Catalog

ABB standard drives
ACS310, 0.37 to 22 kW / 0.5 to 30 hp

Power and productivity
for a better world™

Contents

ABB standard drives, ACS310

ABB standard drives

ACS310 - 03E - 02A6 - 2 + J400

ABB standard drives

The ABB standard drives family has been extended with a new series dedicated drives designed for squared torque applications such as booster pumps and centrifugal fans.

The drive design includes a powerful set of features which benefit pump and fan applications including built-in PID controllers and PFC (pump and fan control) that varies the drive's performance in response to changes in pressure, flow or other external data. The drives also have pre-programmed protection functions such as pipe cleaning for preventive maintenance.

These features, combined with preprogrammed application macros, an intuitive user interface and several assistant screens, speed up the installation, parameter setting and commissioning of the drive.

Applications

- Booster pumps
- Submersible pumps
- Irrigation pumps
- Centrifugal fans

Highlights

- Pump and fan features such and pum and fan control (PFC and SPFC)
- Pipe cleaning and fill functions
- Unified hight and depth
- Energy efficiency counters
- Energy optimizer
- Load Analyzer for optimized dimensioning of the drive, motor and process
- Embedded Modbus RS-485 fieldbus interface
- FlashDrop tool for fast parameter setting

Two ways to select your drive

Choice 1: Simply contact your local ABB drives sales office (see page 17) and let them know what you want. Use page 3 as a reference section for more information.

OR

Choice 2: Build up your own ordering code using the simple 7-step approach below. Each step is accompanied by a reference to a page that is filled with useful information.

Type code stucture:

