Catalog

ABB industrial drives
ACS850, drive modules, 1.1 to 500 kW

Power and productivity
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Contents

Type code stucture: ACS850 - 04 - XX - 5 + XX

ABB industrial drives, ACS850, drive modules, 1.1 to 500 kW

ABB industrial drives

ACS850 - 04 - XX - 5 + XX

ABB industrial drives

ABB industrial drives are highly flexible AC drives, designed for industrial applications, specifically for those in process industries such as the pulp & paper, metals, mining, cement, power, chemical, and oil & gas industries.

The drives can be configured to meet the precise needs of these industries, and hence order-based configuration is an integral part of the offering. Covering a wide power and voltage range and with a vast array of standard and optional features, the drives are readily programmable, making their adaptation to different applications easy.

Robust design

The current ratings of ABB industrial drives are designed for applications that have a high overload requirement.

At the heart of the drive is the motor control platform, Direct Torque Control (DTC) that provides accurate static and dynamic speed and torque control, high starting torque and long motor cables.

Furthermore, inbuilt drive options make the drive installation fast and easy.

The drive is designed for a long working life and as such, parts like fans and capacitors have been selected to maximize their lifetime. This, together with the extensive protection features and design details such as coated circuit boards, results in excellent reliability for the demanding industrial market.

Drive modules

Drive modules are designed to be built into a customer's own cabinet. The ACS850-04 units are complete single drive modules that are optimized for this purpose, using minimal cabinet space while ensuring cabinet assembly is as easy as possible.

ABB industrial drive modules are suitable for system integrators and/or OEMs which are making their own systems. The modules typically have an IP20 enclosure class.

ACS850-04 single drive modules

ACS850 modules include everything that is required for a complete drive. They offer a wide range of inbuilt options such as different I/O and communications. In addition to these, a wide selection of external accessories is also available.

As the modules are designed for cabinet assembly, they can be mounted side-by-side and cabinet assembly documentation is included. The documentation gives examples of different cabinet configurations, examples of drawings and hints on the selection of auxiliary equipment. The flexibility and programmability of the modules makes them an ideal choice for many applications in different areas of industry.

Type code

This is the unique reference number that clearly identifies the drive by construction, power and voltage rating and selected options. Using the type code you can specify your drives from the wide range of options available. Customer-specific options are added to the type code using the corresponding + code.

Drive modules main features

Features	Advantage	Benefits
Modular and compact design		
Compact size	Smallest frame size is only 90 mm wide. More drives can be placed in the same cabinet.	Optimum installation layout and efficient cabinet space usage. Space and cost savings in the cabinets and electrical rooms.
Side by side mounting	Minimized cabinet wall space. No need to remember correct air gaps.	Space and cost savings in the cabinets and electrical rooms.
Modular design	Many standard features and a wide range of options allow different system configurations.	Fits many application needs. Offers flexibility in system design.
Optimal location of power terminals	Top-down power flow in frames A to D enables the most optimal cabinet layout in many cases.	Easy connection of power cables. Optimum installation layout and efficient cabinet space usage. Optimized design from an EMC point of view.
Integrated braking chopper	Braking chopper as standard up to 45 kW (frames A to D) and an inbuilt option for other frame sizes.	Compact and cost-effective design.
User interface and programming		
Intuitive human-machine interface	Large alphanumeric display showing different assistants and macros. Extremely easy to use and commission the drive. DriveStudio PC-program offers easy access to drive parameter setting and start-up features.	Faster and more accurate drive configuration. Optimal drive settings as assistants offer interactive help.
Drive programming and configuration	Can replace relays and small PLCs with function block programming.	Lower investment cost. Higher flexibility in system design.
Memory unit for easy drive management	Complete drive configuration and settings are stored in a separate memory unit. Power or control unit can be replaced without parameter setting.	Drive functionality can be easily configured, modified or updated with the memory unit. Offers quick and easy after-sales service.
Designed for reliability		
Robust main circuit design	Enhanced reliability. Coated boards and long life time components. Cooling supervision (depending on frame size).	Less process interruptions. Lower maintenance costs.
Extensive protection	Advanced thermal protection of the drive semiconductors and motor. Several adjustable protections for the drive and adjoining equipment ensure a reliable operation.	Higher process uptime. Early warning of any production interruptions.
Maintenance assistant	Indicates preventive maintenance needs of drive, motor or machine. User-set alarms and triggering limits. Monitors running hours, cooling fan running hours, number of relay switchings etc.	Helps with maintenance schedules and cost control of maintenance. Fewer unexpected process interruptions.
Diagnostic assistant	Drive helps in locating failures or reasons for performance changes and suggest remedies.	Reduced process downtime. Faster recovery to drives optimum performance.
Optimized use		
Energy saving calculator	Monitors used and saved energy by the motor in kWh, € and $.	Easy check of the return on investment.
Load analyzer	Shows the load profile of the drive.	Easy process analysis.
Energy optimizer	Maximizes efficiency by optimizing the motor flux.	Improves motors performance therefore makes process more efficient. Energy savings are realised and money saved.

