



Low voltage AC drives

# ABB machinery drives

## ACS850

0.37 to 560 kW/0.5 to 700 hp

### Catalog

# Introduction to ACS850



## ABB machinery drives

The ABB machinery drives are designed to be fast drives to install, parameter-set and commission. Thus saving hours of engineering work. They are highly compact and cost effective. Equipped with cutting-edge intelligence and safety capability the drives are designed specifically to meet the production and performance needs of machine builders, system integrators and panel builders, as well as the requirements of end users in a broad range of applications.

In the ABB machinery drives portfolio, ACS850 stands out for its wide power range and high-performance speed and torque control. The embedded PLC, configurable by using an SPC block program, offers a unique possibility for configuring the drive to best support your machine. By choosing an ABB machinery drive, machine builders not only get all the clever things inside the drive, but also everything outside: the entire global ABB network. This means a full range of products and services designed to support your business in an optimal way.

## Highlights

- Designed for speed and torque machinery applications for synchronous, permanent magnet and asynchronous motors
- Accurate motor torque and speed control even without feedback provided by direct torque control (DTC) technology
- Compact design for both single-axis and common DC
- Wide variety of different communication protocols and mechanical options for cabinet mounting available
- Functional safety as standard



# Contents

2	Introduction to ACS850
4	Flexibility and scalability for machinery applications
6	Typical applications
7	How to select a drive
8	Technical data
9	Ratings, types and dimensions
11	Dimensions
12	Control connections
13	Control program for premium motor control
14	Control program for easy drive operation
15	Control program variants for extended performance
16	Synchronous reluctance motor-drive package
17	Options
17	Interface
19	Software tools
20	External
24	G1 and G2 frame drive modules
25	Remote monitoring and diagnostics tools
26	Life cycle services
28	ABB automation products



# Flexibility and scalability for machinery applications

ACS850 drives are designed to be built into a customer's own cabinet, using minimal cabinet space while ensuring that cabinet assembly is as easy as possible. The drive is highly modular and supports eight different fieldbus protocols thus providing flexible connectivity. In addition to a broad range of built-in options such as different I/O and communications, a wide selection of external accessories is also available. The flexibility and programmability of the drives make them suitable for many applications in different industries.

## Performance

Fast, dynamic and accurate step response with DTC motor control improves end product quality, productivity and reliability. Excellent process control even without pulse encoder for lower investment cost.

## Modularity

Many standard features and a wide range of options allow different system configurations that fit many application needs.

## Programming and configuration

With function block programming, relays and small PLCs can be replaced, which lowers investment cost and increases flexibility in system design.

## Compact and scalable design

Compact size, extensive power range from 0.37 to 560 kW and side-by-side mounting ensure optimized cabinet installation in a wide range of applications, resulting in space and cost savings.

## Supported motor types

Same drive can be used to control induction, permanent magnet, asynchronous, synchronous reluctance and high dynamic performance motors.



### Process control optimization

Simplify process analysis with load analyzer showing the load profile of the drive. With ABB's extensive PLC offering, it is possible to combine process control with our intelligent drive offering and motors, allowing user to benefit from ready-made functions such as load sharing, and maintenance and energy savings calculators.

### Energy savings

Improved energy management with energy saving calculator monitoring used and saved energy, displayed in kWh, currency (€ or \$) or volume of CO<sub>2</sub> emission. Improve motor performance and maximize process efficiency with energy optimizer feature enhancing the motor flux without reducing motor torque.

### Communication with major automation networks

Optional fieldbus adapters enable connectivity with major industrial automation networks.



### Safety

Integrated safe torque off (STO) function up to SIL 3 is a cost-effective and certified solution for safe machine maintenance by fulfilling IEC 61508, EN 62061 and EN ISO 13849-1 standards. The safety function can also be used to implement Emergency Stop without contactors.

### Remote monitoring

With a built-in web server and standalone datalogger, NETA-21 enables worldwide and secure access to drives.





# Typical applications

## Industries and applications

The machinery drives are ideal for:

### Plastic & Rubber

Extruders  
Injection moulding machines  
Blow moulding machines

### Sheet-fed printing

Label printing  
Web printing

### Paper & paperboard, film and foil converting

Winders/Unwinders  
Coating  
Laminating

### Material handling

Conveyors  
Automatic storage

### Textile

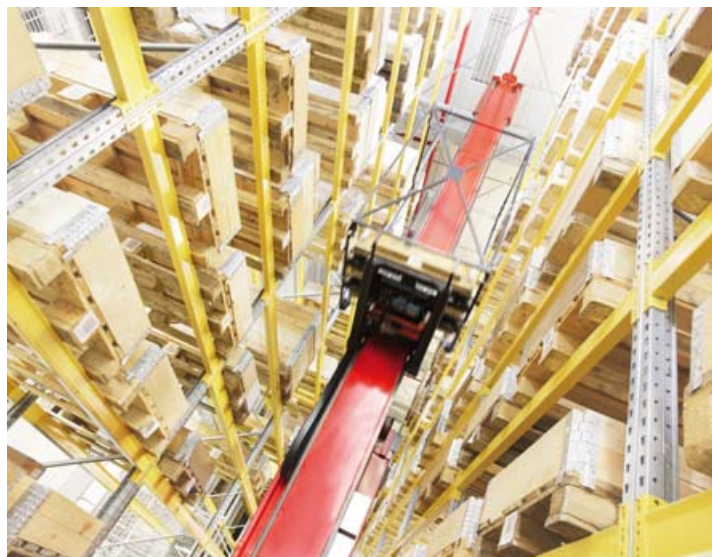
Knitting/weaving machines  
Non-Woven machines  
Fibre processing machines  
Spinning/speeder machines  
Textile coating machines

### Food & beverage

Conveyors, mixers and extruders  
Bottling and labeling  
Packaging  
Decaners and centrifuges

### Other industries and applications

Packaging machinery  
Woodworking machinery  
Wire and cable drawing machinery  
Plywood and chipboard industry  
Compressors



# How to select a drive

It is very easy to select the right drive.

This is how you build up your own ordering code using the type designation key.

- 1

**Start with identifying your supply voltage.** This tells you what rating table to use. See pages 9 and 10.

**Choose your motor's power and current rating** from the ratings table on pages 9 and 10.

Ratings, types and dimensions

ACS850 - 04 - XXXX - 2 + XXXX

Ratings 230 V

U <sub>N</sub> (V)	I <sub>2N</sub> (A)	P <sub>N</sub> (kW)	U <sub>N</sub> = 230 V
3	0.37		
3.6	0.55		
4.8	0.75		
6	1.1		
8	1.5		
10.5	2.2		
14	3		
18	4		
25	5.5		
30	7.5		
35	7.5		
44	11		
50	11		
61	15		
78	18.5		
94	22		

Ratings 400 to 500 V

U <sub>N</sub> (V)	I <sub>2N</sub> (A)	P <sub>N</sub> (kW)	U <sub>N</sub> = 400 V
11	1.5		
15	2.2		
22	3.7		
30	5.5		
37	7.5		
45	11		
55	15		
67	22		
82	30		
100	37		
125	45		
160	55		
200	75		
250	90		
315	110		
400	132		
500	160		

**Type designation**

ACS850-04-03A0-2

ACS850-04-03A6-2

ACS850-04-04A8-2

ACS850-04-06A0-2

ACS850-04-08A0-2

ACS850-04-010A-2

ACS850-04-014A-2

ACS850-04-018A-2

ACS850-04-025A-2

ACS850-04-030A-2

ACS850-04-035A-2

ACS850-04-044A-2

ACS850-04-050A-2

ACS850-04-061A-2

ACS850-04-078A-2

ACS850-04-094A-2

Pages 9 and 10

- 3

**Select your drive's ordering code** from the rating table based on your motor's nominal power rating.

Ratings, types and dimensions

ACS850 - 04 - XXXX - 2 + XXXX

Ratings 230 V

U <sub>N</sub> (V)	I <sub>2N</sub> (A)	P <sub>N</sub> (kW)	U <sub>N</sub> = 230 V
3	0.37		
3.6	0.55		
4.8	0.75		
6	1.1		
8	1.5		
10.5	2.2		
14	3		
18	4		
25	5.5		
30	7.5		
35	7.5		
44	11		
50	11		
61	15		
78	18.5		
94	22		

Ratings 400 to 500 V

U <sub>N</sub> (V)	I <sub>2N</sub> (A)	P <sub>N</sub> (kW)	U <sub>N</sub> = 400 V
11	1.5		
15	2.2		
22	3.7		
30	5.5		
37	7.5		
45	11		
55	15		
67	22		
82	30		
100	37		
125	45		
160	55		
200	75		
250	90		
315	110		
400	132		
500	160		

**Type designation**

ACS850-04-03A0-2

ACS850-04-03A6-2

ACS850-04-04A8-2

ACS850-04-06A0-2

ACS850-04-08A0-2

ACS850-04-010A-2

ACS850-04-014A-2

ACS850-04-018A-2

ACS850-04-025A-2

ACS850-04-030A-2

ACS850-04-035A-2

ACS850-04-044A-2

ACS850-04-050A-2

ACS850-04-061A-2

ACS850-04-078A-2

ACS850-04-094A-2

Pages 9 and 10

- 4

**Choose your options** (on pages 17 to 25) and **add the option codes to drive's ordering code.** Remember to use a "+" mark before each option code.

