



**Optimal solutions, faster**

A photograph of an industrial setting, likely a factory or warehouse. In the foreground, there are several large, white ABB motor control units (drives) mounted on a metal frame. Each unit has a red emergency stop button and a digital display. In the background, there is a large blue robotic arm and other industrial equipment. The text "ABB TOTAL Motor Control Solutions & Services" is overlaid in white on a dark semi-transparent background.

# **ABB TOTAL Motor Control Solutions & Services**

**Drives  
Soft Starters  
ABB Ability Smart Sensors  
IE4 SynRM Motors  
ABB Drive Services**

**Authorized  
value  
provider**



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**Adelaide**  
22 Marlow Road  
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# Drives

## Empower your business with profitable efficiency

You base your business on efficiency and performance. You know that everything counts to make you more competitive. Our drives are made with all this in mind, empowering productivity and efficiency. They provide flexibility to help you optimize your processes and control, and reliable for less downtime. You also get premium service and expertise, anywhere on the globe.

You're always in business with  
ABB & Remtron service and support.



HVAC



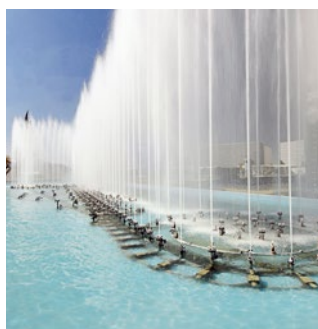
Food



Textile



Pulp and paper



Water and waste



Metals



Power generation



Cement



Oil and Gas



Chemicals



Mining



Marine



LOW VOLTAGE AC DRIVES

## ABB general purpose drives

ACS480, 0.75 to 22 kW



The ACS480 general purpose drives are designed to simplify drive selection, set up, and operation for many basic applications without the head scratching complexities.

### One product, many applications

The drive includes all the essential components for typical light industry applications. The ACS480 is ready to control compressors, conveyors, fans, as well as many other basic speed-controlled applications.

### Reliability and constant high quality

ACS480 drives are designed for customers who value high quality and robustness in their applications. The product features, such as coated boards, earth fault protection and maximum ambient temperature of 50 °C while operating, ensure reliable processes, also in the cabinet installations, where the ACS480 drives are especially optimized. Additionally, all the drives are tested at maximum temperature and with nominal loads. The tests include performance and all protective functions.

### Easier than ever before

ACS480 drives have all the essential features built-in reducing commissioning and setup time. The assistant control panel with 13 different languages is standard for ACS480 drives, and users can upgrade to an optional Bluetooth control panel for wireless commissioning and monitoring. Primary settings and control macros help in the quick product setup and help button offers instant advice in unclear situations.

### Instant availability

ACS480 products are available from the central stock for immediate delivery. The product is also widely available from ABB distributors.



## Technical data

<b>Voltage and power range</b>	3-phase, 380 to 480 V, +10%/-15% 0.75 up to 22 kW
<b>Frequency</b>	48 to 63 Hz
<b>Degree of protection</b>	IP20
<b>Ambient conditions</b>	-10 to +50 °C no derating required, no frost allowed, +50 to +60 °C with derating
<b>Compliance</b>	CE Low Voltage Directive 2014/34/EU, EN 61800-5-1: 2007 Machinery Directive 2006/42/EC, EN 61800-5-2: 2007 EMC Directive 2014/30/EU, EN 61800-3: 2004 + A1: 2012 RoHS directive 2011/65/EU Quality assurance system ISO 9001 Environmental system ISO 14001 Waste electrical and electronic equipment directive (WEEE) 2002/96/ EC RoHS directive 2011/65/EU TÜV certification for functional safety UL, cUL certification
<b>Functional safety</b>	Safe torque off (STO according EN 61800-5-2) IEC 61508 ed2: SIL 3. IEC 61511: SIL 3 IEC 62061: SIL CL 3. EN ISO 13849-1: PL e
<b>EMC</b>	EMC according to EN 61800-3: 2004 + A1: 2012 Class C2 as standard
<b>Control connections in the standard delivery</b>	<b>Base unit:</b> – Two digital inputs – One relay output – Safe torque off (SIL3/PL e) – CCA-01 interface <b>I/O module (RIIO-01):</b> – Two analog inputs (mA or V mode), +10 V voltage supply – Two analog outputs, AO1 (mA or V mode) – Four digital inputs, DI5 (digital or frequency), +24 V voltage supply – Two relay outputs – EIA-485 Modbus RTU <b>Assistant control panel (ACS-AP-S):</b> – Mini USB
<b>Control and communication options</b>	
<b>Fieldbus adapters</b>	PROFIBUS DP, DPV0/DPV1, DeviceNet, Two-Port Modbus/TCP, Two-Port Ethernet/IP, Two-Port PROFINET IO, CANopen, ControlNet, EtherCAT, POWERLINK
<b>PC tools</b>	Drive composer tool entry, available for free via ABB website Drive composer tool pro
<b>Control panel options</b>	ACS-AP-S, assistant control panel (delivered as standard) ACS-AP-W, control panel with Bluetooth interface ACS-AP-I, industrial control panel ACS-BP-S, basic control panel RDUM-01, blank control panel with a RJ-45 connector
<b>I/O options</b>	<b>I/O extension (BIO-01):</b> – Three digital inputs – One digital output – One analog input
<b>Door mounting options</b>	DPMP-01, flush door mounting kit DPMP-02, surface door mounting kit DPMP-EXT2, door mounting kit which includes DPMP-02 and RDUM-01



Video playlist:  
ACS480 how-to  
videos

For more information contact your  
local ABB representative or visit:

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information in this document.

## Simple. Effortless. All-compatible.

### Essential features inside

- Integrated safe torque off (STO)
- Modbus RTU terminal
- USB interface for PC tool connection
- Integrated brake chopper
- Integrated EMC C2 filter

### Get started, without the hassle

- Integrated PID controllers, timers, load analyzer, supervision functions, energy saving optimizer and energy saving calculator for effortless and easy operation
- Three relay outputs and ready-made PFC macro for simplifying running parallel pumps, fans, or compressors
- Same I/O connections and control functionalities as standard as in other general use drives in the industry to make it easy to switch between these products
- Connection to most common industrial automation systems via plug-in fieldbus and Ethernet adapters
- USB port for transferring information between PC and drive
- Free Drive Composer software to program and monitor drive performance

### Learn it once, use it everywhere

- Common drives architecture enables a smooth transition to other all-compatible drives in the ABB portfolio, such as the ACS580 drives
- The drives share the same user interfaces, fieldbus options, and operation logic, enabling users to use the knowledge gained with the ACS480 drives

## There is more to this drive.

### With optional Bluetooth assistant control panel

users can control the drive from up to 75 meters and out of the arc flash boundary.

Compact size together with the control panel door mounting kit make the ACS480 an **optimal product for cabinet installations**.

**Motor control capabilities** include support for asynchronous motors as well as high energy efficient permanent magnet and synchronous reluctance motors.

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LOW VOLTAGE AC DRIVES

# ABB general purpose drives

## ACS580, 0.75 to 500 kW



Designed to simplify drive selection, set up, operation and maintenance, the ACS580 general purpose drives conquer more applications in more industries without the head scratching complexities.

### One product, many applications

The drive includes all the essential components for typical light industry applications. The ACS580 is ready to control compressors, conveyors, mixers, chippers, extruders, as well as many other variable and constant torque applications.

### Reliability and constant high quality

ACS580 drives are designed for customers who value high quality and robustness in their applications. The product features, such as coated boards and compact IP55 enclosure, make the ACS580 suitable for harsh conditions. Additionally, all the drives are tested at maximum temperature and with nominal loads. The tests include performance and all protective functions.

### Easier than ever before

ACS580 drives have all the essential features built-in reducing commissioning and setup time. The assistant control panel with 16 different languages is standard for ACS580 drives, and users can upgrade to an optional Bluetooth control panel for wireless commissioning and monitoring. Primary settings and control macros help in the quick product setup.

### Instant availability

ACS580 products are available from central stocks around the world for immediate delivery up to 500 kW. The product is also widely available from ABB distributors globally.



## Technical data

<b>Voltage and power range</b>	3-phase, 380 to 480 V, +10%/-15% ACS580-01: from 0.75 to 250 kW ACS580-04: from 250 to 500 kW ACS580-07: from 75 to 500 kW
<b>Frequency</b>	50/60 Hz ±5%
<b>Mains choke</b>	As standard, built-in second generation swinging choke
<b>Degree of protection</b>	ACS580-01: IP21 as standard, IP55 as option ACS580-04: IP00 as standard, IP20 as option ACS580-07: IP21 as standard, IP42 and IP54 as option
<b>Ambient conditions</b>	ACS580-01: -15 to +50 °C – No frost allowed – from +40 to +50 °C with derating 1% per 1 °C ACS580-04: -15 to +55 °C – No frost allowed – from +40 to +55 °C with derating 1% per 1 °C ACS580-07: 0 to +50 °C – No frost allowed – from +40 °C to +50 °C with derating 1% per 1 °C
<b>Compliance</b>	ACS580-01: – CE, TÜV Nord (safety functions), UL, EAC, RCM, UL, cUL ACS580-04: – CE, TÜV Nord (safety functions), EAC ACS580-07: – CE, cUL, EAC, RCM
<b>Safety functions</b>	Safe torque off (STO) according to EN/IEC 61800-5-2, SIL 3, PL e (TÜV Nord certified)
<b>EMC</b>	According to EMC Directive 2014/30/EU, EN 61800-3:2004 + A1 2012. ACS580-01: Class C2 as standard ACS580-04: Class C3 as standard ACS580-07: Class C2 or C3 as standard (depends on the frame size)
<b>Harmonic mitigation</b>	According to EN 61000-3-12: 2011
<b>Control connections</b>	Two analog inputs, two analog outputs, six digital inputs, three relay outputs, EIA-485 Modbus RTU, safe torque off (STO), USB via control panel
<b>Control and communication options</b>	
<b>Fieldbus adapters</b>	PROFIBUS DP, CANopen®, DeviceNet™, EtherNet/IP™, Modbus TCP, PROFINET IO, EtherCAT®, POWERLINK, ControlNet
<b>Optional I/O extension modules</b>	CMOD-01: External +24 V AC/DC – two relay outputs – one digital output CMOD-02: External +24 V AC/DC and isolated PTC input CHDI-01: 115/230 V AC digital input – six digital inputs – two relays CPTC-02: ATEX-certified PTC interface and external +24 V CBAI-01: Bipolar I/O extension – two bipolar analog inputs and two unipolar outputs
<b>PC tools</b>	Drive composer tool entry, available for free via ABB website Drive composer tool pro
<b>Control panel options</b>	ACS-AP-I, assistant control panel ACS-AP-W, control panel with Bluetooth interface ACS-BP-S, basic control panel



Video playlist:  
ACS580 how-to  
videos



Online manuals  
for the ACS580  
drives

For more information contact your local ABB representative or visit:

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## Simple. Connected. All-compatible

### Essential features inside

- Integrated safe torque off (STO)
- Removable Modbus RTU terminal
- Option slots
- External +24 V AC/DC
- USB interface for PC tool connection
- Patented swinging choke
- Integrated EMC filter

### Get connected, without the hassle

- Optional Bluetooth assistant control panel for controlling the drive up to 75 meters and out of the arc flash boundary
- Connection to all major industrial automation systems via plug-in fieldbus and Ethernet adapters
- USB port for transferring information between PC and drive
- Optional remote monitoring module for configuring the drive parameters, and monitoring various data such as load levels, runtime, energy consumption, I/O data, and bearing temperatures of the motor
- Free DriveComposer software to program and monitor drive performance

### Learn it once, use it everywhere

- Common drives architecture enables a smooth transition to other all-compatible drives in the ABB portfolio, such as the ACS480 or ACS880
- The drives share the same user interfaces and options, enabling users to use the knowledge gained with the ACS580 drives

## There is more to this drive

**A wide power range** includes drives for wall-mounting, drive modules, and cabinet-built drives.

**Adaptive programming** for customizing the drive for the application, without any previous programming knowledge.

**Motor control capabilities** include asynchronous motors, permanent magnet motors and synchronous reluctance motors.

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LOW VOLTAGE AC DRIVES

# ABB machinery drives

## ACS380, 0.25 to 22 kW



The ACS380 machinery drive is part of ABB's all-compatible drives portfolio. This compact and adaptable drive is designed for machine builders requiring persistent and reliable performance for their machine.

### Persistent performance for your application

The ACS380 machinery drive is ideal for machine building thanks to its robust and compact design, good motor control performance and built-in functions such as safe torque off (SIL 3) and embedded machine control functions like mechanical brake control. Examples of typical ACS380 applications are for example mixers, centrifuges, conveyors and cranes.

### Easy to adapt and configure to machines

With ACS380, commissioning and use is quick and easy thanks to its intuitive control panel, and having all the essential features built-in. Configuration can even be made to unpowered drives. The drive can be adapted to various needs thanks to its good programmability including even extensive PLC type block programming and extensive selection of variants and options allowing the drive to be optimized e.g. for various communication, I/O and EMC requirements.

### Reliability and consistent high quality

The ACS380 drives have improved durability and reliability in harsh conditions, including coated circuit boards, optimized air flow and tolerance for up to 60 °C ambient temperature. All drives are tested during production at maximum temperatures with nominal loads. Tests cover both performance and all protective functions.



