Low voltage AC drives

ABB industrial drives
ACS880-01, single drives
0.55 to 250 kW
Catalog

Power and productivity
for a better world™

What does all-compatible mean for you?

Being all-compatible means that drive choice should add value to your business. Drives should meet the unique demands of your processes, help you save energy and reduce operating costs. Also, all-compatible means that our drives are easy to select, use and maintain. These are the cornerstones making our industrial drive series the all-compatible choice.

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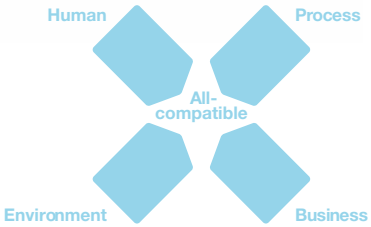


The all-compatible ACS880 series drives

The ACS880 series drives are part of ABB's all-compatible drives portfolio. Compatible with virtually all types of processes, automation systems, users and business requirements they are designed to tackle any motor-driven application, in any industry, whatever the power range. The innovation behind all-compatibility is our new drives architecture that simplifies operation, optimizes energy efficiency and helps maximize process output. The ACS880 series consists of single drives, multidrives and drive modules.

Simplifying your world without limiting your possibilities.

Wide range of safety features
Safe torque-off is built in as standard. An optional safety functions module provides extended safety functions, simplifying the configuration and reducing installation space.

Direct torque control (DTC)
ABB's signature motor control technology provides precise speed and torque control for all applications and virtually any type of AC motor.

Removable memory unit
Stores all the software and parameter configurations in an easily replaceable and simple-to-install module.

Energy efficiency
The drive provides features such as an energy optimizer and energy efficiency information that help you monitor and save the energy used in the processes.

Speed feedback interfaces
Optional speed feedback modules support HTL, TTL and absolute encoders as well as resolver feedback.

Drive-to-drive link
Allows fast communication between drives including master-follower configurations without any additional hardware.

Wall-mounted drives, ACS880-01

The all-compatible drives architecture is designed to provide customers across industries and applications with unprecedented levels of compatibility and flexibility. The wall-mounted ACS880-01 drives can be customized to the precise needs of industries such as oil and gas, mining, metals, chemicals, cement, power plants, material handling, pulp and paper, sawmills and marine. They are designed to control a wide range of applications such as cranes, extruders, winches, winders, conveyors, mixers, compressors, pumps and fans.

Intuitive human-machine interface
Intuitive, high-contrast and high-resolution display enabling easy navigation in multiple languages.

Startup and maintenance tool
PC tool for drive startup, configuration and daily use and process tuning. PC tool is connected to the drive via Ethernet or USB interface.

Communication with all major automation networks
Fieldbus adapters enable connectivity with all major automation networks.

Flexible product configurations
Drives are built-to-order with a wide range of options such as EMC filters, braking options and different enclosure variants.

Input/output extensions
In addition to the standard interfaces the drive has two built-in slots for additional input/output extension modules.

Human all-compatible

The new drives share easy-to-use interfaces saving you time during drive commissioning and maintenance. When you have learned it once, you can use it with all the drives in our all-compatible drives portfolio.

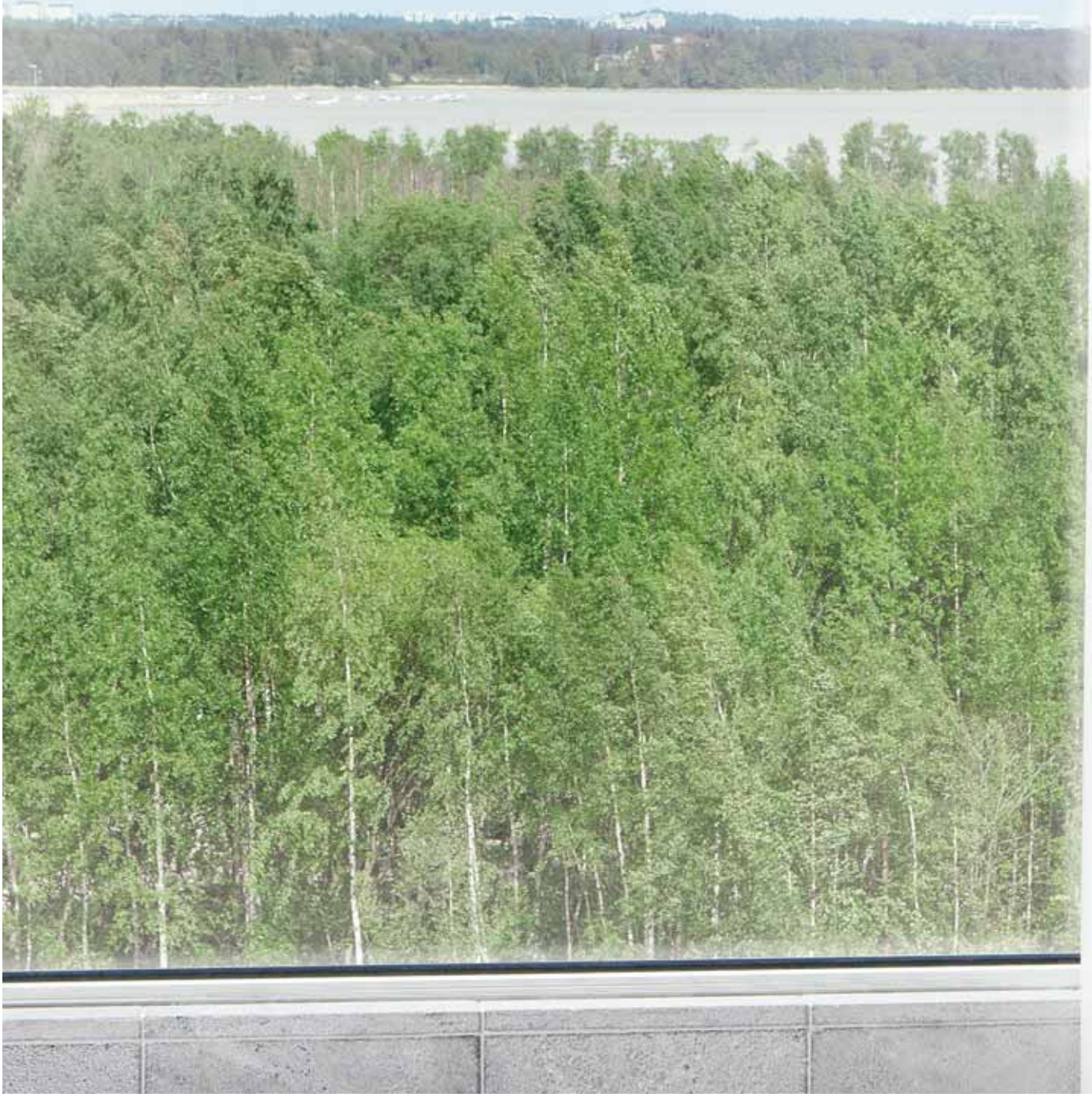
The new control panel supports over 20 languages. The new PC tool provides extensive drive monitoring capabilities and quick access to the drive settings. Integrated and certified safety features provide safety for machine operators.

