided. The required GSD or EDS files can be found on our Internet homepage.



▲ The cable technology

The "green" eight-pole flat cable is the lifeline of the SmartWire-Darwin and interconnects from the gateway to the termination resistor. The flat cable has two prominent distinguishing features: Arrows indicate the direction of the cable from the gateway the bus termination and the black marking indicates the mounting orientation of the devices and the flat connector.



▲ The flat connector

The flat connection serves as the connection of the flat cable to the gateway and the bus termination, or to the respective coupling module. Mounting is safe and simple with the crimping tool – place the flat plug in the crimping tool, put the flat cable into the plug, squeeze the clamping tool – ready.



▲ The bus termination

The bus termination is at the end of every SmartWire-Darwin line. Either in the control panel of as a switch-in bus termination in the M22-.. surface mount enclosures.



The powerfeed module 1

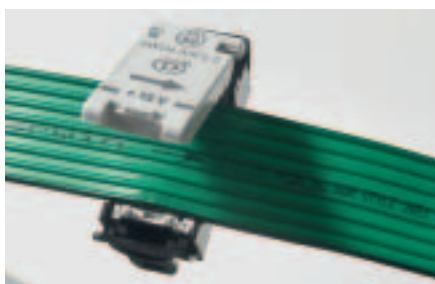
Powerfeed 1 serves as an additional 24 V DC power supply for xStart motor starter combinations or xStart size 1 or 2 contactors on the SmartWire-Darwin line.

The powerfeed module 2

As with powerfeed 1, powerfeed 2 is used as a 24 V DC power supply and also provides the 15 V DC power supply for the devices. Ideal when many devices are used or with extended cable lengths.

The input/output module

Different input/output modules are available for integration of conventional actuators or sensors.



1. Step: mount the device plug

Place the eight pole flat cable in the device plug and snap shut, ...



2. Step: position the device plug

... then position the device plug as required and fix it by applying light pressure ...



3. Step: establish device connector contact

... establish the device plug and flat cable contact using the plug crimping tool.

SmartWire-Darwin. Simply ingenious.

Conventional wiring of control circuit devices involves a lot of effort and expense – every contact or indicator light is wired individually, and separately connected to the input/output modules of the control. This requires a lot of time and has the potential for many wiring faults. SmartWire-Darwin is simply ingenious – the flat green cable connects control circuit devices with just a click. This saves time and reduces the sources of error.



SmartWire-Darwin – simply ingenious – for control circuit devices.



Montage RMQ Titan®

RMQ Titan control circuit devices are plugged together with SmartWire-Darwin function elements.

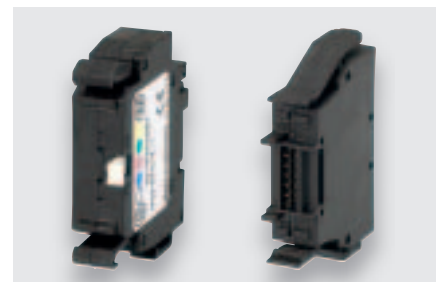
Simply insert the device plug, ready to go.



▲ Function elements for front fixing

The function elements differ in their properties according to the actuation devices that are used (pushbuttons, selector switches, indicator lights, etc.) and are available in the following versions:

- Function element LED
- Function element with 2 positions and LED
- Function element with 3 positions and LED
- Function element with 3 positions
- Function element with 2 positions



▲ Base fixing

The variant shown on the left is also available for base fixing. Shown here: the front and rear view of a function element with 2 positions.



Every SmartWire-Darwin function element has its own address as well as self diagnostics.
The benefits: fast and efficient diagnostics.

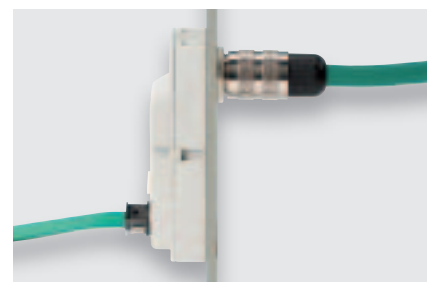
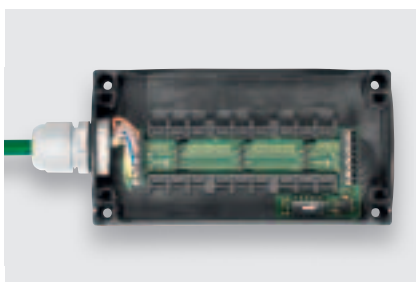
EMERGENCY-STOP device

The 2-position function elements are designed to ensure that a standard contact element can be used to the right and left of the SmartWire-Darwin function element. For the EMERGENCY-STOP device this has the benefit that the EMERGENCY-STOP circuit can be wired separately and can feature a two-channel design. On other control circuit devices the load can be switched in the accustomed way.



