

Adaptable performance with ACS880 machinery drives

Built on ABB's common drives architecture, the ACS880 machinery drive module is a versatile and high-level drive that is easy to adapt to demanding machine building needs. With enclosure class IP20 as standard, the drive is designed to control virtually any type of motor accurately and dependably in a power and voltage range from 0.37 to 45 kW and 230 to 500 V. The voltage range can be extended utilizing ABB's industrial drives. ACS880 machinery drives fit optimally inside cabinets used in various industries including food and beverage, material handling and material forming. ABB's premium motor control technology direct torque control (DTC) is built-in as standard for precise control of applications such as winders, wire drawing, mixers, cranes, sorting conveyors and other high-performance applications within machine building.

Full package for machine building

The ACS880 machinery drive comes in four different frame sizes (R1 to R4) with three option slots for adaptable installation and commissioning. The ACS880 machinery drive offers IEC 61131-3 programming capabilities for flexible control logic design and integration into automation systems. The drive offers integrated safety functionality with safe torque off (STO) built-in as standard, and the optional plug-in safety functions module (FSO-12/-21) for enhanced application safety.

The drive can be quickly and reliably connected to a safety PLC through PROFIsafe over PROFINET. Other options include applications control programs for winder, cranes and high speed applications. The drive also supports a wide range of fieldbus protocols, EMC filters, encoder and resolver interfaces, chokes and brake resistors. The drive is equipped with general motion features, which enable synchronized positioning tasks. The ACS880 machinery drive comes with energy efficiency calculators and the Drive composer PC tool for easy commissioning and configuration. Other compatible tools for adaptable performance include the Automation Builder, Drive Customizer and the Functional safety design tool (FSDT-01).



Integrated safety features include safe torque off (STO) as standard, the plug in safety functions module and PROFIsafe over PROFINET connectivity to PLC.

ACS880 ratings, types and voltages

$U_N = 200 \text{ V}$ (range 200 V to 240 V). The power ratings are valid at nominal voltage 230 V (0.37 to 22 kW)								
Heavy-duty use		Maximum output current	Light-overload use		Nominal ratings		Type designation	Frame size
P_{Hd} kW	I_{Hd} A	I_{max} A	P_{Ld} kW	I_{Ld} A	P_N kW	I_N A		
0.37	2.5	4.4	0.37	2.8	0.37	3	ACS880-M04-03A0-2	R1
0.37	3	5.3	0.55	3.4	0.55	3.6	ACS880-M04-03A6-2	R1
0.55	4	7.0	0.75	4.5	0.75	4.8	ACS880-M04-04A8-2	R1
0.75	5	8.8	1.1	5.5	1.1	6	ACS880-M04-06A0-2	R1
1.1	6	10.5	1.5	7.6	1.5	8	ACS880-M04-08A0-2	R1
1.5	9	13.5	2.2	9.7	2.2	10.5	ACS880-M04-010A-2	R2
2.2	11	16.5	3	13	3	14	ACS880-M04-014A-2	R2
3	14	21	4	16.8	4	18	ACS880-M04-018A-2	R2
4	19	33	5.5	23	5.5	25	ACS880-M04-025A-2	R3
5.5	24	36	7.5	28	7.5	30	ACS880-M04-030A-2	R3
7.5	29	44	7.5	32	7.5	35	ACS880-M04-035A-2	R3
7.5	35	53	11	41	11	44	ACS880-M04-044A-2	R3
11	44	66	11	46	11	50	ACS880-M04-050A-2	R3
11	52	78	15	57	15	61	ACS880-M04-061A-2	R4
15	66	100	18.5	74	18.5	78	ACS880-M04-078A-2	R4

