Drives and controls, motors and mechanical power transmission catalogue
# Drives and controls, motors and mechanical power transmission catalogue

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What’s new in 2015

**ABB general purpose drives, ACS580**
Initially available from 0.75 kW to 250 kW at 380 - 480 V, ABB has introduced a replacement for the successful ACS550. The ACS580 is a member of the new “all compatible” drive platform, ABB’s philosophy of common drives architecture that features the same control panel, harmonised parameters and functions, universal accessories and engineering tools.

The architecture brings faster commissioning, minimal operator training and a familiarity across all ABB drives. The new Assistant control panel takes the drive user interface to new levels. The drive features safe torque-off (STO) as standard and many more options.

**ABB industrial drive modules for cabinet builders, ACS880-04**
The modules are further supported by the addition of:
- Fan kits to cool the unit
- Roof extract fan kits
- Door filter kits up to IP54
- An engineering tool to help design the module assemblies

**ACS880 range now includes multidrives and multidrive modules**
The ACS880 range includes factory-built multidrive cabinets and a wide range of multidrive modules. The cabinet offering includes active rectifier sections up to 6000 kVA, diode rectifier sections up to 5500 kVA and a new style, low cost regenerative rectifier unit up to 6000 kVA.

The multidrive line UPS can be configured with a large selection of inverter and braking sections and integrated options. ABB offers a comprehensive range of multidrive modules that allows system integrators to build complex drive systems of their own.

**ATEX compliant motor-drive packages for hazardous areas**
The challenge of matching low voltage AC motors and AC drives for use in hazardous environments has been overcome by ABB’s ATEX-approved motor-drive package. Among the many motor types that can be matched with ABB’s variable-speed drives are flameproof from 80 to 450 with power ratings from 0.18 kW to 710 kW, non-sparking in 71 to 450 frames from 0.09 kW to 1,000 kW and dust ignition proof (known more specifically as Ex tD/DIP) motors in frames 71 to 450 from 0.09 kW to 1,000 kW.

**Electrical heating made easy, DCT880**
ABB has adapted the firmware inside its DC drive range to generate a unit for industrial heating applications. The unit is suitable for inductive and resistive loads and for infrared or ultraviolet heaters. Different load configurations such as delta, star, star with neutral and open delta are just a few of the options.

**ATEX compliant motor-drive packages for hazardous areas**

The multidrive line UPS can be configured with a large selection of inverter and braking sections and integrated options. ABB offers a comprehensive range of multidrive modules that allows system integrators to build complex drive systems of their own.

**ATEX compliant motor-drive packages for hazardous areas**

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What’s new in 2015

**AVP Energy Toolkit App**
Energy, CO₂ and money saved, together with an estimated return on investment, are the outputs of an App designed to show the benefits of using variable-speed drives (VSDs) and electric motors to replace direct-on-line starting.
The App produces an instant mini-report that contains details of a matched ABB motor-drive package and can be forwarded to one of ABB’s Authorised Value Providers.

**Register your ABB drives and protect your investment**
You can register your drive using the Drivebase smartphone app. Drivebase lets you read product manuals and find ABB contact details, sends you service recommendations and allows quick troubleshooting through fault code analysis.
Registration gives you peace of mind that your drive’s support is in safe hands.

**PROFIsafe enabled drives**
With the new Automation Builder V1.1 engineering tool, ABB’s AC500-S safety PLC and the ACS880 drive, it is possible to create an Ethernet based network topology including standard control and safety control.
This network will use PROFIsafe over PROFINet to implement control and safety. Together with the ACS880’s FSO-12 safety module, this means a larger number of safety and control requirements can be met with less wiring required.

**WIMES-compliant motor**
A new motor specifically designed for water and wastewater applications meets the UK’s Water Industry Mechanical and Electrical Specification (WIMES). The motors are packed with features that afford greater protection against the environmental conditions found in the water and wastewater industry.

**Automation Builder**
A new integrated software suite for machine builders and system integrators wanting to automate their machines and systems in an integrated and efficient way.
Automation Builder is the successor of the PS501 Control Builder Plus product, incorporating all PLC engineering functionality plus additional engineering features.

**AC500**
The built-in high performing processor surrounded with a large memory, offers simplicity, security and reliability to adapt the automation solution to new upcoming challenges.
A variety of connectivity capabilities, integrated safety and usability even under harsh operating environments provide valuable benefits to machine builders for their automation tasks.

**Certification extended for smoke extraction motors**
ABB’s smoke extraction motors, M3BPW in frames 160 to 450, are now certified to 400°C in horizontal and vertical mounting positions for smoke extraction duty. These special-purpose tunnel ventilation motors are regulated by EN12101-3 that specifies motor testing requirements.

**Motiflex e180**
The new Motiflex e180 delivers versatile motion control performance, capability and dependability to power machine innovations. Flexible connectivity with Ethernet and motor feedback technologies is optimised for demanding motion applications.
With the MINT WorkBench PC tool you can quickly and easily customise the drive to the exact control requirements of your machine.

**Register your ABB drives and protect your investment**
You can register your drive using the Drivebase smartphone app. Drivebase lets you read product manuals and find ABB contact details, sends you service recommendations and allows quick troubleshooting through fault code analysis.
Registration gives you peace of mind that your drive’s support is in safe hands.
Authorised Value Providers

Authorised Value Providers deliver sales, support, service and engineering expertise in seamless cooperation with ABB. Being strategically located throughout the UK and Ireland, they bring ABB’s products and services directly to your site along with the same technical knowledge and back-up, combined with the best equipped repair and maintenance facilities in Europe. All providers undertake extensive and on-going training in all aspects of motors, drives and services. This provides the consistency of support, wherever in the UK and Ireland you are located.

Authorised Value Providers - Drives
Offer one of the largest stocks of AC drives, from 0.18 kW to 500 kW, available off-the-shelf.

1. ACS Drives & Control Systems
   Ireland
   Tel: +353 (0)44 934 0242

2. Advantage Control
   Northern Ireland
   Tel: 028 4461 3782

3. APDS
   South West
   Tel: 0117 982 2049

4. Central Group
   Merseyside
   Tel: 0151 546 6000

5. Gubbins Engineering Group
   East Anglia
   Tel: 01621 888 138

6. HALCYON Drives
   Yorkshire and Greater Manchester
   Tel: 0113 236 1509

7. iDrives
   South
   Tel: 01483 766 555

8. Inverter Drive Systems
   East Midlands
   Tel: 0115 944 1036

9. MKE Engineering Group
   South East
   Tel: 01795 438 436

10. Quantum Controls
    North East
    Tel: 01661 835 566

11. Sentrtridge Control
    Midlands
    Tel: 024 7655 3303

Call Authorised Value Providers on:
07000 ABB AVP (07000 222 287)

Authorised Value Providers - Motors
Offer electric motors up to 1,000 kW.

1. AAR Powerdrives
   West Midlands
   Tel: 0138 440 0800

2. APDS
   South West
   Tel: 0117 982 2049

3. Beta Power Engineering
   Cheshire
   Tel: 0161 432 9995

4. Campbell Electric Motors
   Ireland
   Tel: +353(0) 1 4628 333

5. Central Group
   Merseyside
   Tel: 0151 546 6000

6. CovElec (Leics)
   Leicestershire
   Tel: 0116 269 8111

7. EDC (Scotland)
   Scotland
   Tel: 0141 812 3222

8. EMR Silverthorn
   Middlesex
   Tel: 020 8903 1390

9. H.G. Rewinds
   Staffordshire
   Tel: 01785 262525

10. Halcyon
    West Yorkshire
    Tel: 0113 236 1509

11. Heasell Electromechanical Services
    Hertfordshire
    Tel: 01763 243369

12. JJ Loughran
    Northern Ireland
    Tel: 028 8676 2295

13. MKE Engineering Group
    Kent
    Tel: 01795 438 436

14. Quantum Controls
    North East
    Tel: 01661 835 566
Proactive drives and motors maintenance programmes keep you competitive by minimising disruption to your production.

The many drives and motors used in industry have a high degree of reliance placed upon them and often perform critical duties and have a high in-service value. A failure of either asset can result in loss of production and revenues, as well as having safety and environmental consequences. To reduce the risk and consequences of failure, the drive and motor must be properly maintained at the right times in their life cycle.

**Life cycle services**
The services offered by the Authorised Value Providers span the entire value chain, from the moment a customer makes the first enquiry to disposal and recycling of either the motor or the drive. Throughout the value chain, the providers offer training, technical support and customised contracts.

**Pre-purchase**
The Authorised Value Providers offer a range of services that help guide the customers to the right products for their applications.

**Order and delivery**
Orders can be placed directly with the Authorised Value Providers, for timely deliveries including express delivery.

**Installation and commissioning**
While many customers have the resource to undertake installation and commissioning on their own, the Authorised Value Providers offer professional installation and start-up services.

**Operation and maintenance**
From site surveys to preventive maintenance and reconditioning of drives and motors, ABB has all the options covered to keep its customers’ processes operational.

**Upgrade and retrofit**
An existing ABB drive or motor can often be upgraded to the latest model to improve the performance of the application.

**Replacement and recycling**
Authorised Value Providers can advise on the best replacement drive or motor while ensuring that the existing assets are disposed of in a way that meets all local environmental regulations.

**Entire value chain services**
The main services available throughout the entire value chain include:
− Training
− Technical support
− Contracts
# Drives and motors packages

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<th>Page</th>
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Drives and motors packages

Introduction

ABB is one of the only companies that makes both variable-speed drives and low voltage AC motors. As such it is well equipped to offer customers a perfectly designed, tested and approved matched pair, for whatever the motor-driven application.

In addition, ABB has devised a selection of bespoke drives and motors packages aimed at specific industry applications. In this catalogue we introduce five such packages.

Packages can extend beyond matching a motor and a drive. Other components, many of which are featured in this catalogue, also form part of the drive train – from bearings, couplings and gearboxes to programmable logic controls, switches and fusegear.
Drives and controls, motors and mechanical power transmission catalogue
Drives and motors packages
Synchronous reluctance motor-drive package

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

### ABB drive for water and wastewater applications - ACQ810
- 0.37 kW to 500 kW
- IP20 enclosure for installations in compact spaces
- Built-in pump features and protections through Intelligent Pump Control and supported by DTC motor control
- Advanced programming tool for fine tuning the drive to meet your process requirements
- STO as standard

### ABB industrial drive - ACS880
- Intuitive control panel and PC tool
- Direct torque control (DTC) for precise open and closed loop control
- Built-in safety features for simplified configuration
- Communication with all major automation networks
- Removable memory unit for easy drive commissioning and replacement
- Energy optimiser and energy efficiency information for monitoring and saving energy
- STO as standard

### ABB machinery drive - ACS850
- 0.37 kW to 560 kW
- Bookshelf design saves space
- Direct torque control (DTC) for premium motor control as standard
- Designed specifically to integrate into a machine environment
- Solution programming included
- STO as standard

See details on page 47
See details on page 52
See details on page 74
IE4 SynRM
- Cast iron frame 160 to 315
- 7.5 kW to 315 kW
- 40 percent lower losses compared to induction designs
- No magnets
- Cool running rotor
- Improved bearing system reliability
- Easy to service
- Simple to retrofit on induction motor applications due to identical physical size

High Output SynRM
- Aluminium frame 90 to 132
- 1.1 kW to 37 kW
- Cast iron frame 160 to 315
- 18 kW to 350 kW
- Achieve the same output with a motor that’s up to two frame sizes smaller
- Enables smaller, lighter and more cost-efficient machine designs
- Ideal for applications where space and weight factors are critical
Drives and motors packages
IE2 & VSD motor drive package

On 1st January 2015, IE2 motors from 7.5 kW to 375 kW, that are new into the market, can only be used if fitted with a variable-speed drive, in order to comply with the new European Minimum Energy Performance Standard (EU MEPS).

ABB offers a wide range of variable-speed drives, all of which can be fitted to IE2 motors to deliver efficient, reliable and compliant motor control.

ABB machinery drive
ACS355
- 0.37 kW to 22 kW
- FlashDrop - parameter programming with drive still in its box
- Sequence programming designed for food and beverage and materials handling applications

ABB general purpose drives
ACS310
- 0.37 kW to 22 kW
- Pump and soft pump and fan control (PFC and SPFC)
- Pipe cleaning (anti-jam) and pipe fill functions

See details on page 35

ACS580
- 0.55 kW to 250 kW
- Wide power range in wall-mounted IP21 and IP55 variants
- Sensorless vector and scalar control

See details on page 43

ABB drive for HVAC
ACH550
- 0.75 kW to 355 kW
- Quick installation
- Rapid start-up, trouble-free use, easy interfacing
- Built-in BACnet

See details on page 39

ABB industrial drive
ACS880
- Intuitive control panel and PC tool
- Direct torque control (DTC) for precise open- and closed-loop control
- Built-in safety features for simplified configuration
- Communication with all major automation networks
- Removable memory unit for easy drive commissioning and replacement
- Energy optimiser and energy efficiency information for monitoring and saving energy

See details on page 52
General performance motors combine convenience and easy handling seamlessly with ABB’s engineering expertise, while providing standard variants and modifications. The motors can be tailored according to the specific needs of end-users and OEMs.

Highlights
– 0.06 kW to 355 kW
– One year warranty
– IE2 & IE3
– 2, 4 & 6 pole designs

Process performance motors are the flagship of ABB’s standard low voltage motors. This range provides the most comprehensive, versatile set of motors for the process industries and heavy-duty applications which are dependent on continuous reliability, lowest possible environmental impact and life cycle costs.

Highlights
– 0.09 kW to 1,000 kW
– Three years warranty and an option to extend to five years
– IE2, IE3 & IE4
– All variant codes available for process industry applications
Drives and motors packages
ATEX compliant motor-drive package

ATEX approved AC motor and drive combination gives safe, economical power combined with effective control. By choosing an ATEX compliant motor-drive package, end-users can be confident that it is optimised for their application, complies to ATEX 95 and is commercially beneficial, giving more available power for your money.

<table>
<thead>
<tr>
<th>ABB industrial drive</th>
<th>ABB general purpose drive</th>
<th>ABB machinery drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS880</td>
<td>ACS550</td>
<td>ACS355</td>
</tr>
</tbody>
</table>
| - Adaptive programming and CODESYS - like having a PLC (programmable logic controller) inside the drive | - 0.37 kW to 355 kW  
- Assistant control panel providing intuitive use of the drive  
- Patented swinging choke for superior harmonic reduction  
- Sensorless vector and scalar control | - IP20 as standard (UL type 1 as option)  
- IP66/69 variants  
- Advanced functionality with sequence programming  
- Configuration of unpowered drive in 2 seconds  
- Compact installation  
- STO as standard |
| - DTC (direct torque control) proven motor control platform  
- All major types of drive topology covered - 6-pulse, 12-pulse, 4-quadrant, low harmonic, air-cooled and water-cooled  
- Built-in safety module  
- ATEX approved STO | | |

See details on page 52  
See details on page 31
ABB hazardous area low voltage motors
- Flameproof motors, frame size 80 to 450
- 0.18 kW to 710 kW
- Non-sparking motors, frame size 71 to 450
- 0.09 kW to 1,000 kW
- Loadability curves optimised for ABB drives

ABB Ex tD/DIP motors
- Ex tD/DIP motors, frame size 71 to 450
- 0.09 kW to 1,000 kW
- IP55 or IP65 for non-conductive dust
- IP65 for conductive dust
- Loadability curves optimised for ABB drives
Important note: This flowchart only applies to standard ABB motors.

Type testing means thermistor relays are not mandatory but to allow protection against stall conditions they are recommended for a safe installation. Use ATEX approved thermistor measurement. ACS880 does not require a contactor as the ATEX approved STO can be used to disconnect.

### If the motor voltage is ≤ 500 V

**Check the frame size:**

- If the motor voltage is ≤ 500 V:
  - Up to IEC 250...
    - Motor needs: insulated non-drive end bearings
  - IEC 280 to 315...
    - Motor needs: insulated non-drive end bearings
  - IEC 355 and above...
    - Motor needs: common mode filtering installed

### If the motor voltage is 500 to 600 V

- Motor needs reinforced winding insulation
- OR
- AC drive needs du/dt filtering fitted

In addition, check the frame size.

- If the motor voltage is 500 to 600 V:
  - Up to IEC 250...
    - Motor needs: insulated non-drive end bearings
  - IEC 280 to 315...
    - Motor needs: insulated non-drive end bearings
  - IEC 355 and above...
    - Motor needs: common mode filtering installed

### If the motor voltage is 600 to 690 V

- Motor needs reinforced winding insulation
- AND
- AC drive needs du/dt filtering fitted

In addition, check the frame size.

- If the motor voltage is 600 to 690 V:
  - Up to IEC 250...
    - Motor needs: insulated non-drive end bearings
  - IEC 280 to 315...
    - Motor needs: insulated non-drive end bearings
  - IEC 355 and above...
    - Motor needs: common mode filtering installed
Please check motor load capacity curves to ensure correct dimensioning of the motor

Motor to be equipped with thermal control to ensure Ex-temperature class

Additional testing required to obtain EC Declaration of Conformity

DriveSize
Using this tool, users can select a suitable combination of motor and drive.
The tool also shows combinations that have not been tested.

Website
Contains all relevant certificates for tested drive and motor combinations.
www.abb.com/drives
www.abb.com/motors&generators

EC Declaration of Conformity

Important note: This flowchart only applies to standard ABB motors

Type testing means thermistor relays are not mandatory but to allow protection against stall conditions they are recommended for a safe installation. Use ATEX approved thermistor measurement.

ACS880 does not require a contactor as the ATEX approved STO can be used to disconnect.

Please check motor load capacity curves to ensure correct dimensioning of the motor

Motor to be equipped with thermal control to ensure Ex-temperature class

Additional testing required to obtain EC Declaration of Conformity
Drives and motors packages
Cooling tower direct drive motor and variable-speed drive package

The ABB motor-drive package for cooling towers comprises an ABB permanent magnet motor with an ABB industrial drive, ACS880. Together, the package delivers precise fan control without the need for a gearbox, even under low load or speed conditions often experienced in cooling tower applications. ABB’s RPM AC permanent magnet motor has a high power and torque density ratio which is needed to achieve the sustained low speed required for cooling tower operation. It is designed to retrofit into existing gearbox footprints within the cooling tower to allow swap-out in less than six hours.

ABB industrial drive, ACS880 and RPM AC permanent magnet motor
- Designed to drop directly into existing gearbox mounting patterns
- Retrofit can be accomplished in under six hours
- Eliminates gearbox, lowers vibration and system noise
- Permanent magnet control greatly increases operating efficiencies even under lightly loaded conditions, typical in fan applications at low speeds
- Temperature rise in the motor is considerably lower
- A power dense package increases motor life compared to a conventional induction motor system
- Special weather sealing ensures maximum life expectancy
Drives and motors packages
Deck winch motor drive package

ABB offers motors and drives for anchoring and mooring winches, RoRo gate ramp winches and tugboat winches. A deck winch motor-drive package consists of an ABB low voltage marine motor with mechanical disc brakes and an ABB industrial drive, ACS880. Both are designed to stand up to the operations and installations found on many sea-going vessels.

Our marine certified motors and drives fulfil marine and offshore requirements and the design and operation comply with regulations from all major classification societies. Our electrical drive solutions improve reliability and give you many advantages over hydraulic systems. They enable more precise rope control and reduce operating noise. No hydraulics means no hydraulic fluid concerns, less parts, reduced installation space and reduced maintenance needs.

**Control stand integration**
- Connect up to three control stands and one wireless radio controller to a single drive
- Connect via drive I/O, PLC or fieldbus communications

**ABB industrial drive, ACS880**
- Built-in winch control program
- The combination of DTC and winch control program eliminate the need for motor shaft encoders and load cell sensors in the winch gearbox
- Ensures smooth winch start-up, eliminating the motor start-up voltage and current peaks on the ship’s electrical network
- Dynamic braking with integrated brake chopper and external braking resistor
- Stepless speed and torque operation reduces winch noise
- Direct bulkhead installation or in cabinets (marine certified)

**Low voltage marine motors with mechanical disc brakes**
- Exact nominal data on rating plate helps you optimise motor operation especially when motor encoder is not used
- Specially designed low wear shaft seals

- Corrosion resistance improved with zinc primer painting
- IP56 open deck protection class
- Optional heating element and temperature supervision
- Ex motors also available
Low voltage AC drives

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ABB general purpose drive for fans and pumps 35

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Other ABB industrial drive variants 63
# Drives feature finder

The table highlights the differences between the various ABB drives families. It also lists some of the key features of the different ABB drives. However, the table is not exhaustive and if you are seeking a feature which does not appear in the table, please contact ABB for information.

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<th>Drive range</th>
<th>ABB micro drives (ACS55 - ACS150 - p38)</th>
<th>ABB machinery drives (ACS355 - p31)</th>
<th>ABB general purpose drives for fans and pumps (ACS800 - ACS1500 - p31)</th>
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</thead>
<tbody>
<tr>
<td>Voltage &amp; power</td>
<td>Details or additional notes</td>
<td>(ACS55) 1-ph 100 - 120 V; 0.18 - 0.37 kW</td>
<td>1-ph 200 - 240 V; 0.37 - 2.2 kW</td>
</tr>
<tr>
<td>Other rectifier options</td>
<td>12-pulse diode</td>
<td>(ACS150) 3ph 380 - 480 V; 0.37 - 4.0 kW</td>
<td>3-ph 200 - 240 V; 0.37 - 11 kW</td>
</tr>
<tr>
<td>EMC compliance (EN 61800-3, 2004)</td>
<td>No EMC filter</td>
<td>(ACS55) 3ph 380 - 480 V; 0.37 - 22 kW</td>
<td>3-ph 380 - 480 V; 0.37 - 22 kW</td>
</tr>
<tr>
<td>Harmonic filter / choke / active (EN 61000-3-4)</td>
<td>Choke (AC or DC)</td>
<td>≤ (ABB drive)</td>
<td>≤ (ABB drive)</td>
</tr>
<tr>
<td>Enclosure class</td>
<td>IP00</td>
<td>≤ (IP54) drive (SREA)</td>
<td>≤ (IP66/69) F&amp;B</td>
</tr>
<tr>
<td>Mechanical construction</td>
<td>Module - panel mountable (IP20 minimum)</td>
<td>≤ (IP54) (Nema 1)</td>
<td>≤ (Nema 1)</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Direct air-cooling</td>
<td>≤ (Fan variable speed)</td>
<td>≤ (Fan variable speed)</td>
</tr>
<tr>
<td>Dynamic braking chopper</td>
<td>Range of resistors available from ABB</td>
<td>≤ (Fan variable speed)</td>
<td>≤ (Fan variable speed)</td>
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<tr>
<td>Switching frequency</td>
<td>Motor control</td>
<td>1 to 16 kHz</td>
<td>4 to 16 kHz</td>
</tr>
<tr>
<td>Programmability</td>
<td>Parameter programming</td>
<td>2 to 16 kHz</td>
<td>4 to 16 kHz</td>
</tr>
<tr>
<td>Start-up assistance and help</td>
<td>Aids to commissioning and diagnostics</td>
<td>1 to 16 kHz</td>
<td>4 to 16 kHz</td>
</tr>
<tr>
<td>Cold configure</td>
<td>Program the drive whilst still in its box</td>
<td>1 to 16 kHz</td>
<td>4 to 16 kHz</td>
</tr>
<tr>
<td>Removable memory module</td>
<td>No reconfiguring time needed</td>
<td>1 to 16 kHz</td>
<td>4 to 16 kHz</td>
</tr>
<tr>
<td>Real-time clock</td>
<td>With assistant control panel</td>
<td>1 to 16 kHz</td>
<td>4 to 16 kHz</td>
</tr>
<tr>
<td>I/O built-in</td>
<td>Analogue input/output</td>
<td>≤ (800-04*) (NPCU req.)</td>
<td>≤ (800-04*) (NPCU req.)</td>
</tr>
<tr>
<td>Fieldbuses</td>
<td>Interface (popular networks)</td>
<td>≤ (SREA)</td>
<td>≤ (SREA)</td>
</tr>
<tr>
<td>Remote monitoring</td>
<td>Report info and status remotely</td>
<td>≤ (SREA)</td>
<td>≤ (SREA)</td>
</tr>
<tr>
<td>Safety options (TÜV certified hardware)</td>
<td>Emergency stop (CAT.0, CAT.1)</td>
<td>≤ (SREA)</td>
<td>≤ (SREA)</td>
</tr>
<tr>
<td>ATEX</td>
<td>ATEX certified for use with ABB motors</td>
<td>≤ (SREA)</td>
<td>≤ (SREA)</td>
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<tr>
<td>PC tools</td>
<td>DriveConfig tool (programme in box)</td>
<td>≤ (SREA)</td>
<td>≤ (SREA)</td>
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<tr>
<td>Industry specific products</td>
<td>HVAC specific</td>
<td>≤ (SREA)</td>
<td>≤ (SREA)</td>
</tr>
</tbody>
</table>

- = standard, ◆ = option, internal or fitted
-◆ = option, external - ◆ = not available - ◆◆ = can be bookcase or flat mounted - ◆☆ = relay output, ◆☆ = transistor output, ◆ = configurable to be input or output

**Drives feature finder**

**Drive Composer (Entry or Pro)**

- 3 / 1r (ACS55), - (ACS150)
- 5 / 1r (ACS150)
- 5 / 1r (ACS150)

**Drive Config tool (programme in box)**

- (ACS55), - (ACS150)
- (ACS150)
- (ACS150)

**DriveWindow Light**

- (ACS55)
- (ACS150)
- (ACS150)

**DriveWindow**

- (ACS55)
- (ACS150)
- (ACS150)

**DriveAP**

- (ACS55)
- (ACS150)
- (ACS150)

**IEC 61131 tool**

- (ACS55)
- (ACS150)
- (ACS150)

**Drive Composer (Entry or Pro)**

- (ACS800-01,-02,-04,-11,-14,-31 - p52)
- (ACS800-04*, RDCO req.)
- (ACS800-31)

**ABB industrial drives**

- (800-01, -11, -31) IP55
- (800-04 R7/8)
- (800-04*) (RDCO req.)
- (NPCU req.)