ACS310 - 03E - 02A6 - 2 + J400

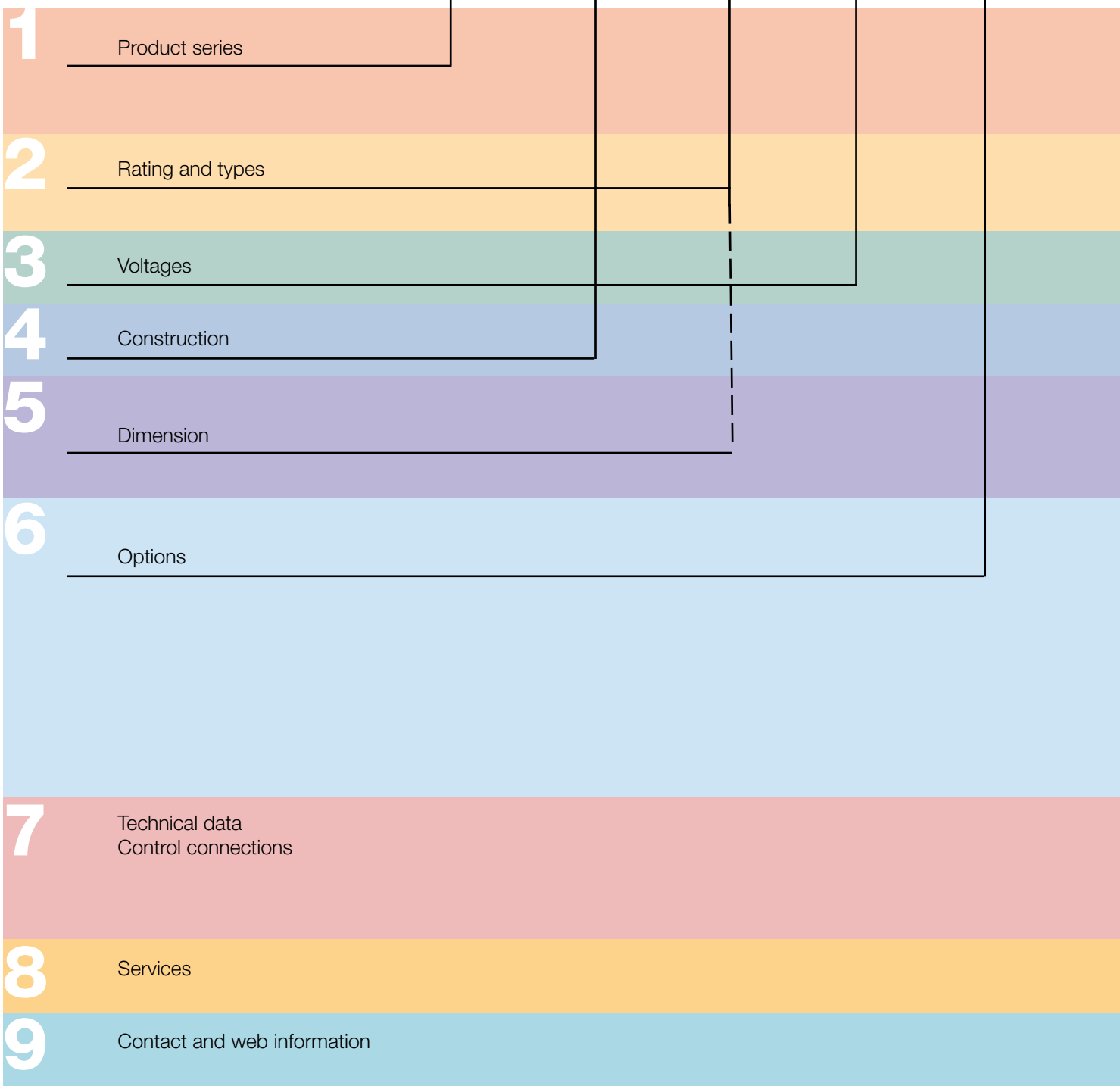


ABB standard drives

ACS310 - 03E - 02A6 - 2 + J400

Feature	Advantage	Benefit
Pump and fan control (PFC) feature to control pumps and fans in parallel	One drive controls several pumps or fans and eliminates the need for an external programmable logic controller. Reduces motor stress and increases lifetime when auxiliary motors are driven according to the needed pump/fan capacity. Interlock function enables one motor to be disengaged from the mains supply while others continue operating in parallel.	Saves cost of additional drives and external PLC. Longer life for pump or fan system while reducing maintenance time and costs. Maintenance can be carried out safely without stopping process.
Soft pump and fan control feature (SPFC)	Reduces unwanted pressure peaks in pumps and pipelines when an auxiliary motor is started.	Reduces maintenance costs. Longer life for pump or fan system. Smoother processes.
Pump protection functions	Integrated protection and control with pre-programmed features like pipe cleaning, pipefill, inlet/outlet pressure supervision and detection of under or over load for preventive maintenance. Improves process control and system reliability. Integrates system protection. Smoother processes: improved and optimized system. Longer life for pump and fan system, reduced maintenance costs.	Reduces maintenance costs. Longer life and reliable operation of pump system.
PID controllers	Varies the drive's performance according to the need of the application.	Enhances production output, stability and accuracy.
Embedded Modbus RS-485 fieldbus interface	No need for external fieldbus options. Integrated and compact design.	Saves costs of external fieldbus devices. Increases reliability.
On/off cooling fan control	Cooling fan rotates only when the drive is running, thereby cooling only when needed.	Silent operation. Improves drive's energy efficiency.
Software controlled phase inversion	Fast and easy way to change the phase order of the motor rotation.	Time savings as there is no need to change the output cable order manually.
Short parameter menu view	Only the most needed drive parameters are shown on the drive's parameter view. Complete parameter view can be changed by setting one parameter.	Time savings as user can quickly see the most important parameters. Fast commissioning of the drive.
Energy optimizer	Improved motor efficiency with intelligent drive control method, especially while operating on partial centrifugal loads.	Boosts energy efficiency due to lower motor currents. Reduces audible noise from the motor.
Energy efficiency counters	Several counters to illustrate saved energy (kWh), carbon-dioxide emissions (CO_2) and cost in local currency.	Shows direct impact on energy bill and helps control operational expenditure (OPEX).
Full output current at 50 °C ambient	Drive can be operated in ambient temperatures up to 50 °C without de-rating the output current.	Optimized drive dimensioning for wide temperature range.
Load analyzer	Load analyzer saves process data, such as current and torque values, which can be used to analyze the process and dimensioning of the drive and motor.	Optimized dimensioning of the drive, motor and process.
Compact size and high power density ratio	Efficient cabinet space usage.	Space savings.
Unified height and depth	Optimum installation layout.	Space savings.
Different mounting options; screw or DIN rail mounting, sideways or side-by-side	Flexible installation.	One drive can be used in various designs, saving installation costs and time.
User interfaces	Assistant control panel with clear alphanumerical dynamic menus, real time clock and 14 languages. Basic panel with numerical display.	Different control panels available according to functionality need.
Maintenance assistant	Monitors consumed energy (kWh), running hours or motor rotation.	Assists in preventive maintenance of the drive, motor or run application.
Commissioning assistants	Easy set up of parameters for PID controllers, real-time clock, serial communication, drive optimizer and drive start-up.	Time savings with reduced need to set the parameters manually. Ensures all required parameters are set.
Drive protection	Motor output and I/O protected against wiring faults. Protection against unstable supply networks. Coated boards as standard.	Latest solution to protect the drive and offer trouble free use and the highest quality.

Technical specification

ACS310 - 03E - 02A6 - 2 + J400

Mains connection

Voltage and power range	3-phase, 200 to 240 V ± 10% 0.37 to 11 kW (0.5 to 15 hp) 3-phase, 380 to 480 V ± 10% 0.37 to 22 kW (0.5 to 30 hp)
Frequency	48 to 63 Hz

Motor connection

Voltage	3-phase, from 0 to U_{supply}
Frequency	0 to 500 Hz
Continuous loading capability	I_{2N} maximum continuous output current at ambient temperature of +40 °C. No overloadability, derating 1% for every additional 1 °C up to 50 °C. I_{LD} continuous output current at max ambient temperature of +50 °C. 10% overloadability for one minute every ten minutes.
Switching frequency Default Selectable	 4 kHz 4 to 16 kHz with 4 kHz steps
Acceleration time	0.1 to 1800 s
Deceleration time	0.1 to 1800 s

Environmental limits

Ambient temperature	-10 to 50 °C (14 to 122 °F), no frost allowed
Altitude Output current	 Rated current available at 0 to 1000 m (0 to 3281 ft) reduced by 1% per 100 m (328 ft) over 1000 to 2000 m (3281 to 6562 ft)
Relative humidity	Lower than 95% (without condensation)
Degree of protection	IP20 / optional NEMA 1 enclosure
Enclosure colour	NCS 1502-Y, RAL 9002, PMS 420 C
Contamination levels Transportation Storage Operation	IEC721-3-3 No conductive dust allowed Class 1C2 (chemical gases) Class 1S2 (solid particles) Class 2C2 (chemical gases) Class 2S2 (solid particles) Class 3C2 (chemical gases) Class 3S2 (solid particles)

