



Industrial Automation systems

EcoStruxure™ Automation Expert

Software Centric Automation

Software version v23.0

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EcoStruxure™ Automation Expert

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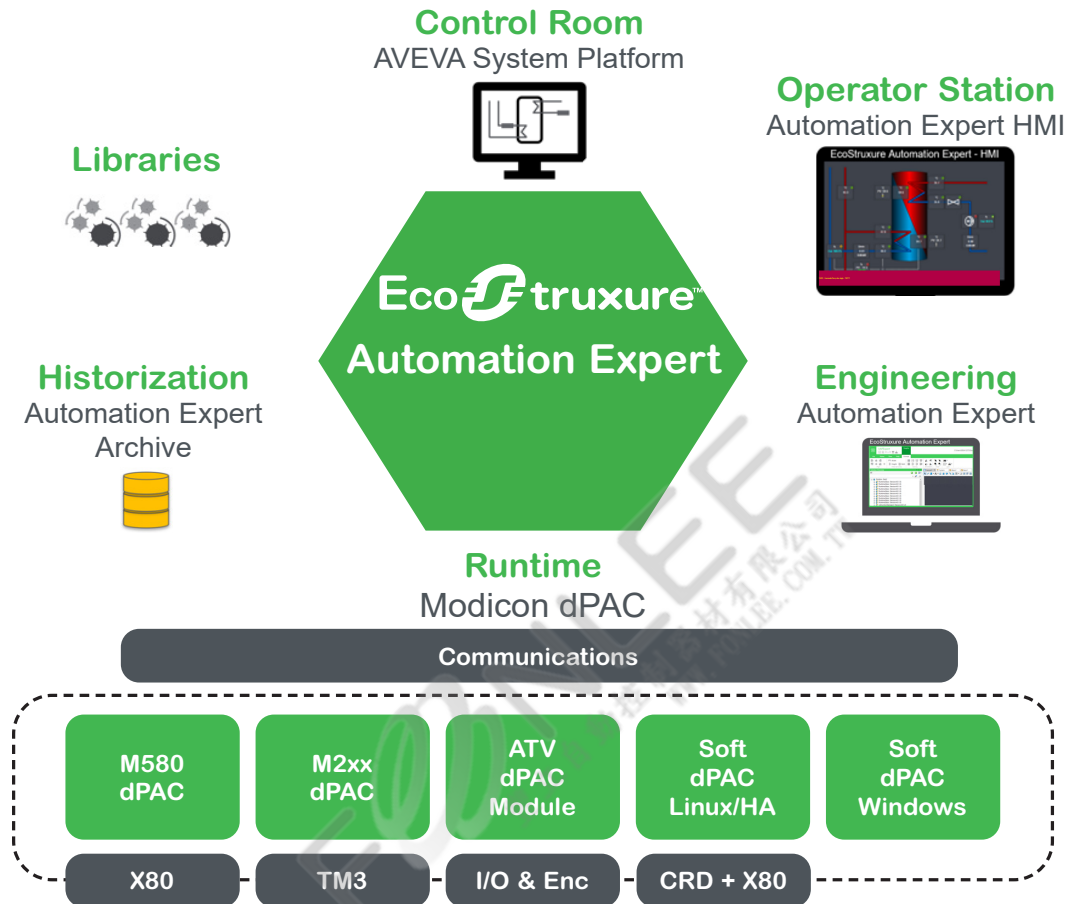
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EcoStruxure™
Automation Expert

EcoStruxure Automation Expert is a new category of industrial automation system that leverages innovative technology to enable industrial operators to achieve step-change improvements 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 engineering, monitoring, and management environment
- > Distributed Programmable Automation Controller (dPAC) platforms with a common, flexible, scalable runtime across:
 - Innovative new software-based controllers:
 - Soft dPAC for Linux™ (for simplex or high availability configurations)
 - Soft dPAC for Windows™
 - Schneider Electric hardware:
 - ATV dPAC for Altivar
 - Modicon M251d and Modicon M262d with TM3 I/O
 - Modicon M580d/X80 I/O
 - Modicon X80 Ethernet Remote I/O head: CRD module
- > 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

Note: UniversalAutomation.org (UAO) is an independent, not-for-profit association that will unleash innovation by decoupling application software from the hardware on which it executes. UAO manages the implementation of an industrial automation shared source runtime execution engine, based on the IEC 61499 standard.

The norm IEC 61499 covers functional blocks for industrial control systems. The specification IEC 61499 defines a generic model for distributed control systems. It is an object-oriented further development of IEC 61131. The cyclical execution model of IEC 61131 is replaced by an event-based execution model in IEC 61499.

This new level of shared technology provides the basis for an ecosystem of portable, interoperable, "plug and produce" solutions and creates an entirely new category within industrial automation.

UniversalAutomation.org is open to new members looking to advance the world of automation. See the UniversalAutomation.org website for more information.

With EcoStruxure Automation Expert, the first UAO-compliant offer, Schneider Electric, as a member of UniversalAutomation.org, delivers an automation solution aligned with the principles of universal automation.

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 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 create 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.

EcoStruxure Automation Expert provides add-ons to perform digital engineering (i.e. declaring object instances in conformance with the project engineering database, as well as generating SCADA objects and associated data paths straight away from what exists in the control application).



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 simpler.



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. Thanks to event-driven execution and object-oriented design, EAE applies to IT programming language standards.

EcoStruxure Automation Expert Software

The EcoStruxure Automation Expert software offer includes:

- The EcoStruxure Automation Expert engineering environment, with add-ons for integration of AVEVA Engineering and AVEVA System Platform software
- EcoStruxure Automation Expert HMI Runtime
- EcoStruxure Automation Expert Archive
- Asset-oriented application libraries
- Modicon Soft dPAC: the software-based distributed process automation controller

EcoStruxure Automation Expert engineering

EcoStruxure Automation Expert is an asset-based, fully-integrated engineering environment that allows portable, IEC 61499-standard-based automation systems to be managed within a single environment. EcoStruxure Automation Expert provides the capability to:

- Design and manage asset-based applications using object libraries based on multifaceted models (asset logic, operating modes, HMI symbols and faceplates (including alarms and trends), I/O interface, and asset documentation)
- Design the process based on asset-oriented objects with single line connections
- Create rich process displays to monitor and control the process from the control room or line terminal by dragging and dropping asset-based objects
- Manage a single solution independently of the number of controllers and HMI stations
- Design the application solution independently of the hardware configuration
- Test and simulate the control and HMI for the whole solution
- Create and modify procedural automation CATs based on S88 state model with graphical editor
- Support multi-user change management through SVN client integration
- Design, configure, and manage network and device topologies
- Flexibly deploy applications to multiple hardware or software platforms based on a common runtime
- Automatically discover and diagnose compatible runtime devices
- Automate bulk generation of asset instances from AVEVA Engineering or DEXPI files
- Automate bulk generation of asset instances for AVEVA System Platform
- Embedded AVEVA industrial graphic editor in EcoStruxure Automation Expert build time to create new AVEVA industrial graphics or to reuse graphics from existing applications
- Secure the automation system by managing authentication with encrypted communication and security certificates at solution and devices level

EcoStruxure Automation Expert – HMI

EcoStruxure Automation Expert HMI is a highly integrated human-machine interface for EcoStruxure Automation Expert applications offering the following features:

- Multi-OS compliant (Windows/Linux)
- Implicit management of controller and HMI communication
- Single/multi operator stations, including cloning
- User management for access control
- Multi-language application
- Monitoring of runtime connections
- Compatible with the following Harmony ST6 touch panel screens: **HMIST6200, HMIST6400, HMIST6500, HMIST6600, and HMIST6700**

EcoStruxure Automation Expert HMI is a Windows 10 Professional and Linux compatible HMI runtime designed to provide a high-performance 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.