Options Interface

ACS850 - 04 - XXXX - 2 + XXXX

Optional I/O

Fieldbus adapter modules

Pages 17 to 25

Fieldbus adapter modules

Option code
FPBA-01
FCAN-01
FDNA-01
FEPL-01
FENA-11
FENA-21
FSCA-01
FECA-01
FLON-01

3

4

**Type designation:**

ACS850 - 04 - XXXX - 2 + XXXX

Product series

Types and construction

Rating

Voltage

Options

# Technical data

ACS850 – 04 – XXXX – 

2
5

 + XXXX

Mains connection		Operating conditions	
Supply voltage	3-phase 380 to 500 V AC +10 /-15% 3-phase 200 to 240 V AC ± 10%	Degree of protection	IP20 according to EN 60529 (G frames IP00); Open type according to UL 508
Frequency	50 to 60 Hz ± 5%	Ambient temperature	-10 to +55 °C (14 to 131 °F), derating above 40 °C (104 °F) No frost allowed
DC connection		Installation altitude	0 to 4000 m (0 to 13000 ft) (IT network: 2000 m [6560 ft]), derating above 1000 m (3280 ft): 1%/100 m (328 ft)
DC voltage level	485 to 675 V DC ± 10% (-5 types) 270 to 324 V DC ± 10% (-2 types)	Relative humidity	Max. 95%, no condensation allowed
Charging circuit	Internal in frames A to D External in frames E0 to G2	Climatic/ environmental conditions	Class 3K3, 3C2 according to EN 60721-3-3. Oil mist, formation of ice, moisture condensation, water drops, water spray, water splashes and water jets are not permissible (EN 60204, Part 1)
Motor connection		Vibration	Class 3M4 according to EN 60721-3-3
Motor types	AC induction motors, permanent magnet motors and synchronous reluctance motors	EMC (According to EN 61800-3)	Categories C2 and C3 with optional filter (according to EN 61800-3)
Output frequency	0 to 599 Hz	Functional safety	Safe torque off (STO according to EN 61800-5-2) IEC 61508: SIL 3 IEC 61511: SIL3 EN 62061: SILCL 3 EN ISO 13849-1: PL e Certified by TÜV
Motor control	Direct torque control (DTC) or scalar control	Compliance	Frames A to D: CE, GOST R, UL, cUL, CSA, C-Tick Frames E0 to G: CE, GOST R; pending: UL, cUL, CSA, C-Tick
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% sec. with 100% torque step		
Closed loop	0.1 to 0.2% sec. with 100% torque step		
Braking power connection			
Brake chopper	Standard in frames A to D, built-in option in the other frame sizes		
Brake resistor	External resistor connected to drive		

Feature/frame size	A	B	C	D	E0	E	G1	G2
Current and power								
Nominal current	3 to 8 A	10.5 to 18 A	25 to 50 A	61 to 94 A	103 to 144 A	166 to 290 A	387 to 650 A	710 to 875 A
Maximum current	4.4 to 10.5 A	13.5 to 21 A	33 to 66 A	78 to 124 A	138 to 170 A	202 to 348 A	470 to 730 A	850 to 1100 A
Typical motor power in kW (230 V)	0.37 to 1.5 kW	2.2 to 4 kW	5.5 to 11 kW	15 to 22 kW	–	–	–	–
(400 V)	1.1 to 3 kW	4 to 7.5 kW	11 to 22 kW	30 to 45 kW	55 to 75 kW	90 to 160 kW	200 to 355 kW	400 to 500 kW
(500 V)	1.5 to 4 kW	5.5 to 11 kW	15 to 30 kW	37 to 55 kW	55 to 90 kW	110 to 200 kW	250 to 400 kW	500 to 560 kW
Typical motor power in hp (230 V)	0.5 to 2 hp	3 to 5 hp	7.5 to 15 hp	20 to 30 hp	–	–	–	–
(480 V)	1.5 to 5 hp	5 to 10 hp	15 to 30 hp	40 to 60 hp	75 to 100 hp	125 to 200 hp	300 to 550 hp	600 to 700 hp
Brake chopper	●	●	●	●	□	□	□	□
Brake resistor	■	■	■	■	■	■	■	■
Input choke	■	■	●	●	●	●	●	●
EMC filter/C2	■	■	■	■	□	□	–	–
EMC filter/C3	■	■	□	□	□	□	●	●
Mounting and cooling								
Air cooling	●	●	●	●	●	●	●	●
Side-by-side mounting	●	●	●	●	●	●	●	●
DIN rail mounting	●	●	–	–	–	–	–	–
Removable power connectors	●	●	–	–	–	–	–	–
Removable control connectors	●	●	●	●	●	●	●	●

● = standard   □ = option, built-in   ■ = option, external   – = not available



# Ratings and types

ACS850	-	04	-	XXXX	-	2	+	XXXX
						5		

## Ratings 230 V

Nominal ratings		No-overload use		Light-duty use			Heavy-duty use			Type designation	Frame size
$I_{2N}$ (A)	$I_{Max}$ (A)	$P_N$ (kW) $U_N = 230$ V	$P_N$ (hp) $U_N = 230$ V	$I_{Ld}$ (A)	$P_{Ld}$ (kW) $U_N = 230$ V	$P_{Ld}$ (hp) $U_N = 230$ V	$I_{Hd}$ (A)	$P_{Hd}$ (kW) $U_N = 230$ V	$P_{Hd}$ (hp) $U_N = 230$ V		
3	4.4	0.37	0.5	2.8	0.37	0.5	2.5	0.37	0.5	ACS850-04-03A0-2	A
3.6	5.3	0.55	0.75	3.4	0.55	0.75	3	0.37	0.5	ACS850-04-03A6-2	A
4.8	7	0.75	1	4.5	0.75	1	4	0.55	0.75	ACS850-04-04A8-2	A
6	8.8	1.1	1.5	5.5	1.1	1	5	0.75	1	ACS850-04-06A0-2	A
8	10.5	1.5	2	7.6	1.5	2	6	1.1	1.5	ACS850-04-08A0-2	A
10.5	13.5	2.2	3	9.7	2.2	3	9	1.5	2	ACS850-04-010A-2	B
14	16.5	3	3	13	3	3	11	2.2	3	ACS850-04-014A-2	B
18	21	4	5	16.8	4	5	14	3	3	ACS850-04-018A-2	B
25	33	5.5	7.5	23	5.5	7.5	19	4	5	ACS850-04-025A-2	C
30	36	7.5	10	28	7.5	10	24	5.5	7.5	ACS850-04-030A-2	C
35	44	7.5	10	32	7.5	10	29	7.5	10	ACS850-04-035A-2	C
44	53	11	15	41	11	15	35	7.5	10	ACS850-04-044A-2	C
50	66	11	15	46	11	15	44	11	15	ACS850-04-050A-2	C
61	78	15	20	57	15	20	52	11	15	ACS850-04-061A-2	D
78	100	18.5	25	74	18.5	25	66	15	20	ACS850-04-078A-2	D
94	124	22	30	90	22	30	75	18.5	25	ACS850-04-094A-2	D