▲ RMQ Titan surface mount enclosure with SmartWire-Darwin

The green SmartWire-Darwin round conductor connects the control panel with the peripherals. The M22-.. surface mount enclosures are connected with cable glands or plug connectors (optional accessories). The circuit board is simply connected using colour coded push-in terminals. Now simply snap on the required base fixing function element – ready to go.



▲ From the control panel into the peripherals

The control panel feed-through interconnects the flat cable with the round cable. For the connection outside the control panel the SWD round cable with IP 67 degree of protection screw attachment is used.

SmartWire-Darwin. Simply clever.

Even the conventional wiring of a control current circuit incorporating motor starters or contactors involves considerable time and effort. Every motor starter or every contactor is wired individually, and separately connected to the input/output modules of the control. This requires a lot of time and has the potential for many wiring faults and operating faults. It is really clever with our motor starters and contactors of the xStart series complemented by SmartWire-Darwin.



SmartWire-Darwin – simply clever –
for motor starters or contactors



Motor starters from standard components

A good example for workload reduction:
The SmartWire-Darwin module for DILM is simply plugged on like an auxiliary contact on contactors up to 38 A. To configure a motor starter the motor-protective circuit-breaker from the standard range is used. This combination can now be complemented by system accessories (e. g. the three-phase commoning link or busbar adapter).



▲ **DOL and reversing starters**

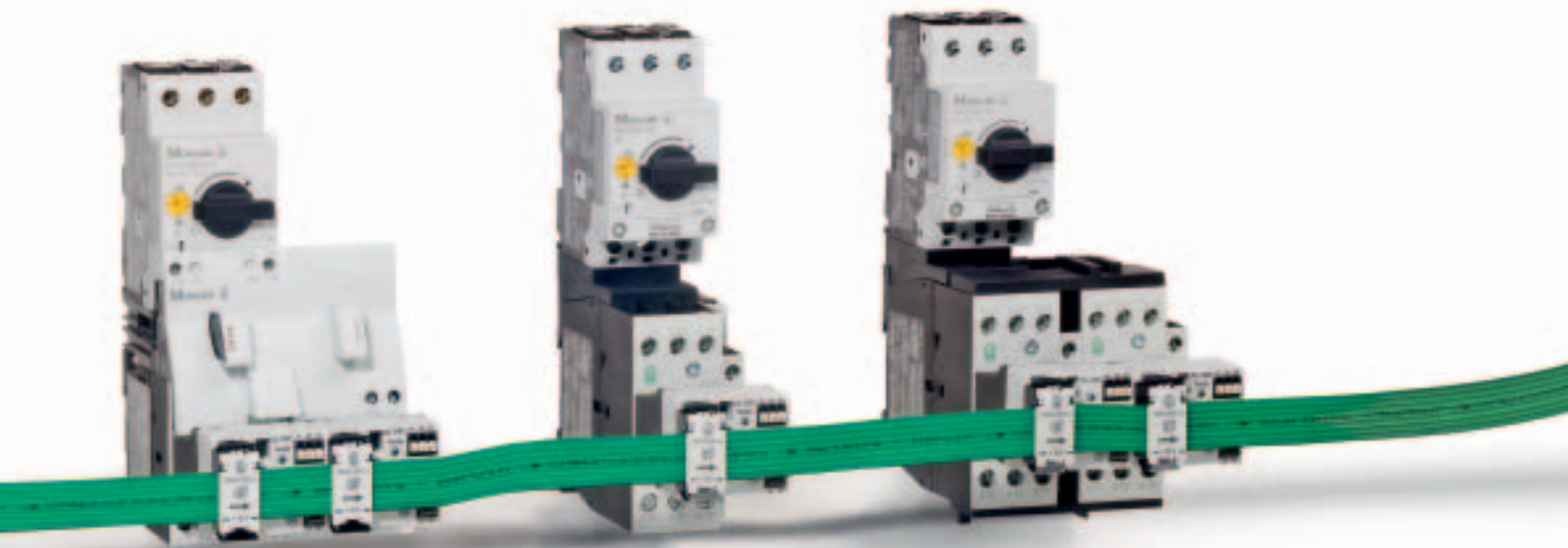
Simple plugging together of xStart DOL and reversing starters up to 15 kW: These are made up of standard components and complemented with space-saving SmartWire-Darwin function elements. The electrical and mechanical interlock of the contactor is still possible.



▲ **EMERGENCY-STOP**

EMERGENCY-STOP shutdown at a central point: The 24 V DC control voltage for the contactors is supplied centrally on the gateway. Thus the power supply is integrated into an EMERGENCY-STOP circuit and leads to switch off of the contactors during an EMERGENCY STOP.