U _N = 500 V (range 380 to 500 V). The power ratings are valid at nominal voltage 400 V (0.75 to 45 kW)								
Heavy-duty use		Maximum output current	Light-overload use		Nominal ratings		Type designation	Frame size
P _{Hd} kW	I _{Hd} A		P _{Ld} kW	I _{Ld} A	No-overload use			
		I _{max} A			P _N kW	I _N A		
0.75	2.5	4.4	1.1	2.8	1.1	3	ACS880-M04-03A0-5	R1
1.1	3	5.3	1.5	3.4	1.5	3.6	ACS880-M04-03A6-5	R1
1.5	4	7.0	1.5	4.5	2.2	4.8	ACS880-M04-04A8-5	R1
2.2	5	8.8	2.2	5.5	2.2	6	ACS880-M04-06A0-5	R1
2,2	6	10,5	3	7,6	3	8	ACS880-M04-08A0-5	R1
4	9	13.5	4	9.7	4	10.5	ACS880-M04-010A-5	R2
5.5	11	16.5	5.5	13	5.5	14	ACS880-M04-014A-5	R2
7.5	14	21	7.5	16.8	7.5	18	ACS880-M04-018A-5	R2
7.5	19	33	11	23	11	25	ACS880-M04-025A-5	R3
11	24	36	15	28	15	30	ACS880-M04-030A-5	R3
15	29	44	15	32	18.5	35	ACS880-M04-035A-5	R3
18.5	35	53	22	41	22	44	ACS880-M04-044A-5	R3
22	44	66	22	46	22	50	ACS880-M04-050A-5	R3
22	52	78	30	57	30	61	ACS880-M04-061A-5	R4
37	66	100	37	74	37	78	ACS880-M04-078A-5	R4
37	75	124	45	90	45	94	ACS880-M04-094A-5	R4

ACS880 ratings, types and voltages

Frames IP20	Height mm	Width mm	Depth 1 mm	Depth 2 mm	Weight kg
R1	474	93.5	197	205	3.4
R2	476	101	275	280	5.6
R3	658	166	276	282	15.8
R4	744	221	276	282	21.5

Nominal ratings

I_N Rated current available continuously without overloadability at 40 °C.

P_N Typical motor power in no-overload use.

Maximum output current

I_{max} Maximum output current. Available for 2 seconds at start, then as long as allowed by drive temperature.

Heavy-duty use

I_{Hd} Continuous current allowing 150% I_{Ld} for 1 minute every 10 minutes at 40 °C.

P_{Hd} Typical motor power in heavy-duty use.

Light-overload use

I_{Ld} Continuous current allowing 110% I_{Ld} for 1 minute every 10 minutes at 40 °C.

P_{Ld} Typical motor power in light-overload use.

The ratings apply at 40 °C ambient temperatures: The ratings apply for the frames R1 to R4 up to 40 °C.
For derating at higher altitudes, temperatures or switching frequencies, see the user's HW manual.

Connectivity and flexibility to meet your needs



When designing a machine, all necessary devices have to be compatible with each other to form a high-performing system level solution. Devices such as drives, programmable logic controllers (PLCs), motors, Human machine interfaces (HMI), fieldbuses, safety functions and certified connectivity need to be integrated seamlessly into one common system and to provide reliability, cost efficiency and flexibility for the entire design process.

All-compatible machinery drives

ABB's machinery drives have hundreds of hours of testing behind them. They are certified, meeting high required standards. They connect smoothly to PLC's through a wide range of available fieldbus protocols, enabling fast and secure communication between them. In order to control virtually any type of motor ABB's machinery drives do this optimally and safely, saving energy and the environment at the same time. In order to access several drives and motors via the PLC there are various types of human machine interfaces such as drive control panels and touchscreen displays for fast and easy configuration. Safety functionality can be designed around or plugged into the drives and connected smoothly to a safety PLC.

Certified solution

ABB machinery drives form with other automation devices a reliable and certified alliance that saves time and costs for the machine builder. Still, as everything is compatible, there must be flexibility to optimize the functionality of the machine. ABB also offers support and maintenance services for throughout the life cycle of the drives in the machine.