Drive modules main features

Features	Advantage	Benefits
Control and performance		
Standard induction (asynchronous) and permanent magnet motors compatibility	Same drive can be used to control different motor types.	Savings in investment costs. Savings in spares stockholding.
Wide range of speed feedback interfaces	In the rare case a speed feedback device is needed, almost any type of device can be connnected.	Additional hardware flexibility. Unmatched open-loop performance.
Standard drive-to-drive link, configurable as Modbus link	No additional hardware needed for master-follower communication or Modbus. Galvanic isolation.	Lower investment cost. More reliable, disturbance-free isolation.
Different communication options	Flexibility with master communication - drive supports PROFIBUS, CANopen, DeviceNet, Modbus, Modbus TCP and Ethernet / IP communication.	Drive can be applied to many existing processes.
Integrated Safe Torque-Off function (SIL 3)	Safe Torque-Off is used to prevent unexpected start-up. High SIL class means high reliability of the safety function. Can also be used to implement Emergency Stop without contactors.	Enhances safety of the machines. Cost-effective and certified solution for safe machine maintenance. Satisfies new safety directives IEB 61508, IEC 62061 and EN ISO 13489-1.
Extensive configurable standard I/Os.	Optimized accessibility. No need for extra I/O.	Lower cost. Fewer parts and installation work needed for cabinet assembly.
Optional I/O extensions	Plug-in analog and digital I/O extensions.	Extends drives' scope, performance and applications opportunities.
Direct Torque Control	Accurate, dynamic and static speed and torque control. Excellent process control even without pulse encoder. Power interruption ride-through using kinetic energy of load. Fast reaction to load or voltage variations. No shock torques. No torque ripple - minimized risk for torsional vibration. Less noise during motor operation. Output frequency up to 500 Hz. Enhanced motor identification at stand still.	Improves product quality, productivity and reliability Lower investment cost. No unnecessary trips or process interruptions Lower mechanical stress. Suitable for use where audible noise is an issue. Applicable in high speed applications. Better process control due to more accurate identification. Can do motor identification without decoupling the load.
High overload and high starting torque	Smooth start without over-dimensioning the drive.	Longer motor and gear lifetime thereby reduced maintenance costs.
Made in ABB		
Global market leader in AC drives Long experience	Well proven, safe and reliable solutions. Application know-how.	Highly reliable drives.
World wide service and support network	Professional support available around the world.	High quality service and support wherever you need it.

Note: some of the features will be available during 2009

Technical specifications

Mains connection	
Supply voltage	3-phase 380 to 500 V +10 /- 15%
Frequency	50 to 60 Hz ± 5%
DC connection	
DC voltage level	485 to 675 V DC ± 10%
Charging	Internal
Motor connection	
Motor types	Asynchronous motors and permanent magnet motors
Output frequency	0 to 500 Hz
Motor control	ABB´s Direct Torque Control
Torque control: Open loop Closed loop Open loop Closed loop Speed control: Open loop Closed loop Open loop Closed loop	Torque step rise time: <5ms with nominal torque <5ms with nominal torque Non-linearity: ±4% with nominal torque ±3% with nominal torque Static accuracy: 10% of motor slip 0.01% of nominal speed Dynamic accuracy 0.3 to 0.4%sec. with 100% torque step 0.1 to 0.2%sec. with 100% torque step
Braking power connection	
Braking chopper	Standard in frames A to D, inbuilt option in the other frame sizes
Braking resistor	External resistor connected to drive

Operating conditions	
Degree of protection	IP20 acc. to EN 60529 (G frame IP00); Open type acc. to UL 508.
Ambient temperature	-10 to +55 °C (G frame +50 °C), derating above 40 °C No frost allowed
Installation altitude	0 to 4000 m (IT network: 2000 m), derating above 1000 m: 1% / 100 m
Relative humidity	max. 95%, no condensation allowed
Climatic/ environmental conditions	Class 3K3, 3C2 acc. 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)
Vibration	Class 3M4 acc. to EN 60721-3-3
EMC (According to EN 61800-3)	Categories C2 and C3 with optional filter
Functional safety	(STO acc. EN 61800-5-2) IEC 61508: SIL 3 EN 954-1: Category 4 IEC 62061: SILCL 3 EN ISO 13849-1: PL e Certified by TÜV
Compliance	Frames A - D: CE, GOST R, UL, cUL; pending: CSA, C-Tick Frames E0 - G: CE, GOST R; pending: UL, cUL, CSA, C-Tick

Types, ratings and dimensions

Feature / frame size	A	B	C	D	E0	E	G
Current & Power							
Nominal current (400 V)	3 to 8 A	10.5 to 18 A	25 to 50 A	61 to 94 A	103 to 144 A	166 to 210 A	430 to 720 A
Maximum current (400 V)	4.4 to 10.5 A	13.5 to 21 A	33 to 66 A	78 to 124 A	131 to 170 A	202 to 348 A	588 to 1017 A
Typical motor power (400 V)	1.1 to 3 kW	4 to 7.5 kW	9 to 22 kW	30 to 45 kW	55 to 75 kW	90 to 160 kW	200 to 400 kW
Braking chopper	●	●	●	●	□	□	□
Braking resistor	■	■	■	■	■	■	■
Input choke	■	■	●	●	●	●	●
EMC filter / C3 *	■	■	□	□	□	□	□
EMC filter / C2	■	■	■	■	□	□	–
Mounting and cooling							
Air cooling	●	●	●	●	●	●	●
Side-by-side mounting	●	●	●	●	●	●	–
DIN-rail mounting	●	●	–	–	–	–	–
Removable power connectors	●	●	–	–	–	–	–
Removable control connectors	●	●	●	●	●	●	●

● = standard □ = option, inbuilt ■ = option, external – = not available * External EMC filters are plug-in type filters that fit to the drive within its installation footprint.

