

# Regenerative AC drive, cabinet-built

ACS800-17, 125 to 2600 Hp

## Complete regenerative drive

The ACS800-17 offers you a complete regenerative drive in a single, compact cabinet-built package. The drive includes everything that is needed for regenerative operation, including line filter. The active supply unit allows full power flow both in motoring and regenerating modes.

## Energy savings

Compared with other braking methods such as mechanical and resistor braking, the energy savings can be significant with the ACS800-17. The braking energy is returned to the AC Line network, not wasted as heat. Handling of waste heat may also be a problem if braking power is significant. As no external braking devices are needed with the ACS800-17, installation work is simpler and the space requirement for installation is less.

## High performance

The ACS800-17 is especially suitable for demanding applications. Transition between motoring and generating is fast due to the patented DTC motor control method. The active supply unit is able to boost output voltage, which guarantees full motor voltage even when the supply voltage is below nominal.

The active supply unit combined with the DTC motor control can even compensate for fast variations in line voltage. There is no risk of fuse blow or component damage due to voltage drops in the network while regenerating.

## Extensive range of features

Adaptation to different application requirements is possible by selecting from a wide range of standardized configurations. The cabinet-built drive series enables having a significant number of features and accessories as built in options.

## Main standard features

- Compact design
- UL Type 1 protection class
- LCL line filter inside
- EMC filter for 2<sup>nd</sup> environment, unrestricted distribution according to EN 61800-3
- Main disconnect switch with aR fuses (ultra fast)
- Line contactor
- Withdrawable air circuit breaker (in frame size nxR8i)
- Du/dt filters (in frame size nxR8i)
- Coated boards
- Extensive, programmable I/O
- Long lifetime cooling fan and capacitors
- Inputs galvanically isolated
- 3 I/O and fieldbus extension slots inside
- Alphanumeric multilingual control panel with start-up assistant feature

## Options for the ACS800-17

- Analogue and digital I/O extension modules
- ATEX approved motor protection
- Cabinet heater
- Customer terminal block
- du/dt output filters (frames R7i -R8i)
- Ground fault monitoring for ungrounded network
- EMC filter for 1<sup>st</sup> environment, restricted distribution according to EN 61800-3
- Fieldbus modules
- UL Type 1 Filtered & UL Type 12 enclosure classes
- Emergency stop, category 0 or 1
- Output for aux motor fan
- Pulse encoder interface module
- Prevention of unexpected start up of motor
- Top entry and exit of cables
- 1 or 2 thermistor relays
- 3, 5 or 8 PT100 relays
- Resolver Interface (Limited SW Support)

Plus tailor made accessories through ABB's application engineering.

