ABB industrial drives
ACS880-04, -04XT drive modules
300 to 1000 hp (315 to 1200 kW)
Catalog

Power and productivity
for a better world™

ABB

Single drive modules, ACS880-04

Built on ABB's common all-compatible drives architecture these modules add simplicity in cabinet assembly. Wheels make for easy installation and transport and connecting to the motor cables inside the cabinet is fast and simple.
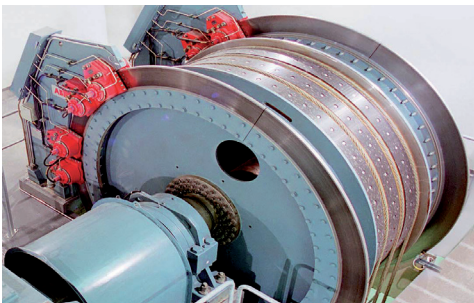
Single drive modules, ACS880-04

Our ACS880-04 single drive modules and -04XT parallel connected module sets are optimized for easy and cost efficient cabinet assembly. With a compact and robust cabinet design, they save a lot of floor space and are easy to maintain and service. Being part of the all-compatible ACS880 industrial drives series, the single drive modules and paired module sets are easy to integrate into other systems and combine superior control performance with versatile drive features. The power intensive drive modules are compatible with a wide range of industries including oil and gas, mining, metals, chemicals, cement, power plants, material handling, pulp and paper and woodworking. Applications range from cranes, extruders, conveyors and compressors to pumps and fans.

Easy and cost efficient cabinet assembly
The modules are designed with all the necessary components to make engineering, cabling and cabinet assembly easier. Modules come standard in a bookshelf configuration with optional capability for flat mounting. Each module has a pedestal with wheels and a ramp for pushing the module inside the cabinet. The optional cabling panel allows fast and simple installation or removal of the module to or from the cabinet, without touching the power cables. For optimized cabinet usage, features include power input connections on the top of the module and power output on the bottom. The control unit can be either installed inside or outside of the module, enabling free location of input/output terminals.

The built-in features include direct torque control (DTC), ABB's premier motor control technology, chokes for harmonic reduction, safe torque off (STO) and drive-to-drive communication as standard. Additional built-in options include EMC filters, braking choppers, several inputs/outputs terminals, fieldbus connectivity, integrated safety including several safety functions and option slots for speed feedback. The drive comes with UL type open enclosure class as standard, reducing engineering time and cabinet assembly costs.

Main features
– Enclosure class UL type open as standard
– Power supply coming from the top part of the module and out from the lower part of the cabinet, enabling more optimal cabinet design
– Possibility for flat mounting enables module installation into cabinets with limited depth
– Easy installation, commissioning and maintenance with pedestal on wheels, ramp and optional cable panel (+H381)
– Direct torque control (DTC) as standard for high performance motor control
– Integrated safety, including safe torque off (STO) as standard and optional safety functions modules
– Supports various motor types including synchronous reluctance motors
– Intuitive control panel with USB connection
– Removable memory unit for easy maintenance
– Drive composer PC tool for commissioning and configuration
– Control unit with three option slots that can be installed either inside the module or in different parts of the cabinet, supporting a wide range of fieldbuses, feedback devices and input/output options
– Redundant fan that enables the module to run in part load even with one fan only running
– Coated boards as standard
– Built-in choke as standard for input harmonics reduction
– Built-in braking chopper (option)
– EMC filter option
– Power terminals are available as standard on the left side of the module. The power terminals can also be cabled on the right side of the module as option
– Common DC busbars (-04 only)

Single drive modules, ACS880-04, frame sizes R10 (with external control unit) and R11 (with internal control unit and control panel integrated in the module), bookshelf mounting