Process all-compatible

The drives are compatible with all kinds of processes. They control virtually any type of AC motor, provide extensive input/output connectivity and support all major fieldbus protocols. The drives cover a wide voltage and power range. Control performance is scalable from basic to demanding applications delivered by direct torque control (DTC). The flexibility and scalability of the drives enable one drive platform to control virtually any application or process, making your drive selection easy.

Environment all-compatible

There is an increased demand for reducing industries' impact on the environment. Our drives can help you reduce energy consumption in a wide range of applications. The new drives have an energy optimizer feature that ensures maximum torque per ampere, reducing energy drawn from the supply. The built-in energy efficiency calculators help you to analyze and optimize processes. We can help you to investigate the energy saving potential of selected applications with our six-step energy appraisal. Our services expand through the life cycle of the drive and help you maintain energy efficiency from installation and commissioning to drive replacement.



Business all-compatible

The new all-compatible drives are not just equipment but part of your business strategy. Providing better control over your processes, the new drives equal lower energy consumption, improved productivity, flexibility and ease of use. In addition to drives we offer a wide range of products and services to support your business. With offices in over 90 countries and a global technical partner network, we are in a good position to offer technical advice and local support, worldwide.

How to select a drive

Many of the features for ACS880 drives are built in as standard making selection easy. A wide options offering is available to optimize the drive for different requirements. To choose the right drive for your application, please refer to the ratings table on page 11. The selected drive has a unique type designation, which identifies the drive by construction, power and voltage range. The options are added to the type designation with a “plus” code. Build up your own ordering code using the type designation key below or contact your local ABB drives sales office and let them know what you want.

Type designation: ACS880 - 01 - XXXX - X + XXXX

- Product series
- Types and construction
- Ratings
- Voltages
- Options

Technical data

Mains connection	
Voltage and power range	3-phase, U_{N3} = 380 to 415 V, +10/-15% 3-phase, U_{N5} = 380 to 500 V, +10/-15% 0.55 to 250 kW
Frequency	50 / 60 Hz ±5%
Power factor	$\cos\varphi_1$ = 0.98 (fundamental) $\cos\varphi$ = 0.93 to 0.95 (total)
Efficiency (at nominal power)	98%

Motor connection	
Voltage	3-phase output voltage 0 to U_1
Frequency	0 to ± 500 Hz*
Motor control	Direct torque control (DTC)
Torque control:	Torque step rise time:
Open loop	<5 ms with nominal torque
Closed loop	<5 ms with nominal torque
	Non-linearity:
Open loop	± 4% with nominal torque
Closed loop	± 3% with nominal torque
Speed control:	Static accuracy:
Open loop	10% of motor slip
Closed loop	0.01% of nominal speed
	Dynamic accuracy:
Open loop	0.3 to 0.4% seconds with 100% torque step
Closed loop	0.1 to 0.2% seconds with 100% torque step

Product compliance

- CE
- Low Voltage Directive 2006/95/EC
- Machinery Directive 2006/42/EC
- EMC Directive 2004/108/EC
- Quality assurance system ISO 9001 and Environmental system ISO 14001
- RoHS
- Pending; UL, cUL 508A or 508C and CSA C22.2 NO.14-95, C-Tick, GOST R

EMC according to EN 61800-3 (2004)

