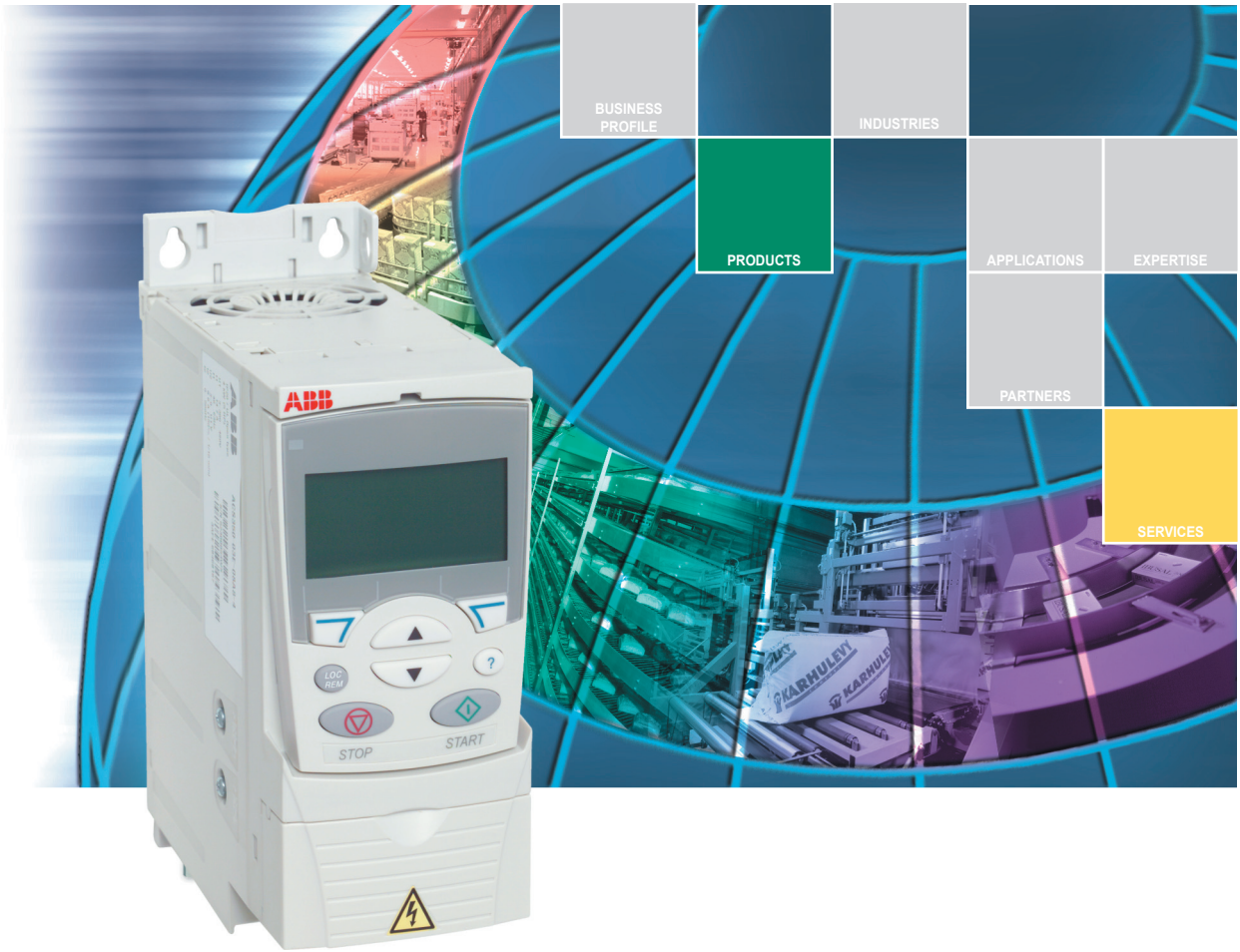
ABB general machinery drives

ACS350, 0.5 to 10 hp

Technical catalog



Contents

Choice 1: Simply contact your local ABB drives sales office and let them know what you want. Use page 4 as a reference section for more information.

OR

Choice 2: Build up your own ordering code using the simple 7-step approach below. Then, contact your local ABB Drives sales office.