EcoStruxure Automation Expert – Archive

EcoStruxure Automation Expert Archive is a high-performance, highly integrated data historian, providing historization and retrieval of live process data with a flexible Windows 10 and Linux 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-generating OPC UA-based secure communications between platforms and will generate AVEVA System Platform-compatible graphics for clean integration. Furthermore, it now embeds the AVEVA Industrial Graphics editor so that users no longer need to move from EAE buildtime to AVEVA buildtime, providing unprecedented integration.

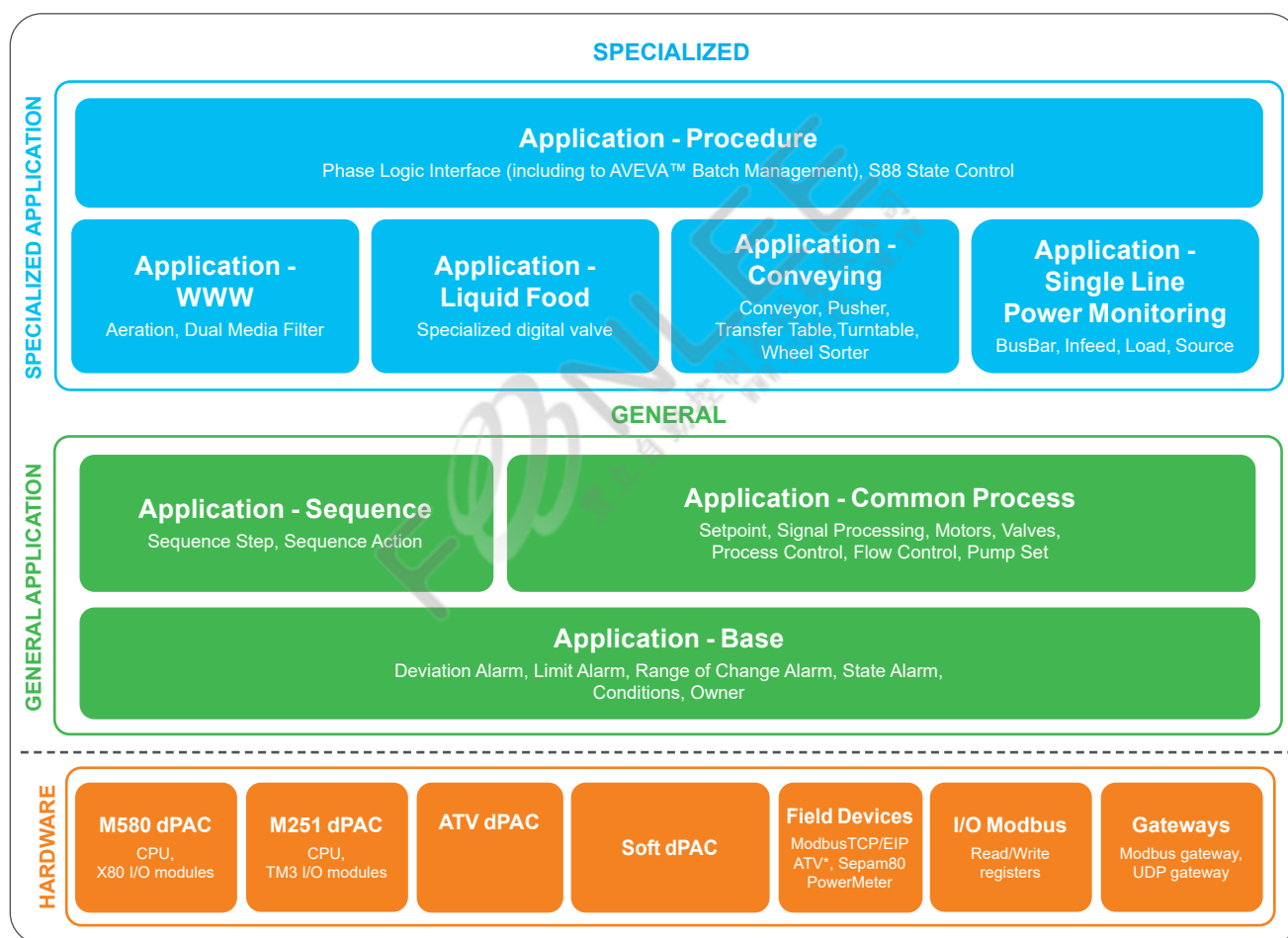
EcoStruxure Automation Expert Software (continued)

EcoStruxure Automation Expert – Libraries

By leveraging an open standard, asset-based engineering, and a 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 this release the libraries include:

- System and device
- CPG liquid food
- Logistics
- Automation sequences
- Asset state management
- Water and wastewater
- Electrical and field devices (Altistart, Easergy Sepam, Compact/Masterpact circuit breakers)

See details below:



With this release the libraries updates include:

- Multi-OS compatibility – All Libraries
- User Management by CAT instance EcoStruxure Automation Expert HMI - CommonProcess
- Multiple parcels / pushers – Conveying
- Change direction on the fly – Conveying
- Persistent data for owner/mode – CommonProcess
- Tracking of Interlock Setpoint - CommonProcess
- Scheduler
- Turkish now managed in the build time on top of other languages

EcoStruxure Automation Expert Software (continued)		
EcoStruxure Automation Expert – Libraries (continued)		
EcoStruxure Automation Expert libraries		
Library name	Short description	Extended description
Runtime.Base	Standard blocks	This library contains the basic function blocks to be used for: <ul style="list-style-type: none"> ■ Runtime management ■ Arithmetic functions ■ Logic functions ■ Format conversion ■ Event management ■ etc.
SE.AppBase	Elementary block of the application	Library of application CATs covering basic application functions like alarms, conditions, owners, and signal conditioning that are used by other application CATs like the ones from SE.AppCommonProcess
SE.AppSequence	Sequence control	This library has a set of application CATs that allows you to create sequential control algorithms with steps and transitions to command control modules
SE.AppCommonProcess	Common process applications	Library of application CATs to address common process assets or functions like digital I/O, analog I/O, motors, valves, flow control, etc. These types of object can be used in any industrial application as well as in process control in manufacturing applications
SE.AppConveying	Conveying	Library of application CATs to address common equipment such as conveyors, sorters, transfer tables, and turntables, typically used in logistic hubs and distribution centers
SE.AppLiquidFood	Liquid and Food	This library has an application CAT to control the seats of mixproof valves used in Liquid and Food applications
SE.SingleLinePowerMonitoring	Low and medium power monitoring	This library includes templates with common functions for electrical objects such as busbars, sources, infeeds, and loads that can be connected to energy management hardware CATs
SE.AppStateManagement	State management	This library is used to monitor and manage interface states of the machine: <ul style="list-style-type: none"> ■ receiving control commands and providing machine information ■ managing acting state sequence and transitions
SE.AppProcedure	Procedure control	This library is used to monitor and manage phases based on ISA-88 associated with sequences in coordination with sequence control blocks from SE.AppSequence . It also includes a phase logical interface that accepts commands from external batching interfaces such as AVEVA Batch Management and returns the phase manager status.
SE.AppWWW	Waste and wastewater	This library contains blocks used to monitor and manage control sequences like aeration and dual media filter for Water and Wastewater applications
SE.DPAC	dPAC hardware controllers	Library containing the dPAC device types
SE.EAEPortal	AVEVA System Platform Device type	The AVEVA System Platform device type is required by Asset Link for establishing communication and creating the application objects automatically in AVEVA System Platform
SE.FieldDevice	Field device hardware CATs	This library has ready-to-use hardware CATs for motor control, energy management, machine safety, and weighing from Schneider Electric, allowing dPAC communication with these devices by Modbus TCP or Ethernet IP depending on the device
SE.HwCommon	Common hardware CAT functions	Library of functions used by the various hardware CAT libraries
SE.IoATV	Variable speed drive I/O services for ATV dPAC	Library of hardware CATs for Altivar I/O (local and modules) used for the Altivar dPAC module hardware configuration
SE.IoNet	UDP gateway	Library of hardware CATs to enable UDP communication
SE.IoTMx	TM I/O services for M251d/M262d	Library of hardware CATs for TM I/O modules used for M251d and M262d hardware configuration
SE.IoX80	X80 I/O services for M580d	Library of hardware CATs for X80 I/O modules used for M580d hardware configuration
SE.ModbusGateway	Standard Modbus gateway	Library of hardware CATs to enable Modbus TCP communication with import of data description file
SE.Standard	EcoStruxure Automation Expert HMI device type	Library with EAE HMI device type