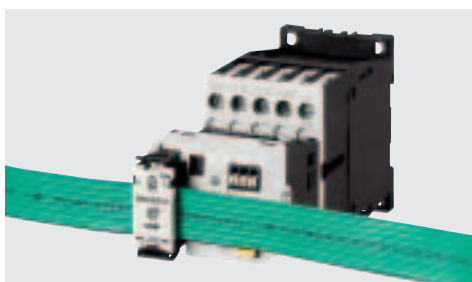
Several EMERGENCY STOP circuits can be established within a SmartWire-Darwin line. EMERGENCY STOP circuits can be simply established by the use of powerfeed 1 or 2.



SmartWire-Darwin offers all the necessary information without complex wiring.

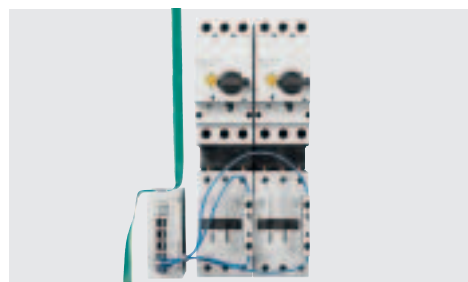
Comfortable operation and optimum information flow

Faster commissioning through simple testing: The xStart motor starter combination can be switched on and off directly on the SmartWire-Darwin function element DIL/MS (manual/auto) using a screwdriver. In automatic mode, the contactor then receives its switching command from the PLC. With SmartWire-Darwin it is possible to receive exact and precise status messages. Hereby a differentiation is made between trips due to a short circuit or an overload. Accordingly optimum system transparency is guaranteed.



▲ Switch up to 2200 A with a coupling contactor

In addition to the size 1 and 2 contactors, the SmartWire-Darwin modules for DILM can also be combined with contactor relays of type DILA. This opens new possibilities for distributed control of loads with AC voltages, or the distributed control of the DILA as a coupling contactor for contactors up to 2200 A. The switching status of the controlled contactor is also determined via the two digital inputs of the SmartWire-Darwin module for DILM.

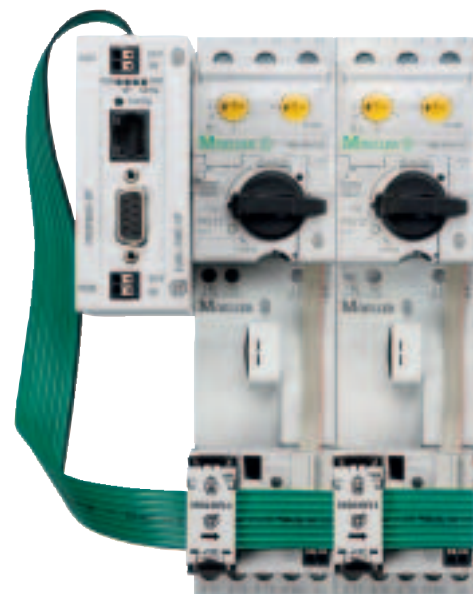


▲ Control of AC voltage loads

AC controlled motor-starter combinations are integrated into the SmartWire-Darwin system via the SmartWire-Darwin input/output modules using relay outputs. Using the digital inputs of the modules, the switch position of the contactor can be determined; with motor-starter combinations, the switch position of the motor-protective circuit-breaker can also be determined.

SmartWire-Darwin. Simply communicative.

Motor-starter combinations with PKE up to 15 kW are simply integrated into the world of automation via SmartWire-Darwin. Using the modular function element PKE-SWD-32, all relevant information can be sent via the motor feeder to the control and is thus available across the entire system.



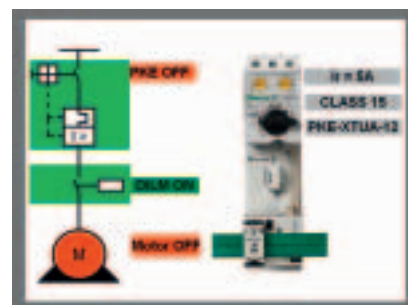
SmartWire-Darwin – simply communicative –
for motor-starter combinations PKE

Networked motor-starter combinations PKE

A SmartWire-Darwin motor starter with communication capabilities is made in just a few simple steps from a standard motor starter combination consisting of a basis unit PKE, electrical and mechanical connectors as well as a contactor DIL M. For this purpose, the control option is inserted into the basis unit, and the SmartWire-Darwin function module PKE is snapped onto the contactor. The supplied data cable is inserted into the PKE and connected to the SmartWire-Darwin function element. The connection of the motor-starter combination extended in this way to the SmartWire-Darwin cable is implemented with the SmartWire-Darwin external device connector.

Everything at a glance

In addition to the integrated control of the motor starter, the function element PKE-SWD-32 provides all switching states and tripping indications that were only accessible up to now using auxiliary contacts. This reduces the entire control current wiring of the motor feeder and provides enhanced transparency. The additional transfer of process data such as the actual motor current and thermal motor loading indicates potential process failures in advance. This improves the service-friendliness and availability of the system.