Standard software with versatile features

Commissioning easier than ever before

The assistant control panel for the ACS880 machinery drive has a clear and intuitive user interface as well as different assistants to make the drive easy to set up and use. This saves on commissioning and learning time. The icon based control panel of the ACS380 is intuitive and easy to use for basic operation, settings and fault tracking.

Optimized motor control

The machinery drives offer sophisticated process control in scalar, vector and DTC control modes. The drive supports a wide range of motors including induction and permanent magnet motors. Many embedded protection and other features improve performance of the motor and process.

Flying start

Flying start is available for scalar, vector and DTC control modes. Catching a running motor, enabled by the flying start feature, is often required in applications with long freewheeling times.

Load profile

The load profile feature collects drive values to a log such as current. The log shows how the drive is operating and enables you to analyze and optimize the application.

Reduced motor noise

The drive reduces motor noise by spreading the switching frequencies over a user-specified range. The user can define an allowed range of used switching frequency. As a result, the drive maximizes the actual used switching frequency based on thermal measurement. The higher used switching frequency reduces motor noise at low load without limiting full current at maximum load.

Optimized energy use

The machinery drives come with features that help you save and manage energy. The energy optimizer feature operates scalar, vector and DTC control modes, ensuring maximum torque per ampere and reducing energy drawn from the supply. You can monitor the hourly, daily and cumulative energy consumption via kWh counters. When the drive replaces other control methods (eg, direct-online control), you can follow the saved energy, CO₂ emissions or money, and see how fast the drive brings you a return on investment.

Easy diagnostics for trouble-free operation

The control panel's diagnostics menu enables you to effectively analyze and resolve issues regarding why the drive is performing as it is - running, stopped or running at the present speed. Active faults, warnings and event logs are shown in the menu. The menu shows if there are any active limitations to the drive operation and gives instructions on how to resolve them. The Drive composer PC tool offers more detailed diagnosis and signal monitoring. The entry level PC tool is available for free via the ABB website (www.abb.com).

Adapt the drive and machine to run optimally

Adaptive programming offers an easy alternative for simple programming needs. It is embedded inside the software of the drive and is especially handy when there is a need to distribute some of the machine's control logic to the drive. Adaptive programming brings savings when the drive is adjusted to control the application optimally. The Drive composer pro PC tool is used for setting up adaptive programming.



Drive application programming based on IEC standard 61131-3 for ACS880 machinery drives

Automation Builder, ABB's software suite for automation engineering, makes programming of industry devices such as drives, PLC's, robots and HMI's easy using one Integrated engineering suite. The Automation Builder is used both for engineering individual industry devices and for putting together entire automation solutions. It is based on a widely used software environment that fulfills many different requirements of industrial automation projects, according to the IEC standard 61131-3. As a single tool, the Automation Builder reduces time typically needed for system configuration and programming. It also reduces the need for installing and maintaining separate programs simultaneously. Automation Builder enables the possibility to do online diagnostic checking of multiple tasks performed by different industrial devices such as ACS880 machinery drives.

Drive application programming

Automation Builder makes it possible for system integrators and machine builders to integrate their desired functionality and know-how directly into the ACS880 machinery drive. This is possible as the drive comes with programming capability embedded inside the drive. Designing an application program in the drive makes the end user application run more efficiently, even without a separate programmable controller. It also brings higher end-product quality and requires less need for installation space and wiring.

Automation Builder lets you extend the standard functionality of parameter functions for the ACS880 machinery drive. This makes the drive very flexible to meet exact requirements set for end user applications. The library management functionality in Automation Builder shortens engineering time as reuse of existing program code is possible. Additional features include the ability to select and use one of five different programming languages, effective program debugging and user password protection.