## Ratings 400 to 500 V

Nominal ratings		No-overload use			Light-duty use				Heavy-duty use				Type designation	Frame size
$I_{2N}$ (A)	$I_{Max}$ (A)	$P_N$ (kW) $U_N = 400$ V	$P_N$ (kW) $U_N = 500$ V	$P_N$ (hp) $U_N = 480$ V	$I_{Ld}$ (A)	$P_{Ld}$ (kW) $U_N = 400$ V	$P_{Ld}$ (kW) $U_N = 500$ V	$P_{Ld}$ (hp) $U_N = 480$ V	$I_{Hd}$ (A)	$P_{Hd}$ (kW) $U_N = 400$ V	$P_{Hd}$ (kW) $U_N = 500$ V	$P_{Hd}$ (hp) $U_N = 480$ V		
3	4.4	1.1	1.5	1.5	2.8	1.1	1.1	1	2.5	0.75	1.1	1	ACS850-04-03A0-5	A
3.6	5.3	1.5	1.5	2	3.4	1.5	1.5	2	3	1.1	1.5	1.5	ACS850-04-03A6-5	A
4.8	7	2.2	2.2	3	4.5	1.5	2.2	2	4	1.5	2.2	2	ACS850-04-04A8-5	A
6	8.8	2.2	3	3	5.5	2.2	3	3	5	2.2	2.2	3	ACS850-04-06A0-5	A
8	10.5	3	4	5	7.6	3	4	5	6	2.2	3	3	ACS850-04-08A0-5	A
10.5	13.5	4	5.5	5	9.7	4	5.5	5	9	4	4	5	ACS850-04-010A-5	B
14	16.5	5.5	7.5	7.5	13	5.5	7.5	7.5	11	5.5	5.5	7.5	ACS850-04-014A-5	B
18	21	7.5	11	10	16.8	7.5	7.5	10	14	7.5	7.5	10	ACS850-04-018A-5	B
25	33	11	15	15	23	11	11	15	19	7.5	11	10	ACS850-04-025A-5	C
30	36	15	18.5	20	28	15	15	20	24	11	15	15	ACS850-04-030A-5	C
35	44	18.5	22	25	32	15	18.5	20	29	15	18.5	20	ACS850-04-035A-5	C
44	53	22	30	30	41	22	22	30	35	18.5	22	25	ACS850-04-044A-5	C
50	66	22	30	30	46	22	30	30	44	22	30	30	ACS850-04-050A-5	C
61	78	30	37	40	57	30	37	40	52	22	30	40	ACS850-04-061A-5	D
78	100	37	45	60	74	37	45	50	66	37	45	50	ACS850-04-078A-5	D
94	124	45	55	60	90	45	55	60	75	37	45	50	ACS850-04-094A-5	D
103	138	55	55	75	100	55	55	75	83	45	55	60	ACS850-04-103A-5	E0
144	170	75	90	100	141	75	90	100	100	55	55	75	ACS850-04-144A-5	E0
166	202	90	110	125	155	75	90	125	115	55	75	75	ACS850-04-166A-5	E
202	282	110	132	150	184	90	110	150	141	75	90	100	ACS850-04-202A-5	E
225	326	110	132	150	220	110	132	150	163	90	110	125	ACS850-04-225A-5	E
260	326	132	160	200	254	132	160	200	215	110	132	150	ACS850-04-260A-5	E
290	348	160	200	200	286	160	200	200	232	132	160	150	ACS850-04-290A-5	E
387	470	200	250	300	377	200	250	300	300	160	200	200	ACS850-04-387A-5	G1
500	560	250	315	350	480	250	315	350	355	200	250	250	ACS850-04-500A-5	G1
580	680	315	355	450	570	315	355	450	414	200	250	350	ACS850-04-580A-5	G1
650	730	355	400	500	634	355	400	500	477	250	315	400	ACS850-04-650A-5	G1
710	850	400	500	600	700	400	500	600	566	315	400	450	ACS850-04-710A-5	G2
807	1020	450	560	700	785	450	560	600	625	355	450	500	ACS850-04-807A-5	G2
875	1100	500	560	700	857	450	560	700	680	400	450	600	ACS850-04-875A-5	G2

### Notes

- For ambient temperature of less than 35 °C (95 °F), maximum overload is 150% of  $I_{Hd}$ . For ambient temperature of 40 °C (104 °F), maximum overload is 145% of  $I_{Hd}$ .
- For ambient temperature of less than 30 °C (86 °F), maximum overload is 150% of  $I_{Hd}$ . For ambient temperature of 40 °C (104 °F), maximum overload is 140% of  $I_{Hd}$ .

### Nominal ratings

$I_{2N}$	Rated current available continuously without overloading at 40 °C (104 °F).
$I_{Max}$	Maximum output current. Available for 10 s at start, otherwise as long as allowed by drive temperature. Note: max. motor shaft power is 150% $P_{Hd}$ .

### Typical ratings: No-overload use

$P_N$	Typical motor power in no-overload use.
-------	---

### Light-duty use

$I_{Ld}$	Continuous current allowing 110% $I_{Ld}$ for 1 min/5 min at 40 °C (104 °F).
$P_{Ld}$	Typical motor power in light-duty use.

### Heavy-duty use

$I_{Hd}$	Continuous current allowing 150% $I_{Hd}$ for 1 min/5 min at 40 °C (104 °F).
$P_{Hd}$	Typical motor power in heavy-duty use.

The current ratings are the same regardless of the supply voltage within one voltage range. The ratings apply at 40 °C (104 °F) ambient temperature.

# Ratings and types



## Cooling characteristics and noise levels

Heat dissipation W	Air flow m³/h (ft³/min)	Noise level dBA	Type designation	Frame size
$U_N = 230\text{ V}$				
91	24 (14)	47	ACS850-04-03A0-2	A
97	24 (14)	47	ACS850-04-03A6-2	A
114	24 (14)	47	ACS850-04-04A8-2	A
134	24 (14)	47	ACS850-04-06A0-2	A
154	24 (14)	47	ACS850-04-08A0-2	A
183	48 (28)	39	ACS850-04-010A-2	B
215	48 (28)	39	ACS850-04-014A-2	B
274	48 (28)	39	ACS850-04-018A-2	B
325	142 (84)	71	ACS850-04-025A-2	C
421	142 (84)	71	ACS850-04-030A-2	C
442	142 (84)	71	ACS850-04-035A-2	C
462	200 (118)	71	ACS850-04-044A-2	C
555	200 (118)	71	ACS850-04-050A-2	C
730	290 (171)	70	ACS850-04-061A-2	D
889	290 (171)	70	ACS850-04-078A-2	D
1054	290 (171)	70	ACS850-04-094A-2	D

Heat dissipation W	Air flow m³/h (ft³/min)	Noise level dBA	Type designation	Frame size
$U_N = 400\text{ V}$				
100	24 (14)	47	ACS850-04-03A0-5	A
106	24 (14)	47	ACS850-04-03A6-5	A
126	24 (14)	47	ACS850-04-04A8-5	A
148	24 (14)	47	ACS850-04-06A0-5	A
172	24 (14)	47	ACS850-04-08A0-5	A
212	48 (28)	39	ACS850-04-010A-5	B
250	48 (28)	39	ACS850-04-014A-5	B
318	48 (28)	39	ACS850-04-018A-5	B
375	142 (84)	71	ACS850-04-025A-5	C
485	142 (84)	71	ACS850-04-030A-5	C
513	142 (84)	71	ACS850-04-035A-5	C
541	200 (118)	71	ACS850-04-044A-5	C
646	200 (118)	71	ACS850-04-050A-5	C
840	290 (171)	70	ACS850-04-061A-5	D
1020	290 (171)	70	ACS850-04-078A-5	D
1200	290 (171)	70	ACS850-04-094A-5	D
1190	168 (99)	65	ACS850-04-103A-5	E0
1440	405 (238)	65	ACS850-04-144A-5	E0
1940	405 (238)	65	ACS850-04-166A-5	E
2310	405 (238)	65	ACS850-04-202A-5	E
2819	405 (238)	65	ACS850-04-225A-5	E
3260	405 (238)	65	ACS850-04-260A-5	E
4200	405 (238)	65	ACS850-04-290A-5	E
4403	1200	72*	ACS850-04-387A-5	G1
5602	1200	72*	ACS850-04-500A-5	G1
6409	1200	72*	ACS850-04-580A-5	G1
8122	1200	72*	ACS850-04-650A-5	G1
8764	1200	72*	ACS850-04-710A-5	G2
9862	1200	72*	ACS850-04-807A-5	G2
10578	1420	72*	ACS850-04-875A-5	G2

\* 65 dBA standby - 72 dBA running.



Frame A



Frame B



Frame C



Frame D

# Dimensions

## Dimensions

Frame size	Height <sup>1)</sup>		Depth <sup>2) 3)</sup>		Width		Weight	
	mm	in	mm	in	mm	in	kg	lb
A	364	14.3	197	7.8	93	3.7	3	7
B	380	15.0	274	10.8	101	4.0	5	11
C	567	22.3	276	10.9	166	6.5	16	35
D	567	22.3	276	10.9	221	8.7	23	51
E0	602	23.7	354	13.9	276	10.9	35	77
E	700	27.6	443	17.4	312	12.3	67	147
G1	1462 (1560) <sup>4)</sup>	57.6 (61.4) <sup>4)</sup>	505 (515) <sup>4)</sup>	19.9 (20.3) <sup>4)</sup>	305 (329) <sup>4)</sup>	12 (13) <sup>4)</sup>	161 (191) <sup>4)</sup>	355 (421) <sup>4)</sup>
G2	1662 (1710) <sup>4)</sup>	65.4 (67.3) <sup>4)</sup>	505 (515) <sup>4)</sup>	19.9 (20.3) <sup>4)</sup>	305 (329) <sup>4)</sup>	12 (13) <sup>4)</sup>	199 (229) <sup>4)</sup>	439 (505) <sup>4)</sup>

### Notes

All dimensions and weights are without additional options.

<sup>1)</sup> Height is the maximum measure without clamping plates.

<sup>2)</sup> An additional 50 mm (2 in) should be reserved for feedback cabling if FEN-01, -11 or -21 options are used (except for frame G1 and G2 with integrated control unit).