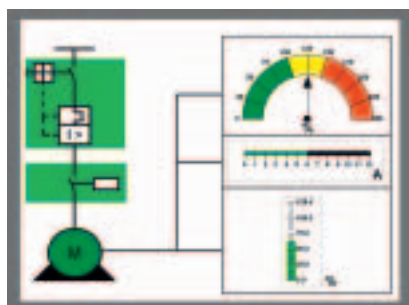
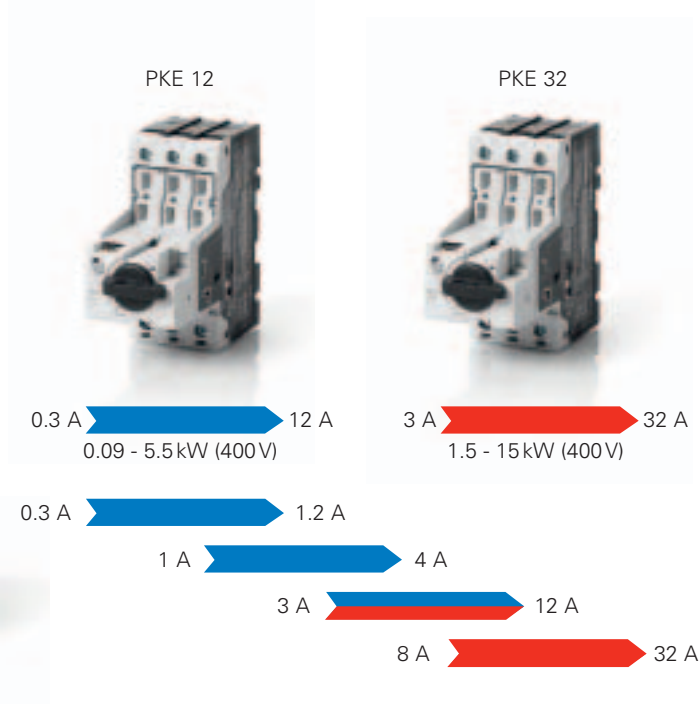
Status

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



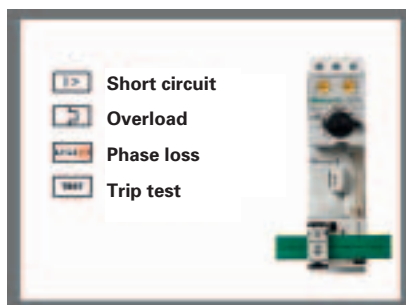
Modular system up to 32 A

The PKE control option type PKE-XTUA-... is used for the connection to the communication system SmartWire-Darwin. This covers the 4 different versions of the current range from 0.3 A to 32 A. The PKE control options are plugged into the basis unit PKE12 or PKE32 without using tools and can be exchanged if necessary.



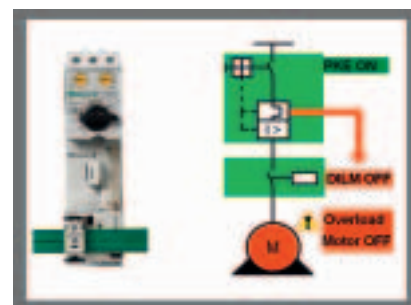
Current / capacity utilization

- Relative motor current value
- Thermal motor loading



Diagnostics

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



Additional functions

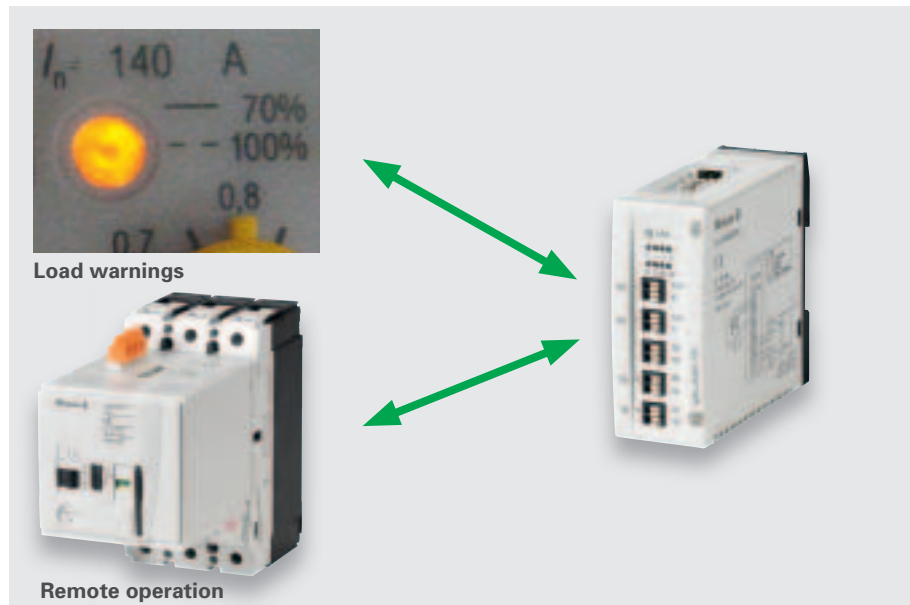
- Overload relay function (contactor is switched off at overload)
- Manual / automatic operation via rotary switch

SmartWire-Darwin.