EcoStruxure Automation Expert Software (continued)

EcoStruxure Automation Expert – Libraries (continued)

EcoStruxure Automation Expert libraries (continued)

Library name	Short description	Extended description
Standard.IoEtherNetIP	Standard Ethernet IP scanner functions	Library of hardware CATs used for EIP scanner configuration (Implicit use by the EAE system when using the EIP scanner and also to add custom EIP connections)
Standard.IoModbus	Standard Modbus functions	Library of hardware CATs to enable Modbus client communication
Standard.IoModbusSlave	Standard Modbus server functions	Library of hardware CATs to enable Modbus server communication
Standard.OPCUAClient	Standard OPC UA client functions	Functions to enable OPC UA client connection, monitor, read, and write data
AVEVA.IndustrialGraphicsLibrary	AVEVA Industrial Graphics objects	Contains the AVEVA Industrial Graphics objects used to design the graphic panels for the AVEVA OMI

Definitions:

■ CAT object: A composite automation type (CAT) function block includes objects with multiple facets:

- Logic to define its operating modes
- I/O interfaces to exchange data/events with its environment
- Symbols/faceplates for control and monitoring in the HMI
- Documentation that is implicitly part of the project online help

■ Application CAT: representing application assets or functions

■ Hardware CAT: representing hardware devices that can be added to the hardware configuration, for device monitoring and control

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 client and server
- Ethernet/IP scanner
- WebSocket server

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.

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.

Hardware and Software – High Availability Configuration

With high availability configuration, it is now possible to use the Soft dPAC controller in a redundant iPC architecture and configuration, running with Linux.

The high availability configuration uses a dedicated hardware reference for Ethernet remote I/O drops head:

- BMECRD0100: Ethernet Remote I/O head for Automation Expert High Availability
- BMECRD0100C: same as above in a coated version

EcoStruxure Automation Expert high availability Soft dPAC is hardware agnostic and initially qualified on Harmony P6 and ASRock iPC (refer to our support for other iPC).

The high availability configuration supports:

- Up to 20 000 OPC UA tags
- Up to 8 Modicon X80 I/O drops, each of them having an optional extension rack
- Up to 1000 I/Os with combination of HART digital and analog
- Up to 60 Modbus TCP/IP servers
- Up to 32 RSTP nodes within the loop

Note: I/O count can increase or decrease depending on the CPU version used on the host iPC, I/O scan rate or change rate, and the auxiliary application load with connected devices, such as Modbus. The host iPC processor speed greatly affects the performance capabilities of the controller. The performance limits can be increased when using more powerful iPC processors, such as the Intel i5/i7 offerings.

EcoStruxure Automation Expert Software (continued)

System requirements

Linux – Software dPAC

System requirements	Minimum	Performance	Required for RT control
OS	Debian 10.3, Ubuntu 18.04 and 20.04, or Raspbian 32- or 64-bit		Ubuntu 20.04 with low-latency patch or other distribution with PREEMPT-RT patch
Docker	Docker 19.03.8 and above		
CPU	X86/ARM 1 GHz or higher	Multi-core X86/ARM 1 GHz or higher	Dedicated cores
RAM	256 MB	1 GB	
HDD/SSD	16 GB	32 GB	
Network	At least one NIC	Two NICs to isolate control and device networks	One NIC per container for RT fieldbuses
Time synchronization	NTPv4 client	NTPv4 client support with monotonic and drift compensation	

Linux – Software dPAC, High Availability (1)

System requirements	Description	Note
Processor	PC Celeron 4305UE, 2 Core, 2 Threads	Need Multi-core X86 processor. ARM is not supported for v23.0
RAM	SO-DIMM RAM 4 GB	Minimum 4GB. ECC support is optional.
Memory	M.2 SSD Standard Endurance 128 GB	128 GB is not required. However, it is the lowest that was tested.
Network interphase	RJ45 GbE Ethernet NIC	Three NICs are needed for redundant network configuration. One NIC needs to be 1GB speed for interlink connection.
Operating system	Linux	Ubuntu 20.04 (Harmony P6)/22.04 (ASRock) tested

(1) A set of 2 manageable switches compatible with RSTP and having at least 6 physical ports is also needed.

Windows – Engineering, HMI, Archive, and Software dPAC

System requirements	Minimum				Performance			
	Engineering	HMI	Archive	Software dPAC	Engineering	HMI	Archive	Software dPAC
Processor	1 GHz				2 GHz or higher			
RAM (1)	2 GB	2 GB	2 GB	2 GB	4 GB	4 GB	4 GB	4 GB
Hard disk free space (1)	1 GB	1 GB	1 GB	1 GB	10 GB	10 GB	10 GB	10 GB
Display resolution	1280x1024				1920x1080 or higher			
Pointing device	Mouse or compatible							
Network access	One Ethernet interface							
Operating system	Microsoft Windows 10 Professional (64-bit) Version 1903 and later, Microsoft Windows 11 Professional Version 21H2 and later, and Microsoft Server Version 2019 (1809 and later)							
.NET framework	.NET 4.8				.NET 4.8 or higher			

(1) Requirement is indicated for each software package. More than one software package can be installed on the same device. In this case, you need to add the respective RAM and hard disk free space requirements together. For example, if you install the HMI and Archive software packages on the same device, the minimum RAM required is 4 GB (2 GB + 2 GB).

EcoStruxure Automation Expert Hardware

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

Modicon M580 dPAC

A 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 Modicon 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:

- Up to 1,024 discrete I/O channels (2)
- Up to 256 analog I/O channels (2)
- Up to 4 racks of local I/O



BMED581020

Modicon M251 dPAC

A cost-optimized, low-footprint distributed controller based on the machine-specialized Modicon M251 Logic Controller 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:

- Up to 448 discrete I/O channels (2)
- Up to 112 analog I/O channels (2)
- Up to 14 Modicon TM3 expansion modules (7 local modules + 7 remote modules) with Modicon TM3 bus expansion modules (transmitter module and receiver module)

It is possible to control up to 4 TeSys U and TeSys D motor starters by connecting a **TM3XTYS4** TM3 module to the Modicon M251 dPAC.



TM251MDESE

Modicon M262 dPAC

This is the controller for performance machines. It is powered with a non-isolated 24 V DC power supply, has a built-in overload protection, embeds a dual-core processor and a 256 MB memory capacity and supports RSTP protocol. Product reference:

- **TM262L01MDESE8T**: Modicon M262 dPAC

The **TM262L01MDESE8T** controller has no embedded I/O; it supports Modicon TM3 I/O expansion modules:

- Up to 448 discrete I/O channels (2)
- Up to 112 analog I/O channels (2)
- Up to 14 Modicon TM3 expansion modules (7 local modules + 7 remote modules) with Modicon TM3 bus expansion modules (transmitter module and receiver module)

It is possible to control up to 4 TeSys U and TeSys D motor starters by connecting a **TM3XTYS4** TM3 module to the Modicon M262 dPAC.