<sup>3)</sup> Assistant control panel adds 23 mm (0.9 in) to the depth (except for frame G1 and G2 with integrated control unit).

<sup>4)</sup> With +H381 optional cabling panel.



Frame E0



Frame E



Frame G1



Frame G2

# Control connections



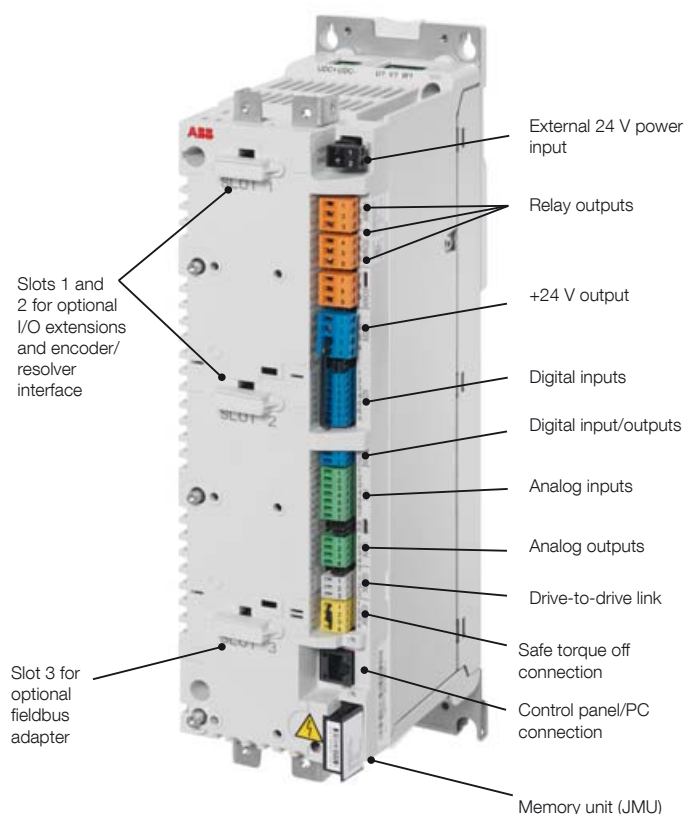
## Control unit

The ACS850 control unit consists of various control connections, which can be configured as required by the customer application.

Control connections are used for different functions such as safe torque off, communication, drive preconfiguration, monitoring and diagnostics (eg, motor temperature).

- Control voltage supply: external supply (24 V DC) input for the control unit
- Safe torque off (STO): designed for Safety Integrity Level 3 (SIL 3) according to IEC 61508
- Memory unit connection: complete drive configuration, settings, application softwares and SPC block programs are stored in the removable memory unit
- Start interlock: drive interlock input

- High speed drive-to-drive link for master-follower operation and multicast communication\*\*. The link can be alternatively configured as embedded Modbus link
- Thermistor input: motor thermistor (PTC, Pt100, KTY84)
- Control panel connection: PC tools and control panel connection (RJ45)
- Three relay outputs for example status monitoring and external fault diagnostics
- Slot 1 and slot 2: I/O extensions or motor feedback devices
- Slot 3: fieldbus communication

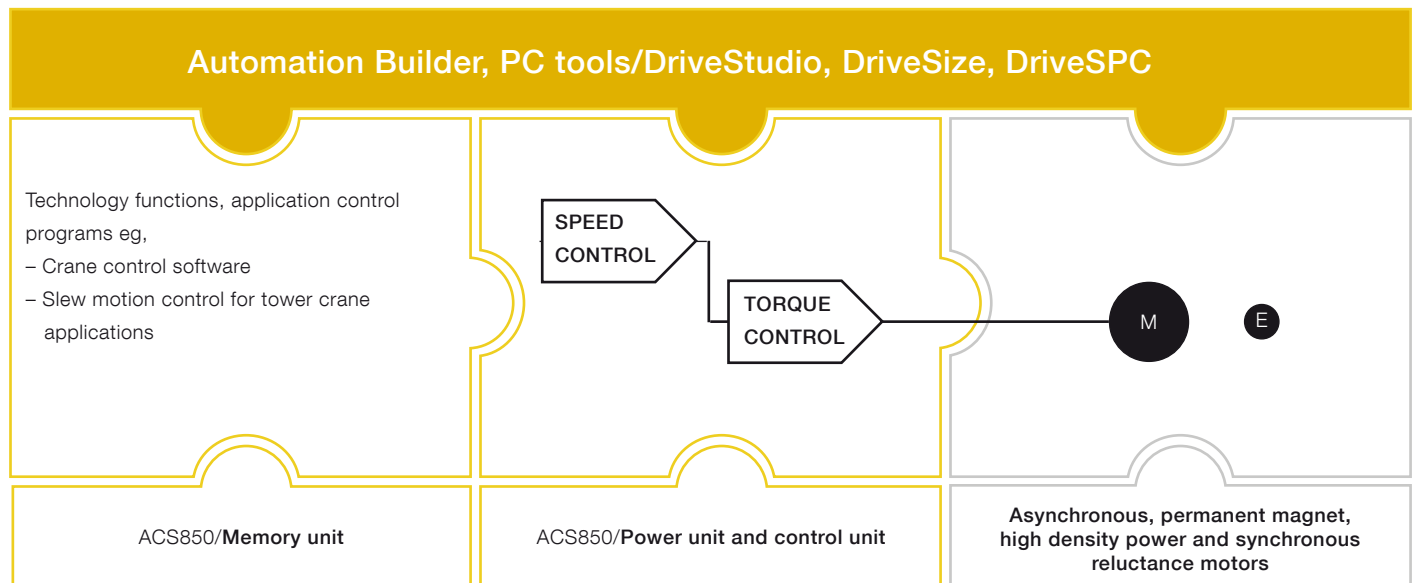


		<b>XPOW</b>	
External power input	+24V	1	
24 V DC, 1.6 A	GND	2	
		<b>XRO1, XRO2, XRO3</b>	
Relay output RO1 [Ready]	NO	1	
250 V AC/30 V DC	COM	2	
2 A	NC	3	
Relay output RO2 [Running]	NO	4	
250 V AC/30 V DC	COM	5	
2 A	NC	6	
Relay output RO3 [Fault (-1)]	NO	7	
250 V AC/30 V DC	COM	8	
2 A	NC	9	
		<b>XD24</b>	
+24 V DC*	+24VD	1	
Digital input ground	DIGND	2	
+24 V DC*	+24VD	3	
Digital input/output ground	DIOGND	4	
Ground selection jumper			
		<b>XDI</b>	
Digital input DI1 [Stop/Start]	DI1	1	
Digital input DI2	DI2	2	
Digital input DI3 [Reset]	DI3	3	
Digital input DI4	DI4	4	
Digital input DI5	DI5	5	
Digital input DI6 or thermistor input	DI6	6	
Start interlock (0 = Stop)	DIIL	A	
		<b>XDIO</b>	
Digital input/output DIO1 [Output: Ready]	DIO1	1	
Digital input/output DIO2 [Output: Running]	DIO2	2	
		<b>XAI</b>	
Reference voltage (+)	+VREF	1	
Reference voltage (-)	-VREF	2	
Ground	AGND	3	
Analog input AI1 (Current or voltage, selectable by jumper AI1) [Speed reference 1]	AI1+	4	
	AI1-	5	
Analog input AI2 (Current or voltage, selectable by jumper AI2)	AI2+	6	
	AI2-	7	
AI1 current/voltage selection jumper		AI1	
AI2 current/voltage selection jumper		AI2	
		<b>XAO</b>	
Analog output AO1 [Current %]	AO1+	1	
	AO1-	2	
Analog output AO2 [Speed %]	AO2+	3	
	AO2-	4	
		<b>XD2D</b>	
Drive-to-drive link termination jumper		T	
Drive-to-drive link	B	1	
	A	2	
	BGND	3	
		<b>XSTO</b>	
Safe torque off. Both circuits must be closed for the drive to start.	OUT1	1	
	OUT2	2	
	IN1	3	
	IN2	4	
Control panel connection			
Memory unit connection			

\*Total maximum current: 200 mA

\*\*Communication to predefined subset of drives

# Control program for premium motor control



The standard control program and features of ACS850 drives are designed to enhance their reliability and durability as well as the easiness of use. Several advanced functions can be accessed either via the assistant control panel or DriveStudio PC tool.

## Speed and torque control

- Open and closed loop DTC (direct torque control)
- Ideal for speed and torque control applications with high bandwidth
- The ACS850 drives support
  - asynchronous reluctance motors
  - permanent magnet (PM) synchronous motors
  - synchronous reluctance motors (SynRM)
  - internal permanent magnet motors
  - high dynamic performance motors

## Fast commissioning and flexible configuration

The ACS850 standard control program offers flexibility and extensive parameter settings which can be extended even further by building links between for example monitor signals, status words and different parameters. It consists of a simple, ready-made program that can easily be modified to meet specific application needs. Commissioning is also simplified by several standard software features.