Integrated engineering suite for operating several industry components together

Using the Drive manager tool embedded in Automation Builder together with ABB's AC500 PLC product family gives the user online connection to all drives in a fieldbus network. This speeds up commissioning and makes diagnostic of the entire automation system easy. Automation Builder saves all the configuration data of industry devices, including drive parameter settings, and program code to the same project archive. This makes engineering work more consistent and manageable.

The drive application programming license is ordered together with the drive.

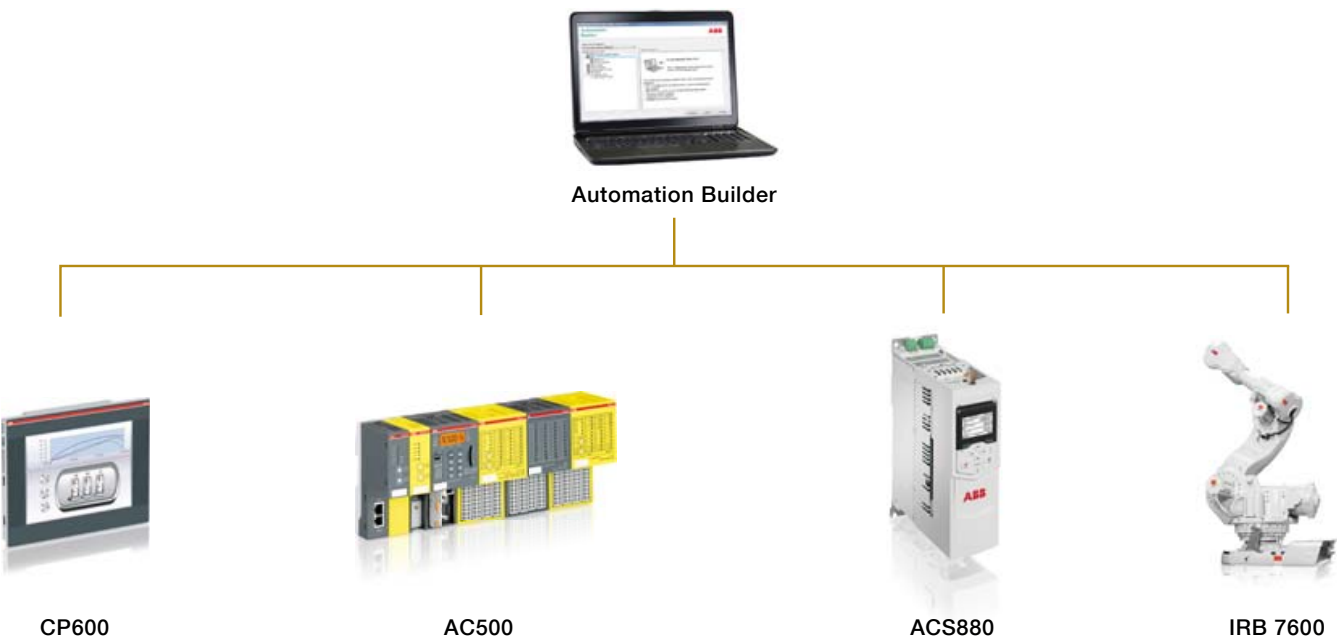
Drive application programmability for ACS880

Option	Option code
License key ¹⁾	+N8010
Automation Builder Standard Single, DM-TOOL ²⁾	1SAP193000R0101
Automation Builder Premium Single, DM-PREEM ²⁾	1SAP193005R0101

¹⁾ The Automation Builder tools must be ordered separately.

For further information please contact your local ABB.