## Technical data

Mains connection	
Voltage and power range	1-phase, 200 to 240 V, +10%/-15% 0.25 to 2.2 kW (1/3 to 3 HP) 3-phase, 380 to 480 V, +10%/-15% 0.37 to 22 kW (0.5 to 30 HP) Built-in braking chopper and common DC connection with internal charging circuit
Frequency	50/60 Hz ±5%
Degree of protection	IP20 as standard (UL open type)
Ambient conditions	-10 to +50 °C (14 to 122 °F), up to +60 °C (140 °F) with derating (except R0)
Altitude	All variants 0 to 2000 m, derating above 1000 m (3300 ft) 3-phase, 380 to 480 V drives 0 to 4000 m (see manual for usage restriction at 4000 m), derating above 1000 m (3300 ft)
Compliance	CE, RoHS, UL, cUL, EAC, CSA, TÜV NORD
Safety	Safe torque off (STO) acc. to EN/IEC 61800-5-2: IEC 61508 ed2: SIL 3, IEC 61511: SIL 3, IEC 62061: SIL CL 3, EN ISO 13849-1: PL e
EMC	EMC category C2 (200 V & 400 V) or EMC category C4 (200 V) and C3 (400 V), according to EMC Directive 2014/30/EU, EN 61800-3:2004 + A1 2012
User interface	Integrated icon-based control panel
Drive programming	Adaptive programming
Connectivity types	
Standard variant connections	Four digital inputs, two digital input/outputs, two analog inputs one analog output, one relay outputs, STO (SIL 3), tool connection (RJ-45), Modbus RTU
Configured variant connections	Two digital inputs, one relay output, STO (SIL 3), tool connection (RJ-45), one preconfigured protocol
Preconfigured fieldbus protocols	PROFIBUS DP with DSUB-9 connector CANopen® with plug-in terminal block or with DSUB-9 connector EtherCAT® with 2 x RJ-45 PROFINET IO with 2 x RJ-45 EtherNet/IP with 2 x RJ-45 Modbus TCP with 2 x RJ-45
Control options	
Extension modules	BTAC-02 Encoder interface with External +24 V DC support BREL-01 External relay option (four relay outputs) BAPO-01 External +24 V DC support BIO-01 I/O Extension module (front option, can be used together with fieldbus)
PC tools and accessories	BCBL-01 USB to RJ-45 data cable Drive composer tool entry, available for free via ABB website Drive composer tool pro Automation builder and Drive Manager for single point of commissioning through PROFIBUS and PROFINET networks
Control panel options	ACS-AP-S assistant control panel ACS-AP-I assistant control panel ACS-AP-W assistant control panel with Bluetooth interface ACS-BP-S basic control panel



Video playlist:  
ACS380 how-to  
videos

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## Reliable. Adaptable. All-compatible.

### For persistent performance

- Support for asynchronous, permanent magnet and synchronous reluctance motors
- High speed and torque control performance with 3-phase current transducers
- Support for encoder feedback (option)
- Integrated brake chopper
- Integrated safe torque off (STO)
- Support for remote and Bluetooth access

### For easy configuration

- Compatible with a wide range of fieldbus protocols
- Preconfigured fieldbus modules for easy commissioning
- Possibility to extend I/O
- External +24 V AC/DC (option)
- Different EMC variants with integrated filter
- Adaptive programming for customizing the drive for the application
- Support for configuration for unpowered drives
- Member of all-compatible drives portfolio with similar user interface and PC tools

### For reliability and constant quality

- Coated boards as standard
- Minimized air flow through the control section
- Advanced ground fault protection by 3-phase current transducers
- Design for up to 60 °C
- All drives tested during production at maximum temperatures with full nominal loads



ABB industrial drives

ACS880-01, wall-mounted single drives, 0.55 to 250 kW



The ACS880-01 is part of ABB's new all-compatible drives portfolio. The drives are compatible with virtually all types of AC motors, automation systems, users and business requirements.



Power and productivity  
for a better world™



The innovation behind all-compatible is ABB's new common architecture, designed to simplify operation, optimize energy efficiency and maximize output.

### Simplifying your world without limiting your possibilities

The ACS880-01 is a wall-mounted single drive compatible with a wide range of applications in a broad range of industries such as oil and gas, mining, metals, chemicals, cement, power plants, material handling, pulp and paper, sawmills and marine. At the heart of the drive is direct torque control (DTC), ABB's premier motor control technology. The extensive range of options include EMC filters, encoders, resolvers, du/dt filters, sine filters, chokes and brake resistors, remote monitoring tool, as well as application-specific software. Built-in safety features reduce the need for external safety components. Programming capability based on IEC 61131-3 is embedded inside the drive for making the application run more efficiently, without a separate programmable controller. Multiple drives can be daisy-chained for synchronized drive-to-drive communication. The drive offers enclosure ratings IP20 and IP21,

and for dusty and wet environments IP55. Flange mounting option with separated control electronics and IP55 backside protection is also available.

### Learn it once, use it everywhere

The common drives architecture features the same control panel, parameter menu structure, universal accessories and engineering tools. The control panel is equipped with an intuitive and high-resolution control display that enables easy navigation. Many flexible data visualizations including bar charts, histograms and trend graphs help users to analyze processes. The menus and messages are customizable for the specific terminology of different applications. An integrated USB port allows easy connection to the Drive composer PC tool, which offers fast and harmonized startup, commissioning and monitoring. The built-in energy calculators, including used and saved kWh, CO<sub>2</sub> reduction and money saved, help the user fine-tune processes to ensure optimal energy use. The energy optimizer control mode ensures the maximum torque per ampere, reducing energy drawn from the supply. The drive also offers built-in service features.



#### Technical data

<b>Voltage and power range</b>	3-phase, $U_{N2}$ = 208 to 240 V, +10/-15% 3-phase, $U_{N3}$ = 380 to 415 V, +10/-15% 3-phase, $U_{N5}$ = 380 to 500 V, +10/-15% 3-phase, $U_{N7}$ = 525 to 690 V, +10/-15% 0.55 to 250 kW
<b>Frequency</b>	50/60 Hz $\pm$ 5%
<b>Mains choke</b>	Standard (built-in)
<b>Degree of protection</b>	IP20 (UL open type), IP21 (UL type 1) and IP55 (UL type 12)
<b>Ambient temperature</b>	-15 to +55 °C, (>40 °C with derating)
<b>Compliance</b>	CE, TÜV Nord (safety functions), UL, cUL, GOST R, CSA, C-Tick, marine type approvals
<b>Safety functions (TÜV Nord certified)</b>	Safe torque off (STO), safe stop 1 (SS1), safely-limited speed (SLS), safe brake control (SBC) and safe maximum speed (SMS), safe stop emergency (SSE), prevention of unexpected startup (POUS)
<b>EMC</b>	According to IEC 61800-3, class C3 and C2 as internal option
<b>Harmonic mitigation</b>	According to IEC 61000-3-12
<b>Control connections</b>	Two analog inputs, two analog outputs, six digital inputs including thermistor input, two digital inputs/outputs, three relay outputs, digital input interlock, drive-to-drive link (or Modbus RTU), safe torque off (STO), external 24 V DC supply input, memory unit connection, USB via control panel

#### Control and communication options

<b>Fieldbus adapter modules</b>	PROFIBUS DP, DeviceNet™, CANopen®, EtherNet/IP™, Modbus TCP, PROFINET IO, EtherCAT®, Modbus RTU, PowerLink, ControlNet
<b>Optional I/O extension modules</b>	FIO-01: four digital inputs/outputs, two relay outputs FIO-11: three analog inputs, one analog output, two digital inputs/outputs FDCO-01, FDCO-02: DDCS communication options
<b>Feedback modules</b>	HTL pulse encoder, TTL pulse encoder, absolute encoder, resolver
<b>PC tools</b>	Drive composer entry Drive composer pro

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ACS880 single  
drives web page

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Power and productivity  
for a better world™



ABB industrial drives

ACS880-07, cabinet-built single drives, 45 to 2800 kW



The ACS880-07 is part of ABB's new all-compatible drives portfolio. The drives are compatible with virtually all types of AC motors, automation systems, users and business requirements.



Power and productivity  
for a better world™





The innovation behind all-compatibility is ABB's common drives architecture, designed to simplify operation, optimize energy efficiency and maximize output.

### Simplifying your world without limiting your possibilities

The ACS880-07 cabinet-built single drive is compatible with a broad range of industries. Typical applications include conveyors, kilns, extruders, pumps and fans. The drive configuration contains a rectifier, DC link and an inverter, all built into a compact cabinet. Built-to-order to meet customers' needs, the drive can meet any technical challenge partly through its built-in array of options. The features and options include extended I/O, fieldbus options, du/dt filtering, EMC filtering, a brake resistor, fuses and a main switch. Induction motors, synchronous motors and induction servo motors are all supported as standard, without any additional software. The drive can control them in either open loop or closed loop, through its high precision motor control platform, direct torque control (DTC). Built-in safety features reduce the need for external safety

components. The drive supports the programming environment based on IEC 61131-3.

### Learn it once, use it everywhere

The common drives architecture features the same control panel, parameter menu structure, universal accessories and engineering tools. The control panel is equipped with an intuitive and high-resolution control display that enables easy navigation. Many flexible data visualizations including bar charts, histograms and trend graphs help users to analyze processes, with assistants available to simplify setup. The menus and messages are customizable for the specific terminology of different applications. An integrated USB port allows easy connection to PC tool - Drive composer, which offers fast and harmonized startup, commissioning and monitoring. The built-in energy calculators, including used and saved kWh, CO<sub>2</sub> reduction and money saved, help the user fine-tune processes to ensure optimal energy use. The energy optimizer control mode ensures the maximum torque per ampere, reducing energy drawn from the supply. The drive also offers built-in service features.



Technical data	
Voltage and power range	3-phase, 380 to 690 V +10/-10% 45 to 2800 kW
Frequency	50/60 Hz ±5%
Mains choke	Standard (built-in)
Degree of protection	IP22, IP42, IP54 (UL type 12)
Ambient temperature	0 to +50 °C, (>40 °C with derating)
Compliance	CE; EAC/GOST, UL, cUL, CSA, C-Tick
Safety (TÜV Nord certified)	Safe torque off (STO), safe stop 1 (SS1), safe stop emergency (SSE), safely-limited speed (SLS), safe brake control (SBC), safe maximum speed (SMS) and prevention of unexpected startup (POUS)
EMC	According to IEC 61800-3, class C3 and C2 as a internal option
Control connections	Two analog inputs, two analog outputs, six digital inputs including thermistor input, two digital inputs/outputs, three relay outputs, drive interlock input, drive-to-drive link (or Modbus RTU), safe torque off (STO), external 24 V DC supply input, memory unit connection, USB via control panel
Control and communication options	
Fieldbus adapter modules	PROFIBUS DP, DeviceNet™, CANopen, EtherNet/IP™, Modbus TCP/IP, PROFINET IO, EtherCAT®, Modbus RTU, PowerLink, ControlNet
I/O extension modules	FIO-01: four digital inputs/outputs, two relay outputs FIO-11: three analog inputs, one analog output, two digital inputs/outputs FDCO-01, FDCO-02: DDCS communication options
Feedback modules	TTL pulse encoder, HTL pulse encoder, absolute encoder, resolver
PC tools	Drive composer entry Drive composer pro

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

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ACS880 single  
drives web page

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ACQ580 LV AC DRIVES

## Drives for water and wastewater

0.75 to 500 kW



The ACQ580 drive for water is part of ABB's all-compatible drives portfolio. This robust, compact and energy efficient drive is designed for securing the flow of water and wastewater in your pumping system.

### • Lowers your energy bill

The drive ensures low energy consumption and optimal motor control when pumping water. It has the built-in energy optimizer control mode to ensure maximum torque per ampere, reducing energy drawn from the supply. The built-in energy calculators help the user monitor and fine-tune processes to ensure optimal energy use.

### • Speaks your pump's language

The drive offers built-in water application functionalities for optimal operation of the pump. These include intelligent multi-pump control, sensorless flow calculation, soft pipe fill, pump protection and cleaning functions. Usability is enhanced with the intuitive Hand-Off-Auto control panel including Bluetooth functionality for wireless access to the drive.

### • A robust and reliable performer

With coated boards and enclosure class up to IP55, the drive requires less space as there is no need to install it into cabinets. Built on ABB's common drive architecture, the drives share the same user interfaces and options, enabling users to use the knowledge gained with the ACQ580 drives in other all-compatible drives motors.



## Technical data

<b>Power range</b>	ACQ580-01: 0.75 to 250 kW (frame sizes R0 to R9) ACQ580-04: 250 to 500 kW (frame sizes R10 to R11) ACQ580-07: 75 to 500 kW (frame sizes R6 to R11)
<b>Voltage range</b>	3-phase, $U_{N2} = 380$ to $480$ V, +10%/-15%
<b>Frequency</b>	50/60 Hz $\pm 5\%$
<b>Mains choke</b>	Built-in swinging choke as standard
<b>Degree of protection</b>	ACQ580-01: IP21 as standard and IP55 as an option ACQ580-04: IP00 as standard and IP20 as an option ACQ580-07: IP21 as standard, IP42 and IP54 as an option
<b>Ambient conditions</b>	ACQ580-01: -15°C to 50°C. No frost allowed. From +40°C to +50°C with derating 1% per 1 °C ACQ580-04: -15°C to 55°C. No frost allowed. From +40 °C to +55°C with derating 1% per 1 °C ACQ580-07: 0°C to +50°C. No frost allowed. From +40 °C to +50 °C with derating 1% per 1 °C.
<b>Compliance</b>	CE, UL, cUL, EAC, RCM
<b>Safety functions (TÜV Nord certified)</b>	Safe torque off (STO) according to EN/IEC 61800-5-2, SIL 3, PL e
<b>EMC</b>	According to EMC directive 2014/30/EU, EN 61800-3:2004 + A1 2012 ACQ580-01: Class C2 as standard ACQ580-04: Class C3, as standard ACQ580-07: Class C2 as standard for frames R6 to R9 and Class C3 as standard for frames R10 to R11
<b>Harmonic mitigation</b>	According to IEC 61000-3-12: 2011
<b>Control connections</b>	Two analog inputs, two analog outputs, six digital inputs including thermistor input, three relay outputs, EIA-485 Modbus RTU, safe torque off (STO), external 24 V DC supply input, USB via control panel
<b>Optional I/O extension modules</b>	CMOD-01: External 24 V DC/AC and digital I/O extension (2 x relay output and 1 x digital output) CMOD-02: External 24 V and isolated PTC interface CHDI-01: six 115/230V AC digital inputs and two relay outputs
<b>PC tools</b>	Drive composer tool entry, available for free via ABB website Drive composer tool pro
<b>Control panel options</b>	Hand-Off-Auto control panel (ACH-AP-H) as standard delivery Hand-Off-Auto control panel with bluetooth (ACH-AP-W) Assistant control panel (ACS-AP-I)



For more information 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)

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## Suitable for many applications like:

### For all water industry applications

For pumps, fans, blowers and mixers

### For various installation needs

From wall-mounted (-01) and drive modules (-04) to cabinet-built (-07) variants

### Ensures high protection class

up to IP55

### Connects virtually to any kind of motor

From induction and permanent magnet motors to synchronous reluctance motors

### Offers built-in pump functionalities

- Intelligent multi-pump control
- Sensorless flow calculation
- Level control
- Soft pipe fill
- Quick ramps
- Pump cleaning
- Dry pump protection

## There is more to this drive

### Programmable

The Drive composer PC tool offers extensive drive monitoring and process tuning.