Categories C3 and C2 with internal option

Environmental limits	
Ambient temperature	
Transport	-40 to +70 °C
Storage	-40 to +70 °C
Operation	
Air-cooled	-15 to +55 °C, no frost allowed +40 to +55 °C with derating of 1% / 1 °C
Cooling method	
Air-cooled	Dry clean air
Altitude	
0 to 1,000 m	Without derating
1,000 to 4,000 m	With derating of 1% / 100 m
Relative humidity	5 to 95%, no condensation allowed
Degree of protection	
IP21	Standard
IP55	Option
Paint color	RAL 9017, RAL 9002
Contamination levels	No conductive dust allowed
Storage	IEC 60721-3-1, Class 1C2 (chemical gases), Class 1S2 (solid particles)
Transportation	IEC 60721-3-2, Class 2C2 (chemical gases), Class 2S2 (solid particles)
Operation	IEC 60721-3-3, Class 3C2 (chemical gases), Class 3S2 (solid particles)
Functional safety	Safe torque-off (STO according EN 61800-5-2)
Standard	IEC 61508: SIL 3, IEC 61511: SIL3, IEC 62061: SILCL 3, EN ISO 13849-1: PL e
Internal safety option	Safe stop 1 (SS1), safely-limited speed (SLS), safe stop emergency (SSE), safe brake control, (SBC) and safe maximum speed (SMS) IEC 61508: SIL 2, IEC 61511: SIL2, IEC 62061: SILCL 2, EN ISO 13849-1: PL d

C = chemically active substances
S = mechanically active substances
* For higher output frequencies please contact your local ABB office

Ratings, types and voltages

U_N = 400 V (range 380 to 415 V). The power ratings are valid at nominal voltage 400 V.

Nominal ratings			Light-overload use		Heavy-duty use		Noise level	Heat dissipation	Air flow	Type designation	Frame size
I_N A	I_{max} A	P_N kW	I_{Ld} A	P_{Ld} kW	I_{Hd} A	P_{Hd} kW	dBA	W	m³/h		
2.4	3.1	0.75	2.3	0.75	1.8	0.55	46	30	44	ACS880-01-02A4-3	R1
3.3	4.1	1.1	3.1	1.1	2.4	0.75	46	40	44	ACS880-01-03A3-3	R1
4	5.6	1.5	3.8	1.5	3.3	1.1	46	52	44	ACS880-01-04A0-3	R1
5.6	6.8	2.2	5.3	2.2	4	1.5	46	73	44	ACS880-01-05A6-3	R1
7.2	9.5	3	6.8	3	5.6	2.2	46	94	44	ACS880-01-07A2-3	R1
9.4	12.2	4	8.9	4	7.2	3	46	122	44	ACS880-01-09A4-3	R1
12.6	16	5.5	12	5.5	9.4	4	46	172	44	ACS880-01-12A6-3	R1
17	21	7.5	16	7.5	12.6	5.5	51	232	88	ACS880-01-017A-3	R2
25	29	11	24	11	17	7.5	51	337	88	ACS880-01-025A-3	R2
32	42	15	30	15	25	11	57	457	134	ACS880-01-032A-3	R3
38	54	18.5	36	18.5	32	15	57	562	134	ACS880-01-038A-3	R3
45	64	22	43	22	38	18.5	62	667	200	ACS880-01-045A-3	R4
61	76	30	58	30	45	22	62	907	200	ACS880-01-061A-3	R4
72	104	37	68	37	61	30	62	1117	280	ACS880-01-072A-3	R5
87	122	45	83	45	72	37	62	1120	280	ACS880-01-087A-3	R5
105	148	55	100	55	87	45	67	1295	435	ACS880-01-105A-3	R6
145	178	75	138	75	105	55	67	1440	435	ACS880-01-145A-3	R6
169	247	90	161	90	145	75	67	1940	450	ACS880-01-169A-3	R7
206	287	110	196	110	169	90	67	2310	450	ACS880-01-206A-3	R7
246	350	132	234	132	206	110	65	3300	550	ACS880-01-246A-3	R8
293	418	160	278	160	246	132	65	3900	550	ACS880-01-293A-3	R8
363	498	200	345	200	293	160	68	4200	1150	ACS880-01-363A-3	R9
430	617	250	428	250	363	200	68	4800	1150	ACS880-01-430A-3	R9

U_N = 500 V (range 380 to 500 V). The power ratings are valid at nominal voltage 500 V.

Nominal ratings			Light-overload use		Heavy-duty use		Noise level	Heat dissipation	Air flow	Type designation	Frame size
I_N A	I_{max} A	P_N kW	I_{Ld} A	P_{Ld} kW	I_{Hd} A	P_{Hd} kW	dBA	W	m³/h		
2.1	3.1	0.75	2.0	0.75	1.6	0.55	46	30	44	ACS880-01-02A1-5	R1
3	4.1	1.1	2.8	1.1	2.1	0.75	46	40	44	ACS880-01-03A0-5	R1
3.4	5.6	1.5	3.2	1.5	3	1.1	46	52	44	ACS880-01-03A4-5	R1
4.8	6.8	2.2	4.6	2.2	3.4	1.5	46	73	44	ACS880-01-04A8-5	R1
5.2	9.5	3	4.9	3	4	2.2	46	94	44	ACS880-01-05A2-5	R1
7.6	12.2	4	7.2	4	5.2	3	46	122	44	ACS880-01-07A6-5	R1
11	16	5.5	10.4	5.5	7.6	4	46	172	44	ACS880-01-11A0-5	R1
14	21	7.5	13	7.5	11	5.5	51	232	88	ACS880-01-014A-5	R2
21	29	11	19	11	14	7.5	51	337	88	ACS880-01-021A-5	R2
27	42	15	26	15	21	11	57	457	134	ACS880-01-027A-5	R3
34	54	18.5	32	18.5	27	15	57	562	134	ACS880-01-034A-5	R3
40	64	22	38	22	34	18.5	62	667	200	ACS880-01-040A-5	R4
52	76	30	49	30	40	22	62	907	200	ACS880-01-052A-5	R4
65	104	37	62	37	52	30	62	1117	280	ACS880-01-065A-5	R5
77	122	45	73	45	65	37	62	1120	280	ACS880-01-077A-5	R5
96	148	55	91	55	77	45	67	1295	435	ACS880-01-096A-5	R6
124	178	75	118	75	96	55	67	1440	435	ACS880-01-124A-5	R6
156	247	90	148	90	124	75	67	1940	450	ACS880-01-156A-5	R7
180	287	110	171	110	156	90	67	2310	450	ACS880-01-180A-5	R7
240	350	132	228	132	180	110	65	3300	550	ACS880-01-240A-5	R8
260	418	160	247	160	240	132	65	3900	550	ACS880-01-260A-5	R8
361	542	200	343	200	260	160	68	4800	1150	ACS880-01-361A-5	R9
414	617	250	393	250	361	200	68	6000	1150	ACS880-01-414A-5	R9