Product compliance

Low Voltage Directive 2006/95/EC
Machinery Directive 98/37/EC
EMC Directive 2004/108/EC
Quality assurance system ISO 9001
Environmental system ISO 14001
CE and C-Tick approvals
UL, cUL and GOST R
RoHS compliant

EMC

Class C3 (2nd environment unrestricted distribution) inbuilt as standard
Class C2 and C1 with external optional EMC filters

Programmable control connections

Two analog inputs	
Voltage signal	
Unipolar	0 (2) to 10 V, R_{in} > 312 kΩ
Bipolar	-10 to 10 V, R_{in} > 312 kΩ
Current signal	
Unipolar	0 (4) to 20 mA, R_{in} = 100 Ω
Bipolar	-20 to 20 mA, R_{in} = 100 Ω
Resolution	0.1%
Accuracy	± 1%
One analog output	0 (4) to 20 mA, load < 500 Ω
Auxiliary voltage	24 V DC ± 10%, max. 200 mA
Five digital inputs	12 to 24 V DC with internal or external supply, PNP and NPN, pulse train 0 to 16 kHz
Input impedance	2.4 kΩ
One relay output	
Type	NO + NC
Maximum switching voltage	250 V AC/30 V DC
Maximum switching current	0.5 A/30 V DC; 5 A/230 V AC
Maximum continuous current	2 A rms
One digital output	
Type	Transistor output
Maximum switching voltage	30 V DC
Maximum switching current	100 mA/30 V DC, short circuit
Frequency	10 Hz to 16 kHz
Resolution	1 Hz
Accuracy	0.2%

Serial communication

Fieldbus	Modbus RS-485, embedded
Cable	Schielded twisted pair, impedance 100 to150 ohms
Termination	Daisy-chained bus, without dropout lines
Isolation	Bus interface isolated from drive
Transfer rate	1.2 to 76.8 kbit/s
Communication type	Serial, asynchronous, half duplex
Protocol	Modbus

Chokes

AC input chokes	External option For reducing THD in partial loads and to comply with EN/IEC 61000-3-12
AC output chokes	External option To achieve longer motor cables

Ratings, types, voltages and construction

ACS310 - 03E - 02A6 - 2 + J400

Type code

This is the unique reference number (shown above and in column 4, right) that clearly identifies your drive by power rating and frame size. Once you have selected the type code, the frame size (column 6) can be used to determine the drive dimensions, shown on the next page.

Voltages

ACS310 is available in two voltage ranges:
2 = 200 - 240 V
4 = 380 - 480 V
Insert either "2" or "4", depending on your chosen voltage, into the type code shown above.

Construction

"03E" within the type code (shown above) varies depending on the drive phase and EMC filtering. Choose below the one you need.
03 = 3-phase
E = EMC filter connected, 50 Hz frequency
U = EMC filter disconnected, 60 Hz frequency (In case the filter is required it can easily be connected.)

Ratings				Type code	Frame size
P_N kW	P_N hp	I_{2N} [1] A	I_{LD} [2] A		
3-phase supply voltage 200 - 240 V units					
0.37	0.5	2.6	2.4	ACS310-03X-02A6-2	R0
0.55	0.75	3.9	3.5	ACS310-03X-03A9-2	R0
0.75	1.0	5.2	4.7	ACS310-03X-05A2-2	R1
1.1	1.5	7.4	6.7	ACS310-03X-07A4-2	R1
1.5	2.0	8.3	7.5	ACS310-03X-08A3-2	R1
2.2	3.0	10.8	9.8	ACS310-03X-10A8-2	R2
3.0	4.0	14.6	13.3	ACS310-03X-14A6-2	R2
4.0	5.0	19.4	17.6	ACS310-03X-19A4-2	R2
5.5	7.5	26.8	24.4	ACS310-03X-26A8-2	R3
7.5	10.0	34.1	31.0	ACS310-03X-34A1-2	R4
11.0	15.0	50.8	46.2	ACS310-03X-50A8-2	R4
3-phase supply voltage 380 - 480 V units					
0.37	0.5	1.3	1.2	ACS310-03X-01A3-4	R0
0.55	0.75	2.1	1.9	ACS310-03X-02A1-4	R0
0.75	1.0	2.6	2.4	ACS310-03X-02A6-4	R1
1.1	1.5	3.6	3.3	ACS310-03X-03A6-4	R1
1.5	2.0	4.5	4.1	ACS310-03X-04A5-4	R1
2.2	3.0	6.2	5.6	ACS310-03X-06A2-4	R1
3.0	4.0	8.0	7.3	ACS310-03X-08A0-4	R1
4.0	5.0	9.7	8.8	ACS310-03X-09A7-4	R1
5.5	7.5	13.8	12.5	ACS310-03X-13A8-4	R3
7.5	10.0	17.2	15.6	ACS310-03X-17A2-4	R3
11.0	15.0	25.4	23.1	ACS310-03X-25A4-4	R3
15.0	20.0	34.1	31	ACS310-03X-34A1-4	R4
18.5	25.0	41.8	38	ACS310-03X-41A8-4	R4
22.0	30.0	48.4	44	ACS310-03X-48A4-4	R4

X within the type code stands for E or U.