Adaptive programming provides extra flexibility by offering an easy alternative for simple programming needs.

### Learn it once, use it everywhere

Enables a smooth transition to other all-compatible drives in the ABB portfolio, such as the ACS880 industrial drives and ACS480 general purpose drives.



See the ACQ580 product video

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LOW VOLTAGE AC DRIVES

## ABB drives for HVAC

ACH580, 0.75 to 500 kW



Comfort. It requires efficient systems to control heating, ventilation, and air conditioning (HVAC).

For half a century, ABB has been leading the way in optimizing HVAC systems using drive control. ACH580 drives provide the quality, reliability, and energy savings you expect, and are easy to use and safe to maintain.

### Leading the way in HVAC drives

The ACH580 drive sets new standards in both simplicity and reliability, and ensures smooth, energy-efficient operation of your HVAC systems in normal and mission-critical situations. Built-in features reduce on-site commissioning time, add value to existing control systems and provide easy diagnostics and troubleshooting.

### Scalable product for all your needs

The ACH580, with an offering ranging from wall-mounted and cabinet-built drives to ultra-low harmonic drive variants, integrates easily into your facility and the power grid in different environments. ACH580 drives are ideal for controlling HVAC fans, pumps, compressors, air-handling units and chillers used in hospitals, data centers, shopping centers, tunnel ventilation, factories, office buildings, and more.

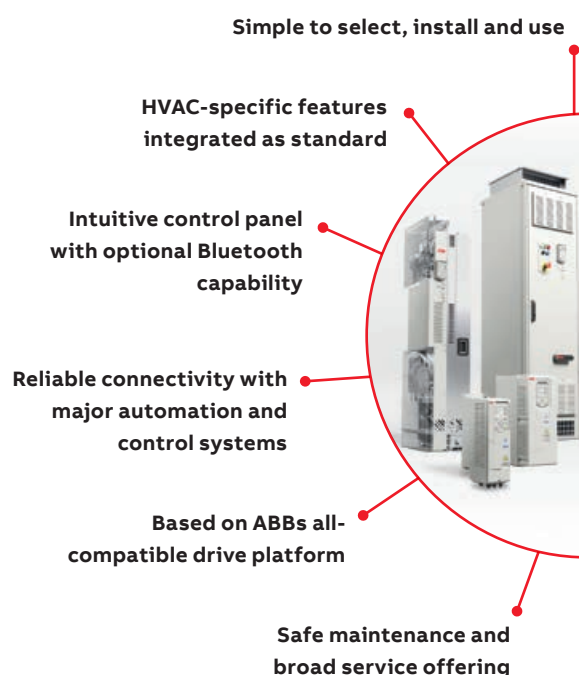
### Maximum usability

The ACH580 drive series provides common features throughout the whole product family, making it easy for you to install, commission, and use them for your entire installation.

### Advanced HVAC features

The drive comes with a variety of new features, such as a new primary settings menu that allows you to commission and program the drive based on your

application. Sleep and timed functions are built into the software to ensure that the drive doesn't run when you don't need it. Another significant feature of the ACH580 drive to increase life and property safety is its in-built override mode.



## ACH580 ultra-low harmonic drive variant

### Overcome challenges of harmonics

Harmonics in electrical systems can be considered as pollution of the electrical grid and can have negative effects on equipment.

ABBs HVAC ultra-low harmonic (ULH) drives are designed with built-in harmonic avoidance systems and meet low harmonic limit recommendations from IEEE519 and G5/5. By using special ultra-low harmonic drives, the problems caused by harmonics are avoided in the first place. ACH580 ULH drives have excellent harmonics performance, keeping the current harmonics in undistorted networks below 3% under all load conditions.

### All-in-one concept

The ACH580 ULH drives for HVAC are perfectly suitable for applications that require low harmonic content, eliminating the risk of resonance, the need for additional hardware, and thus the need to add extra cooling. All this in a simple, compact and cost-efficient package.

### Secured operation under special conditions

In addition to providing low harmonics to the supply network, the active supply unit in the ACH580 drive is able to boost output voltage ensuring reliable operation in weak networks. The voltage boost capability can also be utilized to overcome voltage drops caused by long supply or motor cables.

Technical data	
<b>Voltage and power range</b>	3-phase $U_N$ 380 to 480 V, +10/-15%
Wall-mounted ACH580-01	0.75 to 250 kW
Module ACH580-04	250 to 500 kW
Cabinet-built ACH580-07	75 to 500 kW
Ultra-low harmonic ACH580-31	4 to 45 kW
<b>Supported motor types</b>	Asynchronous motor, permanent magnet motor (vector), SynRM (vector)
<b>Frequency</b>	0 to 500 Hz
<b>Ambient conditions</b>	ACH580-01, ACH580-31: -15 to +50 °C ACH580-07: 0 to +50 °C ACH580-04: -15 to +55 °C 5 to 95% no condensation allowed
<b>Degree of protection</b>	ACH580 drives are available in IP20, IP21 (UL type 1), IP42, IP54 and IP55 (UL type 12)
<b>Inputs and outputs</b>	2 analog inputs, V or mA 2 analog outputs, V or mA 6 digital inputs 3 relay outputs optionally I/O can be extended to add 24 V AC/DC supply for control, relay and transistor outputs, PTC input, 115/230 V AC digital inputs
<b>Communication</b>	
<b>Embedded</b>	BACnet MS/TP, Modbus RTU
<b>Options</b>	BACnet/IP, Modbus TCP and other communication protocols
<b>Application functions</b>	First start assistant Primary settings for HVAC applications Hand-Off-Auto operation mode Start interlock (de-frost) Delayed start Run permissive (damper monitoring) Override operation mode Real-time clock (scheduling) PID controllers for motor and process Motor flying start Motor preheating Energy optimizer and calculators Power loss ride through Motor voltage boost (ACH580-31)
<b>Compliance</b>	
<b>Standards and directives</b>	EN 61800-5-1: 2007; IEC/EN 61000-3-12 EN61800-3:2004 + A1:2012 Category C2 Safe torque off (EN 61800-5-2)
<b>EMC (according to EN61800-3)</b>	ACH580-01, ACH580-07 75-250 kW and ACH580-31 class C2 ACH580-04 and ACH580-07 250-500 kW class C3
<b>Harmonics</b>	With ACH580-31 also IEEE519 and G5/5

For more information contact your local ABB representative or visit:

[new.abb.com/drives/HVAC](http://new.abb.com/drives/HVAC)  
[www.abb.com/drivespartners](http://www.abb.com/drivespartners)  
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## LOW VOLTAGE AC DRIVES

# ABB industrial drives

## ACS880 ultra-low harmonic drives, 2.2 to 3200 kW



ACS880 ultra-low harmonic drives offer an easy harmonic reduction method which is incorporated in the drive. No additional filters or special transformers are needed. This compact, cost-effective solution meets the strictest harmonic recommendations.

### Keeps the network clean

- **Clean supply network**  
 The drive produces exceptionally low harmonic content and exceeds the requirements of harmonic recommendations, such as IEEE 519 and G5/4. The total harmonic current distortion is typically <3% in nominal situation and undistorted network.
- **Minimized downtime**  
 Ultra-low harmonic drives ensure reliable operation in unstable supply network conditions. The drive's active supply unit is able to boost output to guarantee full motor voltage even when the supply voltage is below nominal.
- **Optimized cost and space**  
 The compact drive has harmonics mitigation built-in. This includes an active supply unit and a low harmonic line filter. As there is no need for external filters, multi-pulse arrangements or special transformers, the simple installation offers significant savings in space, time and cost.
- **Maximized motor performance and efficiency**  
 ABB's direct torque control (DTC) provides precise speed and torque control for maximum motor performance and efficiency. The drive's voltage boost capability also improves motor efficiency – with a higher voltage, the same power is achieved with less current.





## Technical data

### ACS880-31 wall-mounted ultra-low harmonic drives

Power range	2.2 to 110 kW
Voltage range	3-phase, 380 to 500 V
Enclosure	IP20, IP21 (as standard) and IP55. Flange mounting with IP55 back side protection as an option.

### ACS880-34 ultra-low harmonic drive modules

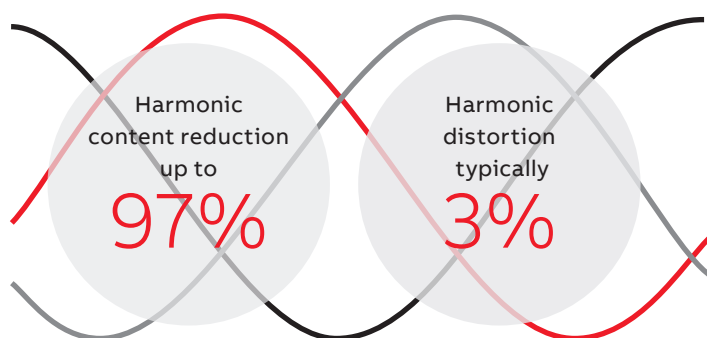
Power range	110 to 400 kW
Voltage range	3-phase, 380 to 690 V
Enclosure	IP20

### ACS880-34 ultra-low harmonic drive module packages

Power range	160 to 2200 kW
Voltage range	3-phase, 380 to 690 V
Enclosure	IP00

### ACS880-37 cabinet-built ultra-low harmonic drives

Power range	45 to 3200 kW
Voltage range	3-phase, 380 to 690 V
Enclosure	IP22 (as standard), IP42 and IP54



## Key features

### Compact package

Designed for easy installation.

### Easy commissioning

No need to set extra parameters for the active supply unit.

### Low harmonic content

Total harmonic current distortion is typically <3% in nominal situation and undistorted network.

### Unity power factor

Possibility also for network power factor correction.

### Voltage boost

Guarantees full motor voltage in all conditions and can also be utilized to overcome a voltage drop caused by long supply or motor cables or output filters. Voltage boost capability may allow a smaller motor to be used.

### Nine-year maintenance interval

### Factory-tested solution for high reliability

All ACS880 drives are tested at maximum temperature with nominal loads.

Video playlist:

ACS880 how-to videos



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

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

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CATALOG

# Softstarters

## PSR, PSE and PSTX



# Common applications for softstarters

## Pumps, fans, compressors and conveyors

A softstarter can do wonders with your operations. Packed with useful features, it reduces the wear of your equipment, improve the reliability of your processes and increase overall productivity.

01 Softstarters  
controlling pumps

02 Softstarters  
controlling fans

### Pumps

#### Eliminating water hammering with torque control

Water hammering is a common problem with pumps and typically results in wear in pipes and valves when starting and stopping the pump. The ABB softstarter feature torque control provides a soft pipe fill during start and eliminates water hammering during stop. The benefits are prolonged lifetime of the system and increased uptime.

#### Keep pipes and pumps clean

Many pumps risk getting clogged over time. This will cause reduced flow and increased risk of pump damage. Thanks to the feature to reverse the direction of the flow and start again with kick-start, ABB softstarters can help prevent and solve pump clogging and associated downtime.

#### Avoid running dry with underload protection

Damages due to pumps running dry can be avoided with the softstarter feature dry pump protection, called underload protection. It stops the motor which saves the pump from additional wear and contributes to prolonging its lifetime.

01



### Fans

#### Soft starting adjusted to application

Fans normally have a high moment of inertia, which makes starting tough and current high. Using an ABB softstarter, the voltage is increased gradually during start, which reduces the current and removes the inrush peak. It is possible to adjust the settings to fit almost any starting condition, from unloaded to fully loaded.

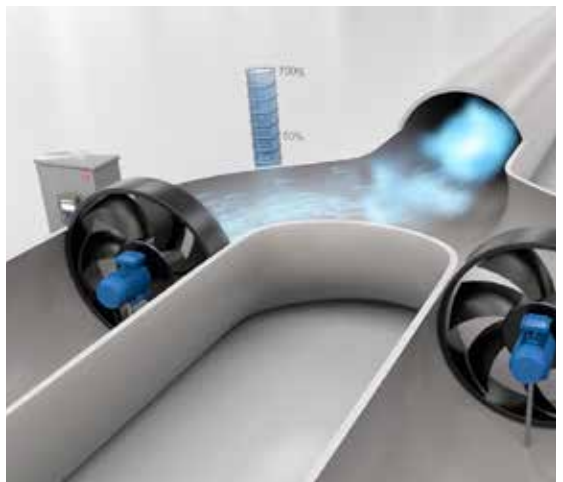
#### Fast stops with motor braking

It can also take a long time to stop a fan. With the dynamic brake feature, also called flux braking, the stopping time can be reduced. This improves process safety when the load has a high moment of inertia and makes fan operation easier for the operator.

#### Avoid unwanted movements with stand still brake

An idle fan that is rotating backwards, due to wind or airflow from another fan, can be kept still using the stand still brake. It prevents unwanted airflow and improves the control of the system without the need for an external mechanical brake.

02



03 Softstarters controlling compressors

04 Softstarters controlling conveyor belts

## Compressors

### Full control of current with current limit

Many applications are sensitive to high or variable starting currents. The feature current limit makes it possible to start the motor securely even in a weaker network, improving the availability of the equipment and system. Reducing the current means reducing the stress on cables, network and motor.

### Full voltage start for scroll compressors

For scroll compressors it is often necessary to start the motor in a very short time while still maintaining a low starting current. Full voltage start is a start mode that gives you almost a direct start but without the current peak.

### Phase reversal protection for problem-free commissioning

A motor rotating in the wrong direction, which may occur due to connecting the phases wrongly, may cause severe damage to a compressor. Using phase reversal protection, the motor won't start in the wrong direction, avoiding costly compressor downtime and repairs.