Ratings

Nominal ratings		No-overload use		Light-duty use			Heavy-duty use			Noise level (dBA)	Heat dissipation (W)	Air flow (m³/h)	Type code	Frame size
I_{2N} (A)	I_{Max} (A)	P_N (kW) U_N=400 V	P_N (kW) U_N=500 V	I_{Ld} (A)	P_{Ld} (kW) U_N=400 V	P_{Ld} (kW) U_N=500 V	I_{hd} (A)	P_{hd} (kW) U_N=400 V	P_{hd} (kW) U_N=500 V					
3	4.4	1.1	1.5	2.8	1.1	1.1	2.5	0.75	1.1	47	100	24	ACS850-04-03A0-5	A
3.6	5.3	1.5	1.5	3.4	1.5	1.5	3	1.1	1.5	47	106	24	ACS850-04-03A6-5	A
4.8	7.0	2.2	2.2	4.5	1.5	2.2	4	1.5	2.2	47	126	24	ACS850-04-04A8-5	A
6	8.8	2.2	3	5.5	2.2	3	5	2.2	2.2	47	148	24	ACS850-04-06A0-5	A
8	10,5	3	4	7.6	3	4	6	2.2	3	47	172	24	ACS850-04-08A0-5	A
10.5	13.5	4	5.5	9.7	4	5.5	9	4	4	39	212	48	ACS850-04-010A-5	B
14	16.5	5.5	7.5	13	5.5	7.5	11	5.5	5.5	39	250	48	ACS850-04-014A-5	B
18	21	7.5	11	16.8	7.5	7.5	14	7.5	7.5	39	318	48	ACS850-04-018A-5	B
25	33	11	15	23	11	11	19	7.5	11	71	375	142	ACS850-04-025A-5	C
30	36	15	18.5	28	15	15	24	11	15	71	375	142	ACS850-04-030A-5	C
35	44	18.5	22	32	15	18.5	29	15	18.5	71	485	142	ACS850-04-035A-5	C
44	53	22	30	41	22	22	35	18.5	22	71	541	200	ACS850-04-044A-5	C
50	66	22	30	46	22	30	44	22	30	71	646	200	ACS850-04-050A-5	C
61	78	30	37	57	30	37	52	22	30	70	840	290	ACS850-04-061A-5	D
78	100	37	45	74	37	45	69	37	45	70	1020	290	ACS850-04-078A-5	D
94	124	45	55	90	45	55	75	37	45	70	1200	290	ACS850-04-094A-5	D
103	138	55	55	100	55	55	83	45	55	65	1190	168	ACS850-04-103A-5	E0
144	170	75	90	141	75	90	100	55	55	65	1440	405	ACS850-04-144A-5	E0
166	202	90	110	155	75	90	115	55	75	65	1940	405	ACS850-04-166A-5	E
202	282	110	132	184	90	110	141	75	90	65	2310	405	ACS850-04-202A-5	E
225	326	110	132	220	110	132	163	90	110	65	2810	405	ACS850-04-225A-5	E
260	326	132	160	254	132	160	215	110	132	65	3260	405	ACS850-04-260A-5	E
290	348	160	200	286	160	200	232	132	160	65	4200	405	ACS850-04-290A-5	E
430	588	200	250	425	200	250	340	160	200	72	6600	1220	ACS850-04-430A-5	G
521	588	250	355	516	250	355	370	200	250	72	7150	1220	ACS850-04-521A-5	G
602	840	315	400	590	315	400	477	250	315	72	8100	1220	ACS850-04-602A-5	G
693	1017	355	450	679	355	450	590 [1]	315	400	72	8650	1220	ACS850-04-693A-5	G
720	1017	400	500	704	400	500	635 [2]	355	450	72	9100	1220	ACS850-04-720A-5	G

[1] 50% overload available if Tamb < 35 °C. If Tamb = 40 °C, max overload is 45%
[2] 50% overload available if Tamb < 30 °C. If Tamb = 40 °C, max overload is 40%

Nominal ratings:
I_{2N}: rated current available continuously without overloading at 40 °C.
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 1min / 5 min at 40 °C.
P_{Ld}: typical motor power in light-duty use.
Heavy-duty use
I_{hd}: continuous current allowing 150% I_{hd} for 1min / 5 min at 40 °C.
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 ambient temperature.

Dimensions

Frame size	Height [3] mm	Depth [4] mm	Width mm	Weight kg
A	364	197	93	3
B	380	274	101	5
C	567	276	166	16
D	567	276	221	23
E0	602	354	276	35
E	700	443	312	67
G	1564	568	562	205

Notes
All dimensions and weights are without options.
3) Height is the maximum measure without clamping plates.
4) An additional 50 mm should be reserved for feedback cabling if FEN-01, 11 or 21 options is used.

EMC filters

1st environment vs 2nd environment

1st environment (category C1 & C2)
1st 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.

2nd environment (category C3 & C4)
2nd environment includes all establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes.

EMC - Electromagnetic Compatibility 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 an inbuilt 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 equipments and systems including drive component 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 table, EMC standards.