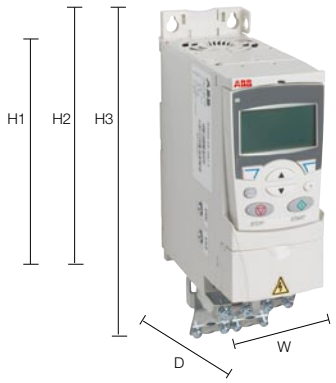
[1] I_{2N} maximum continuous output current at ambient temperature of +40 °C. No overloadability, derating 1% for every additional 1 °C up to 50 °C.

[2] I_{LD} continuous output current at max ambient temperature of +50 °C. 10% overloadability for one minute every ten minutes.

Dimensions

ACS310 - 03E - 02A6 - 2 + J400

Cabinet-mounted drives (IP20 UL open)



Frame size	IP20 UL open						NEMA 1				
	H1	H2	H3	W	D	Weight	H4	H5	W	D	Weight
	mm	mm	mm	mm	mm	kg	mm	mm	mm	mm	kg
R0	169	202	239	70	161	1.1	257	280	70	169	1.5
R1	169	202	239	70	161	1.3	257	280	70	169	1.7
R2	169	202	239	105	165	1.5	257	282	105	169	1.9
R3	169	202	236	169	169	2.9	260	299	169	177	3.5
R4	181	202	244	260	169	4.4	270	320	260	177	5.0

Wall-mounted drives (NEMA 1)

H1 = Height without fastenings and clamping plate
H2 = Height with fastenings but without clamping plate
H3 = Height with fastenings and clamping plate
H4 = Height with fastenings and NEMA 1 connection box
H5 = Height with fastenings, NEMA 1 connection box and hood
W = Width
D = Depth

Options

ACS310 - 03E - 02A6 - 2 + J400

How to select options

The options shown in the table are available within the ACS310 range. The control panels have an associated 4-figure option code, which is shown in the second column. It is this code that replaces J400 in the type code above.

Options	Ordering code	Description	Model
Protection class	*)	NEMA 1 (R0, R1, R2)	MUL1-R1
	*)	NEMA 1 (R3)	MUL1-R3
	*)	NEMA 1 (R4)	MUL1-R4
Control panel	J400	Assistant control panel	ACS-CP-A 2)
	J404	Basic control panel	ACS-CP-C 1)
Panel mounting kit	*)	Panel mounting kit	ACS/H-CP-EXT
	*)	Panel holder mounting kit	OPMP-01
Extension module	*)	Relay output extension module	MREL-01
Tools	*)	FlashDrop tool	MFDT-01
	*)	DriveWindow Light 2	DriveWindow Light 2
External options	*)	Input chokes	
	*)	EMC filters	
	*)	Output chokes	
Remote monitoring	*)	Ethernet adapter	SREA-01

*) = Ordering with a separate MRP code number.
1) The ACS310 is compatible with ACS-CP-C basic control panel Rev M or later.
2) The ACS310 is compatible with ACS-CP-A assistant control panel Rev E or later.
(New panel series manufactured since 2007 with serial number XYYWWRXXXX, where year Y = 7 or greater and revision R = E, F, G, …)

Options
Interfaces

ACS310 - 03E - 02A6 - 2 + J400

Panel cover
(included as standard)

Basic control panel

Assistant control panel

Panel mounting kits

User interfaces

Panel cover
The purpose of the panel cover is to protect the drive's connection surfaces.The ACS310 drive is delivered with a panel cover as standard. In addition there are two alternative control panels available as options.

Basic control panel
The basic control panel features a single line numeric display. The panel can be used to control the drive, set parameter values or copy them from one drive to another.

Assistant control panel
The assistant control panel features a multilingual alphanumeric display for easy drive programming. The control panel has various assistants and an inbuilt help function to guide the user. It includes a real time clock, which can be used during fault logging and in controlling the drive, such as start/stop. The control panel can be used for copying parameters for back up or for downloading to another drive. A large graphical display and soft keys make it extremely easy to navigate.

Panel mounting kits
To attach the control panel to the outside of a larger enclosure, two panel mounting kits are available. A simple and cost-efficient installation is possible with the ACS/H-CP-EXT kit, while the OPMP-01 kit provides a more user-friendly solution, including a panel platform that enables the panel to be removed in the same way as a drive-mounted panel. The panel mounting kits include all hardware required, including 3 m extension cables and installation instructions.

Options
Interfaces

ACS310 - 03E - 02A6 - 2 + J400

Machine interfaces

The embedded Modbus RS-485 fieldbus brings connectivity to major automation systems. A single twisted pair cable avoids large amounts of conventional cabling, thereby reducing costs and increasing system reliability.

Extension module

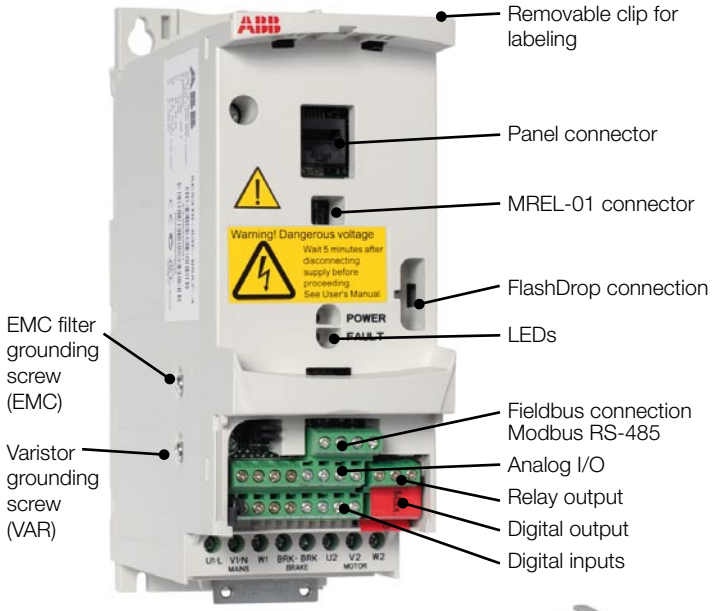
MREL-01
ACS310 has one relay output as standard. The optional MREL-01 module offers three additional relay outputs. The outputs can be configured for different functions by setting selected parameters.