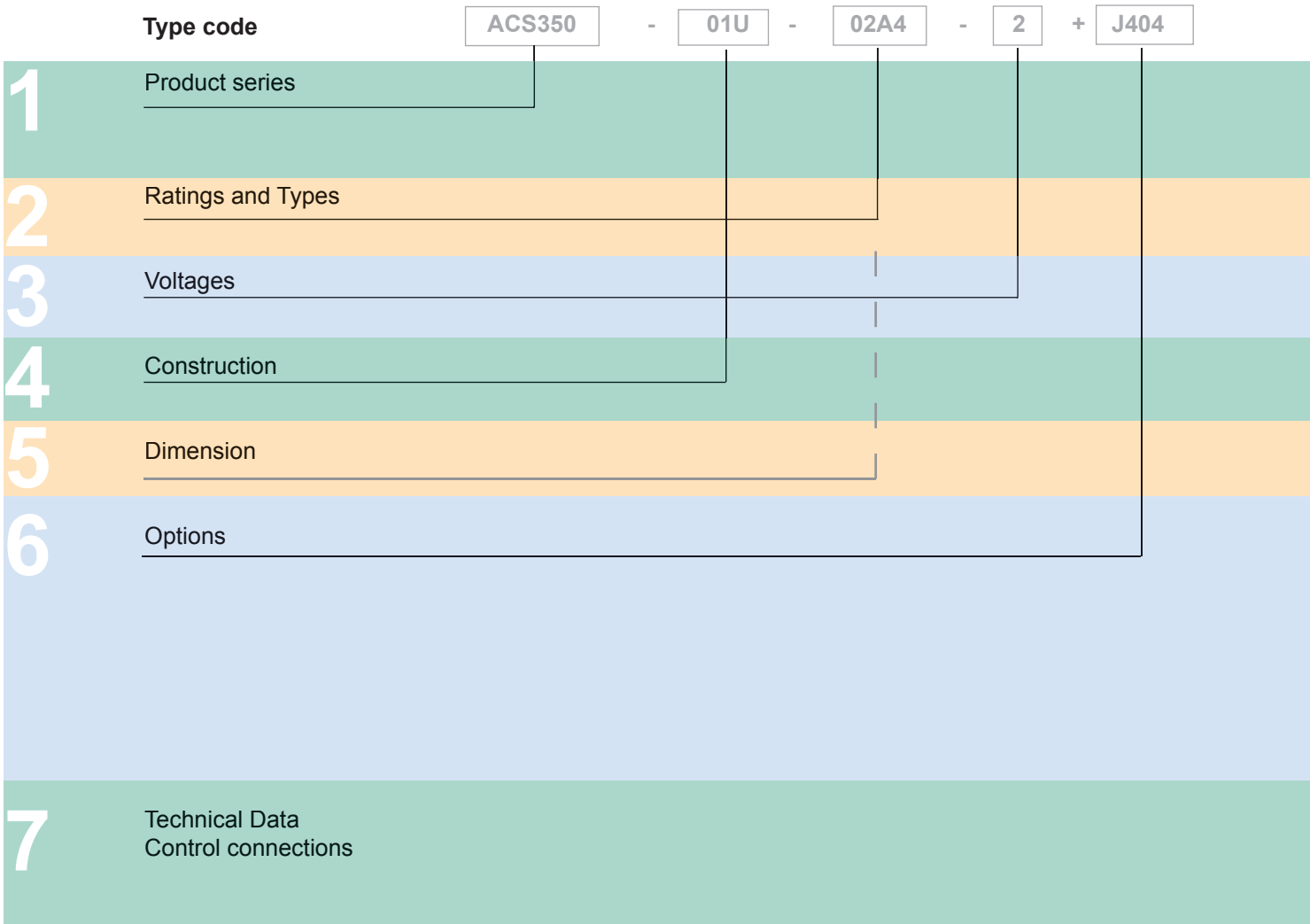


ABB General Machinery Drive, ACS350

ABB general machinery drives

ACS350 - 01U - 02A4 - 2 + J404

What is an ABB ACS350 general machinery drive?

The ABB ACS350 machinery drive is designed specifically for the OEM machine-building sector. In this sector, the manufacturing time per unit is critical. The ACS350 is designed to be the fastest drive in terms of installation, setting parameters and commissioning. The ACS350 has been designed to be as user-friendly as possible, yet provide high application flexibility. The ACS350 offers diverse functionality to cater to the most demanding needs.

Where can it be used?

ABB general machinery drives are designed to meet the requirements of an extensive range of machinery applications. The drive is ideal for food and beverage, material handling, textile, printing, rubber and plastics, and woodworking applications.