**ABB drives for HVAC**

- (ACS55 - p31)
- (ACS150 - p31)
- (ACS800-01,-02,-04,-11,-14,-31 - p52)
- (ACS800-04*, RDCO req.)
- (NPCU req.)

**ABB machinery drives**

- (ACS355 - p31)
- (ACS150 - p31)
- (ACS800-01,-02,-04,-11,-14,-31 - p52)
- (ACS800-04*, RDCO req.)
- (NPCU req.)
<table>
<thead>
<tr>
<th>ABB general purpose drives (ACS350 - p39)</th>
<th>ABB drives for HVAC (ACS150 - p42)</th>
<th>ABB drives for water and wastewater (ACS610-04 - p47)</th>
<th>ABB industrial drives and drive modules (ACS880-01, 02, 04, 07, 17, 37 - p52)</th>
<th>ABB industrial drives cabinet-drive (ACS880-17, 37 - p58)</th>
<th>ABB industrial drives and drive modules (ACS880-01, 04 - p52)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-ph 380 - 480 V: 0.55 - 250 kW</td>
<td>3-ph 208 - 240 V: 0.75 - 75 kW</td>
<td>3-ph 380 - 480 V: 1.1 - 400 kW</td>
<td>3-ph 230 V: 0.55 - 200 kW</td>
<td>3-ph 400 V: 1.1 - 1450 kW</td>
<td>3-ph 400 V: 0.55 - 75 kW</td>
</tr>
<tr>
<td>3-ph 380 - 480 V: 1.1 - 355 kW</td>
<td>3-ph 400 V: 1.1 - 1450 kW</td>
<td>3-ph 500 V: 1.5 - 1850 kW</td>
<td>3-ph 500 V: 0.55 - 1850 kW</td>
<td>3-ph 500 V: 0.55 - 1400 kW</td>
<td>3-ph 400 V: 0.55 - 1400 kW</td>
</tr>
<tr>
<td>3-ph 690 V: 5.5 - 1900 kW</td>
<td>3-ph 690 V: 45 - 2800 kW</td>
<td>3-ph 690 V: 4 - 2200 kW</td>
<td>3-ph 690 V: 4 - 2200 kW</td>
<td>3-ph 690 V: 4 - 2200 kW</td>
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<tr>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(remove EMC screw)</td>
<td>(remove EMC screw)</td>
<td>(remove EMC screw)</td>
<td>(remove EMC screw)</td>
<td>(remove EMC screw)</td>
<td>(remove EMC screw)</td>
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</tr>
<tr>
<td>(IP55)</td>
<td>(IP54)</td>
<td>(IP54)</td>
<td>(IP54)</td>
<td>(IP54)</td>
<td>(IP54)</td>
</tr>
<tr>
<td>(variable-speed fan)</td>
<td>-</td>
<td>-</td>
<td>(LC range)</td>
<td>(Fan variable speed)</td>
<td>-</td>
</tr>
<tr>
<td>(to 22 kW), (later)</td>
<td>(to 11.0 kW), (later)</td>
<td>4 to 12 kHz</td>
<td>4 to 12 kHz</td>
<td>4 to 12 kHz</td>
<td>4 to 12 kHz</td>
</tr>
<tr>
<td>(assistant panel)</td>
<td>(assistant panel)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2 / 2</td>
<td>2 / 2</td>
<td>2 + (3) / 2 + (1)</td>
<td>2 + (3) / 2 + (1)</td>
<td>(SREA)</td>
<td>(SREA)</td>
</tr>
<tr>
<td>6 / 3+(3r)</td>
<td>6 / 3+(3r)</td>
<td>6 + 2+(4) / 2+(2r)</td>
<td>7+(4) / 3+(2)</td>
<td>(SREA)</td>
<td>(SREA)</td>
</tr>
<tr>
<td>4 isolated and configurable</td>
<td>3+(2) / 2+(2)</td>
<td>7+(4) / 3+(2)</td>
<td>2+(3) / 2+(1)</td>
<td>(NETA)</td>
<td>(NETA)</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(via STO)</td>
<td>(via STO)</td>
</tr>
<tr>
<td>(via CMDD)</td>
<td>(via CMDD)</td>
<td>(via CMDD)</td>
<td>(via CMDD)</td>
<td>(via CMDD)</td>
<td>(via CMDD)</td>
</tr>
<tr>
<td>(via STO)</td>
<td>(via STO)</td>
<td>(via STO)</td>
<td>(via STO)</td>
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<tr>
<td>(via CMDD)</td>
<td>(via CMDD)</td>
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<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

All ABB drives are CE marked
Other global approvals such as UL, cUL, CSA, C-Tick, GOST-R also applicable
** ACS880 and ACS880 can be loaded with industry specific code, like crane, winder, winch, spinning etc
** = A wide range of encoder interfaces to suit high performance applications
Low voltage AC drives

ABB micro drives

0.18 kW to 2.2 kW, ACS55

Motor control method - scalar

<table>
<thead>
<tr>
<th>Voltage/Supply</th>
<th>Power Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>200/240 V, 1-phase, 3-phase output</td>
<td>0.18 kW - 2.2 kW</td>
</tr>
<tr>
<td>100/120 V, 1-phase, 3-phase output</td>
<td>0.18 kW - 0.37 kW</td>
</tr>
</tbody>
</table>

What is an ABB micro drive, ACS55?
The ABB micro drive meets the requirements of OEMs, machinery builders and panel builders. It is a component that is purchased, together with other components, from a distributor. ABB micro drive is so small and simple that users of contactors and softstarters can switch to the benefits of variable-speed control. The ACS55 is a simple drive, programmed by switches. Extended programming is possible via a PC if required, as is programming without power.

Highlights

- Quick and easy installation - less than five minutes
- User interface via three rotary switches and a further eight on/off function DIP switches located on panel front
- Can be programmed via DriveConfig if needed to access extended functions (useful to OEMs)
- Compact size and narrow shape
- Ideal drive for DIN-rail mounting
- Two mounting orientations
- 110 V single phase - input gives 240 V, 3-phase output
- IP20 as standard
- Potentiometer option
- Integral EMC filter for 1st environment (EN61800-3), unrestricted distribution (C1)
- Optimised switching frequency for low noise (up to 16 kHz silent motor)

Where can it be used?

- Washing machines
- Dishwashers
- Mixers
- Dishwashers
- Pizza ovens
- Treadmills
- Vacuum cleaners
- Car washing machines
- Sliding doors
- Rotating billboards
- Dryers
- Electric gates

**Feature** | **Advantage** | **Benefit**
---|---|---
No programming is required | Inverter parameter settings with DIP switches and potentiometers. Extended programming is possible via DriveConfig if needed | Faster set up, easier configuration, easy for new users
Compact size and narrow shape | Up to 0.37 kW, 45 mm width; 2.2 kW, 67.5 mm width | Less space required for installation
Removable mounting clip | Removable clip allows DIN-rail and wall-mounting from back and side of the unit | Flexible and easy mounting, book case or flat
DriveConfig kit | Fast and safe configuration of an unpowered drive | Simple programming for high volume OEMs - programming in the box, no mains power needed
EMC | Fast environment, C1 EMC filters as standard (‘E’ model) | Low EMC emissions
Automatic switching frequency | Increases switching frequency automatically when drive temperature is decreased | Provides lowest possible noise without derating the drive
110-240 V AC, single-phase supplies | Output always capable of full 240 V, 3-phase, regardless of supply voltage | Can easily replace single-phase capacitor start motors
RoHS compliance | Compliance achieved during 2007 | Environmentally friendly drives
## Low voltage AC drives

### ABB micro drives

ACS55 – Ratings, types, voltages, prices and dimensions

### Dimensions and weights

<table>
<thead>
<tr>
<th>Frame</th>
<th>H1</th>
<th>H2</th>
<th>W</th>
<th>D</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>170</td>
<td>146.5</td>
<td>45</td>
<td>128</td>
<td>0.75</td>
</tr>
<tr>
<td>B</td>
<td>170</td>
<td>146.5</td>
<td>67.5</td>
<td>128</td>
<td>0.70</td>
</tr>
<tr>
<td>C</td>
<td>194</td>
<td>171</td>
<td>70</td>
<td>159</td>
<td>1.1</td>
</tr>
<tr>
<td>D</td>
<td>226</td>
<td>203</td>
<td>70</td>
<td>159</td>
<td>1.1</td>
</tr>
</tbody>
</table>

### 200/240 V, 1-phase supply, 3-phase output

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Input current A</th>
<th>Output current A</th>
<th>Max output A</th>
<th>Frame Type</th>
<th>Fuse A Type gG</th>
<th>Coolant dissipation W</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type</th>
<th>Price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>With EMC filter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.18</td>
<td>4.4</td>
<td>1.4</td>
<td>2.1</td>
<td>A</td>
<td>10</td>
<td>21</td>
<td>Nat Vent</td>
<td>ACS55-01B-01A4-2</td>
<td>£93</td>
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</tr>
<tr>
<td>0.37</td>
<td>6.9</td>
<td>2.2</td>
<td>3.3</td>
<td>A</td>
<td>16</td>
<td>32</td>
<td>Nat Vent</td>
<td>ACS55-01B-02A2-2</td>
<td>£102</td>
<td></td>
</tr>
<tr>
<td>0.75</td>
<td>10.8</td>
<td>4.3</td>
<td>6.5</td>
<td>B</td>
<td>16</td>
<td>51</td>
<td>Nat Vent</td>
<td>ACS55-01B-04A3-2</td>
<td>£122</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>18.2</td>
<td>7.6</td>
<td>11.4</td>
<td>D</td>
<td>25</td>
<td>74</td>
<td>26</td>
<td>ACS55-01B-07A6-2</td>
<td>£170</td>
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</tr>
<tr>
<td>2.2</td>
<td>22</td>
<td>9.8</td>
<td>14.7</td>
<td>D</td>
<td>32</td>
<td>103</td>
<td>26</td>
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<tr>
<td>Without EMC filter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.18</td>
<td>4.4</td>
<td>1.4</td>
<td>2.1</td>
<td>A</td>
<td>10</td>
<td>21</td>
<td>Nat Vent</td>
<td>ACS55-01B-01A4-1</td>
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<td>0.37</td>
<td>6.9</td>
<td>2.2</td>
<td>3.3</td>
<td>A</td>
<td>16</td>
<td>32</td>
<td>Nat Vent</td>
<td>ACS55-01B-02A2-1</td>
<td>£97</td>
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</tr>
<tr>
<td>0.75</td>
<td>10.8</td>
<td>4.3</td>
<td>6.5</td>
<td>B</td>
<td>16</td>
<td>51</td>
<td>Nat Vent</td>
<td>ACS55-01B-04A3-1</td>
<td>£114</td>
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</tr>
<tr>
<td>1.5</td>
<td>18.2</td>
<td>7.6</td>
<td>11.4</td>
<td>C</td>
<td>25</td>
<td>74</td>
<td>26</td>
<td>ACS55-01B-07A6-1</td>
<td>£159</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>22</td>
<td>9.8</td>
<td>14.7</td>
<td>C</td>
<td>32</td>
<td>103</td>
<td>26</td>
<td>ACS55-01B-09A8-1</td>
<td>£186</td>
<td></td>
</tr>
</tbody>
</table>

*Ensure minimum installation space is provided, see User’s Manual for details*

### 100/120 V, 1-phase supply, 3-phase output

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Input current A</th>
<th>Output current A</th>
<th>Max output A</th>
<th>Frame Type</th>
<th>Fuse A Type gG</th>
<th>Coolant dissipation W</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type</th>
<th>Price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>With EMC filter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.18</td>
<td>6.4</td>
<td>1.4</td>
<td>2.1</td>
<td>A</td>
<td>10</td>
<td>24</td>
<td>Nat Vent</td>
<td>ACS55-01B-01A4-1</td>
<td>£101</td>
<td></td>
</tr>
<tr>
<td>0.37</td>
<td>9.5</td>
<td>2.2</td>
<td>3.3</td>
<td>A</td>
<td>16</td>
<td>35</td>
<td>Nat Vent</td>
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<td>£113</td>
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</tr>
<tr>
<td>Without EMC filter</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.18</td>
<td>6.4</td>
<td>1.4</td>
<td>2.1</td>
<td>A</td>
<td>10</td>
<td>24</td>
<td>Nat Vent</td>
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<td>0.37</td>
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<td>3.3</td>
<td>A</td>
<td>16</td>
<td>35</td>
<td>Nat Vent</td>
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<td>£106</td>
<td></td>
</tr>
</tbody>
</table>

*Ensure minimum installation space is provided, see User’s Manual for details*

### Options and interfaces

#### Potentiometer

Potentiometer with two switches: start/stop and forward/reverse direction. No external power source is needed for the potentiometer, connects directly to drive I/O.

#### DriveConfig programming with no power

To increase the number of applications possible with the ACS55, the DriveConfig kit can be used to access an extended parameter set. It is still possible to programme in the usual way, if these extended features are not required. DriveConfig also allows programming in the box without power.
Low voltage AC drives
ABB micro drives

0.37 kW to 4 kW, ACS150

Motor control method - scalar

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Supply</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>200/240 V, 1-phase</td>
<td>0.37 kW - 2.2 kW</td>
<td></td>
</tr>
<tr>
<td>200/240 V, 3-phase</td>
<td>0.37 kW - 2.2 kW</td>
<td></td>
</tr>
<tr>
<td>380/480 V, 3-phase</td>
<td>0.37 kW - 4 kW</td>
<td></td>
</tr>
</tbody>
</table>

What is an ABB micro drive, ACS150?
The ABB micro drive meets the requirements of OEMs, machinery builders and panel builders. It is a component that is purchased, together with other components, from a logistical distributor. ABB micro drives are designed to encourage users of contactors and softstarters to move to the benefits of variable-speed control. The ACS150 extends the capability of the ACS55 (page 26), by adding an extended range of power frames and programmability. The ACS150 can solve more difficult tasks like PID functionality. To retain the simplicity of an ABB micro drive, the ACS150 does not have a serial communications interface or extended options but does have a fixed keypad and speed control potentiometer.

Highlights
- PID controller built-in
- DC hold stop ensures stationary motor shaft
- IR compensation improves starting torque for heavy loads
- Parameter lock prevents tampering by unauthorised staff
- DIN rail or screw mounting as standard
- IP20 enclosure
- Fixed basic control panel
- Two-year warranty
- Flashdrop - parameter programming whilst drive still in its box - excellent for OEMs
- Protected against wiring errors: shows fault if power cable is inadvertently connected to motor terminals
- Automatic noise reduction
- Optional short or long parameter mode for standard or advanced users
- Unified height across the power range simplifies cabinet design

Where can it be used?
ACS150 can be used to control less demanding components in any machine, fans or pumps or anywhere where a fixed speed motor needs to go to variable-speed control. The functionality of the drive is designed to compliment the ABB machinery drives and ABB motion control drives.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FlashDrop*</td>
<td>Faster and easier drive set-up and commissioning for volume manufacturing. Programming in the box</td>
<td>No need for high voltage safe programming areas Parameters can be hidden for clarity Programme the drive during machine production build-up</td>
</tr>
<tr>
<td>Fixed interface</td>
<td>Simple drive with comfortable and robust interface Easy to navigate parameter structure</td>
<td>Integrated control panel with clear LCD display, backlight and buttons for editing and control</td>
</tr>
<tr>
<td>Fixed potentiometer</td>
<td>Intuitive speed setting</td>
<td>Integrated potentiometer. Settings shown on the control panel</td>
</tr>
<tr>
<td>Programmable functions</td>
<td>Useful control functions like PID, accelerating rates and start/stop modes included</td>
<td>Take control of the motor and reduce cost in the installation</td>
</tr>
<tr>
<td>Built-in EMC filter</td>
<td>No need for external filtering</td>
<td>2nd environment built-in filter. Complying with IEC 61800-3 as standard</td>
</tr>
<tr>
<td>Flexible installation</td>
<td>Optimum layout and efficient cabinet space usage</td>
<td>Screw, DIN-rail, sideways and side-by-side mounting Unified height and depth</td>
</tr>
<tr>
<td>Drive protection</td>
<td>Latest solutions to protect the drive and offer trouble-free use and the highest quality</td>
<td>The drive protects itself when power is connected to the motor terminals. I/O protected against short-circuit. Coated boards included as standard</td>
</tr>
<tr>
<td>Brand labelling</td>
<td>Drive logo, control panel logo, manuals and box can be printed with machine builders logo and name</td>
<td>Drives and packaging badged to your design</td>
</tr>
<tr>
<td>RoHS compliance</td>
<td>Compliance achieved during 2007</td>
<td>Environmentally friendly drives</td>
</tr>
</tbody>
</table>

* For details of FlashDrop, see user interfaces in ABB machinery drive section (page 34)
## Low voltage AC drives

### ABB micro drives

ACS150 – Ratings, types, voltages and prices

### 200/240 V, 1-phase supply voltage

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Nominal output current A</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type</th>
<th>List Price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.37</td>
<td>2.4</td>
<td>4.2</td>
<td>R0</td>
<td>10</td>
<td>25</td>
<td>+Nat Vent</td>
<td>ACS150-01E-02A4-2</td>
<td>£100</td>
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<tr>
<td>0.75</td>
<td>4.7</td>
<td>8.2</td>
<td>R1</td>
<td>16</td>
<td>48</td>
<td>24</td>
<td>ACS150-01E-04A7-2</td>
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<td>1.1</td>
<td>6.7</td>
<td>11.7</td>
<td>R1</td>
<td>20</td>
<td>71</td>
<td>24</td>
<td>ACS150-01E-08A7-2</td>
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</tr>
<tr>
<td>1.5</td>
<td>7.5</td>
<td>13.1</td>
<td>R2</td>
<td>25</td>
<td>73</td>
<td>21</td>
<td>ACS150-01E-07A5-2</td>
<td>£165</td>
</tr>
<tr>
<td>2.2</td>
<td>9.8</td>
<td>17.2</td>
<td>R2</td>
<td>35</td>
<td>96</td>
<td>21</td>
<td>ACS150-01E-09A8-2</td>
<td>£198</td>
</tr>
</tbody>
</table>

+ Ensure enough space around the unit - refer to the User’s Manual for details

### 200/240 V, 3-phase supply voltage

3-phase, 240 V is available for customers supplying the North American market. Please enquire for details.

### 380/480 V, 3-phase supply voltage

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Nominal output current A</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type</th>
<th>List Price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.37</td>
<td>1.2</td>
<td>2.1</td>
<td>R0</td>
<td>10</td>
<td>11</td>
<td>+Nat Vent</td>
<td>ACS150-03E-01A2-4</td>
<td>£159</td>
</tr>
<tr>
<td>0.55</td>
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<td>3.3</td>
<td>R0</td>
<td>10</td>
<td>16</td>
<td>+Nat Vent</td>
<td>ACS150-03E-01A9-4</td>
<td>£168</td>
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<td>2.4</td>
<td>4.2</td>
<td>R1</td>
<td>10</td>
<td>21</td>
<td>13</td>
<td>ACS150-03E-02A4-4</td>
<td>£183</td>
</tr>
<tr>
<td>1.1</td>
<td>3.3</td>
<td>5.6</td>
<td>R1</td>
<td>10</td>
<td>31</td>
<td>13</td>
<td>ACS150-03E-03A3-4</td>
<td>£201</td>
</tr>
<tr>
<td>1.5</td>
<td>4.1</td>
<td>7.2</td>
<td>R1</td>
<td>16</td>
<td>40</td>
<td>13</td>
<td>ACS150-03E-04A1-4</td>
<td>£222</td>
</tr>
<tr>
<td>2.2</td>
<td>5.6</td>
<td>9.8</td>
<td>R1</td>
<td>16</td>
<td>41</td>
<td>19</td>
<td>ACS150-03E-05A1-4</td>
<td>£315</td>
</tr>
<tr>
<td>3</td>
<td>7.3</td>
<td>12.8</td>
<td>R1</td>
<td>16</td>
<td>74</td>
<td>24</td>
<td>ACS150-03E-07A3-4</td>
<td>£379</td>
</tr>
<tr>
<td>4</td>
<td>8.8</td>
<td>15.4</td>
<td>R1</td>
<td>20</td>
<td>94</td>
<td>24</td>
<td>ACS150-03E-08A8-4</td>
<td>£431</td>
</tr>
</tbody>
</table>

+ Ensure enough space around the unit - refer to the User’s Manual for details

The drive can be fitted with the NEMA 1 kit for easy wall-mounting and convenient protection, see user interfaces in ABB machinery drive section, page 34.
Low voltage AC drives
ABB micro drives

ACS150 – Dimensions, I/O and options

Dimensions and weights
Cabinet-mounted drives, wall mounted drives

<table>
<thead>
<tr>
<th>Frame size</th>
<th>IP20 (UL open)</th>
<th>NEMA 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H1 (mm)</td>
<td>H2 (mm)</td>
</tr>
<tr>
<td>R0</td>
<td>169</td>
<td>202</td>
</tr>
<tr>
<td>R1</td>
<td>169</td>
<td>202</td>
</tr>
<tr>
<td>R2</td>
<td>169</td>
<td>202</td>
</tr>
</tbody>
</table>

H1 = Height without fastenings and clamping plate
H2 = Height with fastenings but without clamping plate
H3 = Height with fastenings and clamping plate
H4 = Height with fastenings and NEMA 1 connection box
H5 = Height with fastenings, NEMA 1 connection box and hood
W = Width
D = Depth

Options available
- Input and output chokes
- Brake chopper resistors (all drives in the ACS150 range have integral chopper)
- 1st. environment EMC filters - footprint style
- Low leakage EMC filters < 30mA leakage
- FlashDrop - programming without power
- NEMA kit allows installations to be neater and provides mechanical support for glanded cables

Typical I/O connections

User interfaces
The ACS150 has a simple user interface, consisting of I/O connections and a fixed programming keypad. An integrated speed control potentiometer is also provided.
Low voltage AC drives
ABB machinery drive
0.37 kW to 22 kW, ACS355
Motor control method - scalar, vector (open and closed loop)

200/240 V, 1-phase supply, 0.37 kW - 2.2 kW
200/240 V, 3-phase supply, 0.37 kW - 11 kW
380/480 V, 3-phase supply, 0.37 kW - 22 kW

What is an ABB machinery drive?
ABB machinery drives are designed for the machine building sector. In serial type manufacturing the consumed time per unit is critical. The drive is designed to be optimal in terms of installation, setting parameters, available machinery features and commissioning. The basic product is as user-friendly as possible, yet providing high intelligence. The drive offers diverse functionality to cater for the most demanding needs. The drive is also equipped with a dual-channel safe torque-off interface to SIL3/PL e.

Highlights
- FlashDrop - parameter programming with drive still in its box - excellent for OEMs
- Sequence programming designed for food and beverage and materials handling applications - Eight-steps included
- Unified height and depth across the power range simplifies cabinet design
- Protected against wiring errors: shows fault if power cable is inadvertently connected to motor terminals
- Automatic noise reduction
- Own branding possible for large users

Where can it be used?
ABB machinery drives are designed to meet the requirements of an extensive range of machinery applications. The drive is ideal for food and beverage, material handling, textile, printing, rubber and plastics and woodworking applications. The higher IP66 class variant meets all of the relevant hygiene requirements for the food and beverage industry.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FlashDrop*</td>
<td>Faster and easier drive set-up and commissioning for volume manufacturing. Programming with no power</td>
<td>Fast, safe and trouble-free method to set up and commission without powering up the drive - patented</td>
</tr>
<tr>
<td>Safe torque-off</td>
<td>Built-in compliance to new machinery directive</td>
<td>SIL3/PL e certified dual channel input - TÜV approved</td>
</tr>
<tr>
<td>Sequence programming</td>
<td>Application specific 8-state programming with comprehensive triggering conditions, 16 conditions with option code</td>
<td>Logic programming included as standard. Reduces the need for external PLC</td>
</tr>
<tr>
<td>Common DC link</td>
<td>Connection to existing DC power sources (patented)</td>
<td>Easy integration into high performance machines</td>
</tr>
<tr>
<td>User interfaces</td>
<td>Wide range, including Assistant panel</td>
<td>Cost efficient approach - meets requirements of OEM</td>
</tr>
<tr>
<td>Fieldbus</td>
<td>Extensive range of industrial fieldbus option modules available</td>
<td>Connectability to all of the most popular fieldbuses</td>
</tr>
<tr>
<td>24 V ‘live keypad’ operation</td>
<td>Connect 24 V to the drive via the MPOW option</td>
<td>Keep fieldbus, control card and I/O healthy while able to remove the main supply - safer maintenance</td>
</tr>
<tr>
<td>Built-in EMC filter</td>
<td>2nd environment filter complying with IEC 61800-3 as standard</td>
<td>No extra space, parts, time or cost required</td>
</tr>
<tr>
<td>Built-in brake chopper</td>
<td>100 percent braking capability</td>
<td>Reduces cost, saves space and simplifies wiring</td>
</tr>
<tr>
<td>Drive protection</td>
<td>Latest solutions to protect the drive and offer trouble-free use and the highest quality</td>
<td>The drive protects itself when power is connected to the motor terminals. I/O protected against short-circuit. Coated boards included as standard</td>
</tr>
<tr>
<td>IP66/69k enclosure option</td>
<td>Makes drive suitable for hose down applications</td>
<td>Meets food hygiene standards in a wall-mounted enclosure</td>
</tr>
<tr>
<td>Brand labelling</td>
<td>Drive logo, control panel logo, manuals and box can be printed with machine builders logo and name</td>
<td>Drives and packaging badged to your design</td>
</tr>
<tr>
<td>RoHS compliance</td>
<td>Compliance achieved during 2007</td>
<td>Environmentally friendly drives</td>
</tr>
</tbody>
</table>

* For details of FlashDrop, see user interfaces in ABB machinery drive section, page 34
**Low voltage AC drives**

**ABB machinery drive**

**ACS355 - Ratings, types, voltages and prices**

### 200/240 V, 1-phase supply voltage

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Output current A</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A (Type G)</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type (code shown is IP20)</th>
<th>IP20 list price £</th>
<th>IP66 list price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.37</td>
<td>2.4</td>
<td>4.2</td>
<td>R0</td>
<td>10</td>
<td>48</td>
<td>Nat Vent</td>
<td>ACS355-01E-02A4-2</td>
<td>£111</td>
<td>n/a</td>
</tr>
<tr>
<td>0.75</td>
<td>4.7</td>
<td>8.2</td>
<td>R1</td>
<td>16</td>
<td>72</td>
<td>24</td>
<td>ACS355-01E-04A7-2</td>
<td>£139</td>
<td>n/a</td>
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<tr>
<td>1.1</td>
<td>6.7</td>
<td>11.7</td>
<td>R1</td>
<td>20</td>
<td>97</td>
<td>24</td>
<td>ACS355-01E-06A7-2</td>
<td>£163</td>
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<tr>
<td>1.5</td>
<td>7.5</td>
<td>13.1</td>
<td>R2</td>
<td>25</td>
<td>101</td>
<td>21</td>
<td>ACS355-01E-07A5-2</td>
<td>£179</td>
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<tr>
<td>2.2</td>
<td>9.8</td>
<td>17.2</td>
<td>R2</td>
<td>35</td>
<td>124</td>
<td>21</td>
<td>ACS355-01E-09A8-2</td>
<td>£219</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* Ensure enough space around the unit - refer to the User's Manual for details
* Note: IP20 drives require a keypad for parameter alteration, it can then be removed if required
** Note: IP66 drives are always delivered with the Assistant keypad

### 200/240 V, 3-phase supply voltage

3-phase, 240 V is also available for customers supplying the North American market. Please enquire for details.