Selecting an EMC filter

The following table gives the correct filter selection.

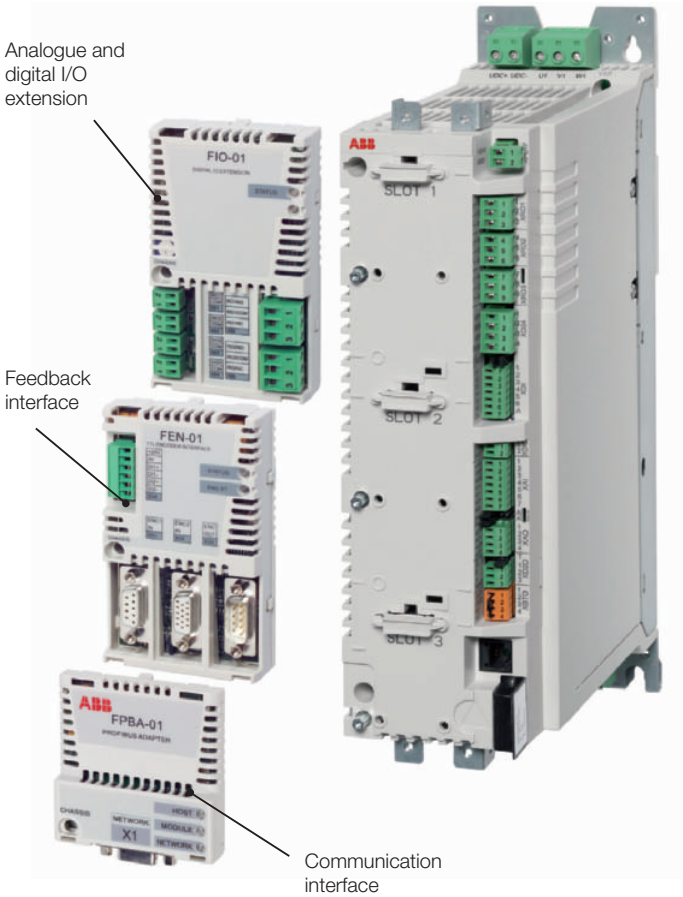
EMC standards

Option / Frame	A&B	C&D	E0&E	G
Built-in C3 filter, earthed/unearthed network*			●	●
Built-in C3 filter, earthed network only*		●		
External, plug-in C3 filter, earthed network only*	●			
Built-in C2 filter, earthed network only*			●	
External C2 filter, earthed network only*	●	●		

* Max. cable length 100 m

EN61800-3 (2004) product standard	EN 55011, product family standard for industrial, scientific and medical (ISM) equipment	EN61000-6-4, generic emission standard for industrial environments	EN61000-6-3, generic emission standard for residential, commercial and light-industrial environment
Category C1 (1st environment)	Group 1 Class B	Not applicable	Applicable
Category C2 (1st environment)	Group 1 Class A	Applicable	Not applicable
Category C3 (2nd environment)	Group 2 Class A	Not applicable	Not applicable
Category C4 (2nd environment)	Not applicable	Not applicable	Not applicable

Standard I/O



Control unit

XPOW		
External power input 24 V DC, 1.6 A	+24VI	1
	GND	2
XRO1, XRO2, XRO3		
Relay output RO1 [Ready] 250 V AC / 30 V DC 2 A	NO	1
	COM	2
	NC	3
Relay output RO2 250 V AC / 30 V DC 2 A	NO	4
	COM	5
	NC	6
Relay output RO3 250 V AC / 30 V DC 2 A	NO	7
	COM	8
	NC	9
XD24		
+24 V DC*	+24VD	1
Digital input ground	DIGND	2
+24 V DC*	+24VD	3
Digital input/output ground	DIOGND	4
Ground selection jumper		
XDI		
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
XDIO		
Digital input/output DIO1 [Output: Ready]	DIO1	1
Digital input/output DIO2 [Output: Running]	DIO2	2
XAI		
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
XAO		
Analog output AO1 [Current %]	AO1+	1
	AO1-	2
Analog output AO2 [Speed %]	AO2+	3
	AO2-	4
XD2D		
Drive-to-drive link termination jumper		T
Drive-to-drive link.	B	1
	A	2
	BGND	3
XSTO		
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

Standard I/O

- Control voltage supply: external supply (24V DC) input for the control unit
- Digital I/O: 6xDI, 2xDI/O (can be used also for pulse train inputs or outputs, max 32 kHz), 3xRO
- Analog I/O: 2xAI (mA or V), 2xAO
- Thermistor input: motor thermistor (PTC, KTY)
- Start interlock: drive interlock input
- Drive-to-drive link: galvanically isolated, can also be used for ModBus
- Safe Torque-Off (STO): designed for Safety Integrity Level 3 (SIL 3) acc. to IEC 61508 and Safety Category 4 acc. to EN 954-1
- Control panel connection: PC tools and control panel connection (RJ45). Can be used also as a Modbus link for monitoring
- Memory unit connection: complete drive configuration and settings are stored in the removable memory unit

Options

Optional I/O

The ACS850 drive modules have one of the most extensive offering of standard I/Os in the market. In addition, optional I/O extension modules are available, providing additional connection possibilities. Extensions include analog and digital extension modules and pulse encoder 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 communication buses.

