

ABB Solutions for HVAC – Heating, ventilation and air conditioning

Components and systems



ABB



Anyone designing and manufacturing air conditioning equipment and systems is well aware of the expectations of their customers, which can be summed up as a need for increasingly high quality standards to respond to the ever changing market demands for comfort, simple and safe usage, rapid maintenance and high levels of efficiency.

New challenges in the air conditioning sector

Today, however, new and specific needs have arisen alongside the traditional demands of the market: a growing awareness of environmental and energy saving issues, as well as pledges made by industrialised countries at international level, with the resultant provision of regulations and laws, now call, and will continue to do so, for us to operate in an increasingly determined way according to criteria which do not just focus on the initial cost, but first and foremost take into consideration the advantages offered by a correct environmental impact, throughout the life of the equipment. These advantages take the form of both overall benefits for the general public and considerable savings for the user which, continuing throughout the useful life of the equipment itself, can by far exceed the limited savings which may be obtained by purchasing technically outdated solutions.





„Energy saving“: the cutting edge design method

The most forward-looking professionals well understand the value of modern design, which aims to create “energetically correct” equipment, as they now often termed. The problem, quite the opposite, is finding suitable components on the market, ones which effectively satisfy the new needs and are reliable; but that are also backed by manufacturers with recognised experience, who can guarantee the necessary service all over the world.



With this in mind, ABB offers its organisation as the ideal partner for air conditioning designers and installers, since it is able to offer a full range of products and technologies for power distribution and automation, as well as professional and effective service, thanks to an organisation which is present in over 100 countries all over the world.

Considering some commonly accepted statistical data, for example the fact that in countries like the United States air conditioning accounts for over 40% of power consumption and, in general, that motors use the greater part of electric power consumed by industry and the service sector, it is not hard to understand that any technological improvement in electric motors and their operation will certainly produce useful advantages in terms of power and the environment. From this point of view, ABB first of all offers two important solutions: high-performance **EFF I** category motors (according to the agreement signed in 1999 by major manufacturers), which permit power savings of up to 20%, and static frequency converters which, by controlling the start-up, stopping and speed of fans, compressors and pumps far more efficiently than traditional solutions, can lead to power savings of 30% to 60%.

Merely as an example, some significant figures show just how valid new technologies can be: it is estimated that, in general, in one year the use of frequency converters permits a reduction by many tens of thousands of GWh in power consumption, with a consequent reduction of tens of millions of tons of CO₂ released into the environment.



Functional plant improvement

Over and above the evident positive aspects related to energy saving and safeguarding the environment, choosing new products and new technologies for air conditioning systems leads to considerable improvements in the construction and operation of equipment.

If we consider only general aspects, without going into the technical details, there are many advantages to be gained from using frequency converters: precise regulation of flow rate and pressure; rapid adjustment of pump and fan speeds to varying operating conditions; lower consumption at low speeds; operation at variable speed and power, without the need to continually stop and restart the system which is on the contrary indispensable in many traditional appliances to main-



tain optimum working conditions; reduction of mechanical and electrical stress on components; less wear and therefore a reduction in repairs and time required for maintenance; reduction in the noise produced by the fans; smaller-sized mechanical components and thus less space required for installation; improvement in the power factor, which approaches 1 without needing to be compensated by capacitors; elimination of registers and further reductions in the number of components.





ABB: motors, drives ... and much more

If high-performance motors and frequency converters are the two most specific ABB solutions permitting the achievement of the greatest financial and operational advantages from HVAC systems, the range of products offered by ABB for air conditioning applications is far wider. First of all the very extensive range of appliances and systems for low voltage power distribution, including switchboards in metal and in insulating material, control, protection and measurement devices, cabling and connection components, cable ducts, appliance holders and gangways. There is also a very extensive choice of industrial control, protection and automation products: overload cut-out switches, contactors, control and signalling units, programmable logic controllers, limit switches and sensors, process instrumentation, as well as soft starters that mitigate mechanical stress during the startup of pumps and fans working at a fixed number of revolutions.

Lastly, it should not be forgotten that ABB can supply building automation systems using the twisted pair bus technique which permit the integration of HVAC systems into a single management and supervision logic, controlling all the technological installations in a building.

In order to increasingly effectively satisfy the demands of professionals in this sector, ABB constantly updates the technological and functional characteristics of its equipment and increases its overall range, to ensure that users may in any case find the support necessary to attain their respective quality, safety and reliability goals.

In general, and depending upon the application for which each type of equipment is to be used, ABB products are compliant with the major international standards, in particular with those in force in Europe and North America, and with the requirements of the Shipping Bureaus.