### 380/480 V, 3-phase supply voltage

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Output current A</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A (Type G)</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type (code shown is IP20)</th>
<th>IP20 list price £</th>
<th>IP66 list price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.37</td>
<td>1.2</td>
<td>2.1</td>
<td>R0</td>
<td>10</td>
<td>35</td>
<td>Nat Vent</td>
<td>ACS355-03E-01A2-4</td>
<td>£189</td>
<td>£400</td>
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<td>0.55</td>
<td>1.9</td>
<td>3.3</td>
<td>R0</td>
<td>10</td>
<td>40</td>
<td>Nat Vent</td>
<td>ACS355-03E-01A9-4</td>
<td>£199</td>
<td>£402</td>
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<td>0.75</td>
<td>2.4</td>
<td>4.2</td>
<td>R1</td>
<td>10</td>
<td>50</td>
<td>13</td>
<td>ACS355-03E-02A4-4</td>
<td>£218</td>
<td>£417</td>
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<td>1.1</td>
<td>3.3</td>
<td>5.8</td>
<td>R1</td>
<td>10</td>
<td>60</td>
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<td>ACS355-03E-03A4-4</td>
<td>£247</td>
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<td>1.5</td>
<td>4.1</td>
<td>7.2</td>
<td>R1</td>
<td>16</td>
<td>69</td>
<td>13</td>
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<td>£596</td>
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<td>2.2</td>
<td>5.6</td>
<td>9.8</td>
<td>R1</td>
<td>16</td>
<td>90</td>
<td>19</td>
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<td>12.8</td>
<td>R1</td>
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<td>£454</td>
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<td>4</td>
<td>8.8</td>
<td>15.4</td>
<td>R1</td>
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<td>ACS355-03E-08A8-4</td>
<td>£517</td>
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<td>5.5</td>
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<td>21.9</td>
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<td>25</td>
<td>161</td>
<td>52</td>
<td>ACS355-03E-12A5-4</td>
<td>£599</td>
<td>£1,043</td>
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<td>7.5</td>
<td>15.6</td>
<td>27.3</td>
<td>R3</td>
<td>30</td>
<td>204</td>
<td>52</td>
<td>ACS355-03E-15A6-4</td>
<td>£777</td>
<td>£1,237</td>
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<tr>
<td>11</td>
<td>23.1</td>
<td>40.4</td>
<td>R3</td>
<td>50</td>
<td>301</td>
<td>71</td>
<td>ACS355-03E-23A1-4</td>
<td>£949</td>
<td>n/a</td>
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<td>15</td>
<td>31.0</td>
<td>54.3</td>
<td>R4</td>
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<td>408</td>
<td>96</td>
<td>ACS355-03E-31A0-4</td>
<td>£1,216</td>
<td>n/a</td>
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<td>18.5</td>
<td>38.0</td>
<td>66.5</td>
<td>R4</td>
<td>100</td>
<td>498</td>
<td>96</td>
<td>ACS355-03E-38A0-4</td>
<td>£1,443</td>
<td>n/a</td>
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<tr>
<td>22</td>
<td>44.0</td>
<td>77.0</td>
<td>R4</td>
<td>100</td>
<td>588</td>
<td>96</td>
<td>ACS355-03E-44A0-4</td>
<td>£1,764</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* Ensure enough space around the unit - refer to the User's Manual for details
* Note: IP20 drives require a keypad for parameter alteration, it can then be removed if required
** Note: IP66 drives are always delivered with the Assistant keypad

### Control panel

<table>
<thead>
<tr>
<th>Control panel</th>
<th>Type</th>
<th>Price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant control panel</td>
<td>ACS-CP-A</td>
<td>£396</td>
</tr>
<tr>
<td>Basic keypad</td>
<td>ACS-CP-C</td>
<td>£24</td>
</tr>
</tbody>
</table>

† Price of control panel only when purchased with drive

Panel mounting kit and user interface descriptions, see page 34
Low voltage AC drives
ABB machinery drive

ACS355 – Dimensions, I/O and options

### Dimensions and weights

<table>
<thead>
<tr>
<th>IP20 UL Open</th>
<th>NEMA 1/UL Type 1</th>
<th>IP66/67/UL Type 4x</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frame</strong></td>
<td><strong>H1</strong></td>
<td><strong>H2</strong></td>
</tr>
<tr>
<td><strong>size</strong></td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>R0</td>
<td>169</td>
<td>202</td>
</tr>
<tr>
<td>R1</td>
<td>169</td>
<td>202</td>
</tr>
<tr>
<td>R2</td>
<td>169</td>
<td>202</td>
</tr>
<tr>
<td>R3</td>
<td>169</td>
<td>202</td>
</tr>
<tr>
<td>R4</td>
<td>181</td>
<td>202</td>
</tr>
</tbody>
</table>

H = Height
H1 = Height without fastenings and clamping plate
H2 = Height with fastenings but without clamping plate
H3 = Height with fastenings and clamping plate
H4 = Height with fastenings and NEMA 1 connection box
H5 = Height with fastenings, NEMA 1 connection box and hood
W = Width
D1 = Standard depth
D2 = Depth with MREL or MT AC option

### STO connections

The ACS355 has a dual channel STO (safe torque-off) input as standard, certified to BS EN 62061 and BS EN 13849-1

![STO connections diagram](image)

### Options available

- Input and output chokes
- Brake chopper resistors (all drives in the ACS355 range have integral chopper)
- 1st. environment EMC filters - footprint style
- Low leakage EMC filters < 30 mA leakage
- FlashDrop, programming in the box without power
- Fieldbus modules
- NEMA kit allows installations to be neater and provides mechanical support for glanded cables
- An extensive range of user interfaces is available - please see following pages
- IP66 pressure relief valves

### Typical control connections

![Typical control connections diagram](image)
Assistant control panel (+J400)
Features a multilingual alphanumeric display for easy drive programming.
The control panel has various assistants and a built-in help function to guide
the user. It includes a real-time clock, which is used during fault logging and in
controlling the drive, such as start/stop. The control panel can be used for
copying parameters for backup or for downloading to another drive. A large
graphical display and soft keys make it extremely easy to navigate.

Basic control panel (+J404)
Features a single line numeric display.
The panel can be used to control the
drive, set the parameter values or copy
them from one drive to another, or view
changes.

Panel cover
The panel cover protects the drive
when no control panel is used. The ABB
machinery drive is delivered with a panel
cover as standard. In addition, there are
two alternative control panels available
as options, see above.

NEMA 1 kit
The NEMA 1 kit is a convenient cover
which is added to the drive and
enables easy wall-mounting. It includes
a connection box for cable gland or
conduit tube installation and a hood for
protection against dirt and dust.

Panel mounting kits, IP54 and IP66
The panel mounting kits enable
mounting of control panels onto cabinet
doors. These kits include
a 3 m extension cable, a gasket,
mounting screws and a mounting
template - two versions are now
available, IP54 and IP66. The IP66 has
an additional keypad membrane cover.
Note: IP66 cover is not suitable for outdoor use.

Relay extension module (+L511)
Add an additional three relays to the
ACS355 to allow greater use of the drives
programme. Fits behind the keypad.

Potentiometer (+J402)
Potentiometer with two switches: start/stop and forward/reverse direction. No
external power source is needed for the potentiometer. Fits to the drive I/O.

FlashDrop
Programme the drive whilst still in the
box, with no power. Perfect for OEMs
and machine builders. FlashDrop is a
powerful palm-sized tool for fast and
easy parameter selecting and setting.
It gives the possibility to hide selected
parameters to protect the machine. The
tool stores 20 parameter sets, which
can be moved between a PC and a
drive. Safe programming during machine
building production for unskilled staff.

Fieldbus interfaces
Extensive range of plug-in fieldbus
interfaces, allowing connection to
Profibus, DeviceNet, CanOpen, Modbus
RTU and Ethernet and many others.

24V “live keypad” options
There are two ways of powering the
fieldbus modules, so that they operate
when the main power is removed.
FEPA - maintains power to the fieldbus
module only.
MPOW (+G406) - powers the fieldbus
module, the control card, the drive I/O
and the drive keypad, generating the
functionality commonly known as ‘live
keypad’ operation.

DriveWindow Light PC tool
The tool is a parameterisation and
commissioning tool used to set-up and
commission the drive. Monitoring and
diagnostic facilities are included, as well as
a local control panel. Wizards are included
to guide the user through the most
commonly performed tasks.
Low voltage AC drives

**ABB general purpose drive for fans and pumps**

0.37 kW to 22 kW, ACS310

Motor control method – scalar

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Supply</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>200/240 V, 1-phase</td>
<td>0.37 kW - 2.2 kW</td>
<td></td>
</tr>
<tr>
<td>200/240 V, 3-phase</td>
<td>0.37 kW - 11 kW</td>
<td></td>
</tr>
<tr>
<td>380/480 V, 3-phase</td>
<td>0.37 kW - 22 kW</td>
<td></td>
</tr>
</tbody>
</table>

What is an ABB general purpose drive for fans and pumps?

A dedicated fan and pump controller, designed for squared-torque applications such as booster, submersible and irrigation pumps and centrifugal fans.

The drive design includes a powerful set of features which benefit pump and fan applications including built-in PID controllers and PFC (pump and fan control). The drives also have pre-programmed protection functions such as pipe cleaning (anti-jam) and duty standby functionality, including soft pipe filling to reduce leaks.

These features, combined with pre-programmed application macros, an intuitive user interface, and several assistant screens, speed up the installation, parameter setting and commissioning of the drive.

### Highlights

- **Pump, soft pump and fan control (PFC and SPFC)**, for multi-pump and soft fill control
- **Pipe cleaning (anti-jam) and pipe fill functions**
- **Multiple PID set points**, allowing for automatic duty/assist/standby schemes to be implemented
- **Energy efficiency counters, real-time clock**
- **Energy optimiser** – optimises the motor control for the application to run with minimum energy requirements
- **Load analyser** for optimised dimensioning of the drive, motor and process
- **Embedded Modbus RS-485 fieldbus interface**
- **FlashDrop tool** for fast parameter setting, without mains power

### Where can it be used?

The ABB general purpose drive’s software features are ideal for solving the challenges and issues surrounding pumping in general, and those of water and wastewater in particular.

The drive is designed to compliment the features offered by the industry specific products for water and wastewater (see page 47).

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump and fan control (PFC) feature to control pumps and fans in parallel</td>
<td>One drive controls several pumps or fans and eliminates the need for an external programmable logic controller</td>
<td>Saves cost of additional drives and external PLC. Longer life for pump or fan system while reducing maintenance time and costs. Maintenance can be carried out safely without stopping the process</td>
</tr>
<tr>
<td>Soft pump and fan control feature (SPFC)</td>
<td>Reduces unwanted pressure peaks in pumps and pipelines when an auxiliary motor is started or main pump started</td>
<td>Reduces maintenance costs and leaks typically seen in DOL starting. Longer life for pump or fan system. Ideal for irrigation systems</td>
</tr>
<tr>
<td>Pump protection functions</td>
<td>Pre-programmed features like: Pipe cleaning (anti-jamming), inlet/outlet pressure supervision and detection of under or overload for preventive maintenance</td>
<td>Reduces maintenance costs. Smoother processes: improved and optimised system. Longer life for pump and fan system, reduced maintenance costs</td>
</tr>
<tr>
<td>Energy monitoring and optimising features</td>
<td>Drive monitors the saved energy compared to equivalent DOL operation</td>
<td>Energy savings presented in local currency and CO₂ consumed energy optimised across the speed and load range</td>
</tr>
<tr>
<td>Full output current at 50°C ambient</td>
<td>Drive can be operated in ambient temperatures up to 50°C without de-rating the output current</td>
<td>Optimised drive dimensioning for wide temperature range</td>
</tr>
<tr>
<td>Unified height and depth</td>
<td>Optimum installation layout, as all drive frames are the same height – only the width changes</td>
<td>Space savings. Easier to lay the cabinet back panel out</td>
</tr>
<tr>
<td>Best-in-class user interfaces</td>
<td>Assistant and Basic keypads with intuitive operation. Short and long menus, Assistants and wizards for ease of use</td>
<td>Users are supported as they program the drive, can tailor the open menu views to suite their customer needs</td>
</tr>
<tr>
<td>FlashDrop*</td>
<td>Faster and easier drive set up and commissioning for volume manufacturing</td>
<td>Fast, safe and trouble-free method to set up and commission without powering up the drive - patented</td>
</tr>
<tr>
<td>RoHS compliance</td>
<td>Compliance achieved during 2007</td>
<td>Environmentally friendly drives</td>
</tr>
</tbody>
</table>

* For details of FlashDrop, see user interfaces (page 38)
# Low voltage AC drives

**ABB general purpose drive for fans and pumps**

**ACS310 – Ratings, types, voltages and prices**

## 200/240 V, 1-phase supply voltage

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Nominal output current A</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A Type gG</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type</th>
<th>IP20 list price without control panel* £</th>
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</thead>
<tbody>
<tr>
<td>0.37</td>
<td>2.4</td>
<td>4.0</td>
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</table>

* Ensure enough space around the unit - refer to the User’s Manual for details

* Drives require a control panel for parameter alteration, it can then be removed if required

For 50°C ratings contact ABB

## 200/240 V, 3-phase supply voltage

3-phase, 240 V is available for customers supplying the North American market. Please enquire for details.

## 380/480 V, 3-phase supply voltage

<table>
<thead>
<tr>
<th>Nominal kW</th>
<th>Nominal output current A</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A Type gG</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type</th>
<th>IP20 list price without control panel* £</th>
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<tr>
<td>0.37</td>
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</table>

* Ensure enough space around the unit - refer to the User’s Manual for details

* Drives require a control panel for parameter alteration, it can then be removed if required

For 50°C ratings contact ABB

## Control panel

<table>
<thead>
<tr>
<th>Control panel Type</th>
<th>Price £</th>
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<tbody>
<tr>
<td>Assistant control panel ACS-CP-A</td>
<td>£96**</td>
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<tr>
<td>Basic keypad ACS-CP-C</td>
<td>£24</td>
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</tbody>
</table>

** Price of control panel only when purchased with drive

Panel mounting kit and user interface descriptions, see page 38
Low voltage AC drives
ABB general purpose drive for fans and pumps

ACS310 – Dimensions, I/O and options

Dimensions and weights

<table>
<thead>
<tr>
<th>Frame size</th>
<th>H1 mm</th>
<th>H2 mm</th>
<th>H3 mm</th>
<th>W mm</th>
<th>D mm</th>
<th>Weight Kg</th>
<th>H4 mm</th>
<th>H5 mm</th>
<th>W mm</th>
<th>D mm</th>
<th>Weight Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0</td>
<td>169</td>
<td>202</td>
<td>239</td>
<td>70</td>
<td>161</td>
<td>1.1</td>
<td>257</td>
<td>280</td>
<td>70</td>
<td>169</td>
<td>1.5</td>
</tr>
<tr>
<td>R1</td>
<td>169</td>
<td>202</td>
<td>239</td>
<td>70</td>
<td>161</td>
<td>1.3</td>
<td>257</td>
<td>280</td>
<td>70</td>
<td>169</td>
<td>1.7</td>
</tr>
<tr>
<td>R2</td>
<td>169</td>
<td>202</td>
<td>239</td>
<td>105</td>
<td>165</td>
<td>1.5</td>
<td>257</td>
<td>282</td>
<td>105</td>
<td>169</td>
<td>1.9</td>
</tr>
<tr>
<td>R3</td>
<td>169</td>
<td>202</td>
<td>236</td>
<td>169</td>
<td>169</td>
<td>2.9</td>
<td>260</td>
<td>299</td>
<td>169</td>
<td>177</td>
<td>3.5</td>
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<tr>
<td>R4</td>
<td>181</td>
<td>202</td>
<td>244</td>
<td>260</td>
<td>169</td>
<td>4.4</td>
<td>270</td>
<td>320</td>
<td>260</td>
<td>177</td>
<td>5.0</td>
</tr>
</tbody>
</table>

H1 = Height without fastenings and clamping plate
H2 = Height with fastenings but without clamping plate
H3 = Height with fastenings and clamping plate
H4 = Height with fastenings and NEMA 1 connection box
H5 = Height with fastenings, NEMA 1 connection box and hood
W = Width
D = Depth

Options available

- Input and output chokes
- ACS310 has no braking options
- 1st environment EMC filters - footprint style
- Low leakage EMC filters < 30mA leakage
- FlashDrop
- NEMA kit allows installations to be neater and provides mechanical support for glanded cables
- An extensive range of user interfaces is available - please see following pages

Typical control connections

- All I/O are programmable for other configurations

Diagrams of control connections...
Low voltage AC drives
ABB general purpose drive for fans and pumps

ACS310 – User interfaces

**Assistant control panel (+J400)**
Features a multilingual alphanumeric display for easy drive programming. The control panel has various assistants and a built-in help function to guide the user. It includes a real-time clock, which is used during fault logging and in controlling the drive, such as start/stop. The control panel can be used for copying parameters for backup or for downloading to another drive. A large graphical display and softkeys make it extremely easy to navigate.

**Basic control panel (+J404)**
Features a single line numeric display. The panel can be used to control the drive, set the parameter values or copy them from one drive to another.

**Panel cover**
The panel cover protects the drive’s connection when no control panel is used. The ABB general purpose drive is delivered with a panel cover as standard, thereby providing a cost effective package. In addition, there are two alternative control panels available as options, see above.

**NEMA 1 kit**
The NEMA 1 kit is a convenient cover which is added to the drive and enables easy wall-mounting. It includes a connection box for cable gland or conduit tube installation and a hood for protection against dirt and dust.

**Panel mounting kit, IP54 and IP66**
The panel mounting kit enables mounting of control panels on cabinet doors. These kits include a 3 m extension cable, a gasket, mounting screws and a mounting template - two versions are now available, IP54 and IP66. The IP66 has an additional keypad membrane cover.

*Note: IP66 cover is not suitable for outdoor use.*

**Relay extension module (+L511)**
Add an additional three relays to the ACS310 to allow greater use of the PFC program. Fits behind the keypad.

**FlashDrop**
Programme the drive whilst still in the box, with no power. Perfect for OEMs and machine builders. FlashDrop is a powerful palm sized tool for fast and easy parameter selecting and setting. It gives the possibility to hide selected parameters to protect the machine. The tool stores 20 parameter sets, which can be moved between a PC and a drive. Safe programming during machine building production for unskilled staff.

**Fieldbus communications**
ACS310 has no industrial fieldbus interfaces, but it does have an RS485 Modbus communications link built-in. This link can be used to communicate to industrial HMIs or remote monitoring devices or to a fieldbus via a suitable gateway.

**DriveWindow Light PC tool**
This tool is a parameterisation and commissioning tool used to set-up and commission the drive. Monitoring and diagnostic facilities are included, as well as a local control panel. Wizards are included to guide the user through the most commonly performed tasks.
Low voltage AC drives
ABB general purpose drive

0.55 kW to 250 kW, ACS580
Motor control method – scalar or vector control (open or closed loop)

380 - 480 V, 3-phase supply, 0.55kW to 250kW

What is an ABB general purpose drive?
The ACS580 is part of the ABB all-compatible family, which means it uses the same keypad and same PC tool as the other drives in the family. The drive contains the new harmonised parameter set, so familiarity with the ABB industrial drive is closer than it ever has been.

Highlights
– Improved internal options including 24V support
– Integral EMC filter for 1st and 2nd environment as standard
– Assistant control panel with improved primary settings menu and backups
– Wide power range in wall-mounted IP21 and IP55 variants
– Patented permanent magnet swinging choke for superior harmonic reduction, even at reduced motor load
– STO as standard SIL 3 Pl e
– Flexible fieldbus system with built-in Modbus and numerous internally mountable fieldbus adapters
– SynRM, permanent magnet (PM) and induction motor control with improved motor platform
– New energy monitoring features

Where can it be used?
The ABB general purpose drive is ideal in those situations where there is a need for simplicity to install, commission and use and where reasonable amounts of flexibility and functionality are required. The addition of STO, 24V support and improved fieldbus support, extends the applications.

Feature | Advantage | Benefit
--- | --- | ---
Intuitive modern keypad | High contrast, high definition display giving intuitive access to the drive parameters, Built-in "Help" button, giving programming hints. Real-time clock, allows timed tracing of faults and setting of parameters to activate functions at various times of day. Changed parameters menu also included, so you can see your edits | Easy commissioning, programming, maintenance and fault finding, making the drive easy to own and use across all activities
Primary setting menu | Assisted set-up for all of the drives common settings. Intuitive and context sensitive makes navigation easier for the user | Even easier to configure the drive to the application
Start-up assistant | Guided start up for getting the drive going | Step-by-step instructions make the set up easy
Text editing capabilities | Rename drive variables or warning messages | Tailor the drive to "speak" in the language of the application
Clone drives | Copy parameters from drives of differing rating or software versions | Easy to copy parameters to other drives, reducing commissioning times
Improved backups | Keyboard can store backups with a time stamp, or automatic backups can be taken. Backups can be viewed before download, or partial downloads can be performed | Easy to manage installed base and speeds up commissioning. Auto backup means you never forget
Integrated safety, STO as standard SIL3 Pl e | TÜV approved STO is on board the drive. Makes it easy to generate safety systems without the need for external contactors | Minimise installation time and space. Shorter design times using TÜV approved interface
Modern PC tools | Entry level (FOC) and Pro level PC tools are available for commissioning, tuning, parameter management and monitoring | Keep copies of the parameters for back-up. Use the PC tools to optimise the application
Fieldbus gateways | Built-in Modbus using RS 485, or built-in Ethernet Optional plug-in fieldbus modules also available | Reduced cost, full access to industrial networks
Energy monitoring and optimising features | Drive controls the motor voltage dependant on the load. Drive monitors the saved energy compared to equivalent DOL operation | Consumed energy optimised across the speed and load range. Energy savings presented in local currency and tonnes of CO₂
24V operation | Power the drive control card, I/O and fieldbus from an external 24V | Safer diagnostics and maintenance activities can be undertaken without the need for mains voltages
Cold configuration - Programming without mains power whilst in the box | Quick parameter programming for OEM users. Drive can be programmed with a PC interface that injects the parameters directly into the drive whilst it is still in the box | Quicker, cheaper manufacturing for OEMs. Easier spares handling in store without the need to power on the drive

For more details, please refer to Technical Catalogue 3AUA0000145061
The drive is programmed by the most intuitive and user-friendly keypad ABB has produced and incorporates a “primary settings” menu that guides the user through the most common settings. The new PC tool is designed to incorporate all of the latest functionality that new operating systems bring, including a free of charge entry level version and a chargeable Pro version.

The drive retains the same harmonic suppression technology as previously, the swinging choke, which has been updated to permanent magnet technology, making the package lighter. The IP rating has improved to IP55. Improvements are made to terminal sizes and fieldbus offerings, as well as gaining the ability to be powered by an external 24V.

The drive includes built-in machinery safety functionality with safe torque-off (STO) to SIL 3 PL e as standard. There are more frame sizes, extending the power range to 250 kW in a wall-mounted format and the IP55 variant is significantly smaller, occupying almost the same space as the IP21 equivalent.

### 380 – 480 V, 3-phase supply voltage (ratings shown are for 415 V)

<table>
<thead>
<tr>
<th>No-overload (nominal) use</th>
<th>Light-duty use</th>
<th>Heavy-duty use</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation</th>
<th>Type (+J400 + H358 to order keypad &amp; SWA gland plate)</th>
<th>Price IP21</th>
<th>Price IP55 (+B056)</th>
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<tbody>
<tr>
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<td>Ie A</td>
<td>Pn A</td>
<td>Ieq A</td>
<td>Pn A</td>
<td>Ieq A</td>
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For 440 to 480V data see the user’s manual, document code: 3AUA0000076333
Low voltage AC drives
ABB general purpose drive
ACS580-01 – Dimensions and options

Options for ACS580-01
ACS580-01 is a wall mounted drive, so all of the options fit inside:
- IP55 variant
- Internal fieldbus options
- Optional additional industrial fieldbus
- Optional relay expansion
- Optional isolated PTC option
- Optional 115/230 V digital inputs
- UK gland box to accommodate SWA cable
- Brake chopper (up to frame R3 fitted as standard)

All ABB general purpose drives use the same common options and user interfaces. These are detailed on page 42. They are also part of the “all compatible family” so keypad interfaces, common PC tools, parameter structures and programing methods are all common.