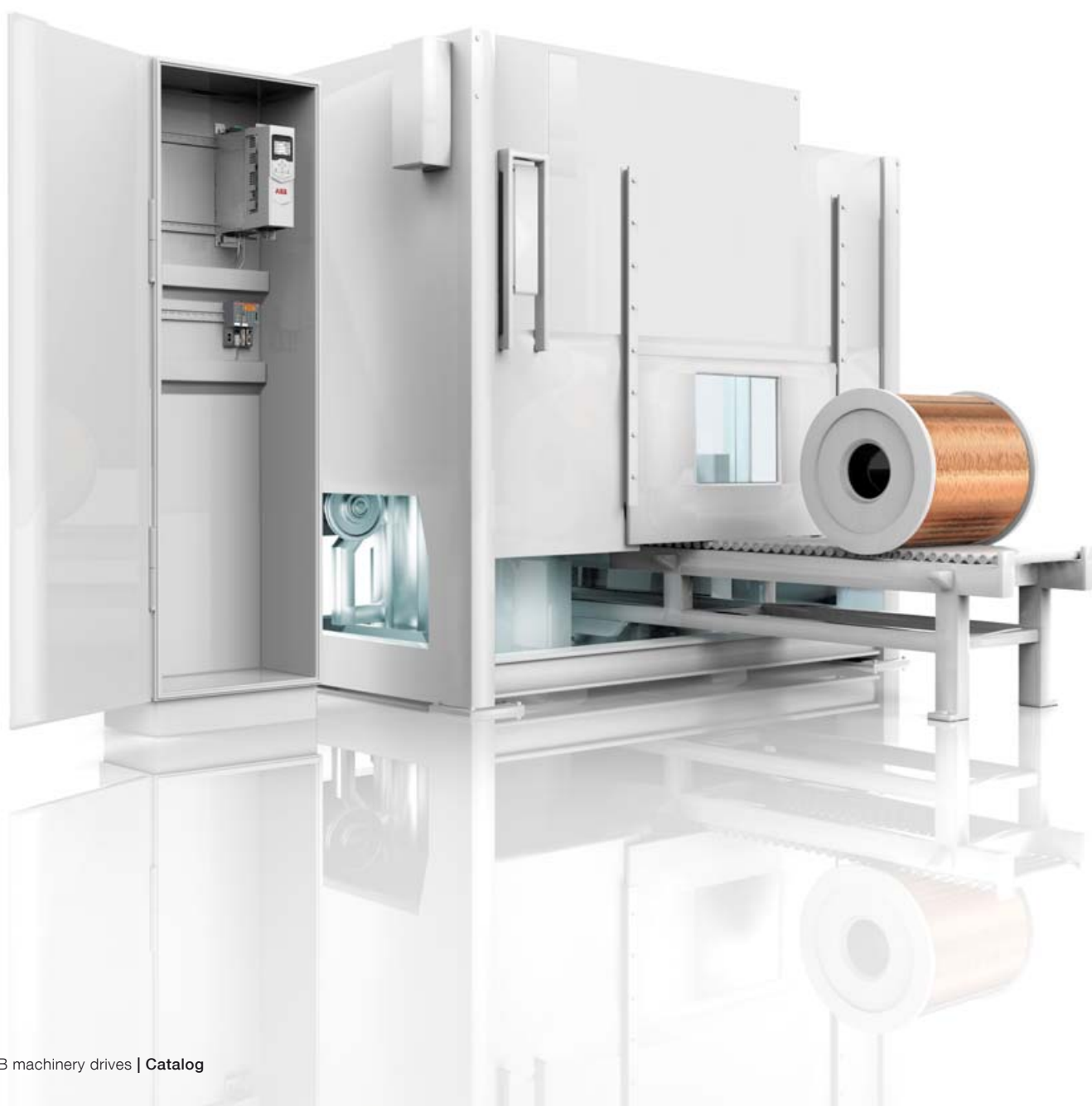
²⁾ Single user license - bound to PC or DM-KEY (USB Key)



Application control programs for ACS880 machinery drives

Our application control programs have been developed for the ACS880 machinery drives by working closely with our customers over many years. This has resulted in application programs that include the lessons learned from many customers, and that are designed to give you the flexibility to adapt the programs to your specific needs. These programs enhance application usability and lower energy consumption. They increase safe operation of the applications and reduce the need for a PLC. Other benefits include protection of machinery and optimization of application productivity. The programs also optimize time usage and lower operational costs.