Nominal ratings	
I_N	Rated current available continuously without overloadability at 40 °C.
P_N	Typical motor power in no-overload use.
I_{MAX}	Maximum output current. Available for 10 seconds at start, then as long as allowed by drive temperature.
Light-overload use	
I_{Ld}	Continuous current allowing 110% I_{Ld} 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% I_{Hd} for 1 min / 5 min at 40 °C.
P_{Hd}	Typical motor power in heavy-duty use.

The current ratings depend on the supply voltage.

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

Frame size	Height 1 (mm)	Height 2 (mm)	Width (mm)	Depth (mm)	Weight (kg)
R1	405	370	155	227	6
R2	405	370	155	250	8
R3	471	420	172	262	10
R4	573	490	203	275	18.5
R5	730	596	203	274	23
R6	726	548	252	357	45
R7	880	623	284	365	55
R8	963	700	300	386	70
R9	955	700	380	414	98

H1 = Height with cable entry box

H2 = Height without cable entry box

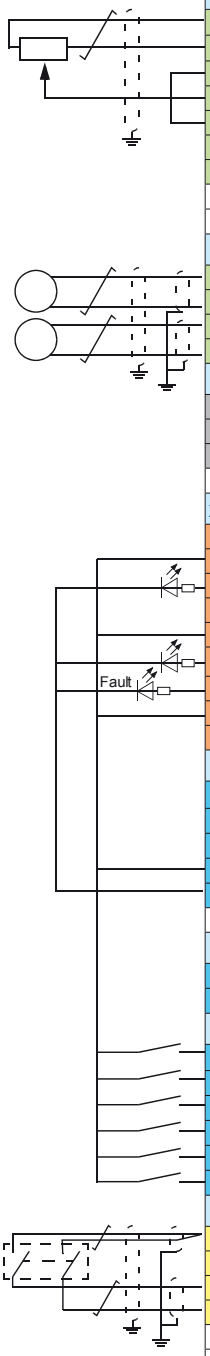
Width and depth with cable entry box

Standard interface and extensions for comprehensive connectivity

The ACS880-01 offers 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.

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, R_{load} < 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 (XDI:6) can alternatively be used as an input for 1 to 3 PTC thermistors.
Digital input interlock (DIIL)	Input type: NPN/PNP
2 digital inputs/outputs (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 (STO)	For the drive to start, both connections must be closed
Drive-to-drive link (XD2D)	Physical layer: EIA-485
Built-in Modbus	EIA-485
Assistant control panel/ PC tool connection	Connector: RJ-45

Default input/output connection diagram



XPOW	**External power input**	
1	+24VI	24 V DC, 2 A
2	GND	
XAI	**Reference voltage and analog inputs**	
1	+VREF	10 V DC, R_L 1 to 10 kohm
2	-VREF	-10 V DC, R_L 1 to 10 kohm
3	AGND	Ground
4	AI1+	**Speed reference** 0(2) to 10 V,
5	AI1-	R_{in} > 200 kohm
6	AI2+	By default not in use. 0(4) to 20 mA,
7	AI2-	R_{in} > 100 ohm
J1	J1	AI1 current/voltage selection jumper
J2	J2	AI2 current/voltage selection jumper
XAO	**Analog outputs**	
1	AO1	**Motor speed rpm** 0 to 20 mA,
2	AGND	R_L < 500 ohm
3	AO2	**Motor current** 0 to 20 mA, R_L < 500 ohm
4	AGND	
XD2D	**Drive-to-drive link or Modbus**	
1	B	Drive-to-drive link
2	A	
3	BGND	
J3	J3	Drive-to-drive link termination switch
XRO1, XRO2, XRO3	**Relay outputs**	
1	NC	**Ready** 250 V AC / 30 V DC 2 A
2	COM	
3	NO	
1	NC	**Running** 250 V AC / 30 V DC 2 A
2	COM	
3	NO	
1	NC	**Faulted(-1)** 250 V AC / 30 V DC 2 A
2	COM	
3	NO	
XD24	**Auxiliary voltage output, digital input interlock**	
1	DIIL	By default not in use.
2	+24VD	+24 V DC 200 mA
3	DICOM	Digital input ground
4	+24VD	+24 V DC 200 mA
5	DIOGND	Digital input/output ground
J6	Ground selection switch	
XDIO	**Digital inputs/outputs**	
1	DIO1	Output: Ready
2	DIO2	Output: Running
XDI	**Digital inputs**	
1	DI1	Stop (0) / Start (1)
2	DI2	Forward (0) / Reverse (1)
3	DI3	Reset
4	DI4	Acceleration and deceleration select
5	DI5	Constant speed select
6	DI6	By default not in use.
XSTO	**Safe torque-off**	
1	OUT1	Safe torque-off. Both circuits must be closed for the drive to start.
2	SGND	
3	IN1	
4	IN2	
X12	Safety functions module connection	
X13	Control panel connection	
X205	Memory unit connection	

Standard software for scalable control and functionality

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

- Basic setup for input/output control and fieldbus adapter 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

The drives are equipped with direct torque control (DTC), ABB's signature motor control platform which supports motors such as induction motors, permanent magnet synchronous motors and servo motors. 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.