Protection and installation

NEMA 1 kit
The NEMA 1 kit includes a connection box for finger protection, conduit tube installation, and a hood for protection against dirt and dust.

Terminal cover
The terminal cover is for protection of the I/O connections.

Clamping plates
The clamping plates are used for protection against electrical disturbances. The clamping plates with the clamps are included in the drive package as standard.




Terminal cover
(included as standard)


Clamping plates
(included as standard)


MREL-01 module


NEMA 1 kit

Options
External

A separate order line and type code is required for any of these external options.

FlashDrop tool

FlashDrop is a powerful palm sized tool for fast and easy parameter selecting and setting. It gives the possibility to hide selected parameters to protect the machine. Only the parameters needed in the application are shown. The tool can copy parameters between two drives or between a PC and a drive. All the above can be done without a power connection to the drive – in fact, it is not even necessary to unpack the drive.

DrivePM
DrivePM (Drive parameter manager) is a tool to create, edit and copy parameter sets for FlashDrop. For each parameter/group the user has a possibility to hide it, which means that the drive user does not see the parameter/group at all. DrivePM version 1.2 is compatible with ACS310 drives.

DrivePM requirements
- Windows 2000/XP/Vista
- Free serial port from a PC

FlashDrop package includes
- FlashDrop tool
- DrivePM software on a CD-rom
- User's manual in English and in pdf-format on the CD-rom
- Cable OPCA-02 for connection between the PC and FlashDrop tool
- Battery charger

SREA-01 Ethernet adapter

SREA-01 Ethernet adapter with remote monitoring access can send process data, data logs and event messages independently, without a PLC or a dedicated on-site computer. It has an internal web server for configuration and drive access.

Options
External

A separate order line and type code is required for any of these external options.

EMC filters

The ACS310's internal EMC filter is designed to meet category C3 requirements of EN/IEC 61800-3 standard. External EMC filters are used to enhance the drives electromagnetic performance in conjunction with its internal filtering. Maximum motor cable length depends on required electromagnetic performance, according to the table below.

Type code ACS310-	Frame size	Filter type	Cable length with EMC filter			Cable length without EMC filter	
			C1 [m]	C2 [m]	C3 [m]	C3 [m]	C4 [m]
3-phase supply voltage 200 - 240 V units							
03X-02A6-2	R0	RFI-32	10	30	-	30	30
03X-03A9-2	R0	RFI-32	10	30	-	30	30
03X-05A2-2	R1	RFI-32	10	30	50	30	50
03X-07A4-2	R1	RFI-32	10	30	50	30	50
03X-08A3-2	R1	RFI-32	10	30	50	30	50
03X-10A8-2	R2	RFI-32	10	30	50	30	50
03X-14A6-2	R2	RFI-33	10	30	50	30	50
03X-19A4-2	R2	RFI-33	10	30	50	30	50
03X-26A8-2	R3	RFI-34	10	30	50	30	50
03X-34A1-2	R4	RFI-34	10	30	50	30	50
03X-50A8-2	R4	RFI-34	10	30	50	30	50
3-phase supply voltage 380 - 480 V units							
03X-01A3-4	R0	RFI-32	30	30	-	30	30
03X-02A1-4	R0	RFI-32	30	30	-	30	30
03X-02A6-4	R1	RFI-32	50	50	50	30	50
03X-03A6-4	R1	RFI-32	50	50	50	30	50
03X-04A5-4	R1	RFI-32	50	50	50	30	50
03X-06A2-4	R1	RFI-32	50	50	50	30	50
03X-08A0-4	R1	RFI-32	50	50	50	30	50
03X-09A7-4	R1	RFI-32	50	50	50	30	50
03X-13A8-4	R3	RFI-33	40	40	40	30	50
03X-17A2-4	R3	RFI-33	40	40	40	30	50
03X-25A4-4	R3	RFI-33	40	40	40	30	50
03X-34A1-4	R4	RFI-34	-	30	-	30	50
03X-41A8-4	R4	RFI-34	-	30	-	30	50
03X-48A4-4	R4	RFI-34	-	30	-	30	50

Low leakage current filters

Low leakage current filters are ideal for installations where residual current devices (RCD) are required and leakage current needs to be below 30 mA.

Type code ACS310-	Frame size	Filter type	Cable length[1] with LRFI filter
			C2 [m]
Low leakage current filters, 3-phase supply voltage 400 V units			
03X-01A3-4	R0	LRFI-31	10
03X-02A1-4	R0	LRFI-31	10
03X-02A6-4	R1	LRFI-31	10
03X-03A6-4	R1	LRFI-31	10
03X-04A5-4	R1	LRFI-31	10
03X-06A2-4	R1	LRFI-31	10
03X-08A0-4	R1	LRFI-32	10
03X-09A7-4	R1	LRFI-32	10

[1] Internal EMC filter must be disconnected by removing the EMC screw from the drive.