The ACS880 machinery drive application control programs come with adaptive programming features. This makes fine tuning of the ready-made application control program functionalities easy. Additionally, we understand that you may need to use different configurations in your process. That's why each of our control programs comes with the ability to configure up to four different configurations. The ACS880 offers integrated safety with safe torque off (STO) functionality as standard. The optional safety functions module comes with several safety functions including safe brake control (SBC).





Control program for winder

This control program makes sure that the unwinding and winding of a roll of web material, such as textile, plastic and paper is performed optimally. The control program observes the diameter of rolls and tension of the web material and makes sure that the drives controlling different parts of the winder are in sync. Based on the feedback from the dancer or tension measurement of the web, the speed or torque of the drive is adjusted appropriately. The result is a straightforward, cost-effective solution in web handling. Another feature is the mechanics ID run function that calculates automatically the inertia and friction of the roll. This speeds up the commissioning of the drive.

Option code

+N5000

Control program for cranes

This control program makes it possible to control crane movements in hoist, trolley and travel motion using the same software. The control program comes with integrated mechanical brake control to assure safe opening and closing of the mechanical disc or drum brakes. Stand-alone and master-follower functionality is supported along with synchro control of multimotors. The synchro control for common operation of the load functionality makes it possible to lift and lower loads, such as containers, in a smooth and balanced way during transportation. The load speed control function maximizes the hoist speed for the given load and ensures that there is sufficient motor torque in the field weakening area. This minimizes operation time and optimizes crane capacity. Fieldbus and conventional I/O control are supported. The anti-sway function is designed for indoor cranes to prevent unnecessary swaying of the load.

Option code

+N5050

Control program for high-speed applications

This control program is designed for applications that require higher output speeds than 500 Hz. The program is typically used with spindle or woodworking machinery. It is especially suitable for permanent magnet high-speed motors. The program requires export licence when delivered outside the EU. The high-speed software is handled according to EC regulation N.o 428/2009 appendix I as it is stated in the European Commission's delegated act (EU) N:o 1382/2014, item 3A225.

For further ordering information please contact your local ABB.

PC tool for drive monitoring and process tuning capabilities

The Drive composer PC tool offers fast and harmonized setup, commissioning and monitoring for the whole all-compatible drives portfolio. The free version of the tool provides startup and maintenance capabilities, while the professional version provides additional features such as custom parameter windows, control diagrams of the drive's configuration and improved monitoring and diagnostics.

The Drive composer tool is connected to the drive using the mini USB connection on the assistant control panel. All drive information such as parameter loggers, faults, backups and event lists are gathered into a support diagnostics file with a single mouse click. This provides faster fault tracking, shortens downtime and reduces operational and maintenance costs.

Drive composer pro offers extended functionality

Drive composer pro provides the same standard functionality as the free version and some additional features, like graphical control diagrams. The control diagrams save users from browsing long lists of parameters and help to set the drive's logic quickly and easily. The tool has fast monitoring capabilities of multiple signals from several drives in the panel bus. Full backup and restore functions are also included.



Remote monitoring access worldwide

The remote monitoring tool, NETA-21, gives easy access to the drive via the Internet or local Ethernet network. NETA-21 comes with a built-in web server. Compatible with standard web browsers, it ensures easy access to a web-based user interface. Through the web interface, the user can configure drive parameters, monitor drive log data, load levels, run time, energy consumption, I/O data and bearing temperatures of the motor connected to the drive.

Remote monitoring option

Ordering code	Description	Type designation
3AUA0000094517	2 x panel bus interface, 2 x 32 = max. 64 drives 2 x Ethernet interface SD memory card USB port for WLAN/3G	NETA-21



Drive commissioning and adaptable use with your control panel

Almost anyone can set up and commission the machinery drive using available control panels. Both machinery drives use the assistant control panel (AP-I, AP-S or AP-W). The ACS380 comes with the integrated icon based control panel as standard. You do not need to know any drive parameters as the control panel helps you to set up the essential settings quickly and get the drive into action.