Highlights

- FlashDrop
- Sensorless Vector Motor Control
- Sequence programming
- Impressive software and compact hardware
- Optimized interfaces for users and machines
- Unified height and depth
- Convenient installation
- Coated boards as standard
- Built-in brake chopper as standard

Features	Benefits	Notes
FlashDrop	Faster and easier drive set up and commissioning.	New fast, safe and trouble free method to download parameters available without electricity - Patented.
Sequence programming	Logic programming included as standard. PLC-like functions standard	Application specific 8-state programming with comprehensive triggering conditions.
Software	State of the art technology and performance with exceptional flexibility.	Sensorless vector and flux vector control with innovative features.
User interfaces	Cost efficient approach offering different control panels according to functionality need.	Blank cover Basic panel with numerical display Advanced control panel with clear alphanumerical dynamic menus, real time clock and 14 languages.
Cabinet compatibility	Optimum installation layout and efficient cabinet space usage.	Screw, DIN-rail, sideways and side-by-side mounting. Unified height and depth.
Fieldbuses	High speed communication with compact and robust fieldbus design.	Enclosed plug-in type of fieldbus adapter.
Built-in EMC filter	No extra space, parts, time or cost required.	2nd environment filter complying with IEC 61800-3 as standard.
Coated boards	Longer lifetime in hostile environments. Reduced service.	Protections against moisture and hostile particles as standard.

Technical specification

ACS350 - 01U - 02A4 - 2 + J404

Input connection

Voltage and power range	1-phase, 200 to 240 V ±10% 0.37 to 2.2 kW (0.5 to 3 hp) 3-phase, 200 to 240 V ±10% 0.37 to 4 kW (0.5 to 5 hp) 3-phase, 380 to 480 V ±10% 0.37 to 7.5 kW (0.5 to 10 hp)
Frequency	48 to 63 Hz
Power factor	0.98

Output connection

Voltage	3-phase, from 0 to U_{SUPPLY}
Frequency	0 to 500 Hz
Continuous loading capability (constant torque at a max. ambient temperature of 40°C)	Rated output current I_{2N}
Overload capacity (at a max. ambient temperature of 40°C)	1.5 x I_{2N} for 1 minute every 10 minutes 1.8 x I_{2N} for 2 s every 10 minutes
Switching frequency Default Selectable	 4 kHz 4 to 12 kHz with 4 kHz steps
Acceleration time	0.1 to 1800 s
Deceleration time	0.1 to 1800 s
Braking	Brake chopper- standard (100% braking capability)

Environmental limits

Ambient temperature	-10 to 40°C (14 to 104°F), no frost allowed 50°C (122°F) with 10% derating
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)
Protection class	IP 20 / Protected Chassis
Enclosure color	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 73/23/EEC with supplements
Machinery Directive 98/37/EC
EMC Directive 89/336/EEC with supplements
Quality assurance system ISO 9001
Environmental system ISO 14001
UL, cUL, and CE approvals

EMC (according to EN61800-3)

2nd environment filter, unrestricted distribution with 30 m (98 ft) cable- standard.

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
Potentiometer reference	10 V ±1% max. 10 mA, R < 10 kΩ
value	0.1%
Resolution	±1%
Accuracy	
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 protected
Frequency	10 Hz to 16 kHz
Resolution	1 Hz
Accuracy	0.2%

Serial communication

Fieldbuses	Plug-in type
Refresh rate	< 10 ms (between drive and fieldbus module)
PROFIBUS DP	9-pin D-connector Baud rate up to 12 Mbit/s PROFIBUS DP and PROFIBUS DPV1 Network side based on “PROFIdrive” profile.
DeviceNet	5-pin screw type connector Baud rate up to 500 kbit/s Network side based on ODVA “AC/DC drive” profile.
CANopen	9-pin D-connector Baud rate up to 1 Mbit/s Network side based on CiA DS402 profile.
Modbus	4-pin screw type connector Baud rate up to 115 kbit/s

Ratings, types, voltages and construction

ACS350 - 01U - 02A4 - 2 + J404

Type code

This is a unique reference number that clearly identifies the drive by power rating, voltage, and construction. Once you have selected the type code, the frame size can be used to determine the drive dimensions, shown on the next page.

Voltages

The ACS350 is available in two voltage ranges:

2 = 200 - 240 V
4 = 380 - 480 V

Construction

"01U" or the "03U" within the type code indicates the number of input phases for the power and EMC filtering.