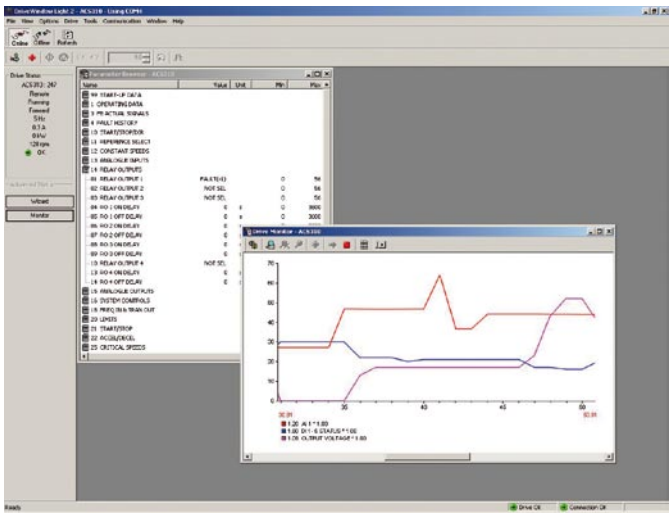
EMC standards in general

EN 61800-3 (2004), product standard	EN 55011, product family standard for industrial, scientific and medical (ISM) equipment	EN 61800-3/A11 (2000), product standard
Category C1	Group 1 Class B	1st environment, unrestricted distribution
Category C2	Group 1 Class A	1st environment, restricted distribution
Category C3	Group 2 Class A	2nd environment, unrestricted distribution
Category C4	Not applicable	2nd environment, restricted distribution

Options
Software tools

A separate order line and type code is required for any of these software tool options.

DriveWindow Light 2



DriveWindow Light 2 is an easy-to-use start-up and maintenance tool for ACS310 drives. It can be used in an offline mode, which enables parameter setting at the office even before going to the actual site. The parameter browser enables viewing, editing and saving of parameters. The parameter comparison feature makes it possible to compare parameter values between the drive and saved parameter files. With the parameter subset you can create your own parameter sets. Controlling the drive is one of the features in DriveWindow Light. With this software tool, you can monitor up to four signals simultaneously. This can be done in both graphical and numerical format. DriveWindow Light 2 version 2.9 or later is compatible with ACS310 drives.

Start-up wizards
Start-up wizards make the setting of parameters easy. Simply launch the wizard, select an appropriate assistant e.g. for setting analog outputs, and all parameters related to this function are shown together with help pictures.

Highlights
- Editing, saving and downloading parameters
- Graphical and numerical signal monitoring
- Drive control
- Start-up wizards

DriveWindow Light requirements
- Windows NT/2000/XP/Vista
- Free serial port from a PC
- Free control panel connector

Technical data

Cooling

ACS310 is fitted with cooling fans as standard. The cooling air must be free from corrosive substances and must not be above the maximum ambient temperature of 50 °C. For more specific limits see the Technical specification - Environmental limits in this catalogue.

Cooling air flow

Type code	Frame size	Heat dissipation		Air flow	
		w	BTU/Hr	m^3/h	ft^3/min
3-phase supply voltage 200 - 240 V units					
ACS310-03X-02A6-2	R0	42	142	-*)	-*)
ACS310-03X-03A9-2	R0	54	183	-*)	-*)
ACS310-03X-05A2-2	R1	64	220	24	14
ACS310-03X-07A4-2	R1	86	295	24	14
ACS310-03X-08A3-2	R1	88	302	21	12
ACS310-03X-10A8-2	R2	111	377	21	12
ACS310-03X-14A6-2	R2	140	476	52	31
ACS310-03X-19A4-2	R2	180	613	52	31
ACS310-03X-26A8-2	R3	285	975	71	42
ACS310-03X-34A1-2	R4	328	1119	96	57
ACS310-03X-50A8-2	R4	488	1666	96	57
3-phase supply voltage 380 - 480 V units					
ACS310-03X-01A3-4	R0	35	121	-*)	-*)
ACS310-03X-02A1-4	R0	40	138	-*)	-*)
ACS310-03X-02A6-4	R1	50	170	13	8
ACS310-03X-03A6-4	R1	60	204	13	8
ACS310-03X-04A5-4	R1	69	235	13	8
ACS310-03X-06A2-4	R1	90	306	19	11
ACS310-03X-08A0-4	R1	107	364	24	14
ACS310-03X-09A7-4	R1	127	433	24	14
ACS310-03X-13A8-4	R3	161	551	52	31
ACS310-03X-17A2-4	R3	204	697	52	31
ACS310-03X-25A4-4	R3	301	1029	71	42
ACS310-03X-34A1-4	R4	408	1393	96	57
ACS310-03X-41A8-4	R4	498	1700	96	57
ACS310-03X-48A4-4	R4	588	2007	96	57

X within the type code stands for E or U.
*) Frame size R0 with free convection cooling.

Free space requirements

Enclosure type	Space above mm	Space below mm	Space on left/right mm
All frame sizes	75	75	0

Fuses

Standard fuses can be used with ABB standard drives. For input fuse connections see table below.

