

Catalog | November 2020



Industrial Automation systems

EcoStruxure™ Automation Expert

Software Centric Automation

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EcoStruxure™ Automation Expert

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Schneider Electric's IoT-enabled, plug-and-play, open, secure, interoperable architecture and platform, in Industries, Infrastructures, Data Centers, and Buildings.

Innovation at every level

EcoStruxure is based on a three-tiered technology stack delivering innovation at every level, from connected products to edge control and apps, analytics, and services.

Together with our hybrid segments approach, this enhances your value around safety, reliability, operational efficiency, sustainability, and connectivity across 6 domains of expertise:

- Power
- IT
- Building
- Machine
- Plant
- Grid

Dedicated architectures and IoT

We tailor our solutions in the form of dedicated reference architectures for plants:

- Management systems
- Power systems
- Data center systems
- Industrial plant and machine systems
- Smart grid systems

The Industrial Internet of Things (IIoT) gives an additional boost to technologies. That's why we provide our customers with an IoT-enabled architecture and platform offering simple, reliable, productive, and cost-efficient solutions.

Cybersecurity solutions

Robust cybersecurity protection is a must, and Schneider Electric's solutions can deliver it, regardless of business type or industry.

The vendor-agnostic services provided by our skilled professionals help to protect your entire critical infrastructure. We help to assess your risk, implement cyber-specific solutions, and maintain your onsite defenses over time, while integrating appropriate IT policies and requirements.

This is our difference and your advantage.

Enhanced safety

With the release of M580 Safety, Schneider Electric further expands the EcoStruxure platform.

This consolidates our position as one of the most trusted industrial safety vendor, with thousands of Modicon and Triconex safety systems protecting the most critical industrial processes globally.

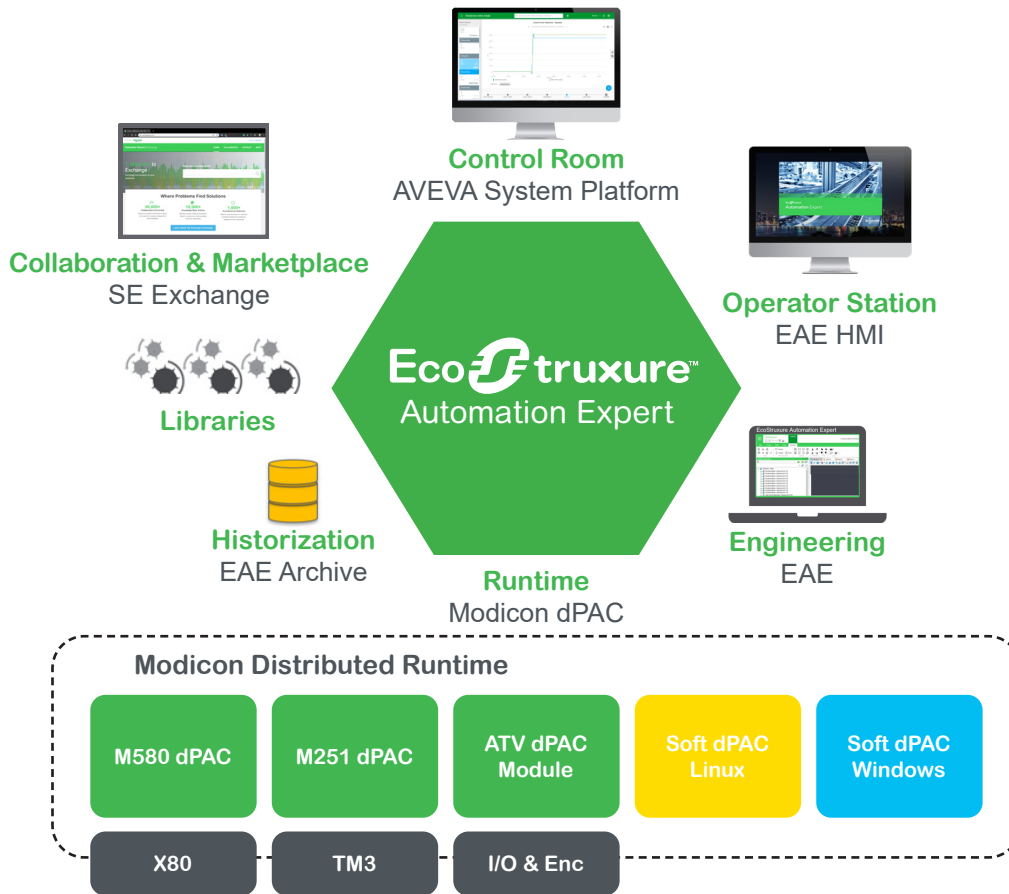
EcoStruxure™ for Industry
Innovation At Every Level



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EcoStruxure™ Automation Expert

EcoStruxure Automation Expert is a new category of industrial automation system that leverages innovative technology to enable industrial operators to realise a step-change improvement over traditional process control systems in productivity, quality, flexibility, and security over the full lifecycle of their industrial assets.



EcoStruxure Automation Expert is a cohesive system consisting of a suite of integrated hardware and software solutions:

- > EcoStruxure Automation Expert (EAE) engineering, monitoring, and management environment
- > Distributed Programmable Automation Controller (dPAC) platforms with a common, flexible, scalable runtime across:
 - Schneider Electric hardware:
 - ATV dPAC for Altivar
 - Modicon M251d/TM3 I/O
 - Modicon M580d/X80 I/O
 - Innovative new software-based controllers:
 - Soft dPAC for Linux™
 - Soft dPAC for Windows™
- > EcoStruxure Automation Expert - HMI, a fully integrated, object-orientated industrial visualization solution
- > EcoStruxure Automation Expert - Archive, a centralized solution for the historization of process data, alarms, and trends
- > Schneider Electric Libraries, a comprehensive set of hardware-independent libraries, ranging from basic functions to segment solutions

Feature overview

EcoStruxure Automation Expert represents a new approach to designing, building, operating, and maintaining industrial automation systems that offers a unique technology mix to define a new category of integrated automation systems.



Complexity mastered

Systems, devices, services, and assets are natively represented as ready-to-use software objects that called composite automation types (CATs) that encapsulate internal behaviour and simplify functional interfaces. An object-orientated approach promotes code reuse, standardization on best practice, and helps manage complexity while providing the fundamental building blocks for the creation of state-of-the-art cyber-physical systems. CAT objects follow a type/instance relation and can be combined to new objects that encapsulate:

- Control logic
- HMI/SCADA visualization
- I/O and device communications
- Simulation and test rigging
- Documentation



Decoupling the application from implementation

EcoStruxure Automation Expert addresses full automation system engineering and extends the best features of classic PLC and DCS control approaches to a new generation of automation system that completely decouples the application design from runtime deployment, enabling automation professionals to focus on these tasks independently in their project lifecycle. Applications are portable, reusable, and interoperable across runtime platforms, meaning deployment decisions are made just in time and on the fly, enabling exceptional system agility.