Options	Data	Install in
Analogue & digital extension		
FIO-01	4xDI/O, 2xRO	Slot 1 or 2
FIO-11	3xAI (mA/V), 1xAO (mA), 2xDI/O	
FIO-21	1xAI (mA/V), 1xAO (mA), 1XDI, 2xRO	
Feedback interface		
FEN-01	2 inputs (TTL incremental encoder), 1 output *	Slot 1 or 2
FEN-11	2 inputs (SinCos absolute, TTL incremental encoder), 1 output *	
FEN-21	2 inputs (Resolver, TTL incremental encoder), 1 output*	
FEN-31	1 input (HTL incremental encoder), 1 output	
Communication		
FPBA-01	PROFIBUS-DP, DPV0/DPV1	Slot 3
FCAN-01	CANopen	
FDNA-01	DeviceNet	
FENA-01	Ethernet/IP, Modbus TCP	
FSCA-01	Modbus	
FLON-01	LONWORKS®	

* When this module is used, the lower part of the control unit cover cannot be used

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 alphanumeric display
- Extremely easy to navigate
- Soft and convenient keys
- Local control keys (start/stop/reference)
- Parameter setting and monitoring
- Status and history data
- Real-time clock

The panel mounting kit enables mounting of control panel either on the drive itself or on the cabinet door or inside the control cabinet. IP54 kits are also available.

Fieldbus control

The ACS850 drive modules have an embedded Modbus link as standard. This RS-485 link is galvanically isolated for trouble-free operation and can be alternatively configured as a high speed drive-to-drive link for master-follower operation.

Other fieldbus protocols are also supported, enabling connectivity to major automation systems. This is achieved with a dedicated gateway concept between the different fieldbus systems and ABB drives.

The fieldbus gateway module can easily be mounted inside the drive. Because of the wide range of fieldbus gateways, your choice of automation system is independent of your decision to use ABB AC drives.

This allows manufacturing flexibility and reduced installation and engineering effort via:

- Drive control (using a 16-bit word)
- Drive monitoring
- Drive diagnostics (via alarms, limit and fault words)
- Drive parameter handling
- Optimized design
- Precommissioning
- Fast and easy assembly

Currently available gateways

Fieldbus	Protocol	Device profile	Baud rate
PROFIBUS (+K454) FPBA-01	DP, DPV0, DPV1	PROFIdrive ABB Drives	9.6 kbit/s - 12 Mbit/s
DeviceNet (+K451) FDNA-01	-	AC/DC drive ABB Drives	125 kbit/s - 500 kbit/s
CANopen (+K457) FCAN-01	-	Drives and motion control ABB Drives	50 kbit/s, 1 Mbit/s
Modbus (+K458) FSCA-01	RTU	ABB Drives	9.6 kbit/s - 115.2 kbit/s
Ethernet (+K464) FENA-01	Modbus/TCP Ethernet / IP	ABB Drives	10/100 Mbit/s
LONWORKS® (+K452) FLON-01	LONTALK®	Variable speed motor drive	78 kbit/s

Options

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 N-end (non-driven 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

500V	du/dt filter type (3 filters included in kits marked *) Unprotected (IP00)							
	NOCH0016-60	NOCH0030-60	NOCH0070-60	* NOCH0120-60	* NOCH0260-60	FOCH0260-70	FOCH0320-50	FOCH0610-70
ACS850-04-03A0-5								
ACS850-04-03A6-5								
ACS850-04-04A8-5								
ACS850-04-06A0-5	1							
ACS850-04-08A0-5								
ACS850-04-010A-5								
ACS850-04-014A-5								
ACS850-04-018A-5								
ACS850-04-025A-5								
ACS850-04-030A-5		1						
ACS850-04-035A-5								
ACS850-04-044A-5								
ACS850-04-050A-5								
ACS850-04-061A-5			1					
ACS850-04-078A-5								
ACS850-04-094A-5								
ACS850-04-103A-5								
ACS850-04-144A-5				1				
ACS850-04-166A-5								
ACS850-04-202A-5					1			
ACS850-04-225A-5								
ACS850-04-260A-5						1		
ACS850-04-290A-5								
ACS850-04-430A-5							1	
ACS850-04-521A-5								
ACS850-04-602A-5								
ACS850-04-693A-5								1
ACS850-04-720A-5								

Filter selection table for ACS850

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 V < $U_N \leq 500$ V	Standard insulation system.
ABB random-wound HXR and AM motors	380 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 Δt=0.2 µs, du/dt filtering is not required. With du/dt filtering the insulation system must withstand $\hat{U}_{LL}$=1300 V.

Symbol	Explanation
U_N	Nominal mains voltage.
$\hat{U}_{LL}$	Peak line to line voltage at motor terminals.
Δt	Rise time, i.e. interval during which line to line voltage at motor terminals changes from 10% to 90% of full voltage range.

Dimensions and weights of the du/dt filters

du/dt filter	Height mm	Width mm	Depth mm	Weight kg
NOCH0016-60	195	140	115	2.4
NOCH0030-60	215	165	130	4.7
NOCH0070-60	261	180	150	9.5
NOCH0120-60*	200	154	106	7
NOCH0260-60*	383	185	111	12
FOCH0260-70	382	190	254	47
FOCH0320-50	662	319	282	65
FOCH0610-70	662	319	282	65

* 3 filters included, dimensions apply for one filter.