Cold configuration adapter – CCA-01
ACS580 drives can be programmed without the need for mains power or without taking the drive out of the box using the CCA-01. This specifically allows rapid programming for OEM without the need for safe areas in production.

Typical I/O connections for ACS580
These connections are shown as examples only. Please refer to the User’s Manual – macro section, for more detailed information and for different I/O configurations.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Meaning</th>
<th>Default macro connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCR</td>
<td>Signal cable shield (screen)</td>
</tr>
<tr>
<td>2</td>
<td>AI1</td>
<td>External frequency reference 1: 0 to 10 V</td>
</tr>
<tr>
<td>3</td>
<td>AGND</td>
<td>Analogue input circuit common</td>
</tr>
<tr>
<td>4</td>
<td>+10V</td>
<td>Output reference voltage 10 V DC</td>
</tr>
<tr>
<td>5</td>
<td>AI2</td>
<td>Analogue input (not used)</td>
</tr>
<tr>
<td>6</td>
<td>AGND</td>
<td>Analogue input circuit common</td>
</tr>
<tr>
<td>7</td>
<td>AO1</td>
<td>Output frequency: 0 to 20 mA</td>
</tr>
<tr>
<td>8</td>
<td>AO2</td>
<td>Output current: 0 to 20 mA</td>
</tr>
<tr>
<td>9</td>
<td>AGND</td>
<td>Analogue output circuit common</td>
</tr>
<tr>
<td>10</td>
<td>S3</td>
<td>I/U Voltage/Current selection for analogue output</td>
</tr>
<tr>
<td>11</td>
<td>X2, X3</td>
<td>Aux. voltage output and programmable digital inputs</td>
</tr>
<tr>
<td>12</td>
<td>+24V</td>
<td>Auxiliary voltage output +24 V DC</td>
</tr>
<tr>
<td>13</td>
<td>DGND</td>
<td>Auxiliary voltage output common</td>
</tr>
<tr>
<td>14</td>
<td>DCOM</td>
<td>Digital input common for all DI</td>
</tr>
<tr>
<td>15</td>
<td>DI1</td>
<td>Start/Stop: Activate to start</td>
</tr>
<tr>
<td>16</td>
<td>DI2</td>
<td>Fwd/Rev: Activate to reverse rotation direction</td>
</tr>
<tr>
<td>17</td>
<td>DI3</td>
<td>Constant speed selection</td>
</tr>
<tr>
<td>18</td>
<td>DI4</td>
<td>Constant speed selection</td>
</tr>
<tr>
<td>19</td>
<td>DI5</td>
<td>Ramp pair selection: Activate to select second pair</td>
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<tr>
<td>20</td>
<td>DI6</td>
<td>Not used</td>
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<tr>
<td>21</td>
<td>X5</td>
<td>EIA-485 Modbus RTU</td>
</tr>
<tr>
<td>22</td>
<td>B+</td>
<td>Built-in Modbus RTU fieldbus interface</td>
</tr>
<tr>
<td>23</td>
<td>SGND</td>
<td>Safe torque-off</td>
</tr>
<tr>
<td>24</td>
<td>A-</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>IN1</td>
<td>24 V AC/DC-in. Ext. 24 V AC/DC input to power up the control unit when the main supply is disconnected</td>
</tr>
<tr>
<td>26</td>
<td>IN2</td>
<td>24 V AC/DC-in. Ext. 24 V AC/DC input to power up the control unit when the main supply is disconnected</td>
</tr>
<tr>
<td>27</td>
<td>24 V DC-in. Ext. 24 V DC input to power up the control unit when the main supply is disconnected</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>24 V DC-in. Ext. 24 V DC input to power up the control unit when the main supply is disconnected</td>
<td></td>
</tr>
</tbody>
</table>

*Standard on R5 frames and above and is optional on smaller frames
Low voltage AC drives
ABB general purpose drive

ACS580 – Common user interfaces

New control panel
State-of-the-art high resolution keypad brings a new level of usability to the drives marketplace. The ACS580 uses the keypad platform from the new “all compatible” range of drives from ABB. The main difference, is that the ACS580 includes a “primary settings” menu, a guided set-up procedure similar to that of a smart phone.

I/O extension and external 24 V (+L501)
The CMOD-01 offer additional two relay outputs (changeover) and one digital output, as well as giving a place to connect external 24 V (AC or DC).

Fieldbus (various and codes)
The ACS580 supports an extensive list of fieldbus modules for connectivity to industrial networks. These modules are common with other drives within the ABB drives range.

Embedded fieldbus
The ACS580 can be fitted with one of two embedded low cost fieldbus units, either Modbus RS485 or EtherNet. These modules fit into a dedicated slot on the drive.

Panel/keypad bus adapter - CDPI-01(+K450)
The ACS580 can be connected onto a panel bus, where 32 drives can be daisy chained using a simple CAT cable. The chain would have one keypad mounted on the cabinet door, communicating to the other drives via the CDPI module, which fits where the keypad normally connects on the drive.

Interface

Keypad connection
Cold configuration port
Analogue I/O
24 V supply
Digital inputs
Safe torque-off
Fieldbus slot
Embedded fieldbus
Relay outputs
CMOD slot
Power and motor connections

Isolated PTC input and external
24 V (+L523)
The CMOD-02 offers an isolated PTC interface, as well as giving a place to connect external 24 V (AC or DC).

High Voltage I/O extension (+L512)
The CHDI-01 offers an additional six high voltage (115/230 V) digital inputs and two relay outputs (changeover); allows high voltage connection without interposing relays.

Drive Composer PC tool
Drive Composer is the new PC tool for the ACS580 family. The PC tool comes in two variants – the “Entry” level is a free of charge point-to-point tool and allows simple parameter editing and storage, as well as monitoring and commissioning support, while the “Pro” level has all of this as well as animated control diagrams and extended commissioning, monitoring and diagnostic support, as well as the ability to program the safety functions. The Pro tool allows the user to connect to multiple drives either over “panel bus” where the keypad port is used, or over Ethernet.

Door mounting kit, ACS/H/Q-AP-EXT
The keypad can be mounted onto a panel door using a two part kit. The kit includes a CDPI which is mounted onto the drive, then the DPMP-02 (pictured) is mounted onto the door and a CAT5 cable is used to connect between the two.
Low voltage AC drives
ABB drive for HVAC
0.75 kW to 355 kW, ACH550
Motor control method - scalar, vector speed and torque (open and closed loop)

<table>
<thead>
<tr>
<th>208/240 V, 3-phase supply, 0.75 kW - 75 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>380/480 V, 3-phase supply, 0.75 kW - 355 kW</td>
</tr>
</tbody>
</table>

What is an ABB HVAC drive?
ACH550 is a dedicated low voltage AC drive for heating, ventilation & air-conditioning (HVAC) applications. The drives are designed to meet the HVAC market requirements including harmonics and EMC standards and for easy integration with building management systems straight out of the box. They feature built-in control programmes specifically designed for HVAC applications like cooling tower fans, supply and return fans and booster pumps and condensers. With built-in PID control, native BACnet communication, timers, real-time clock and a calendar, ABB HVAC drives provide flexible solutions for a wide range of HVAC needs.

Where can it be used?
ABB HVAC drives make maintaining a buildings comfort zone easy, quick and energy efficient. The drives control the speed of pump, fan and compressor motors used in air handling units, cooling towers, chillers and other HVAC applications. They help reduce the HVAC system’s energy consumption by up to 70 percent, and quite often have payback times of less than a year. These highly reliable drives with built-in BACnet easily integrate into building management systems.

Highlights
– Built-in BACnet
– New energy monitoring features record energy, CO₂ and money saved (compared to equivalent DOL)
– Wide power range in wall-mounted IP21 and IP54 variants
– Intelligent HVAC control panel
– Programmed with several HVAC applications, including supply and return fans, cooling tower fans, booster pumps and condensers

Feature | Advantage | Benefit
--- | --- | ---
Swinging choke | Patented by ABB | Reduces the drives’ harmonic signature
| Reduces part load harmonics by up to 25 percent, in comparison with traditional chokes. Variable air volume (VAV) systems run on partial loads at least 95 percent of the time
EMC (manufacturer’s statement available) | Integrated category C2 |
| *(1st environment)* filters to BS EN 61800-3 | EMC filters suitable for 400 V network connection built-into the drive as standard will save panel space, avoid additional wiring, earthing and assembly costs
Additional serial communications | HVAC protocols built-in as standard. | Can connect to any building management system (BMS), native BACnet as standard
| BACnet, Modbus RTU, FLN Apogee, N2 MetaSys, RS 485 | Fieldbus adapter allows connection of: LONWorks, Probus-DP, CANopen, DeviceNet, Modbus/TCP, ControlNet, Ethernet
Real-time clock | Easily set up at time of installation and protected by its own battery back-up. | Can be used together with timer functions of the drive to trigger various events (via relays or outputs) within the application software such as time / speed profile, allowing the drive to be a stand alone unit without the need for BMS input
| The time allows the drive to timestamp and operate functions at set times | Instant fault tracking and date stamping, gives status of drive to enable rapid drive diagnostics
System diagnostics | Diagnostic assistant, on-board fault history with real-time of when fault occurred, covering voltage, current, DC link level etc | Can assist with electricity billing in accordance with Part L Building Regulations. Allows verification of energy savings before making investments in capital equipment
Energy efficiency counters | Works out energy savings of the application in kWh and MWh; the cost of the energy saved in a local currency; and the carbon dioxide (CO₂) emissions equivalent of the energy saved | * For details of FlashDrop, see user interfaces [page 46]*
## Low voltage AC drives

**ABB drive for HVAC**

**ACH550** – Variants, ratings, types, voltages and prices

### Wall-mounted - 0.75 kW - 160 kW, 380/480 V,
- Wall-mounted, frame sizes R1-R6
- Two variants, IP21 and IP54
- 55 percent size reduction at 160 kW
- Built-in EMC filter (1st & 2nd environment)
- Standard software, easy to configure
- Built-in BACnet and Modbus interfaces
- Cable connection box
- Brake chopper in frame sizes R1-R2
- HVAC assistant control panel
- Built-in patented swinging choke
- Sensorless vector control, scalar control
- FlashDrop compatible
- RoHS compliant

### Free-standing - 160 kW - 355 kW, 380/480 V
- Free-standing, frame size R8
- IP21 as standard, very compact design
- Built-in EMC filter
- Standard software, easy to configure
- Built-in BACnet and Modbus interface
- Pedestal unit on wheels, easy handling
- HVAC assistant control panel
- Sensorless vector control, scalar control
- Free-standing units are not FlashDrop compatible
- Not RoHS compliant

For dimensions and prices, please contact ABB

### Types, ratings and dimensions

#### 380-480 V, 3-phase supply voltage

<table>
<thead>
<tr>
<th>Pn (kW)</th>
<th>Im (A)</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation</th>
<th>Cooling requirements</th>
<th>Type (code shown is IP21, for IP54 add +B055)</th>
<th>IP20 list price without control panel*</th>
<th>IP20 list price with control panel**</th>
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<td>16</td>
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<td>R2</td>
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<td>337</td>
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<td>457</td>
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<td>R6</td>
<td>250</td>
<td>3050</td>
<td>405</td>
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<td>132</td>
<td>245</td>
<td>R6**</td>
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<td>3260</td>
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<td>R6**</td>
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<td>405</td>
<td>ACH550-01-290A4-4</td>
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</table>

Includes EMC filter

* Control panel is required for programming and set-up - see below

† Heavy duty ratings available, when higher overload requirements are needed - contact ABB

** R6a is not an official frame size, it just designates slightly different dimensions

### Control panel

<table>
<thead>
<tr>
<th>Control panel</th>
<th>Type</th>
<th>Price £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant control panel</td>
<td>ACH-CP-B</td>
<td>EPOA</td>
</tr>
</tbody>
</table>

---

For prices on industry specific products please contact ABB's HVAC team

For prices on industry specific products please contact ABB's HVAC team

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### 208/240 V, 3-phase supply voltage

3-phase 240 V is also available for customers supplying the North American market. Please enquire for details.
Low voltage AC drives
ABB drive for HVAC

ACH550 – Dimensions, I/O and options

Dimensions and weights

<table>
<thead>
<tr>
<th>Frame size</th>
<th>IP20 UL Open size</th>
<th>IP54 / UL type 12</th>
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<tbody>
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<td>R1</td>
<td>R2</td>
</tr>
<tr>
<td></td>
<td>H1 (mm)</td>
<td>H2 (mm)</td>
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<td>R3</td>
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<td>986</td>
<td>700</td>
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</tbody>
</table>

** R6a not an official frame size, shown here to highlight the slightly different dimensions of the largest rating

Brake units and choppers technical data

<table>
<thead>
<tr>
<th>Frequency converter input voltage (AC)</th>
<th>Resistor ohm</th>
<th>Continuous output W</th>
<th>Max. output 20 s W</th>
<th>Brake unit type code</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 - 240 V AC</td>
<td>32</td>
<td>2000</td>
<td>4500</td>
<td>ACS-BRK-D</td>
</tr>
<tr>
<td>380 - 480 V AC</td>
<td>32</td>
<td>2000</td>
<td>12000</td>
<td>ACS-BRK-D</td>
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<tr>
<td>200 - 240 V AC</td>
<td>10.5</td>
<td>7000</td>
<td>14000</td>
<td>ACS-BRK-D</td>
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<tr>
<td>380 - 480 V AC</td>
<td>10.5</td>
<td>7000</td>
<td>42000</td>
<td>ACS-BRK-D</td>
</tr>
</tbody>
</table>

Other available options

- IP54 protection class (frames R1-R6a)
- Encoder feedback option available
- For other options, please see the user interfaces on page 46

Typical control connections

These connections are shown as examples only. Please refer to the User’s Manual – macro section, for more detailed information and for different I/O configurations.

Typical I/O connections

1. SCR: Signal cable shield (screen)
2. AI1: External reference
3. AI2: Analog input circuit common
4. AGND: Reference voltage +10 V DC
5. AGND: Actual signal: 0(2)...10 V or 0(4)...20 mA
6. AO1: Analog input circuit common
7. AO1: Output frequency: 0(4)...20 mA
8. AO2: Analog output circuit common
9. AGND: Auxiliary voltage output +24 V DC
10. AGND: Common for DI return signals
11. DCOM: Digital input common for all
12. DI8: Start/Stop: Activation starts the drive
13. DI2: Not used
14. DI1: Constant speed 1 (par. 1202) 1
15. DI3: Start enable 1: Deactivation stops the drive 2
16. DI4: Not used
17. DI5: Not used
18. DI6: Not used
19. DI7: Not used
20. RO1A: Relay output 1 (par. 1401)
21. RO1B: Default operation
22. RO2C: Ready => 19 connected to 21
23. RO2A: Relay output 2 (par. 1402)
24. RO2B: Default operation
25. RO3C: Running => 22 connected to 24
26. RO3A: Relay output 3 (par. 1403)
27. RO3B: Default operation
28. RO4A: Fault (-1) => 25 connected to 27

Drives and controls, motors and mechanical power transmission catalogue 45
Low voltage AC drives
ABB drive for HVAC
ACH550 – User interfaces

Assistant control panel
For easy drive programming, a detachable, multilingual alphanumeric Assistant control panel is offered as standard. The control panel has various assistants and a built-in help function to guide the user. It includes a real-time clock, which can be used during fault logging and in controlling the drive, such as start/stop at certain times of the day. The control panel can be used for copying parameters for back-up or for downloading to another drive. A large graphical display and soft keys make it extremely easy to navigate.

Keypad display can display any of the drive parameters. The display can be three lines (as shown here) or two lines (parameter name with value) or bar graph display.

<table>
<thead>
<tr>
<th>ACS550</th>
<th>ACH550</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>Hand</td>
<td>Initiates operation of motor control</td>
</tr>
<tr>
<td>Stop</td>
<td>Off</td>
<td>Ceases operation of motor control</td>
</tr>
<tr>
<td>Up</td>
<td></td>
<td>Changes parameters and their value/increases reference</td>
</tr>
<tr>
<td>Down</td>
<td></td>
<td>Changes parameters and their value/decreases reference</td>
</tr>
<tr>
<td>Loc/Rem</td>
<td>Auto</td>
<td>Changes drive state from local/hand-control (control panel) to remote/auto-control (I/O or other external source)</td>
</tr>
<tr>
<td>HELP</td>
<td></td>
<td>Built-in “Help” button</td>
</tr>
<tr>
<td>Softkey 1</td>
<td></td>
<td>Function changes according to state of panel</td>
</tr>
<tr>
<td>Softkey 2</td>
<td></td>
<td>Function changes according to state of panel</td>
</tr>
</tbody>
</table>

Relay output extension option module (3 relays)
Encoder feedback option module (fits behind relay extension)
Relay outputs
Built-in Modbus using RS 485
Built-in BACnet on ACH550
Plug-in fieldbus module
DeviceNet LONWORKS®
PROFIBUS DP CANopen
ControlNet Ethernet and others

Relay extension (+L511)
An extra 3 V free change-over relays can be added to the ACx550 by requesting an OREL module.

Panel mounting kit, IP54 and IP66
The panel mounting kit enables mounting of control panels on cabinet doors. These kits include a 3 m extension cable, a gasket, mounting screws and a mounting template - two versions are now available, IP54 and IP66. The IP66 has an additional keypad membrane cover.

FlashDrop
A powerful palm-sized tool for fast and easy parameter setting, ideal for programming many drives. Programming in the box - unpowered. Ideal for OEMs as programming can be left until the moment before commissioning, or at the end of the production line, making it a safe option.

Fieldbus modules and fieldbus
An extensive range of fieldbus modules are available to allow connection to all the major industrial protocols. The drive has an RS485 Modbus interface built-in.

DriveWindow Light PC tool
DriveWindow Light is a parameterisation and commissioning tool used to set-up and commission the drive. Monitoring and diagnostic facilities are included, as well as a local control panel. Wizards are included to guide the user through the most commonly performed tasks.
Low voltage AC drives

ABB drive for water and wastewater

0.37 kW to 500 kW, ACQ810

Motor control method – DTC

200/480 V, 3-phase supply, 0.37 kW - 500 kW

What is an ABB drive for water and wastewater?

This industry-specific drive is designed for all of the applications commonly used in the water and wastewater industry. The modules feature tailor-made pump control functions for single and multi-pump systems. These functions ensure smooth, disturbance-free operation of water and wastewater processes, maximising energy efficiency while reducing unnecessary downtime. The drives’ pump-specific functions decrease the life cycle cost of the pumping system, helping to save time and money. The power range is extended with the introduction of the G1 and G2 frame sizes.

Highlights

- Optimal pump control for various applications
- Intelligent solution for controlling pump performance
- Remote monitoring and diagnostics
- Pump auto change
- Full multipump software functionality
- Flow measurement included in the product, ideal for leak detection
- Anti-jam pump cleaning algorithms
- Easy and cost-effective cabinet assembly

Where can it be used?

The ABB industry-specific drive module can be used for the variable-speed applications contained within the water and wastewater industry, to optimise the system and to save energy. The modules are designed for cabinet assembly and are easily mounted side-by-side. Intelligent start-up assistant ensures that drive commissioning is straightforward. The functions needed for most pumping systems can be easily implemented with the pre-programmed macros. Starting up a pumping system and optimising its performance is extremely easy.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct torque control</td>
<td>Premium motor control platform</td>
<td>Lower losses, improved energy saving</td>
</tr>
<tr>
<td>Soft pipe filling</td>
<td>Provides a pump with a smooth build-up of flow and pressure in pipes</td>
<td>This avoids pressure peaks and reduces the stresses on weak or ageing water mains when demand changes</td>
</tr>
<tr>
<td>Pump cleaning or anti-jam</td>
<td>Used in wastewater pumping stations to prevent pump and pipe clogging and expensive maintenance activities</td>
<td>The function can be set to trigger against different commands e.g on each pump start; on monitoring if the pump is becoming blocked; in response to a digital input or PLC command. If the pump cleaning function runs too often, an alarm is raised. Benefits: reduced downtime, increased efficiency</td>
</tr>
<tr>
<td>Flow calculation</td>
<td>The drive has a flow meter routine that very accurately determines the flow rate within a process</td>
<td>Avoids the need for costly external flow meters and is suitable for applications where the flow data is not needed for invoicing purposes</td>
</tr>
<tr>
<td>Level control</td>
<td>Used to effectively control the filling or emptying of water or wastewater storage tanks</td>
<td>Fast-ramp starting creates a flush effect to keep pipes clear. Users can define the “efficiency speed” based on the pumps best efficiency point</td>
</tr>
<tr>
<td>Multi-pump control</td>
<td>Optimal control of applications where several parallel pumps are operated together and the required flow rate is variable</td>
<td>Maintains stable process conditions optimising the speed and number of the pumps needed without over-riding controller</td>
</tr>
<tr>
<td>Pump priority</td>
<td>Optimal control of applications where the consumption rate varies based on demand</td>
<td>Operate higher capacity pumps during daytime and smaller units at night. This allows pumps to be operated closer to their best efficiency point</td>
</tr>
<tr>
<td>Pump specific protection features</td>
<td>The protection functions indicate if the pre-defined process conditions change</td>
<td>Underload and overload functions are pre-defined across the speed range at five distinct points. Belt breaks or dry sumps can be detected</td>
</tr>
<tr>
<td>Safe torque-off</td>
<td>TÜV certified safely to SIL3</td>
<td>Remove the contactor from MCC builds, saving cost</td>
</tr>
</tbody>
</table>

For further information, see Technical Catalogue 3AU0000055685
Low voltage AC drives
ABB drive for water and wastewater

ACQ810 – Variants, ratings, types, voltages and prices

Available in several frame sizes to optimise the packing density ensuring MCC cabinet line-ups are as compact as possible. Minimised MCC line-ups mean that compliant bids to the water industry are as small as possible whilst still complying with EMC and thermal requirements.

**Frame A and B** – EMC external but plug-in, so no extra cabling required. Drives can be horizontally mounted for smaller compartments.

**Frame C to E** – EMC and harmonics choke built-into the unit, so most compact size with no extra items to fit or cable.

**Frame G1 and G2** – New high power design, mounted on wheels for easy manual handling. Removeable cabling boxes ensure power cables are fitted only once.

### 380 to 480 V, 3–phase supply voltage

<table>
<thead>
<tr>
<th>Light overload &amp; No overload use</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation W</th>
<th>Cooling requirements m³/h</th>
<th>Type</th>
<th>MCC mounting kits</th>
<th>IP20 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>P&lt;sub&gt;k&lt;/sub&gt;</td>
<td>I&lt;sub&gt;N&lt;/sub&gt; A</td>
<td>I&lt;sub&gt;I&lt;/sub&gt; A</td>
<td>Max output A</td>
<td>Type gG</td>
<td></td>
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</tr>
<tr>
<td>1.1</td>
<td>2.7</td>
<td>3</td>
<td>4.4</td>
<td>A</td>
<td>6</td>
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<td>24</td>
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<tr>
<td>UL</td>
<td>3</td>
<td>3.6</td>
<td>5.3</td>
<td>A</td>
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<td>24</td>
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<td>2.2</td>
<td>4.9</td>
<td>6</td>
<td>8.8</td>
<td>A</td>
<td>10</td>
<td>148</td>
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<tr>
<td>3</td>
<td>6.3</td>
<td>8</td>
<td>10.5</td>
<td>A</td>
<td>16</td>
<td>172</td>
<td>24</td>
</tr>
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<td>4</td>
<td>8.3</td>
<td>10.5</td>
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<td>B</td>
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<td>5.5</td>
<td>11</td>
<td>14</td>
<td>16.5</td>
<td>B</td>
<td>20</td>
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<td>48</td>
</tr>
<tr>
<td>7.5</td>
<td>14.4</td>
<td>18</td>
<td>21</td>
<td>B</td>
<td>25</td>
<td>318</td>
<td>48</td>
</tr>
<tr>
<td>15</td>
<td>28</td>
<td>30</td>
<td>36</td>
<td>C</td>
<td>32</td>
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<tr>
<td>18.5</td>
<td>35</td>
<td>44</td>
<td>53</td>
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<td>541</td>
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<td>50</td>
<td>66</td>
<td>C</td>
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<td>67</td>
<td>78</td>
<td>100</td>
<td>D</td>
<td>80</td>
<td>1020</td>
<td>290</td>
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<td>45</td>
<td>80</td>
<td>94</td>
<td>124</td>
<td>D</td>
<td>100</td>
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<td>55</td>
<td>98</td>
<td>103</td>
<td>138</td>
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<td>75</td>
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<td>2310</td>
<td>405</td>
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<td>110</td>
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<td>225</td>
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<td>250</td>
<td>2810</td>
<td>405</td>
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<td>132</td>
<td>240</td>
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<td>326</td>
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<td>3260</td>
<td>405</td>
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<tr>
<td>160</td>
<td>286</td>
<td>290</td>
<td>348</td>
<td>E&lt;sub&gt;0&lt;/sub&gt;</td>
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<td>4200</td>
<td>405</td>
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<td>200</td>
<td>377</td>
<td>367</td>
<td>470</td>
<td>G&lt;sub&gt;1&lt;/sub&gt;</td>
<td>300</td>
<td>4403</td>
<td>1200</td>
</tr>
<tr>
<td>250</td>
<td>440</td>
<td>500</td>
<td>560</td>
<td>G&lt;sub&gt;1&lt;/sub&gt;</td>
<td>300</td>
<td>5602</td>
<td>1200</td>
</tr>
<tr>
<td>315</td>
<td>570</td>
<td>580</td>
<td>680</td>
<td>G&lt;sub&gt;1&lt;/sub&gt;</td>
<td>1000</td>
<td>6409</td>
<td>1200</td>
</tr>
<tr>
<td>355</td>
<td>634</td>
<td>650</td>
<td>730</td>
<td>G&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>8122</td>
<td>1200</td>
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<tr>
<td>400</td>
<td>700</td>
<td>710</td>
<td>850</td>
<td>G&lt;sub&gt;2&lt;/sub&gt;</td>
<td>300</td>
<td>7002</td>
<td>1200</td>
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<td>450</td>
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<td>300</td>
<td>8764</td>
<td>1200</td>
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<tr>
<td>500</td>
<td>857</td>
<td>875</td>
<td>1100</td>
<td>G&lt;sub&gt;2&lt;/sub&gt;</td>
<td>300</td>
<td>9862</td>
<td>1200</td>
</tr>
</tbody>
</table>

- **I<sub>N</sub>** - Nominal output current. 110% overload 1 min / 5 min.
- **I<sub>I</sub>** - Continuous rms output current with no overload capacity
- **UL = UL** - NEMA rated motor - no IEC motor equivalent, however the current rating may be useful
- **†** For fuse selection, refer to the hardware manual, weak networks may require aR fuses
- **∆** gG fuses not recommended for this frame size

---

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Low voltage AC drives

ABB drive for water and wastewater

ACQ810 – Dimensions, I/O and options

Dimensions and weights

<table>
<thead>
<tr>
<th>Frame size</th>
<th>Height 1</th>
<th>Depth 2</th>
<th>Width</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>364</td>
<td>219</td>
<td>94</td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
<td>380</td>
<td>297</td>
<td>101</td>
<td>5.4</td>
</tr>
<tr>
<td>C</td>
<td>567</td>
<td>298</td>
<td>166</td>
<td>15.6</td>
</tr>
<tr>
<td>D</td>
<td>567</td>
<td>298</td>
<td>221</td>
<td>21.3</td>
</tr>
<tr>
<td>E0</td>
<td>602</td>
<td>376</td>
<td>276</td>
<td>34</td>
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<tr>
<td>E</td>
<td>700</td>
<td>465</td>
<td>312</td>
<td>67</td>
</tr>
<tr>
<td>G1</td>
<td>1,462</td>
<td>505 (515)</td>
<td>305 (329)</td>
<td>161 (191)</td>
</tr>
<tr>
<td>G2</td>
<td>1,662</td>
<td>505 (515)</td>
<td>305 (329)</td>
<td>199 (229)</td>
</tr>
</tbody>
</table>

Notes

- All dimensions and weights are without options.
- Height is the maximum measure without clamping plates. In A and B frames the external G3 EMC-filter adds 160mm to the height. (The EMC filter does not have to be plugged in, it can be sited nearby) EMC-filter is internal in frames C, D, E0 and G.
- Total depth with control panel, 10mm less with keypad removed.
- These notes do not apply to the G1 and G2 frames.