# Ratings and dimensions

## ACS800-17

ACS800 - 17 - XXXX - 57 + XXXX

Type code	Frame size	Input A	I <sub>max</sub> A	Normal Duty		Heavy-duty use		Noise Level dBA	Air flow ft³/min	Heat Dissipation BTU/hr
				I <sub>2N</sub> A	P <sub>N</sub> Hp	I <sub>2HD</sub> A	P <sub>HD</sub> Hp			
3-phase supply voltage 380, 400, 415, 460, 480, 500. The power ratings are valid at nominal voltage, 480Vac 60Hz										
ACS800-17-0070-5+C129	R6	112	168	114	75	88	60	73	295	8200
ACS800-17-0100-5+C129	R6	129	234	132	100	114	75	73	295	9600
ACS800-17-0120-5+C129	R6	145	264	156	125	125	100	73	295	11600
ACS800-17-0170-5+C129	R7i	180	291	192	150	156	125	74	765	20500
ACS800-17-0210-5+C129	R7i	220	356	240	200	183	150	74	765	27300
ACS800-17-0260-5+C129	R8i	270	438	302	250	226	150	75	1860	30700
ACS800-17-0320-5+C129	R8i	329	530	361	300	273	200	75	1860	37600
ACS800-17-0400-5+C129	R8i	410	660	437	350	340	250	75	1860	47600
ACS800-17-0460-5+C129	R8i	473	762	504	400	393	300	75	1860	54700
ACS800-17-0510-5+C129	R8i	536	863	571	450	445	350	75	1860	61500
ACS800-17-0580-5+C129	R8i	600	972	643	500	501	400	75	1860	75100
ACS800-17-0780-5+C129+H359	2xR8i	803	1294	856	700	667	550	77	3770	88800
ACS800-17-0870-5+C129+H359	2xR8i	900	1458	965	800	752	650	77	3770	109000
ACS800-17-1140-5+C129+H359	2xR8i	1176	1906	1261	1050	982	850	77	3770	147000
ACS800-17-1330-5+C129+H359	3xR8i	1379	2217	1467	1250	1143	1000	78	6030	157000
ACS800-17-1640-5+C129+H359	3xR8i	1746	2734	1809	1550	1409	1250	78	6030	219000
ACS800-17-2160-5+C129+H359	4xR8i	2304	3608	2387	2050	1860	1600	79	7530	287000
3-phase supply voltage 525, 550, 575, 600, 690. The power ratings are valid at nominal voltage, 575Vac 60Hz										
ACS800-17-0060-7+C129	R6	53	86	54	50	43	40	73	294	6142
ACS800-17-0070-7+C129	R6	73	120	75	60	60	50	73	294	8190
ACS800-17-0100-7+C129	R6	86	142	88	75	71	60	73	294	9554
ACS800-17-0160-7+C129	R7i	119	192	127	125	99	100	74	765	27300
ACS800-17-0200-7+C129	R7i	135	218	144	150	112	125	74	765	30700
ACS800-17-0260-7+C129	R8i	180	301	193	200	150	150	75	1860	41000
ACS800-17-0320-7+C129	R8i	250	417	268	250	209	200	75	1860	51200
ACS800-17-0400-7+C129	R8i	300	502	322	300	251	250	75	1860	61500
ACS800-17-0440-7+C129	R8i	344	571	367	350	286	300	75	1860	64900
ACS800-17-0540-7+C129	R8i	400	668	429	450	334	350	75	1860	71700
ACS800-17-0790-7+C129+H359	2xR8i	593	985	632	650	493	500	77	3770	120000
ACS800-17-0870-7+C129+H359	2xR8i	657	1091	700	750	545	600	77	3770	126000
ACS800-17-1050-7+C129+H359	2xR8i	784	1310	840	900	655	700	77	3770	143000
ACS800-17-1330-7+C129+H359	3xR8i	1001	1663	1067	1150	831	900	78	6030	184000
ACS800-17-1510-7+C129+H359	3xR8i	1164	1879	1206	1300	940	1050	78	6030	212000
ACS800-17-1980-7+C129+H359	4xR8i	1536	2480	1591	1750	1240	1350	79	7530	280000
ACS800-17-2780-7+C129+H359	5xR8i	2091	3472	2228	2450	1736	1900	79	10550	362000
ACS800-17-2940-7+C129+H359	6xR8i	2280	3680	2362	2600	1840	2000	79	11300	413000

NOTE: C129 captures US requirements

Frame size	Width in	Height UL Type 1 in	Height UL Type 12 in	Depth top entry/exit <sup>B)</sup> in	Weight lb
R6	16.9	83.9	91.1	25.4	550
R7i	24.8	83.9	91.1	25.4	880
R8i	48.4 <sup>A)</sup>	83.9	91.1	25.4	2090
2xR8i	107.5	83.9	91.1	25.4	4982
3xR8i	139.0	83.9	91.1	25.4	6746
4xR8i	178.3	83.9	91.1	25.4	7937
5xR8i	225.6	83.9	91.1	25.4	10538
6xR8i	243.4	83.9	91.1	25.4	10869

<sup>A)</sup> 60.2 in if equipped with 1<sup>st</sup> environment filter and common motor terminal.

<sup>B)</sup> The depth without the handle.

NOTES:

I<sub>max</sub> current available for 10 seconds at start.

I<sub>2N</sub> continuous base current at 40°C (104°F). Overload cycle 110% I<sub>2N</sub> for 1 minute / 5 minutes allowed.

I<sub>2hd</sub> continuous base current at 40°C (104°F). Overload cycle 150% I<sub>2hd</sub> for 1 minute / 5 minutes allowed.

- Current ratings do not change with different supply voltages.

- The rated current of the ACS800 must be greater than or equal to the rated motor current to achieve the rated motor power given in the table.

- Horsepower ratings are based on NEMA motor ratings for typical 4-pole motors (1800 rpm). Check motor nameplate current for compatibility.