03



## Conveyors

### Avoid overheating with overload protection

Too much material on a conveyor belt may cause overload and overheating, reducing the reliability and longevity of the motor. ABB's overload protection feature shuts down the motor in case of overload, avoiding overheating.

### Increased flexibility with jog with slow speed

After stopping the belt, it may be necessary to run the motor at low speed to correctly position the belt before resuming operation. The jog with slow speed feature makes it possible to position the belt manually, in both forward and reverse direction, before re-starting the belt. This improves process efficiency and eliminates the need for a variable speed drive, a considerably more expensive solution for solving the problem.

### Continuous operation with limp mode

Shorted thyristor is a possible problem for a softstarter, putting it out of operation until the component has been replaced. Using limp mode, the softstarter will continue to work with one thyristor shorted, avoiding costly unplanned stoppages.

04





# Softstarters portfolio

## Overview



### PSTX - The advanced range

#### Key features

- Multiple different start and stop ramps
- Built-in bypass for energy saving and fast installation
- Detachable IP66/4X outdoor keypad
- 3 DI, 3 DO, 1 AO, PTC/PT100, Built-in Modbus
- Complete motor protection
- Extensive functionality

#### Technical data

- Operational voltage: 208-600 and 208-690 V AC (2 frames)
- Rated control supply voltage: 100-250 V AC, 50/60 Hz
- PSTX rated operational current: 30-1250 A (inside-delta: 2160 A) (6 frames)
- Three-phase controlled
- Both in-line and inside-delta connection is possible

#### Certifications and approvals:

- CE, cULus, CCC, EAC, ANCE, C-tick, ABS, DNV GL, Lloyd's Register, CCS, PRS, Class NK

### PSE - The efficient range

#### Key features

- Soft start/stop with voltage ramp and torque ramp
- Built-in bypass for energy saving and fast installation
- Easy set-up with graphical display
- Run, TOR and event output relays, AO
- Basic motor protection and current limit

#### Technical data

- Operational voltage: 208-600 V AC (1 frame)
- Wide rated control supply voltage: 100-250 V AC, 50/60 Hz
- Rated operational current: 18-370 A (3 frames)
- Two-phase controlled

#### Certifications and approvals:

- CE, cULus, CCC, EAC, ANCE, C-tick, ABS, DNV GL, Lloyd's Register, CCS, PRS, Class NK

### PSR - The compact range

#### Key features

- Soft start/stop with linear voltage ramp
- Built-in bypass for energy saving and fast installation
- Set-up with 3 potentiometers
- Run & TOR output relays
- Few items to stock – in total only 4 frame sizes

#### Technical data

- Operational voltage: 208-600 V AC (1 frame)
- Wide rated control supply voltage: 100-240 V AC, 50/60 Hz or 24 V AC/DC
- Rated operational current: 3-105 A (4 frames)
- Two-phase controlled

#### Certifications and approvals:

- CE, cULus, CCC, EAC, ANCE, C-tick, PRS

# Softstarters selection

ABB softstarters offering consists of three ranges, covering every need. The products help you secure motor reliability, improve installation efficiency and increase application productivity.



PSR – The compact range	PSE – The efficient range	PSTX – The advanced range
<ul style="list-style-type: none"> <li>When standard softstarter benefits and values are requested</li> <li>When operating a small motor</li> <li>When up to 100 starts per hour are requested</li> </ul>	<ul style="list-style-type: none"> <li>When there is limited space</li> <li>When common softstarter functions and protections are needed</li> <li>When operating a pump</li> </ul>	<ul style="list-style-type: none"> <li>When full control and motor protection is needed</li> <li>When an advanced softstarter with an extensive functionality is needed</li> <li>When motor is connected inside delta or in 690 V</li> </ul>

Step	Process
1	<p><b>Which softstarter series?</b></p> <p>ABB offers three different softstarter series, and the first step for the selection is to determine what softstarter series that will fulfill the needs of the motor and application. In the selection guide to the right, a comprehensive softstarter feature and functionality overview is provided to help with this selection.</p> <p>When the softstarter series is selected, remember the different current ratings of the three different series. Ensure that the motor nominal current matches these:</p> <ul style="list-style-type: none"> <li>PSR: 1...105 Ampere, 208...600 V</li> <li>PSE: 6...370 Ampere, 208...600 V</li> <li>PSTX: 9...1250 Ampere, 208...600/690 V</li> </ul>
2	<p><b>Select the correct size</b></p> <p>When the softstarter series is determined, the correct softstarter size must be selected. A softstarter is selected based on the motor current, so when you have selected the series, go to that softstarter series page and find the I<sub>e</sub> (IEC) or FLA (UL) that corresponds to the rated motor current. It is also possible to use the voltage and power for this selection.</p>
3	<p><b>Fine tune the selection</b></p> <p>The last step is to fine tune the selection, and there are three different factors to consider which are listed on the right:</p> <ol style="list-style-type: none"> <li>Normal or a heavy load? See the table below. If the load is characterized as a heavy load, select the next size softstarter in the series.</li> <li>High ambient temperature: De-rate the softstarter with the formulas on the right</li> <li>High altitude: De-rate with the formula on the right</li> </ol>

Note: If the application is more complicated and there are specific requirements on acceleration time, maximum starting current or many starts per hour, the software proSoft should be used for a fine tuned selection.

Altitude formula	
De-rate for altitudes between 1000-4000 m or 3280-13123 ft with the following formula for all softstarters:	
In meters:	% of I <sub>e</sub> = 100 – (x-1000)/150
In feet:	% of FLA = 100 – (y-3280)/480
Where x/y is the actual altitude in m/ft	

Temperature formula	
PSTX and PSR	
In Celsius:	40...60 °C: Reduce I <sub>e</sub> with 0.8%/°C
In Fahrenheit:	104...140 °F: Reduce FLA with 0.44%/°F
PSE	
In Celsius:	40...60 °C: Reduce I <sub>e</sub> with 0.6%/°C
In Fahrenheit:	104...140 °F: Reduce FLA with 0.33%/°F

Typical applications	
Normal duty start	Heavy duty
Bow thrusters	Centrifugal fan
Centrifugal pump	Conveyor belt (long)
Compressors	Crusher
Conveyor belt (short)	Conveyor belt (long)
Elevator	Mill
Escalators	Stirrer



Softstarter features	PSR	PSE	PSTX
Current limit	–	●	●
Current limit ramp and dual current limit	–	–	●
Electronic motor overload protection	–	●	●
Dual overload protection	–	–	●
Underload protection	–	●	●
Power factor underload protection	–	–	●
Locked rotor protection	–	●	●
Current/Voltage imbalance protection	–	–	●
Phase reversal protection	–	–	●
Customer defined protection	–	–	●
Motor heating	–	–	●
PTC/PT100 input for motor protection	–	–	●
Overvoltage/undervoltage protection	–	–	●
Earth-fault protection	–	–	●

● = standard, O = option, – = not available



Softstarter features	PSR	PSE	PSTX
Built-in bypass	●	●	●
Inside-delta connection possible	–	–	●
Graphical display and keypad	–	●	●
Detachable keypad	–	–	●
Motor runtime and start count	–	–	●
Programmable warning functions	–	–	●
Diagnostics	–	–	●
Overload time-to-trip	–	–	●
Overload time-to-cool	–	–	●
Analog output	–	●	●
Fieldbus communication	O	O	●
Event log	–	O	●
Multiple languages	–	–	17
Electricity metering	–	–	●

● = standard, O = option, – = not available



Softstarter features	PSR	PSE	PSTX
Torque control	–	●	●
Torque limit	–	–	●
Coated PCBA	–	●	●
Limp mode	–	–	●
Jog with slow speed forward/ reverse	–	–	●
Dynamic brake	–	–	●
Stand still brake	–	–	●
Sequence start	–	–	●
Full voltage start	–	–	●
Kick start	–	●	●
Automatic pump cleaning	–	–	●

● = standard, O = option, – = not available

# PSR - The compact range

## Introduction



- Two-phase controlled
- Operational voltage: 208...600 V AC
- Wide rated control supply voltage: 100...240 V AC, 50/60 Hz or 24 V AC/DC
- Rated operational current: 3...105 A
- Soft start with voltage ramp
- Soft stop with voltage ramp
- Built-in bypass for energy saving and easy installation
- Easy set-up by three potentiometers
- Fieldbus communication with fieldbus plug adapter and the fieldbus plug
- Run and Top of Ramp relays available for monitoring
- Connection kits available for connection to ABB's manual motor starters (MMS)



### SECURE MOTOR Reliability

#### Reduce the electrical stresses and keep the motor protected with the MMS

The PSR reduces the starting current for the motor. The possibility to connect it to the manual motor starter makes it possible to build a compact and complete starting solution with overload and short-circuit protection.



### IMPROVE INSTALLATION Efficiency

#### Saving time and money with built-in bypass and easy set-up

On the PSR, the bypass is built in and verified by ABB, saving you time during installation and space in your panel. Set-up is done through three potentiometers making it very fast and easy.



### INCREASE APPLICATION Productivity

#### Reduce the mechanical stresses on your motor

Soft start and stop with PSR will reduce mechanical wear and tear on the application and increase the availability and uptime.



# PSE - The efficient range

## Introduction



- Two-phase controlled
- Operational voltage: 208...600 V AC
- Wide rated control supply voltage: 100...250 V AC, 50/60 Hz
- Rated operational current: 18...370 A
- Voltage ramp and torque control for both start and stop
- Current limit
- Kick-start
- Built-in bypass for energy saving and easy installation
- Coated PCBA protecting from dust, moist and corrosive atmosphere
- Illuminated display that uses symbols to become language neutral
- External keypad rated IP66 (Type 1, 4X,12) as an option
- Fieldbus communication with fieldbus plug adapter and the fieldbus plug
- Analog output for display of motor current
- Electronic overload protection
- Underload protection
- Locked rotor protection



SECURE  
MOTOR  
**Reliability**

### Basic motor protection and current limit

The PSE includes the most important protections for handling different load situations that can happen to pumps e.g. overload and underload. The current limit gives you more control of the motor during start and allows you to start your motor in weaker networks.



IMPROVE  
INSTALLATION  
**Efficiency**

### Saving time and money with built-in bypass and compact design

On the PSE, the bypass is built in and verified by ABB, saving you time during installation and space in your panel. The keypad is language neutral and illuminated for easy set-up and operation in field. The compact design makes installation fast and easy.



INCREASE  
APPLICATION  
**Productivity**

### Torque control for elimination of water hammering in pumps

Torque control is the most efficient way to stop a full speed pump. The PSE has a special torque stop ramp that is designed together with a pump manufacturer to eliminate water hammering in an optimal way.

# PSTX - The advanced range

## Introduction



- Three-phase controlled
- Operational voltage: 208 – 690 VAC
- Wide rated control supply voltage: 100 – 250 V, 50/60 Hz
- PSTX rated operational current: 30 to 1250 A
- (inside-delta: 2160 A)
- Both in-line and inside-delta connection
- Coated circuit boards protecting from dust, moist and corrosive atmosphere
- Detachable keypad rated IP66 (Type 1, 4X,12)
- Graphical display with 17 languages for easy setup and operation
- Built-in bypass for energy saving and easy installation
- Built-in Modbus RTU for monitoring and control
- Support for all major communication protocols
- Analog output for measurement of current, voltage, power factor etc.



SECURE  
MOTOR

### Reliability

#### Complete motor protection

The PSTX offers complete motor protection in only one unit and is able to handle both load and network irregularities. PT-100, earth fault protection and over/under voltage protection along with many other functions keep your motor safer than ever.

#### Three types of current limit

PSTX offers three types of current limit: standard, dual and ramp. This gives you full control of your motor during start. It also allows you to use your motor in weaker networks.



IMPROVE  
INSTALLATION

### Efficiency

#### Built-in bypass saves time and energy

When reaching full speed, the PSTX will activate its bypass. This saves energy while reducing the softstarters heat generation. On the PSTX, the bypass is built in and verified by ABB, saving you time during installation and space in your panel.

#### Easy-to-use and detachable keypad

A user-friendly and clear display saves you time and resources during both setup and operation. The detachable keypad is standard on all PSTX softstarters.



INCREASE  
APPLICATION

### Productivity

#### Complete control of pumps

Time to use your processes to their full potential. The PSTX features many application enhancing features, including torque control: the most efficient way to start and stop pumps. The pump cleaning feature can reverse pump flow and clean out pipes, securing uptime of your pump system.

#### Jog with slow speed

The slow speed forward and backward jog feature will make you more flexible when operating e.g. conveyor belts and cranes. The PSTX provides positioning capabilities, letting you take control of your process.

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## SERVICE NOTE

# ABB Ability™ Smart Sensor

## Condition monitoring solution for low voltage motors

ABB Ability™ Smart Sensor is a condition monitoring solution that makes predictive maintenance possible for almost all low voltage motors. By monitoring and analyzing data on motor operating parameters, it enables motor users to optimize their maintenance. The solution helps to reduce downtime by as much as 70 percent, extend motor lifetimes by up to 30 percent and reduce energy consumption by up to 10%.




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### Making condition monitoring the new standard for LV motors

In the past, permanently installed condition monitoring was too expensive to use with the majority of LV motors. As a result most of these motors were run until they failed. ABB's new cost-efficient solution changes all that. With a payback time estimated at less than one year, it makes remote monitoring possible for practically all LV motors – plants can even implement condition monitoring for their entire LV motor fleet. Condition monitoring means that maintenance activities can be planned in advance, which reduces downtime and supports longer motor lifetimes. At the same time the solution generates 'big data' on the status of large numbers of motors, paving the way for plant-wide optimization of operations and energy consumption.

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### Easy-to-fit smart sensing technology

At the heart of the solution is a compact sensor unit that is easily attached to motors without the need for wiring. Selected ranges of ABB LV motors can be factory fitted with the sensors as an option. For already installed motors, retrofit

kits are available that enable motors to be field upgraded with sensors. Mounting and configuring the sensors takes only a matter of minutes. They are compatible with almost all LV motors, whether new or old, from ABB or other vendors.