Typical I/O connections

- **Relay input RI** (Ready)
- **Relay input RII** (Fault)
- **Digital input DI**
- **Digital output DO**
- **Analogue input AI**
- **Analogue output AO**
- **Relay output RO**

Options available

A number of control panel mounting options are available, to optimise MCC design. The drive is normally delivered with a control panel and holder fitted as standard. Other options include:
- No control panel at all
- Control panel door mounting kit
- No cover at all for the drive unit
- The new G1 and G2 frames can be ordered with cabling boxes (providing shrouding) which allow easier module removal

Other options for the ACQ810 include:
- Analogue I/O extension module
- Analogue and digital extension module
- Relay I/O extension module
- Extensive range of plug-in fieldbus modules
- External du/dt filters if required

Typical STO and drive-to-drive link connections

- STO stands for safe torque-off and is certified by TÜV to SIL3 according to IEC61508.
- No need for contactors

STO can be used to guarantee no mechanical rotation (no torque) at the shaft of the motor and thus allows MCC panels to be built without the need for the traditional isolator, where maintenance of the rotating machinery is a requirement. Electrical isolation will only be required for working on the drive or the electrical connections of the motor, so the traditional door isolator will suffice for that requirement.

ACQ810 main connections overview
Low voltage AC drives
ABB drive for water and wastewater
ACQ810 – User interfaces

Assistant keypad
For easy drive programming, a detachable, multilingual alphanumeric Assistant control panel is offered as standard. The control panel has various assistants and built-in help functions to guide the user. It includes a real-time clock, which can be used during fault logging and in controlling the drive, such as starting and stopping. The control panel can be used for copying parameters for back-up or for downloading to another drive. A large graphical display and softkeys make it extremely easy to navigate.

Keypad display can display any of the drive parameters. The display can be three lines (as shown here) or two lines (parameter name with value) or bar graph display.

Keypad door mounting platform
Designed to hold the keypad so that it can be attached to the MCC door. An IP54 variant is also available for higher IP requirements.

Removable memory unit
The memory unit stores the complete parameter and firmware set for the drive. Should a drive need to be replaced, swapping the memory unit to the new drive will transfer a complete drive set-up – absolutely no recommissioning is required. This reduces down time in the event of a problem.

Expansion for analogue and digital I/O
Additional I/O can be added to the ACQ810. This I/O can be addressed by the fieldbus so that the ACQ810 can be used as an “nest”, or of course the I/O can be used to simply allow more connectivity from the process to the drive, for example, flow or level transducers.

EMC filters – frames A and B
Pluggable EMC filters for frame sizes A and B can be plugged directly into the drive, or can be mounted next to the drive on the end of a plug and socket cable – easy to install and mount.

Fieldbus interfaces
Extensive range of plug-in fieldbus interfaces, allowing connection to Profibus, DeviceNet, CanOpen, Modbus RTU, Profinet and Ethernet.

DriveStudio PC tool
DriveStudio is a parameterisation and commissioning tool used to set-up and commission the water and wastewater drive. Monitoring and diagnostic facilities are included, as well as a local control panel. Wizards are included to guide the user through the most commonly performed tasks.

DriveSPC PC tool
DriveSPC (Solution Program Composer) allows access to the extended programming area of the ACQ810. Application specific IEC 61131 solution programmes can be generated and stored inside the drive. This way the drive can be tailored to the application and fully utilise the extended I/O and removes the need for additional equipment.
Low voltage AC drives
ABB industrial drive

What is the ABB industrial drive?
The ACS880 range contains a new harmonised parameter set, taking its features from all of the best functions within the existing ABB drive’s family. The drive is programmed by the most intuitive and user-friendly keypad ABB has produced to date. A new PC tool is designed to incorporate all of the latest functionality including a free-of-charge entry level version and a professional level version. The drive also contains the very latest 4th generation DTC motor control core, making the drive all-compatible with any motor available on the market today including asynchronous, permanent magnet and synchronous reluctance (SynRM).

Where can it be used?
The ABB industrial drive is ideally suited for the most demanding industrial applications. Constant torque and torque at zero speed are perfect due to the DTC core. Suitable applications include cranes, winders, hoists, extruders and heavy conveyors. Applications with high breakaway torque, like rubber mixers and highly precise applications like paper machines and engine dynamometers are easily handled.

Highlights
– Built-in safety functionality to satisfy the demands of IEC 62061 and ISO 13849-1
– Removable memory unit - zero re-commissioning
– Flexibility to programme more advanced applications
– Common user and process interface with fieldbus
– Common software tools for sizing and commissioning
– Innovative hardware variants
– Energy efficiency counters
– Energy optimiser – optimises the motor control for the application
– Load analyser for optimised dimensioning of the drive, motor and process

0.55 kW to 2800 kW, ACS880
Motor control method – DTC or scalar

<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>Supply Type</th>
<th>Power Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>208 / 240 V, 3-phase</td>
<td>supply, powers dependent on range</td>
<td></td>
</tr>
<tr>
<td>380 / 415 V, 3-phase</td>
<td>supply, powers dependent on range</td>
<td></td>
</tr>
<tr>
<td>380 / 500 V, 3-phase</td>
<td>supply, powers dependent on range</td>
<td></td>
</tr>
<tr>
<td>525 / 690 V, 3-phase</td>
<td>supply, powers dependent on range</td>
<td></td>
</tr>
</tbody>
</table>
## Low voltage AC drives
### ABB industrial drive

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct torque control (DTC)</td>
<td>Full torque at zero speed without encoder</td>
<td>Consistently excellent performance ensures that drive is not the limiting factor in the process</td>
</tr>
<tr>
<td>Intuitive modern keypad</td>
<td>High contrast, high definition display giving intuitive access to the drive parameters</td>
<td>Easy commissioning, programming, maintenance and fault finding</td>
</tr>
<tr>
<td>Start-up assistant</td>
<td>Guides user through all essential settings without going to parameter list</td>
<td>Easy set-up of parameters, your own language, on-line information system always available</td>
</tr>
<tr>
<td>Removable memory unit</td>
<td>Programme, parameter edits, motor calibrations and fault histories stored in the removable memory unit</td>
<td>Zero re-commissioning in case of drive failure, just move the memory unit, very short MTTR</td>
</tr>
<tr>
<td>Safe torque-off (STO)</td>
<td>Standard feature always in the drive. SIL3 PLe, TÜV approved</td>
<td>Convenient safety built-in. ATEX approved for hazardous areas</td>
</tr>
<tr>
<td>iEC61131 programming (CODESYS)</td>
<td>Familiar PLC programming on the drive</td>
<td>Decide to have distributed or central control of your process. Program can copy from PLC to drive using same tool</td>
</tr>
<tr>
<td>Integrated, patented, TÜV approved safety module option</td>
<td>No need to use external programmable safety hardware for drive specific functions. The module carries out drive specific safety functionality more efficiently than external programmable devices, as they are designed to work directly with the drive. Patented safety monitoring functions allow the drive to undertake speed related safety functions with no additional speed feedback devices needed</td>
<td>Minimise installation time and space. Shorter design times using TÜV approved module. Drive specific safety functions save time and money as they are built-in, and do not require additional speed monitoring devices to operate</td>
</tr>
<tr>
<td>Modern PC tools</td>
<td>Entry level (FOC) and Pro level PC tools are available for commissioning, tuning, parameter management and monitoring</td>
<td>Keep copies of the parameters for back-up. Use the PC tools to optimise the application</td>
</tr>
<tr>
<td>Fieldbus gateway</td>
<td>Snap-on module that is easily mounted inside drive</td>
<td>Access to all major automation platforms</td>
</tr>
<tr>
<td>I/O extension modules</td>
<td>Additional I/O can be added to the drive</td>
<td>Easy addition of extra I/O to allow the drive to control the application properly</td>
</tr>
<tr>
<td>Speed feedback modules</td>
<td>A large array or high performance speed feedback devices can be interfaced to the drive via these modules</td>
<td>Higher performances can be achieved or position control can be undertaken</td>
</tr>
<tr>
<td>Energy monitoring and optimising features</td>
<td>Drive controls the motor voltage dependant on the load, Drive monitors the saved energy compared to equivalent DOL operation</td>
<td>Consumed energy optimised across the speed and load range. Energy savings presented in local currency and tonnes of CO₂</td>
</tr>
<tr>
<td>Drive-to-drive link</td>
<td>Built-in industrial control link</td>
<td>Built-in ability to undertake master-follower applications with no extra hardware</td>
</tr>
<tr>
<td>ATEX approved package</td>
<td>ATEX 95 type tested motor/drive packages from one supplier</td>
<td>Easy selection of fully approved ATEX drive and motor packages, easier to satisfy ATEX rules with a more cost effective offering</td>
</tr>
</tbody>
</table>
Low voltage AC drives
ABB industrial drive

ACS880-01 - Variants, ratings, types, voltages and prices

Wall-mounted single drive
- 0.55 kW to 250 kW, (208 - 690 V)
- Largest power wall-mounted drive on market
- Coated boards as standard
- TÜV approved safe torque-off (STO) to SIL 3 PL e standard
- IP21 as standard, IP55 as option
- IP55 variant same footprint as IP21 variant
- Brake chopper standard to R4 frame, option thereafter
- Wide range of built-in options
- EMC filter for C3 category according to EN 61800-3 (2004) standard (category C2 optional)
- Optional UK cable box for SWA cables
- Optional internal fieldbus
- Optional safety module for extended safety functionality
- Optional I/O expansion
- Optional IEC61131 programming (CODESYS), full system capability

For further information, see Technical Catalogue 3AU0000098111

<table>
<thead>
<tr>
<th>No-overload (nominal) use</th>
<th>Light-duty use kW</th>
<th>Heavy-duty use kW</th>
<th>Max output A kW</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation W</th>
<th>Cooling requirements</th>
<th>Type (+E200, +R700 + H358 to order EMC &amp; SWA gland plate)</th>
<th>Price IP21 £</th>
<th>Price IP55 (+B056) £</th>
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</tbody>
</table>

*130% overload, **125% overload
1 For fuse selection, refer to the hardware manual. Weak networks may require aR fuses
2 These fuses are aR fuses, ABB does not recommend gG fuses on these larger drives
Note: Current rating match IE3 motor nameplates
Note: Prices include keypad, EMC filter and SWA gland plates and full manuals
ACS880-01 – Dimensions and options

Options

ACS880-01 is a wall-mounted drive, so all of the options fit inside:

- IP55 variant
- Can be ordered without covers for cabinet installation
- Extensive range of expansion I/O options
- Extensive range of motor feedback devices
- Extensive range of fieldbus options
- IEC61131 (CODESYS) environment
- Built-in safety option module, TÜV approved
- UK gland box to accommodate SWA cable
- Different levels of EMC compliance
- Extended warranty

All ABB industrial drives use the same common options and user interfaces. These are detailed on page 61.

- The IP55 variant is designed to occupy the same physical space as the IP21 unit, thus minimising wall space required to support this module.
- The drive has three slots for I/O and fieldbus expansion and one drive-to-drive serial communication link.

- I/O modules can be chosen from analogue expansion, digital expansion, encoder and resolver feedback options
- Fieldbus modules can be connected to any slot and all of the major industrial fieldbus modules are available. The drive also supports two fieldbus modules at a time, so can control via a traditional industrial fieldbus, but data gather via an Ethernet based protocol
- Remote monitoring modules can be employed to monitor the drive over the web
- The safety module occupies a separate dedicated connection point ensuring safety integrity
- The drive is operated and commissioned either from a keypad or from a PC tool. The PC tool used with ACS880 is Drive Composer
- 32 drives can be connected onto a panelbus. The panelbus can be used to communicate to many drives, either using the keypad or the composer Pro tool
- 156K of IEC61131 environment is available

User interfaces

Please refer to page 61 for details of the ACS880 common user interfaces.
Low voltage AC drives
ABB industrial drive
ACS880-04- Variants, ratings, types, voltages and prices

Single drive modules
- 200 kW to 1400 kW, (380 - 690 V)
- Highest power density from a module on the market, extremely compact power module
- Wheeled module supplied with extendable ramp
- Coated boards as standard
- Speed controlled redundant fan cooling arrangement
- TÜV approved safe torque-off (STO) to SIL 3 PL e standard
- Plastic IP20 shrouds supplied which can be substituted for a pair of IP20 cabling panels which allow the module to be removed from the cabinet without disturbing wiring
- Brake chopper optional
- Wide range of cabinet installation options, including instructions for Rittal cabinet installation
- EMC filter for C3 category according to EN 61800-3 (2004)
- Optional common-mode filter
- Optional fieldbus modules, safety module, I/O expansion
- Optional fan kits and cabinet installation kits

The following table details the R10 and R11 frames (pictured above).
If you require information on the higher power modules (D8T and R8i), please contact ABB.

### 380 to 415 V, 3-phase supply voltage. The power ratings are valid at nominal voltage (400 V)

<table>
<thead>
<tr>
<th>No-overload (nominal) use</th>
<th>Light-duty use</th>
<th>Heavy-duty use</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation</th>
<th>Cooling requirements</th>
<th>Type (+ E210 + E208 + J410 + R700 + H381 to order filters, cable boxes and keypad door mounting)</th>
<th>Price IP21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pn kW</td>
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<td>Pd kW</td>
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† For fuse selection refer to the hardware manual, weak networks may require a different rating
Price shown is complete with keypad door mounting kit, cabling panels, EMC filter, CMF filter and manuals
Note: Currents match IE3 motor ratings

The ACS880-04 can be supplied in two major variant variants.
The standard variant comes complete with IP20 shrouds (plastic) a telescopic ramp, separate control unit and keypad.
The customer power cabling is taken directly to the module and would need to be disconnected to allow module removal.

The second variant comes complete with cable panels which fit inside the cabinet. The customer power cabling is attached to these panels, which allows the module to be removed without disconnecting the customer cabling, in both cases the module is withdrawn down the ramp which is provided.

There is a wide range of other control card and keypad mounting options to allow the unit to integrate into a cabinet.
The manual gives extensive instructions for Rittal cabinet installation, including a list of Rittal parts required.
Low voltage AC drives
ABB industrial drive
ACS880-04 – Dimensions and options

Dimensions and weights for drives modules

<table>
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<th>Basic module dimensions (no shrouds or panels)</th>
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<td>R11</td>
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<table>
<thead>
<tr>
<th>Module dimensions including the cable panels +H381</th>
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<td>R10</td>
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<tr>
<td>R11</td>
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</table>

Options
ACS880-04 is a cabinet mounted drive, so the options are designed to complement cabinet installation:

- Cabling is arranged to come in at the top and motor out at the bottom
- Standard offering comes with plastic IP20 shrouds for input and output, and motor terminals are supplied with “full sized” terminals allowing for parallel motor cables. The standard configuration is also supplied with a separate control unit and keypad
- Option +H370 requests “full sized” terminals on the input power connections, allowing for parallel mains cables
- Option +H381 request full cable panels, which bolt onto the side of the module and onto the side of the cabinet wall (replaces the standard IP20 shrouds and fixed full size cable terminals)
- Option +H356 request DC terminals
- Option +P905 request the control unit to be fitted to the power module
- Option +J414 integrates the control panel onto the front of the power module
- Option +J410 includes a keypad door mounting kit with the module
- EMC filters and common mode filters can be included
- Shrouds, keypads and wheeled pedestal can be removed if required
- Fan kits and cabinet assembly kits are also available

All ACS880 drives use the same common options and user interfaces. These are detailed on page 61.

- The drive has three slots for I/O and fieldbus expansion and one drive-to-drive serial communication link
- I/O modules can be chosen from analogue expansion, digital expansion, encoder and resolver feedback options
- Fieldbus modules can be connected to any slot and all of the major industrial fieldbus modules are available. The drive also supports two fieldbus modules at a time, so can control via a traditional industrial fieldbus, but data gather via an Ethernet based protocol
- Remote monitoring modules can also be employed to monitor the drive over the internet
- The safety module occupies a separate dedicated connection point ensuring safety integrity
- The drive is operated and commissioned either from a keypad or from a PC tool. The PC tool used with ACS880 is Drive Composer
- 32 drives can be connected onto a panelbus. The panelbus can be used to communicate to many drives using the keypad or the Composer Pro PC tool

User interfaces
The ACS880-04 can be supplied with a keypad door mounting arrangement, which requires a single rectangular hole for the cabinet door.
Low voltage AC drives
ABB industrial drive
ACS880-07 – Variants, ratings, types, voltages and prices

Cabinet-built single drive
- 45 kW to 2,800 kW, (380 - 690 V)
- IP21 as standard, IP42 and IP54 as options
- 250 kW based on a single module including rectifier and inverter
- Coated boards as standard
- TÜV approved safe torque-off (STO) to SIL 3 PL e standard
- TÜV approved emergency stopping options
- Extremely compact, internal swinging gate for control options minimises cabinet size, but ensures easy access
- Internal customer wiring is redesigned to give easier access, with pluggable connectors included
- Drive module can be extracted using a set of maintenance rails
- Factory-built cabinet with EMC and thermally type-tested for trouble-free operation
- Extensive range of standard options, that are increased to incorporate the most popular engineered options ordered with the ACS800 range
- Optional UK cable for SWA cables
- Optional motor thermistor and PTC connections
- Internal fieldbus options
- Optional safety module
- Optional I/O modules

380 to 415 V, 3-phase supply voltage. The power ratings are valid at nominal voltage (400 V)

<table>
<thead>
<tr>
<th>No-overload (nominal) use</th>
<th>Light-duty use</th>
<th>Heavy-duty use</th>
<th>Max output A</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation</th>
<th>Cooling requirements</th>
<th>Price</th>
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<td>Phd kW</td>
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<td>ACS880-07-0363A-3</td>
</tr>
<tr>
<td>250 430</td>
<td>250 428</td>
<td>200 363**</td>
<td>545</td>
<td>R9</td>
<td>700</td>
<td>6500</td>
<td>1150</td>
<td>ACS880-07-0430A-3</td>
</tr>
</tbody>
</table>

*130% overload, **125% overload
1 For fuse selection, refer to the hardware manual
ABB recommends the use of arf fuses for their cabinet drives, other fuses could be used if their melting curve matches ABB’s recommendations

For further information, see Technical Catalogue 3AUA0000098111

*130% overload, **125% overload
1 For fuse selection, refer to the hardware manual
ABB recommends the use of arf fuses for their cabinet drives, other fuses could be used if their melting curve matches ABB’s recommendations
Low voltage AC drives
ABB industrial drive

ACS880-07 – Dimensions and options

**Dimensions and weights, for cabinet-built drives**

<table>
<thead>
<tr>
<th>Frame size</th>
<th>Height H1</th>
<th>Height H2</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>R6</td>
<td>2145</td>
<td>2315</td>
<td>430</td>
<td>673</td>
<td>240</td>
</tr>
<tr>
<td>R7</td>
<td>2145</td>
<td>2315</td>
<td>430</td>
<td>673</td>
<td>250</td>
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<tr>
<td>R8</td>
<td>2145</td>
<td>2315</td>
<td>830</td>
<td>698</td>
<td>265</td>
</tr>
<tr>
<td>R9</td>
<td>2145</td>
<td>2315</td>
<td>430</td>
<td>673</td>
<td>240</td>
</tr>
</tbody>
</table>

Larger powers use R8i modules, please contact ABB for information.

Note: these are the dimensions of the basic cabinet, dimensions will change with the addition of some options.

**Options**

ACS880-07 is a cabinet-built drive, so its options fit inside the cabinet. The cabinet drive can be fitted with:

- IP21, IP42, IP54, variants
- Emergency stop variants, TÜV approved
- Motor thermistor relays
- Marine construction
- UL approved components
- Various types of cable markings, cabinet heaters, door furniture and lighting etc.
- Top or bottom cable entry for either motor or power cables
- UK gland plates for SWA cables
- 24 V control inside the cabinet
- Different levels of EMC compliance
- Extended warranty
- Additionally, ABB can accommodate any specialised option or feature by using its in-house application design team

ACS880-07 comes with options that are fitted to the drive module which is inside the cabinet:

- The drive module has three slots for I/O and fieldbus expansion and one drive-to-drive serial communication link.
- I/O modules can be chosen from analogue expansion, digital expansion, encoder and resolver feedback options
- Fieldbus modules can be connected to any slot and all of the major industrial fieldbus modules are available. The drive also supports two fieldbus modules at a time, so can control, via a traditional industrial fieldbus, but data gathers via an Ethernet-based protocol
- Remote monitoring modules can be employed to monitor the drive over the internet
- The safety module occupies a separate dedicated connection point ensuring safety integrity
- The drive is operated and commissioned either from a keypad or from a PC tool. The PC tool used with ACS880 is Drive Composer
- 32 drives can be connected onto a panelbus. The panelbus can be used to communicate to many drives, either using the keypad or the Composer Pro tool

**User interfaces**

Please refer to page 61 for details of the ACS880 common user interfaces
Low voltage AC drives
ABB industrial drive

ACS880 – Multidrive

A multidrive is a custom-made system to suit a larger application or a process line. The system contains multiple inverter stages of differing size, supplied from a common DC bus.

ABB can provide a ready-made cabinet, or it can provide system integrators with a comprehensive range of power modules and mechanical kits to build bespoke cabinets for end clients.

**Multidrive cabinets**
- 1.5 kW to 5600 kW
- IP21 as standard IP42 as option
- High packing density with 16 inverter units (up to frame size R2i) can be installed into one 1000 mm cabinet
- Diode bridge that is highly reliable with high power density
- Fast connectors for motor cables in the bottom part of the cabinet, making installation easy
- Integrated safety including safe torque-off (STO) as standard with several safety functions as options
- Coated boards as standard
- Braking options
- DC fuse disconnection, DC fuses or DC fuse switch including charging circuit for inverters
- Cabinet light and heater options
- Highly efficient thermal handling as heat loss of each inverter unit is guided to the back of the cabinet. All cabinets are their own separate compartment
- Long lifetime capacitors and high efficiency cooling fan with speed or on-off control
- TÜV approved emergency stops
- ACS880 user interfaces described later

**Multidrive modules**
- 1.5 kW to 2200 kW
- A range of IP20 modules and IP00 kits to generate bespoke multidrive systems built-into system integrators own panels
- Modules have no rectifiers, they are inverters only and range in frames from R2i to R8i (i=inverter only)
- Contain internal pre-charge circuits making them easier to integrate
- Selection of rectifiers available to generate DC link for the system. Active IGBT rectifiers and diode modules are available
- New style diode module (DxD) only contains diodes, making it more competitively priced and more reliable
- Cabinet kits ensure easy integration
- Safe torque-off (STO) as standard with several safety functions as options using the new safety module
- Coated boards as standard

For further information, see Technical Catalogue 3AUA0000115037

For further information, see Technical Catalogue 3AUA0000115038
Low voltage AC drives
ABB industrial drive
ACS880 – Common user interfaces

New control panel/keypad
State-of-the-art high resolution keypad brings a new level of usability to the drives marketplace. The keypad is designed by industrial designers to ensure maximum usability and intuitive use. The keypad display is extremely high definition and is visible in any control room. Innovative views, transitions and screen will be very familiar to users of smartphones. The display supports graphics and icons to help the user navigate. The keypad also supports text editing to allow users to re-name fault messages to match plant specific actions. Customer specific start-up images and parameter favourites make the keypad easily tailorable to customers and OEMs alike.