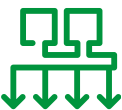
Efficient engineering

EcoStruxure Automation Expert provides a single, modular engineering environment for all tasks engineering, monitoring, and managing the complete automation system including hardware and software, control, and visualization. EcoStruxure Automation Expert automates low-value engineering and integration tasks, thus reducing engineering effort and sources of error. Complex functions can be encapsulated into manageable objects, enabling non-technical users to understand and manage complex systems. Cross communications are transparent and implicit regardless of physical location, requiring zero engineering consideration.



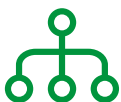
Common runtime environment

Through the implementation of a common distributed control runtime across hardware and software platforms, EcoStruxure Automation Expert provides excellent reusability, scalability, and architectural flexibility. Application portability provides cost savings through the decoupling of the lifecycles of software and hardware systems.



Simple system orchestration

EcoStruxure Automation Expert was designed with the complete lifecycle of an automation system in mind, with functions to facilitate management and monitoring of multiple assets and devices at scale. With a single user environment covering the entire system scope including third-party devices, orchestration of complex, heterogeneous systems becomes simple.



Native IT integration

Modern automation systems generate increased value when coupled with business information and hence wider IT ecosystems. EcoStruxure Automation Expert provides an expandable platform for Industry 4.0 solutions with support for high-level programming, modular systems design, and open standards.

EcoStruxure Automation Expert Hardware

EcoStruxure Automation Expert consists of several hardware components working together to create a complete automation system.

Modicon M580 dPAC



BMED581020

High-performance, rugged distributed field controller based on the widely successful Modicon M580 ePAC platform with up to 64 MB ECC RAM for programs and data. The M580 dPAC supports the robust, high-performance Modicon X80 I/O catalog (1) and is available in standard and conformal coated versions.

Product references:

- **BMED581020**: Modicon M580 dPAC (standard)
- **BMED581020C**: Modicon M580 dPAC (conformal coated)

BMED581020 and **BMED581020C** controllers support:

- 320 digital I/O channels
- 64 analog I/O channels
- Up to 4 racks of local I/O

Modicon M251 dPAC



TM251MDESE

Cost-optimized, low-footprint distributed controller based on the machine-specialized Modicon M251 PAC platform. The Modicon M251 dPAC provides a single Ethernet port for fieldbus, switched dual Ethernet ports for peer communications, and supports the field-proven TM3 I/O system (1).

Product reference:

- **TM251MDESE**: Modicon M251 dPAC

The **TM251MDESE** controller has no embedded I/O; it supports Modicon TM3 I/O expansion modules:

- Digital I/O modules up to 488 digital I/O
- Analog I/O modules up to 114 analog I/O
- Up to 14 Modicon TM3 expansion modules (7 local modules + 7 remote modules) with Modicon TM3 bus expansion modules (transmitter module and receiver module)

Altivar ATV dPAC module



Altivar Process drives slots

The ATV dPAC module is part of the EcoStruxure Automation Expert distributed controller solution platform. It is intended to be used as a slide-in option for ATV600, ATV900, and ATV340 variable speed drive (VSD) families (2). The Altivar ATV dPAC module is powered by the drive and provides dual Ethernet sockets for connection to peer controllers, distributed I/O, or remote secondary devices.

Product references:

- **VW3A3530D**: Altivar ATV dPAC module
- **VW3A1111**: Graphic display terminal for ATV340

The **VW3A3530D** dedicated controller has no embedded I/O. However, all standard I/O on the respective Altivar Process and Altivar Machine can be used and extended with I/O modules.



VW3A3530D

(1) Expert/specialist modules are not supported in this release. Some I/O modules will be supported in a later release. Please refer to the compatibility list on [page 14](#).

(2) For details, please refer to the compatibility table on [page 15](#).

EcoStruxure Automation Expert Software

The EcoStruxure Automation Expert software offer includes the EcoStruxure Automation Expert Studio engineering environment, plus HMI runtime, historian, libraries, AVEVA System Platform integration, and the software-based distributed process automation controller (Soft dPAC).

EcoStruxure Automation Expert – Studio

EcoStruxure Automation Expert Studio is an asset-based, fully integrated engineering environment designed to allow users to design, configure, and manage next generation automation systems based on multifaceted asset models within a single engineering environment. EcoStruxure Automation Expert Studio includes the capability to:

- Create portable, IEC 61499 standard-based automation programs
- Create rich HMI screens and design user interactions
- Support multi-user change management through SVN integration
- Design, configure, and manage network and device topologies
- Create, import, and export wrap-and-reuse code libraries
- Flexibly deploy applications to multiple hardware platforms based on a common runtime
- Automatically discover compatible runtime devices

EcoStruxure Automation Expert – HMI

EcoStruxure Automation Expert HMI is a Windows 10 native HMI runtime designed to provide a high-performance and highly integrated user interface for EcoStruxure Automation Expert applications that is asset based and network transparent. It enables pluggable reuse of asset models and interactions, and requires minimal engineering effort to create rich user interfaces, providing exceptional flexibility and agility in deployment.

Automation Expert HMI system requirements

System requirements	Minimum	Recommended
Processor	1 GHz	2 GHz or higher
RAM memory	2 GB	4 GB or higher
Hard disk free space	1 GB	10 GB free space
Display resolution	1280x1024	1920x1200 or higher
Operating system	Microsoft Windows 10 (32-bit)	Microsoft Windows 10 (64-bit)

EcoStruxure Automation Expert – Archive

EcoStruxure Automation Expert Archive is a high-performance, highly integrated store-and-forward data historian, providing zero engineering historization and retrieval of live process data with a flexible Windows 10-based runtime.

EcoStruxure Automation Expert – AVEVA System Platform integration

EcoStruxure Automation Expert includes native support for System Platform - AVEVA's real-time operations control platform for supervisory, HMI, SCADA, and IIoT applications. EcoStruxure Automation Expert is capable of auto-generation of secure OPC UA-based communications between platforms and will generate System Platform compatible graphics for clean integration.