Simply efficient.

In addition to control circuit devices and motor starters, the SmartWire-Darwin can also communicate directly with compact circuit-breakers. The NZM module XSWD-704 is used for this purpose.. The SmartWire-Darwin communication system demonstrates its capabilities here. Control circuit devices with 1 bit data can be operated just as well as circuit-breakers with 32 byte data. Important circuit-breaker information is made available via SmartWire-Darwin. This is, for example, the phase currents or diagnostic data such as load warnings and diagnostic messages.

All NZM 2/3/4 with electronic releases can be connected directly to the SmartWire-Darwin via the NZM module. All currents up to 1600 A in the energy distribution system are thus under control of SmartWire-Darwin.



SmartWire-Darwin –
high-performance communica-
tion for energy management

NZM communication

The detection and correction of faults before they occur is the objective of the preventative warning. NZM reports excessive current values in 3 warning stages via SmartWire-Darwin. SmartWire-Darwin also assumes the control of a remote operator for the circuit-breaker, so that the wiring that would otherwise be required can be eliminated.

Comprehensive range of data

Inputs

- Currents
- Status
- Diagnostics
- Energy meter
- Setting values
- Identification

All three phases and the switch position are available as input data. For diagnostic purposes, the load warnings, and in the case of a trip, information concerning the cause is sent. In addition to the active energy, the switch type and current trip setting parameters are provided.

Outputs

- Remote operation
- Reset
- Energy meter

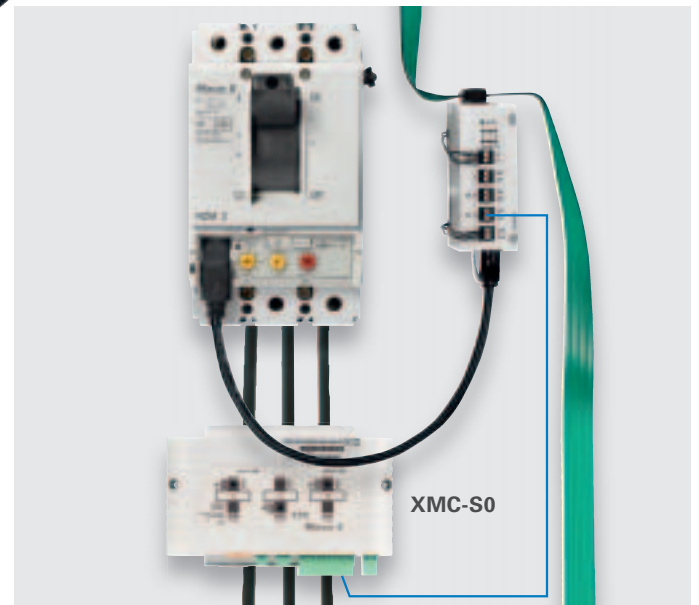
Switch on and off via remote operator as well as a reset of the energy meter can be sent as commands to the switch.





Energy meter on board

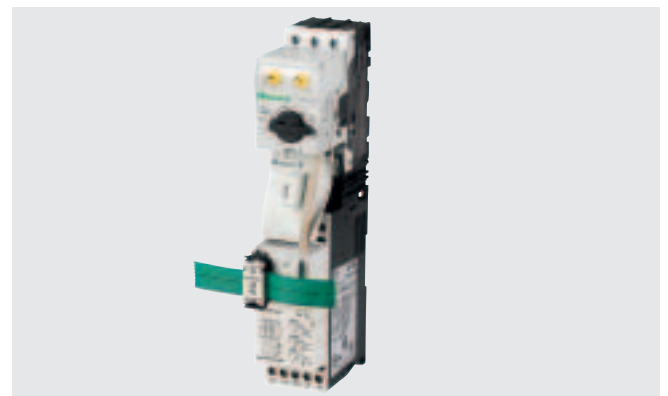
The NZM module transfers the value of consumed active energy in the respective input or output circuit. For this purpose, a non-volatile energy meter is on board the module and can be read at any time via SmartWire-Darwin. This provides the prerequisite for energy optimization. The NZM function element has a further standardized S0 interface for energy measurement in addition to the NZM interface. The NZM-XMC-S0 module, which actually measures the energy, is connected to it. It incorporates the measurement transformer and the required measurement circuitry.