Removable memory unit
The memory unit stores the complete parameter and firmware set for the drive. Should a drive need to be replaced, swapping the memory unit to the new drive will transfer a complete drive set-up – absolutely no recommissioning is required. This reduces down time in the event of a problem.

Fieldbus
The ACS880 supports an extensive list of fieldbus modules for connectivity to industrial networks. These modules are common with other drives within the ABB drives range. Two modules can be operated together.

Expansion for analogue and digital I/O
Additional I/O can be added to the ACS880. This I/O can be addressed by the fieldbus so that the ACS880 can be used as an I/O "nest", or the I/O can be used to simply allow more connectability from the process to the drive, for example, flow or level transducers.

Safety module, FSO-12
SIL3 rated TÜV approved safety module fits within the drive, to offer drive specific safety functions. Safely Limited Speed (SLS), Safe Maximum Speed (SMS), Safe Stop Emergency (SSE), Safe Stop 1 (SS1) / Stop Category 1 and Safe Brake Control (SBC) can be realised with no encoder feedback required (patent pending). Other functions available soon.

Drive Composer PC tool
New PC tool for the ACS880 family come in two variants – the “entry” level is a free of charge point-to-point tool and allows simple parameter editing and storage, as well as monitoring and commissioning support, while the “Pro” level has all of this as well as animated control diagrams and extended commissioning, monitoring and diagnostic support, as well as the ability to program the safety functions. The Pro tool also allows the user to connect to multiple drives either over “panelbus” where the keypad port is used, or over Ethernet.
Typical I/O and control connections
The ABB industrial drive family uses the same control card, keypad and software structure throughout its entire range. All I/Os are fully configurable to be whatever function is required. The diagram shows a typical I/O connection.

The ACS880 uses macros to configure its I/O. The macros pre-define the I/O functionality to comply with popular industrial configurations. It is also possible to configure the I/O manually to any function required.

The ACS880 control card showing the colour coded terminal strips
Low voltage AC drives
ABB industrial drive - other variants

ACS800 – Variants, ratings, types, voltages and prices

Low harmonic, active rectifier drives
These are a dedicated range of low harmonic drives based on active rectifier technology. No regenerative capability ensures no mistakes on generator supplies, thereby still retaining a low 2-4 percent total harmonic distortion (THD) signature.

Series ACS800-31, wall-mounted
- 5.5 kW to 110 kW (230 - 690 V)
- IP21 as standard
- Single package for easy cabinet installation, reducing installation time and cabinet space

Series ACS800-37 and ACS880-37 cabinet-built
- ACS800 power range from 37 kW to 2700 kW (230 to 690 V)
- ACS880 power range from 250 kW to 3200 kW
- IP21 as standard; IP22, IP42, IP54 and IP54 R available as options
- Wheel-out power modules for improved manual handling
- Plug-in power connectors for easy maintenance and redundancy
- Power module redundancy for improved availability
- Factory-built cabinets ensure good installation

The R5 and R6 modules are detailed below. Please contact ABB if you require higher powers. Also, fully regenerative products are available called ACS800-11 and ACS800-17. Please refer to page 65 for more information.

Low harmonic, wall-mounted drives - ACS800-31
380, 400 or 415 V, 3-phase supply voltage. The power ratings are valid at nominal voltage (400 V)

<table>
<thead>
<tr>
<th>No-overload use</th>
<th>Light overload</th>
<th>Heavy-duty use</th>
<th>Max output</th>
<th>Frame</th>
<th>Fuse A</th>
<th>Heat dissipation</th>
<th>Cooling requirements</th>
<th>Type (+E200 to order the EMC filter)</th>
<th>IP21 price with keypad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pcont. max kW</td>
<td>Icont. max A</td>
<td>Pn kW</td>
<td>In A</td>
<td>Phd kW</td>
<td>Ind A</td>
<td>A</td>
<td>W</td>
<td>m³/h</td>
<td>ACS800-31-0016-3</td>
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<td>15</td>
<td>34</td>
<td>15</td>
<td>32</td>
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<td>26</td>
<td>52</td>
<td>R5</td>
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<td>18.5</td>
<td>38</td>
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<td>37</td>
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<td>30</td>
<td>59</td>
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<td>R5</td>
<td>80</td>
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<td>86</td>
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<td>65</td>
<td>137</td>
<td>R5</td>
<td>100</td>
<td>1450</td>
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<td>45</td>
<td>88</td>
<td>168</td>
<td>R6</td>
<td>125</td>
<td>1750</td>
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<td>75</td>
<td>150</td>
<td>75</td>
<td>143</td>
<td>55</td>
<td>117</td>
<td>234</td>
<td>R6</td>
<td>160</td>
<td>2350</td>
</tr>
<tr>
<td>90</td>
<td>165</td>
<td>75</td>
<td>157</td>
<td>75</td>
<td>132</td>
<td>264</td>
<td>R6</td>
<td>200</td>
<td>2800</td>
</tr>
</tbody>
</table>

Other ratings and voltage ranges available, 230 V, 500 V, 690 V. Price on application.
Price includes 2nd environment EMC filter and control panel
Prices for low harmonic cabinet drives ACS800-37 available on application
† For fuse selection, refer to the hardware manual. Weak networks may require aR fuses
Low voltage AC drives
ABB industrial drive - other variants
ACS800 & ACS880 – Dimensions and options

Dimensions and weights, ACS800-31

<table>
<thead>
<tr>
<th>Frame size</th>
<th>H (mm)</th>
<th>W (mm)</th>
<th>D (mm)</th>
<th>Weight (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5</td>
<td>818</td>
<td>250</td>
<td>390</td>
<td>62</td>
</tr>
<tr>
<td>R6</td>
<td>970</td>
<td>300</td>
<td>440</td>
<td>100</td>
</tr>
</tbody>
</table>

Height includes cable box, one enclosure, no external items

Options for ACS800-31, wall-mounted
- UK gland box to accommodate SWA cable
- Different levels of EMC compliance
- SIL2 safe torque-off interface (unit mounts outside the drive)
- Coated boards standard
- Extended warranty
- Marine certification mounts and kits

Options for ACS800-37, cabinet-built
Being cabinet drive, all of the options available for ACS800-31 are also valid, as they fit inside the cabinet. Additionally the cabinet drive can be fitted with:
- IP21, IP22, IP42, IP54, IP54R variants (no IP55)
- Emergency stop variants
- Motor thermistor relays
- ATEX-approved motor protection
- Marine construction
- UL approved components
- Various types of cable markings, cabinet heaters, door furniture and lighting etc.
- Sine filter fitted to output (for older motors)
- Top or bottom cable entry for either motor or power cables
- UK gland plates for SWA cables
- 110 V control inside the cabinet
- Additionally, ABB can accommodate any specialised option or feature, by using its in-house application design team
- SIL2/PL d safe torque-off interface
- Coated boards

ACS880-37 cabinet-built options and user interfaces
The ACS880-37 is part of the all compatible ACS880 range. It follows the same build format and options as the ACS880-07 (see page 58) and has the same ACS880 user interfaces (see page 61)

User interfaces
All ACS800s use the same common options and user interfaces, these are detailed on page 67.
- The drive has two slots for I/O and fieldbus expansion and one slot for an optical interface (an additional mother board can also be added – giving three more slots)
- I/O modules can be chosen from analogue expansion, digital expansion, encoder and resolver feedback options
- Fieldbus modules are always fixed to slot one, and all of the major industrial fieldbus modules are available
- The drive can be ordered with specially designed application specific software variants. There are 11 variants available in all, for example, crane, master follower, winder control, etc. The advantage of selecting these pre-written software variants is that they have been written to cover the market requirements. They are tested and certified by the factory and come complete with a User Manual and cabling instructions.
Low voltage AC drives
ABB industrial drive - other variants
ACS800 – Variants, ratings, types, voltages and prices

Regenerative, active rectifier drives
Series ACS 800-11, wall-mounted
- 5.5 kW to 110 kW (230 - 690 V)
- IP21 as standard
- Active rectifier unit
- Single package for easy cabinet installation, reducing installation time and cabinet space

Series ACS800-17 and ACS880-17, cabinet-built
- ACS800, 45 kW to 2500 kW (230 - 690 V)
- ACS880-17, 250 kW to 3200 kW
- IP21 as standard, IP22, IP42, IP54 and IP54 R available as options
- Wheel-out power modules for improved manual handling
- Plug-in power connectors for easy maintenance and redundancy
- Power module redundancy for improved availability
- Factory-built cabinets ensure good installation and compliance with standards
- ATEX approved PTC interfaces and blanket certification with ABB motors

Regenerative, active rectifier drive modules - low harmonic
Series ACS800-14
- 75 kW to 1700 kW (380 - 690 V)
- IP00 kits
- Assembly kits for Rittal cabinets and generic cabinets
- Separate controllers for galvanic isolation
- Requires a separate +24 V DC supply at 3 A
- Active supply unit can be configured for low harmonic mode (2-4 percent harmonic distortion) or regenerative mode, for better dynamic performance
- Comprehensive installation instructions and CAD drawings

Liquid cooled modules
Series ACS800-x04LC
- Extremely compact size, compared to air-cooled
- 98 percent of drive losses transferred to liquid - removes the need for air-conditioned control rooms
- Tested electrical/mechanical kits available - which make different solutions easy to build
- ACAD, PDF and full 3D ePLAN® modelling support
- Pre-designed mounting frames available to reduce design time
- Liquid / liquid-heat exchanger assemblies can be supplied by ABB
- Module features:
  - Diode supply modules include line side chokes
  - Inverter modules include du/dt filters
  - Easy structure, fewer components
  - Inverter units, IGBT supply units and dynamic braking units are based on one common R8i module
Low voltage AC drives
ABB industrial drive - other variants

ACS800 - Variants, ratings, types, voltages and prices

Liquid-cooled drives
Series ACS800 - 17LC and ACS800 - 37LC
- 37 kW to 2700 kW, (380-690 V)
- IP42 as standard, IP54 as option
- ACS800-17LC, fully regenerative,
  ACS800-37LC, low harmonic
- Provides reliable operation in adverse conditions
- Silent and safe operation without the need for air ventilation or
  air conditioning, fully enclosed cabinets, smaller than previous
  generation
- Extensive range of cabinet options, including water pumping
  and heat exchanger cabinets
- Marine enclosure available
- Parallel modules allow redundant configuration
- Ideal where space is limited, in harsh environments, or at sites
  that require quieter operation, in applications where cooling
  water is freely available
- IEC, UL, CSA, Lloyds, DNV, ABS approvals
- ATEX-approved PTC interfaces and blanket certification with
  ABB motors

For further information see Technical Catalogue 3AFE88375126
Low voltage AC drives
Other variants
ACS800 – Common user interfaces

Control panel
The control panel features a
textual multilingual display.
Dedicated keys allow fast
access to actual signals,
parameters, assistant functions
and drive information. The panel
can be used for parameter
copying and for configuring
adaptive programmes, working
as a PLC inside the drive. Local
motor control and parameter
copying is also possible.

Panel mounting kits
Kits are available that allow
mounting on the cabinet door,
or in a holder inside the cabinet.
The panel can be screwed to
the cabinet door, without the
need for an additional holder.

Fieldbus
The ACS800 supports an
extensive list of fieldbus
modules for connectivity to
industrial networks.

I/O expansion
ACS800 can be fitted with a
large range of analogue and
digital I/O modules to expand its
I/O capability.

DriveWindow - PC Tool
DriveWindow is a high
specification, high speed
commissioning, maintenance
and monitoring tool for the
ACS800 drive range. It operates
over an optical fibre link. (Drive
requires an RCDO module)

DriveAP - PC Tool
DriveAP allows access to the
ACS800 adaptive, block
programming environment.

Typical I/O and control connections
The ABB industrial drive family uses the same control card,
keypad and software structure throughout its entire range.
Analogue and digital I/O channels are used for different
functions such as control, monitoring and measurement
purposes (e.g. motor temperature). In addition, optional I/O
extension modules are available providing additional analogue
or digital I/O connections.

Below are the standard drive control I/O of the ABB industrial
drive with factory macro. For other ACS800 application
macros the functions may be different. Please refer to the
firmware manual for details.

| X20 | 1 | VREF- | Reference voltage -10 VDC, |
| X21 | 2 | AGND | R_{L} > 1 kohm |
| X21 | 3 | A1+ | Speed reference 0(2) ... 10 V, R_{L} > 200 kohm |
| X21 | 4 | A1- | By default, not in use. 0(4) ... 20 mA, R_{L} = 100 ohm |
| X21 | 5 | A2+ | By default, not in use. 0(4) ... 20 mA, R_{L} = 100 ohm |
| X21 | 6 | A2- | Motor speed 0(4)...20 mA = 0...motor nom. speed, R_{L} < 700 ohm |
| X21 | 7 | AO1+ | Output current 0(4)...20 mA = 0...motor nom. current, R_{L} < 700 ohm |
| X21 | 8 | AO1- |
| X23 | 1 | Di1 | Stop/Start |
| X23 | 2 | Di2 | Forward/Reverse |
| X23 | 3 | Di3 | By default, not in use. |
| X23 | 4 | Di4 | Acceleration & deceleration select |
| X23 | 5 | Di5 | Constant speed select |
| X23 | 6 | Di6 | Constant speed select |
| X23 | 7 | +24VD | +24 V DC max. 100 mA |
| X23 | 8 | +24VD |
| X23 | 9 | Digital ground |
| X23 | 10 | Digital ground |
| X23 | 11 | Start interlock (0 = stop) |
| X25 | 1 | Aux power supply output, non-isolated, 24 V DC 250 mA |
| X25 | 2 | Relay output 1: ready |
| X25 | 3 | |
| X26 | 1 | Relay output 2: running |
| X26 | 2 | |
| X27 | 1 | Relay output 3: fault (-1) |
| X27 | 2 | |
| X27 | 3 | |
Other drives, accessories and services

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<td>Life Cycle Assessment service and training</td>
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</table>
Servo drives
Analogue, PTO, PowerLink and EtherCAT® options

**MicroFlex Analogue**
- Compact motion control drive for single and three-phase operation
- ±10 V analogue speed / torque demand or pulse + direction inputs
- Choice of resolver feedback or incremental encoder / SSI
- Pulse train control inputs compatible to pulse train output (PTO) module FM562 for AC500 and AC500-eCo

**MicroFlex e100**
- Compact motion control drive for single and three-phase operation
- Ethernet PowerLink technology for real-time motion control
- MINT programming for multitasking control of communications, logic, motion and HMI interaction in simple motion applications

**Series MicroFlex Analogue**
- 1 or 3-phase operation 105...250 V AC
- 3, 6 and 9 A rms
- IP20 enclosure for cabinet installation (UL open)
- Auto-tuning and anti-resonance digital filters
- Suitable for single drive and multi axis systems
- Controls rotary and linear AC servo motors
- Options
  - Space saving footprint EMC filter
  - Brake units

For further information, see flyer "ABB motion control drives, MicroFlex brushless AC servo drives", code: 3AUA0000123110 EN.

**Series MicroFlex e100**
- 1 or 3-phase operation 105...250 V AC
- 3, 6 and 9 A rms
- IP20 enclosure for cabinet installation (UL open)
- Real-time Ethernet operation with PowerLink
- Suitable for single drive and multi axis systems
- Controls rotary and linear AC servo motors
- Options
  - Space saving footprint EMC filter
  - Brake units

For further information, see flyer "ABB motion control drives, MicroFlex e100 servo drives", code: 3AUA0000116018 EN.
Servo drives
Analogue, PTO, PowerLink and EtherCAT® options

**MicroFlex e150**
- Compact motion control drive with embedded safety for single and three-phase operation
- Ethernet technology including EtherCAT® for real-time motion control
- Advanced MINT programming for multitasking control of communications, logic, motion and HMI interaction in high performance motion applications

**MotiFlex e180**
- EtherCAT®, Modbus/TCP, EtherNet/IP and PowerLink
- DSL combined power and feedback option
- Advanced MINT programming for multitasking control of communications, logic, motion and HMI interaction in high performance motion applications.
- Safety as standard

**Series MicroFlex e150**
- 1 or 3-phase operation 105...250 V AC
- 3, 6 and 9 A rms
- IP20 enclosure for cabinet installation (UL open)
- Embedded real-time Ethernet including EtherCAT®, Modbus® TCP and Ethernet/IP™
- Suitable for single drive and multi axis systems
- Controls rotary and linear AC servo motors
- Safe torque-off feature as standard
- Options
  - MINT Motion programming
  - Space-saving footprint EMC filter
  - Resolver adapter
  - Dual encoder splitter
  - Brake units
For further information, see flyer "ABB motion control products, MicroFlex e150 servo drives*, code: 3AUA0000097609 EN.

**Series MotiFlex e180**
- Three-phase operation 200...480 V AC
- 3.0..55 A rms in four frame sizes
- IP20 enclosure for cabinet installation (UL open)
- Real-time Ethernet with EtherCAT and PowerLink and Modbus TCP and EtherNet/IP
- Suitable for single drive and multi axis systems
- Controls rotary and linear AC servo motors
- Safe torque-off as standard
- Memory unit for firmware, settings and functionality level
- Options
  - Drive functionality levels (single axis MINT motion)
  - Feedback options, resolver, encoder, serial encoders or DSL
  - Filters, brake resistors and chokes
For further information, see flyer "ABB motion control products, MotiFlex e180 servo drives*, code: 3AUA0000168682.
Motion controllers
MINT programmable, analogue, PTO, CANopen and PowerLink

NextMove ESB-2
- Compact panel mount motion controller
- Up to 8 axis of coordinated motion
- Stepper and analogue axis control
- CANopen manager for system expansion
- MINT programming for multitasking control of communications, logic, motion and HMI interaction in simple motion applications

NextMove e100
- Compact panel mount motion controller
- Ethernet PowerLink technology for real-time motion control
- Stepper and analogue axis control
- CANopen manager for system expansion
- MINT programming for multitasking control of communications, logic, motion and HMI interaction in simple motion applications

Series NextMove ESB-2
- Up to 8 axis of coordinated motion
- 4 x PTO (stepper) axis
- 3 or 4 x analogue controlled axis with encoder feedback
- Maximum of 8 axis of control
- Digital and analog I/O including 4 x high speed registration latches
- Options
  - RS232 or RS485 serial option
  - Differential/single-ended stepper interfaces
  - 7 axis or 8 axis variants

Series NextMove e100
- 1 to 16 axis interpolated axis via PowerLink
- Additional CN profiled PowerLink axis
- 4 x PTO (stepper) axis
- 3 x analogue controlled axis with encoder feedback
- Maximum of 30 axis of control
- Digital and analogue I/O including 4 x high speed registration latches
- Options
  - Differential/single-ended stepper interfaces
  - 8, 12 or 16 axis of interpolated motion

Compact motion controller for analog and stepper control
Compact motion controller with real-time Ethernet PowerLink technology
Motion controllers

NextMove

**NextMove e100 (Ethernet PowerLink, Modbus® TCP and Modbus RTU)**
- Compact, high performance motion controller
- Real-time Ethernet PowerLink and Modbus® TCP/IP
- 8, 12 or 16 axis of interpolated motion
- (16 MN + 14 CN) profiled axis = max. 30 PowerLink axis
- 4 stepper axis/3 analogue axis
- CANopen® network manager
- RS232/422 and USB communications
- Advanced multitasking MINT programming
- ActiveX® controls
- Integrated digital/analogue I/O including high speed registration inputs

<table>
<thead>
<tr>
<th>Number of axis</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Differential stepper</td>
</tr>
<tr>
<td>8</td>
<td>NXE100-1608DBW</td>
</tr>
<tr>
<td>12</td>
<td>NXE100-1612DBW</td>
</tr>
<tr>
<td>16</td>
<td>NXE100-1616DBW</td>
</tr>
</tbody>
</table>

(1) For use with DSMS stepper/driver.

**NextMove ESB-2**
- Compact, panel mount motion controller
- Economical and simple to install
- Powerful multitasking MINT programming
- 4 axis of closed loop control
- 4 axis of open loop control (step/direction outputs)
- Max. 8 axis
- USB, serial and CANopen® provide flexible communications to PLC, distributed I/O and other devices
- Integrated digital/analogue I/O including high speed registration inputs
- Firmware variant allows the controller to operate as a CANopen® DS402 master and control up to 64 axis

<table>
<thead>
<tr>
<th>Number of axis</th>
<th>Serial port</th>
<th>Order code</th>
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<tbody>
<tr>
<td></td>
<td>Differential stepper</td>
<td>Single ended stepper</td>
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<tr>
<td>7</td>
<td>RS232 / USB</td>
<td>NSB202-501W</td>
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<tr>
<td>7</td>
<td>RS485 / USB</td>
<td>NSB202-502W</td>
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<td>RS232 / USB</td>
<td>NSB204-501W</td>
</tr>
<tr>
<td>8</td>
<td>RS485 / USB</td>
<td>NSB204-502W</td>
</tr>
</tbody>
</table>

**NextMove PCI-2**
- Compact, high performance PCI-bus motion controller
- 4 stepper axis + 4 analogue axis
- Onboard digital and analogue I/O
- CANopen® for distributed control
- High speed PCI bus interface
- Advanced multitasking MINT or ActiveX® programming
- Firmware variant allows the controller to operate as a CANopen® DS402 master and control up to 64 axis

<table>
<thead>
<tr>
<th>Number of axis</th>
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<td>PNP outputs</td>
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<td>1 (2)</td>
<td>PC0201-501</td>
</tr>
<tr>
<td>2 (2)</td>
<td>PC0201-502</td>
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<tr>
<td>3 (2)</td>
<td>PC0201-503</td>
</tr>
<tr>
<td>4 (2)</td>
<td>PC0201-504</td>
</tr>
<tr>
<td>8 (3)</td>
<td>PC0201-508</td>
</tr>
</tbody>
</table>

(2) User configurable for servo or stepper. (3) 4-axis servo control and 4-axis stepper.

**Plug in option cards for use with MotiFlex e100**
- Plug-in motion controller
- 4 PowerLink axis + 1 analogue axis
- Onboard digital and analogue I/O
- Encoder input for electronic gearing functions
- CANopen® manager for I/O expansion (via host drive)
- Add CP600 HMI via RS485 Modbus® RTU
- Fully utilise drive I/O and interfaces including additional option cards

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Single axis MINT motion option (plug-in)</td>
<td>OPT-MF-100</td>
</tr>
<tr>
<td>Multi axis MINT motion option (plug-in)</td>
<td>OPT-MF-101</td>
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</tbody>
</table>
Other drives, accessories and services

ABB motion control drive and ABB machinery drive module

ABB offers an extensive range of machine control solutions for diverse industrial applications such as labelling, packaging, bottling, pick and place, laser cutting/trimming, stacking, cut-to-length, flying shear, web feeders and high speed rotary wrappers.

ABB’s motion control solutions include human-machine interfaces (HMI), programmable logic controllers (PLC) and safety technology. Solutions extend to multi-axis motion controllers, high performance servo drives, rotary servo motors and linear motors; all of which seamlessly interface to provide a complete machine control solution. Motors are stocked or can be ordered with a wide range of options to suit application needs or DC retrofitting.

**ABB motion control drive**

**Series ACSM1**
- For demanding machinery applications
- One drive for all motor types
- For synchronous and induction motors
- Adaptable design with modular, compact hardware
- Memory unit for easy drive management and re-commissioning
- Wide range of feedback interfaces
- Solution programming to extend drive functions, DriveStudio (IEC 61131 compatible)
- Modular and compact design, includes the functionality needed for the application
- Safe torque-off (SIL3 rated), TÜV approved

**ABB machinery drive modules**

**Series ACS850-04**
- New higher powered module. Integral wheels and shrouding
- Optimal power frame sizes and side-by-side mounting
- Power in at top, motor out at bottom for logical cable management within the cabinet
- DC bus connection - common DC link schemes are possible
- Integrated brake chopper - choppers in each module can be used when on a DC link, to distribute braking
- DTC motor control platform
- DriveStudio and DriveSPC PC tools for customising the parameter driven drive with IEC61131 application coding and software application blocks
- Memory module contains the complete firmware, parameter and programme set-up – no re-commissioning
- Safe torque-off to SIL3/PL e as standard
- Modules which complement the full range of multidrive modules

For more details, please refer to Technical Catalogue 3AFE68675073

For further information see Technical Catalogue 3AUA0000041481

For technical information see Technical Catalogue 3AKA0000068580

For more information see Technical Catalogue 3AUA0000041481
Other drives, accessories and services
Medium voltage AC drives

ABB offers a complete range of medium voltage AC drives for speed and torque control and for the starting of large AC motors. The drives feature an arc-resistant design that protects workforce and goods from electric arcs. Certified functional safety features and an integrated DC grounding switch ensure safety and reliability.