EcoStruxure Automation Expert Software (continued)

EcoStruxure Automation Expert – Software dPAC

EcoStruxure Automation Expert Software dPAC is a state-of-the-art multi-platform IEC 61499-based control runtime that includes:

- Event-based, network-transparent automation capability
- Native process alarm support
- Modbus/TCP client and server
- OPC UA Server
- Ethernet/IP (limited platform support in v20.2)

EcoStruxure Automation Expert Soft dPAC enables an open, flexible, scalable, highly integrated IEC 61499 runtime for standard PCs from low-cost embedded systems through to high-performance IT servers.

The runtime provides an open platform to integrate and run advanced IT tools, libraries, and applications at the industrial edge via custom TCP/UDP sockets or direct links to DLL libraries.

This common runtime is available as an integrated hardware solution for selected Altivar Process drives, Modicon M251 dPAC, Modicon M580 dPAC, plus as a virtualized container-based Soft dPAC runtime for Linux-based systems.

EcoStruxure Automation Expert Soft dPAC for Linux is compatible with realtime Linux kernels and supports multiple Soft PAC instances per machine with communications via Modbus/TCP and Ethernet/IP (with limitations).

Software dPAC system requirements

Hardware and software requirements

CPU architecture	Intel x86-64 and Intel Atom ARM HF
Available memory (RAM and non-volatile)	RAM > 128 MB RAM Storage (SSD, SD card or HDD) > 16 GB
Host OS	<ul style="list-style-type: none"> ■ Any LTS (Long Time support) Linux distribution supporting Docker. 32- or 64-bit kernel. ■ Validation tests are performed on Ubuntu and Debian ■ Linux RT is required for realtime control
Container virtualization	Docker community-edition, v19.03
Container management	Portainer.io or other

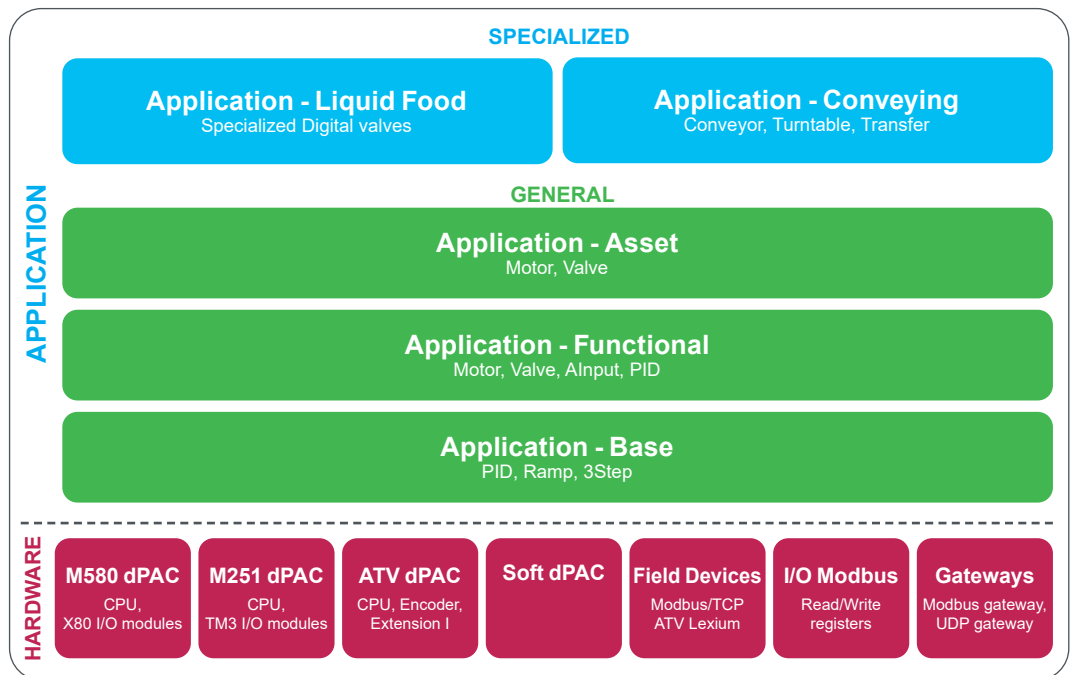
EcoStruxure Automation Expert Software (continued)

EcoStruxure Automation Expert – Libraries

By leveraging asset-based engineering, an open code format and wrap-and-reuse approach, EcoStruxure Automation Expert includes system, device, and segment-based libraries that include multiple facets - code, HMI, documentation, etc. - within a single package. With release v20.2 the libraries include:

- System and device
- CPG liquid food
- Logistics
- Non-synchronized motion

Other libraries will continue to be added to the EcoStruxure Automation Expert as the offer evolves.



Library: Application - Base

Library	Object name	Description
SE.AppBase	Mode	This block is used as a common mode logic block. It handles the mode logic in a common adjustable way, so that mode behavior is the same in all blocks.
	CyclicPulse	This CAT is used to generate a cyclic output for a continuous motor or other devices
	ScaleLimited	This block allows the field value to be scaled with configurable ranges from supervision. The block has an option to select use limits so that the output takes account of the ranges in case the processed value is outside the limit.
	SignalDelay	Used to delay change from input value to output value
	MathVar	This functional CAT is used to execute mathematical calculations based on the given formula.
	BinSetVal/BinGetVal	These CATs are used to manage Boolean values
	AnaGetVal/SetVal	These CATs are used to manage real values