Easy drive setup

- The assistant control panel offers a settings menu with embedded assistants providing a smart and quick way to set up the drive.
- The integrated icon based control panel in the ACS380 makes drive setup fast and easy.
- Each setting for both control panels is clearly named or shown with an icon by its function, such as motor, ramp or limit settings.

Simplified process monitoring

- One glance at the assistant control panel's editable display will show the status of the drive and its processes.
- See how the electrical terminals are configured, what is the actual status and get a quick access to the related settings from the I/O menu.
- Add information eg, to I/O signals, customize fault and warning messages or give the drive a unique name with the assistant control panel's text editor.
- Connect the PC tool to the drive through the USB connector on the assistant control panel.

Simplified drive maintenance

- Faults or warnings are quickly resolved as the help in provides context sensitive guidance and troubleshooting instructions.
- Powerful assistant manual and automatic backup and restore functions (with name, date and content).

Control panel options

All panels excluding the ACS-AP-S are optional for the ACS880 machinery drive. The integrated icon based control panel comes as standard in the ACS380. Other panels are available as options.



Ordering code	Description	Type designation
3AUA0000088311	Assistant control panel	ACS-AP-I
3AUA0000064884	Assistant control panel	ACS-AP-S ¹⁾
3AXD0000025965	Assistant control panel with bluetooth interface	ACS-AP-W
3AXD0000028828	Basic control panel	ACS-BP-S
3AUA0000108878	Control panel mounting platform (flush mounted)	DPMP-01
3AXD0000009374	Control panel mounting platform (surface mounted)	DPMP-02

¹⁾ Not available for ACS880 machinery drives.

Flexible connectivity to automation networks

A fieldbus enables communication between drives and PLC systems, I/O devices and the process. Fieldbus communication reduces wiring costs when compared with traditional hard wired input/output connections. Fieldbus systems also offer the ability to gather large amounts of data, which can then be utilized for improving the performance or safety of the machine.

The machinery drives are compatible with a wide range of fieldbus protocols. ACS880 machinery drives comes with Modbus RTU fieldbus interface as standard. The optional fieldbus adapter can be easily be mounted on the drive. In ACS380 the standard variant of the drive comes with built-in Modbus RTU protocol. In configured variant the wanted fieldbus protocol is selected by option code.

Drive monitoring

A set of drive parameters and/or actual signals, such as torque, speed, current, etc., can be selected for cyclic data transfer, providing fast data access.

Drive diagnostics

Accurate and reliable diagnostic information can be obtained through the alarm, limit and fault words, giving easy interfacing with plantwide HMIs.

Cabling

Substituting the large amount of conventional drive control cabling and wiring with a single cable reduces costs and increases system reliability and flexibility.

Design

The use of fieldbus control reduces engineering time at installation due to the modular structure of the hardware and software and the simplicity of the connections to the drives.

Commissioning and assembly

The modular machine configuration allows precommissioning of single machine sections and provides easy and fast assembly of the complete installation.

Universal communication with ABB fieldbus adapters

The machinery drives support the following fieldbus protocols:

Option code	Fieldbus protocol	Adapter
+K454	PROFIBUS DP, DPV0/DPV1	FPBA-01-M
+K457	CANopen®	FCAN-01-M
+K469	EtherCAT®	FECA-01-M
+K475	Two port EtherNet/IP™, Modbus TCP, PROFINET IO	FENA-21-M
+K473	EtherNet/IP™, Modbus TCP, PROFINET IO	FENA-11
+K458	Modbus RTU	FSCA-01
+K451	DeviceNet™	FDNA-01
+K462	ControlNet	FCNA-01
+K470	PowerLink	FEPL-02

