Rodotec AG: Assembly lines for the USA

Rodotec AG develops assembly systems for industry – from simple transfer systems and semi-automatic workstations to fully automated production plants.

Assembly line supports workers – controller monitors work steps

Rodotec produced a semi-automatic assembly line for a car manufacturer. Along the 24-meter-long line, components are bolted and pressed into place at ten modular workstations connected via a bus cable. Hydraulic and pneumatic tools support the workers with the assembly. With the aid of monitoring via the controller and the final test, hydraulic modules can be manufactured without a fault.

Rodotec's customer requirement was that no control cabinets were to be installed at the individual modules along the assembly line. IO modules with IP65/67 protection were requested instead. Only the controller of the complete assembly line is housed in a control cabinet. Due to its compactness and the flexible expansion and assembly options, the SIMATIC ET 200AL IO system has practically forced its way into this role. The controller was configured and programmed with the TIA Portal.

The fast commissioning, integrated diagnostics and the possibility of option handling can all be mentioned as advantages.

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In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.
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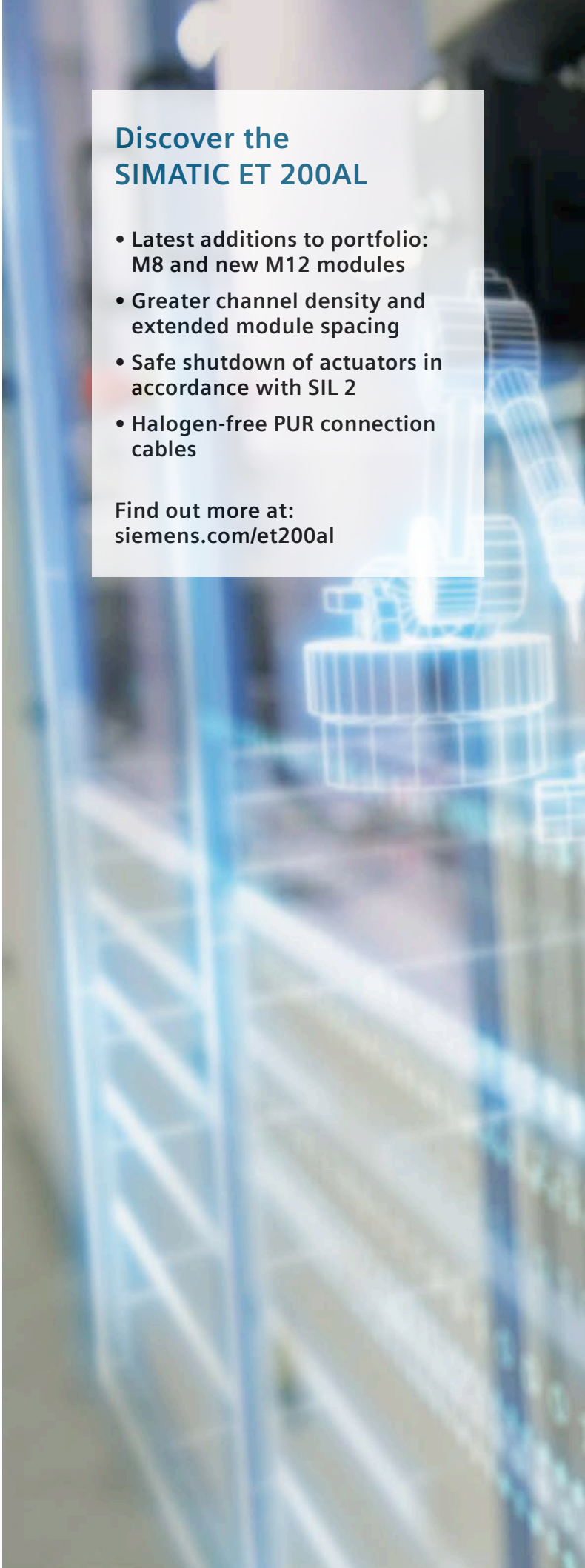


Discover the SIMATIC ET 200AL

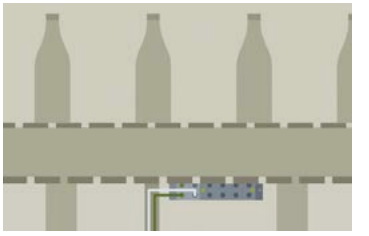
- **Latest additions to portfolio: M8 and new M12 modules**
- **Greater channel density and extended module spacing**
- **Safe shutdown of actuators in accordance with SIL 2**
- **Halogen-free PUR connection cables**

Find out more at:
siemens.com/et200al

SIMATIC ET 200AL – Added value for a host of applications

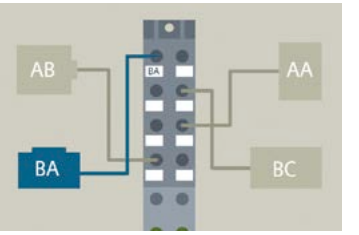
1 Flexible mounting

Front or side screw connection in all mounting positions. SIMATIC ET 200AL modules can be installed easily in any position, whether installed vertically or horizontally, with front or side screw attachment. They are mounted on site directly onto the machine or assembly line and incorporate the sensors and actuators by means of M8 or M12 connection technology.