Overview

LV motors

- *Standard motors*
- *Smoke venting motors*

Drives

- *On-board auxiliary converters*
- *LV converters*

Command and protection

- *Soft-starters*
- *Automatic circuit-breakers*
- *Contactors and thermal overload relays*
- *Command and signalling units*
- *Programmable logic controllers*
- *Isolators*

Building automation systems

- *ABB i-bus twisted pairs bus*





Enclosures and wiring components

- *Switchboards, distribution boards and cabinet*
- *Thermoplastic and halogen free wiring ducts*
- *Metal trunkings*
- *Plastic enclosures*
- *Cable trays*

Process instrumentation and measurements devices

- *Physical measuring instrumentation*
- *Actuators and I/P converters*
- *Measurement instruments and energy meters*





Products for general applications

Command and protection

■ Circuit-breakers and switches



Automatic

*MCBs (depending on the series): In up to 100 A; Icu up to 25 kA
MCCBs (depending on the series): In up to 630 A;
Icu 830/414 V c.a.) up to 200 kA*



Isolators

*Switch disconnectors: from 16 to 3150 A
Switch fuses: from 16 to 160 A
Enclosed safety switches*

■ Motor protection and command



MCCBs

*Moulded-case: In up to 630 A; Icu (400 V c.a.) up to 50 kA
Modular motor starters: regulation field from 0.1 to 100 A*

Contactors and miniature size contactors

For power up to 400 kW (depending on the series)

Thermal overload & protection relays

*Bi-metal
Electronic*

Starters

DOL, star-delta, reversing for normal and severe starters

Command and signalling units (modular and compact versions)

*Push-buttons, switches, warning lights,
luminous floor boxes*

■ Programmable logic controllers



Logic modules

AC010: from 12 to 40 I/O

PLCs

Up to 1000 I/U in remote configuration

■ Devices for auxiliary functions



Electronic timers

Electronic industrial relays

For current, voltage, temperature, phase controls etc.

■ Equipment mounted components



Limit switches and sensors





Enclosures and wiring components

Sheet-steel boards



Boxes, multipurpose enclosures

- H: from 300 to 1200 mm, W: from 200 to 800 mm,
- D: from 150 to 300 mm

Switchboards and cabinets

- H: from 1800 to 2200 mm, W: from 400 to 1200 mm,
- D: from 300 to 1000 mm

Wiring components



Thermoplastic wiring ducts

- With vertical slots
- Flexible wiring ducts
- With lateral knockouts
- Halogen free wiring ducts

Metal trunkings

Terminal blocks assemblies

Terminals for remote controls



Self stripping connections in A.D.O. technology

Screw and spring terminals

Faston terminals

Power connections

Studs

Motors and generators

LV motors and generators



Three-phase induction motors

- Aluminium, cast iron and steel frames;
- **EFF 1** and **EFF 2** efficiency classes

Single-phase motors

Motors for hazardous area (ATEX)

Non-sparking EEX nA

Increased safety EEx e

Flameproof EEx d/EEx de

Dust Ignition Proof (DIP)

Wiring components

Special for use with drives

Integral motors

Smoke venting motors

MV motors



Induction

- Modular: output power up to 18000 kW
- Slip Ring: output power up to 8000 kW
- Ribs cooled: output power up to 2250 kW
- Flameproof: output power up to 4500 kW

Synchronous

- Output power up to 70 MW

DC Motors

Output power up to 3200 kW



Products for general applications

Drives

■ LV converters



PWM technology (ACS50, ACS100, ACS140, ACS160, ACS550, ACH550)

- For all applications up to 355 kW



DTC technology (ACS 800)

- Power from 1.1 to 3000 kW, voltages from 220 to 600 V, IP00-IP54
- SingleDrive and MultiDrive



■ Direct current drives



DCS series

- Power from 10 to 20000 kW, voltages from 220 to 1000 V, IP00-IP31
- SingleDrive and MultiDrive

■ MT converters



DTC technology

- Power from 315 to 5000 kW, voltages from 2.3 – 3.3 to 4.16 kV





Process instrumentation

Instrumentation for chemical and physical measuring



Pressure, differential pressure, level

- Complete range of smart electronic transmitters, also Fieldbus Pneumatic transmitters

Temperature

- Field and control panel transmitters
- Thermocouples, thermoresistances and cables
- Barriers and remote I/O

Flow

- Electromagnetic flowmeters
- Vortex, Swirlmeters
- Variable area
- Thermal mass and Coriolis mass flowmeters
- Sensyflow mass flowmeters for air and gas
- Battery-powered meters with GSM transmission

Liquids analysis

- Sensors and transmitters for pH/Redox, conductivity, dissolved oxygen, turbidity
- Ion selective, colorimetric and UV monitors

Heat computing

Control instruments



Controllers and recorders

- Microprocessor based controllers
- Continuous line and multipoint videographic recorders
- Analog and digital indicators

Process management

- Scalable process management
- Fieldbus applications

Regulation and actuation



Converters

- Field I/P converters

Actuators

- Conventional diaphragm actuators
- Electrical actuators

Positioners

- Pneumatic and electro-pneumatic, also Smart





Products for general applications

Other products

■ Building Automation systems



ABB i-bus EIB
– Twisted pair bus



■ Building Automation systems



Consumer units and special enclosures in various protection categories
Emergency enclosures
Modular enclosures for IEC 309-1 sockets

■ Trunking systems



Feeder and cable trunkings
Industrial trunkings and cable trays

■ Metal distribution boards



Switchboards, installation boards, distribution boards, monoblock and kit up to 3200 A

■ Measurements devices



Electronic energy meters
– Single-phase and three-phase meters
Measurements instruments
– Digital and analogue instruments





Services

Low voltage on line

An Internet site that is a real working instrument, divided into various sections including indexes of all products, selection and coordination tools, news and documentation.