EcoStruxure Automation Expert Software (continued)		
EcoStruxure Automation Expert – Libraries		
Library: Application - Functional		
Library	Object name	Description
SE.App Functional	conditionItem	Interlock condition summary block
	conditionItem	Interlock condition summary block with user-defined strings
	AnaCount	Analog totalizer
	AnaLimitMon(4)	Analog threshold monitoring block (4 alarm limits)
	AnaMon	Conditions an analog signal
	AnaSeq2/3/5	Analog split range 2/3/5 channels
	AnaSp	Analog signal control with setpoint and change rate limits
	AnaDev2D	Controls analog speed drives with discrete 3-state (Stop/Fwd/Rew) device state change and trip monitoring
	BinDev1S/2S/1D/2D	On/Off device control, one/two speeds, one/two directions
	BinManValve	Manual Valve
	BitCtrl	Discrete signal control
	BitMon	Conditions a discrete signal
	AnaCtrlPID	Standard PID control
	PIDDetailMon	PID monitoring
	AnalogInput	Conditions an analog signal that usually comes from a physical input
	AnalogOutput	Conditions an analog signal usually associated with a physical output
	DigitalInput	Conditions a digital signal that usually comes from a physical input
	DigitalOutput	Condition a digital signal usually associated with a physical output
	CondMonSummary	Conditions summary and first up condition detection
	PermMonSummary	Receives the permissive condition summary result from the upstream block and identifies the permission status to start or stop. Mainly used inside the asset CAT
Library: Application - Asset		
SE.App Asset	Motor1S1D/1S2D/2S1D	Provides interlock condition detection and discrete 2-state device functionalities like device off/forward/reverse/Speed1/Speed2, feedback monitoring, and operation in various modes
	MotorVS2D	Provides interlock condition detection and analog speed device functionalities like device on/off/forward/reverse/variable speed, feedback monitoring/speed feedback, and operation in various modes.
	DigitalInputExt	Provides output suppressing function, different mode of control, output inversion, and output control as per the delay. This asset is based on SE.Functional library objects.
	DigitalOutputExt	Provides interlock condition detection, different mode of control, output inversion, and output control as per the delay. This asset is based on SE.Functional library objects.
	AnalogInoutExt	Provides scaling, filtering, and smoothing of channel value and 4 configurable alarm limits (low low, low, high and high high)
	AnalogOutputExt	This analog setpoint (output) driver with setpoint and change rate limits provides interlock condition detection.

EcoStruxure Automation Expert Software (continued)

EcoStruxure Automation Expert – Libraries

Library: Application - Liquid Food

Library	Object name	Description
SE.App Liquid Food	BinDev1SCyclic	Controls discrete 2-state devices (Motor, Valve, etc.) with state change and trip monitoring. Allows cyclic and continuous operation.
	BinDev1SExt	Controls discrete 2-state devices (Motor, 2WayValve, 3WayValve, etc.) with command delay, state change, and trip monitoring
	MotorCyclic	Provides interlock condition detection and discrete 2-state device functionalities like device on/off (Motor, 2WayValve, 3WayValve, etc.), feedback monitoring, cyclic/continuous operation with delay options, and operation in various modes.
	Valve2PlugCtl/Valve1PlugCtl	The Valve2plugCtl asset provides monitoring and control of a 4-way mixproof valve with 2 plugs (double seat). It allows Valve & Plug to operate separately, however, not all devices can operate at the same time.
	ValveCtl	Provides control of an on/off valve with delayed command and separate alarm for open and close feedback monitoring.

Library: Application - Conveying

SE.AppConveying	Conveyor1S/2S/1D/2D	This conveyor moves in one/two directions with one/two speeds and has a zone sensor for presence of goods.
	ConveyorVS2D	Conveyor for variable speed and two directions. It has a speed sensor for changing speed (high to low) and two zone sensors for presence of goods depending on the working direction.
	ConLogicSolver	The conveyor working mode must be configured here.
	Lifecheck4D	Lifecheck for four lines connection control. Lifecheck sends a signal to the corresponding modules and waits for feedback in a given response time.
	LineCtrl	Controls the conveyor line, failure detection feedback, and transportation mode selection for the line.
	TransferERC	Used for moving goods in three directions (360°, 90°, and 270°) (used with the TransferLift CAT)
	TransferLift	Used for moving goods (together with the TransferERC CAT). Has two devices, one for vertical movement, the other for chain movement.
	TransLogicSolver	Used for working direction and function logic of the transfer table
	Tunable	Controls movement of goods in forward and reverse direction and turning the table left or right in forward direction and back in reverse direction.
	TurntableLogicSolver	Used for working direction and function logic of the turntable

Automation Expert HMI library compatibility

Library	Automation Expert HMI	AVEVA System Platform
Application - Liquid Food	Yes	Yes
Application - Conveying	Yes	No
Application - Asset	Yes	Yes
Application - Functional	Yes	Yes
Application - Base	Yes	Yes
Comm. Smart Devices/Connected Devices, etc.	Yes	Yes
Hardware (M580 dPAC, M251 dPAC, ATV dPAC, etc.)	Yes	No

EcoStruxure Automation Expert licensing

The EcoStruxure Automation Expert license offer is based on 2 types of license:

Workstation seat license
One license requested per engineering workstation seat

Application license
One license requested per physical system
License price sized with number of control signals (sum of I/O)
Portfolio of system options with scaled pricing

Includes:
Build Time tool suite
Latest software version
Engineer Control, HMI, and Archive

Available as:
Single seat (1), Group (3), Team (10), and Entity (100)

Application license		
License	Type	Description
Base	Mandatory	EcoRuntime base license to embark on an IEC 61499-based distributed control journey
EAE HMI Runtime	Optional	Embedded human-machine interface engine. <i>A single fee for one or multiple displays</i>
EAE Archive	Optional	To historize data and events
SoftdPAC	Optional	Software controller and containerized, platform-independent EcoRunTime enabling edge computing
SoftdPAC multi OS	Optional	Additional license if SoftdPAC runs on different operating systems (Linux and Windows) within the same system

EcoStruxure Automation Expert – Engineering license

One engineering license is required per EcoStruxure Automation Expert Studio seat. The base engineering license provides the capability to create, configure, and manage IEC 61499 control applications, HMI, archive, and network/device topologies.

Each license entitles a user to :

- Design, development, simulation with HMI, and commission a complete system
- Collaborative engineering (SVN client) plugin
- Physical topology editor
- Free software updates
- Access to private communities on exchange.se.com for:
 - p2p support, libraries, project samples, training materials, TVDAs, etc.
 - 9 am to 5 pm support desk

Engineering licences are perpetual and are available in groups.

Engineering licenses		
Designation	Number of seats	Reference
Single	1	EALBT1CZZSXM02
Group	3	EALBT1CZZGXM02
Team	10	EALBT1CZZTXM02
Entity	100	EALBT1CZZEXM02

For EcoStruxure Automation Expert v20.2, a 10-seat team license is available for members of the [Schneider Electric Alliance Program](#) as part of the Alliance Software Package 2021.



EcoStruxure Automation Expert licensing (continued)

EcoStruxure Automation Expert – Application license

In addition to a build-time engineering license required to create applications, each EcoStruxure Automation Expert runtime requires a single, appropriate application licence in order to deploy and run. Application licenses are sized based on the total control signal count associated with an application and are independent of the control platform or total number of controllers.

Total control signal count is defined as the sum of all the I/O associated with the EcoStruxure Automation Expert runtimes:

Total control signals = sum of digital I/O + sum of analog I/O + sum of soft I/O

Control signals

Discrete I/O

Physical discrete (or 'digital', e.g. 24 VDC input, 240 VAC relay output) input/output channels that are connected via Schneider Electric discrete I/O modules.