TM262L01MDESE8T

Altivar ATV dPAC module

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 (3). 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 drives can be used and extended with I/O modules.



Altivar Process drives slots



VW3A3530D

(1) Expert/specialist modules are not supported in this release. Please refer to the compatibility list on [page 13](#).

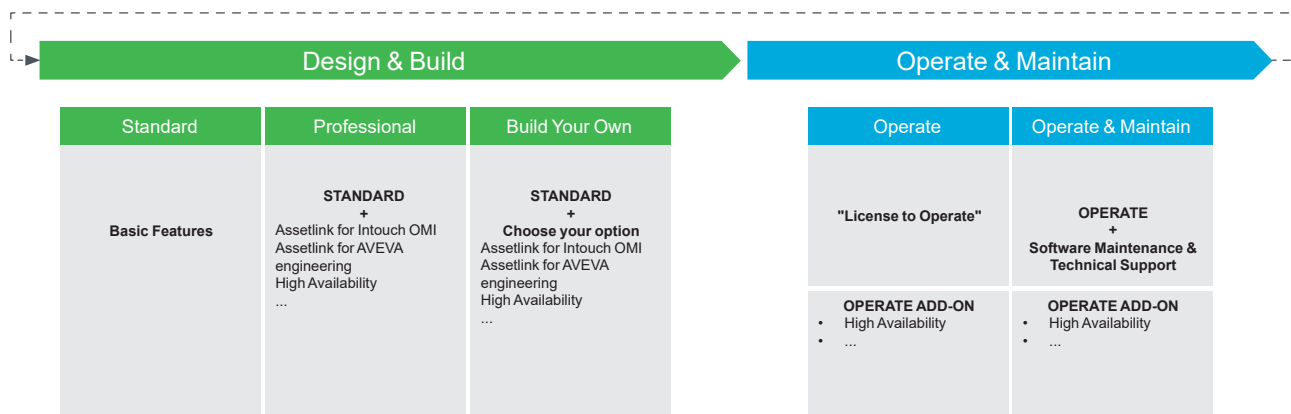
(2) These values are theoretical limits; the device limits are highly dependent on the event load of the user application.

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

Operational Technology (OT) Communication Protocols								
Platform		ATV dPAC	M251 dPAC	M262 dPAC	M580 dPAC	Soft dPAC L (Linux)	Soft dPAC W (Windows)	Soft dPAC High Availability (HA) (Linux)
Modbus TCP	Client	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Server	Yes	Yes	Yes	Yes	Yes	Yes	–
OPC UA	Client	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Server	Yes	Yes	Yes	Yes	Yes	Yes	–
Ethernet - UDP	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EtherNet/IP	Scanner (Client)	–	Yes	Yes	Yes	Yes	–	–
Profibus	Master (Client)	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW
	Slave (Server)	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW
Modbus SL	Client	–	Yes	Yes	–	–	–	–
	Server	–	Yes	Yes	–	–	–	–
ASInterface		ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW	ModbusTCP GTW
HART		–	–	–	–	–	–	Yes

EcoStruxure Automation Expert licensing

The EcoStruxure Automation Expert license offer provides a simplified approach to the software licensing model. The offer has two categories of licenses.



EcoStruxure Automation Expert – Design & Build license

The **Design & Build** software requires a permanent, single seat license to create Automation Expert based applications of commercial purpose. The Design & Build engineering license provides the capability to create, configure, and manage IEC 61499 control applications, HMI, archive, and network/device topologies.

Each license provides the user with:

- The capability to design, develop, simulate 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 material, TVDAs, etc.
 - 9 am to 5 pm support desk

An engineering license is perpetual and is available as a single seat option only.

Engineering license references

Number of seats	Reference	Description
1	EALBTP23	Standard engineering license
1	EALBTEP23	Standard engineering for OEMs license
1	EALBFP23	Professional engineering license

Design & Build Add-ons for EcoStruxure Automation Expert Standard licenses

Dedicated references are now available as add-ons for functionalities related to bulk engineering, SCADA engineering, and high availability engineering. These functions were originally part of the buildtime license but are not used by all users.

Optional engineering license references

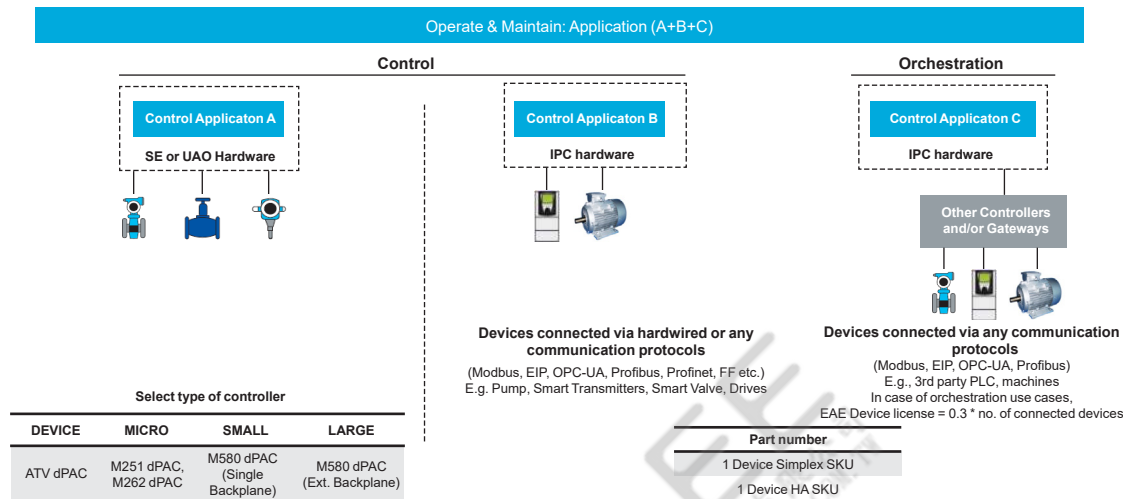
Number of seats	Reference	Description
1	EALBAP23	Asset link add-on for bulk engineering
1	EALBATP23	Asset link add-on for AVEVA InTouch OMI
1	EALBAHP23	Add-on for high availability engineering

EcoStruxure Automation Expert licensing (continued)

EcoStruxure Automation Expert – Operate & Maintain licenses

In addition to the buildtime engineering license required to create applications, each hardware running EcoStruxure Automation Expert runtime must be licensed for operational use.

The Operate & Maintain perpetual licenses will be based on the control type for Schneider Electric dPAC controllers and based on the number of connected devices for Soft dPAC PC-based control.



For exact calculation of the number of devices and controller type for the application license, a software license configurator for EcoStruxure Automation Expert is available on our [website](#).

The EcoStruxure Automation Expert HMI license includes rights to both HMI and Archive runtimes. All runtime licenses are perpetual.

Different license types are required depending on the platform on which the runtime is installed, as per the following table:

EcoStruxure Automation Expert – HMI license

Automation Expert Runtime	Platform	License type
HMI (1)	Harmony ST6 HMI range	1 license per HMI runtime instance
HMI (1)	PC-type HMI (Windows 10/Linux)	1 license per HMI runtime instance

(1) Each license includes both Automation Expert HMI and Automation Expert Archive runtime rights.