SmartWire-Darwin perspective



▲ A SmartWire-Darwin connection is in preparation for the frequency inverter M-Max for simple and flexible data transfer.



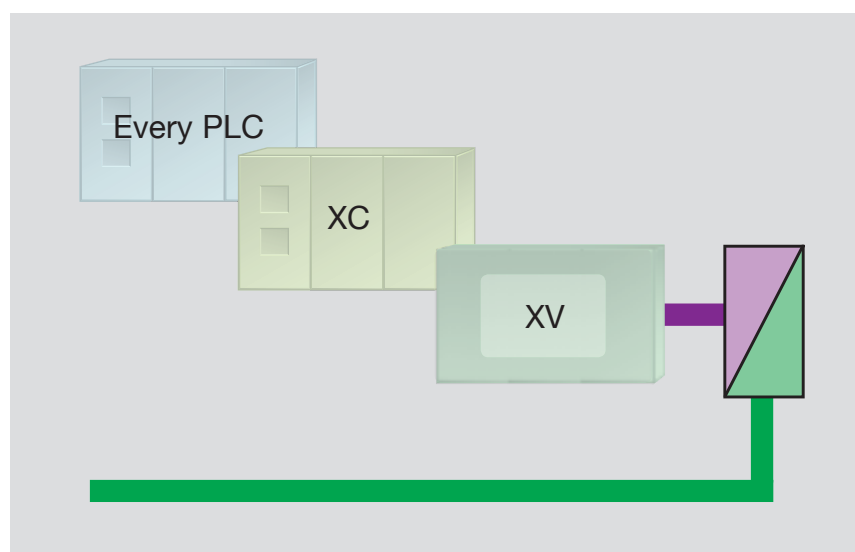
▲ The soft starter DS7 will soon be available with a SmartWire-Darwin connection to simplify wiring and enhance functionality.

SmartWire-Darwin.

Protects your know-how.

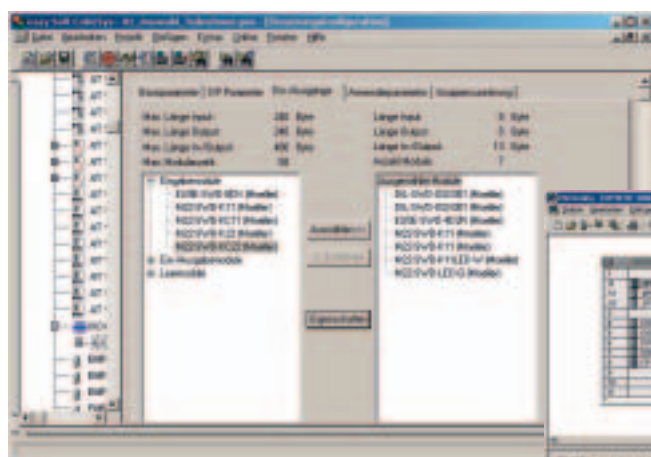
SmartWire-Darwin to a very great degree reduces the wiring effort and expense and helps along the entire value-added chain, from the design to the construction, the programming, to the commissioning and up to system expansion – in the reduction of costs.

SmartWire-Darwin based on the known and proven – that is on Moeller industrial switchgear – SmartWire-Darwin transforms Moeller industrial switchgear to communication-enabled devices.



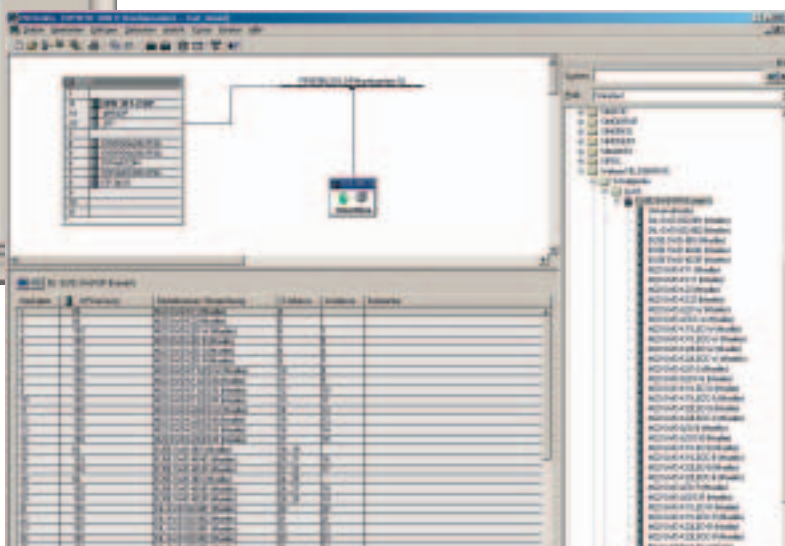
Your application program is retained

Integration of the SmartWire-Darwin gateways into the PLC program is problem-free. It simply acts as the control configuration not as the application program. Thus the conversion to SmartWire-Darwin is also made simple and easy in the area of PLC programming. You continue to protect and retain your software know-how!