Series ACS1000i
- Single drives 315 kW to 2 MW
- Output voltage 2.3 kV to 4.16 kV
- Air-cooled, 24-pulse drive with integrated input transformer
- Retrofit-ready for existing motors, suitable for most MV applications
- Integrated output sine filter for pure sinusoidal voltage and current output
- Offshore cabinet versions available

Series ACS1000
- Single drives from 315 kW to 5 MW
- Output voltage 2.3 kV to 4.16 kV
- Air-cooled (315 kW to 2 MW) and water-cooled (2 MW to 5 MW) versions
- Retrofit-ready for existing motors, suitable for most MV applications
- Integrated output sine filter for pure sinusoidal voltage and current output
- Offshore cabinet versions available

Series ACS2000
- Single drives, air-cooled from 250 kW to 3.2 MW
- Output voltage 4.16 kV to 6.9 kV
- Active rectifier unit or 24-pulse diode front end for minimal line side harmonics
- Regeneration and power factor correction with active rectifier
- Direct-to-line versions for operation without an input transformer
- Optional integrated input transformer
- Multilevel topology allows the use of standard motors
- Simple drive system integration
- Modular power modules for reduced MTTR
- Sine filter output optional, for retrofit and long cable run applications

Series ACS5000
- Single drives from 2 MW to 36 MW
- Air-cooled (2 MW to 7 MW) and water-cooled (5 MW to 36 MW) versions
- Air-cooled version with integrated input transformer (2 MW to 6 MW)
- Output voltage 6 kV to 13.8 kV
- Multilevel topology allows the use of standard motors
- Multilevel fuseless topology results in a drive with unbeatable efficiency, reliability and footprint
- Optimal network friendliness due to 36-pulse configuration
Other drives, accessories and services
Medium voltage AC drives and low voltage DC drives

Medium voltage drives cont...
Series ACS6000
– Single or multidrives, water-cooled 5 MW to 36 MW
– Output voltage 2.3 kV to 3.3 kV
– Active rectifier unit available for 4-quadrant operation, reduced harmonics and adjustable power factor
– Line supply unit available for 2-quadrant operation and a constant power factor of 0.96 across entire speed range
– Modular design for optimum configurations, including multidrive and redundant configurations
– Offshore cabinet versions available

Series MEGADRIVE LCI
– 2 MW to 72 MW (higher power on request)
– High power with series connection of thyristors
– N+1 thyristor redundancy possible
– Fuseless design
– Water- and air-cooled converters available
– Line side harmonics: 6-pulse, 12-pulse or 24-pulse
– Motor side harmonics: 6-pulse or 12-pulse
– High converter efficiency
– Proven technology and design
– Complete package solutions including transformers, drives and motors

ABB general purpose DC drives
Series DCS550
– A digital DC drive targeted at OEMs, such as machine builders
– Range from 20 to 1000 A DC
– 230 V AC - 525 V AC
– Start-up assistants and commissioning wizards
– Extensive range of fieldbus interfaces
– Adaptive program for additional flexibility
– Onboard field controller

ABB industrial DC drives and DC heaters
Series DCS800, DCT880
– From 25 to 5200 A
– Commissioning wizard gives easy start-up
– Easy to use - standard macros or user programmability
– Intuitive control panel with ‘Help’ key, consistent with many of the AC drives
– Adaptive programming for additional flexibility
– Modules can be connected in parallel up to 20,000 A
– Uses ACS800 I/O option modules and fieldbus modules
– I/O is backward compatible with DCS500 and DCS600
– Field converters built-in (up to 25 A)
– The drive can be ordered as an electrical heater control, the DCT880, ideal for all industrial heating
Other drives, accessories and services
Power quality filters (PQF)

Overview
- Actively eliminates harmonics in a controlled way
- Filters up to 50th harmonic in accordance with G5/4 requirements. Each harmonic individually programmable
- Redundancy feature allows units to continue when others have shut down
- Active filters - only work when harmonics are present thereby reducing unwanted losses, resulting in greater overall efficiency
- Close loop for better measurement of harmonics - thereby more accurately eliminating the potentially damaging harmonic
- Auto-detection of CT polarity - ensures accurate current distortion readings on network, resulting in easy commissioning
- Stores record trail. Fault and event log - any trip will have a record trail

Series PQFM, PQFI
- Available in IP00 back plate or IP21, IP42 cabinets
- New intuitive user interface
- Current ratings, 70 A, 100 A, 130 A, 150 A, 250 A, 450 A, per module. The modules can be connected in parallel to a maximum of eight modules of equal rating

Series PQFs
- Small compact unit suitable for wall mounting
- Low ratings available from 30 A, 45 A, 60 A, 70 A, 80 A, 90 A, 100 A, 120 A. The modules can be connected in parallel to a maximum of four modules of equal rating
- Same user interface as the larger units
- Available in IP30
Remote monitoring overview
Remote monitoring is the reporting of information back to
the user, from a remote station or location. Typical remote
monitoring information can include:
- Energy consumption and savings
- Motor condition
- Warnings (predictive maintenance), faults and alarms
- Diagnostics
- Monitoring actual values and parameters
- Parameter access is possible, but is
  not the primary function of remote
monitoring

Ethernet adapter – for ABB machinery drives and ABB
standard drives
SREA-01
Ethernet adapter provides remote monitoring access for up to 10 drives.
It connects to the drive(s) via an RS485 modbus interface. It can send process
data, data logs and event messages independently, without a PLC or a dedicated
on-site computer. The module can send either e-mails or SMS text messages to
inform the user of the status of the drive(s) connected to it. It has an internal web server for easy configuration and drive access. Web pages can be configured with site photos and site naming.

Ethernet adapter for ABB industrial drives
NETA-21
NETA-21 module provides remote access for ABB drives and connected devices.
The module connects to the drive via several different connection possibilities:
- 2 x panel ports (32 drives per port)
- Optical connection (10 drives)
- Ethernet connection (32 drives)
- RS485 Modbus (32 devices)
It can send process data, data logs and event messages independently, without
a PLC or a dedicated on-site computer. The module can send either e-mails or
SMS text messages to inform the user of the status of the drive(s) connected to
it. It has an internal web server for easy configuration and drive access.

Ethernet adapter for local communication
MOXA
MOXA module provides remote access to a single individual drive. The module
connects to the drive via an RS232 connection to the keypad/panel port of
the drive. It is a low cost point-to-point remote monitoring device. MOXA is ideal
as a point-to-point device over which commissioning tools can be connected to the drive from a
remote location, so diagnosis of faults and problems are possible.

High speed drive monitoring – remote diagnostics
DriveMonitor
DriveMonitor is a service tool which can be fitted to any
ABB industrial drive in case of site problems and issues.
It uses high speed optical connections to the drives
power stages and monitors all of the switching signals
sent. In this way complicated system problems can be diagnosed. DriveMonitor can also
be used as a system optimisation and recording tool, as its
memory buffers can save up to one years worth of
performance data.

Monitor drives on existing networks
DriveBrowser PC tool
DriveBrowser allows a user to monitor any ABB drive
connected to an existing Ethernet network, without having to
connect another “tools” chain network on the site. Connect
DriveBrowser to a suitable “hub” location and view, edit and
tune all of the ABB drives on the Ethernet ring.

Ethernet adapters
The ABB range of drives can be fitted with Ethernet adapters which allow them to
communicate on Ethernet networks. The
FENA-11 is two-port so removes the need for
a switch. Once on a company newtork
the drive can be monitored from anywhere
within that company, or if firewall allow, from
anywhere on earth.
Other drives, accessories and services

Software tools

ABB offers several software tools to facilitate and enhance the use of ABB drives. These tools provide a user-friendly and easy-to-use approach for the selection, commissioning and use of AC drives.

Integration and programming tools

**Drive Composer**

The Drive Composer PC tool offers fast and harmonised set-up, commissioning and monitoring for the new ABB next generation drive portfolio. The tool has two variants, a free version called Drive Composer Entry and a professional level tool which is licensed. The free version of the tool provides start-up and maintenance programming with monitoring and parameter editing, while the professional version provides additional features such as custom parameter windows, control diagrams for easy parameter editing of the drive’s configuration and the ability to programme the built-in safety module. Drive Composer will have add-ons for adaptive programming and enables CODESYS programming for more complicated system designs. CODESYS requires Automation Builder.

**DriveAP**

For adaptive programming of ABB industrial drives.

This PC tool is used to create, document, edit and download adaptive programs. Adaptive programming can be done with the standard control panel or with DriveAP.

DriveAP offers a clear and easy way to develop, test and document adaptive programmes with a PC. It modifies function blocks and their connections and requires no special programming.

**DriveManager for SIMATIC**

Drive Manager for SIMATIC (DM4S-01) is a plug-in device tool that can be easily installed into the STEP 7 and TIA Portal. It utilizes the TCI interface of the SIMATIC PLC to communicate with the drives connected to PROFIBUS or PROFINET network. Drive Manager for SIMATIC offers features for the setup of ABB low voltage drives used with SIMATIC S7 PLCs.

**Automation Builder**

Automation Builder is an integrated software suite for machine builders and system integrators wanting to automate their machines and systems in an integrated and efficient way. Automation Builder is the successor of the PS501 Control Builder Plus product, incorporating all PLC engineering functionality plus additional engineering features.

**DriveStudio**

A user-friendly PC environment for simple drive commissioning tasks as well as more demanding drive tuning and programming tasks. DriveStudio is used with the ABB machinery drive and ABB motion control drives and water and wastewater drives. Drive Studio contains:

Commissioning and tuning
- Drive overview screen
- Parameter setting and signal monitoring
- Data logger and on-line signal monitoring for tuning

Solution programme composer
- Function block programming with standard function block library
- Professional programming environment: hierarchy levels, custom circuits, user parameters, copy protection etc.

**DriveWindow**

A Windows application used for commissioning and maintenance. Functions include local control, monitoring, parameter edits, fault logging, trending, backup and restore

- Shows actual status of the connected drive
- Edit and show the drive parameters
- Save and load drive parameters
- Backup and restore drive parameters
- Offline configuration of drive parameters
- Read fault loggers and diagnostic data

Used with ABB industrial drives equipped with high-speed fibre optic communication, or remotely via the Internet.
Other drives, accessories and services

Software tools

**DriveWindow Light**
Available for ABB general purpose drives and ABB machinery drives, has the same functions as DriveWindow but is designed for point-to-point communication, via control panel port.

**DriveConfig**
Dedicated programming tool for the ABB micro drive. Allows access to the extended parameter set of ACS55 and allows un-powered programming.

To download software tools, go to: www.abb.com > drives > drive PC tools.

**Drive Upgrade**
For finding an adequate drive to replace an old one. This on-line tool is ideal for finding a replacement to an existing ABB drive that may be coming to the end of its useful life. Simply input some basic information and the modern equivalent drive will be revealed.

To download, go to: www.abb.com > drives > drive PC tools.

**Energy saving tools**
For comparison of energy consumption between different flow control methods in pumps and fans, ABB has developed calculation tools for estimating the energy savings that become available when applying electric speed control to certain flow machines.

**PumpSave**
For comparing AC drive control against throttling, on/off and hydraulic coupling control in pumps. Calculate how much energy and money you could be saving with ABB drives while also deriving other benefits such as soft starting and stopping, an improved power factor and connection into process automation. PumpSave also carries out a simple dimensioning and recommends an appropriate ABB drive type. Medium voltage drives now included.

**FanSave**
For comparing AC drive control against traditional flow control methods in fans. Calculate the savings you can achieve by replacing outlet damper, inlet vane or pitch control methods with electronic speed control from an ABB drive. FanSave also provides financial and environmental figures concerning the control method retrofit project and recommends a suitable ABB drive type.

**AVP Energy Toolkit App**
Energy, CO₂ and money saved, together with an estimated return on investment, are the outputs of an App designed to show the benefits of using variable-speed drives (VSDs) and electric motors to replace direct-on-line starting. The App produces an instant mini-report that contains details of a matched ABB motor-drive package and can be forwarded to one of ABB’s Authorised Value Providers.

To download the App, visit the Apple App Store on your iPhone or iPad and search AVP Energy Toolkit.
In the UK, it is estimated that over 80 percent of installed variable-speed drives are not maintained. The Life Cycle Assessment service helps to highlight this issue by preparing a report at a given site, which shows life cycle phase, maintenance history and recommended maintenance schedule.

**Total cost of ownership**
Consider this:

\[
\text{Cost of ownership} = \text{Purchase Cost} + \text{Cost of running} + \text{Cost of not running}
\]

The main challenge facing every motor-driven application is how to minimise the cost of not running. While rapid response to failures is one approach, it would be much easier if the risk of failure was minimised in the first place.

This is where Life Cycle Assessment service steps in. The cost of maintenance is always less than the cost of failure; therefore a structured maintenance/ replacement scheme drives down the total cost of ownership.

**Life Cycle Assessment**
Maximizing profit means that every part of your process is running uninterrupted, without surprises. Predictability saves time, cuts costs and ultimately, keeps your business effective.

With the Life Cycle Assessment service, you can combine the drives maintenance status with its criticality to the process or application. This provides the know-how to determine exactly where your process stands, now and in the future.

Life Cycle Assessments work by highlighting the most critical drives so clear priorities for maintenance are set. Service budgeting is optimised as the total plant’s maintenance actions can be planned in advance. As a result, fewer unexpected interruptions occur. The ultimate aim: to always maximise reliability of the ABB drives installed base at a site and to manage the entire lifecycle, reducing downtime and production losses.

Taking ownership via some long term planning of maintenance and replacement through Life Cycle Assessments reduces total cost of ownership since cost of not running is minimised via maximising uptime.

Life Cycle Assessments are suitable for all drives, no matter what make or stage in their life cycle.

**How it works**
**Drive registration**
Before any assessments can be done, every drive needs to be registered. During registration, the drive criticality can also be defined and customer identification and application data will be entered.

**Getting started**
ABB collects and prepares all applicable data on your drives, along with detailed service history and environment of the installation. Together with the insight of on-site professionals, we gather all the crucial data about your technical infrastructure.

**Focusing on the detail**
Details of each drive are analysed including age, location, business impact, effects of operating environment, service history, as well as all additional third party servicing and part replacements.

**Analysing your maintenance plant**
The Life Cycle Assessment service now combines the variables of each drive to paint a comprehensive picture of your entire technical infrastructure that allows you to define and review your maintenance plan.

**Getting to know your facts**
Finally, ABB provides you with an in-depth report that examines the current and future state of your factory or plant. Getting detailed information helps you plan future investments and maintenance better, with the related schedules, budgeting and execution. It also lets you tackle any imminent future defects in time.

**ABB University - Professional drives training**
Factory certified courses delivered in a bespoke drives training facility by experienced applications and service personnel. With ABB University you can enrol onto either e-learning or classroom based courses. Please call 01785 285939 or visit www.abb.co.uk/abbuniversity
### Sizes 56-450

<table>
<thead>
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<th>63</th>
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### General performance motors - page 93

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</table>
- IE2 aluminum motors
- IE2 cast iron motors
- IE3 cast iron motors
- IE2 dust ignition protection motors
- IE3 dust ignition protection motors
- IE4 cast iron motors

### Process performance motors - page 90

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</table>
- IE2 aluminium motors
- IE2 cast iron motors
- IE3 cast iron motors
- IE2 dust ignition protection motors
- IE3 dust ignition protection motors

### Motors for hazardous areas - page 96

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</thead>
</table>
- IE2 flameproof motor
- Increased safety motors
- IE2 non-sparking motors
- IE3 non-sparking motors
- IE2 dust ignition protection motors
- IE3 dust ignition protection motors

### Marine motors

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</table>
- Process performance motors (aluminium)
- Process performance motors (cast iron)
- General performance motors (aluminium, cast iron)

### Motors for other applications

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</thead>
</table>
- Brake motors
- High ambient motors
- Smoke venting motors
- Roller table motors
- Water-cooled motors
- Permanent magnet motors
- Wind turbine generators
- High dynamic performance motors (HDP)
- Synchronous reluctance motors (SynRM)
Low voltage AC motors
European Minimum Energy Performance Standards (EU MEPS)

2009
EU Directives
2005/32/EC
Eco-design
formally
adopted
EC 640/2009

2014
Regulation
EU 4/2014
introduced

Mandatory EuP Directive
Applies to motors:
- rated voltage up to 1000 V
- single-speed, three-phase, 50 Hz
- 2, 4 and 6-pole
- rated output from 0.75 kW - 375 kW
- S1 Duty

Does not apply to motors designed to operate exclusively:
- in potentially explosive atmospheres as defined in ATEX
directive 94/9/EC
- brake motors
- ambient air temperature outside the range
  -30°C to +60°C
- altitudes exceeding 4000m asl
- maximum operating air temperature above 400°C

Implementation timetable

<table>
<thead>
<tr>
<th>Phase</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>From 16 June, 2012</td>
</tr>
<tr>
<td>Phase 2</td>
<td>From 1 January, 2015</td>
</tr>
<tr>
<td>Phase 3</td>
<td>From 1 January, 2017</td>
</tr>
</tbody>
</table>

2008
IEC 60034-30

Standard for LV motor efficiency classes
Motors covered by standard include:
- Single-speed, three-phase, 50 and 60 Hz
- 2, 4 or 6-pole
- Rated output from 0.75 kW - 375 kW
- Rated voltage $U_N$ up to 1000 V
- Duty type S1 (continuous duty), or S3 (intermittent periodic duty) with a rated cyclic duration factor of 80 percent or higher
- Capable of operating direct online 50 and 60 Hz

Super premium efficiency
IE4
Not yet defined

Premium efficiency
IE3
Premium

High efficiency
IE2
Comparable to Ef1

Standard efficiency
IE1
Comparable to Ef2

2007
IEC 60034-2-1

Standard on efficiency measurement methods
Introduces new rules concerning the testing methods to be used for determining losses and efficiency.

The resulting efficiency values differ from those obtained under the previous IEC testing standard IEC 60034-2: 1996

ABB calculates efficiency values according to the indirect method, with additional losses determined from measurement. This is the preferred low uncertainty method outlined in the standard.
Low voltage AC motors  
EU 4/2014 - main changes and exclusions

### Original Regulation EC 640/2009

EU MEPS covers 2-, 4- and 6-pole single speed, three-phase induction motors in a power range of 0.75 kW - 375 kW rated up to 1000 V. It covers all duty types as long as the motors are capable of continuous duty operation.

The original Regulation excluded the following motors from the scope of EU MEPS:

<table>
<thead>
<tr>
<th>Change</th>
<th>Original Description</th>
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<tbody>
<tr>
<td>motors designed to operate wholly immersed in a liquid</td>
<td>specified to operate</td>
</tr>
<tr>
<td>motors completely integrated into a product where the motor's energy performance cannot be tested independently from the product</td>
<td>no change</td>
</tr>
<tr>
<td>motors specifically designed to operate continuously:</td>
<td>specified to operate exclusively</td>
</tr>
<tr>
<td>at altitudes exceeding 1000 meters ASL</td>
<td>4000 m</td>
</tr>
<tr>
<td>outside the ambient air temperature range of -15°C ... +40°C</td>
<td>-30°C ... +60°C</td>
</tr>
<tr>
<td>where ambient air temperatures are less than – 15 °C for any motor or less than 0 °C for a motor with air cooling</td>
<td>water cooling</td>
</tr>
<tr>
<td>in maximum operating temperatures above 400°C</td>
<td>no change</td>
</tr>
<tr>
<td>where the water coolant temperature at the inlet to a product is less than 5°C or exceeds 25°C</td>
<td>0°C ... 32°C</td>
</tr>
<tr>
<td>in potentially explosive atmospheres as defined in Directive 94/9/EC</td>
<td>no change</td>
</tr>
<tr>
<td>brake motors</td>
<td>no change</td>
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### Amending Regulation EU 4/2014

The amending Regulation came into force in mid-2014 and was intended to close loopholes in the original Regulation. The amendment was issued after it became clear that certain manufacturers were intentionally contravening the spirit of EU MEPS.

The amendment did not change the scope of EU MEPS, but instead clarified the original spirit of Regulation EC 640. The main changes are shown below.

Requirements for markings on motor rating plates:

<table>
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<td>manufacturers must mark efficiency at 100%, 75% and 50% of rated load</td>
<td>In the case of small motors (ie, where the rating plate is small) only the efficiency for 100% rated load to be shown</td>
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</table>
Low voltage AC motors
Process performance motors

What is a process performance motor?
Process performance motors are the flagship of ABB’s standard low voltage motors. This range provides the most comprehensive, versatile set of motors for the process industries and heavy-duty applications which are dependent on continuous reliability, lowest possible environmental impact and life cycle costs. Their superior ability to perform reliably and efficiently, continuously and even under the most challenging circumstances, ensures that they power their way through the toughest tasks and conditions.

Where can it be used?
- End-users in continuous process industries
- Project OEMs
- Demanding industries:  
  - pulp and paper
  - metals
  - minerals and mining

Highlights
- All variant codes possible for process industry
- Application knowledge and engineering
- With three years warranty and option to extend to five years
- IE3 and IE4
### Output kW, Torque Nm, Current I, Eff* Frame size, Foot price, Flange price

#### 8000 r/min = 2 poles

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#### 1600 r/min = 4 poles

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* Efficiency full load 100%
### Low voltage AC motors
#### Process performance aluminium motors
80-250, 2, 4 & 6 poles

**TEFC low voltage motors, aluminium, IP55, IC 411, single-speed, 400 V 3-phase 50 Hz.**

See product catalogues or [www.abb.com/motors&generators](http://www.abb.com/motors&generators) for more information on products.

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<th>Output kW</th>
<th>Torque Nm</th>
<th>Current A</th>
<th>Eff*</th>
<th>Frame size</th>
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<th>Flange price</th>
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* Efficiency full load 100%

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<th>Frame size</th>
<th>Foot price</th>
<th>Flange price</th>
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* Efficiency full load 100%
Low voltage AC motors
General performance motors

What is a general performance motor?
These motors combine convenience and easy handling seamlessly with ABB’s engineering expertise, while at the same time providing standard variants and modifications. The motors can be tailored according to the specific needs of OEMs. The high modularity enables adding a wide variety of elements to the robust frame, thus making the overall solution to fit the specific situation and customer need perfectly. As the user only pays for the enhancements needed and used, the motors are free from all unnecessary elements.

Where can it be used?
– End-users in various industries
– Tailored serial project OEM
– Pumps
– Fans
– Compressors

Highlights
– Variant codes which OEM customers need
– One year warranty
– IE3
– 2, 4 & 6 pole
**Low voltage AC motors**

**General performance cast iron motors**

132-355, 2, 4 & 6 poles

TEFC low voltage motors, cast iron, IP55, IC 411, single-speed. 400 V 3-phase 50 Hz

See product catalogues or [www.abb.com/motors&generators](http://www.abb.com/motors&generators) for more information on products.

### Output kW

<table>
<thead>
<tr>
<th>Torque (Nm)</th>
<th>Current I</th>
<th>Eff*</th>
<th>Frame size</th>
<th>Foot price</th>
<th>Flange price</th>
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* Efficiency full load 100%

### Torque (Nm) 1000 r/min = 2 poles

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### Torque (Nm) 1500 r/min = 6 poles

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* Efficiency full load 100%
Low voltage AC motors
Explosive atmospheres

There are systems in place worldwide to classify explosive atmospheres by zones, according to the risk posed by explosive gas ("G") or dust ("D").

Classification of explosive atmospheres according to CENELEC and IEC

The following standards define areas according to the presence of gas or dust in the atmosphere:

IEC/EN 60079-10-1 Gas
IEC/EN 60079-10-2 Dust

<table>
<thead>
<tr>
<th>Standard</th>
<th>IEC 60079-0 EN 60079-0</th>
<th>EPL</th>
<th>Protection level</th>
<th>Installation Zone acc. to IEC 60079-10-x EN 60079-10-x Zones</th>
<th>Atex Directive 94/9/EC</th>
<th>Main motor protection Types</th>
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<td>Mb</td>
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<td>II (Surface)</td>
<td>1G</td>
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Low voltage AC motors
Explosive atmospheres

To ensure equipment can be safely used in potentially explosive atmospheres, the explosive atmospheres where the equipment is installed must be known. The temperature class of equipment must be compared with the spontaneous ignition the equipment of the gas mixtures concerned, and in specific cases the gas group must be known (e.g. flame proof protection).

### Gas classification

<table>
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<tr>
<th>Temperature class</th>
<th>Ignition temp. of gas/vapour °C</th>
<th>Max. permitted temp. of equipment °C</th>
<th>Gas examples</th>
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<td>450</td>
<td>Hydrogen</td>
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<td>T2</td>
<td>&gt;300 &lt;450</td>
<td>300</td>
<td>Ethanol</td>
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<td>T3</td>
<td>&gt;200 &lt;300</td>
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<td>Hydrogen sulfide</td>
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<tr>
<td>T4</td>
<td>&gt;135 &lt;200</td>
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<td>Detyl ether</td>
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<td>&gt;100 &lt;135</td>
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<td>-</td>
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<td>T6</td>
<td>&gt;85 &lt;100</td>
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<td>Carbon disulfide</td>
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### Gas subdivision

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<th>Gas group</th>
<th>Description</th>
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<td>IIA</td>
<td>- 120 gases and vapours, e.g. butane/petroleum/propane</td>
</tr>
<tr>
<td>IIB</td>
<td>- 30 gases and vapours, e.g. ethylene/dimethyl ether/coke oven gas</td>
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<tr>
<td>IIC</td>
<td>- three gases: hydrogen H₂/acetylene C₂H₂/carbon disulfide CS₂</td>
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### Marking of equipment protection for gas according to ATEX

- **CE Conformity marking**
  - **CE marking**
  - Identification of the notified body responsible for the approval. 0081 is the identification number of LCIE
  - The European Commission mark for Ex products
  - Equipment grouping: II for surface industry
  - Equipment category: 2G for gas environment demanding a high level of protection

- **Equipment protection marking for gas:**
  - Ex d IIB T4 Gb
  - Protection type Ex d = flameproof
  - Equipment grouping IIB for gas group B
  - Temperature class T4 = max. permitted 135 °C
  - Equipment protection level = level b for gas

### Marking of equipment protection for gas according to IEC

- **Example for gas:**
  - Ex d IIB T4 Gb
  - Protection type Ex d = flameproof
  - Equipment grouping IIB for gas group B
  - Temperature class T4 = max. permitted 135 °C
  - Equipment protection level = level b for gas
## Low voltage AC motors

### Flameproof motors 80-400, 2 & 4 poles

**Exd/e IIB T4**

TEFC low voltage motors, cast iron, IP55, IC 411, single-speed. 400 V 3-phase 50 Hz

See product catalogues or [www.abb.com/motors&generators](http://www.abb.com/motors&generators) for more information on products.