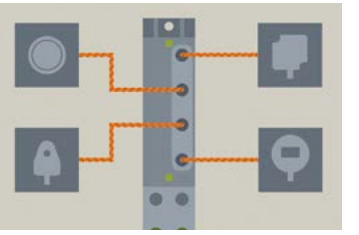
2 Clear, easy connections

Wiring is simplified by color coding for sockets and the appropriate connecting cables. Cables can be retained by attaching cable ties directly to the module. The modules can be connected to PROFINET or PROFIBUS. Module identification labels ensure greater clarity.



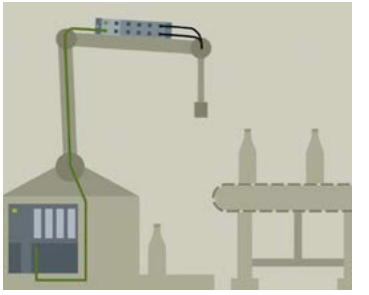
3 IO-Link interface

With IO-Link specification V1.1 it is possible to transfer current device and master parameters automatically to the IO-Link device – no additional engineering is required when replacing a device. The versatile IO-Link Master features adjustable parameters and diagnostic functions and can be adapted as required.



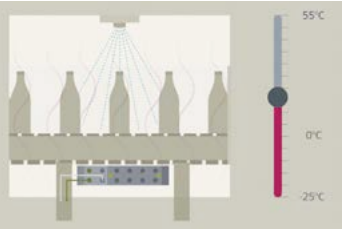
4 Greater reliability

Thanks to its plastic enclosure, the SIMATIC ET 200AL is particularly suitable for moving applications with accelerations of 5 g (continuous) and 10 g (maximum). The modules have electronic short-circuit protection and restart automatically after a power interruption or module replacement. The reduced amount of wiring minimizes the risk of a cable break.



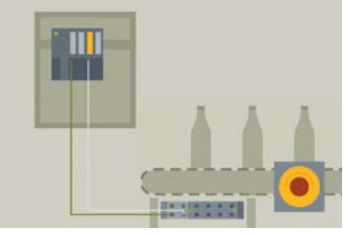
5 Ruggedness

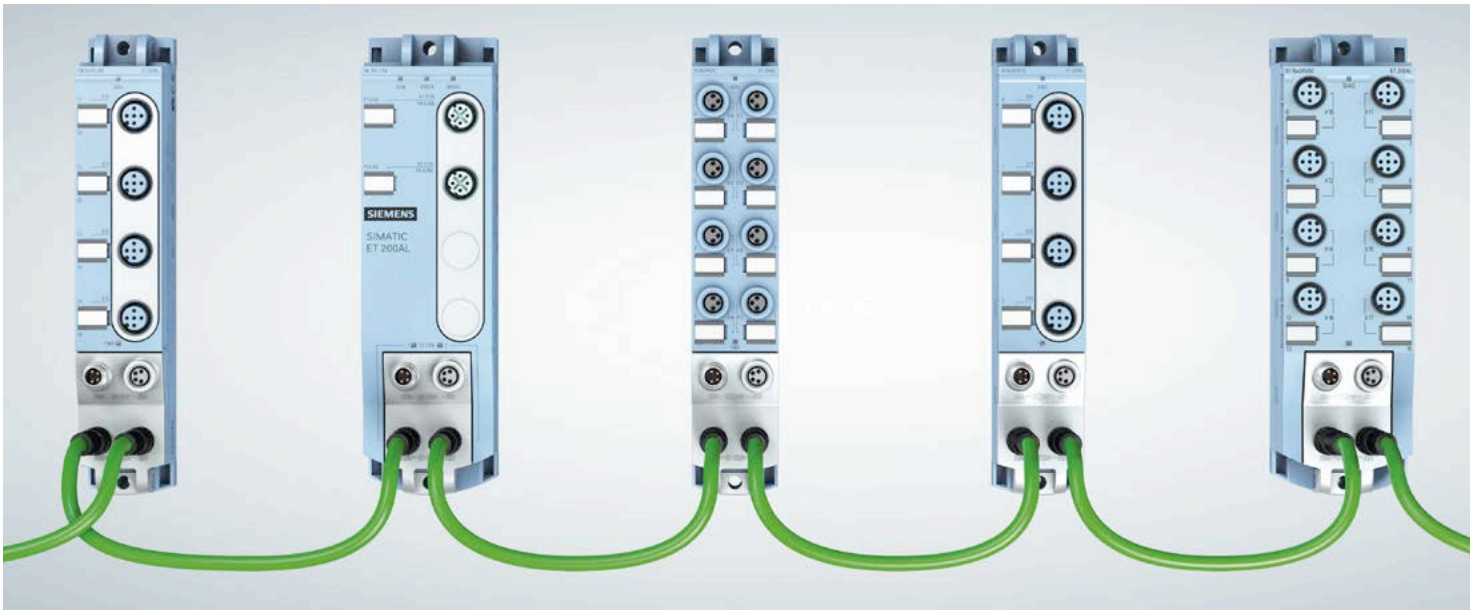
SIMATIC ET 200AL modules comply with protection class IP65/67, making them extremely robust. They are suitable for use at temperatures between –25 and +55 degrees Celsius. The high degree of protection ensures the modules are splash and dustproof, as well as oil-tight. The non-flammable plastic enclosure reduces weight, but is nevertheless robust and the devices remain stable when subjected to strong vibration (5 g).