The sensor monitors signals from the motor, accurately measuring key parameters at regular intervals. It transfers the data using built-in Bluetooth® low energy technology to a smartphone or (in future releases) ABB gateway and ultimately to a secure cloud-based server. Data communications use industry standard encryption protocols, and all data are stored in the cloud in an encrypted form.

Advanced algorithms based on ABB's extensive know-how analyze the data and produce meaningful information. The server then sends this information directly to the user's smartphone and to a dedicated ABB Ability™ Smart Sensor portal. Data is also tracked over time for trend analysis.

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### Intuitive interface

Once users have downloaded the ABB Ability™ Smart Sensor app they can check the status of their motors at any time with their smartphone. The interface includes a straightforward 'traffic light' display to give a quick overview of all the motors that are being monitored. Users also receive clear recommendations on how to optimize maintenance and save costs.



#### RED

critical issue – failure likely soon. Take action as soon as possible.



#### YELLOW

operation can continue but the motor should be watched closely and serviced at the next available opportunity.



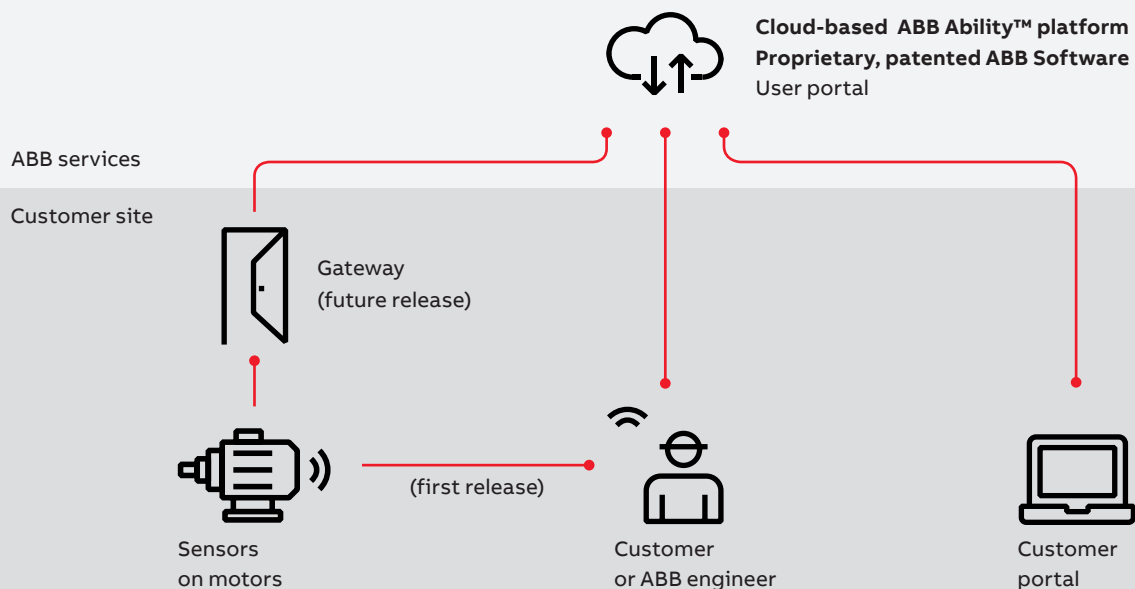
#### GREEN

motor fine – operation can continue.

The traffic light display gives a quick overview of motor status. When a yellow or red signal is triggered the user can drill down to identify the cause, e.g. bearing related data has exceeded preset limits.

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### Condition monitoring solution for low voltage motors



ABB's condition monitoring solution for LV motors. The ABB Ability™ Smart Sensor transmits data via a smartphone (first release) or gateway to a secure cloud service. Algorithms in the cloud analyze the data and convert it into meaningful information, which is then sent to the user's smartphone and customer portal.

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### Smart motors and intelligent maintenance

ABB Ability™ Smart Sensor converts machines that have always been rather simple into smart, wirelessly connected devices. It provides meaningful information on motor condition and performance, enabling users to put intelligence into their maintenance. Plants can now plan maintenance according to actual needs rather than on the basis of time intervals or operating hours alone. This cuts maintenance costs and reduces or even eliminates unplanned stops.

There are also opportunities to optimize motors' energy consumption – by combining data on the energy consumption levels of individual motors with plant operating information, it is possible to select the most appropriate motors to cut energy costs. The solution therefore supports plant operators' efforts to reduce their overall cost of motor ownership.

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### Internet of Things

ABB Ability™ Smart Sensor is an important part of ABB's offering for the Internet of Things (IoT). ABB has been advancing technologies for the IoT for more than a decade via its control systems, communication solutions, sensors and software. Its technologies allow industry, utility and infrastructure customers to make more intelligent use of data to optimize their operations, increase productivity and achieve greater flexibility. For further information about the IoT please visit: [new.abb.com/abb-ability](http://new.abb.com/abb-ability)

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### Accurate monitoring of key parameters

The solution monitors motors' key operational and health parameters, collecting data accurately and at regular intervals – far more frequently than conventional methods based on plant walk-downs.



Parameters supported	Problem or operating characteristic	DOL or Softstarter, S1 operation
Vibration parameters		
Overall Vibration	Unbalance, loose mass, coupling management, load effects, soft foot, etc.	●
Axial Vibration		●
Radial Vibration		●
Tangential Vibration		●
Health parameters		
Bearing Condition	Bearing damage	●
Cooling Condition	Overheating due to blocking of air flow	●
Airgap Eccentricity	Soft foot / bent shaft / thermal bow	●
Rotor Winding Health	Cracked rotor bar / ring detection	●
Operating parameters		
Skin Temperature / °C or °F	Operating information	●
Energy Consumption / kWh	Process change, replacement decision	●
Operating Hours / h	Operating information	●
Operating Power / kW and Loading / %	Process change, reliability (overloading)	●
Number of Starts	Operating information	●
Speed / rpm	Operating information	●
Motor Supply Frequency / Hz	Operating information	●
Maintenance Advice		
Notifications		●
Regreasing		●
Sensor unit status		
Battery indicator		●
Certifications		
IP 66		●
CE		●
FCC, UL, C-UL		●
NEMA Class 1, Div. 2		●
IEC Intrinsically Safe ATEX (Ex ia T4 –40 °C / +85 °C)		●

● = AVAILABLE IN FIRST RELEASE

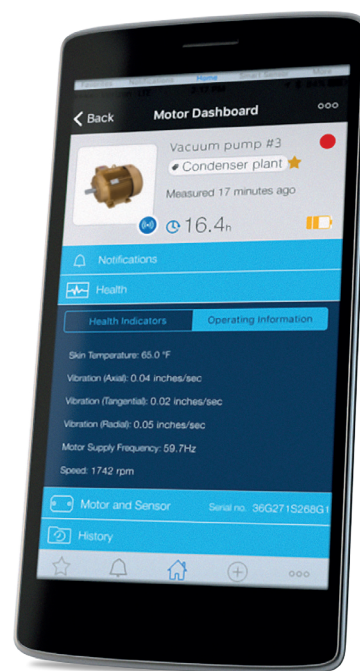
● = AVAILABLE IN FUTURE RELEASE (SOFTWARE UPDATES / CERTIFICATION PROCESS)

DOL INTERMITTENT AND VFD OPERATION AVAILABLE IN FUTURE RELEASE (SOFTWARE UPDATES)

### Functionality and compatibility of early releases.

**First release:** The sensors are initially available as retrofit kits for already installed IEC motors (in limited quantities). They will then be introduced as a factory-fitted option on severe duty NEMA motors manufactured by Baldor, ABB's unit in the US, and supplied via distributors in North America. In the next stage the sensors will be available as a factory-fitted option on certain IEC motors. The sensors are compatible with standard cast iron fin cooled induction motors in frame sizes 140-449 (NEMA) and 160-450 (IEC) that are connected Direct-On-Line (DOL) and operate in continuous duty (S1). The solution uses a smartphone to relay data from the sensor to the internet. Parameters monitored are surface temperature, bearing condition and overall vibration.

**Later releases:** Compatibility will be expanded to cover other motor types, DOL intermittent operation, and VFD (variable frequency drive) controlled motors. The range of monitored parameters will be increased on a staged basis to cover the full list shown above. A dedicated gateway will be introduced for automated data communications between the sensor and internet, eliminating the need to periodically pass by with a smartphone to collect the data.



For more information please visit:

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

or contact [support.smartsensors@abb.com](mailto:support.smartsensors@abb.com)

PRODUCT NOTE

# ABB Ability™ Smart Sensor for pumps

Smart technology enhances business intelligence and efficiency



The ABB Ability™ Smart Sensor converts traditional pumps into smart, wirelessly connected devices, enabling you to transform your business into a factory of the future and join the Internet of Things.

01

01 ABB Ability™ Smart Sensor for pumps

## Intelligent maintenance

ABB Ability™ Smart Sensor for pumps is an intelligent sensor for pump experts wanting improve their business by identifying inefficiencies within the pumping system and reducing risks related to operation and maintenance. It provides valuable information on the pump's condition and performance which can be used to plan maintenance based on actual needs rather than on generic schedules. ABB Ability™ Smart Sensor for pumps gives you the tools to:

- Identify inefficiencies within the system
- Reduce risks related to operation and maintenance
- Prevent unexpected downtime
- Cut maintenance costs
- Extend equipment life

## Monitoring the health of the pump

ABB Ability™ Smart Sensor monitors the vital operating parameters of the pump, such as vibration and temperature, which can be used to predict pump failure before the danger becomes imminent. Pump health indicators are calculated with these measurements and can be used to detect early signs of common operating problems for pumps, such as cavitation, bearing failure, blade problems, looseness, unbalance or overheating.

## Easy-to-install

At the heart of the solution is a compact sensor unit which can be easily attached to the pump without wiring. The sensor monitors signals from the pump, accurately measuring key parameters at regular intervals. It transfers the data, using built-in wireless Bluetooth® Low Energy technology, to a smartphone, tablet or Bluetooth-gateway. Data communications use industry standard encryption protocols and all data is transferred to a secure cloud-based server where it is stored in encrypted form.

Technical data	
Monitored parameters	Vibration, temperature
Performance Indicators	Rotating speed of the pump, Operating hours, Blade problems, Looseness, Misalignment, Cavitation, Unbalance
Approvals	CE, UL, IC, FCC
Wireless communication	Bluetooth® 4.0
IP class	IP66
Lifetime	Design life of 5 years
Case material	Stainless steel/Thermoplastic
Ambient conditions	Operation: -40°C to +85°C Storage: 40 °C maximum
Dimensions	16 x 130 x 76.7 mm

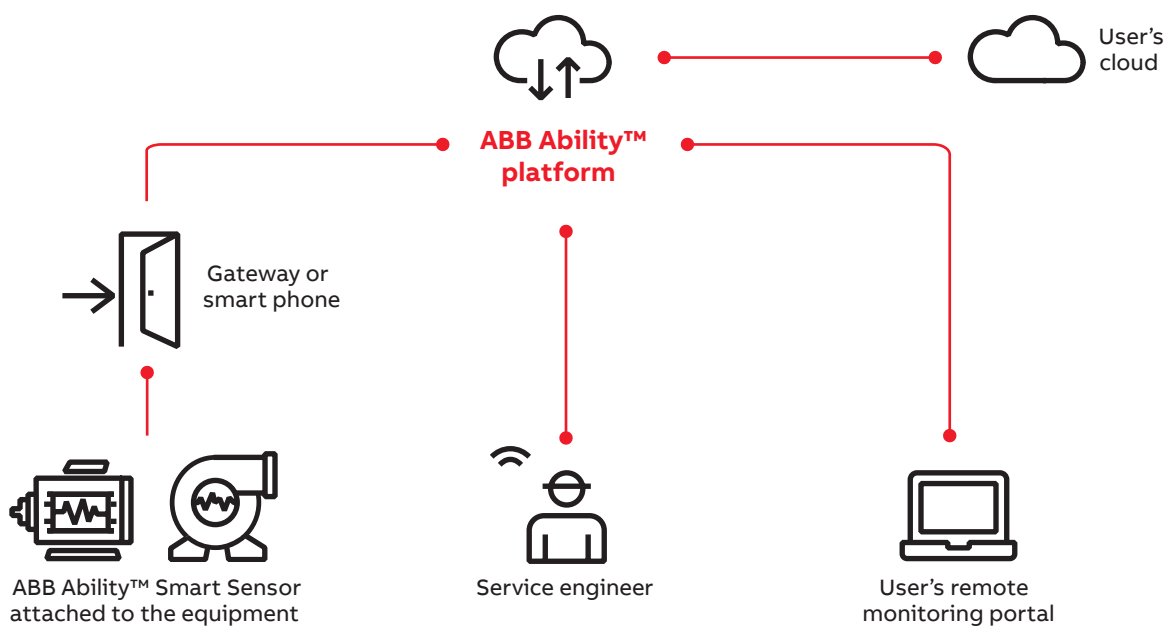


### Better safety and reliability

Pumps operating in dangerous environments or hard-to-reach locations pose a risk to workplace safety and are more likely to break down due to inadequate maintenance. By monitoring the pump and transferring the data wirelessly to the cloud, ABB Ability™ Smart Sensor enables pump experts to identify maintenance needs from a distance. This increases work safety, saves time and improves reliability.

### Factory of the future with digital powertrain

Smart, connected factories are the future of manufacturing. ABB Ability™ connects our customers to the power of the Industrial Internet of Things (IIoT). ABB Ability™ can combine data collected by the pump sensor with data from other connected equipment, such as motors and drives. This data can be accessed and analyzed remotely, providing deeper insight into the health of the entire process. ABB offers a unique digital advantage by combining connectivity and data analytics with industrial expertise to make your operations efficient, predictable and safe.



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

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

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## ABB Ability™ Smart Sensor for Mounted Bearings

Bearings that perform their own health check



ABB Ability™ Smart Sensor for mounted bearings is a condition monitoring solution that allows you to safely and quickly get an overall health indication of the bearing. With the ABB Ability™ Smart Sensor, the bearing lets you know when it needs maintenance, which prevents unplanned downtime and extends equipment life.

