

# ABB high performance machinery drives ACSM1, 0.75 to 160 kW / 1 to 200 hp

ABB high performance machinery drives provide speed, torque and motion control for demanding applications. They can control induction, synchronous and asynchronous servo and high torque motors with various feedback devices. The compact hardware, different variants and programming flexibility ensure the optimum system solution.



## Highlights

- Compact design for single and multidrive systems
- Regenerative supply for applications with high braking power duty cycles
- Functionality can be easily extended using a block programming tool
- Functional safety as standard

## Target industries and applications

ABB high performance machinery drives benefit many industries from plastics and rubber to material handling, wood working, printing and food and beverage. The drives are specifically targeted for applications that demand high accuracy, speed, torque and motion control such as extruders, label printing, coaters, winders, automatic storage and elevators.

## Designed for machine builders

The proven motor control platform, direct torque control (DTC), provides high performance across all applications. The drives with various mounting options give flexibility for a variety of cabinet designs. Control and communication options can be added via three slots. A series of drive tools support commissioning, tuning and programming.

## Modular and compact design

- Five compact frame sizes
- Several mounting and cooling options
- Versatile control interfaces as standard
- Control program variants to cover torque, speed and position control, including function block programming capability according to IEC 61131
- Scalability with internal and external options
- Compatible with ABB AC500 PLC offering
- Global compatibility with machinery environment and standards

# ABB high performance machinery drives ACSM1

## Variety of supply alternatives

The drives have AC and DC input connection, enabling their use in single drive and multidrive systems. In multidrive systems, where several drives are supplied via a common DC bus, the incoming power required can be reduced compared to that of a single drive. The drive can be used as a supply unit for the common DC bus and to drive a motor at the same time.

An alternative is to use an optional regen supply, which enables the power to be fed back to the supply network. In a critical application the drives can be separately powered from a UPS or a battery back-up.

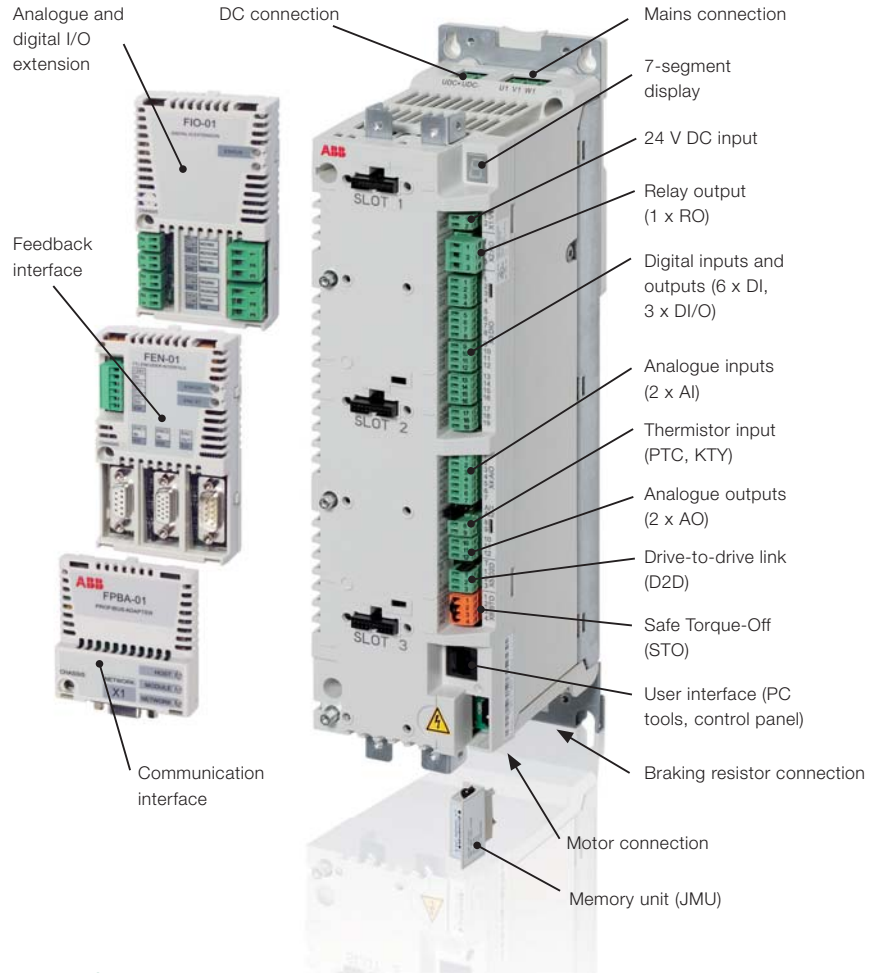
ABB Smissline power distribution system provides a compact, versatile and flexible means of distributing power to the drives in different configurations.