01 = 1-phase (200 - 240V only)
03 = 3-phase (200 - 240V and 380 - 480V)

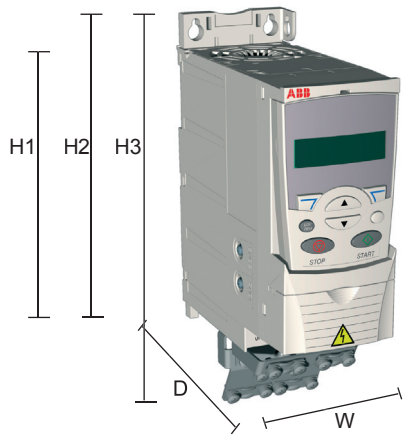
U = EMC filter disconnected, 60 Hz frequency
(In case the filter is required it can easily be connected.)

Ratings			Type code	Frame size
P_N hp	P_N kW	I_{2N} A		
1-phase supply voltage 200 - 240 V units				
0.5	0.37	2.4	ACS350-01U-02A4-2	R0
1	0.75	4.7	ACS350-01U-04A7-2	R1
1.5	1.1	6.7	ACS350-01U-06A7-2	R1
2	1.5	7.5	ACS350-01U-07A5-2	R2
3	2.2	9.8	ACS350-01U-09A8-2	R2
3-phase supply voltage 200 - 240 V units				
0.5	0.37	2.4	ACS350-03U-02A4-2	R0
0.75	0.55	3.5	ACS350-03U-03A5-2	R0
1	0.75	4.7	ACS350-03U-04A7-2	R1
1.5	1.1	6.7	ASC350-03U-06A7-2	R1
2	1.5	7.5	ACS350-03U-07A5-2	R1
3	2.2	9.8	ACS350-03U-09A8-2	R2
5	4	17.6	ACS350-03U-17A6-2	R2
3-phase supply voltage 380 - 480 V units				
0.5	0.37	1.2	ACS350-03U-01A2-4	R0
0.75	0.55	1.9	ACS350-03U-01A9-4	R0
1	0.75	2.4	ACS350-03U-02A4-4	R0
1.5	1.1	3.3	ACS350-03U-03A3-4	R1
2	1.5	4.1	ACS350-03U-04A1-4	R1
3	2.2	5.6	ACS350-03U-05A6-4	R1
5	4	8.8	ACS350-03U-08A8-4	R1
7.5	5.5	12.5	ACS350-03U-12A5-4	R3
10	7.5	15.6	ACS350-03U-15A6-4	R3

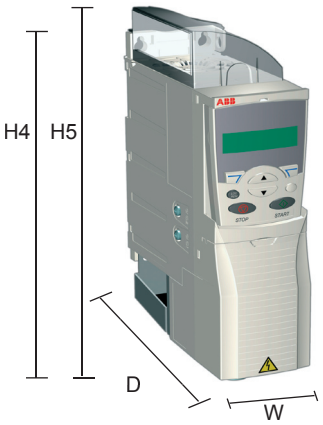
Dimensions, Weight and Noise

ACS350 - 01U - 02A4 - 2 + J404

Cabinet-mounted drives (IP 20 UL open)



Wall-mounted drives (NEMA 1)



Frame size	Dimensions and weights												Noise
	IP 20 (cabinet) / UL open												
	H1		H2		H3		W		D		Weight		Noise level
	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb	dBA
R0	169	6.65	202	7.95	239	9.41	70	2.76	161	6.34	1.1	2.4	50
R1	169	6.65	202	7.95	239	9.41	70	2.76	161	6.34	1.3/1.2[1)]	2.9/2.6[1)]	60
R2	169	6.65	202	7.95	239	9.41	105	4.13	165	6.5	1.5	3.3	60
R3	169	6.65	202	7.95	236	9.29	169	6.65	169	6.65	2.5	5.5	60

[1)] U_N=200...240 V: 1.3 kg / 2.9 lb, U_N=380...480 V: 1.2 kg / 2.6 lb

Frame size	Dimensions and weights										Noise
	NEMA 1										
	H4		H5		W		D		Weight		Noise level
	mm	in	mm	in	mm	in	mm	in	kg	lb	dBA
R0	257	10.12	280	11.02	70	2.76	169	6.65	1.5	3.3	50
R1	257	10.12	280	11.02	70	2.76	169	6.65	1.7/1.6[2)]	3.7/3.5[2)]	60
R2	257	10.12	282	11.10	105	4.13	169	6.65	1.9	4.2	60
R3	260	10.24	299	11.77	169	6.65	177	6.97	3.1	6.8	60

[2)] U_N=200...240 V: 1.7 kg / 3.7 lb, U_N=380...480 V: 1.6kg / 3.5 lb

NOTES:
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

ACS350 - 01U - 02A4 - 2 + J404

How to select options

The options show in the table are available with the ACS350. Each has an option-unique 4-digit code, which is shown in the first column. This option code is added to the end of the basic drive option code using a "+" code.