### What it does

Designed for use on ABB Dodge® mounted bearings, the latest Smart Sensor solution is an advanced sensor that connects to the bearing and communicates wirelessly – through smartphones or other devices – health parameters of the bearing. Without touching the equipment, maintenance and other relevant personnel can safely get a quick health check of the bearing, which prevents unexpected breakdown and extend equipment life

### Know when you need maintenance

Eighty percent of bearing failures are lubrication related. A bearing “running hot” can indicate that proper lubrication procedures are not in place. Vibration is also a first indicator of a potential system problem. The ABB Ability Smart Sensor for Mounted Bearings monitors temperature and vibration to give a quick health indication of the bearing, as well as warnings on decreasing health status. This allows you to plan maintenance before there is a problem and the system is down.



### Health monitoring of key parameters

The sensor monitors key operational parameters of the bearing accurately and at regular intervals. Users can check the status of their bearings at any time with their smartphone. Data from the sensor is stored and can be displayed graphically on a smart phone, tablet or web portal for analysis. A traffic light display gives a quick overview of bearing status. When a yellow or red signal is triggered the user can drill down to identify the cause, for instance bearing related data has exceeded preset limits.

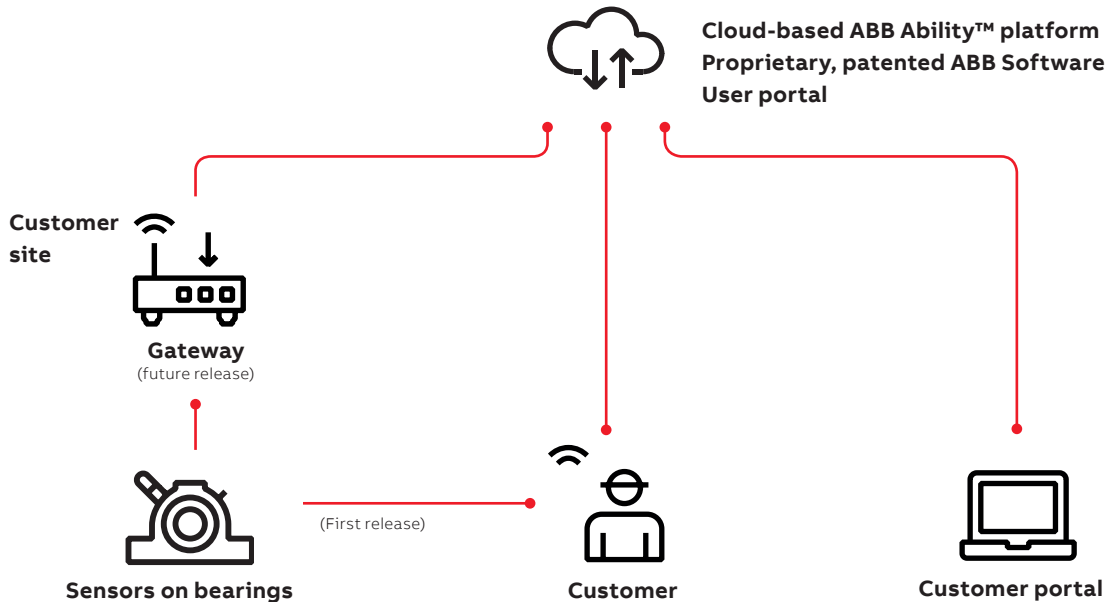
### Easy Installation

The ABB Ability™ Smart Sensor for mounted bearings is installed on each bearing by removing the special plug from housing to uncover a drilled and threaded installation hole. The sensor is battery operated, eliminating wiring that can be restrictive and pose a safety hazard.

### Factory of the future with digital powertrain

Smart, connected factories are the future of manufacturing. ABB Ability™ connects our customers to the power of the Industrial Internet of Things (IIoT). It offers the possibility to combine the data collected by the pump sensor with the data from other connected equipment such as motors and drives. This data can be accessed and analyzed remotely and in real-time, providing deeper insight into the health of the entire process. ABB offers a unique digital advantage by combining connectivity and data analytics with our expertise to make your operations efficient, predictable and safe.

### Condition monitoring solution for mounted bearings



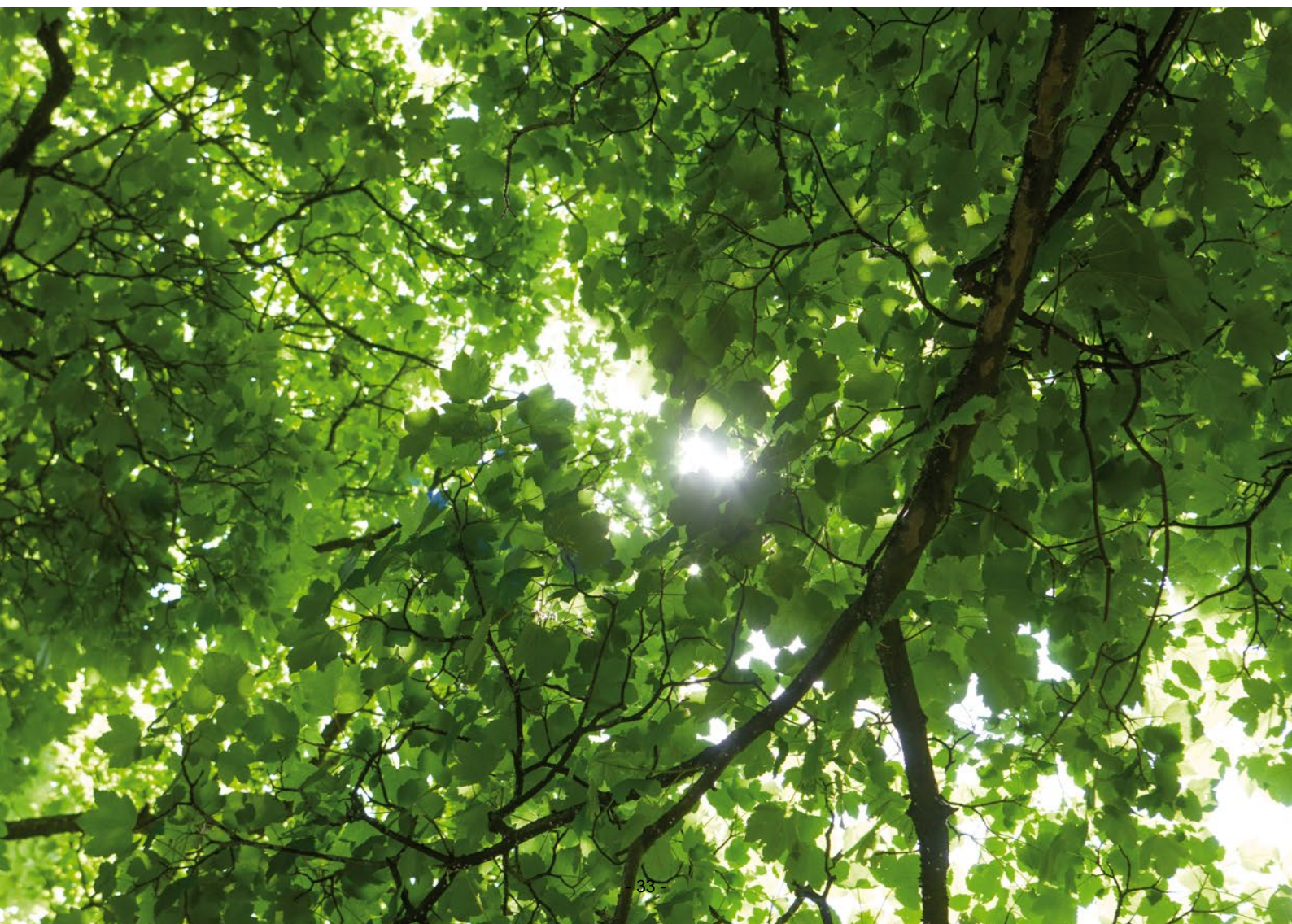
ABB's condition monitoring solution for mounted bearings. The ABB Ability™ Smart Sensor transmits data via a smartphone (first release) or gateway to a secure cloud service. Algorithms in the cloud analyze the data and convert it into meaningful information, which is then sent to the user's smartphone and customer portal.

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BROCHURE

# **IE4 SynRM motor-drive packages**

Super premium efficiency for industry



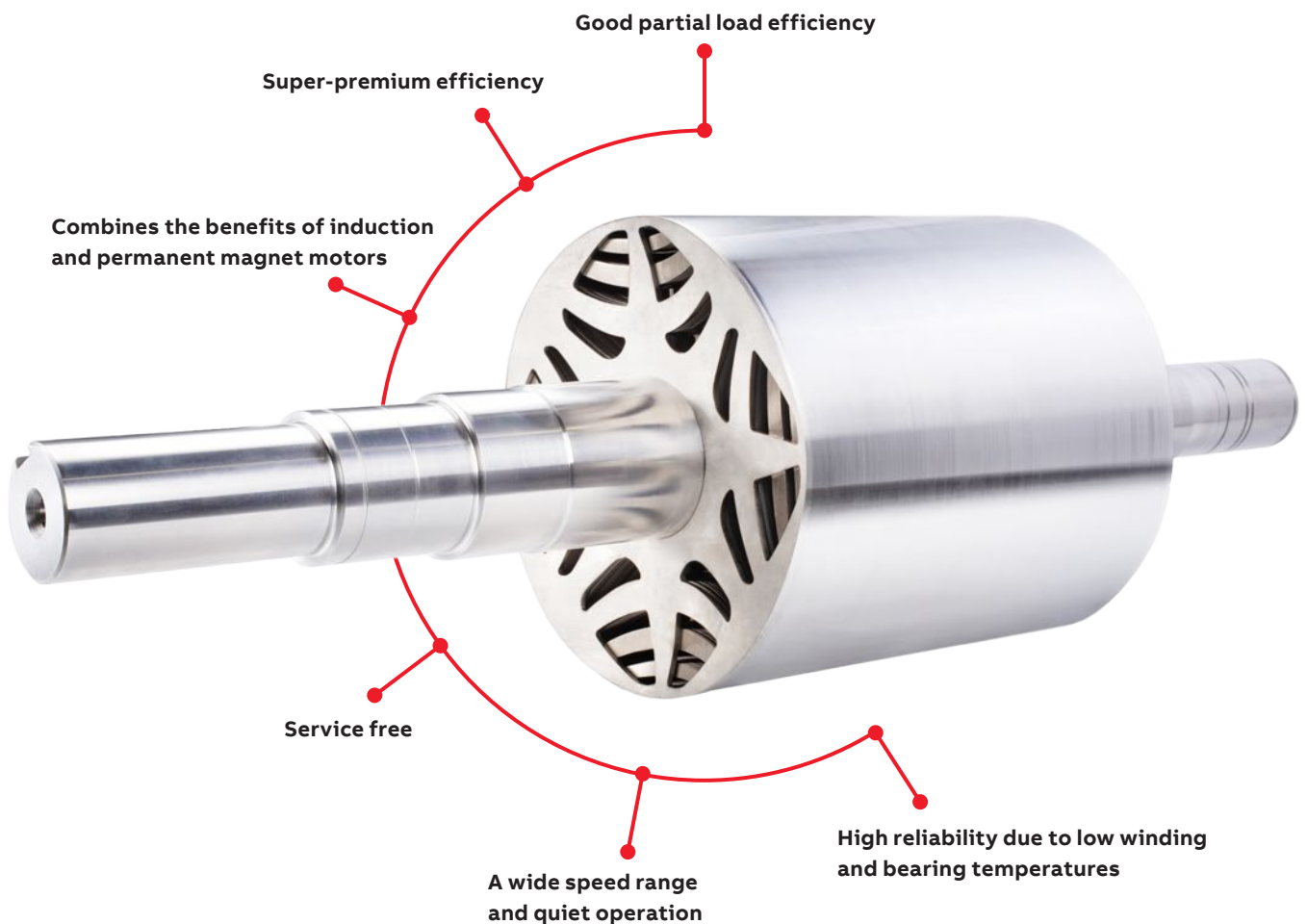
# Energy efficiency. Usability. Productivity

## Everything counts

ABB's SynRM motor-drive package offers matched pairs of motors and drives. This matching means excellent control performance in all applications, an easy start-up process and one number to call in case you need any support.

**SynRM packages also include efficiency data about the entire package throughout the operating range. All this leads to savings in your motor-drive package life cycle costs.**

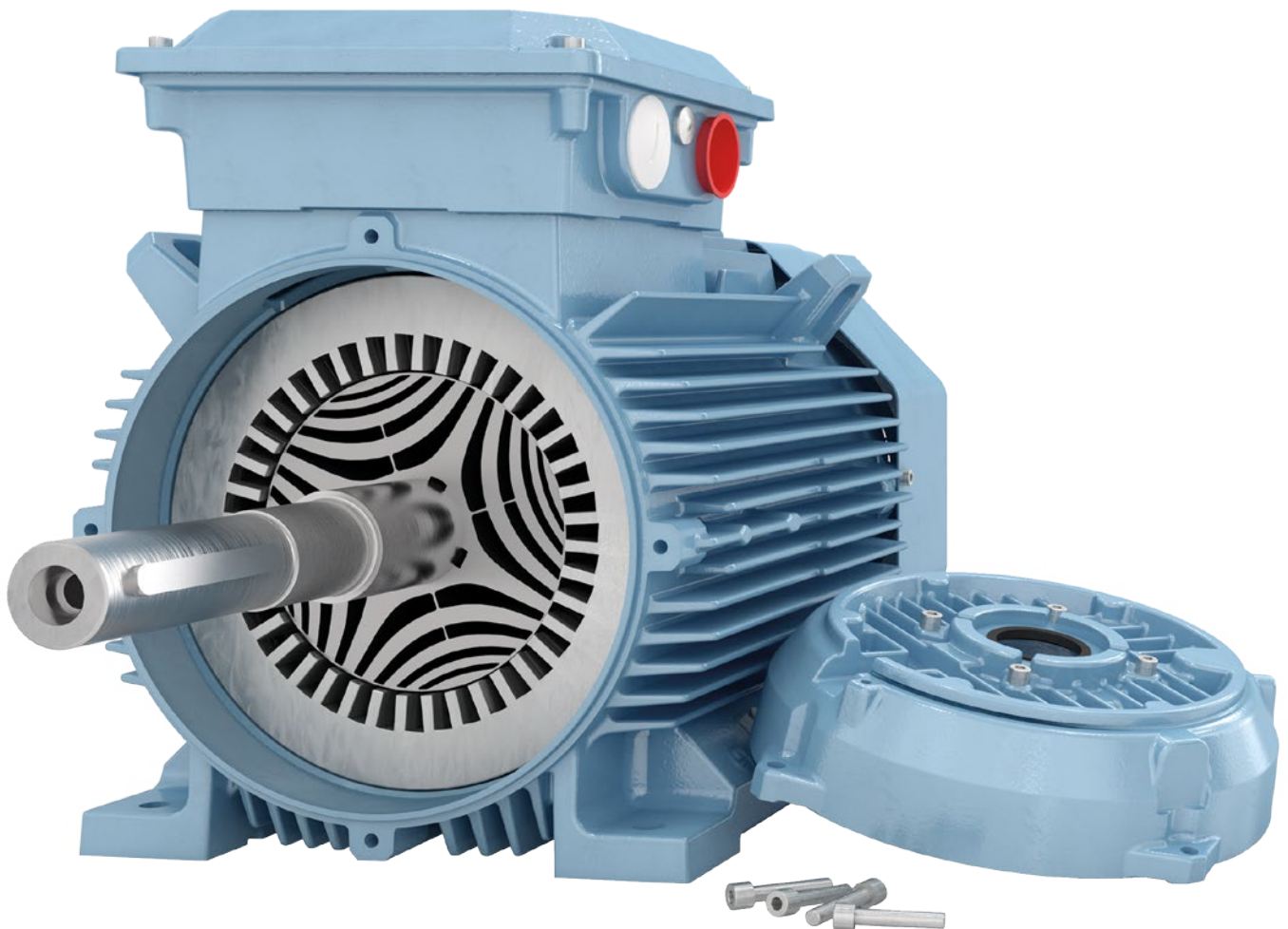
The core idea of a synchronous reluctance motor (SynRM) is that the rotor has no windings or magnets, just electric steel plates stacked together to form a rotor package. Unlike in an induction motor, a SynRM rotor has no induced current and thus no losses. This makes SynRM the perfect combination of simplicity and efficiency.