Download the HMIBMI, HMIBMO,
and HMIP6 ranges catalog

Catalog | May 2022



Harmony iPC

Industrial PC, Edge Box and Display

Life is On | Schneider Electric

Operate & Maintain application license references

Reference	Description
EALADP	Application license for one runtime instance, DEVICE
EALANP	Application license for one runtime instance, NANO
EALAMP	Application license for one runtime instance, MICRO
EALASP	Application license for one runtime instance, SMALL
EALALP	Application license for one runtime instance, LARGE
EALDSP	Application license for one simplex device
EALDSEP	Application license for standard device (OEM Tier 1) (1)
EALDSMP	Application license for standard device (OEM Tier 2) (1)
EALDHP	Application license for one high availability device
EALH1P	HMI license, Ecostruxure Automation Expert, for Panel-Type HMI ST6 range
EALH2P	HMI license, Ecostruxure Automation Expert, for PC-type HMI (Windows 10/Linux)

(1) Depending on the number of machine contracted per year, an OEM can have access to one or the other licenses, leading to decrease in application license cost as the number of machines contracted decreases.

List of Modicon 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
Analog I/O	BMXAMM0600	4 analog inputs - 2 analog outputs
Analog I/O	BMXAMM0600H	Ruggedized 4 analog inputs - 2 analog outputs
Analog I/O	BMXAMO0210	2 isolated analog outputs
Analog I/O	BMXAMO0210H	Ruggedized 2 voltage/current isolated analog outputs
Analog I/O	BMXART0814	8 isolated TC/RTD inputs
Analog I/O	BMXART0814H	Ruggedized 8 isolated TC/RTD inputs
Power	BMXCPS2000	Standard AC power supply
Power	BMXCPS2010	Standard isolated DC power supply
Power	BMXCPS3020	High-power isolated 24 to 48 V DC power supply
Power	BMXCPS3020H	Ruggedized high-power isolated 24 to 48 V DC power supply
Power	BMXCPS3500	High-power AC power supply
Power	BMXCPS3500H	Ruggedized high-power AC power supply
Power	BMXCPS3522	Redundant 125 V DC power supply
Power	BMXCPS3540T	High-power 125 V DC power supply
Power	BMXCPS4002	Redundant AC power supply
Power	BMXCPS4022	Redundant 24 to 48 V DC power supply
Discrete I/O	BMXDDI1602	16x 24 V DC sink discrete inputs
Discrete I/O	BMXDDI1602H	Ruggedized 16x 24 V DC sink discrete inputs
Discrete I/O	BMXDDI3202K	32x 24 V DC sink discrete inputs
Discrete I/O	BMXDDI6402K	64x 24 V DC sink discrete inputs
Discrete I/O	BMXDDM16025	8x 24 V DC discrete inputs, 8x discrete relay outputs
Discrete I/O	BMXDDM16025H	Ruggedized 8x 24 V DC discrete inputs, 8x 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	BMXDRA0815	8 isolated relay outputs
Discrete I/O	BMXDRA0815H	Ruggedized 8 isolated relay outputs

List of Modicon X80 hardware compatible with Modicon M580 dPAC (continued)

Type	Reference	Description
Discrete I/O	BMXDRA1605	16 discrete relay outputs
Discrete I/O	BMXDRA1605H	Ruggedized 16 discrete relay outputs
Discrete I/O	BMXDAI0814	8x 100...120 V AC isolated inputs
Discrete I/O	BMXDAI1604	16x 100...120 V AC capacitive inputs
Discrete I/O	BMXDAI1604H	Ruggedized 16x 100...120 V AC capacitive inputs
Discrete I/O	BMXDAO1605	16x 100...240 V AC triac outputs
Discrete I/O	BMXDAO1605H	Ruggedized 16x 100...240 V AC triac outputs
Discrete I/O	BMXDDM16022	3-channel SSI encoder interface
Discrete I/O	BMXDDM16022H	Ruggedized 3-channel SSI encoder interface
Discrete I/O	BMXDDM3202K	16x 24 V DC inputs - 16x solid state outputs
Other	BMXNRP0200	Fiber converter MM/LC 2-channel, 100 m/328 ft
Other	BMXNRP0201	Fiber converter SM/LC 2-channel, 100 m/328 ft
Expert	BMXEHC0800	8 high-speed counter channels
Expert	BMXEHC0800H	Ruggedized 8 high-speed counter channels
Expert	BMXEA0300	3-channel SSI encoder interface module
Expert	BMXEA0300H	Ruggedized 3-channel SSI encoder interface module

List of Modicon X80 hardware compatible with Soft dPAC, high availability

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
Analog I/O	BMXAMI0410	4 voltage/current isolated high-speed analog inputs
Analog I/O	BMXAMI0810	8 voltage/current isolated fast analog inputs
Analog I/O	BMXAMO0802	8 current non-isolated analog outputs
Analog I/O	BMXAMO0410	4 voltage/current isolated analog outputs
Analog I/O	BMEAHI0812	8 current isolated analog inputs, HART
Analog I/O	BMEAHO0412	4 current isolated high-level analog outputs, HART
Analog I/O	BMEART0814	8 voltage/current isolated temperature analog inputs
Discrete I/O	BMXDDI1602	16x 24 V DC sink discrete inputs

Discrete I/O	BMXDDI6402K	64x 24 V DC sink discrete inputs
Discrete I/O	BMXDDO1602	16 transistor source 0.5 A discrete outputs
Discrete I/O	BMXDDO6402K	64 transistor source 0.1 A discrete outputs

List of TM3 hardware compatible with Modicon M251 dPAC and M262 dPAC		
Type	Reference	Description
Discrete I/O	TM3DI16/TM3DI16G	16 discrete inputs
Discrete I/O	TM3DI32K	32 discrete inputs, HE10 connection
Discrete I/O	TM3DI8/TM3DI8A/TM3DI8G	8 discrete inputs
Discrete I/O	TM3DQ8T/TM3DQ8TG	8x 0.5 A transistor source discrete outputs
Discrete I/O	TM3DQ16T/TM3DQ16TG	16x 0.5 A transistor source discrete outputs
Discrete I/O	TM3DQ16R/TM3DQ16RG	16x 2 A discrete relay outputs
Discrete I/O	TM3DQ32TK	32x 0.1 A transistor source discrete outputs, HE10 connection
Discrete I/O	TM3DQ8U/TM3DQ8UG	8x 0.3 A transistor sink discrete outputs
Discrete I/O	TM3DQ16U/TM3DQ16UG	16x 0.3 A transistor sink discrete outputs
Discrete I/O	TM3DQ32UK	32x 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	TM3AI4/TM3AI4G	4 analog inputs, +-10 V, 0-10 V, 0-20 mA, 4-20 mA, 12-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
Analog I/O	TM3AQ2/TM3AQ2G	2 analog outputs, +-10 V, 0-10 V, 0-20 mA, 4-20 mA, 12-bit, 1 ms
Analog I/O	TM3AQ4/TM3AQ4G	4 analog inputs, +-10 V, 0-10 V, 0-20 mA, 4-20 mA, 12-bit, 1 ms
Safety I/O	TM3SAC5R/TM3SAC5RG	CAT3 Safety, 1 function, max. PL d/SIL3, 3 outputs 6 A relays
Safety I/O	TM3SAF5R/TM3SAF5RG	CAT4 Safety, 1 function, max. PL e/SIL3, 3 outputs 6 A relays
Safety I/O	TM3SAFL5R/TM3SAFL5RG	CAT3 Safety, 2 functions, max. PL d/SIL3, 3 outputs 6 A relays
Safety I/O	TM3SAK6R/TM3SAK6RG	CAT4 Safety, 3 functions, max. PL e/SIL3, 3 outputs 6 A relays
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	TM3DM8R/TM3DM8RG	8x 2 A relay outputs
Relay I/O	TM3DM24R/TM3DM24RG	24x 2 A relay outputs
Relay I/O	TM3DQ8R/TM3DQ8RG	8x 2 A relays outputs
Other	TM3XREC1	TM3 remote receiver module
Other	TM3XTRA1	TM3 remote transmitter module
Other	TM3XTYS4	TM3 parallel interface for 4 Tesys motor starters
Expert	TM3XHSC202/TM3XHSC202G	High-speed counting, 2 HSC channels, 10 inputs, 8 outputs

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
Drive	ATV6L0●●●●● ATV9L0●●●●●	Altivar Process liquid-cooled 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	VW3A3422	Analog encoder interface module for Altivar 340 and Altivar 9●● variable speed drives	Yes
Encoder	VW3A3423	Resolver interface module for Altivar 340 and Altivar 9●● variable speed drives	Yes
Encoder	VW3A3424	HTL encoder interface module	Yes



BMED581020

Modicon M580 dPAC

Local I/O capacity	Communication ports	Service ports	Reference	Weight kg/lb
Up to 1024 discrete I/O	2	1	BMED581020	0.848/
Up to 256 analog I/O			BMED581020C	1.872
64 MB integrated memory				

Standards and certifications

The Modicon M580 dPAC 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](#).