In addition to standard control program functionalities the ACS850 offers function block programming which makes it possible to replace relays or even a PLC.

## Preprogrammed protection functions

A wide range of features provide protection for the drive, motor and the process:

- Ambient temperature
- DC overvoltage & undervoltage
- Drive temperature
- Input phase loss
- Overcurrent
- Power limits
- Short circuit

## Programmable protection functions:

- Adjustable power limits
- Control signal supervision
- Critical frequencies lock-out
- Current and torque limits
- Earth fault protection
- External fault
- Motor phase loss
- Motor stall protection
- Motor thermal protection
- Motor underload protection
- Panel loss



# Control program for easy drive operation

## Startup assistant

The intelligent and intuitive startup assistant allows first time users to quickly get up to speed and customize the drive according to their needs. A built-in help function makes parameter-by-parameter setting easy. The assistant allows users to go through the list of changed parameters, making it quick to identify the recently modified ones.

## Maintenance assistant

The maintenance assistant reminds the user about the drive's preventive maintenance schedule or routine, or that of its associated components such as motor, cabinet air inlet filters and input contactors. It reminds users of planned maintenance needs based on running hours, operating hours or relay switching to reduce unplanned process interruptions.

## Removable memory unit

A removable memory unit stores the complete firmware including all user settings as well as motor and application data, and speeds up recommissioning of a replaced drive.

The removable memory unit:

- Allows fast and easy commissioning
- Easy maintenance of the drive
- Fast replacement of the drive with minimum process downtime
- Enables software and parameter configuration at workshop instead of doing it on-site



# Control program variants for extended performance

## Crane control program

### Dedicated AC drives for standalone crane applications

Standalone cranes that require independent movements can benefit from using ACS850 with crane control program. This combination provides stepless speed and torque control of the crane along with control of the mechanical brake and other crane functionality.

Crane applications that can benefit from these functions, whether new or retrofit are:

- Tower cranes in hoist, trolley and slew motions
- Industrial cranes in hoist, trolley and long travel motions

### Flexible usability with the crane control program

The ready-made crane control program can interface with analog, digital or fieldbus systems, enabling a wide range of connectivity for start, stop and reference change signals. The program includes four different user sets for customizing the parameter settings for multiple configurations. Each user set includes two different control places and an overriding emergency control place.

### Crane control program features

- Mechanical brake control for improved safety
- Reference handling flexibility with joystick
- Enhanced safety with motor speed matching and overspeed protection
- Load speed control optimizes crane capacity
- Safety control to keep the crane within limits (slowdown end limit)
- Slack rope detection to increase safety on crane drums
- Function block programming for extended functions (DriveSPC)
- Homing mode for defining position of crane or hook
- Crane load analyzer to monitor loading
- Maintenance counters
- Support for conical motors
- Brake match for improved safety with mechanical brakes

### Ordering

The crane control program can be ordered using option code +N5050 for crane control program and +N3050 for crane technology library.



# Synchronous reluctance motor-drive package

## High performance for ultimate machine design

### ACS850 machinery drives supporting SynRM motors

- Excellent SynRM motor control performance even without encoders
- Accurate torque control over the whole speed range with ABB's direct torque control (DTC) technology
- Runs any motor type including induction, PM and SynRM
- Commissioning and parameter settings as easy as with a standard induction motors
- Option +N7502 for SynRM motor control

### SynRM – Synchronous reluctance motor and drive package (+N7502)

Get the best of two worlds. The advantages of permanent magnet technology together with the simplicity and service-friendliness of an induction platform. Each motor-drive package combines proven stator technology, an innovative magnet-free rotor design, a best-in-class drive and advanced software to offer complete, optimized solution.

### High output/IE4 SynRM motor & ACS850 drive packages for machine builders

Finding ways to improve machine designs helps customers to produce more competitive machines. ABB offers two package options; the compact High output SynRM & ACS850 package and the efficient IE4 SynRM & ACS850 package. SynRM packages are available for almost all common applications such as compressors, pumps, fans, extruders, and decaners among other.

### High output SynRM motor highlights:

- Smaller, lighter and more cost-efficient machine designs with up to two frame sizes smaller motors
- More powerful machines designs with up to double output power without increasing motor sizes
- Motor meeting IE2 to IE3 efficiency levels

### IE4 SynRM motor highlights:

- More efficient machine designs with the IE4 SynRM motors
- Unprecedented reliability through very low winding and bearing temperature
- Easy to replace standard IE2 induction motors with same power and size combinations

### SynRM verified package efficiency by ABB

The SynRM motor & ACS850 drive package efficiency is measured to verify the efficiency of the whole system and not just separate components. Using the package efficiency curves, the users can determine the energy consumption of motor-drive packages precisely and base their investment calculation of these figures.



SynRM motor & ACS850 drive



Manufacturer's statement for verified package efficiency

# Options Interface

ACS850	-	04	-	XXXX	-	2	+	XXXX
						5		

## Assistant control panel

The assistant control panel features a multilingual alphanumeric display for easy drive configuration. It is an ideal tool for service engineers, providing the following features:



- A large display
- Easy navigation
- Soft and ergonomic keys
- Parameter setting and monitoring
- Status and history data
- Real-time clock

### Assisting functionalities like:

- Startup assistant
- Maintenance assistant
- Diagnostic assistant



## Assistant control panel options

There are various cover assembly options for the ACS850. The cover is mounted on the drive depending on the specific need of the customer application.

### Standard control unit cover

The control unit cover comes as standard without an assistant control panel and holder.



### Control unit cover with assistant control panel (+J400)

Includes the assistant control panel, a control unit cover with a panel holder and an internal interface cable.



### Control unit cover with panel holder (+J414)

Includes the control unit cover with a panel holder, a panel cover and an internal interface cable.



### Door mounting kit with assistant control panel (+J410)

Includes the assistant control panel and a panel holder for cabinet door mounting, with IP54 kit and 3 m (10 ft) cable.



# Options Interface



### Optional I/O

The optional I/O extension modules provide additional connectivity possibilities for ACS850 drives. Extensions include analog and digital modules and speed feedback interface modules which are mounted in the slots on the ACS850 control board. The control board has two slots available for I/O extension modules. Additionally, there is a third slot available for fieldbus adapter modules.

### Analog and digital extension modules

FIO-01	4 x DI/O, 2 x RO	Option code +L501
FIO-11	3 x AI (mA/V), 1 x AO (mA), 2 x DI/O	+L500
FIO-21	1 x AI (mA/V), 1 x AO (mA), 1 x DI, 2 x RO	+L519

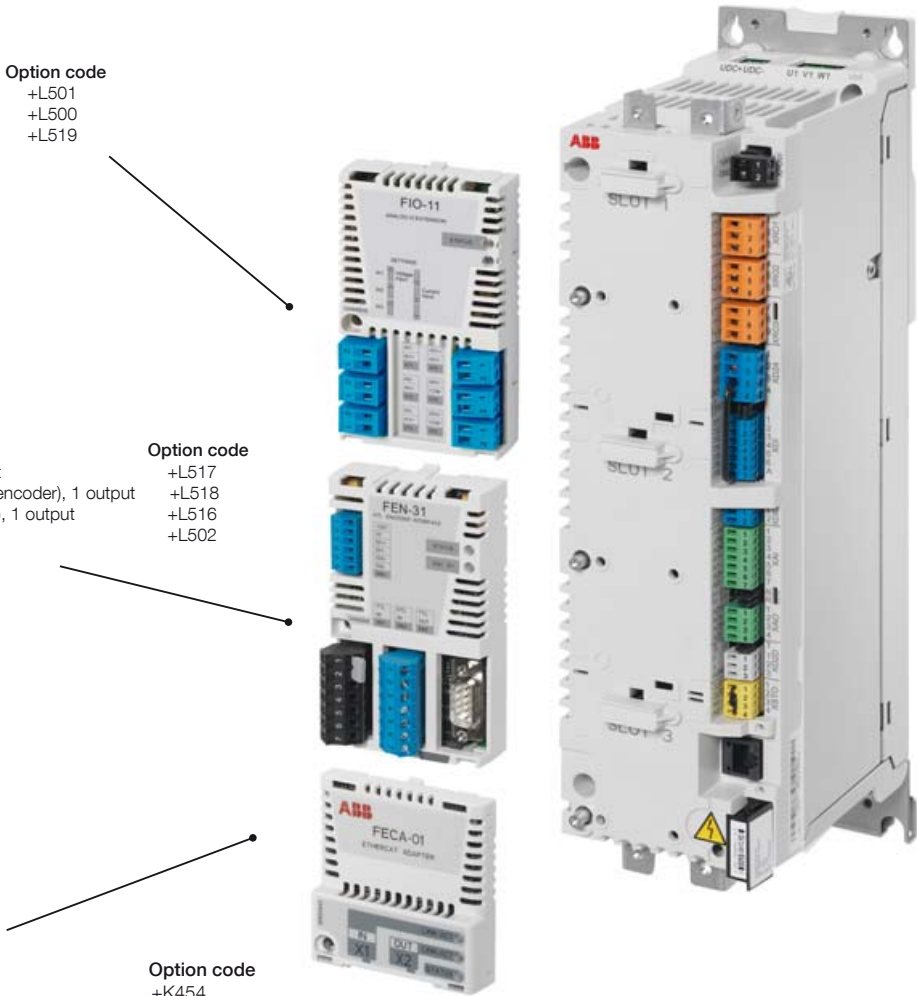
### Feedback interface modules

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

### Fieldbus adapter modules

FPBA-01	PROFIBUS DP, DPV0/DPV1	Option code +K454
FCAN-01	CANopen®	+K457
FDNA-01	DeviceNet™	+K451
FEPL-01	EtherNet PowerLink	+K470
FENA-11	EtherNet/IP™, Modbus TCP, PROFINET IO	+K473
FENA-21	EtherNet/IP™, Modbus TCP, PROFINET IO	+K475
FSCA-01	Modbus RTU	+K458
FECA-01	EtherCAT®	+K469
FLON-01	LonWorks®	+K452