For example, an ACS350-03U-01A2-4+J400 would be a base drive with an Advanced Control Panel shipped together. Option descriptions are provided in the subsequent pages.

Selection table

Control panel		
J400	Advanced control panel	ACS-CP-A
J404	Basic control panel	ACS-CP-C
Potentiometer		
J402	Potentiometer	MPOT-01
Fieldbus		
K451	DeviceNet	FDNA-01
K454	PROFIBUS DP	FPBA-01
K457	CANopen	FCAN-01
K458	ModBus RTU	FMBA-01

Options

ACS350 - 01U - 02A4 - 2 + J404

User interfaces

Panel cover
The purpose of the panel cover is to protect the drive's connection surfaces if a control panel is not used.

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

Advanced control panel
For easy drive programming, a detachable, multi-lingual alphanumeric advanced control panel is available. The control panel provides assistants and a built-in 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.

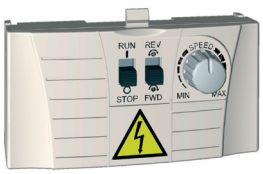
Potentiometer
Potentiometer MPOT-01 with two switches: start/stop and forward/reverse. Polarity (PNP or NPN) is selected with DIP switches. No external power source is needed for the potentiometer.

Panel mounting kit
The panel mounting kit ACS/H-CP-EXT enables mounting of control panels on cabinet doors. This kit includes a 9 ft extension cable and mounting hardware.

FlashDrop
FlashDrop is a powerful palm sized tool for fast and easy parameter selecting and setting. This tool can be used to download parameters to a drive in as little as two seconds. Using this tool it is also possible to hide selected parameters to protect the machine. Only the parameters needed in the application are shown. FlashDrop does not require the drive to be powered. The drives shipping container is also designed to allow use of the FlashDrop tool without removing the drive.

Panel cover

Basic control panel



Potentiometer

Advanced control panel


FlashDrop

Options

ACS350	-	01U	-	02A4	-	2	+	J404

Machine interfaces

Plug-in fieldbus modules bring connectivity to major automation systems. A single twisted pair of wire avoids large amounts of conventional cabling, thereby reducing costs and increasing system reliability.

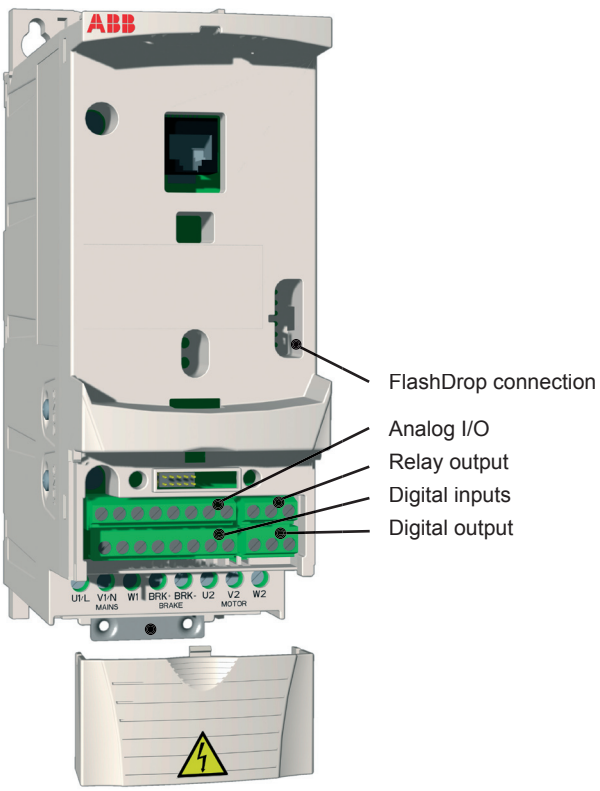
The ACS350 supports the following fieldbus protocols:

- DeviceNet
- PROFIBUS DP
- CANopen
- Modbus RTU

Protection and installation

NEMA 1 kit

The NEMA 1 kit includes a conduit box and hood for protection against dirt and dust. Two kits are available to cover all frame sizes of the ACS350. MUL1-R1 covers frame sizes R0 through R2 and MUL1-R3 covers frame size R3.