Mains chokes

Mains chokes are typically used to reduce harmonics in the mains current.

Frames C to G are equipped with inbuilt choke as standard. For frames A and B, the ACS850 drive modules do not necessarily need a separate mains choke for operation. If however separate mains choke are needed they are available to meet different system design needs.

Frame size	Type	Dimensions			Mass
		Width mm	Length mm	Depth mm	kg
A	CHK-01	120	146	79	1.8
A	CHK-02	150	175	86	3.8
B	CHK-03	150	175	100	5.4
B	CHK-04	150	175	100	5.2

Programming

Based on Direct Torque Control technology, the ACS850 offers highly advanced features as standard. The ACS850 standard program provides solutions to virtually all AC drives applications such as mixers, separators, extruders and conveyors, to name few.

Fast and easy commissioning

The standard ACS850 program offers flexibility and extensive parameter settings. It consists of a simple, ready-made program that can easily be modified to meet specific application needs. Commisioning is also simplified by several software features that come standard with every drive.

Pre-programmed protection functions

A wide range of features provides protection for the drive, motor and the process.

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

Furthermore the standard application program offers an integrated emergency stop and supports the functionality of prevention of unexpected start-up.

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

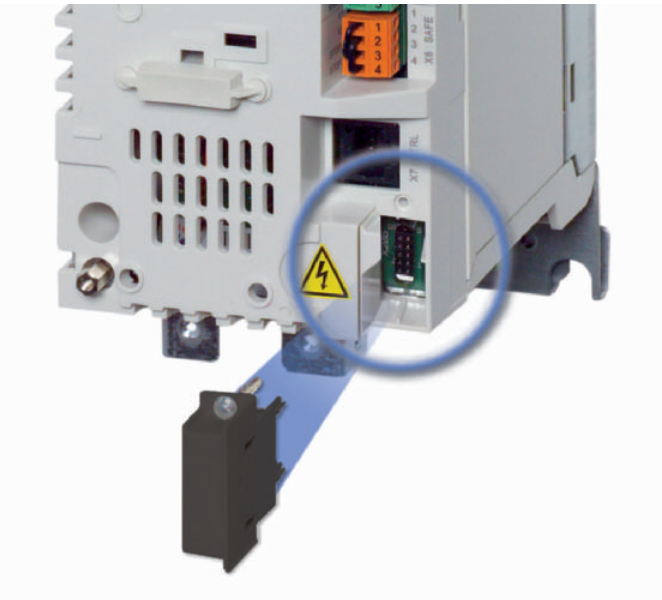
Program customization

Using DriveSPC allows fine-tuning of the standard program to fit any application. In addition to parameters, ABB industrial drives offer function block programming, this makes it possible to replace relays or even a PLC, in some applications.

Removable memory unit

A removable memory unit provides easy maintenance by storing the complete firmware, including all user settings and motor data. Thus, if the power unit or control unit is replaced, the drive can be re-commissioned without any reprogramming, just move the memory unit.

- Stores the drive software and parameter settings
- Fast and easy recommissioning
- Enables software and parameter configuration at workshop instead of doing it on-site



Software features

ABB industrial drive modules have many features to enhance their reliability and durability as well as the easiness of use. Among those, several macros for parameter settings and several advanced functions such as short and long parameter menus, I/O mapping and changed parameters list, making the drive simple to use.

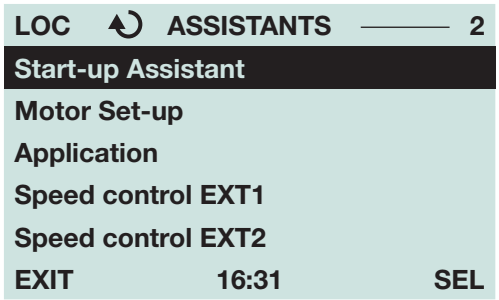
All these functions can be accessed either via the user-friendly control panel or DriveStudio PC tool.

Macros

Several macros which have pre-set, application-specific parameter settings are available as standard in each drive. These pre-programmed parameter settings enable fast and easy commissioning by adjusting all the relevant parameters in just a couple of clicks..

Start-up assistant

The intelligent and intuitive start-up assistant allows first-time users to quickly get up-to-speed and customize the drive according to their needs. This is complemented by a built-in help function to make parameter-by-parameter setting easy. This way the drive can be quickly commissioned, even without manuals.



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, relay switching to reduce unplanned process interruptions.

Diagnostic assistant

Each ACS850-04 drive module is equipped with a diagnostic assistant that helps in locating the cause of any disturbance to the drive and even suggests possible remedies. This reduces process downtime by making repair or adjustments quicker and easier.

Energy saving calculator

This feature consists of three functionalities:

- An energy efficiency optimizer that adjusts the motor flux in such a way that the total efficiency is maximized
- A counter that monitors used and saved energy by the motor and displays them in kWh, currency ($ or €) or volume of CO_2 emission
- A load analyzer showing the load profile of the drive

Short/long menus

The user interface can be configured so that it displays only the most common parameters. This short menu allows users to quickly access the parameters they need without having to go through all the drive's parameters.

A long menu is available, displaying the exhaustive list of parameters for a more advanced configuration.

I/O mapping

This functionality allows user to easily go through the I/O configuration of the drive.