6 Safety

Actuators can be shut down in groups on a safety-related basis in accordance with performance level d via the outputs of the SIMATIC ET 200AL modules. The necessary performance level is determined or assigned as part of the risk assessment according to EN ISO 13849-1.





ET 200AL in IP65/67– by means of an ET 200AL PROFIBUS/PROFINET interface module, the ET 200AL I/O modules are combined in two rows to form one station.

SIMATIC ET 200AL: Allrounder with impressive benefits

Whether in engineering, installation or operation: The SIMATIC ET 200AL IO system offers a wealth of benefits – making it the ideal system for a host of applications.

Impressive installation

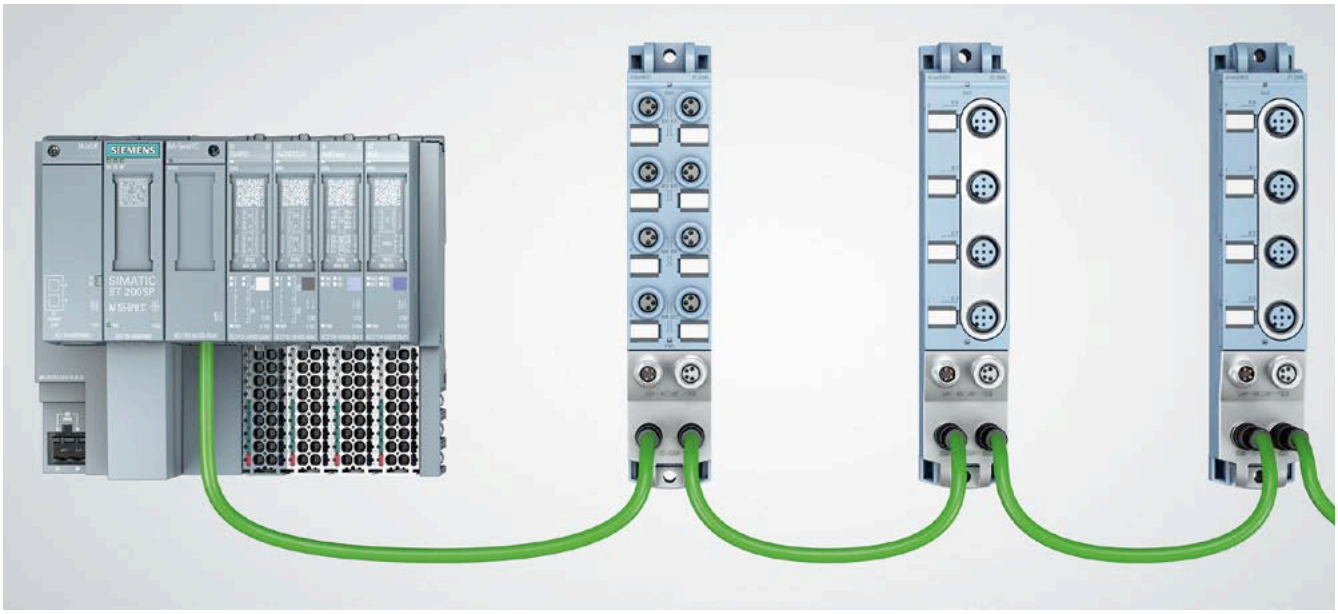
- Simple installation in all mounting positions – even where space is very limited
- Front and side screw connection possible on a flat surface or on aluminum support profiles
- Flexible connection to PROFINET or PROFIBUS or easy integration into SIMATIC ET 200SP (interface module or CPU)
- Simple wiring thanks to color-coded sockets