Terminal cover

DriveWindow Light 2

DriveWindow Light 2 is an easy-to-use start-up and maintenance tool for ACS350 drives. It can be used in an offline mode, enabling parameter setting at the office 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 a drive and file. Using the parameter subset you can create your own parameter sets. Controlling the drive is also possible using DriveWindow Light. With DriveWindow Light, you can monitor up to four signals simultaneously in either a graphical or numerical format. Any signal can be set to stop being monitored at a pre-defined level.

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.

DriveSP - special feature for the ACS350

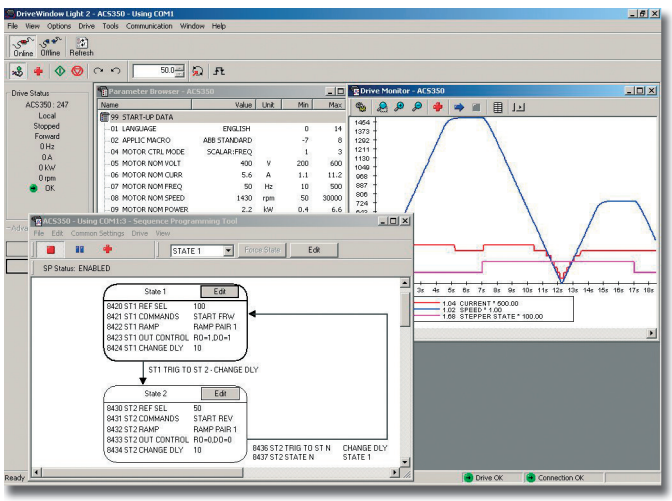
For the ACS350 DriveWindow Light offers DriveSP, which is a new tool used for setting up the sequence programming parameters. DriveSP draws the program graphically on the PC screen showing used states, active state, transition conditions, possible transition delay as well as used reference and ramps.

Highlights

- Sequence programming tool for ACS350
- Editing, saving and downloading parameters
- Graphical and numerical signal monitoring
- Drive control
- Start-up wizards

DriveWindow Light requirements

- Windows NT/2000/XP
- Free serial port from a PC
- Free control panel connector



Specifications
Brake Resistors

Brake resistors

All ACS350 drives are configured with a built-in brake chopper rated for 100% braking. By connecting an external resistor you can enable the dynamic braking function. The minimum and maximum resistance and the required power is shown in the table below. Ensure the resistor purchased does not exceed the maximum resistance nor is smaller than the minimum resistance.

For more information about selection of brake resistors, see the ACS350 User's Manual.

Selection table

Type code	Frame size	R_{min} ohm	R_{max} ohm	P_{BRmax} hp	kW
1-phase supply voltage 200 - 240 V units					
ACS350-01U-02A4-2	R0	70	390	0.5	0.37
ACS350-01U-04A7-2	R1	40	200	1	0.75
ACS350-01U-06A7-2	R1	40	130	1.5	1.1
ACS350-01U-07A5-2	R2	30	100	2	1.5
ACS350-01U-09A8-2	R2	30	70	3	2.2
3-phase supply voltage 200 - 240 V units					
ACS350-03U-02A4-2	R0	70	390	0.5	0.37
ACS350-03U-03A5-2	R0	70	260	0.75	0.55
ACS350-03U-04A7-2	R1	40	200	1	0.75
ASC350-03U-06A7-2	R1	40	130	1.5	1.1
ACS350-03U-07A5-2	R1	30	100	2	1.5
ACS350-03U-09A8-2	R2	30	70	3	2.2
ACS350-03U-17A6-2	R2	30	40	5	4
3-phase supply voltage 380 - 480 V units					
ACS350-03U-01A2-4	R0	310	1180	0.5	0.37
ACS350-03U-01A9-4	R0	230	800	0.75	0.55
ACS350-03U-02A4-4	R0	210	500	1	0.75
ACS350-03U-03A3-4	R1	150	400	1.5	1.1
ACS350-03U-04A1-4	R1	130	300	2	1.5
ACS350-03U-05A6-4	R1	100	200	3	2.2
ACS350-03U-08A8-4	R1	70	110	5	4
ACS350-03U-12A5-4	R3	40	80	7.5	5.5
ACS350-03U-15A6-4	R3	40	60	10	7.5

Technical data

Cooling

The ACS350 is configured with cooling fans as standard. The cooling air must be free from corrosive materials and must not be above the maximum ambient temperature of 40°C (50°C with derating). For more specific limits see the Technical specification - Environmental limits in this catalog.