- ### Fieldbus adapter modules
- A wide range of fieldbus protocols are supported to enable the ACS850 to connect to major automation system networks. Fieldbus adapter modules allow manufacturing flexibility, reduced installation and engineering effort via:
- Drive control
  - Drive monitoring
  - Drive diagnostics
  - Drive parameter handling





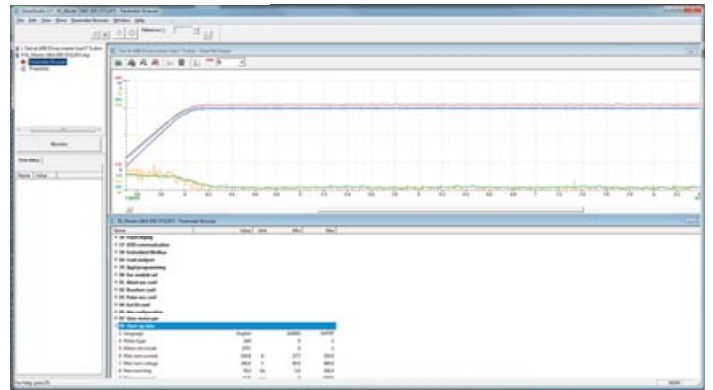
# Options

## Software tools

### DriveStudio

PC tool both for simple drive commissioning tasks and for the more demanding drive tuning and programming tasks.

- Drive overview screen for fast parameter and function block navigation
- Parameter setting and signal monitoring
- Parameter set comparison
- Data logger and online signal monitoring for drive tuning (multiple signal channels and triggering conditions)
- Backup and restore tool for drive parameter cloning and life time support
- Case sensitive help with detailed drive parameter, event and function descriptions
- Wizards for configuring communications options (PROFIBUS DP, CANopen®) and motor setup

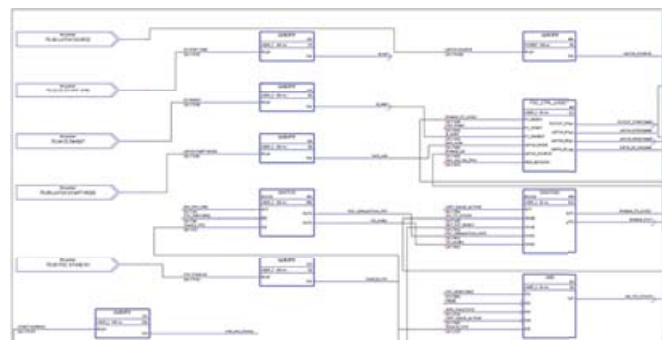


DriveStudio

### DriveSPC

DriveSPC is a programming tool that enables easy modification or extension of drive functionality:

- Easy-to-learn function block interface showing drive firmware functions, signals and parameters
- Easy to add user-defined function block programs even on the fast time levels of the drive control
- Function block programming with standard IEC61131 function block library
- Professional programming environment with hierarchy levels, custom circuits, user parameters and copy protection of DriveSPC programs



DriveSPC

# Options External

ACS850	-	04	-	XXXX	-	2	+	XXXX
						5		

## Mains chokes

Mains chokes are typically used to reduce harmonics in the mains current. Frames C to G2 are equipped with built-in choke as standard. For frames A and B, the ACS850 drives

do not necessarily need a separate mains choke for operation. If, however, a separate mains choke is needed, mains chokes are available according to the following table.

Frame size	Drive type designation	Type	Dimensions						Weight	
			Width		Length		Depth			
			mm	in	mm	in	mm	in	kg	lb
A	ACS850-04-03A0-5	CHK-01	120	4.72	146	5.75	79	3.11	1.8	4.0
A	ACS850-04-03A6-5	CHK-01	120	4.72	146	5.75	79	3.11	1.8	4.0
A	ACS850-04-04A8-5	CHK-02	150	5.91	175	6.89	86	3.39	3.8	8.4
A	ACS850-04-06A0-5	CHK-02	150	5.91	175	6.89	86	3.39	3.8	8.4
A	ACS850-04-08A0-5	CHK-02	150	5.91	175	6.89	86	3.39	3.8	8.4
B	ACS850-04-010A-5	CHK-03	150	5.91	175	6.89	100	3.39	5.4	11.9
B	ACS850-04-014A-5	CHK-03	150	5.91	175	6.89	100	3.39	5.4	11.9
B	ACS850-04-018A-5	CHK-04	150	5.91	175	6.89	100	3.39	5.2	11.5

## Resistor braking

Depending on the application, an external braking resistor may be needed to dissipate the generated kinetic energy thermally. For this, ACS850 uses its braking chopper and external braking resistor.

providing the specified resistance value is not decreased, and the heat dissipation capacity of the resistor is sufficient for the drive application.

For ACS850 drives, no separate fuses in the brake circuit are required if the following conditions are met:

## Brake chopper

The ACS850 series has built-in brake choppers in frames A to D (up to 45 kW [60 hp] at 400 V) as standard. Above this, brake choppers are available as built-in options.

- The ACS850 mains cable is protected by fuses
- No mains cable/fuse overrating takes place

## Brake resistor

Preselected brake resistors are separately available for all ACS850 types. Resistors include integrated thermal sensor as standard. Resistors other than standard offering may be used

Brake chopper				Brake resistors			
Type designation	Frame size	Structure	$P_{br,cont}$ kW	Type	$R_{min}$ Ohm	$E_r$ kJ	$P_N$ W
$U_N = 230 V$							
ACS850-04-03A0-2	A	●	0.45	JBR-01	120	22	105
ACS850-04-03A6-2	A	●	0.65	JBR-01	120	22	105
ACS850-04-04A8-2	A	●	0.9	JBR-01	120	22	105
ACS850-04-06A0-2	A	●	1.3	JBR-01	120	22	105
ACS850-04-08A0-2	A	●	1.3	JBR-01	120	22	105
ACS850-04-010A-2	B	●	2.25	JBR-03	80	40	135
ACS850-04-014A-2	B	●	3.3	JBR-04	40	73	360
ACS850-04-018A-2	B	●	4.25	JBR-04	40	73	360
ACS850-04-025A-2	C	●	5.25	JBR-05	20	77	570
ACS850-04-030A-2	C	●	6	JBR-05	20	77	570
ACS850-04-035A-2	C	●	6	JBR-05	20	77	570
ACS850-04-044A-2	C	●	8.75	JBR-06	13	132	790
ACS850-04-050A-2	C	●	8.75	JBR-06	13	132	790
ACS850-04-061A-2	D	●	18	JBR-06	13	132	790
ACS850-04-078A-2	D	●	18	JBR-06	13	132	790
ACS850-04-094A-2	D	●	18	JBR-06	13	132	790