## Different cooling methods

The drive comes as standard with the traditional air cooling method. In addition the drive offers three different cooling variants as options. With the push-through (flange-mounted) variant the main cooling air flow and heat losses can be separated from the control electronics side. The cold plate variant can be installed on an external cooling element, which may be liquid-cooled. The drive variant with integrated liquid-cooling is available in the higher power range.

## Braking power features

The change in speed or position reference may cause the motor to decelerate and feed power back to the DC link. If the power is not consumed by the other drives via the common DC bus, the over-voltage limit will be reached. The additional braking power can be handled using a braking chopper which comes as standard. Alternatively the regen supply can be used, which feeds braking power back to the supply network.



## Clean power features

The drives can be equipped with an external mains choke to limit AC supply side harmonics and high frequency noise emission (EMC) to category C2. These features are also available in the regen filter module, which is used together with the optional regen supply module. With the regen supply, the line side current harmonics are very low (THD < 5%) with EMC at category C2 as well.

## Machine safety

The drives feature a built-in Safe Torque-Off (STO) function as standard which disables the power semiconductors. As such, the drive can not power the motor making it torque-free. More safety functions, such as Safe Stop 1, Safe Brake Control, Safely Limited Speed, Safe Speed Monitor and Safe Direction, can be implemented with external safety system options.

## Control and communication

ABB high performance machinery drives can run various motor types with a variety of speed or position feedback devices. In addition, the motor can be run in open loop mode. The speed and torque control variant is the workhorse for all machines and applications. When positioning functionality is needed the motion control variant is the right choice.

The basic functionality of the drive's firmware can be easily modified or extended with built-in function block programming. The same applies for ready-made application control programs, such as the winder control program. The control interfaces for the drives include digital and analog inputs and outputs, drive-to-drive link and Safe Torque-Off (STO). The extension options are available to increase the number of inputs or outputs.

For communication with an automation controller the most common adapters are available, such as PROFIBUS, CANopen, DeviceNet and Modbus. Ethernet adapter is used for Ethernet/IP and Modbus/TCP and PROFINET I/O. Real-time synchronous communication is available with EtherCAT or SERCOS adapters.

The complete drive configuration and settings are stored in the removable memory unit, making it easy to pre-configure, update and replace the drive.

### Drive tools

The control panel offers quick access to simple settings and changes. DriveStudio is an advanced PC tool for more complicated applications. In addition to the firmware parameter interface, signal monitoring and data logger features can be activated. DriveSPC tool further extends the functionality having a function block interface with drive firmware functions. The extensive standard function block library covers most needs for custom modifications. The application control programs have dedicated function block libraries, such as those for the CAM profiler. The desired CAM profile is programmed with the DriveCAM tool.

The DriveSize selection tool helps to choose the optimum motor and drive combination. The ready-made sizing examples, within the tool, cover the most typical linear and rotary movements.

### System offering

ABB offers a broad motion control automation system comprising controllers, drives, motors and accessories that are designed to work seamlessly together. The services offered to support the integrated system span the entire value chain, from the moment a customer makes the first inquiry to disposal and recycling of the various components. All of this is supported by one of the most extensive global sales and service networks.