Single drive modules, ACS880-04, flat mounting

Single drive module set, ACS880-04XT

ACS880-04, -04XT
Ratings, types and voltages

Light-overload use (110% overload for 1 min)			Heavy-duty use (150% overload for 1 min)			Noise level	Heat dissipation	Air flow	Type designation	Frame size
I_{Ld} A	P_{Ld} Hp	P_{Ld} kW	I_{Hd} A	P_{Ld} Hp	P_{Hd} kW	dB(A)	W	m3/h		
6-pulse										
483	400	315	361	300	250	72	5602	1200	ACS880-04-503A-5+H356	R10
573	450	400	414	350	250	72	6409	1200	ACS880-04-583A-5+H356	R10
623	500	450	477	400	315	72	8122	1200	ACS880-04-635A-5+H356	R10
705	600	500	566	450	400	72	8764	1200	ACS880-04-715A-5+H356	R11
807	700	560	625	500	450	71	9862	1420	ACS880-04-820A-5+H356	R11
857	700	560	697	500	500	71	11078	1420	ACS880-04-880A-5+H356	R11
1146	1000	800	878	700	630	75	16244	2400	ACS880-04XT-1160A-5	2xR10
1570	1250	1000	1274[2]	1000	900	74	21156	2840	ACS880-04XT-1610A-5	2xR11

Light-overload use (110% overload for 1 min)			Heavy-duty use (150% overload for 1 min)			Noise level	Heat dissipation	Air flow	Type designation	Frame size
I_{Ld} A	P_{Ld} Hp	P_{Ld} kW*	I_{Hd} A	P_{Ld} Hp	P_{Hd} kW*	dB(A)	W	m3/h		
6-pulse										
320	300	315	255	250	250	72	4403	1200	ACS880-04-330A-7+H356	R10
360	350	355	325	300	315	72	5602	1200	ACS880-04-370A-7+H356	R10
424	450	400	360	350	355	72	6409	1200	ACS880-04-430A-7+H356	R10
455	450	450	415	450	400	72	8122	1200	ACS880-04-470A-7+H356	R11
505	500	500	455	450	450	72	8764	1200	ACS880-04-522A-7+H356	R11
571	600	560	505	500	500	71	9862	1200	ACS880-04-590A-7+H356	R11
630	700	630	571	600	560	71	10578	1420	ACS880-04-650A-7+H356	R11
705	700	630	571	600	560	71	10578	1420	ACS880-04-721A-7+H356	R11
791	800	710	678[1]	700	630	75	12818	2400	ACS880-04XT-0810A-7	2xR10
1051	1000	1000	929	1000	900	75	19724	2400	ACS880-04XT-1080A-7	2xR11
1297	1250	1200	1051[3]	1000	1000	75	21156	2840	ACS880-04XT-1320A-7	2xR11

* 690V IEC Ratings

Frame size	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lbs)	(kg)
R10	60.67[1]	1541	13.78[1]	350	19.88	505	354.2	161
R11	68.54[1]	1741	13.78[1]	350	19.88	505	437.8	199

Light-overload use

I_{Ld}	Continuous current allowing 110% ILd for 1 min/5 min at 40 °C.
P_{Ld}	Typical motor power in light-overload use.

Heavy-duty use

I_{Hd}	Continuous current allowing 150% IHd for 1 min/5 min at 40 °C.
P_{Hd}	Typical motor power in heavy-duty use.

Notes:

The ratings apply at 40 °C ambient temperature. At higher temperatures (up to 50 °C 2) or up to 55 °C 3)) the derating is 1%/1 °C.

To achieve the rated motor power given in the table, the rated current of the drive must be higher than or equal to the rated motor current.

1) Without pedestal (+0H354) and without IP20 shrouds and full-size terminals (+0B051+0H371) height is 179 mm less and width 45 mm less. More information from HW manual.

Intuitive human-machine interface

The assistant control panel features intuitive use and easy navigation. High resolution display enables visual guidance. The panel saves on commissioning and learning time by means of different assistants, making the drive simple to set up and use.

It is possible to organize parameters in different ways and store essential parameters for different configurations for any specialized application needed. The menus and messages can be customized for specific terminology so that each application can be set up and configured to its optimum performance. This makes the drive easier to use with information that is familiar to users. With the panel's text editor, users can also add information, customize text and label the drive. Powerful backup and restore functions are supported as well as different language versions. The help key provides context sensitive guidance. Faults or warnings can be resolved quickly since the help key provides troubleshooting instructions.

One control panel can be connected to several drives simultaneously using the panel network feature. The user can also select the drive to operate in the panel network. The PC

tool can be easily connected to the drive through the USB connector on the control panel. There is also the assistant control panel mounting platform, DPMP-01 IP55 kit available for cabinet door flush mounting.

PC tool for easy startup and maintenance

The Drive composer PC tool offers fast and harmonized setup, commissioning and monitoring for the whole 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 safety settings.