Impressive engineering and configuration

- Fast and convenient configuration and commissioning via the TIA Portal with CAx-compliant labeling of all interfaces
- Consistent system diagnostics due to standardized engineering
- Configuration control for implementing flexible machine concepts

Impressive operation

- Extensive IO quantity structure with module widths of 30 or 45 mm and up to 32 modules per station
- Integration of sensors and actuators via M8 and M12 connection technology
- All modules designed with high IP65/67 degree of protection
- For use in ambient temperatures from –25 to +55 °C
- PROFIenergy functionality



Integration of ET 200SP:
The ET 200AL IO modules are integrated into ET 200SP via the BU-Send and BA-Send 1xFC modules. Data is exchanged between the ET 200AL IO modules and the higher-level controller via the interface module of the ET 200SP or the ET 200SP CPU directly.

Integrated counting function in the new digital hybrid module DIQ 16x24 V DC/0.5 A, 8x M12:

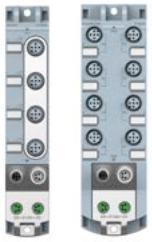
- Type of configuration 2x count or 4x count with 2 or 4 counters
- Counting frequency 2 kHz
- Counting width 32 bit
- Direction of counting can be configured
- GATE function
- Parameterizable diagnostics and process alarms

Overview of modules

Interface modules

PROFINET interface module IM157-1 PN	IP67 protection	6ES7157-1AB00-0AB0
PROFIBUS interface module IM157-1 DP	IP67 protection	6ES7157-1AA00-0AB0
Connection module ET 200SP BU-Send	IP67 protection	6ES7193-6BN00-0NE0
Connection module ET 200SP BA-Send 1xFC	IP67 protection	6ES7193-6AS00-0AA0

Peripheral modules



Digital input module DI 8 x 24 V DC, 8 x M8	IP67 protection	6ES7141-5BF00-0BA0
Digital input module DI 8 x 24 V DC, 4 x M12	IP67 protection	6ES7141-5AF00-0BA0
Digital input module DI 16 x 24 V DC, 8 x M12	IP67 protection	6ES7141-5AH00-0BA0
Digital output module DQ 8 x 24 V DC/2 A, 8 x M12	IP67 protection	6ES7142-5AF00-0BA0
Digital mixed module DIQ 4+DQ 4 x 24 V DC/0,5 A, 8 x M8	IP67 protection	6ES7143-5BF00-0BA0
Digital mixed module DIQ 4+DQ 4 x 24 V DC/0,5 A, 4 x M12	IP67 protection	6ES7143-5AF00-0BA0
Digital mixed module DIQ 16 x 24 V DC/0,5 A, 8 x M12	IP67 protection	6ES7143-5AH00-0BA0
Analog module AI 4 x U/I/RTD, 4 x M12	IP67 protection	6ES7144-5KD00-0BA0
Analog module AQ 4 x U/I, 4 x M12	IP67 protection	6ES7145-5ND00-0BA0
Communications module CM 4 x IO-LINK, 4 x M12	IP67 protection	6ES7147-5JD00-0BA0

Accessories

Connection cables and plugs for ET-Connection

	For internal bus connection ET-Connection M8 • Preassembled at both ends with 2x M8 connectors • 4-pin, shielded • PVC or PUR cable	length 0,19 m	6ES7194-2+H02-0AA0*
		length 0,3 m	6ES7194-2+H03-0AA0*
		length 1,0 m	6ES7194-2+H10-0AA0*
		length 2,0 m	6ES7194-2+H20-0AA0*
		length 5,0 m	6ES7194-2+H50-0AA0*
		length 10,0 m	6ES7194-2+N10-0AA0*
		length 15,0 m	6ES7194-2+N15-0AA0*
	For internal bus connection ET-Connection M8 • Preassembled at both ends with 2x M8 angled connectors • 4-pin, shielded • PVC or PUR cable	length 0,3 m	6ES7194-2+H03-0AB0*
		length 1,0 m	6ES7194-2+H10-0AB0*
		length 2,0 m	6ES7194-2+H20-0AB0*
		length 5,0 m	6ES7194-2+H50-0AB0*
		length 10,0 m	6ES7194-2+N10-0AB0*
		length 15,0 m	6ES7194-2+N15-0AB0*
	For internal bus connection ET-Connection M8 • Preassembled at one end with 1xM8 connector • 4-pin, shielded • PVC or PUR cable	length 2,0 m	6ES7194-2+H20-0AC0*
		length 5,0 m	6ES7194-2+H50-0AC0*
		length 10,0 m	6ES7194-2+N10-0AC0*
		length 15,0 m	6ES7194-2+N15-0AC0*
	Connection cable for internal bus connection ET-Connection M8 • Preassembled at both ends with 2x M8 connectors • 4-pin, shielded • PVC or PUR cable	length 0,2 m	6ES7194-2+H02-0AD0*
	M8 plug for ET-Connection, 4-pin, shielded		6ES7194-2AB00-0AA0