● = standard ■ = option +D150, external

# Options External

ACS850 – 04 – XXXX – 

2
5

 + XXXX

Brake chopper				Brake resistors			
Type designation	Frame size	Structure	$P_{br,cont}$ kW	Type	$R_{min}$ Ohm	$E_r$ kJ	$P_N$ W
$U_N = 400\text{ V}$							
ACS850-04-03A0-5	A	●	0.9	JBR-01	120	22	105
ACS850-04-03A6-5	A	●	1.3	JBR-01	120	22	105
ACS850-04-04A8-5	A	●	1.8	JBR-01	120	22	105
ACS850-04-06A0-5	A	●	2.6	JBR-01	120	22	105
ACS850-04-08A0-5	A	●	2.6	JBR-01	120	22	105
ACS850-04-010A-5	B	●	4.5	JBR-03	80	40	135
ACS850-04-014A-5	B	●	6.6	JBR-04	40	73	360
ACS850-04-018A-5	B	●	8.5	JBR-04	40	73	360
ACS850-04-025A-5	C	●	10.5	JBR-05	20	77	570
ACS850-04-030A-5	C	●	12	JBR-05	20	77	570
ACS850-04-035A-5	C	●	12	JBR-05	20	77	570
ACS850-04-044A-5	C	●	17.5	JBR-06	13	132	790
ACS850-04-050A-5	C	●	17.5	JBR-06	13	132	790
ACS850-04-061A-5	D	●	36	JBR-06	13	132	790
ACS850-04-078A-5	D	●	36	JBR-06	13	132	790
ACS850-04-094A-5	D	●	36	JBR-06	13	132	790
ACS850-04-103A-5	E0	■	61	SAFUR90F575	8	1800	4500
ACS850-04-144A-5	E0	■	75	SAFUR80F500	6	2400	6000
ACS850-04-166A-5	E	■	112.5	SAFUR125F500	4	3600	9000
ACS850-04-202A-5	E	■	135	SAFUR125F500	4	3600	9000
ACS850-04-225A-5	E	■	135	SAFUR125F500	4	3600	9000
ACS850-04-260A-5	E	■	160	SAFUR125F500	4	3600	9000
ACS850-04-290A-5	E	■	200	SAFUR200F500	2.7	5400	13500
ACS850-04-387A-5	G1	■	250	2xSAFUR125F500	2	7200	18000
ACS850-04-500A-5	G1	■	250	2xSAFUR125F500	2	7200	18000
ACS850-04-580A-5	G1	■	355	2xSAFUR200F500	1.35	10800	27000
ACS850-04-650A-5	G1	■	355	2xSAFUR200F500	1.35	10800	27000
ACS850-04-710A-5	G2	■	400	3xSAFUR200F500	0.9	16200	40000
ACS850-04-807A-5	G2	■	400	3xSAFUR200F500	0.9	16200	40000
ACS850-04-875A-5	G2	■	400	3xSAFUR200F500	0.9	16200	40000

● = standard ■ = option +D150, external

The braking energy transmitted to the resistor during any period shorter than 400 seconds may exceed  $E_r$ . ( $E_r$  varies depending on the resistor).

$P_{br,cont}$	Continuous brake chopper power. The value applies to the minimum resistance value. With a higher resistance value the $P_{br,cont}$ may increase in some ACS850 drives.
$R_{min}$	The allowed minimum braking resistor values for each frame size. For optimal values, calculations are always required.
$E_r$	Energy pulse that the resistor assembly will withstand (400 seconds duty cycle). This energy will heat the resistor element from 40 °C (104 °F) to the maximum allowable temperature.
$P_{rcont}$	Continuous power (heat) dissipation of the resistor when placed correctly. Energy $E_r$ dissipates in 400 seconds.

All brake resistors are to be installed outside the converter module.

The SAFUR brake resistors are built-in to an IP00 metal frame.

# Options External

ACS850	-	04	-	XXXX	-	2	+	XXXX
						5		

## 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 age and insulation. For information on the construction of the motor insulation, consult the motor manufacturer. If the motor does not fulfil the requirements of the filter selection table, the lifetime of the motor might decrease. Insulated non-driven end (N-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 ACS850 hardware manual.

## External du/dt filters

ACS850-04		du/dt filter type (3 filters included in kits marked *)							
		Unprotected (IP00)							
230 V	500 V	NOCH0016-60	NOCH0030-60	NOCH0070-620	* NOCH0120-60	* NOCH0260-60	FOCH0260-70	FOCH0610-70	FOCH875-70
-03A0-2	-03A0-5	■	-	-	-	-	-	-	-
-03A6-2	-03A6-5	■	-	-	-	-	-	-	-
-04A8-2	-04A8-5	■	-	-	-	-	-	-	-
-06A0-2	-06A0-5	■	-	-	-	-	-	-	-
-08A0-2	-08A0-5	■	-	-	-	-	-	-	-
-010A-2	-010A-5	■	-	-	-	-	-	-	-
-014A-2	-014A-5	■	-	-	-	-	-	-	-
-018A-2	-018A-5	■	-	-	-	-	-	-	-
-025A-2	-025A-5	-	■	-	-	-	-	-	-
-030A-2	-030A-5	-	■	-	-	-	-	-	-
-035A-2	-035A-5	-	■	-	-	-	-	-	-
-044A-2	-044A-5	-	-	■	-	-	-	-	-
-050A-2	-050A-5	-	-	■	-	-	-	-	-
-061A-2	-061A-5	-	-	■	-	-	-	-	-
-078A-2	-078A-5	-	-	■	-	-	-	-	-
-094A-2	-094A-5	-	-	-	■	-	-	-	-
	-103A-5	-	-	-	■	-	-	-	-
	-144A-5	-	-	-	■	-	-	-	-
	-166A-5	-	-	-	■	-	-	-	-
	-202A-5	-	-	-	-	■	-	-	-
	-225A-5	-	-	-	-	-	■	-	-
	-260A-5	-	-	-	-	-	■	-	-
	-290A-5	-	-	-	-	-	■	-	-
	-387A-5	-	-	-	-	-	-	■	-
	-500A-5	-	-	-	-	-	-	■	-
	-580A-5	-	-	-	-	-	-	■	-
	-650A-5	-	-	-	-	-	-	■	-
	-710A-5	-	-	-	-	-	-	■	-
	-807A-5	-	-	-	-	-	-	-	■
	-875A-5	-	-	-	-	-	-	-	■

■ = option, external    - = not applicable

## du/dt filter selection table

Motor type	Nominal mains voltage ( $U_N$ )	Motor insulation requirement
ABB M2 and M3 motors	$U_N \leq 500$ V	Standard insulation system.
ABB form-wound HXR and AM motors	$380 \text{ V} < U_N \leq 500$ V	Standard insulation system.
ABB random-wound HXR and AM motors	$380 \text{ V} < U_N \leq 500$ V	Check motor insulation system with the motor manufacturer.
Non-ABB random-wound and form-wound	$U_N \leq 420$ V	If the insulation system withstands $\hat{U}_{LL} = 1600$ V and $\Delta t = 0.2 \mu\text{s}$ , du/dt filtering is not required. With du/dt filtering the insulation system must withstand $\hat{U}_{LL} = 1300$ V.

$U_N$  = Nominal mains voltage.

$\hat{U}_{LL}$  = Peak line-to-line voltage at motor terminals.

$\Delta t$  = Rise time, ie, interval during which line-to-line voltage at motor terminals changes from 10% to 90% of full voltage range.

## Dimensions and weights of du/dt filters

du/dt filter	Height		Width		Depth		Weight	
	mm	in	mm	in	mm	in	kg	lb
NOCH0016-60	195	7.7	140	5.5	115	4.5	2.4	5.28
NOCH0030-60	215	8.5	165	6.5	130	5.1	4.7	10.34
NOCH0070-60	261	10.3	180	7.1	150	5.9	9.5	20.9
NOCH0120-60*	200	7.9	154	6.1	106	4.2	7	15.4
NOCH0260-60*	383	15.1	185	7.3	111	4.4	12	26.4
FOCH0260-70	382	15.0	340	13.4	254	10.0	47	103.4
FOCH0610-70	662	26.1	319	12.6	282	11.1	65	143
FOCH0875-70	662	26.1	319	12.6	292	11.5	65	143

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

# Options External

ACS850	–	04	–	XXXX	–	2	+	XXXX
						5		

## Electromagnetic Compatibility (EMC) and modules

The electrical/electronic equipment must be able to operate without problems within an electromagnetic environment. This is called immunity. The ACS850 is designed to have adequate immunity against interference from other equipment. Likewise, the equipment must not disturb or interfere with any other product or system within its locality. This is called emission. Each ACS850 model can be equipped with a built-in filter to reduce high frequency emission.

## 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 EN 55011, or EN 61000-6-3/4, are applicable to industrial and domestic equipment and systems including drive components inside. Drive units complying with 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 nor require a motor to be connected as a load. The emission limits are comparable according to the following EMC standards table.

## 1<sup>st</sup> environment vs 2<sup>nd</sup> environment

### 1<sup>st</sup> environment (category C1 to C2)

1<sup>st</sup> environment includes domestic premises. It also includes establishments directly connected without intermediate transformer to a low voltage power supply network which supplies buildings used for domestic purposes.

### 2<sup>nd</sup> environment (category C3 to C4)

2<sup>nd</sup> environment includes all establishments other than those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

## Selecting an EMC filter

For filter selection, please see tables below.