The Drive composer tool is connected to the drive using an Ethernet connection or through the 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 minimizes operational and maintenance costs.

Drive composer pro
Drive composer pro provides basic functionality, including parameter settings, downloading and uploading files and search parameters. Advanced features such as graphical control diagrams and various displays are also available.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 a PC tool network. Full backup and restore functions are also included. Safety settings can be configured with Drive composer pro.
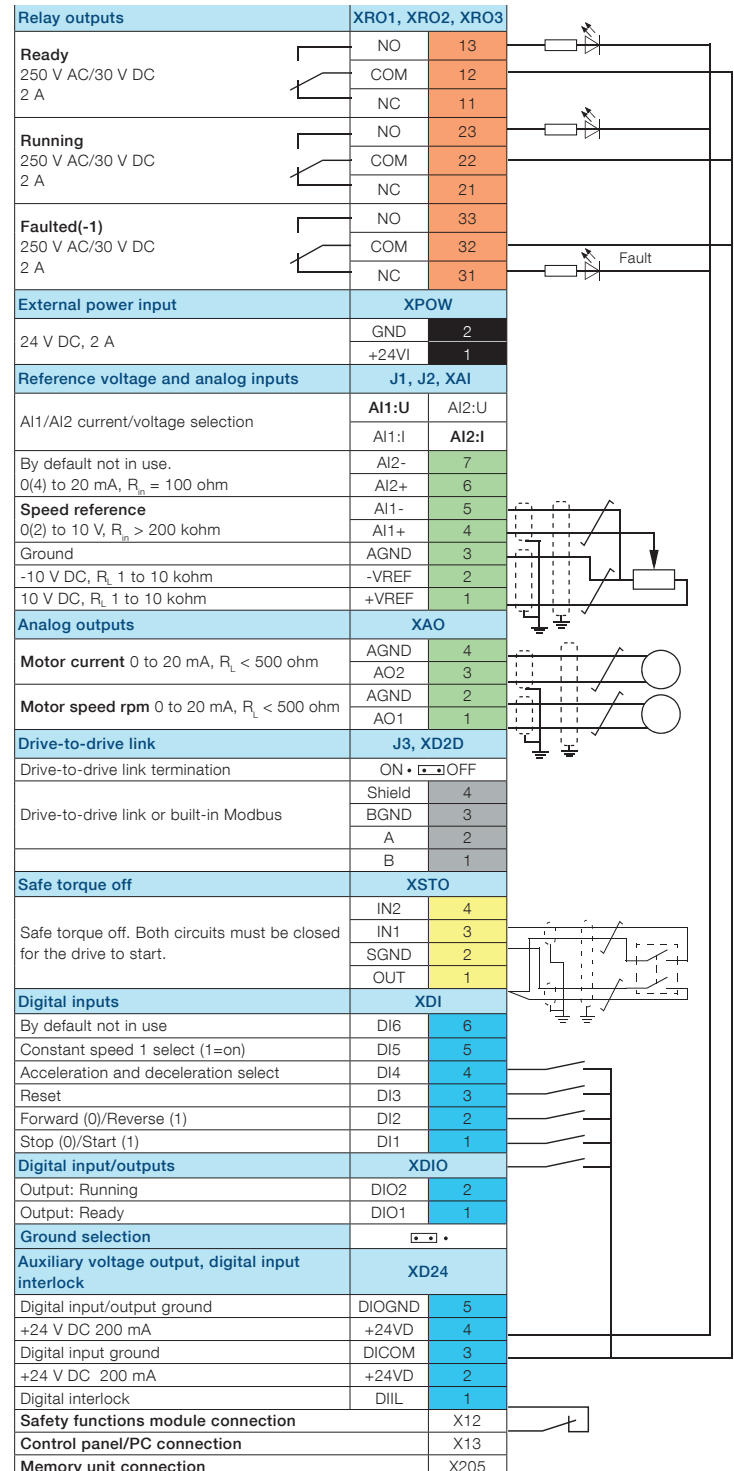
Standard interface and extensions for comprehensive connectivity

The ACS880 drive modules offer a wide range of standard interfaces. In addition the drive has three option slots that can be used for extensions including fieldbus adapter modules, input/ output extension modules, feedback modules and a safety functions module.