Cooling air flow

Type code	Frame size	Heat dissipation		Air flow	
		W	BTU/Hr	m^3/h	ft^3/min
1-phase supply voltage 200 - 240 V units					
ACS350-01U-02A4-2	R0	25	85	-*)	-*)
ACS350-01U-04A7-2	R1	46	157	24	14
ACS350-01U-06A7-2	R1	71	242	24	14
ACS350-01U-07A5-2	R2	73	249	21	12
ACS350-01U-09A8-2	R2	96	328	21	12
3-phase supply voltage 200 - 240 V units					
ACS350-03U-02A4-2	R0	19	65	-*)	-*)
ACS350-03U-03A5-2	R0	31	106	-*)	-*)
ACS350-03U-04A7-2	R1	38	130	24	14
ASC350-03U-06A7-2	R1	60	205	24	14
ACS350-03U-07A5-2	R1	62	212	21	12
ACS350-03U-09A8-2	R2	83	283	21	12
ACS350-03U-17A6-2	R2	152	519	52	31
3-phase supply voltage 380 - 480 V units					
ACS350-03U-01A2-4	R0	11	38	-*)	-*)
ACS350-03U-01A9-4	R0	16	55	-*)	-*)
ACS350-03U-02A4-4	R0	21	72	-*)	-*)
ACS350-03U-03A3-4	R1	31	106	13	8
ACS350-03U-04A1-4	R1	40	137	13	8
ACS350-03U-05A6-4	R1	61	208	19	11
ACS350-03U-08A8-4	R1	94	321	24	14
ACS350-03U-12A5-4	R3	130	444	52	31
ACS350-03U-15A6-4	R3	173	591	52	31

Free space requirements

Enclosure type	Space above mm/in	Space below mm/in	Space on left/right mm/in
All frame sizes	80/3.15	80/3.15	0/0

Fuses

Standard semi-conductor fuses can be used with the ACS350. Recommended fuse ratings are shown in the table below.