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:

- Adaptive programming
- Automatic reset
- Automatic start
- Access levels
- Constant speeds
- Critical speeds and frequencies
- DC hold
- DC magnetizing
- Diagnostics
- Flux braking
- Mechanical brake control
- Drive-to-drive link for master-follower control
- Power loss ride-through
- Process PID control with trim function
- Programmable inputs and outputs
- Programmable and pre-programmed protection functions
- Speed controller with auto tuning
- Startup assistants
- Scalar control with IR compensation
- User selectable acceleration and deceleration ramps
- User adjustable load supervision/limitation
- 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.

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 are customizable for specific terminology, so 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 the user 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.

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 entry version provides startup and maintenance capabilities, while the professional version of the tool 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 control panel. With one mouse click all drive information such as parameter lists, faults, backup and event lists are gathered into a support diagnostics file. This provides faster fault tracking, shortens downtime and minimizes operational and maintenance costs.

Drive composer pro

Drive composer pro provides both basic functionality, including parameter settings, downloading and uploading files and searching parameters, and advanced features such as graphical control diagrams and various displays. 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 network. Full backup and restore functions are also included. Safety settings can be configured with Drive composer pro.

Integrated safety for simplified configuration

Integrated safety reduces the need for external safety components, simplifying the configuration and reducing installation space. In the ACS880 the safety functionality is a built-in feature. The ACS880 comes with safe torque-off as standard. Optional safety functions include safe stop 1, safe stop emergency, safely-limited speed, safe brake control and safe maximum speed. The drives' functional safety complies with the requirements of the European Union Machinery Directive 2006/42/EC.

Safe torque-off as standard

Safe torque-off (STO) is used for prevention of unexpected startup (with such hardware as a key lock switch) or other stopping-related functions enabling safe machine maintenance and operation. With safe torque-off the drive will not provide a rotational field, thereby preventing the motor from generating a torque on the shaft. This function corresponds to an uncontrolled stop in accordance with stop category 0 of EN 60204-1.

The safety functions module

The safety functions module FSO-11 comes with self diagnostic functionality and a range of safety functions that meet current safety requirements and standards in one compact module. Compared to using external safety components, the FSO-11 provides a cost-efficient solution packed into a single safety functions module to ensure safe drive operation. The FSO-11 is easy to mount in the drive.

Commissioning and configuration is done through the Drive composer pro PC tool. The safety functions module supports the following safety functions (which at least achieve SIL2 or PL d safety level (Cat. 3)):

- Safe stop 1 (SS1) initiates motor deceleration (eg, emergency stop, stop category 1), monitors deceleration and automatically activates the safe torque-off. When stopped this function corresponds to a controlled stop in accordance with EN 60204-1.
- Safely-limited speed (SLS) prevents the motor from exceeding the specified safe speed.
- Safe brake control (SBC) provides a safe output for controlling the motor's external (mechanical) brakes.
- Safe maximum speed (SMS) monitors the drive output frequency to ensure it does not exceed the set. This function is set to be continuously active, to provide protection for eg, structural maximum motor frequency.
- Safe stop emergency (SSE) can be configured to, upon request, either activate STO instantly (category 0 stop), or first initiate motor deceleration and then when motor is stopped activate the STO (category 1 stop).

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, and the possibility for redundant 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

Option	Option code	Fieldbus protocol
FPBA-01 *	+K454	PROFIBUS DP, DPV0/DPV1
FCAN-01 *	+K457	CANopen®
FDNA-01 *	+K451	DeviceNet™
FENA-11 *	+K473	EtherNet/IP™, Modbus TCP, PROFINET IO
FECA-01 *	+K469	EtherCAT®

*For further details please contact your local ABB sales office.

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 drive.

Analog and digital input/output extension modules

Option	Option code	Connections
FIO-01	+L501	4 x DI/O, 2 x RO
FIO-11	+L500	3 x AI (mA/V), 1 x AO (mA), 2 x DI/O

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	Option code	Connections
FEN-01	+L517	2 inputs (TTL incremental encoder), 1 output
FEN-11	+L518	2 inputs (SinCos absolute, TTL incremental encoder), 1 output
FEN-21	+L516	2 inputs (Resolver, TTL incremental encoder), 1 output
FEN-31	+L502	1 input (HTL incremental encoder), 1 output

Brake options

Brake chopper

The brake chopper is built in as standard for the ACS880-01 frame sizes R1 to R4. For the other frames a brake chopper is a selectable internal option. Braking control is integrated into the ACS880-01. It controls braking, supervises system status and detects failures such as brake resistor and resistor cable short-circuits, chopper short-circuit, and calculated resistor overtemperature.