Example of a typical drive modules input/output connection diagram. Variations may be possible (please see HW manual for more information).

Control connections	Description
2 analog inputs (XAI)	Current input: –20 to 20 mA, R_{in}: 100 ohm Voltage input: –10 to 10 V, R_{in} > 200 kohm Resolution: 11 bit + sign bit
2 analog outputs (XAO)	0 to 20 mA, Rload < 500 ohm Frequency range: 0 to 300 Hz Resolution: 11 bit + sign bit
6 digital inputs (XDI)	Input type: NPN/PNP (DI1 to DI5), NPN (DI6) DI6 can alternatively be used as an input for a PTC thermistor.
Digital input interlock (DIIL)	Input type: NPN/PNP
2 digital inputs/out-puts (XDIO)	As input: 24 V logic levels: 0 < 5 V, 1 > 15 V R_{in}: 2.0 kohm Filtering: 0.25 ms As output: Total output current from 24 V DC is limited to 200 mA Can be set as pulse train input and output
3 relay outputs (XRO1, XRO2, XRO3)	250 V AC/30 V DC, 2 A
Safe torque off (XSTO)	For the drive to start, both connections must be closed
Drive-to-drive link (XD2D)	Physical layer: EIA-485
Built-in Modbus	EIA-4z85
Assistant control panel/ PC tool con-nection	Connector: RJ-45

Relay outputs		XRO1, XRO2, XRO3	
Ready 250 V AC/30 V DC 2 A	NO	13	
	COM	12	
	NC	11	
Running 250 V AC/30 V DC 2 A	NO	23	
	COM	22	
	NC	21	
Faulted(-1) 250 V AC/30 V DC 2 A	NO	33	
	COM	32	
	NC	31	
External power input		**XPOW**	
24 V DC, 2 A	GND	2	
	+24VI	1	
Reference voltage and analog inputs		**J1, J2, XAI**	
AI1/AI2 current/voltage selection	AI1:U	AI2:U	
	AI1:I	AI2:I	
By default not in use. 0(4) to 20 mA, R_{in} = 100 ohm	AI2-	7	
	AI2+	6	
Speed reference 0(2) to 10 V, R_{in} > 200 kohm	AI1-	5	
	AI1+	4	
Ground	AGND	3	
-10 V DC, R_L 1 to 10 kohm	-VREF	2	
10 V DC, R_L 1 to 10 kohm	+VREF	1	
Analog outputs		**XAO**	
Motor current 0 to 20 mA, R_L < 500 ohm	AGND	4	
	AO2	3	
Motor speed rpm 0 to 20 mA, R_L < 500 ohm	AGND	2	
	AO1	1	
Drive-to-drive link		**J3, XD2D**	
Drive-to-drive link termination	ON • ▭ OFF		
Drive-to-drive link or built-in Modbus	Shield	4	
	BGND	3	
	A	2	
	B	1	
Safe torque off		**XSTO**	
Safe torque off. Both circuits must be closed for the drive to start.	IN2	4	
	IN1	3	
	SGND	2	
	OUT	1	
Digital inputs		**XDI**	
By default not in use	DI6	6	
Constant speed 1 select (1=on)	DI5	5	
Acceleration and deceleration select	DI4	4	
Reset	DI3	3	
Forward (0)/Reverse (1)	DI2	2	
Stop (0)/Start (1)	DI1	1	
Digital input/outputs		**XDIO**	
Output: Running	DIO2	2	
Output: Ready	DIO1	1	
Ground selection		▭ •	
Auxiliary voltage output, digital input interlock		**XD24**	
Digital input/output ground	DIOGND	5	
+24 V DC 200 mA	+24VD	4	
Digital input ground	DICOM	3	
+24 V DC 200 mA	+24VD	2	
Digital interlock	DIIL	1	
Safety functions module connection		X12	
Control panel/PC connection		X13	
Memory unit connection		X205	

Standard software for scalable control and functionality

The same software, the primary control program, is used across the whole ACS880 series. Features such as built-in pre-programmed application macros save time during configuration and drive commissioning. The application macros help set parameters for various functions including:

– Basic setup for input/output control and fieldbus control
– Hand/auto control for local and remote operation
– PID control for closed loop processes
– Sequential control for repetitive cycles
– Torque control
– Four user defined sets, for own parameter settings

Direct torque control (DTC)

The drives are equipped with direct torque control (DTC), ABB's signature motor control platform which supports motors such as induction motors, permanent magnet motors, servo motors and the new synchronous reluctance motor. DTC helps control the motor from standstill to maximum torque and speed without the necessity of position sensors or encoders. DTC allows high overloadability, gives high starting torque and reduces stress on mechanics.