List of changed parameters

This feature allows users to go through the list of changed parameters. This way, the user does not have to go through all the drive's parameters and it is quickly possible to identify the ones recently modified.

PC tools

DriveStudio

User-friendly PC tool for quick drive startup, drive tuning and advanced programming tasks.

Start-up and maintenance tools:

- Fast parameter navigation
- Parameter setting
- Data logging and online drive signal monitoring of multiple signal channels for drive tuning
- Back-up and restore tool for drive parameter and DriveSPC program cloning
- Case sensitive help with detailed descriptions of drive parameters, events and functions
- Overview of the drive performance and status

DriveSPC

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

- Simple, easy-to-learn function block interface showing drive firmware functions, signals and parameters
- Easy addition of 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

DriveSize

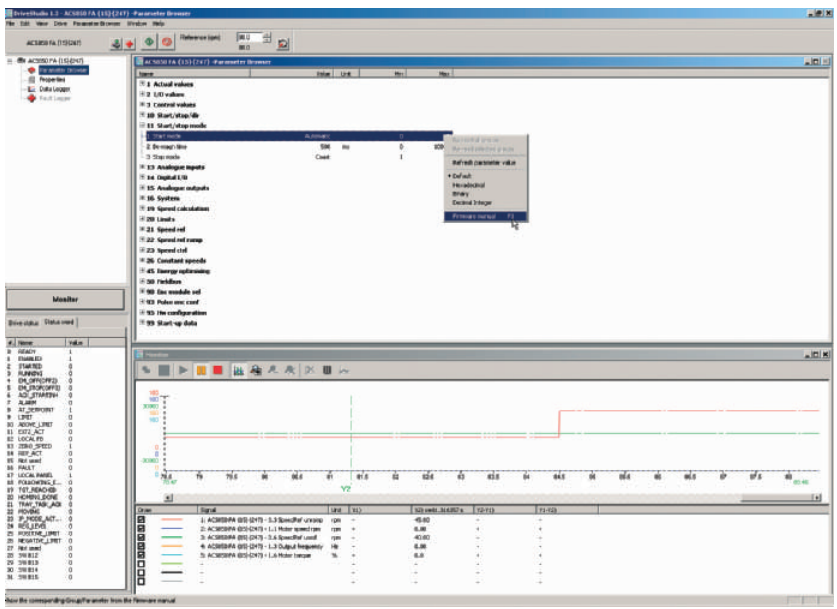
DriveSize is a PC program for helping the user select the optimal motor, frequency converter and transformer, especially in the case where a straightforward selection from a catalogue is not possible. Additionally it can be used to compute currents, network harmonics and to create documents about the dimensioning based on actual load.

DriveSize contains the current versions of the ABB motor and AC drive catalogues.

The default values make DriveSize simple to use, and the user is provided with ample options for drive selection. The shortcut keys make drive selection easy while giving the optimal dimensioning result. A manual selection mode is also supported.

DriveSize features:

- Selects the optimal motor, drive unit, supply unit and transformer
- Calculates network harmonics for a single supply unit or for the whole system
- Allows importation of own motor database
- Supplies dimensioning results in graphical and numerical format
- Prints and saves the results



Remote monitoring and diagnostic tools

SREA-01 enables remote access

With drives increasingly being installed in remote locations, operational data needs to be acquired from the process for sending to a central location for process monitoring and further analysis. Furthermore, with no qualified service people on site it is vital to be able to monitor the drive remotely.

ABB's SREA-01 Ethernet adapter performs all these remote access tasks. Designed as an optional remote interface module for the drives, the SREA-01 can send process data, data logs and event messages independently, without a PLC or a dedicated on-site computer, and has an internal web server for configuration and drive access.

Connect a maximum of 10 drives to an Ethernet or GPRS network

In addition to a standard Ethernet port, the SREA-01 is equipped with an additional serial port for connecting to a standard GSM/GPRS modem for Internet connectivity in isolated places. The modem connection can be used for sending e-mail or SMS messages, uploading data files by FTP or accessing the Web pages of the module.

The SREA-01 is connected to the panel port, or alternatively to the Modbus interface, of a drive. A maximum of 10 drives can be connected to a single SREA-01 module, although an additional RS-485 converter is needed for each drive if several drives are connected by their panel port interfaces.

Collect data logs and integrate drive data in SCADA applications

For collecting data from the drive for further analysis, the SREA-01 has a fully configurable data logger that can store values from the drives to a file, with sample intervals from ten seconds to one hour. The files are stored in the standard Comma Separated Values (CSV) format that can be imported to applications such as Microsoft Excel for processing.

The collected data logs can be sent by e-mail or FTP, either on a local area network or the Internet. The sending interval can also be configured by the user, with logs being sent, for example, every hour or once a week.

In addition to providing data logging functionality, the SREA-01 also has an internal Modbus TCP gateway, providing a standard interface that can be used by SCADA (Supervisory Control And Data Acquisition) applications to display drive information in real-time.

Receive alarms and access the drive remotely

The SREA-01 unit can be used to monitor the drive for abnormal situations, such as too high process temperatures, and send alarm messages to maintenance personnel. The event and alarm messages can be sent as SMS messages or by e-mail. The event conditions and messages can be configured by the user to make them suitable for a number of applications.