Connection cables and plugs for power supply

	Power cable M8 • Preassembled at both ends with M8 plug and M8 socket • 4-pin • PVC or PUR cable	length 0,19 m	6ES7194-2+H02-1AA0*
		length 0,3 m	6ES7194-2+H03-1AA0*
		length 1,0 m	6ES7194-2+H10-1AA0*
		length 2,0 m	6ES7194-2+H20-1AA0*
		length 5,0 m	6ES7194-2+H50-1AA0*
		length 10,0 m	6ES7194-2+N10-1AA0*
		length 15,0 m	6ES7194-2+N15-1AA0*
	Power cable M8 • Preassembled at both ends with M8 plug angled and M8 angled sockets • 4-pin • PVC or PUR cable	length 0,3 m	6ES7194-2+H03-1AB0*
		length 1,0 m	6ES7194-2+H10-1AB0*
		length 2,0 m	6ES7194-2+H20-1AB0*
		length 5,0 m	6ES7194-2+H50-1AB0*
		length 10,0 m	6ES7194-2+N10-1AB0*
		length 15,0 m	6ES7194-2+N15-1AB0*
	Power cable M8 • Preassembled at one end with M8 socket • 4-pin • PVC or PUR cable	length 2,0 m	6ES7194-2+H20-1AC0*
		length 5,0 m	6ES7194-2+H50-1AC0*
		length 10,0 m	6ES7194-2+N10-1AC0*
		length 15,0 m	6ES7194-2+N15-1AC0*
	M8 power plug, pin insert, 4-pin		6ES7194-2AA00-0AA0
	M8 power plug, socket insert, 4-pin		6ES7194-2AC00-0AA0
	ET-Connection Fast Connect Stripping Tool for fast stripping of the ET-Connection bus cable		6ES7194-2KA00-0AA0
	Identification labels 10 x 5 mm RAL9016, consisting of 200 labels on frame, 40 labels per frame		6ES7194-2BA00-0AA0

* Replace the »+« in the MLFB for the required variant: L for PVC cable; M for PUR cable

TIA Portal

The Totally Integrated Automation Portal (TIA Portal) is more than just an engineering system – it supports machine builders and plant operators through consistent engineering and transparent operation as well as the optimum implementation of digital workflows.

Digital Workflow with TIA Portal – this concept stands for open, virtual and networked working with flexible cloud solutions, commissioning with a digital virtual twin and open interfaces for greater connectivity.

Integrated Engineering with the TIA Portal shortens your time-to-market, for example by means of coordinated collaboration in interdisciplinary teams, and by automatic generation of the automation solution instead of manual programming.

Transparent Operation with TIA Portal – enhance your productivity, by means of data consistency and transparency in production, for example. And utilize Energy Management for greater energy transparency and to save energy in accordance with ISO 50001.
siemens.com/tia-portal

TIA Selection Tool

The TIA Selection Tool offers you a smart, time-saving option for selecting devices and components for Totally Integrated Automation. With this tool, you can quickly, easily, and reliably select, configure, and order components from the entire SIMATIC portfolio. Smart selection wizards ensure error-free orders. Required modules, devices, and networks are generated automatically and clearly compared with each other. Thanks to this simple application, you can enjoy time savings of 80 percent during the design phase. You can import the generated configuration directly into the TIA Portal, which saves you even more time during engineering!
siemens.com/tia-selection-tool

PRONETA V2.3

PRONETA simplifies the commissioning and configuration of your PROFINET network. The topology of your network is read automatically. You can manually adapt the address parameters of your SIMATIC ET 200AL station or simply apply the parameters from a template. I/O modules are configured, controlled and monitored using PRONETA. The test results are clearly recorded.
siemens.com/proneta