Energy efficiency information

The drives come with built-in energy efficiency information that helps the user fine-tune processes to ensure optimum energy use. The energy optimizer mode ensures the maximum torque per ampere, reducing energy drawn from the supply. The load profile feature collects drive values with three loggers: two amplitude loggers and one peak value logger. Calculators provide essential energy efficiency information: used and saved electrical energy, CO_2 reduction and money saved.

Additional software features include:

– Access levels
– Adaptive programming
– Automatic reset
– Automatic start
– Constant speeds
– Critical speeds and frequencies
– DC hold
– DC magnetizing
– Diagnostics
– Drive-to-drive link for master-follower control
– Flux braking
– Jogging
– Maintenance timer and counters
– Mechanical brake control
– Motor potentiometer
– Output phase order selection, switches rotation direction of the motor
– Oscillation damping
– Power loss ride-through
– Process PID control with trim function
– Programmable and pre-programmed protection functions
– Programmable inputs and outputs
– Scalar control with IR compensation
– Speed controller with auto tuning
– Startup assistants
– User adjustable load supervision/limitation
– User selectable acceleration and deceleration ramps
– Variable slope

Removable memory unit

The removable memory unit stores the standard software that includes user settings, parameter settings and motor data. Situated on the control unit, the memory unit can easily be removed for maintenance, update or replacement purposes. This common type of memory unit is used throughout the ACS880 series.

Control Unit ZCU for -04

Control Unit BCU for -04XT

Flexible connectivity to automation networks

Our fieldbus adapter modules enable communication between drives, systems, devices and software. Our industrial drives are compatible with a wide range of fieldbus protocols.

The plug-in fieldbus adapter module can easily be mounted inside the drive. Other benefits include reduced wiring costs when compared with traditional input/output connections. Fieldbus systems are also less complex than conventional systems, resulting in less overall maintenance.

Multiple fieldbus connections for flexible control

ACS880 supports two fieldbus connections simultaneously. The user has flexibility of choice for control modes by being able to select one protocol for control and one for monitoring. Fieldbus adapters using the same protocol.

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.

Drive parameter handling

The Ethernet fieldbus adapter module allows users to build an Ethernet network for drive monitoring and diagnostic and parameter handling purposes.

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 pre-commissioning of single machine sections and provides easy and fast assembly of the complete installation.

Universal communication with ABB fieldbus adapters

The ACS880 supports the following fieldbus protocols:
Fieldbus adapter modules

Fieldbus adapter modules

Option	Fieldbus protocol
FPBA-01	PROFIBUS DP, DPV0/DPV1
FCAN-01	CANopen®
FDNA-01	DeviceNet™
FENA-11	1 port EtherNet/IP™, Modbus TCP, PROFINET IO, PROFIsafe 1)
FENA-21	2 port EtherNet/IP™, Modbus TCP, PROFINET IO, PROFIsafe 1)
FECA-01	EtherCAT®
FSCA-01	Modbus RTU
FEPL-02	PowerLink
FCNA-01	ControlNetTM

1) For the PROFIsafe to work PROFINET fieldbus adapter module (FENA-21) and the safety functions module (FSO-12/-21) are required.

Input/output extension modules for increased connectivity

Standard input and output can be extended by using optional analog and digital input/output extension modules. The modules are easily installed in the extension slots located on the control unit.

Analog and digital input/output extension modules

Option	Connections
FIO-01	4×DI/O, 2×RO
FIO-11	3×AI (mA/V), 1×AO (mA), 2×DI/O
FAIO-01	2×AI (mA/V), 2×AO (mA)

FIO-01

Speed feedback interfaces for precise process control

ACS880 drives can be connected to various feedback devices, such as HTL pulse encoder, TTL pulse encoder, absolute encoder and resolver. The optional feedback module is installed in the option slot on the drive. It is possible to use two feedback modules at the same time, either of the same type or different type.