Modicon M580 dPACs 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 dPAC automation platform	Modicon M580 dPAC harsh I/O platform
Temperature	Operation	0...60 °C/32...140 °F	-25...+70 °C/-13...158 °F
	Storage	-40...85 °C/-40...185 °F	-40...85 °C/-40...185 °F
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	0...2,000 m/0...6,562 ft (full specification: temperature and isolation) 2,000...5,000 m/6,562...16,404 ft (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
Supply voltage	Nominal voltage	24 V ---	24...48 V ---	125 V ---	100...240 V ~	100...240 V ~
	Limit voltages	18...31.2 V ---	18...62.4 V ---	100...150 V ---	85...264 V ~	85...264 V ~
	Nominal frequencies	—	—	—	50/60 Hz	50/60 Hz
	Limit frequencies	—	—	—	47/63 Hz	47/63 Hz

Protective treatment of the Modicon M580 dPAC automation platform

The Modicon M580 dPAC 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 dPAC must be embedded in enclosures with minimum IP54 protection.

The Modicon M580 dPAC 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.

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

Environment tests

Immunity to LF interference (CE) (1)

Name of test	Standards	Levels
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: ■ 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: ■ 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	■ 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 ...1,000 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: ■ 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.



BMECRD0100

Modicon CRD, I/O bus over Ethernet

I/O capacity	Communication ports	Service ports	Reference	Weight kg/lb
Up to 1024 discrete I/O	2	1	BMECRD0100	0.848/
Up to 256 analog I/O			BMECRD0100C	1.872
64 MB integrated memory				

Standards and certifications

The Modicon CRD 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](#).

Modicon CRD is 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 CRD automation platform	Modicon CRD harsh I/O platform
Temperature	Operation	0...60 °C/32...140 °F	-25...+70 °C/-13...158 °F
	Storage	-40...85 °C/-40...185 °F	-40...85 °C/-40...185 °F
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	0...2,000 m/0...6,562 ft (full specification: temperature and isolation) 2,000...5,000 m/6,562...16,404 ft (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	24 V $\overline{\text{---}}$	24...48 V $\overline{\text{---}}$	125 V $\overline{\text{---}}$	100...240 V \sim	100...240 V \sim
	Limit voltages	18...31.2 V $\overline{\text{---}}$	18...62.4 V $\overline{\text{---}}$	100...150 V $\overline{\text{---}}$	85...264 V \sim	85...264 V \sim
	Nominal frequencies	—	—	—	50/60 Hz	50/60 Hz
	Limit frequencies	—	—	—	47/63 Hz	47/63 Hz

Protective treatment of the Modicon CRD automation platform

The Modicon CRD 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 CRD must be embedded in enclosures with minimum IP54 protection.

The Modicon CRD 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.

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

Environment tests

Immunity to LF interference (CE) (1)

Name of test	Standards	Levels
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: ■ 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: ■ 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	■ 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 ... 1,000 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: ■ 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
 - ☐ ANSI/ISA 12.12.01-2007
 - ☐ CSA C22.2 No. 213 and No. 142
- Certifications
 - ☐ CE
 - ☐ cULus Listing Mark
 - ☐ RCM
 - ☐ Achilles
 - ☐ UKCA

Environmental characteristics**Service conditions and recommendations relating to the environment**

Temperature	Operation	Vertical installation: -10...35 °C/14...122 °F Horizontal installation: -10...55 °C/14...131 °F
	Storage	-40...70 °C/-40...158 °F
Relative humidity (without condensation)	Operation	10...95%
	Storage	
Altitude	Operation	0...2,000 m/0...6,562 ft: complete specification for temperature and exposure
	Storage	0...3,000 m (0...9,842 ft)
Immunity to mechanical stress	1131	■ Rail mounting: <ul style="list-style-type: none"> <input type="checkbox"/> 5...8.4 Hz (amplitude 3.5 mm/0.138 in.) <input type="checkbox"/> 8.4...150 Hz (acceleration 1 g) ■ Panel mounting: <ul style="list-style-type: none"> <input type="checkbox"/> 8.7...150 Hz (acceleration 3 g)
	Merchant Navy	2...13.2 Hz (amplitude 1.0 mm/0.039 in.) 13.2...100 Hz (acceleration 0.7 g)

Supply charecteristics

Power supply		24 V $\overline{\text{---}}$
Voltage limit	Including ripple	19.2...28.8 V $\overline{\text{---}}$
Immunity to micro-cuts	Class PS-2	10 ms
Max. consumption		45 W



Modicon M262 dPAC module

Modicon M262 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	TM262L01MDESE8T	0.655/ 1.444

Standards and certifications

■ Standards

- ☐ IEC/EN 61131-2 (Edition 2 2007)
- ☐ UL 61010-1, 61010-2-201
- ☐ ANSI/ISA 12.12.01-2007
- ☐ CSA C22.2 No. 213, No. 61010-1, No. 61010-2-201

■ Certifications

- ☐ CEC
- ☐ cULus, cULus HazLoc Class I Division 2 CSA 22-2 No 213
- ☐ RCM
- ☐ Achilles
- ☐ KC
- ☐ EAC

Environmental characteristics**Service conditions and recommendations relating to the environment**

Temperature	Operation	Vertical installation: -20...50 °C/-4...122 °F Horizontal installation: -20...60 °C/-4...140 °F Flat mounting: -20...45 °C/-4...113 °F
	Storage	-40...85 °C/-40...185 °F
Relative humidity (without condensation)	Operation	5...95%
	Storage	
Altitude	Operation	0...2,000 m/0...6,562 ft
	Storage	0...3,000 m (0...9,842 ft)
Immunity to mechanical stress		3.5 mm at 2...8.4 Hz 1 gn at 8.4...200 Hz

Supply characteristics

Power supply	24 V \pm (-15...20%)
Voltage limit	20.4...28.8 V \pm
Immunity to micro-cuts	0.01 ms
Max. consumption	82 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

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



VW3A1104R10

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

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.

Service conditions and recommendations relating to the environment

Temperature	Operation	As standard: -15...50 °C/+5...122 °F With derating: -15...60 °C/+5...140 °F
	Storage and transport	-40...70 °C/-40...158 °F
Relative humidity (without condensation)	Operation	5...95%
	Storage	
Altitude	Operation	<ul style="list-style-type: none"> ■ 0...1,000 m/0...3,281 ft <i>without derating</i> ■ 1,000...4,800 m/3,281...15,700 ft <i>with derating of 1% per 100 m/328 ft (1)</i>
Protection of drives		IP20 to IP55
Withstand to harsh environment		<ul style="list-style-type: none"> ■ 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

Environmental characteristics

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



Schneider Electric offers lifecycle services for your industrial automation systems based on EcoStruxure Automation Expert. Our lifecycle services include field and digital services. We believe, with our best-in-class processes and tools, we are your trusted expert in field and digital services to help you achieve greater functional safety, efficiency, sustainability, and resilience in your plant operations.