Product indexes

Full information on the range of control and automation products and installation and distribution equipment is available either by categories (eg. circuit-breakers) and in alphabetical order so that it can be found at each visitor's ease and needs.

Product selection and coordination

A range of tools to select the products that best fit in each specific application, to coordinate them for back-up and motor protection, to choose the most appropriate kits for retrofitting. All are easy and friendly to use.

Technical library

The multilingual collection of all manuals, catalogues, certificates, drawings, pictures and other documents available for our range of products in each country. Files are saved in PDF format and can be downloaded for free. The news section provides for the most updated information about products.

Contact lists

The addresses, e-mails and web sites of ABB local contacts all over the world to be as close as possible to our customers and always fulfil their expectations.





System pro *M* compact®: To cover all challenges in air conditioning applications



A wide product range suitable for all applications in residential, industrial and commercial installations. Thanks to the compatibility between the new System pro *M* compact® range and the System pro *M* range, ABB offers many additional functionalities like:

- protection and switching
- checking and monitoring
- control and programming

Shape and dimensions of the new series allow both precise adapting in already existing installations and continuity in terms of profile and appearance.

Time saving in cross-wiring within groups and combinations of devices is another advantage.

The technologically innovative bidirectional cylinder-lift terminal enables synchronous closing of the front and rear wiring input.

Highest safety standard for the installer thanks to protection against electric shock according to EN 41140.

Marking of devices is reliable and clear.

Both supply and connection with busbars from top or bottom is admitted.





- Special characteristics like K and Z
- Universal products for international use IEC + UL + CSA
- Wide range for all different levels of requirement



The System pro M compact® range

■ MCBs:

- new circuit-breakers

■ RCDs:

- new residual current circuit-breakers (RCCBs)
- new RCD-blocks
- new residual current circuit-breakers with overcurrent protection (RCBOs)

■ Auxiliary elements:

- new universal signal contact switch/auxiliary switch
- new auxiliary switch for circuit-breaker extensions
- new shunt release
- new undervoltage release

■ MDRCs-Surge protection devices

■ MDRCs-Protection devices

In addition to MCBs and RCDs, ABB supplies other modular devices for protection such as residual current relays and fuse holders.

■ MDRCs-Command devices

This category includes devices that are operated manually to command the electric system: contactors, latching relays, switchisolators, switches, pushbuttons etc. Typically they are installed to control lights from several points of the same circuit or to pilot user devices with a high number of operations.

■ MDRCs-Load management devices

Overload relays, load management switches, anti black-out lamps, time switches and the other modular devices in this category react automatically to variations of parameters and other events in the system to allow for plant optimisation.

■ MDRCs-Measurement devices

The range of devices in this category is very wide, including a great number of auxiliary components and accessories that make installation in switchboards and consumer units practical and economic.

■ MDRCs-Other devices

The range of ABB MDRCs also includes bells, transformers etc.

■ Various accessories



System pro M compact®: To cover all challenges in air conditioning applications



MCBs are also available with an integrated auxiliary contact (1 NO or 1 NC). Existing installations can be easily upgraded to include auxiliary switch functionality.



Availability of a quite wide range of factory fitted RCBOs.



RCD-blocks DDA 200 2P, 3P, 4P up to 40 A fit into two modules. Versions in 63 A sizes are supplied with two additional terminals for remote tripping.



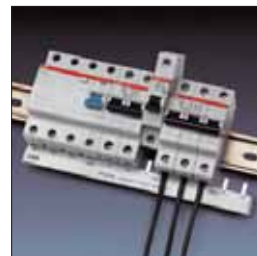
Universal signal/auxiliary and auxiliary contacts fit on S 200, F 200 and DS 200.



Without busbars two terminal spaces can be used for cables with different cross sections: incoming supply with supplementary terminal up to 50 mm² from the front side.



Safe connection between DDA 200 and S 200 thanks to not losable coupling elements, opportunely shaped pins and plastic clamps.



Special quick fastening for an easy removal of the devices from the assembly pressing upwards, both for MCBs S 200 and RCBOs F 200: the only in the market that can be removed without a screw-driver.



More working space between component rows.



- Special characteristics like K and Z
- Universal products for international use IEC + UL + CSA
- Wide range for all different levels of requirement



New System pro M compact® range is compatible with the System pro M range, thanks to the configuration of new vs old terminals.



Supply from top or bottom either with cables or busbars.



Safe terminal technology: the terminals offer protection from misconnection.









ABB STOTZ-KONTAKT GmbH

P.O. Box 10 16 80, 69006 Heidelberg, Germany
Eppelheimer Straße 82, 69123 Heidelberg, Germany
Telephone +49 (0) 6221/701-0
Telefax +49 (0) 6221/701-240
www.abb.de/stotz-kontakt
E-mail: info@de.abb.com