Brake resistor

The brake resistors are separately available for ACS880-01. Resistors other than the standard resistors may be used providing the specified resistance value is not decreased, and the heat dissipation capacity of the resistor is sufficient for the drive application. No separate fuses in the brake circuit are required if the conditions for eg. the mains cable is protected with fuses and no mains cable/fuse overrating takes place.

EMC – electromagnetic compatibility

Each ACS880 model can be equipped with a built-in filter to reduce high frequency emissions.

EMC standards

The EMC product standard (EN 61800-3 (2004)) covers the specific EMC requirements stated for drives (tested with motor and cable) within the EU. EMC standards such as EN55011, or EN 61000-6-3/4, are applicable to industrial and domestic equipment and systems including components inside the drive. Drive units complying with the requirements of EN 61800-3 are compliant with comparable categories in EN 55011 and EN 61000-6-3/4, but not necessarily vice versa. EN 55011 and EN 61000-6-3/4 do not specify cable length or require a motor to be connected as a load. The emission limits are comparable to EMC standards according to the following table below.

1st environment versus 2nd environment

1st environment includes domestic premises. It also includes establishments directly connected without an intermediate transformer to a low-voltage power supply network that supplies buildings used for domestic purposes.
2nd environment includes all establishments other than those directly connected to a low voltage power supply network that supplies buildings used for domestic purposes.

EMC standards

EMC according to EN 61800-3 (2004) product standard	EN 61800-3 product standard	EN 55011, product family standard for industrial, scientific and medical (ISM) equipment	EN 61000-6-4, generic emission standard for industrial environments	EN 61000-6-3, generic emission standard for residential, commercial and light-industrial environment
1st environment, unrestricted distribution	Category C1	Group 1, Class B	Not applicable	Applicable
1st environment, restricted distribution	Category C2	Group 1, Class A	Applicable	Not applicable
2nd environment, unrestricted distribution	Category C3	Group 2, Class A	Not applicable	Not applicable
2nd environment, restricted distribution	Category C4	Not applicable	Not applicable	Not applicable

Selecting an EMC filter

The following table gives the correct filter selection.

Type	Voltage	Frame sizes	1st environment, restricted distribution, C2, grounded network (TN) Option code	2nd environment, C3 grounded network (TN) Option code	2nd environment, C3, ungrounded network (IT) Option code
ACS880-01	380 to 500	R1 to R9	+E202	+E200	+E210 (R6 to R9 frame size)

du/dt filters

du/dt filtering suppresses inverter output voltage spikes and rapid voltage changes that stress motor insulation. Additionally, du/dt filtering reduces capacitive leakage currents and high frequency emission of the motor cable as well as high frequency losses and bearing currents in the motor. The need for du/dt filtering depends on the motor insulation. For information on the construction of the motor insulation, consult the manufacturer.

If the motor does not fulfil the following requirements, the lifetime of the motor might decrease. Insulated N-end (nondriven end) bearings and / or common mode filters are also required for motor bearing currents with motors bigger than 100 kW. For more information please see the ACS880 hardware manuals.

How to select a filter according to the motor. Please see below:

NOCH0016-62

NOCH0016-60

NOCH0016-65

FOCH0610-70

Filter selection table for ACS880

Motor type	Nominal AC supply voltage	Requirements for		
		Motor insulation system	ABB du/dt and common mode filters, insulated N-end motor bearings	
			P_N < 100 kW and frame size < IEC 315	100 kW ≤ P_N < 350 kW or IEC 315 ≤ frame size < IEC 400
			P_N < 134 hp and frame size < NEMA 500	134 hp ≤ P_N < 469 hp or NEMA 500 ≤ frame size ≤ NEMA 580
ABB motors				
Random-wound M2__, M3__ and M4__	U_N ≤ 500 V	Standard	-	+ N
	500 V < U_N ≤ 600 V	Standard	+ du/dt	+ du/dt + N
		or		
		Reinforced	-	+ N
	600 V < U_N ≤ 690 V (cable length ≤ 150 m)	Reinforced	+ du/dt	+ du/dt + N
	600 V < U_N ≤ 690 V (cable length > 150 m)	Reinforced	-	+ N
Form-wound HX__ and AM__	380 V < U_N ≤ 690 V	Standard	n.a.	+ N + CMF
Old* form-wound HX__ and modular	380 V < U_N ≤ 690 V	Check with the motor manufacturer	+ du/dt with voltages over 500 V + N + CMF	
Random-wound HX__ and AM__**	0 V < U_N ≤ 500 V	Enmelled wire with fiber glass taping	+ N + CMF	
	500 V < U_N ≤ 690 V		+ du/dt + N + CMF	
HDP	Consult the motor manufacturer.			