We offer services that are designed to address your needs as you plan, install, operate, and optimize your industrial automation systems based on EcoStruxure Automation Expert. These include:

- Consulting services
- Maintenance and support services
- Training Services
- Migration Services

For more information, visit our [Industrial Automation Services page](#).

Consulting services

Consulting services are about bringing our expertise to help find solutions to some of your key operational challenges. Be it about maximizing the business value from your digital transformation initiatives, identifying improvement opportunities in your industrial automation system lifecycle management plans, or improving your cybersecurity posture and compliance, we can help. Take a look at some of our consulting offerings:

Security consulting

Our cybersecurity consultants will help you assess and review your EcoStruxure Automation Expert systems to detect gaps, identify risks, uncover any security malpractices, assess your staff's security competencies, provide emergency response services, and more. For more information, visit our [Cybersecurity Services page](#).

IA lifecycle consulting

Audits performed by our service team provide insights and recommendations to help improve the maintenance plans of industrial automation assets. This service helps identify potential risks to the reliability and maintainability of these assets and plan mitigation actions. Watch the video to learn more about our [IA Lifecycle Consulting Service](#).

Maintenance and support services

Our maintenance and support offerings help you quickly restore your operations in the event of an unplanned downtime incident. They can also help reduce the risk of occurrence and the associated costs. Take a look at some of our maintenance and support offerings:

Extended warranty

The extended warranty offer gives you the option to extend the warranty of selected Schneider Electric hardware by up to three years.

Note: Please contact your Customer Care Center for offer availability.

Spare parts, exchanges, and repairs

These solutions help you to respond, in the most optimal manner, to requests for spare parts for your EcoStruxure Automation Expert system based on Schneider Electric hardware. Services include:

- Parts management service:
Onsite or shared spares inventory, managed by us, to help ensure parts availability, while optimizing costs.
- Repair:
Product repairs performed onsite when possible, or at our repair centers.
- Exchange:
A refurbished product is provided in exchange for a product returned with a detected fault.

Note: Availability of these services may vary depending on the applicable Schneider Electric hardware. Please contact your Customer Care Center for offer availability.

Maintenance and support services (continued)

Maintenance and support contracts

Our Advantage Service Plan is a simplified and modular annual service contract, designed to provide you with the right level of flexibility and confidence to meet your support and maintenance needs for your industrial automation systems based on EcoStruxure Automation Expert.

The plan offers a choice of two tiers of included services - Essential and Advanced - accompanied by a selection of optional services. The following table provides you with a snapshot of the plan:

Deliverables	Essential	Advanced ⁽¹⁾
Included services		
Priority technical support (NBH) – Phone, chat	SLA	SLA
mySchneider support portal - Premium support	Yes	Yes
Software version update	Yes	Yes
Corrective maintenance - En-route commitment	–	SLA
Scheduled onsite visit	–	Yes
Optional services ⁽¹⁾		
24/7 priority technical support – Phone		
Block of support hours		
Cybersecurity assessment		

Note: NBH: normal business hours

SLA: service level agreement

Yes: included in base price

⁽¹⁾ Subject to confirmation by your local Schneider Electric office

The Essential tier, as the name suggests, includes key support services to bolster your efforts towards the upkeep of your automation systems.

The Advanced tier takes this further by bringing our certified engineers onsite, to partner with you in realizing your system maintenance objectives. You can tailor your plan to your specific needs by adding on optional services as needed.

Training services

Our training services are designed for users to take maximum advantage of our industrial automation systems based on EcoStruxure Automation Expert. Our training catalog includes courses on:

- Automation fundamentals
- IEC 61499 concepts
- EcoStruxure Automation Expert engineering and configuration

For more information, please visit our [Learning Services Home Page](#) or send us an [email](#).

Modernization and migration services

Over the years, we have been involved in migrating many major automation systems to Schneider Electric. Our migration services, based on this expertise and complemented by a set of dedicated tools, helps to minimize the risks and costs involved in such upgrades to an open EcoStruxure Automation Expert-based system. The available set of tools and services are outlined below:

Tools and services

Source platforms		Tools and services		
		Reverse engineering	Application conversion service	Wiring systems for Modicon X80
Schneider Electric	Modicon Premium	Yes	2023	Yes
Rockwell Automation	SLC 500	Yes	Yes	Yes
	PLC-5	Yes	Yes	Yes
	ControlLogix	Yes	2023	–

In addition to the above, we can also offer project-specific solutions. Please contact your local service teams for more information.