Analog I/O

Physical analog (e.g. 4-20 mA input, 0-10 VDC output) input/output channels that are connected via Schneider Electric analog I/O modules.

Note: Intelligent analog I/O modules that can present multi-variable signals are counted as soft I/O.

Soft I/O

A virtual tag or attribute of information that enters the system via digital communications. It is sourced from an intelligent remote device and does not include signal conditioning or engineering units (in the case of analog signals) as it is assumed that this is handled by the source system.

Application license types and function

Application	Type	Description
Base	Mandatory	Base license required to deploy an EcoStruxure Automation Expert application
HMI Runtime	Optional	Human-machine interface license. Can be deployed multiple times within application.
Archive	Optional	Data and event historization license
Soft dPAC	Optional	Platform-independent control runtime for soft control. Can be deployed multiple times within application.
Soft dPAC Multi-OS	Optional	Permits Soft dPAC runtime on multiple operating systems within a single application

References

Once application size and optional features are decided, an application license is ordered according to a matrix of size for a base license, plus optional features.

License references according to size, base, and optional features

Size	Max. no. of controlled signals	Mandatory		Optional		
		Base license	HMI Runtime	Archive	Soft dPAC	Soft dPAC Multi-OS
XXXS	100	EALA00CZZSPM02	EALH00CZZSPM02	EALR00CZZSPM02	EALS00CZZSPM02	EALM00CZZSPM02
XXS	250	EALA01CZZSPM02	EALH01CZZSPM02	EALR01CZZSPM02	EALS01CZZSPM02	EALM01CZZSPM02
XS	500	EALA02CZZSPM02	EALH02CZZSPM02	EALR02CZZSPM02	EALS02CZZSPM02	EALM02CZZSPM02
S	1000	EALA03CZZSPM02	EALH03CZZSPM02	EALR03CZZSPM02	EALS03CZZSPM02	EALM03CZZSPM02
M	2000	EALA04CZZSPM02	EALH04CZZSPM02	EALR04CZZSPM02	EALS04CZZSPM02	EALM04CZZSPM02
L	4000	EALA05CZZSPM02	EALH05CZZSPM02	EALR05CZZSPM02	EALS05CZZSPM02	EALM05CZZSPM02
XL	5000	EALA06CZZSPM02	EALH06CZZSPM02	EALR06CZZSPM02	EALS06CZZSPM02	EALM06CZZSPM02
XXL	7500	EALA07CZZSPM02	EALH07CZZSPM02	EALR07CZZSPM02	EALS07CZZSPM02	EALM07CZZSPM02
XXXL	10000	EALA08CZZSPM02	EALH08CZZSPM02	EALR08CZZSPM02	EALS08CZZSPM02	EALM08CZZSPM02

Pricing on demand is available for larger license sizes. For existing systems, the 'maximum total control signals' includes a tolerance of 15% before switching to a larger package size becomes mandatory.

To simplify the licensing process, there is a Microsoft Excel pricing tool available with release v20.2 of EcoStruxure Automation Expert. Please contact your local sales representative for more information.

List of X80 hardware compatible with Modicon M580 dPAC

Type	Reference	Description
Rack	BMEXBP0400	4-slot Ethernet backplane
Rack	BMEXBP0400H	Ruggedized 4-slot Ethernet backplane
Rack	BMEXBP0602	6-slot Ethernet backplane redundant PS
Rack	BMEXBP0602H	Ruggedized 6-slot Ethernet backplane redundant PS
Rack	BMEXBP0800	8-slot Ethernet backplane
Rack	BMEXBP0800H	Ruggedized 8-slot Ethernet backplane
Rack	BMEXBP1002	10-slot Ethernet backplane redundant PS
Rack	BMEXBP1002H	Ruggedized 10-slot Ethernet backplane redundant PS
Rack	BMEXBP1200	12-slot Ethernet backplane
Rack	BMEXBP1200H	Ruggedized 12-slot Ethernet backplane
Rack	BMXXBC008K	Backplane extension cable 0.8 m/2.6 ft
Rack	BMXXBC015K	Backplane extension cable 1.5 m/4.9 ft
Rack	BMXXBC030K	Backplane extension cable 3 m/9.8 ft
Rack	BMXXBC050K	Backplane extension cable 5 m/16.4 ft
Rack	BMXXBC120K	Backplane extension cable 12 m/39 ft
Rack	BMXXBE1000	Standard backplane extender
Rack	BMXXBE1000H	Ruggedized standard backplane extender
Rack	BMXXBE2005	Backplane extender kit
Rack	BMXXBP0400	4-slot backplane
Rack	BMXXBP0400H	Ruggedized 4-slot backplane
Rack	BMXXBP0600	6-slot backplane
Rack	BMXXBP0600H	Ruggedized 6-slot backplane
Rack	BMXXBP0800	8-slot backplane
Rack	BMXXBP0800H	Ruggedized 8-slot backplane
Rack	BMXXBP1200	12-slot backplane
Rack	BMXXBP1200H	Ruggedized 12-slot backplane
SD card	BMXRMS004GPF	Optional M580 SD card 4 GB
Analog I/O	BMXAMI0410	4 voltage/current isolated high-speed analog inputs
Analog I/O	BMXAMI0410H	Ruggedized 4 voltage/current isolated high-level analog inputs
Analog I/O	BMXAMI0800	8 voltage/current non-isolated fast analog inputs
Analog I/O	BMXAMI0810	8 voltage/current isolated fast analog inputs
Analog I/O	BMXAMI0810H	Ruggedized 8 voltage/current isolated fast analog inputs
Analog I/O	BMXAMO0410	4 voltage/current isolated analog outputs
Analog I/O	BMXAMO0410H	Ruggedized 4 voltage/current isolated analog outputs
Analog I/O	BMXAMO0802	8 current non-isolated analog outputs
Power	BMXCPS2000	Standard AC power supply
Power	BMXCPS2010	Standard isolated DC power supply
Power	BMXCPS3020	High-power isolated 24 to 48 VDC power supply
Power	BMXCPS3020H	Ruggedized high-power isolated 24 to 48 VDC power supply
Power	BMXCPS3500	High-power AC power supply
Power	BMXCPS3500H	Ruggedized high-power AC power supply
Power	BMXCPS3540T	High-power 125 VDC power supply
Discrete I/O	BMXDDI1602	16 x 24 VDC sink discrete inputs
Discrete I/O	BMXDDI1602H	Ruggedized 16 x 24 VDC sink discrete inputs
Discrete I/O	BMXDDI3202K	32 x 24 VDC sink discrete inputs
Discrete I/O	BMXDDI6402K	64 x 24 VDC sink discrete inputs
Discrete I/O	BMXDDM16025	8 x 24 VDC discrete inputs, 8 x discrete relay outputs
Discrete I/O	BMXDDM16025H	Ruggedized 8 x 24 VDC discrete inputs, 8 x discrete relay outputs
Discrete I/O	BMXDDO1602	16 transistor source 0.5 A discrete outputs
Discrete I/O	BMXDDO1602H	Ruggedized 16 transistor source 0.5 A discrete outputs
Discrete I/O	BMXDDO3202K	32 transistor source 0.1 A discrete outputs
Discrete I/O	BMXDDO6402K	64 transistor source 0.1 A discrete outputs
Discrete I/O	BMXDRA0805	8 discrete relay outputs
Discrete I/O	BMXDRA1605	16 discrete relay outputs
Discrete I/O	BMXDRA1605H	Ruggedized 16 discrete relay outputs
Other	BMXNRP0200	Fiber converter MM/LC 2CH 100M
Other	BMXNRP0201	Fiber converter SM/LC 2CH 100M