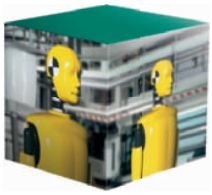
If emergency situations or faults occur, the internal web server of the SREA-01 provides an easy-to-use user interface for accessing the drives. Travel to sites can often be avoided by using a regular web browser to view and change the drive parameters, monitor the status of all connected drives and browse the fault history of the installation.

Summary of features and options

Easy and cost efficient cabinet assembly

- Compact size
- Side-by-side installation
- Optimal location of power and I/O terminals

Safety as standard



- Integrated Safe Torque-Off function (SIL 3)
- Solutions for other safety functions available

Customizable to meet all needs

- Wide selection of options - "order what you need"
- Extensive standard I/O offering and extensions available
- Flexible software: extensive parameter settings
- Good programmability (also function block programming)

Precise and reliable control

- DTC with enhanced features
- Drive-to-drive link as standard

Save money and the environment

- Energy optimizer
- Energy-saving calculator

Maximized process uptime

- Diagnostic assistant to identify and solve potential problems
- Maintenance assistant for preventive maintenance
- Coated boards as standards
- Advanced thermal protection of power semiconductors
- Fast and advanced over/under voltage and load protections
- Cooling fan supervision (up to 45 kW)

Services and support

- Extensive support documentation and support material
- Advanced PC tools available for dimensioning, programming, commissioning and maintenance
- Worldwide service network by ABB and partners

Fast and easy commissioning

- Intuitive multilingual user interface
- Intelligent and intuitive start-up assistant with inbuilt help function
- Removable memory unit

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

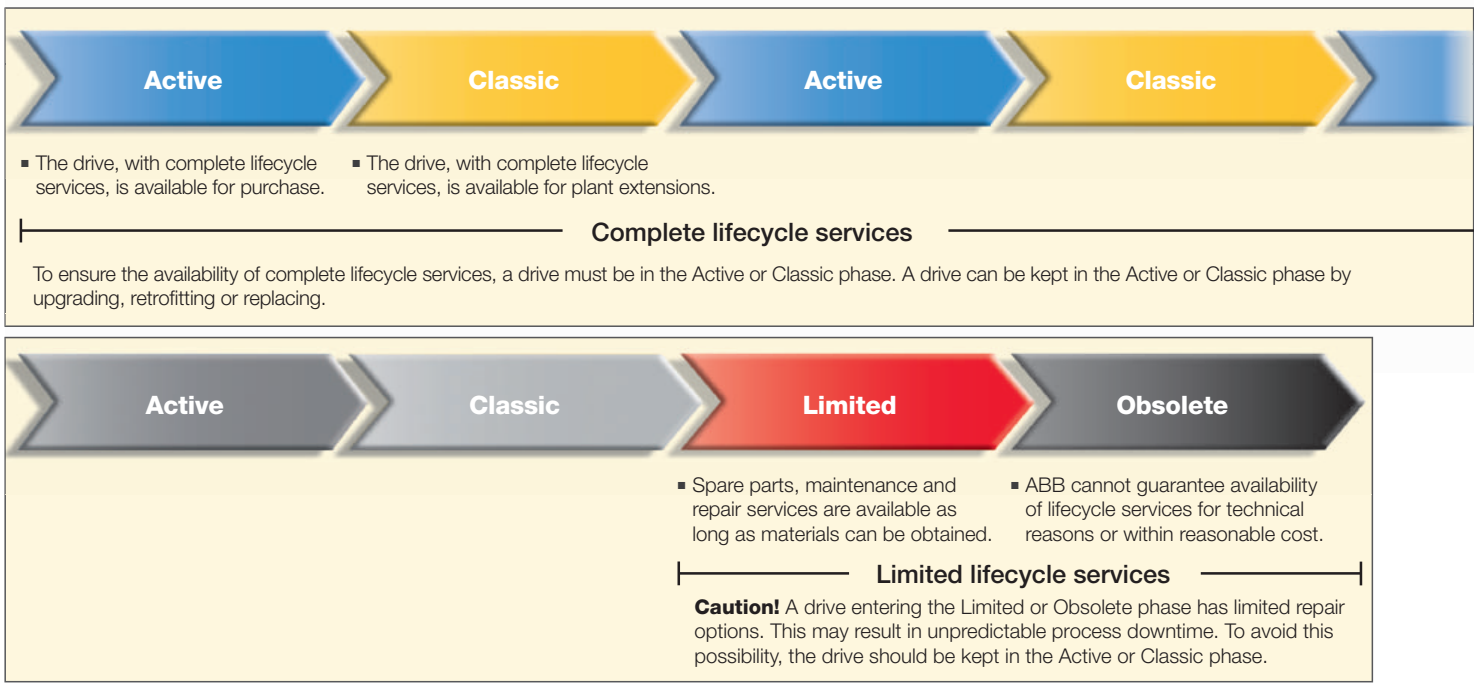


ABB follows a four-phase model for managing drive lifecycles, which brings enhanced customer support and improved efficiency.

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.

Contact and web information

www.abb.com/drives

ABB's worldwide presence is built on strong local companies working together with the channel partner network. By combining the experience and know-how gained in local and global markets, we ensure that our customers in all industries can gain the full benefit from our products.

For further details about all our low voltage AC drives and services please contact your nearest ABB office or ABB drives channel partner or visit the websites www.abb.com/drives and www.abb.com/drivespartners.

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