SmartWire-Darwin in the easySoft-CoDeSys configuration

SmartWire-Darwin in the Step7 PLC configuration



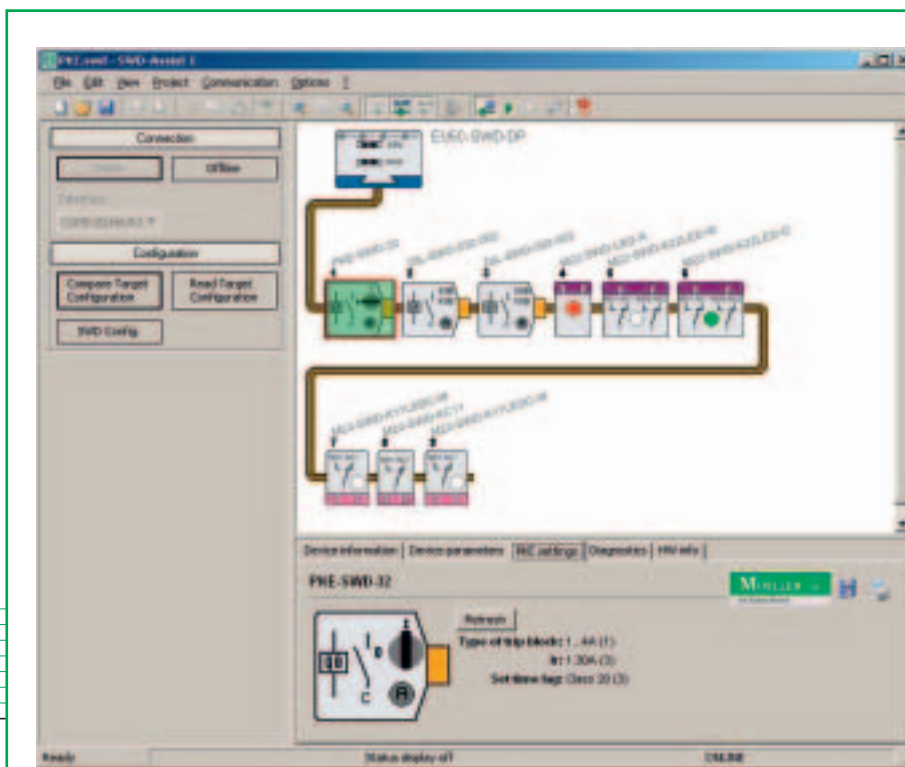


Easily achieve you target with SWD-Assist

The SWD-Assist software supports you in the planning, engineering and commissioning of a SmartWire-Darwin network. You simply select the required SWD function elements from the device catalogue and place them at the intended location. The configuration can be saved and reused for other projects. For PROFIBUS, the generation of a project-specific gsd-file is also possible. This can be integrated into the programming environment in the usual manner. Entry into the SWD-configuration in the control configuration is no longer necessary.



The SWD-Assist can be downloaded free-of-charge from our website:
www.moeller.net/swdassist



Fast and comfortable: SWD online diagnostics

You can also directly access the SmartWire-Darwin devices over the configuration interface of the gateway. The entire SWD network can be checked without a connected PLC. Reading and editing of the current configuration is possible just as is the display of states, parameter data and diagnostic messages. Differences between the existing configuration and the configuration defined in the control configurator are also displayed. Device faults are detected immediately and can be quickly remedied.

SmartWire-Darwin – an overview of the product range.

Gateway



◀ Gateways

	Part no.	Article no.
Gateway Profibus-DP	EU5C-SWD-DP	116308
Gateway CANopen	EU5C-SWD-CAN	116307

Input/output modules



◀ I/O modules

	Part no.	Article no.
Digital module, 8 inputs	EU5E-SWD-8DX	116381
Digital module, 4 inputs, 4 outputs	EU5E-SWD-4D4D	116382
Digital module, 4 inputs, 2 outputs	EU5E-SWD-4D2R	116383

Control circuit devices



◀ Function elements front fixing

	Part no.	Article no.
Function element, 2 positions	M22-SWD-K11	115964
Function element, 3 positions	M22-SWD-K22	115965
Function element, LED white	M22-SWD-LED-W	115966
Function element, LED blue	M22-SWD-LED-B	115967
Function element, LED green	M22-SWD-LED-G	115968
Function element, LED red	M22-SWD-LED-R	115969
Function element, 2 positions, LED white	M22-SWD-K11LED-W	115972
Function element, 2 positions, LED blue	M22-SWD-K11LED-B	115973
Function element, 2 positions, LED green	M22-SWD-K11LED-G	115974
Function element, 2 positions, LED red	M22-SWD-K11LED-R	115975
Function element, 3 positions, LED white	M22-SWD-K22LED-W	115978
Function element, 3 positions, LED blue	M22-SWD-K22LED-B	115979
Function element, 3 positions, LED green	M22-SWD-K22LED-G	115980
Function element, 3 positions, LED red	M22-SWD-K22LED-R	115981