List of TM3 hardware compatible with Modicon M251 dPAC

Type	Reference	Description
Discrete I/O	TM3DI16	16 discrete inputs
Discrete I/O	TM3DI16G	16 discrete inputs, spring connection
Discrete I/O	TM3DI32K	32 discrete inputs, HE10 connection
Discrete I/O	TM3DI8A	8 discrete inputs, 120 VAC
Discrete I/O	TM3DQ16T	16 x 0.5 A transistor source discrete outputs
Discrete I/O	TM3DQ16TG	16 x 0.5 A transistor source discrete outputs, spring connection
Discrete I/O	TM3DQ16R	16 x 2 A discrete relay outputs
Discrete I/O	TM3DQ16RG	16 x 2 A discrete relay outputs, spring connection
Discrete I/O	TM3DQ32TK	32 x 0.1 A transistor source discrete outputs, HE10 connection
Discrete I/O	TM3DQ8U	8 x 0.3 A transistor sink discrete outputs
Discrete I/O	TM3DQ16U	16 x 0.3 A transistor sink discrete outputs
Discrete I/O	TM3DQ32UK	32 x 0.4 A transistor sink discrete outputs, HE10 connection
Analog I/O	TM3AI2H/TM3AI2HG	2 high-resolution analog inputs, +-10 V, 0-10 V, 0-20 mA, 4-20 mA, 16-bit, 1 ms
Analog I/O	TM3AI8/TM3AI8G	8 analog inputs, +-10 V, 0-10 V, 0-20 mA, 4-20 mA, 12-bit, 1 ms
Mixed analog I/O	TM3AM6/TM3AM6G	4 analog outputs, 2 analog inputs, +-10 V, 0-10 V, 0-20 mA, 4-20 mA, 12-bit, 1 ms
Thermocouple mixed	TM3TM3/TM3TM3G	2 temperature inputs + 1 analog output TC (J, K, R, S, B, T, N, E, C, L) RTD (NI100, NI1000, PT100, PT1000) (+-10 V, 0-10 V) (0-20 mA, 4-20 mA) 16-bit, 100 ms
Thermocouple input	TM3TI4/TM3TI4G	4 temperature inputs TC (J, K, R, S, B, T, N, E, C, L) RTD (NI100, NI1000, PT100, PT1000), (+-10 V, 0-10 V) (0-20 mA, 4-20 mA) 16-bit, 100 ms
Thermocouple input	TM3TI8T/TM3TI8TG	8 temperature inputs, NTC, PTC, and TC (J, K, R, S, B, T, N, E, C, L), 16-bit 100 ms
Relay I/O	TM3DM24R	24 x 2 A relay I/O
Relay I/O	TM3DM24RG	24 x 2 A relay I/O, spring connection

Altivar hardware and Altivar ATV dPAC compatibility

Type	Reference	Description	Compatible
Drive	ATV340●●●N4	Altivar Machine drives	Yes
Drive	ATV340●●●N4E ≤ D22	Altivar Machine drives	No
Drive	ATV340●●●N4E ≥ D30	Altivar Machine drives	Yes
Drive	ATV630●●●●● ATV630●●●●●F	Altivar Process drives	Yes
Drive	ATV650●●●●● ATV650●●●●●E ATV650●●●●●F	Altivar Process drives	Yes
Drive	ATV930●●●●● ATV930●●●●●C ATV930●●●●●F	Altivar Process drives	Yes
Drive	ATV950●●●●● ATV950●●●●●E ATV950●●●●●F	Altivar Process drives	Yes
Drive	ATV660●●●●● ATV680●●●●●	Altivar Process drive systems	Yes
Drive	ATV960●●●●● ATV980●●●●●	Altivar Process drive systems	Yes
Drive	ATV99●●●●●	Altivar Process drive systems	Yes
Drive	ATV6A0●●●●● ATV6B0●●●●●	Altivar Process Modular drives	Yes
Drive	ATV9A0●●●●● ATV9B0●●●●●	Altivar Process Modular drives	Yes
Other	VW3A1111	Graphic display terminal	Yes
Other	VW3A1112	Door mounting kit	Yes
I/O	VW3A3203	Extended I/O module - 6 digital inputs/ 2 digital outputs/2 analog inputs	Yes
I/O	VW3A3204	Extended relay module - 3 relay outputs	Yes
Encoder	VW3A3420	Digital encoder interface module	Yes
Encoder	VW3A3424	HTL encoder interface module	Yes



BMED581020

Modicon M580 dPAC				
Local I/O capacity	Communication ports	Service ports	Reference	Weight kg/lb
320 discrete I/O	2	1	BMED581020	0.848/
64 analog I/O			BMED581020C	1.872
64 MB integrated memory				

Standards and certifications

The Modicon M580 automation platform has been developed to comply with the principal national and international standards concerning electronic equipment for industrial automation systems.

- Requirements specific to programmable controllers: functional characteristics, immunity, resistance, etc.: IEC/EN 61131-2 and IEC/EN/UL/CSA 61010-2-201
- Requirements specific to power utility automation systems: IEC/EN 61000-6-5, IEC/EN 61850-3 (with installation restrictions)
- Requirements specific to railway applications: EN 50155/IEC 60571 (with installation restrictions)
- Ex areas:
 - For USA and Canada: Hazardous location class I, division 2, groups A, B, C, and D
 - For other countries: CE ATEX (2014/34/EU) or IECEx in defined atmosphere Zone 2 (gas) and/or Zone 22 (dust)
- Merchant navy requirements of the major international organizations: unified in IACS (International Association of Classification Societies)
- Compliance with European Directives for CE marking:
 - Low voltage: 2014/35/EU
 - Electromagnetic compatibility: 2014/30/EU
 - Machinery: 2006/42/EC

Up-to-date information on which certifications have been obtained is available on our [website](#).