# SynRM is the best choice for you – why?

Why would you choose a SynRM motor and drive package instead of the familiar induction motor you have learned to trust?





# SynRM for all industrial applications

## Efficiency in all applications

SynRM technology is designed to replace induction and permanent magnet motors in variable speed applications. Our experiences show that the SynRM motor and drive package is suitable for all applications, whether quadratic or constant torque.

## Precise process control

The SynRM motor and drive package provides very accurate speed and torque over the whole speed range, which improves the process efficiency. It is capable of producing full torque at zero speed. This means that SynRM package can be considered for any variable speed application, including demanding constant torque applications. Tests by customers have shown a 0.5 rpm tolerance at 1500 rpm on an extrusion molding machine. In this application, it means higher end product quality as well as less wastage and fewer rejected products. It should also be remembered that the wastage and rejects must be ground up, fed back to the extruder and heated. This all takes extra energy.



# ACS880 industrial drive highlights



## ACS880 drive highlights

- Compact design for easy installation, commissioning and maintenance
- Enclosure classes IP21, IP22, IP42, IP54, IP55 for various ambient conditions
- The offering ranges from wall-mounted to cabinet-built drives and drive modules
- SIL 3 integrated safety including safe torque off (STO) as standard and a plug-in safety functions module as an option
- Full motor torque over the whole speed range down to zero with direct torque control (DTC) technology, without feedback devices like encoders or position sensors
- The drive's flying start capability senses the rotation speed and direction of a machine and increases the motor speed to the corresponding level without stopping the machine
- Removable memory unit for easy maintenance and replacement
- Bluetooth capability and mobile app to connect and control a drive that is difficult to access
- Wide range of fieldbus adapters enable connectivity with all major automation networks

## IE4 motor-drive packages with SynRM optimized ACS880-01 modules

Output (kW)	Motor type	Product ID	Current $I_N$ (A)	Torque $T_N$ (Nm)	Overload- ability at nominal speed $T_{OL}/T_N$	Weight  m (kg)	Suggested ACS880 SynRM package frequency converter for light duty (no overload)*	Package efficiency at nominal point	IES2 efficiency class low limit
<b>3000 r/min (100 Hz)</b>									
5.5	M3AL 132 SMA 4	3GAL 132 217-_SC	12.6	17.5	1.5	41	ACS880-01-14A3-3	90.0	82.5
7.5	M3AL 132 SMB 4	3GAL 132 227-_SC	16.9	23.9	1.5	41	ACS880-01-17A7-3	90.1	83.9
11	M3BL 160 MLA 4	3GBL 162 417-_SC	25.0	35	1.5	133	ACS880-01-25A5-3	90.1	85.3
11	M3AL 132 SMC 4	3GAL 132 237-_SC	25.0	35.0	1.5	47	ACS880-01-25A5-3	89.9	85.3
15	M3BL 160 MLB 4	3GBL 162 427-_SC	34.8	48	1.5	133	ACS880-01-035A-3	90.9	86.2
15	M3AL 132 SMD 4	3GAL 132 247-_SC	33.5	47.7	1.5	47	ACS880-01-035A-3	90.0	86.2
18.5	M3BL 160 MLC 4	3GBL 162 437-_SC	42.8	59	1.5	133	ACS880-01-043A-3	91.6	86.9
22	M3BL 180 MLA 4	3GBL 182 417-_SC	50.0	70	1.5	160	ACS880-01-050A-3	91.8	87.3
30	M3BL 200 MLA 4	3GBL 202 417-_SC	68.8	95	1.5	259	ACS880-01-069A-3	91.8	88.1
37	M3BL 200 MLB 4	3GBL 202 427-_SC	84.6	118	1.5	259	ACS880-01-085A-3	92.4	88.6
45	M3BL 225 SMA 4	3GBL 222 217-_SC	103	143	1.5	282	ACS880-01-103A-3	92.8	89.0
55	M3BL 225 SMF 4	3GBL 222 267-_SC	122	175	1.5	282	ACS880-01-123A-3	92.9	89.4
<b>1500 r/min (50 Hz)</b>									
5.5	M3AL 132 SMA 4	3GAL 132 213-_SC	12.1	35	1.5	63	ACS880-01-14A3-3	90.0	82.5
7.5	M3AL 132 SMB 4	3GAL 132 223-_SC	16.2	47.7	1.5	63	ACS880-01-17A7-3	90.1	83.9
11	M3BL 160 MLA 4	3GBL 162 413-_SC	24.9	70	1.5	160	ACS880-01-25A5-3	90.9	85.3
11	M3AL 132 SMC 4	3GAL 132 233-_SC	24.0	70	1.5	69	ACS880-01-25A5-3	90.0	85.3
15	M3BL 160 MLB 4	3GBL 162 423-_SC	33.7	95	1.5	177	ACS880-01-035A-3	91.6	86.2
18.5	M3BL 180 MLA 4	3GBL 182 413-_SC	42.0	118	1.5	177	ACS880-01-043A-3	92.2	86.9
22	M3BL 200 MLF 4	3GBL 202 463-_SC	49.1	140	1.5	304	ACS880-01-050A-3	92.4	87.3
30	M3BL 200 MLA 4	3GBL 202 413-_SC	66.7	191	1.5	304	ACS880-01-069A-3	92.8	88.1
37	M3BL 250 SMF 4	3GBL 252 263-_SC	82.0	236	1.5	428	ACS880-01-085A-3	93.1	88.6
45	M3BL 250 SMG 4	3GBL 252 273-_SC	99.5	286	1.5	428	ACS880-01-103A-3	93.2	89.0
55	M3BL 250 SMA 4	3GBL 252 213-_SC	121	350	1.5	454	ACS880-01-123A-3	93.4	89.4
75	M3BL 280 SMA 4	3GBL 282 213-_DC	173	478	1.7	639	ACS880-01-173A-3	93.7	90.0
90	M3BL 280 SMB 4	3GBL 282 223-_DC	202	573	1.7	639	ACS880-01-202A-3	93.9	90.2
110	M3BL 280 SMC 4	3GBL 282 233-_DC	245	699	1.8	697	ACS880-01-245A-3	94.2	90.5
110	M3BL 315 SMA 4	3GBL 312 213-_DC	244	702	1.8	873	ACS880-01-245A-3	94.2	90.5
132	M3BL 315 SMB 4	3GBL 312 223-_DC	290	842	1.9	925	ACS880-01-290A-3	94.2	90.7
160	M3BL 315 SMC 4	3GBL 312 233-_DC	343	1018	1.7	965	ACS880-01-343A-3	94.5	90.9
200	M3BL 315 MLA 4	3GBL 312 413-_DC	427	1272	1.7	1116	ACS880-01-427A-3	94.4	91.1
<b>1000 r/min (33 Hz)</b>									
7.5	M3BL 160 MLA 4	3GBL 162 412-_SC	17.3	72	1.5	160	ACS880-01-17A7-3	88.9	83.9
11	M3BL 160 MLB 4	3GBL 162 422-_SC	25.0	105	1.5	177	ACS880-01-25A5-3	89.9	85.3
15	M3BL 200 MLF 4	3GBL 202 462-_SC	34.1	143	1.5	282	ACS880-01-035A-3	90.6	86.2
18.5	M3BL 200 MLA 4	3GBL 202 412-_SC	41.8	177	1.5	304	ACS880-01-043A-3	91.4	86.9
22	M3BL 200 MLB 4	3GBL 202 422-_SC	49.5	210	1.5	304	ACS880-01-050A-3	91.4	87.3
30	M3BL 250 SMF 4	3GBL 252 262-_SC	67.2	286	1.5	391	ACS880-01-069A-3	92.1	88.1
37	M3BL 250 SMA 4	3GBL 252 212-_SC	82.6	353	1.5	428	ACS880-01-085A-3	92.4	88.6
45	M3BL 280 SMA 4	3GBL 282 212-_DC	103	430	1.9	639	ACS880-01-103A-3	92.6	89.0
55	M3BL 280 SMB 4	3GBL 282 222-_DC	123	526	1.7	639	ACS880-01-123A-3	92.8	89.4
75	M3BL 280 SMC 4	3GBL 282 232-_DC	166	715	1.8	697	ACS880-01-173A-3	93.4	90.0
75	M3BL 315 SMA 4	3GBL 312 212-_DC	166	717	1.8	873	ACS880-01-173A-3	93.3	90.2
90	M3BL 315 SMB 4	3GBL 312 222-_DC	198	859	1.8	925	ACS880-01-202A-3	93.4	90.5
110	M3BL 315 SMC 4	3GBL 312 232-_DC	241	1051	1.7	965	ACS880-01-245A-3	93.7	90.5
132	M3BL 315 MLA 4	3GBL 312 412-_DC	279	1261	1.6	1116	ACS880-01-290A-3	93.9	90.7
160	M3BL 315 LKA 4	3GBL 312 812-_DC	340	1527	1.7	1357	ACS880-01-343A-3	94.1	90.9
200	M3BL 315 LKC 4	3GBL 312 832-_DC	418	1910	1.7	1533	ACS880-01-427A-3	94.1	91.1

\* Consult ABB for motor and drive dimensioning for applications with other load characteristics.

Protection class IP55 – Self cooling IC 411 – Insulation class F, temperature rise class B. Performance values apply with ACS880 drive supply.



# Six reasons to choose an ABB SynRM package

## **1. Full motor control, down to zero speed**

Many processes require accurate speed control. As the name says, SynRM is a synchronous motor that always runs at reference speed with practically no error, without an encoder. Even the best slip compensation systems in an induction motor inverter will never match the precision of SynRM.

Sometimes your application may require you to run your motor at slow speeds, for example at less than 40 rpm. If you are using SynRM and your drive cannot provide the necessary torque, it may trip. This means you may have downtime while the problem is being debugged. ABB drives provide full control and torque down to zero speed, even without speed sensors.

## **2. For all applications**

This is important if you are planning on using the motor with applications other than quadratic torque applications like pumps and fans. Our drives provide full SynRM motor control for constant torque applications such as extruders, conveyors and wire drawing machines.

## **3. Cool motor that doesn't keep too much noise about itself**

The SynRM package where the motor and the drive are designed to work together brings two major benefits.

The less noise your motor produces, the better the working environment you provide for your staff. The SynRM motor runs very quietly compared to an induction motor thanks to the rotor geometry and the DTC technology of the ACS880 industrial drive.

Heat means lost energy, but it also means that you need to cool your workspace to compensate for the heat produced.

As the rotor geometry of SynRM has no rotor currents, the rotor losses, which in induction motor can add up to 40% of the total loss, are completely eliminated. Reduced losses mean better efficiency, a longer bearing lifetime and less dissipated heat losses from the motor.

## **4. Wide selection of drives**

Processes are different, and each has its own demands for the drive. That's why we offer you a selection of drives with voltage range from 230 to 690 V and a power range up to 710 kW. You can order optional application programs with your drive. These programs are designed to support adaptation to various applications like artificial lifting, winders, cranes, cooling towers, etc. In addition, our drives have built-in adaptive programming support based on IEC 61131-3 PLC logic that can be used if no suitable program is available.

## **5. Verified package efficiency statements**

The efficiency of the motor and drive at different operating points is very useful information. This helps you estimate energy use when combined with your own overall machine efficiency. This is the focus of the new European standard 50598-2. IE4 packages fulfil the IES2 efficiency class defined in EN50598-2.

With ABB's SynRM package, you will always get a motor and drive that are dimensioned to work together efficiently.

## **6. Perfect for retrofits**

The SynRM package is a perfect solution for motor retrofits. The IE4 SynRM is the same size as an IE2 induction motor, eliminating the need for mechanical modifications. The increased efficiency will, on the other hand, reduce the payback time of the investment.



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# ABB Drive Services

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 service  
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. In this brochure we give you a concise overview of ABB drives service options for you to make an informed choice about your drive's future.

# Services to match your needs

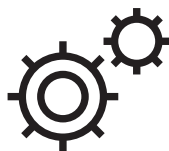
Your service needs depend on your operation, life cycle of your equipment and business priorities. We have identified our customers' four most common needs and defined service options to satisfy them. What is your choice to keep your drives at peak performance?