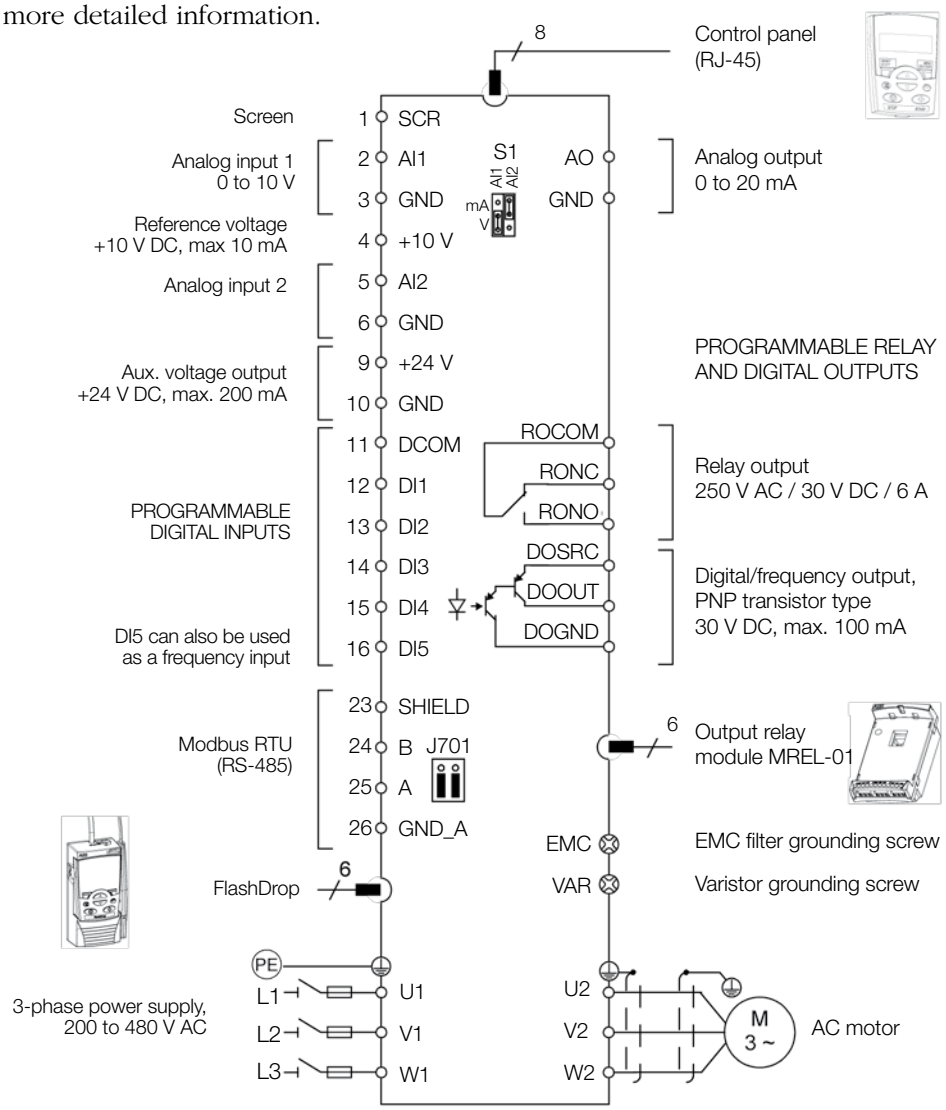
Selection table

Type code	Frame size	IEC Fuses		UL Fuses	
		A	Fuse type*)	A	Fuse type*)
3-phase supply voltage 200 - 240 V units					
ACS310-03X-02A6-2	R0	10	gG	10	UL class T
ACS310-03X-03A9-2	R0	10	gG	10	UL class T
ACS310-03X-05A2-2	R1	10	gG	15	UL class T
ACS310-03X-07A4-2	R1	16	gG	15	UL class T
ACS310-03X-08A3-2	R1	16	gG	15	UL class T
ACS310-03X-10A8-2	R2	16	gG	20	UL class T
ACS310-03X-14A6-2	R2	25	gG	30	UL class T
ACS310-03X-19A4-2	R2	25	gG	35	UL class T
ACS310-03X-26A8-2	R3	63	gG	60	UL class T
ACS310-03X-34A1-2	R4	80	gG	80	UL class T
ACS310-03X-50A8-2	R4	100	gG	100	UL class T
3-phase supply voltage 380 - 480 V units					
ACS310-03X-01A3-4	R0	10	gG	10	UL class T
ACS310-03X-02A1-4	R0	10	gG	10	UL class T
ACS310-03X-02A6-4	R1	10	gG	10	UL class T
ACS310-03X-03A6-4	R1	10	gG	10	UL class T
ACS310-03X-04A5-4	R1	16	gG	15	UL class T
ACS310-03X-06A2-4	R1	16	gG	15	UL class T
ACS310-03X-08A0-4	R1	16	gG	20	UL class T
ACS310-03X-09A7-4	R1	20	gG	25	UL class T
ACS310-03X-13A8-4	R3	25	gG	30	UL class T
ACS310-03X-17A2-4	R3	35	gG	35	UL class T
ACS310-03X-25A4-4	R3	50	gG	50	UL class T
ACS310-03X-34A1-4	R4	80	gG	80	UL class T
ACS310-03X-41A8-4	R4	100	gG	100	UL class T
ACS310-03X-48A4-4	R4	100	gG	100	UL class T

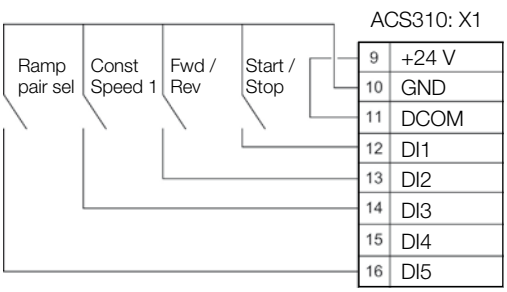
X within the type code stands for E or U.
*) According to IEC-60269 standard.