M580 PACs are considered as open equipment and are designed for use in industrial environments, in pollution degree 2, overvoltage category II (IEC 60664-1), and in low-voltage installations, where the main power branch is protected on both wires by devices such as fuses or circuit breakers limiting the current to 15 A for North America and 16 A for the rest of the world.

Characteristics							
Service conditions and recommendations relating to the environment							
			Modicon M580 automation platform	Modicon M580 harsh I/O platform			
Temperature	Operation	°C/°F	0...+60/32...140		-25...+70/-13...+158		
	Storage	°C/°F	-40...+85/-40...+185		-40...+85/-40...+185		
Relative humidity (without condensation)	Cyclical humidity	%	+5 ... +95 up to 55 °C/131 °F		+5 ... +95 up to 55 °C/131 °F		
	Continuous humidity	%	+5 ... +93 up to 55 °C/131 °F		+5 ... +93 up to 60 °C/140 °F		
Altitude	Operation	m/ft	0...2,000/0...6,562 (full specification: temperature and isolation) 2,000...5,000/6,562...16,404 (temperature derating: approx. 1 °C/400 m (33.8 °F/1,312 ft), isolation 150 V/1,000 m(3,281 ft)) For accurate temperature derating calculation, refer to IEC 61131-2 Ed 4.0 Annex A				
			Modicon X80 I/O power supply modules				
			BMXCPS2010	BMXCPS3020 BMXCPS3020H	BMXCPS3540T	BMXCPS2000	BMXCPS3500 BMXCPS3500H BMXCPS4002 BMXCPS4002S BMXCPS4002H
Supply voltage	Nominal voltage	V	24 ---	24...48 ---	125 ---	100...240 ~	100...240 ~
	Limit voltages	V	18...31.2 ---	18...62.4 ---	100...150 ---	85...264 ~	85...264 ~
	Nominal frequencies	Hz	–	–	–	50/60	50/60
	Limit frequencies	Hz	–	–	–	47/63	47/63

Protective treatment of the Modicon M580 automation platform

The Modicon M580 platform meets the requirements of "TC" treatment (treatment for all climates).

For installations in industrial production workshops or environments corresponding to "TH" treatment (treatment for hot and humid environments), Modicon M580 must be embedded in enclosures with minimum IP54 protection.

The Modicon M580 platform offers **protection to IP20 level** and **protection against access to terminals** (enclosed equipment) (1). They can therefore be installed without an enclosure in reserved-access areas that do not exceed **pollution level 2** (control room with no dust-producing machine or activity). Pollution level 2 does not take account of more severe environmental conditions: air pollution by dust, smoke, corrosive or radioactive particles, vapors or salts, molds, insects, etc.

(1) In cases where a slot is not occupied by a module, a **BMXXEM010** protective cover must be installed.

(C): Tests required by European directives (C) and based on IEC/EN 61131-2 standards.

Environment tests		
Name of test	Standards	Levels
Immunity to LF interference (CE) (1)		
Voltage and frequency variations	IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-11	0.85...1.10 Un - 0.94...1.04 Fn; 4 steps t = 30 min
	IACS E10; IEC 61000-4-11	0.80 Un...0.90 Fn; 1.20 Un...1.10 Fn; t = 1.5 s/5 s
Direct voltage variations	IEC/EN 61131-2; IEC 61000-4-29; IACS E10 (PLC not connected to charging battery)	0.85...1.2 Un + ripple: 5% peak; 2 steps t = 30 min
Third harmonic	IEC/EN 61131-2	H3 (10% Un), 0°/180°; 2 steps t = 5 min
Voltage interruptions	IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-11; IEC 61000-4-29; IACS E10	Power supply immunity: <ul style="list-style-type: none"> ■ 10 ms for ~ and --- PS2 (20 ms DS criteria) ■ Check operating mode for longer interruptions up to 5 s, 85% Un ■ For IACS, 3 times 30 s in 5 min, 85% Un
	IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-11	For ~ PS2: <ul style="list-style-type: none"> ■ 20% Un, t0: ½ period ■ 40% Un, cycle 10/12 ■ 70% Un, cycle 25/30 ■ 0% Un, cycle 250/300
Voltage shut-down and start-up	IEC/EN 61131-2	<ul style="list-style-type: none"> ■ Un...0...Un; t = Un/60 s ■ Umin...0...Umin; t = Umin/5 s ■ Umin...0.9 Udl...Umin; t = Umin/60 s
Magnetic field	IEC/EN 61131-2; IEC 61000-4-8 (for MV power stations: IEC 61000-6-5; IEC 61850-3)	Power frequency: 50/60 Hz, 100 A/m continuous ...1000 A/m; t = 3 s; 3 axes
	IEC 61000-4-10	Oscillatory: 100 kHz...1 MHz, 100 A/m; t = 9 s; 3 axes
Conducted common mode disturbances range 0 Hz ... 150 kHz	IEC 61000-4-16 (for MV power stations: IEC 61000-6-5; IEC 61850-3)	For remote systems: <ul style="list-style-type: none"> ■ 50/60 Hz and ---, 300 V, t = 1 s ■ 50/60 Hz and ---, 30 V, t = 1 min ■ 5 Hz...150 kHz, sweep 3 V...30 ■ For ~: 10 V ■ For ---: 10 V cont. or 100 V, t = 1 s

Where:

- PS1 applies to PLC supplied by battery, PS2 applies to PLC energized from ~ or --- supplies
- Un: nominal voltage; Fn: nominal frequency; Udl: detection level with power on

(1) Devices must be installed, wired, and maintained in accordance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems".

(2) These tests are performed without an enclosure, with devices fixed on a metal grid and wired as per the recommendations in the manual "Grounding and Electromagnetic Compatibility of PLC systems".

(CE): Tests required by European directives (CE) and based on IEC/EN 61131-2 standards.