* manufactured before 1.1.1998

** For motors manufactured before 1.1.1998, check for additional instructions with the motor manufacturer.

Motor type	Nominal AC supply voltage	Requirements for		
		Motor insulation system	ABB du/dt and common mode filters, insulated N-end motor bearings	
			P_N < 100 kW and frame size < IEC 315	100 kW ≤ P_N < 350 kW or IEC 315 ≤ frame size < IEC 400
			P_N < 134 hp and frame size < NEMA 500	134 hp ≤ P_N < 469 hp or NEMA 500 ≤ frame size ≤ NEMA 580
Non-ABB motors				
Random-wound and form-wound	U_N ≤ 420 V	Standard $\hat{U}_{LL}$ = 1300 V	-	+ N or CMF
	420 V < U_N ≤ 500 V	Standard $\hat{U}_{LL}$ = 1300 V	+ du/dt	+ du/dt + N or + du/dt + CMF
		or		
		Reinforced: $\hat{U}_{LL}$ = 1600 V, 0.2 microsecond rise time	-	+ N or CMF
	500 V < U_N ≤ 600 V	Reinforced: $\hat{U}_{LL}$ = 1600 V	+ du/dt	+ du/dt + N or + du/dt + CMF
		or		
		Reinforced: $\hat{U}_{LL}$ = 1800 V	-	+ N or CMF
	600 V < U_N ≤ 690 V	Reinforced: $\hat{U}_{LL}$ = 1800 V	+ du/dt	+ du/dt + N
		Reinforced: $\hat{U}_{LL}$ = 2000 V, 0.3 microsecond rise time	-	+ N or CMF

The abbreviations used in the table are defined below

Abbr.	Definition
U_N	Nominal AC line voltage.
$\hat{U}_{LL}$	Peak line-to-line voltage at motor terminals which the motor insulation must withstand.
P_N	Motor nominal power.
du/dt	du/dt filter at the output of the drive. Available from ABB as an optional add-on kit.
CMF	Common mode filter. Available from ABB as an optional add-on kit.
N	N-ned bearing: insulated motor non-drive end bearing.
n.a.	Motors of this power range are not available as standard units. Consult the motor manufacturer.

External du/dt filters for ACS880-01

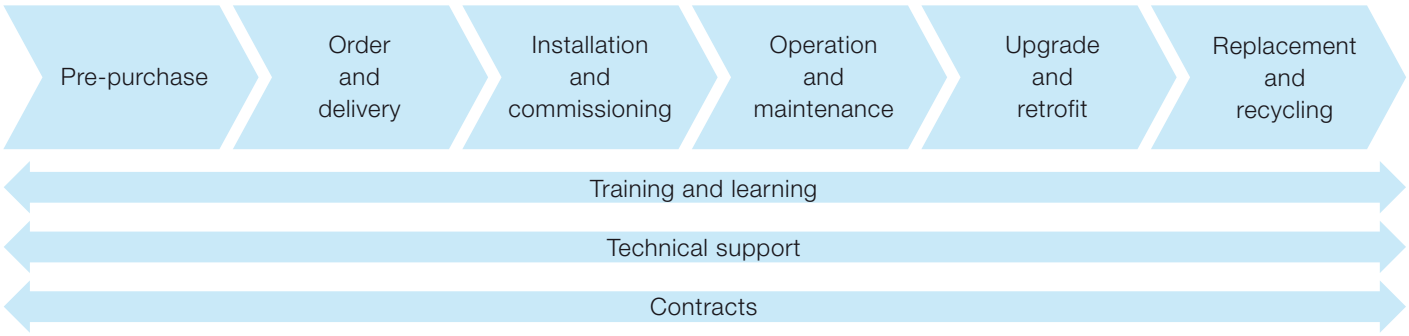
ACS880		du/dt filter type (3 filters included in kits marked *)															
		Unprotected (IP00)								Protected to IP22				Protected to IP54			
400 V	500 V	NOCH0016-60	NOCH0030-60	NOCH0070-60	NOCH0120-60 *)	NOCH0260-60 *)	FOCH0260-70	FOCH0320-50	FOCH0610-70	NOCH0016-62	NOCH0030-62	NOCH0070-62	NOCH0120-62	NOCH0016-65	NOCH0030-65	NOCH0070-65	NOCH0120-65
02A4-3	02A1-5	1								1				1			
03A3-3	03A0-5	1								1				1			
04A0-3	03A4-5	1								1				1			
05A6-3	04A8-5	1								1				1			
07A2-3	05A2-5	1								1				1			
09A4-3	07A6-5	1								1				1			
12A6-3	11A0-5	1								1				1			
017A-3	014A-5	1								1				1			
	021A-5	1								1				1			
025A-3	027A-5		1								1				1		
			1								1				1		
032A-3	034A-5			1								1				1	
038A-3	040A-5			1								1				1	
045A-3	052A-5			1								1				1	
061A-3	065A-5			1								1				1	
072A-3	077A-5			1								1				1	
087A-3	096A-5				1								1				1
105A-3	124A-5				1								1				1
145A-3	156A-5				1												
169A-3	180A-5					1											
206A-3	240A-5						1										
246A-3	260A-5						1										
293A-3							1										
363A-3	361A-5							1									
430A-3	414A-5							1									

Dimensions and weights of the du/dt filters

du/dt filter	Height	Width	Depth	Weight
	mm	mm	mm	kg
NOCH0016-60	195	140	115	2.4
NOCH0016-62/65	323	199	154	6
NOCH0030-60	215	165	130	4.7
NOCH0030-62/65	348	249	172	9
NOCH0070-60	261	180	150	9.5
NOCH0070-62/65	433	279	202	15.5
NOCH0120-60**	200	154	106	7
NOCH0120-62/65	765	308	256	45
NOCH0260-60**	383	185	111	12
FOCH0260-70	382	340	254	47
FOCH0320-50	662	319	293	65
FOCH0610-70	662	319	293	65

** 3 filters included, dimensions apply for one filter.

Expertise at every stage of the value chain



The services offered for ABB low voltage drives span the entire value chain, from the moment a customer makes the first enquiry through to disposal and recycling of the drive. Throughout the value chain, ABB provides training and learning, technical support and contracts. All of this is supported by one of the most extensive global drive sales and service networks.