### Enclosure

Degree of Protection:  
UL Type 1 (Standard)  
UL Type 1 Filtered, UL Type 12 (opt)  
Paint color:  
Light beige RAL 7035 semi-gloss



# Single drive main features

Features	Benefits	Notes
<b>Compact and complete</b>		
<b>Compact size, everything integrated</b>	Less space and installation work required.	No need to install extra components such as input chokes or EMC filter.
<b>Built in harmonic filter in all ACS800 drives</b>	<p>Low harmonics, meaning less interference and less heating in cables and transformers.</p> <p>Filter also protects the drive from line side transients.</p>	For the lowest harmonic level, ACS800-37 offers almost a harmonic free solution.
<b>Wide range of options available</b>	Standard solutions available from ABB to meet most customers application needs.	Custom made solutions are available in the ACS800-U7/07/17/37
<b>Versatile braking options</b>	<p>Optimal braking options are always available.</p> <p>No need for an external braking chopper thus reducing size and installation cost.</p>	<p>Brake chopper built inside all frame sizes (standard/optional).</p> <p>Regenerative braking with ACS800-U11 and ACS800-17.</p>
<b>User interface</b>		
<b>User friendly customer interface</b>	Easy and fast commissioning and operation.	<p>Clear, alphanumeric display with start-up assistant that guides through the start-up procedure.</p> <p>Easy to use PC tools available for commissioning, maintenance, monitoring and programming.</p>
<b>Versatile connections and communications</b>	Standard I/O covers most requirements. Connectable to commonly used fieldbuses.	Extensive standard and optional I/O.
<b>Extensive programmability</b>	Flexibility. Possible to replace relays or even a PLC in some applications.	<p>Two levels of programmability:</p> <ol style="list-style-type: none"> <li>1. Parameter programming (standard)</li> <li>2. Adaptive programming (free block programming) <ul style="list-style-type: none"> <li>- standard feature</li> <li>- more blocks available as options</li> <li>- all I/Os are programmable</li> </ul> </li> </ol>
<b>Industrial design</b>		
<b>Wide power and voltage range</b>	One product series can be used to meet all application needs, meaning less training and spare parts and standardized interface to drives.	0.75 to 3000 Hp 208 to 690 Vac
<b>Wide range of robust enclosures available</b>	Industrial suitable solutions available for different environments.	UL Type 1, UL Type 1 filtered, UL Type 12
<b>Robust main circuit design</b>	<p>Suitable for heavy industrial use.</p> <p>Reliable.</p> <p>Long motor cables can be used without extra output filters.</p>	<p>Components dimensioned for heavy duty and long lifetime.</p> <p>Advanced thermal model allows high overloadability.</p>

# Single drive main features

Features	Benefits	Notes
<b>Industrial design</b>		
<b>Extensive protection features</b>	Enhanced reliability, fewer process interruptions. Possibility to also protect motors and process.	Several adjustable limits to protect other equipment included.
<b>Galvanic isolation of I/O</b>	Safe and reliable operation without separate isolators and relays.	Isolated input signals and relay outputs as standard.
<b>All terminals designed for industrial use</b>	Sufficient size even for large aluminum cables.  No need for special tools in I/O cabling.	
<b>Worldwide approvals: CE, UL, cUL, CSA, C-Tick, GOST R</b>	Products that can be used everywhere in the world.	
<b>Right performance for every application</b>		
<b>DTC, accurate dynamic and static speed and torque control</b>	Excellent process control even without speed feedback device - improved product quality, productivity, reliability and lower investment cost.	
<b>DTC - allows high overloadability and gives high starting torque</b>	Reliable, smooth start without overdimensioning the drive.	
<b>DTC, fast control</b>	No unnecessary trips or process interruptions.	Fast reaction to load or voltage variations prevents tripping.  Rides through power interruptions by using kinetic energy of the load.
<b>DTC, flux optimization and sophisticated motor model</b>	Excellent motor and drive efficiency - cost savings for non-dynamic applications like pumps or fans.	Optimal flux in the motor reduces losses on applications where Dynamic Response requirements are minimal.
<b>DTC, mechanics friendly</b>	Less stress for mechanics improves reliability.	No shock torques.  No torque ripple - minimized risk for torsional vibration.  Active oscillation damping.
<b>DTC, line supply control</b>	High performance and robust control in active supply unit with programmable power factor.	Applies for ACS800-U11, ACS800-17, ACS800-U31, and ACS800-37
<b>Made by ABB</b>		
<b>Global market leader in AC drives. Long experience.</b>	Well proven, safe and reliable solutions. Application know-how.	
<b>World wide service and support network</b>	Professional support available around the world.	