Feedback interface modules

Option	Connections
FEN-01	2 inputs (TTL pulse encoder), 1 output
FEN-11	2 inputs (SinCos absolute, TTL pulse encoder), 1 output
FEN-21	2 inputs (Resolver, TTL pulse encoder), 1 output
FEN-31	1 input (HTL pulse encoder), 1 output

FEN-01

DDCS communication option modules

The FDCO-0X (used in the ZCU control unit) and RDCO-0X (used in the BCU control unit) optical DDCS communication options are add-on modules on the ACS880 industrial drives control board. The modules include connectors for two fiber optic DDCS channels. The FDCO-0X modules make it possible to perform master-follower and AC800 M communication.

Option	Connections
FDCO-01	Optical DDCS (10 Mbd/10 Mbd)
FDCO-02	Optical DDCS (5 Mbd/10 Mbd)
RDCO-04	Optical DDCS (10 Mbd/10 Mbd/10 Mbd/10 Mbd)

Summary of features and options

Power and voltage range	Ordering Code	ACS880-04 Single drive modules Frame sizes R10 to R11 kW	ACS880-04XT Single drive modules Frame sizes 2xR10 to 2xR11 kW
500 V		200 to 630	800 to 1000
690 V		250 to 710	800 to 1200
Mounting			
Mounting direction - bookshelf		●	●
Mounting direction - flat (= sideways)	+C173	□	■
Side by side mounting		●	●
External drive control unit		●	●
Wheels for easy maneuvering of the module		●	●
Cabling			
Supply top entry (module terminals)		●	●
Inverter bottom exit (module terminals)		●	●
DC connection bus bars/terminals	+H356	●	—
Cabling panel for quick module installation/removal	+H381	□	■
Right hand side terminals (180 degrees turn)	+H391	□	■
Degree of protection			
IP00 (UL open type)	+0B051	□	●
IP20 (UL open type)		●	■
Motor control			
DTC (direct torque control)		●	●
Software			
Primary control program		●	●
Drive application programming based on IEC 61131-3 using Automation Builder	+N8010	□	□
Application control program for crane	+N5050	□	□
Application control program for winder	+N5000	□	—
Application control program for PCP/ESP pump	+N5200	□	—
Application control program for Rod pump	+N5250	□	—
Application control program for centrifuge/decanter	+N5150	□	—
Support for asynchronous motor		●	□
Support for permanent magnet motor		●	●
Control panel			
Intuitive control panel		●	■
Control panel mounting platform (flush), DPMP-01	+J410	□	□
Control connections (I/O) and communications			
2 pcs analog inputs, programmable, galvanically isolated		●	●
2 pcs analog outputs, programmable		●	●
6 pcs digital inputs, programmable, galvanically isolated - can be divided into two groups		●	●
2 pcs digital inputs/outputs		●	●
1 pcs digital input interlock		●	●
3 pcs relay outputs programmable		●	●
Safe torque off (STO)		●	●
Drive-to-drive link/Built-in Modbus		●	●
Assistant control panel/PC tool connection		●	●
Possibility for external power supply for control unit		●	●
Built-in I/O extension and speed feedback modules: for more details see sections: "Input/output extension modules for increased connectivity", "Speed feedback interfaces for precise process control" and "DDCS communication option modules"		□	■
Built-in adapters for several fieldbuses: for more details see sections: Flexible connectivity to automation networks"		□	■
EMC filters			
EMC 1st environment, restricted distribution, C2, grounded network (TN)	+E202	□[1]	□
EMC 2nd environment, C3, grounded network (TN)	+E200	□[2]	□
EMC 2nd environment, C3, ungrounded network (IT)	+E201	□[2]	□
EMC 2nd environment, C3, grounded (TN) and ungrounded (IT)	+E210	□[1]	■

Summary of features and options

Power and voltage range	Ordering Code	ACS880-04 Single drive modules Frame sizes R10 to R11 kW	ACS880-04XT Single drive modules Frame sizes 2xR10 to 2xR11 kW
500 V		200 to 630	800 to 1000
690 V		250 to 710	800 to 1200
Output filters			
Common mode filter	+E208	□	●
du/dt filters		■	■
Braking (see braking unit table)			
Brake chopper	+D150	□	□
Brake resistor		■	■
Safety functions			
Safe torque off (STO)		●	●
Safety functions module, FSO-12, without encoder, programmable functions: Safe stop 1 (SS1) Safely-limited speed (SLS) Safe brake control (SBC) Safe maximum speed (SMS) Safe stop emergency (SSE) Prevention of unexpected startup (POUS)	+Q973	□	■
Earth fault monitoring, earthed mains		●	●
Approvals			
CE		●	●
UL, cUL, CSA		●	●
EAC (EAC has replaced GOST R)		●	●
RoHS		●	●
C-Tick		●	●
TÜV Nord certificate for safety functions	+Q973	●	●