## Is uptime your priority?

Keep your drives running with precisely planned and executed maintenance.

### Example services include:

- ABB Ability™ Life Cycle Assessment for drives
- Installation and Commissioning
- Spare Parts
- Preventive Maintenance
- Reconditioning
- ABB Drive Care agreement
- Drive Exchange



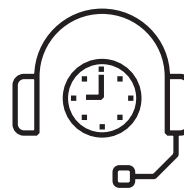
Operational efficiency

## 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
- ABB Ability™ Remote Assistance for drives
- Response time agreements
- Training



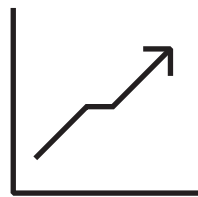
Rapid response

## Need to extend your assets' lifetime?

Maximize your drive's lifetime with our services.

### Example services include:

- ABB Ability™ Life Cycle Assessment for drives
- Upgrades, Retrofits and Modernization
- Replacement, Disposal and Recycling



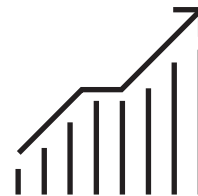
Life cycle management

## Is performance most critical to your operation?

Get optimal performance out of your machinery and systems.

### Example services include:

- ABB Ability™ Remote Services
- Engineering and Consulting
- Inspection and Diagnostics
- Upgrades, Retrofits and Modernization
- Workshop Repair



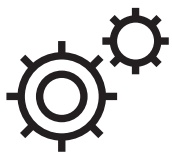
Performance improvement



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# Operational efficiency

Your operation depends upon the most optimal configuration, set up and maintenance program. When it comes to important operations, you want to make sure that everything is done just right from the start. From commissioning to spare parts and preventive maintenance, we are with you all the way.



## Installation and Commissioning

You have all the support you need to correctly install and run drives efficiently. On your request, ABB-certified engineers can undertake the entire drive installation and commissioning for you. Correctly installed drives are more reliable, and well-commissioned drives lead to energy savings and lower operational costs.

## Spare Parts

Wherever you are in the world, we strive to ensure that you run a trouble free operation. We send you genuine ABB spare parts as quickly as possible. Directly from ABB or from our channel partners. We provide a one year warranty on individual spare parts and spare part kits.

## Drive Exchange service

If your drive or module fails, we swap it for a fully tested exchange unit to get your critical applications up and running quickly. It's a far more efficient alternative to repairing an installed drive or purchasing a new one. Your exchange drive comes with a one-year warranty. Express delivery is available in very urgent cases.

## Preventive Maintenance

An ideal drive maintenance schedule manages the parts replacement at the right time. This regular maintenance keeps costs down and lifetime performance optimal. There are preventive maintenance kits designed to match specific drive types. Highly skilled and trained engineers carry out all your annual inspections and component replacements, accordingly.



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We help you optimize the availability and efficiency of your equipment and improve the profitability of your assets.

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# Rapid response

There are times when the unexpected happens and you need support, a replacement, repair or part straightaway. Rapid response services is your key choice to solving these moments promptly. Ahead of time.



## Technical Support

Just contact us when you need to via phone or email. For whatever technical questions you have, or advanced product and application support, all our drives expertise is available, through our local ABB contact centers.

## On-site and workshop repairs

Your request for repairs on the spot has a quick response. You get the latest expertise on-site, carried out by ABB-certified service engineers. If it is not possible to fix a drive on-site, our state-of-the-art workshops are perfect for an in-depth investigation of your drive. All work is full-load tested, backed by a one-year warranty.

## Remote Support

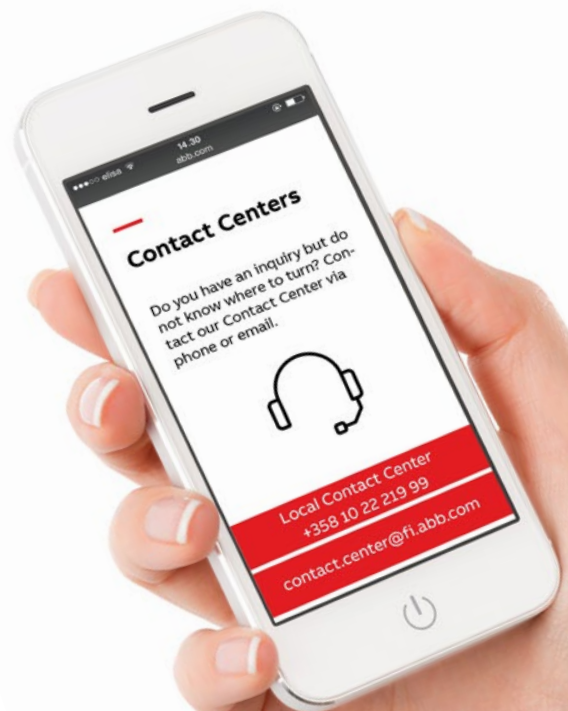
If you detect a fault, we use your drives data, stored remotely, for rapid support. Where possible we strive to respond within two hours from your inquiry, to find a quick resolution and reduce your downtime.

## Training

You will have the most up-to-date maintenance and competent service teams with our training courses and e-learning opportunities. It will enhance safety, develop your staff's troubleshooting skills, and maximize the availability of your drives. We have hands-on courses at local training centers, but some of our courses can also be conducted at your facilities.

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We promise fast and flexible service response to restore your production or process to full working order within the agreed timeframe.



# Life cycle management

One of the most important aspects in defining service solutions is knowing the exact status and condition of your business infrastructure. Our extensive experience and top solutions help you extend, analyze and optimize the lifecycle of your drives.



## ABB Ability™ Life Cycle Assessment for drives

When you need information on the condition of your equipment and the life cycle of components, we provide help in diagnosis and assessment of your drives in a modern and easy service. ABB Ability™ Life Cycle Assessment for drives service gives you powerful knowledge to determine exactly where your process stands, now and in the future.

## Reconditioning

This is how you improve your drives reliability and extend its lifetime. We recommend it at least once in drives' lifetime. Reconditioning in an authorized ABB drive service workshop restores drives to their original condition and includes a full inspection, thorough cleaning, and individual component analysis and replacement. Every reconditioned drive is thoroughly tested and comes with a one-year warranty.

## Upgrades, Retrofits and Modernization

We offer you the choice to select an appropriate service to extend the lifetime of your key assets and applications for both ABB and non-ABB drives and systems.

A variety of upgrades and retrofits enhance the efficiency and reliability of your drive and bring it up to date with the latest technology. Investment costs and process downtime are optimized with a range of standard solutions, which also can be customized to fulfill your specific requirements.

## Replacement, Disposal and Recycling

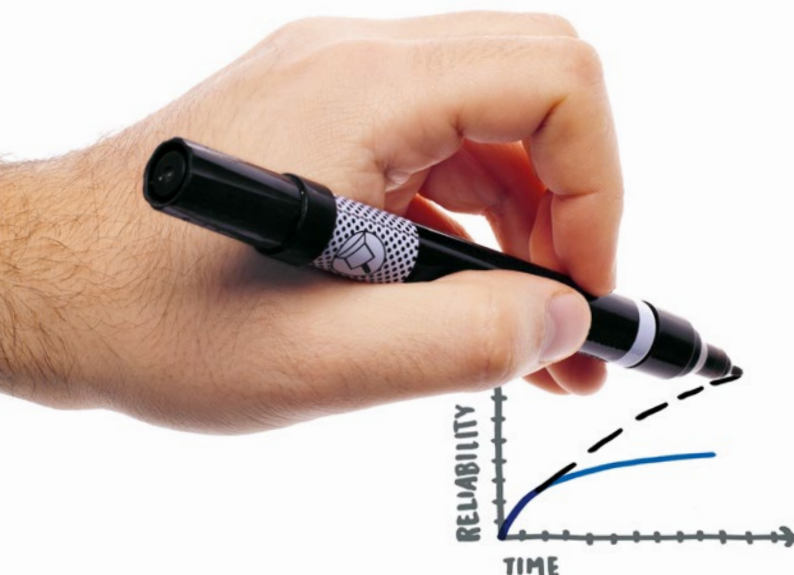
You want to keep the environment in mind when you dispose of your drive and then choose its replacement. We'll help you do both optimally, as you choose from the widest range of drives possible.

## Drive Exchange service

If your drive or module fails, we swap it for a fully tested exchange unit to get your critical applications up and running quickly. It's a far more efficient alternative to repairing an installed drive or purchasing a new one. Your exchange drive comes with a one-year warranty. Express delivery is available in very urgent cases.

## Preventive Maintenance

An ideal drive maintenance schedule manages the parts replacement at the right time. This regular maintenance keeps costs down and lifetime performance optimal. There are preventive maintenance kits designed to match specific drive types. Highly skilled and trained engineers carry out all your annual inspections and component replacements, accordingly.

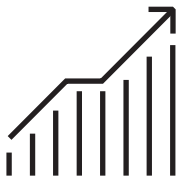


We provide you powerful tools and our knowledge base to analyze, optimize and extend the life cycle of your drives.

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# Performance improvement

Your performance counts on how your staff manage and maintain your drive, just as much as the technology or engineering inside it. By keeping your drives up-to-date with the latest technology, it adds available services to your old equipment, and ensures its better performance.



## **Inspection and Diagnostics**

Inspection and Diagnostics services enable you to recognize your drive's future maintenance needs by measuring and analyzing the condition of your drive and its application on-site.

## **Engineering and Consulting**

Engineering and Consulting services are based on production, safety and energy efficiency analyses of machines and drive systems. We take care of any specific requirements that you might have during the procurement, operation and maintenance of your assets.

## **Advanced services**

Our remote monitoring and energy efficiency solutions mean your business stays a step ahead. Accurate, real-time information about your energy consumption or drive events will facilitate you making the right decisions about your assets operations at the right time.

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We offer you a strategic partnership in improving productivity, safety, cost and energy efficiency of your equipment.





# The freedom of choice

## ABB Drive Care agreement

Your business efficiency depends on your choices. ABB Drive Care agreements let you focus on what you do best, while your drives run smoothly. With your drive performance optimized, your cost control improved, it's your way towards less unplanned downtime and easier maintenance budgeting.

Here are some examples of the service choice you can make:



### Preventive Care

This is the essential maintenance to prolong the lifetime of your drive assets. We take precise maintenance actions, including providing genuine ABB parts in preventive maintenance kits.



### Complete Care

If you want to fix your yearly maintenance costs, this is the package. We perform Preventive Care and put your drives back into operation should they fail. With labor and spare parts included.



### Technical Support

Expert help is only a phone call away. Perfect for all drive technical telephone assistance and rapid troubleshooting advice.



### On-site response time

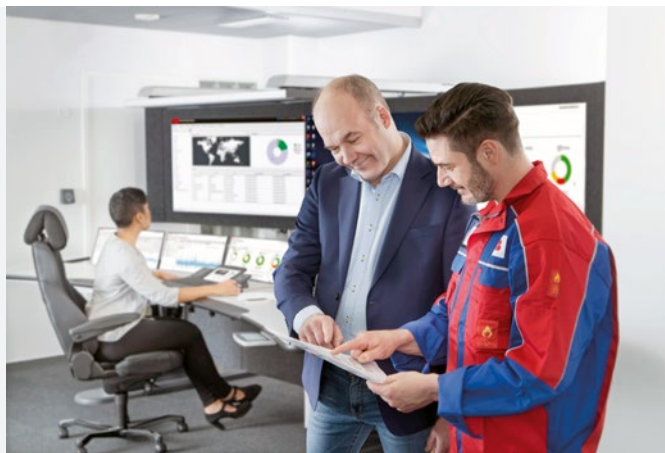
For those times when you need help, and you need it now. One phone call and an expert will be on-site within the time agreed.



# Gain digital advantage

## ABB Ability™ Services

ABB Ability™ services for drives offer a unique digital advantage by combining connectivity and data analytics with industrial expertise. The data collected from connected drives can be accessed and analyzed providing deeper insight into the health of your assets for effective lifecycle management and maintenance planning.



### Advisory services

#### ABB Ability™ Life Cycle Assessment for drives

- Maximizing profit means that every part of your process is running uninterrupted, without surprises.
- When you need facts on how to keep your process running Life Cycle Assessment gives you powerful knowledge to determine exactly where your process stands, now and in the future.

#### ABB Ability™ Energy Optimization for drives and motors

Do more with less by improving energy efficiency

- ABB Ability™ Energy Optimization service is able to analyze the energy savings potential in your business by using ABB drives and motors.

### Connected services

#### ABB Ability™ Remote Assistance for drives

– up to 70% reduced downtime

The fastest way to recover production

- Should a fault be detected within a drive, ABB specialist provides rapid support by using the drive's data which is stored remotely.

#### ABB Ability™ Condition Monitoring for drives

– up to 30% extended equipment lifetime

Reveal your drive's true potential

- ABB Ability Condition Monitoring for drives is a service that delivers you accurate, real-time information about drive events to ensure your equipment is available, reliable and maintainable.

#### ABB Ability™ Predictive Maintenance for drives\*

– up to 20% service costs reduction

Valuable insight to increase your process uptime

- ABB Ability™ Predictive Maintenance service harnesses the combined power of cloud computing, machine learning and ABB's expertise to propose highly targeted maintenance actions for critical drive applications. This gives you better availability, longer process uptime, and peace of mind.

\* subject to local availability



# 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	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.
Services	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.

### We inform you proactively, in two steps:

- 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.

# Keep track of your drives

Now you can download a Drivebase mobile app for ABB drives registration and support, anywhere and at any time.

## Drivebase app lets you:

- Register your drive
- Read online manuals
- Store drive information on your device
- Get service recommendations
- Find your closest service provider
- Troubleshoot your drives

To register your drive, you will need the drive's serial number and location, together with your company name, contact details, application and industry. Once we know where you are we are better placed to help you.



1

Find the Drivebase app in the Apple App Store, Google Play or Windows Store.

2

Register your drives and get access to global contact details, service recommendations and notifications.

3

Registration gives you peace of mind that your drive's support is in safe hands.



Check the terms and conditions at  
[abb.com/drivereg](http://abb.com/drivereg)





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