# Technical specification

## Mains connection

Voltage and power range	3-phase, $U_{2IN} = 208$ to $240$ V, $\pm 10\%$ , except -U2,-U7,-07,-17,-37 3-phase, $U_{5IN} = 380$ to $500$ V, $\pm 10\%$ 3-phase, $U_{7IN} = 525$ to $690$ V, $\pm 10\%$ (600 V UL, CSA)
Short Circuit Current Rating (SCCR)	ACS800-U1,-U11,-U31 = 65ka ACS800-PC,-U2,-U7/07,-17,-37 = 100ka
Frequency	48 to 63 Hz
Nominal Impedance	3% Nominal Impedance R2-R3, DC Bus Choke R4 and greater, AC Reactor
Power factor	
ACS800-U1,-PC,-U2,-U7/07	$\cos\phi_1 = 0.98$ (fundamental) $\cos\phi = 0.93...0.95$ (total)
ACS800-U11,-17,-U31,-37	$\cos\phi_1 = 1$ (fundamental) $\cos\phi = 0.99$ (total)
Efficiency (at nominal power)	
ACS800-U1,-PC,-U2,-U7/07, 07LC	98%
ACS800-U11,-17,-U31,-37	97%

## Motor connection

Voltage for > 500 V units	3-phase output voltage $0...U_{2IN}/U_{5IN}/U_{7IN}$ please see "Filter selection table for ACS800" under the du/dt filters on page 33
Frequency du/dt	$0... \pm 300$ Hz ( $0... \pm 120$ Hz for -U7/-07 frames R6-R8 with du/dt filters and external du/dt filters)
Field weakening point	$8...300$ Hz
Motor control	ABB's exclusive Direct Torque Control (DTC)
Torque control	Torque step rise time
Open loop	<5 ms with nominal torque
Closed loop	<5 ms with nominal torque
	Non-linearity:
Open loop	$\pm 4\%$ with nominal torque
Closed loop	$\pm 1\%$ 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...0.4% sec. with 100% torque step
Closed loop	0.1...0.2% sec. with 100% torque step

## Environmental

Ambient temperature	
Transport	-40...+70°C
Storage	-40...+70°C
Operation	-15...+50°C, no frost allowed 40...50°C at reduced output current (1% / 1°C)
Operation (ACS800-07LC)	0 to +55°C, no frost allowed +45 to 55°C, at reduced output current (1% / 1°C)
Cooling method	Dry clean air
Altitude	
0...1000 m	without derating
1000...4000 m	with derating ~ (1% / 100 m) (690 V units 1000...2000 m with derating)
Relative humidity	5 to 95%, no condensation allowed
Protection class	
UL Type 1	standard for -U1,-PC,-U2,-U7/07,07LC, -U11, -17,-U31,-37
UL Type 1 filtered	option for -U7/07,-17,-37
UL Type 12	option for -U1,-PC,-U7/07,07LC, -17,-37
Paint color	-PC,-U7/07,07LC, -17,-37: RAL 7035 -U1,-U11,-U2,-U31: NCS 1502-Y (RAL 90021, PMS 420 C)
Contamination levels	No conductive dust allowed
Storage gases),	IEC60721-3-1, Class 1C2 (chemical)
Transportation	Class 1S2 (solid particles)
Operation	IEC60721-3-2, Class 2C2 (chemical gases), Class 2S2 (solid particles)
	IEC60721-3-3, Class 3C1/3C2* (chemical gases), Class 3S2 (solid particles)
C = chemically active substances	
S = mechanically active substances	

## Product compliance

UL & cUL (508A or 508C) and CSA C22.2 NO.14-95, C-Tick, GOST R NEC 430.126(A)(2) Motor Overtemperature Protection  
Quality assurance system ISO 9001 and  
Environmental system ISO 14001  
CE (Available)  
Low Voltage Directive 73/23/EEC with amendment 93/68/EEC  
Machinery Directive 98/37/EC  
EMC Directive 89/336/EEC with amendment 93/68/EEC

## EMC (according to EN 61800-3)

2<sup>nd</sup> environment, unrestricted distribution category C3 as standard in -07 (frame size nxR8i), 07LC, -17 and -37 (frame sizes R7i-nxR8i), option in the others  
1<sup>st</sup> environment, restricted distribution category C2 as option up to 1000 A input current

NOTE: Available options are shown in the Summary of features options table. Please see pages 48-49.