● Standard
□ Selectable option, with plus code
■ Selectable option, external, no plus code
— Not available

Notes
1) For 380 to 500 V
2) For 525 to 690 V
3) For availability please check with your local ABB

Drives service
Your choice, your future

The future of your drives depends on the service you choose.

Whatever you choose, it should be a well-informed decision. No guesswork. We have the expertise and experience to help you find and implement the right service for your drive equipment. You can start by asking yourself these two critical questions:

– Why should my drive be serviced?
– What would my optimal service options be?

From here, you have our guidance and full support along the course you take, throughout the entire lifetime of your drives.

Your choice, your business efficiency

ABB Drive Care agreement lets you focus on your core business. A selection of predefined service options matching your needs provides optimal, more reliable performance, extended drive lifetime and improved cost control. So you can reduce the risk of unplanned downtime and find it easier to budget for maintenance.

We can help you more by knowing where you are! Register your drive at www.abb.com/drivereg for extended warranty options and other benefits.

Service to match your needs

Your service needs depend on your operation, life cycle of your equipment and business priorities. We have identified our customers' four most common needs and defined service options to satisfy them. What is your choice to keep your drives at peak performance?

Is uptime your priority?

Keep your drives running with precisely planned and executed maintenance.

Example services include:
– Life Cycle Assessment
– Installation and
– Commissioning
– Spare Parts
– Preventive Maintenance
– Reconditioning
– ABB Drive Care agreement

Is rapid response a key consideration?

If your drives require immediate action, our global network is at your service.

Example services include:
– Technical Support
– Drive Exchange
– On-site Repair
– Remote Support
– Response time agreements

Need to extend your assets' lifetime?

Maximize your drive's lifetime with our services.

Example services include:
– Life Cycle Assessment
– Control Upgrades
– Retrofits
– Replacement, Disposal and
– Recycling

Is performance most critical to your operation?

Get optimal performance out of your machinery and systems.

Example services include:
– Training
– Inspections and Diagnostics
– Hardware Upgrades
– Retrofits
– Workshop Repair

Operational efficiency

Rapid response

Life cycle management

Performance improvement
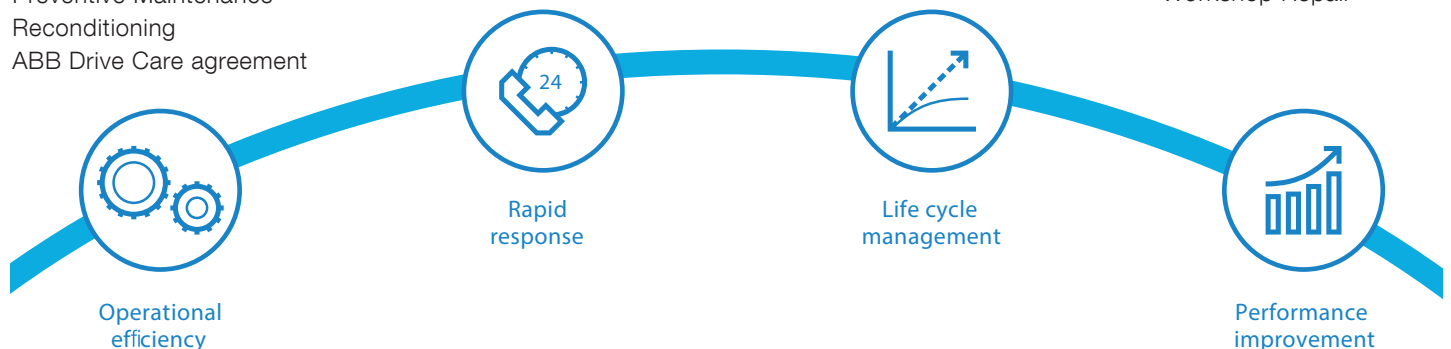
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for a better world™

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