A					
ATV340D11N4	16	ATV650D11N4E	16	ATV680C13T4X1	16
ATV340D11N4E	16	ATV650D15N4	16	ATV680C16Q4X1	16
ATV340D15N4	16	ATV650D15N4E	16	ATV680C16T4X1	16
ATV340D15N4E	16	ATV650D18N4	16	ATV680C20Q4X1	16
ATV340D18N4	16	ATV650D18N4E	16	ATV680C20T4X1	16
ATV340D18N4E	16	ATV650D22N4	16	ATV680C25Q4X1	16
ATV340D22N4	16	ATV650D22N4E	16	ATV680C25T4X1	16
ATV340D22N4E	16	ATV650D30N4	16	ATV680C31Q4X1	16
ATV340D30N4	16	ATV650D30N4E	16	ATV680C31T4X1	16
ATV340D37N4	16	ATV650D37N4	16	ATV680C35Q4X1	16
ATV340D45N4	16	ATV650D37N4E	16	ATV680C35T4X1	16
ATV340D55N4	16	ATV650D45N4	16	ATV680C40Q4X1	16
ATV340D75N4	16	ATV650D45N4E	16	ATV680C40T4X1	16
ATV340U07N4	16	ATV650D55N4	16	ATV680C45Q4X1	16
ATV340U07N4E	16	ATV650D55N4E	16	ATV680C45T4X1	16
ATV340U15N4	16	ATV650D75N4	16	ATV680C50Q4X1	16
ATV340U15N4E	16	ATV650D75N4E	16	ATV680C50T4X1	16
ATV340U22N4	16	ATV650D90N4	16	ATV680C56Q4X1	16
ATV340U22N4E	16	ATV650D90N4E	16	ATV680C56T4X1	16
ATV340U30N4	16	ATV650U07N4	16	ATV680C63Q4X1	16
ATV340U30N4E	16	ATV650U07N4E	16	ATV680C63T4X1	16
ATV340U40N4	16	ATV650U15N4	16	ATV680C71Q4X1	16
ATV340U40N4E	16	ATV650U15N4E	16	ATV680C71T4X1	16
ATV340U55N4	16	ATV650U22N4	16	ATV680C80Q4X1	16
ATV340U55N4E	16	ATV650U22N4E	16	ATV680C80T4X1	16
ATV340U75N4	16	ATV650U30N4	16	ATV6A0C11N6	16
ATV340U75N4E	16	ATV650U30N4E	16	ATV6A0C11Q4	16
ATV630C11N4	16	ATV650U40N4	16	ATV6A0C11Q6	16
ATV630C11N4F	16	ATV650U40N4E	16	ATV6A0C11R4	16
ATV630C13N4	16	ATV650U55N4	16	ATV6A0C11S6	16
ATV630C13N4F	16	ATV650U55N4E	16	ATV6A0C11T4	16
ATV630C16N4	16	ATV650U75N4	16	ATV6A0C11T6	16
ATV630C16N4F	16	ATV650U75N4E	16	ATV6A0C13N6	16
ATV630C20N4F	16	ATV660C11Q4X1	16	ATV6A0C13Q4	16
ATV630C22N4	16	ATV660C11T4X1	16	ATV6A0C13Q6	16
ATV630C25N4	16	ATV660C13Q4X1	16	ATV6A0C13R4	16
ATV630C25N4F	16	ATV660C13T4X1	16	ATV6A0C13S6	16
ATV630C31N4	16	ATV660C16Q4X1	16	ATV6A0C13T4	16
ATV630C31N4F	16	ATV660C16T4X1	16	ATV6A0C13T6	16
ATV630D11N4	16	ATV660C20Q4X1	16	ATV6A0C16N6	16
ATV630D15N4	16	ATV660C20T4X1	16	ATV6A0C16Q4	16
ATV630D18N4	16	ATV660C25Q4X1	16	ATV6A0C16Q6	16
ATV630D22N4	16	ATV660C25T4X1	16	ATV6A0C16R4	16
ATV630D30N4	16	ATV660C31Q4X1	16	ATV6A0C16S6	16
ATV630D37N4	16	ATV660C31T4X1	16	ATV6A0C16T4	16
ATV630D45N4	16	ATV660C35Q4X1	16	ATV6A0C16T6	16
ATV630D55N4	16	ATV660C35T4X1	16	ATV6A0C20N6	16
ATV630D75N4	16	ATV660C40Q4X1	16	ATV6A0C20Q4	16
ATV630D90N4	16	ATV660C40T4X1	16	ATV6A0C20Q6	16
ATV630U07N4	16	ATV660C45Q4X1	16	ATV6A0C20R4	16
ATV630U15N4	16	ATV660C45T4X1	16	ATV6A0C20S6	16
ATV630U22N4	16	ATV660C50Q4X1	16	ATV6A0C20S6	16
ATV630U30N4	16	ATV660C50T4X1	16	ATV6A0C20T4	16
ATV630U40N4	16	ATV660C56Q4X1	16	ATV6A0C20T6	16
ATV630U55N4	16	ATV660C56T4X1	16	ATV6A0C25N6	16
ATV630U75N4	16	ATV660C63Q4X1	16	ATV6A0C25Q4	16
ATV650C11N4F	16	ATV660C63T4X1	16	ATV6A0C25Q6	16
ATV650C13N4F	16	ATV660C71Q4X1	16	ATV6A0C25R4	16
ATV650C16N4F	16	ATV660C71T4X1	16	ATV6A0C25T4	16
ATV650C20N4F	16	ATV660C80Q4X1	16	ATV6A0C25T6	16
ATV650C25N4F	16	ATV660C80T4X1	16	ATV6A0C31N6	16
ATV650C31N4F	16	ATV680C11Q4X1	16	ATV6A0C31Q4	16
ATV650D11N4	16	ATV680C11T4X1	16	ATV6B0C16T4	16
		ATV680C13Q4X1	16	ATV6B0C16T6	16
				ATV6B0C20N6	16
				ATV6B0C20Q4	16
				ATV6B0C20Q6	16
				ATV6B0C20R4	16
				ATV6B0C20T4	16
				ATV6B0C20T6	16
				ATV6B0C25N6	16
				ATV6B0C25Q4	16
				ATV6B0C25Q6	16
				ATV6B0C25R4	16
				ATV6B0C25T4	16
				ATV6B0C25T6	16
				ATV6B0C31N6	16
				ATV6B0C31Q4	16
				ATV6B0C31Q6	16
				ATV6B0C31R4	16
				ATV6B0C31T4	16
				ATV6B0C31T6	16
				ATV6B0C35Q4	16
				ATV6B0C35R4	16
				ATV6B0C35T4	16
				ATV6B0C40N6	16
				ATV6B0C40Q4	16
				ATV6B0C40Q6	16
				ATV6B0C40R4	16
				ATV6B0C40T4	16
				ATV6B0C40T6	16
				ATV6B0C45Q4	16
				ATV6B0C45R4	16
				ATV6B0C45T4	16
				ATV6B0C50N6	16
				ATV6B0C50Q4	16
				ATV6B0C50Q6	16
				ATV6B0C50R4	16
				ATV6B0C50T4	16
				ATV6B0C50T6	16
				ATV6B0C56Q4	16
				ATV6B0C56R4	16
				ATV6B0C56T4	16
				ATV6B0C63N6	16
				ATV6B0C63Q4	16
				ATV6B0C63Q6	16
				ATV6B0C63R4	16
				ATV6B0C63T4	16
				ATV6B0C63T6	16
				ATV6B0C71Q4	16
				ATV6B0C71R4	16
				ATV6B0C71T4	16
				ATV6B0C80N6	16
				ATV6B0C80Q4	16
				ATV6B0C80Q6	16
				ATV6B0C80R4	16
				ATV6B0C80T4	16
				ATV6B0C80T6	16
				ATV6B0M10N6	16
				ATV6B0M10Q4	16
				ATV6B0M10Q6	16
				ATV6B0M10R4	16
				ATV6B0M10T4	16
				ATV6B0M10T6	16
				ATV6B0M12N6	16
				ATV6B0M12Q6	16
				ATV6B0M12T6	16
				ATV6B0M12Q6	16
				ATV6B0M12Q6	16
				ATV6B0M12T6	16
				ATV6L0C13Q4	16

ATV6L0C13R4	16	ATV6L0M14T6	16	ATV950D15N4E	16	ATV980C16T4X1	16
ATV6L0C13T4	16	ATV6L0M15Q4	16	ATV950D18N4	16	ATV980C20Q4X1	16
ATV6L0C16Q4	16	ATV6L0M15R4	16	ATV950D18N4E	16	ATV980C20T4X1	16
ATV6L0C16R4	16	ATV6L0M15T4	16	ATV950D22N4	16	ATV980C25Q4X1	16
ATV6L0C16T4	16	ATV6L0M16N6	16	ATV950D22N4E	16	ATV980C25T4X1	16
ATV6L0C20N6	16	ATV6L0M16Q6	16	ATV950D30N4	16	ATV980C31Q4X1	16
ATV6L0C20Q4	16	ATV6L0M16T6	16	ATV950D30N4E	16	ATV980C31T4X1	16
ATV6L0C20Q6	16	ATV6L0M18N6	16	ATV950D37N4	16	ATV980C35Q4X1	16
ATV6L0C20R4	16	ATV6L0M18Q4	16	ATV950D37N4E	16	ATV980C35T4X1	16
ATV6L0C20T4	16	ATV6L0M18Q6	16	ATV950D45N4	16	ATV980C40Q4X1	16
ATV6L0C20T6	16	ATV6L0M18R4	16	ATV950D45N4E	16	ATV980C40T4X1	16
ATV6L0C25Q4	16	ATV6L0M18T4	16	ATV950D55N4	16	ATV980C45Q4X1	16
ATV6L0C25R4	16	ATV6L0M18T6	16	ATV950D55N4E	16	ATV980C45T4X1	16
ATV6L0C25T4	16	ATV6L0M22N6	16	ATV950D75N4	16	ATV980C50Q4X1	16
ATV6L0C28N6	16	ATV6L0M22Q6	16	ATV950D75N4E	16	ATV980C50T4X1	16
ATV6L0C28Q6	16	ATV6L0M22T6	16	ATV950D90N4	16	ATV980C56Q4X1	16
ATV6L0C28T6	16	ATV6L0M26N6	16	ATV950D90N4E	16	ATV980C56T4X1	16
ATV6L0C31N6	16	ATV6L0M26Q6	16	ATV950U07N4	16	ATV980C63Q4X1	16
ATV6L0C31Q4	16	ATV6L0M26T6	16	ATV950U07N4E	16	ATV980C63T4X1	16
ATV6L0C31Q6	16	ATV930C11N4	16	ATV950U15N4	16	ATV980C71Q4X1	16
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ATV6L0C31T4	16	ATV930C11N4F	16	ATV950U22N4	16	ATV980C80Q4X1	16
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DIA3ED2201101EN
July 2023 - V6.0