### Output Torque Current Efficiency Frame size Foot price Flange price

<table>
<thead>
<tr>
<th>Output kW</th>
<th>Torque Nm</th>
<th>Current I</th>
<th>Efficiency</th>
<th>Frame size</th>
<th>Foot price</th>
<th>Flange price</th>
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*JP Exd*  
*KP Exd*

**HO = High-output design**  
† Efficiency full load 100%
### Low voltage AC motors

Flameproof motors, 80-450, 6 & 8+ poles

**Exd/e IIB T4**

TEFC low voltage motors, cast iron, IP55, 411, single-speed. 400 V 3-phase 50 Hz

See product catalogues or [www.abb.com/motors&generators](http://www.abb.com/motors&generators) for more information on products.

#### Output kW

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* Efficiency full load 100%
## Low voltage AC motors

**Optional extras for low voltage AC motors**

Please note, ABB general performance motors have limited optional extras (see extras marked with *).
Select motor from the ABB process performance range when additional extras are required.

### R = On request
### S = Standard
### N = Not available

| Option description | Modification code | Motor types | 80 | 90 | 100 | 112 | 122 | 132 | 160 | 180 | 200 | 225 | 250 | 280 | 315 | 355 |
|--------------------|-------------------|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Auxiliary terminal box for accessories | 418 | ● | N | N | N | N | N | 343 | 343 | 343 | 343 | 343 | 343 | 343 | 343 | 343 |
| 418 | ■ | 343 | 343 | 343 | 343 | 343 | 343 | 343 | 343 | 343 | 343 | 343 | 343 |
| British Standard sliderails* | 403 | ● | 75 | 75 | 108 | 108 | 108 | 148 | 148 | 272 | 272 | 456 | 456 | 839 | 839 |
| 403 | ■ | 75 | 75 | 108 | 108 | 108 | 148 | 148 | 272 | 272 | 456 | 456 | 839 | 839 |
| Degree of Protection IP56* | 158 | ● | 232 | 232 | 232 | 289 | 289 | 331 | 331 | 331 | 331 | 363 | 383 |
| 158 | ■ | 232 | 232 | 232 | 289 | 289 | 331 | 331 | 331 | 331 | 363 | 383 |
| Degree of Protection IP65 | 67 | ● | 66 | 66 | 66 | 66 | 66 | 115 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| 67 | ■ | 66 | 66 | 66 | 66 | 66 | 115 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| Foot and face mounting* | 9 | ● | 122 | 122 | 122 | 159 | 159 | N | N | N | N | N | N | N | N |
| 9 | ■ | 122 | 122 | 122 | 159 | 159 | N | N | N | N | N | N | N | N |
| Foot and flange mounting* | 8 | ● | 88 | 88 | 88 | 128 | N | N | N | N | N | N | N | N | N |
| 8 | ■ | 88 | 88 | 88 | 128 | N | N | N | N | N | N | N | N | N |
| Frequency converter rating plate. Rating data according to quotation | 163 | ● | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 |
| Insulated bearing at NDE. Frame 280 and above on variable-speed drives.* | 701 | ● | R | R | R | R | R | R | R | R | R | R | R | 1063 | 1063 | 1472 |
| 701 | ■ | R | R | R | R | R | R | R | R | R | R | R | 1063 | 1063 | 1472 |
| Metal fan | 48 | ● | 141 | 141 | 141 | 198 | 198 | 285 | 285 | 307 | 322 | 322 | 518 | 555 | 591 |
| 48 | ■ | 136 | 136 | 136 | 196 | 253 | 253 | 270 | 285 | 285 | 518 | 555 | 591 |
| Metal fan cover | 345 | ● | 94 | 94 | 94 | 131 | 129 | S | S | S | S | S | S | S | S |
| 345 | ■ | S | S | S | S | S | S | S | S | S | S | S | S | S |
| Paint colour to standard RAL specify RAL no.* | 144 | ● | 202 | 202 | 202 | 198 | 198 | 242 | 242 | 242 | 242 | 235 | 235 | 235 | 235 |
| 144 | ■ | 202 | 202 | 202 | 198 | 198 | 242 | 242 | 242 | 242 | 235 | 235 | 235 | 235 |
| PT100 resistance element one per phase | 445 | ● | N | N | N | 598 | 598 | 587 | 587 | 869 | 869 | 869 | 819 | 819 | 819 |
| 445 | ■ | R | R | R | 598 | 598 | 587 | 587 | 869 | 869 | 869 | 819 | 819 | 819 |
| PTC thermistors, three in series, 150°C others on request** | 436 | ● | 123 | 123 | 123 | 159 | 159 | 232 | 232 | 232 | 232 | 200 | 200 | 200 | 200 |
| 436 | ■ | 123 | 123 | 123 | 159 | 159 | 232 | 232 | 232 | 232 | 200 | 200 | 200 | 200 |
Low voltage AC motors
Optional extras for low voltage AC motors

Please note, ABB general performance motors have limited optional extras (see extras marked with *). Select motor from ABB process performance range when additional extras are required.

R = On request
S = Standard
N = Not available

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Alloy ⬤
Cast Iron □
Low voltage AC motors
NEMA motors

General purpose industrial motors
Three-phase, totally enclosed, foot mounted
- 1/8 – 400 HP
- NEMA 42 – 449T

Applications
Pumps, compressors, fans, conveyors, machine tools and other general purpose three-phase applications.

Features
Suitable for mounting in any position. Ball bearings, heavy-gauge steel and cast-iron frames, and gasketed conduit boxes. Class F insulation, 1.15 service factor, low-loss electrical grade lamination steel. EM Super-E® motors have NEMA Premium® efficiency and three years warranty. Motors with TR suffix have roller bearings for heavy belted loads.

Severe duty motors
Three-phase, totally enclosed, foot mounted
- 1 – 400 HP
- NEMA 143T – 449T

Applications
Petrochemical plants, mines, foundries, pulp and paper plants, waste management facilities, chemical plants, tropical climates and other processing industry applications requiring protection against corrosion caused by severe environmental operating conditions.

Features
ECP motors are XEX designs. 1.15 service factor, corrosion resistant epoxy finish, regreasable ball or roller bearings, oversized rotatable cast iron conduit box, cast iron frames, V-ring shaft seal, moisture resistant copper windings. Class F insulation, stainless steel nameplate and corrosion resistant hardware. ECP/XEX Super-E® motors have NEMA Premium® efficiency and three years warranty. Positive lubrication system (PLS) on 360 frames and larger.

Explosion-proof motors
Single and three-phase, foot mounted
- 1/4 – 300 HP
- NEMA 48 – 449T

Applications
Ideal for use where hazardous fumes or dust may be present.

Features
UL and CSA approved for Division 1, Class I, Group D; Class I, Group D, Class II Group F & G; Class I, Group C & D, Class II, Group F & G. Corrosion resistant epoxy finish. Shipped with UL and CSA approved cast conduit box assembled to each motor. 1.00 service factor. EM Super-E® explosion proof motors have NEMA Premium® efficiency and three years warranty.
ABB’s European logistics centre in Menden, Germany offers customers on-time and just-in-time delivery on a wide range of ABB products.

The 23,000 square metre facility has 45,000 automated parts bins and stocks over 2.5 million ABB items including parts and accessories.

NEMA motors are in stock at the facility and include:

- NEMA general purpose
- ECP XEX severe duty
- IEEE841 totally enclosed severe duty and speciality motors.

NEMA general purpose TEFC motors are basic protection motors used on pump and fan applications and have a protection similar to the European IP44 rating.

The NEMA ECP XEX severe duty TEFC motors are suited to tougher industrial operating environments and are protected similar to IP54.

The IEEE841 specification, totally enclosed severe duty motors are protected similar to IP56.

Among those motors stocked in Menden are 2-pole and 4-pole variants, with various mounting styles available including foot mounted, C-face mounted and C-face footless options. The speciality motors include a selection of Baldor permanent magnet DC motors.

NEMA motors are now available within 48 hours from ABB’s central European stockholding in Germany.

NEMA general purpose motors
- 1/3 through 250 HP, 0.25 to 187 kW

NEMA general purpose motors
- 1/3 through 250 HP, 0.25 to 187 kW

IEEE841 standard severe duty motors
- 1 through 250 HP, 0.75 to 187 kW
Low voltage AC motors
Mod Express® line, Menden, Germany

Modifications to NEMA motors, certified to CSA standards, can be carried out by ABB at its European logistics centre in Germany for distribution across Europe.

The motor build centre, called the Mod Express® line, carries out modifications to NEMA general purpose, severe duty and IEEE 841 severe duty motors held in stock. General purpose and IEEE severe duty motors are available with foot mount, C-face foot and C-face footless options and severe duty motors stocked with foot mounted options.

ABB’s European logistics centre in Germany is fully equipped with a secure storage facility, access to fast-track air freight dispatch and has an export packaging option through the Mod Express® line, giving an all-in-one facility for immediate NEMA motor dispatch.

A dedicated exports team ensure that all the correct paperwork is supplied with the motor to allow on-time delivery worldwide without Customs delays.

ABB is the only supplier able to deliver a customised NEMA motor from local stock with full accreditation to CSA anywhere in the world.

The modifications available for these motors include:
- Installation of thermistors
- Thermal protection sensors
- Bearing upgrades
- Conduit box modifications
- Tropicalisation
- Customised paint finishes
- Nameplate modification
High voltage AC motors
Overview

Engineered rib-cooled motor NXR
- 100 kW to 1,250 kW
- 355 to 450 frame size
- New platform for HV rib-cooled motors
- High efficiency levels, low noise levels
- Fixed-speed, variable-speed and safe area use

Engineered rib-cooled motor HXR
- 100 kW to 2,250 kW
- 355 to 560 frame size
- High efficiency levels, low noise levels
- Fixed-speed, variable-speed and hazardous area use
High voltage AC motors

Overview

Modular induction motors
- Built from the basic design by using modular construction
- Complete range of enclosures and cooling arrangements
- Optimal weight to power ratio
  - 140 kW to 23,000 kW
  - 400 – 1000 frame size

Flameproof motors Ex d
- Motor intended for explosive atmosphere
- Protection category according to EN/IEC Flameproof Ex d, Ex de
- Totally-enclosed, fan-cooled
- Cooling methods: IC411 and IC511
- Both cast-iron and welded steel frame available
- Certified according to ATEX directives, IEC, EN and NEMA standards and all major local requirements
- Suitable for variable-speed drives
  - 160 kW to 8,000 kW
  - 355 – 900 frame size
Low voltage AC motor services
MotorAdvantage

MotorAdvantage aims to encourage industry to uncover the true cost of running electric motors. Research by ABB reveals that UK industry is failing to efficiently manage its motor inventory, thereby incurring millions of pounds of unnecessary downtime, repair and energy costs.

MotorAdvantage is aimed at companies operating a continuous process such as those found in food & beverage, chemical, oil & gas and pharmaceuticals. Such processes tend to have critical applications, whereby if a motor fails the cost to a company can be hundreds of pounds per hour in lost revenue. It is not just the loss of production but the potential loss of the company’s customer.

How it works
There are three stages to MotorAdvantage:

1. Consultation
During the consultation process ABB examines the installed motor asset register for the plant and, working with the local engineers, identifies up to five critical applications that are running either continuously or for more than 4,000 hours per annum. They then determine some basic information about these motors such as:
   - How old are the installed motors?
   - How efficient are the installed motors?
   - How many hours do they run per annum?
   - Have they been rewound before?
   - What spares holding do you have for critical plant?
   - What is your repair/rewind policy for ‘failed’ motors?

ABB also engages with the plant’s process engineers to determine the exact design criteria for the various processes. This gives ABB a clearer understanding of how the process is meant to operate and its critical design operating points, thereby ensuring that a properly dimensioned motor is selected should a replacement be deemed necessary.

2. The Appraisal
An ABB engineer, or one of ABB’s Authorised Value Providers partners, visits the end-user to inspect the selected motors, get an understanding of the plant, the inventory of spare motors, energy and maintenance plans. It is not unusual to find that an old motor can be 1-5 percent lower in efficiency compared to a new premium efficiency variant. If that motor is running continuously then you can achieve a typical payback of between two to three years should you wish to take the decision to scrap the motor prior to failure.

If the motor is replaced at the point of failure then taking the rewind cost into the payback calculation, the new motor cost can be recovered in less than 12 months. Bear in mind that many rewound motors will only have a six month warranty of the repaired components whilst a new premium efficiency motor from ABB comes with a three year warranty.

3. Proving the savings – report and recommendations
Following the collection of the data, the findings are analysed and potential savings identified using dedicated software. The findings are methodically presented, with tables being created to help identify where savings are likely to arise. Among the data available includes an estimation of present energy usage; whether the application would benefit from variable-speed control; payback time if an investment is made in new motors; carbon dioxide emission reductions; along with many other key facts and analysis.

An action plan is prepared, usually comprising an Executive Summary and a detailed Engineer’s Report, highlighting applications that can save the most. The figures will normally be translated into monthly savings, and there will be detailed recommendations for implementation.

Benefits
- In just half-a-day, an ABB engineer can assess up to five installed motors that could benefit from a motor management plan
- Examines the end-user’s current policy in the event of a motor failure and the financial impact on the company
- Identifies improvements to be made with regards to maintenance and stockholding
- Determines the energy use of the current installation
Low voltage AC motor services

DriveSize & MotSize

DriveSize

DriveSize is a software tool that helps users select an optimum motor, drive and transformer especially for applications where straightforward selection from a catalogue is not possible.

DriveSize can also compute current, network harmonics and create dimensioning documents based on actual load parameters. DriveSize is available to use online via the ABB website or can be downloaded for use on a PC. For system requirements see:

http://new.abb.com/drives/software-tools/drivesize

DriveSize contains a current version of the ABB motor and drives catalogue and allows users to import their own motor database. The default values make DriveSize simple to use with ample options for drive selection.

The software performs dimensioning based on the following input:
- Speed range and mechanical load with overloads
- Ambient temperature and altitude
- Required IP-class and allowed temperature rise
- Supply network characteristics
- Load type and duty cycle
- Optionally current requirements for inverter unit
- Optionally current requirements for inverter unit Optionally current
- Apparent power requirement for the transformer

The software enables you to:
- Calculate the network harmonics of individual drive or set of drives
- Obtain efficiency values
- See your selection in graphical or numeric form
- Select manually an optional unit from database
- Print reports in Excel
- Save the results into XML project files
- Import your own motor database

Benefit
- Select an optimal motor, frequency converter and transformer
- Dimensioning based on actual shaft load
- Documents dimensioning results, graphical and numerical presentation
- Network harmonic and power factor calculation
- Print and save the results

MotSize

MotSize is a selection tool that helps users to select an optimal direct-on-line (DOL) motor from the low voltage motors catalogue. Additionally, MotSize allows users to dimension motors for specific application requirements.

MotSize functions

The software performs dimensioning based on the following data:
- Ambient conditions
- Altitude
- Requirements for a temperature rise
- Supply network data
- Load type and duty cycle

The following single-speed and/or two-speed motor types are included:
- General purpose motors:
  - Aluminium, cast iron, steel, open drip proof, brake
- Process performance motors:
  - Cast iron, aluminium
- Marine motors:
  - Aluminium, cast iron, steel, open drip proof
- Hazardous area motors:
  - Non-sparking aluminium, cast iron motors
  - Increased safety aluminium, cast iron motors
  - Flameproof cast iron motors
  - Dust ignition proof aluminium, cast iron motors

The software can handle imperial as well as metric units, all technical data is updated regularly.

The software also enables you to:
- Specify starting conditions
- Rest current, power, voltage and frequency
- Obtain rating data as well as data with partial load
- Choose the language for the printouts
- Print-out technical data sheets and graphs
Low voltage AC motor services
Optimiser

ABB’s Optimiser is an online tool that can quickly select the optimum motor for any minimum energy performance standard (MEPS) worldwide.

Motor users can select motors, compare running costs and get further documents about their motors and work out the cost of ownership.

Optimizer gives users eight drop down selection menus.
1. MEPS area (e.g. EU, United States)
2. Efficiency class (IE2, IE3 etc)
3. Frame material
4. Motor range
5. Voltage
6. Frequency
7. Speed
8. Power output

Once the required characteristics are selected, the tool presents a list of suitable motors. Selecting EU MEPS, IE3, dust ignition proof motors, 400 V, 50 Hz, all poles and outputs, returns a list of 49 suitable motors. They can be compared by running cost, payback periods, life cycle savings and reduction in greenhouse gas emission.

Optimizer automatically suggests, a higher efficiency motor and highlights savings realised by upgrading. Test reports, drawings, data sheets and other documents can be accessed quickly and easily for the selected motors. Documents can be opened on screen, saved or exported as a zip file.

Optimizer can be downloaded from the Apple store for iPad use by searching for ‘ABB Optimizer’.

For more information about Optimizer call the ABB motors team on 07000 MOTORS, that’s 07000 668677
AC motors
Motors and generators services

ABB MACHsense-P
Regular health checks help to maintain maximum performance over entire life cycle

ABB MACHsense-P is a condition monitoring service that addresses the reliability of the complete shaft line, including the motor, gearbox and driven load (pump, fan or compressor). It identifies electrical and mechanical issues related to the rotor, bearings, gearbox and other components – problems which account for a major percentage of total failures.

Key benefits:
– Instant summary report, with a full report after detailed analysis
– Earlier warnings and more comprehensive diagnosis than conventional solutions
– Vibration and electrical measurements are processed in a single software platform to avoid false positives and negatives
– Advanced software delivers a high degree of accuracy
– Collection of vibration data over wider frequency range covers greater number of potential problems
– Testing is done with the motor in its operating condition, so no preparatory work is necessary
– Optimised cost of ownership

ABB MACHsense-R
Continuous, remote monitoring with instant alarms and expert follow-up

ABB MACHsense-R continuously monitors key condition parameters specific to the type of motor being monitored. ABB MACHsense-R can identify nascent fault conditions at an earlier stage than conventional methods. Shaft line monitoring can be implemented with MACHsense-R.

Customers can access operating data and trend graphs via the internet. An alarm is triggered if a measured parameter exceeds set limits, giving the plant operator an early warning that maintenance is needed.

Key benefits:
– Motor or generator is constantly monitored during operation
– Model based analysis increases reliability of defect identification and quantifies defect severity
– Motor and generator design and construction taken into account for higher precision
– Multi-channel operation and fast data collection rates increase sensitivity

– On-board processing reduces volume of data transmitted to server for lower communication costs
– Authorised customers can quickly access motor or generator specific data on ABB’s server
– Customers can receive regular reports on condition of their motors and generators
– Unplanned downtime is reduced, resulting in optimised cost of ownership

ABB LEAP
Life Expectancy Analysis Program (LEAP) for motors and generators

ABB Life Expectancy Analysis Program or ABB LEAP is a diagnostic tool for assessing the condition of the stator winding insulation in electric machines.

ABB LEAP goes further than conventional health monitoring programmes for rotating electrical machines, which typically use green, yellow and red LEDs, or similar to express the results. ABB has evolved this methodology to a new level: ABB LEAP analysis provides precise information on the remaining lifetime of the stator winding. Based on this, specific service actions can be planned well ahead. This method drastically reduces unplanned shutdowns caused by the failures due to factors such as thermal, electrical, ambient, or mechanical aging.

Key benefits:
– Optimises maintenance planning for electrical machines by moving from time based to condition based maintenance
– Supports efforts to extend machine lifetime, boosting return on investment (ROI)
– Facilitates decision making for short and long term maintenance and run-replace decisions
– Minimises unplanned downtime and reduces risk levels
– Provides information for lifecycle cost estimation
Mechanical power transmission

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For well over a century, Dodge products have helped manufacturers, OEM and producers increase the productivity and profitability of their operations.

ABB is excited to bring the history and innovation of ABB Dodge mechanical power transmission products to our portfolio.

**Torque-Arm II**

- All reducers can be shaft mounted: screw conveyor, vertical, and flange mounted
- Up to 294 kW
- Up to 56,500 Nm
- Standard 5, 9, 15, 25, and up to 40:1 gear ratios
- Nearly 300:1 speed reduction with V-belt drives
- Twin-tapered bushing bores: 25 mm through 160 mm
- Highly efficient helical gearing
- Meets or exceeds AGMA standards, including 5,000 hours L10 life and 25,000 average hour life
- New heavy duty lip seals for extended wear life, -40 - 138°C
- 100 percent factory noise and leak tested
- New metal shield sealing system with excluder lip
- AGMA output torque ratings up to 56,500 Nm

**Quantis**

- Inline helical (ILH), right angle helical bevel (RHB), motorised shaft mount (MSM)
- 0.75 kW - 56 kW up to 14,000 Nm
- Ratios, 1.5:1 - 300:1
- 8 case sizes per housing configuration, clamp collar, 3-piece coupled, integral gearmotor, separate input. Solid, straight hollow output – ILH/MSM efficiency of 98 percent per stage, RHB efficiency of 95 percent per stage
- All units shipped filled with oil from the factory and are installation ready
- Optional XT harsh duty seal for operation in wet and dirty environments
- Class 30 grey iron housings cast with internal ribbing for added strength
- Options include washdown and screw conveyor configurations

**MagnaGearXTR®**

- Parallel shaft or right angle configurations available
- Torque capacities from 32 - 104 kNm available
- Global product design to fit all markets
- Multiple mounting configurations available (base mounting, swing base mounting, tunnel housings)
- Can be used with a variety of soft start mechanisms including VSD and fluid couplings

ABB’s commitment includes adding new warehouse space to stock Dodge mechanical power transmission products, which ensures they are quickly accessible when you need them.
When it comes to reliable service and low maintenance, ABB Dodge® mounted ball bearings are unmatched in the industry. ABB Dodge mounted ball bearings are available in any of our proven locking devices: our exclusive 65° setscrew locking system, our patented Grip Tight adapter mounted, eccentric locking collars and D-Lok™ concentric clamp locking system mounted ball bearing.

**Setscrew ball bearings**
- Superior 65° locking setscrew
- DualGuard seal – comprised of single lip seal and rubberised flinger
- Stronger, more flexible bearing cage
- Optimum balance between locking forces
- Heat stabilised nylon construction with an inner ring stress fiber-glass reinforcement
- Secure fit to the shaft

**Grip Tight® ball bearings**
- Two types: normal duty GT and medium duty GTM
- DualGuard seal – comprised of single lip seal and rubberised flinger
- Thin wall adapter mounting offers 360° full shaft contact and concentricity. No shaft
- Marring or fretting corrosion like setscrew and eccentric collar products. Integral dismount feature easily removes the bearing from the shaft. Turned, ground and polished shafting is not required
- Anti-rotation device prevents insert rotation associated with heavy loads, vibration, unbalanced loads and high-speed applications
- High-temperature option available to 204 °C
- Plus or minus 2° static misalignment

**Ultra Kleen®, E-Z Kleen®**
- Reinforced polymer and stainless steel housings
- Patented polymer housing includes-antimicrobial agent which resists bacterial and fungus growth - two inserts: corrosion resistant and stainless steel insert
- Three locking devices: 65° setscrew angle (SC), Grip Tight adapter mount and concentric clamp collar (D-Lok).
- Quadguard seal: comprised of our triple lip seal and rubberised flinger. Additional grease retention provided by the maxlife cage
- Anti-rotation device prevents insert rotation associated with heavy loads, vibration, unbalanced loads and high-speed applications - plus or minus 2° static misalignment
For decades, industry’s leading producers have depended on ABB Dodge® roller bearings to handle their conveyance and power transmission needs. ABB Dodge bearings offer innovative designs; a wide range of shaft attachment methods, rolling elements, housings and seal choices, patented features and consistent performance.

**ISN spherical roller bearings**

- The only push/pull adapter mount system
- Available in two-bolt pillow blocks
- Accepts commercial shaft tolerances
- Installation and removal in fewer than 15 minutes
- Fully concentric shaft attachment with adapter sleeve mount
- Virtually eliminates fretting corrosion
- Capable of withstanding static or dynamic misalignment of ±1° - shaft-ready out of the box - available with Trident triple lip or labyrinth seal options
- Sizes range from 30 mm through 170 mm
- SN mounting dimensions

**Type E-xtra® tapered roller bearings**

- Tapered rolling elements
- Completely assembled, factory adjusted and properly lubricated
- Shaft ready
- Extra protection
- E-Tect seal option - comparable mounting dimensions with ball bearings
- E-xtra allows easy upgrade from ball bearings
Mechanical power transmission
Couplings

Elastomeric, sleeve style - ABB Dodge D-Flex couplings

Three-way flexing action handles shock, vibration and misalignment. The ABB Dodge D-Flex™ coupling features moulded, non-lubricated, interchangeable elastomeric sleeves of EPDM, neoprene Hytrel. Its three-way flexing action accommodates torsional, angular and parallel misalignment, as well as axial end float.

Elastomeric, tyre style - ABB Dodge Para-Flex

ABB Dodge Para-Flex elements are manufactured with reinforcing fabric tension cords that transmit much of the torque during operation.

The uniform and centred bead in the foot of the tyre element prevents it from pulling out during operation. Additionally, the tyre element is reinforced at the split to reduce fatigue and extend life.

ABB Dodge Para-Flex elements provide accommodation of shaft misalignment during installation, running-time and replacement better than other elastomeric elements.

With an industry-leading combined 4° angular, 3.17 mm (1/8 in.) parallel and 7.93 mm (5/16 in.) end-float capability, Para-Flex couplings will perform in difficult applications and reduce valuable time needed for installation and maintenance.

Metalllic, grid style - ABB Dodge Grid-Lign

Compact in size, yet high in torque capability, ABB Dodge Grid-Lign couplings are available in a variety of sizes, in standard and spacer styles. Every coupling features two steel shaft hubs, a tapered grid element, two seals and a cover assembly. Its versatile design allows for a motor or reducer output speed connection and its speed capability ranges up to 6,000 rpm dependant on size. ABB Dodge Grid-Lign is available in T31 and T35 spacer designs up to size 1200T. This spacer offering can be used as a spacer coupling, or mounted to a brake disc or drum.

The ABB Dodge Grid-Lign coupling’s tapered grid element is engineered with high-strength, spring steel that is quenched and tempered. This feature helps isolate vibration and cushions shock loads. In addition, it allows uniform contact during light, normal and shock-loading conditions for long machine life.