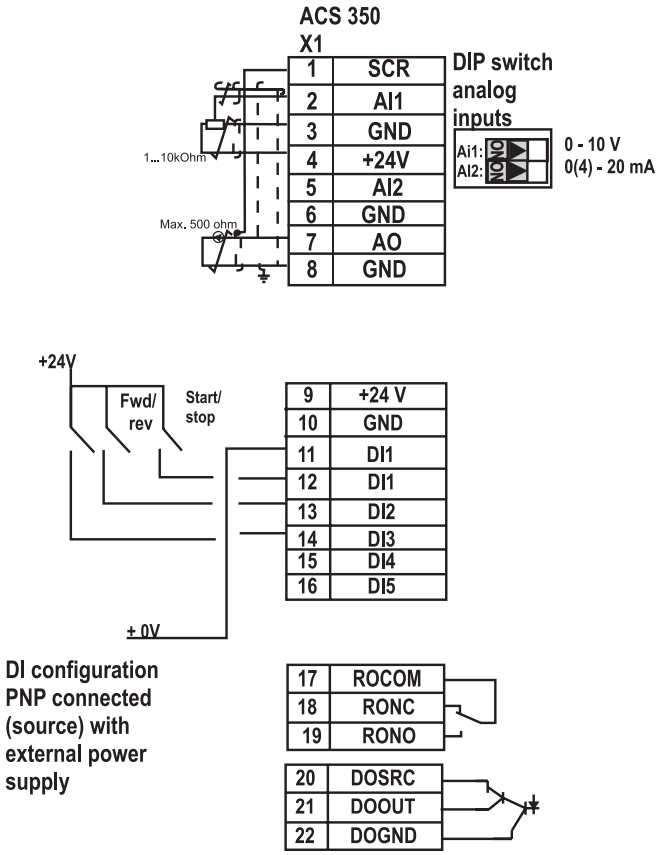
Selection table

Type code	Frame size	IEC Fuses		UL Fuses	
		A	Fuse type*)	A	Fuse type*)
1-phase supply voltage 200 - 240 V units					
ACS350-01U-02A4-2	R0	10	gG	10	UL class T
ACS350-01U-04A7-2	R1	16	gG	20	UL class T
ACS350-01U-06A7-2	R1	20	gG	25	UL class T
ACS350-01U-07A5-2	R2	25	gG	30	UL class T
ACS350-01U-09A8-2	R2	35	gG	35	UL class T
3-phase supply voltage 200 - 240 V units					
ACS350-03U-02A4-2	R0	10	gG	10	UL class T
ACS350-03U-03A5-2	R0	10	gG	10	UL class T
ACS350-03U-04A7-2	R1	10	gG	15	UL class T
ASC350-03U-06A7-2	R1	16	gG	15	UL class T
ACS350-03U-07A5-2	R1	16	gG	15	UL class T
ACS350-03U-09A8-2	R2	16	gG	20	UL class T
ACS350-03U-17A6-2	R2	25	gG	35	UL class T
3-phase supply voltage 380 - 480 V units					
ACS350-03U-01A2-4	R0	10	gG	10	UL class T
ACS350-03U-01A9-4	R0	10	gG	10	UL class T
ACS350-03U-02A4-4	R0	10	gG	10	UL class T
ACS350-03U-03A3-4	R1	10	gG	10	UL class T
ACS350-03U-04A1-4	R1	16	gG	15	UL class T
ACS350-03U-05A6-4	R1	16	gG	15	UL class T
ACS350-03U-08A8-4	R1	20	gG	25	UL class T
ACS350-03U-12A5-4	R3	25	gG	30	UL class T
ACS350-03U-15A6-4	R3	30	gG	35	UL class T

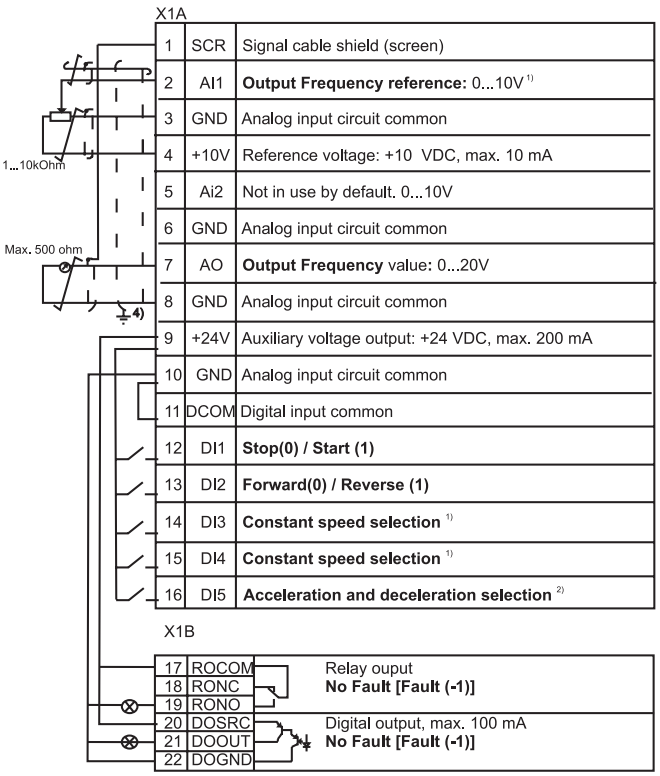
*) According to IEC-60269 standard.

Control connections

These connections are shown as examples only. Please refer to the ACS350 User's Manual for more detailed information.



Default I/O connections



Notes

Notes

ABB Product Family

ACS50, ACS150, ACS350 and ACS550 AC Drive Families
Includes the ACS50, ACS150, ACS350 and ACS550 AC drives, covering sizes from ¼ hp to 550 hp and voltages from 110 to 600 V.

ACS800 AC Drive Family
The ACS800 product family includes Single drives, Multi-Drives, Regenerative AC drives, and Ultra Low Harmonic drives in ratings from 0.75 hp to 3,000 hp and voltages from 230 to 690 V.

Medium Voltage Drives
ABB's highly reliable ACS1000 is available from 400 hp to 6,700 hp and voltages of 2.3, 3.3, and 4.16 kV.

DCS 400 and DCS 500 DC Drive Families
DCS 400 and DCS 500 DC Drives are available from 5 hp to 10,000 hp and voltages from 230 to 1,190 V.

Low Voltage AC, DC and Medium Voltage AC Motors
Low-voltage AC motors from ABB range from ¼ hp to 800 hp and voltages from 208 to 480 V. A wide range of medium-voltage AC and low-voltage DC motors are also available.

ABB Control
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