TM251MDESE

Modicon M251 dPAC

Local I/O capacity	Device ports	Service ports	Reference	Weight kg/lb
No embedded I/O, supporting Modicon TM3 I/O expansion modules	2	1	TM251MDESE	0.848/ 1.872

Standards and certifications

- Standards
 - IEC/EN 61131-2 (Edition 2 2007)
 - UL508 (UL61010-2-201)
 - ANSI/ISA 12.12.01-2007
 - CSA C22.2 No. 213, No. 142
 - E61131-2 and IACS E10

- Certifications
 - CE
 - cULus Listing Mark
 - C-Tick
 - Achilles

Environmental characteristics

- Ambient operating temperature: -10...+55 °C (+14...+131 °F)
- Storage temperature: -40...+70 °C (-40...+158 °F)
- Relative humidity: 5...95% (non-condensing)
- Operating altitude:
 - 0...2,000 m (0...6,562 ft): complete specification for temperature and exposure
 - 2,000...4,000 m (6,562...13,123 ft):
 - Temperature derating: =1 °C/400 m (+1.8 °F/1,312 ft)
 - Insulation losses: 150 Vc/1,000 m (150 Vc/3,280 ft)
 - Storage altitude: 0...3,000 m (0...9,842 ft)
 - Immunity to mechanical stress:
 - For 1131: 5...8.4 Hz (amplitude 3.5 mm/0.138 in.); 8.4...150 Hz (acceleration 1 g)
 - For Merchant Navy: 5...13.2 Hz (amplitude 1.0 mm/0.039 in.); 13.2...100 Hz (acceleration 0.7g)

Supply characteristics

- 24 V $\overline{\text{---}}$ power supply
- Voltage limit (including ripple): 19.2...28.8 V $\overline{\text{---}}$
- Immunity to micro-cuts (class PS-2): 10 ms
- Max. consumption: 45 W



VW3A3530D

Altivar ATV dPAC				
ATV dPAC module				
Local I/O capacity	Device ports	Service ports	Reference	Weight kg/lb
I/O available from respective drive configuration	2	–	VW3A3530D	0.020/ 0.044



VW3A1111

Graphic display terminal		
Description	Reference	Weight kg/lb
To be used with ATV340 (ATV600 and ATV900 are equipped with the graphic display terminal as standard) Resolution 240 x 160 pixels Protection IP65	VW3A1111	0.020/ 0.044



VW3A1112

Remote mounting kit		
Description	Reference	Weight kg/lb
Remote mounting kit For remote mounting of graphic display terminal, suitable for ATV340, ATV600, and ATV900 families Protection IP65	VW3A1112	0.020/ 0.044



VW3A1104R10

Remote mounting cordset			
Description	Length (m/ft)	Reference	Weight kg/lb
Remote mounting cordset Equipped with 2 RJ45 connectors for connection of the graphic display terminal to the drive	1/ 3.28	VW3A1104R10	0.050/ 0.110
	3/ 9.84	VW3A1104R30	0.150/ 0.331
	5/ 16.4	VW3A1104R50	0.250/ 0.551
	10/ 32.8	VW3A1104R100	0.500/ 1.102

Altivar ATV dPAC (continued)

Environmental characteristics

Altivar Process and Altivar Machine drives are designed to operate in a variety of environments, including harsh environments. The conditions stated below are general data and must be verified with the respective ATV600, ATV900, and ATV340 manuals for the specific drive type used.

- Ambient operating temperature: $-15...+50\text{ °C}/+ 5...122\text{ °F}$ as standard, up to $60\text{ °C}/140\text{ °F}$ with derating
- Relative humidity without condensing: 5...95%
- Storage and transport temperature: $-40...+70\text{ °C}/-40...+158\text{ °F}$
- Operating altitude:
 - 0...1,000 m/0...3,281 ft without derating
 - 1,000...4,800 m/3,281...15,700 ft with derating of 1% per 100 m/328 ft (1)
- Withstand to harsh environments:
 - Chemical class 3C3 conforming to IEC/EN 60721-3-3
 - Mechanical class 3S3 conforming to IEC/EN 60721-3-3
 - Printed circuit boards with protective coating
- Protection of drives: IP20 up to IP55

Electromagnetic compatibility (EMC)

Compliance with electromagnetic compatibility requirements has been incorporated into the design of Altivar Process and Altivar Machine drives. They are CE marked according to the European EMC directive (2014/30/EU).

Depending on the specific drive type used for ATV dPAC integration, the EMC compliance values must be checked in the corresponding ATV340/600/900 manual

Standards and certifications

Depending on the specific drive type used for ATV dPAC integration, the standards and certifications must be checked in the corresponding ATV340/600/900 manual.

- Standards
 - EN/IEC 61800-3
 - EN/IEC 61800-5-1
 - IEC 61000-3-12
 - IEC 60721-3
 - IEC 61508
 - SEMI F47-0706
 - UL508C and UL61800-5-1
 - RoHS-2 according to EU directive 2002/95/EC
 - REACH according to EU regulation 1907/2006
- Certifications
 - CE
 - UL
 - CSA
 - RCM
 - EAC
 - ATEX
 - DNV-GL

B	
BMED581020	16
BMED581020C	16
E	
EALA00CZZSPM02	13
EALA01CZZSPM02	13
EALA02CZZSPM02	13
EALA03CZZSPM02	13
EALA04CZZSPM02	13
EALA05CZZSPM02	13
EALA06CZZSPM02	13
EALA07CZZSPM02	13
EALA08CZZSPM02	13
EALBT1CZZEXM02	12
EALBT1CZZGXM02	12
EALBT1CZZSXM02	12
EALBT1CZZTXM02	12
EALH00CZZSPM02	13
EALH01CZZSPM02	13
EALH02CZZSPM02	13
EALH03CZZSPM02	13
EALH04CZZSPM02	13
EALH05CZZSPM02	13
EALH06CZZSPM02	13
EALH07CZZSPM02	13
EALH08CZZSPM02	13
EALM00CZZSPM02	13
EALM01CZZSPM02	13
EALM02CZZSPM02	13
EALM03CZZSPM02	13
EALM04CZZSPM02	13
EALM05CZZSPM02	13
EALM06CZZSPM02	13
EALM07CZZSPM02	13
EALM08CZZSPM02	13
EALR00CZZSPM02	13
EALR01CZZSPM02	13
EALR02CZZSPM02	13
EALR03CZZSPM02	13
EALR04CZZSPM02	13
EALR05CZZSPM02	13
EALR06CZZSPM02	13
EALR07CZZSPM02	13
EALR08CZZSPM02	13
EALS00CZZSPM02	13
EALS01CZZSPM02	13
EALS02CZZSPM02	13
EALS03CZZSPM02	13
EALS04CZZSPM02	13
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