Control connections

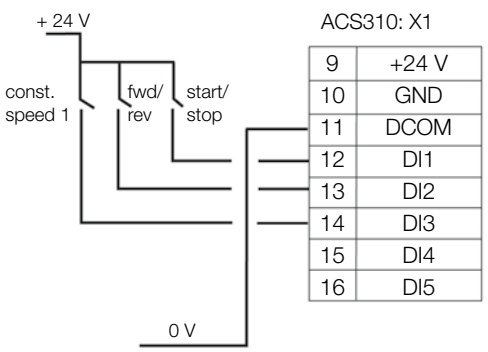
The diagram below gives an overview of ACS310 control connections. Please refer to the ACS310 User's Manual for more detailed information.



DI configuration
NPN connected (sink)



DI configuration
PNP connected (source) with external power supply



Services

All industries face a common goal: to maximize their production output at the lowest possible cost, while maintaining the highest quality end products. One of ABB's key objectives is to maximize the uptime of its customers' processes by ensuring optimum lifetime of all ABB products in a predictable, safe and low cost manner.

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.

Maximizing return on investment

At the heart of ABB's services is its drive lifecycle management model. All services available for ABB low voltage drives are planned according to this model. For customers it is easy to see which services are available at which phase.

Drive specific maintenance schedules are also based on this four-phase model. Thus, a customer knows precisely the timing of the part replacements plus all other maintenance related actions. The model also helps the customer when deciding about upgrades, retrofits and replacements.

Professional management of the drive's lifecycle maximizes the return on any investment in ABB low voltage drives.

ABB drive lifecycle management model

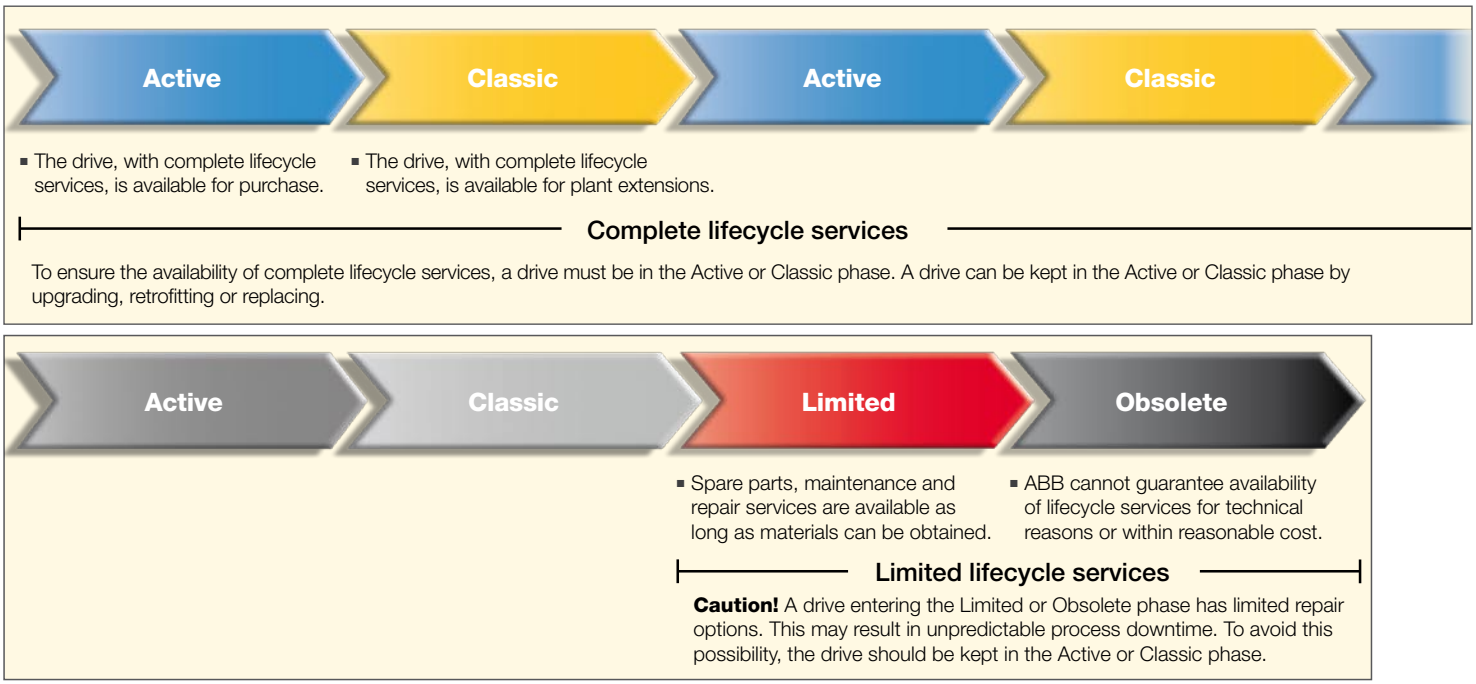


ABB follows a four-phase model for managing drive lifecycles, which brings enhanced customer support and improved efficiency.

Examples of lifecycle services are: selection and dimensioning, installation and commissioning, preventive and corrective maintenance, remote services, spare part services, training and learning, technical support, upgrade and retrofit, replacement and recycling.

Power and productivity
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