Pre-purchase

ABB provides a range of services that help guide the customers to the right products for their applications. Examples of services include correct drive selection and dimensioning, energy appraisal, harmonic survey and EMC assessment.

Order and delivery

Orders can be placed through any ABB office or through ABB's channel partners. Placing and tracking of orders can be done online.

ABB's sales and services network offers timely deliveries including express delivery.

Installation and commissioning

While many customers have the resources to undertake installation and commissioning on their own, ABB and its channel partners are available to advise or undertake the entire drive installation and commissioning.

Operation and maintenance

Through remote monitoring, ABB can guide the customer through a fast and efficient fault-finding procedure as well as analyze the operation of the drive and the customer's process. From maintenance assessment to preventive maintenance and reconditioning of drives, ABB has all the options covered to keep its customers' processes operational.

Should corrective maintenance of drives be needed, ABB offers on-site and workshop repair, fully backed up by the most extensive spare holding.

Upgrade and retrofit

An existing ABB drive can often be upgraded to the latest software or hardware to improve the performance of the application.

Existing processes can be economically modernized by retrofitting the latest drive technology to mechanical control equipment, such as inlet guide vanes or dampers or older generations of drives.

Instead of replacing an entire drive or drive system, it is often more economical to modernize the old installation by reusing all relevant parts of the original equipment and purchasing new where necessary.

Replacement and recycling

ABB can advise on the best replacement drive while ensuring that the existing drive is disposed in a way that meets all local environmental regulations.

Entire value chain services

The main services available throughout the value chain include:

– Training and learning – ABB offers product and application training in classrooms and on the Internet.

– Technical support – At each stage of the value chain, an ABB expert is available to offer advice to keep the customer's process or plant operational.

– Contracts – Drive care contracts and other types of agreements, from individual services through to complete drive care covering all repairs and even drive replacements, are available.

Customers that register their drives with ABB can get six months drive care contract for free. To qualify, contact your local ABB office.

Secure uptime throughout the drive life cycle

ABB follows a four-phase model for managing the life cycles of its drives. The life cycle phases are active, classic, limited and obsolete. The availability of individual services varies according to the drive life cycle phase.

Examples of individual services are drive selection and dimensioning, installation and commissioning, preventive and corrective maintenance, remote monitoring and intelligent diagnostics, technical support, upgrade and retrofit, replacement and recycling plus training and learning.

In the active phase the drive is in serial production. The drive, with complete life cycle services, is available for purchase.

In the classic phase, the serial production of the drive has ended. The drive, with complete life cycle services, is available for plant extensions.

In the limited phase, the drive is no longer available. The life cycle services are limited. Spare parts as well as maintenance and repair services are available as long as materials can be obtained.

In the obsolete phase, the drive is not available. ABB cannot guarantee availability of services for technical reasons or within reasonable cost.

ABB defines individual services and their duration for every drive at each phase of its life cycle. Services are identical in the active and classic phases.

To ensure the availability of complete life cycle services, ABB recommends that a drive is kept in the active or classic phase by upgrading, retrofitting or replacing.

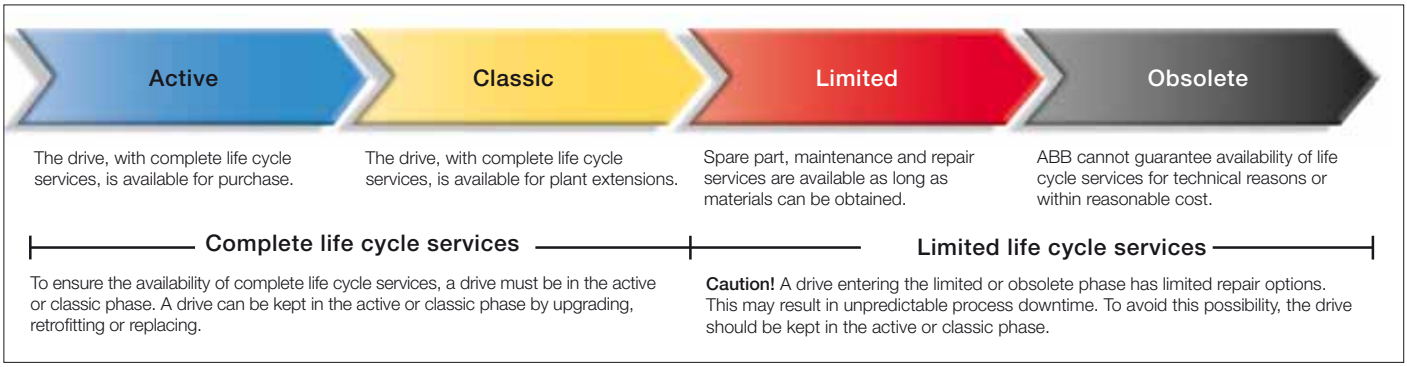
In the classic phase ABB carries out an annual review for each drive life cycle plan. Should any changes to the availability or duration of the services be necessary, ABB gives a life cycle announcement indicating eventual change of life cycle phase and/or any change in the duration of services.

In the limited phase, ABB issues a life cycle phase change announcement, half a year prior to shifting the product into the obsolete phase.

Maximizing return on investment

The life cycle management model provides customers with a transparent method for managing their investment in drives. In each phase, customers clearly see what life cycle services are available, and more importantly, what services are not available. Decisions on upgrading, retrofitting or replacing drives can be made with confidence.

ABB drive life cycle management model



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