◀ Function elements base fixing

	Part no.	Article no.
Function element, 2 positions	M22-SWD-KC11	115995
Function element, 3 positions	M22-SWD-KC22	115996
Function element, LED white	M22-SWD-LEDC-W	115997
Function element, LED blue	M22-SWD-LEDC-B	115998
Function element, LED green	M22-SWD-LEDC-G	115999
Function element, LED red	M22-SWD-LEDC-R	116000
Function element, 2 positions, LED white	M22-SWD-K11LEDC-W	116003
Function element, 2 positions, LED blue	M22-SWD-K11LEDC-B	116004
Function element, 2 positions, LED green	M22-SWD-K11LEDC-G	116005
Function element, 2 positions, LED red	M22-SWD-K11LEDC-R	116006
Function element, 3 positions, LED white	M22-SWD-K22LEDC-W	116009
Function element, 3 positions, LED blue	M22-SWD-K22LEDC-B	116010
Function element, 3 positions, LED green	M22-SWD-K22LEDC-G	116011
Function element, 3 positions, LED red	M22-SWD-K22LEDC-R	116012



◀ Accessories surface mounted enclosure M22-I..

	Part no.	Article no.
PCB for enclosure, 1 installation position	M22-SWD-I1-LP01	115990
PCB for enclosure, 2 installation positions	M22-SWD-I2-LP01	115991
PCB for enclosure, 3 installation positions	M22-SWD-I3-LP01	115992

PCB for enclosure, 4 installation positions	M22-SWD-I4-LP01	115993
PCB for enclosure, 6 installation positions	M22-SWD-I6-LP01	115994

Function element DIL M / Contactor modules



Function element for DIL M / MSC	Part no.	Article no.
Function element, DIL/MS	DIL-SWD-32-001	118560
Function element, DIL/MS, manual/auto	DIL-SWD-32-002	118561
Function element for PKE12/32	PKE-SWD-32	126895
NZM module	Part no.	Article no.
SWD interface for circuit-breaker NZM	NZM-XSWD-704	135530

Accessories



Powerfeed modules	Part no.	Article no.
Powerfeed 1	EU5C-SWD-PF1-1	116309
Powerfeed 2	EU5C-SWD-PF2-1	116380
Flat and round cables	Part no.	Article no.
Flat cable, 100 m, 8-pole	SWD4-100LF8-24	116026
Flat cable, 3 m, 8-pole with flat cable plug	SWD4-3LF8-24-2S	116027
Flat cable, 5 m, 8-pole with flat cable plug	SWD4-5LF8-24-2S	116028
Flat cable, 10 m, 8-pole with flat cable plug	SWD4-10LF8-24-2S	116029
Round cable, 50 m, 8-pole	SWD4-50LR8-24	116030
Connectors and terminations	Part no.	Article no.
Device connector, 8-pole	SWD4-8SF2-5	116022
Flat plug, 8-pole	SWD4-8MF2	116023
Flat plug coupling, 8-pole	SWD4-8SFF2-5	116024
Bus termination	SWD4-RC8-10	116020
Mounting tools	Part no.	Article no.
Crimping tool for device connector	SWD4-CRP-1	116025
Crimping tool for flat plug	SWD4-CRP-2	116699
Adapter SWD device connector for crimping tool	SWD4-CRPAD-1	116700
Adapter flat plug for crimping tool	SWD4-CRPAD-2	116701
Connection elements	Part no.	Article no.
Device connector cable jumper, base	M22-SWD-SEL8-10	116698
Device connector cable jumper, front	SWD4-SEL8-10	116021
4-way adapter for joystick, 4-way push and select switches	M22-SWD-A4	116016
Enclosure feed-through socket for M22	SWD4-SF8-20	116031
Enclosure feed-through plug for M22	SWD4-SM8-20	116032
Control panel feed-through socket, POW	SWD4-SFL8-20	121380
Control panel feed-through plug, POW	SWD4-SML8-20	121381
Socket, straight, 8-pole	SWD4-SF8-67	116033
Plug, straight, 8-pole	SWD4-SM8-67	116034
Socket, angled 90°, 8-pole	SWD4-SF8-67W	116035
Plug, angled 90°, 8-pole	SWD4-SM8-67W	116036
Adapter flat connector / round cable	SWD4-8FRF-10	121377

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