## EMC standards

EN61800-3 (2004) 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
Category C1 (1 <sup>st</sup> environment)	Group 1 Class B	Not applicable	Applicable
Category C2 (1 <sup>st</sup> environment)	Group 1 Class A	Applicable	Not applicable
Category C3 (2 <sup>nd</sup> environment)	Group 2 Class A	Not applicable	Not applicable
Category C4 (2 <sup>nd</sup> environment)	Not applicable	Not applicable	Not applicable

EMC category / frame	Option code	A to B	C to D	E0 to E	G1 to G2
C3 filter, earthed/unearthed network *	+E210	–	–	□	●
C3 filter earthed network only *	+E200	■ <sup>1)</sup>	□	–	–
C2 filter, earthed network only *	+E202	–	–	□	–
C2 filter, earthed network only *		■ <sup>2)</sup>	■ <sup>2)</sup>	–	–

● = standard □ = option, built-in ■ = option, external – = not available

## Notes

<sup>1)</sup> External, plug-in

<sup>2)</sup> External accessory, no plus code

\* Max. cable length 100 m (328 ft)



# Options

## G1 and G2 frame drive modules



The ACS850 G1 and G2 frames have some useful optional features. For ordering codes and description see the table below.

Option code	Description
+D150	Braking chopper + connection busbars
+E208	Common mode filter
+H356	DC connection busbars
+H381	Power cabling panels
+OH354	Without pedestal
+P905	Integrated control unit
+B051	IP20 covers for cabling area
+H371	Full size output cable terminals
+P904	Extension for warranty 30 months from delivery

The cabling panel option allows easy connection of input power and motor cables. The cabling panel enables cabinet drive module installing and removing without the need of disconnecting cables.

As a standard, the G1 and G2 frames have an external control unit. This allows easy and safe installation of control cabling. With the integrated control unit option (+P905), the control unit is located inside the drive module making the installation space requirement compact.



Optional +H356 DC connection busbars



Optional +P905 (integrated) control unit with control panel (+J400)



Standard drive module delivery includes external control unit. The control panel +J400 comes as an option.

Optional +B051 IP20 covers for cabling area



Optional +D150 braking chopper + connection busbars

# Options

## Remote monitoring and diagnostic tools

### NETA-21 remote monitoring option

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

### Remote monitoring option

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



# ABB automation products

## Motion controllers

ABB offers a wide range of motion control products to suit many different applications. Motion controllers are available in PCI format, as standalone units with USB, CANopen®, serial and Ethernet interfaces and as intelligent programmable drives for use in single or multiaxis systems.



## Control panels

Our control panels offer a wide range of touchscreen graphical displays from 3.5" up to 15". They are provided with user-friendly configuration software that enables tailor-made customized HMI solutions. Rich sets of graphical symbols and the relevant drivers for ABB automation products are provided. Control panels for visualization of AC500 web server applications are available.



## Servo drives

ABB offers a range of servo drives to cover many different applications. Its drives range from simple analog, fieldbus controlled drives, indexing drives, fully programmable motion drives and real-time Ethernet solutions based on the open standard Ethernet PowerLink and EtherCAT®. ABB motion drives control rotary and linear AC servo motors, and are available from 1 A single phase through to 65 A three phase.



## Servo motors

ABB's BSM series servo motors offer a wide choice of high or low inertia models with winding options, feedback devices and gearheads to match. All ABB servo motors are designed for durability and ability to handle harsh environments.



## AC motors

ABB's low voltage AC motors are designed to save energy, reduce operating costs and enable demanding motor applications to perform reliably and without unscheduled downtime. General performance motors combine convenience and easy handling seamlessly with ABB's engineering expertise. Process performance motors provide the most comprehensive, versatile set of motors for the process industries and heavy-duty applications.



## Machinery drives

ABB offers machinery builders AC drives from component drives up to high performance machinery drives. Global support and service guarantees lifelong satisfaction. ABB machinery drives provide speed control of diverse applications from spa bath motors to treadmill motors, as well as high precision applications such as positioning and synchronization systems.



## Jokab safety products

ABB Jokab Safety offers an extensive range of innovative products and solutions for machine safety systems. It is represented in standardization organisations for machine safety and works daily with the practical application of safety requirements in combination with production requirements. ABB Jokab Safety delivers everything from a single safety solution to complete safety systems for single machines or entire production lines.



# ABB automation products

## AC500

ABB's powerful flagship PLC offering a wide range of performance levels and scalability within a single simple concept where most competitors require multiple product ranges to deliver similar functionality. Web server integrated and IEC 60870-5-104 remote control protocol for all Ethernet versions.



## AC500-eCo

Meets the cost-effective demands of the small PLC market whilst offering total inter-operability with the core AC500 range. Web server, FTP server and Modbus-TCP for all Ethernet versions. A Pulse Train Out-put module is available for multi-axis positioning.



## AC500-S

A PLC based modular automation solution that makes it easier than before to mix and match standard and safety I/O modules to meet your safety requirements in all functional safety applications. "Extreme conditions" version is also offered.



## AC500-XC

"Extreme conditions" modules with extended operating temperature, immunity to vibration and hazardous gases, for use at high altitudes, in humid conditions, etc. It replaces expensive cabinets with its built-in protection against dirt, water, gases and dust.



## Robotics

ABB's robotic automation offers cell automation by integrating AC500 PLCs in IRC5 robot controllers. More productivity with robots is achieved by wireless interfaces for sensors and actuators on robot tools. Wireless from ABB is an innovative, proven solution well-suited for robots, presses, rotary tables and gantries.



## Programming software

Automation Builder integrates the engineering and maintenance for PLC, drives, motion products, HMI and robotics. It complies with the IEC 61131-3 standard offering all five IEC programming languages for PLC and drive configuration. In addition, it includes continuous function chart, C, extensive function block libraries and powerful embedded simulation/visualization features. Automation Builder supports a number of languages (English, German, French, Chinese, Spanish) and comes with new libraries, FTP functions, SMTP, SNMP, smart diagnostics and debugging capabilities.



## I/O modules

Centralised I/O expansion of the AC500 line and decentralised modular I/O supporting CS31, CANopen®, PROFIBUS DP, PROFINET and EtherCAT®.



# Drives service

## Your choice, your future

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

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

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

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

### Your choice, your business efficiency

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

### We can help you more by knowing where you are!

Register your drive at [www.abb.com/drivereg](http://www.abb.com/drivereg) for extended warranty options and other benefits.



## Service to match your needs

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

### Is uptime your priority?

Keep your drives running with precisely planned and executed maintenance.

#### Example services include:

- ✓ Life Cycle Assessment
- ✓ Installation and Commissioning
- ✓ Spare Parts
- ✓ Preventive Maintenance
- ✓ Reconditioning
- ✓ ABB Drive Care agreement
- ✓ Drive Exchange

### Is rapid response a key consideration?

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

#### Example services include:

- ✓ Technical Support
- ✓ On-site Repair
- ✓ Remote Support
- ✓ Response time agreements
- ✓ Training

### Need to extend your assets' lifetime?

Maximize your drive's lifetime with our services.

#### Example services include:

- ✓ Life Cycle Assessment
- ✓ Upgrades, Retrofits and Modernization
- ✓ Replacement, Disposal and Recycling

### Is performance most critical to your operation?

Get optimal performance out of your machinery and systems.

#### Example services include:

- ✓ Advanced services
- ✓ Engineering and Consulting
- ✓ Inspection and Diagnostics
- ✓ Upgrades, Retrofits and Modernization
- ✓ Workshop Repair
- ✓ Tailored services



Operational efficiency



Rapid response



Life cycle management



Performance improvement



# Drives service

## A lifetime of peak performance

You're in control of every life cycle phase of your drives. At the heart of drive services is a four-phase product life cycle management model. This model defines the services recommended and available throughout drives lifespan.

Now it's easy for you to see the exact service and maintenance available for your drives.

ABB drives life cycle phases explained:

		Active	Classic	Limited	Obsolete
		Full range of life cycle services and support		Limited range of life cycle services and support	Replacement and end-of-life services
Product	Services	Product is in active sales and manufacturing phase.	Serial production has ceased. Product may be available for plant extensions, as a spare part or for installed base renewal.	Product is no longer available.	Product is no longer available.
		Full range of life cycle services is available.	Full range of life cycle services is available.  Product enhancements may be available through upgrade and retrofit solutions.	Limited range of life cycle services is available.  Spare parts availability is limited to available stock.	Replacement and end-of-life services are available.

### Keeping you informed

We notify you every step of the way using life cycle status statements and announcements.

Your benefit is clear information about your drives' status and precise services available. It helps you plan the preferred service actions ahead of time and make sure that continuous support is always available.

### Step 1 Life Cycle Status Announcement

Provides early information about the upcoming life cycle phase change and how it affects the availability of services.

### Step 2 Life Cycle Status Statement

Provides information about the drive's current life cycle status, availability of product and services, life cycle plan and recommended actions.

## Notes

## Notes

# Contact us

For more information please contact your local ABB representative or visit:

**[www.abb.com/drives](http://www.abb.com/drives)**

**[www.abb.com/drivespartners](http://www.abb.com/drivespartners)**

© Copyright 2016 ABB. All rights reserved.  
Specifications subject to change without notice.

3AUA0000041481 REV I EN 18.5.2016