Mains connection	
Supply voltage	3-phase 380 to 480 V AC +10 /- 15%
Frequency	50 to 60 Hz +/- 5%
Total harmonic distortion (THD)	With mains choke to meet limits acc. to EN 61000-3-2, IEC 61000-3-12, IEC 61000-3-4.
DC connection	
DC voltage level	485 to 648 V DC ± 10%
Charging circuit	Internal, A to D frames / External, E frame
Motor connection	
Motor types	Asynchronous motors (standard induction motors, servo) and synchronous motors (servo, high torque)
Output frequency	0 to 500 Hz
Switching frequency	$f_{sw} = 1$ to 16 kHz, 4 kHz as default. Output current derating above 4 kHz
Braking power connection	
Braking chopper	As standard in all types
Braking resistor	External resistor connected to drive
Operating conditions	
Degree of protection	IP20 acc. to EN 60529; Open Type acc. to UL 508.
EMC	With mains filter: Category C2 (According to EN 61800-3)
Compliance	CE, UL, cUL, CSA, C-Tick, GOST R
Control interface	
Control voltage supply	Internal or 24 V DC external
PC-tools / control panel	Connection as standard
Status display	7-segment display as standard
Memory unit	Standard
Drive to drive link	Galvanic RS-485 as standard
Digital I/O	6 x DI, 3 x DI/O, 1 x RO
Analog I/O	2 x AI, 2 x AO
Thermistor input	PTC, KTY
Safe Torque-Off (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
Option slots	Three slots for analog and digital I/O, feedback and communication plug-in options
Control and communication options	
Analog & digital extension	
FIO-01	4 x DI/O, 2 x RO
FIO-11	3 x AI, 1 x AO, 2 x DI/O
Feedback interface	
FEN-01	2 inputs (TTL incremental encoder), 1 output
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
FCAN-01	CANopen
FDNA-01	DeviceNet
FENA-01/-11*	EtherNet/IP, Modbus/TCP, PROFINET IO
FSCA-01	Modbus RTU
FECA-01*	EtherCAT
FSEA-01*	SERCOS II

\* = in preparation

# Technical data, dimensions and weights

Feature / frame size	A	B	C	D	E
<b>Current and power</b>					
Continuous current <sup>1)</sup>	3 to 8 A	10.5 to 18 A	27 to 50 A	65 to 93 A	110 to 260 A
Maximum current <sup>1)</sup>	5.3 to 14.7 A	16.6 to 28 A	42 to 81 A	105 to 150 A	165 to 351 A
Typical motor power	0.75 to 3 kW	4 to 7.5 kW	11 to 22 kW	30 to 45 kW	55 to 110 kW/160 kW <sup>2)</sup>
	1 to 3 hp	5 to 10 hp	15 to 30 hp	40 to 60 hp	75 to 150 hp/200 hp <sup>2)</sup>
Dimensions *) (H x D x W)	364 x 146 x 90 mm	380 x 223 x 100 mm	467 x 225 x 165 mm	467 x 225 x 220 mm	700 x 398 x 314 mm
Weight	3 kg	5 kg	10 kg	17 kg	67 kg
Braking chopper	●	●	●	●	●
Braking resistor	□	□	□	□	□
Mains choke	□	□	□	□	●
Mains filter (EMC)	□	□	□	□	●
Regen supply	□	□	□	□	-
<b>Mounting and cooling</b>					
Removable power connectors	●	●	-	-	-
Removable control connectors	●	●	●	●	●
Air-cooled variant	■	■	■	■	■
- Back plate mounting	●	●	●	●	●
- DIN-rail mounting	●	●	-	-	-
- Horizontal mounting	●	●	●	●	-
Push-through variant	-	-	■	■	□
Cold plate variant	-	-	■	■	-
Liquid-cooled variant	-	-	-	-	■

<sup>1)</sup> Ratings with 400 VAC supply and 4 kHz switching frequency. Derating needed with higher values.

<sup>2)</sup> Power range up to 160 kW/200 hp with the liquid-cooled variant.

● = standard      ■ = product variant

□ = option, external      - = not available

\*) All dimensions and weights are without options.

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For more information see catalog ABB high performance machinery drives, ACSM1 (3AFE68675073).

For more information please contact:

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

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

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3AFE68719780 REV E EN 27.10.2009 #14711