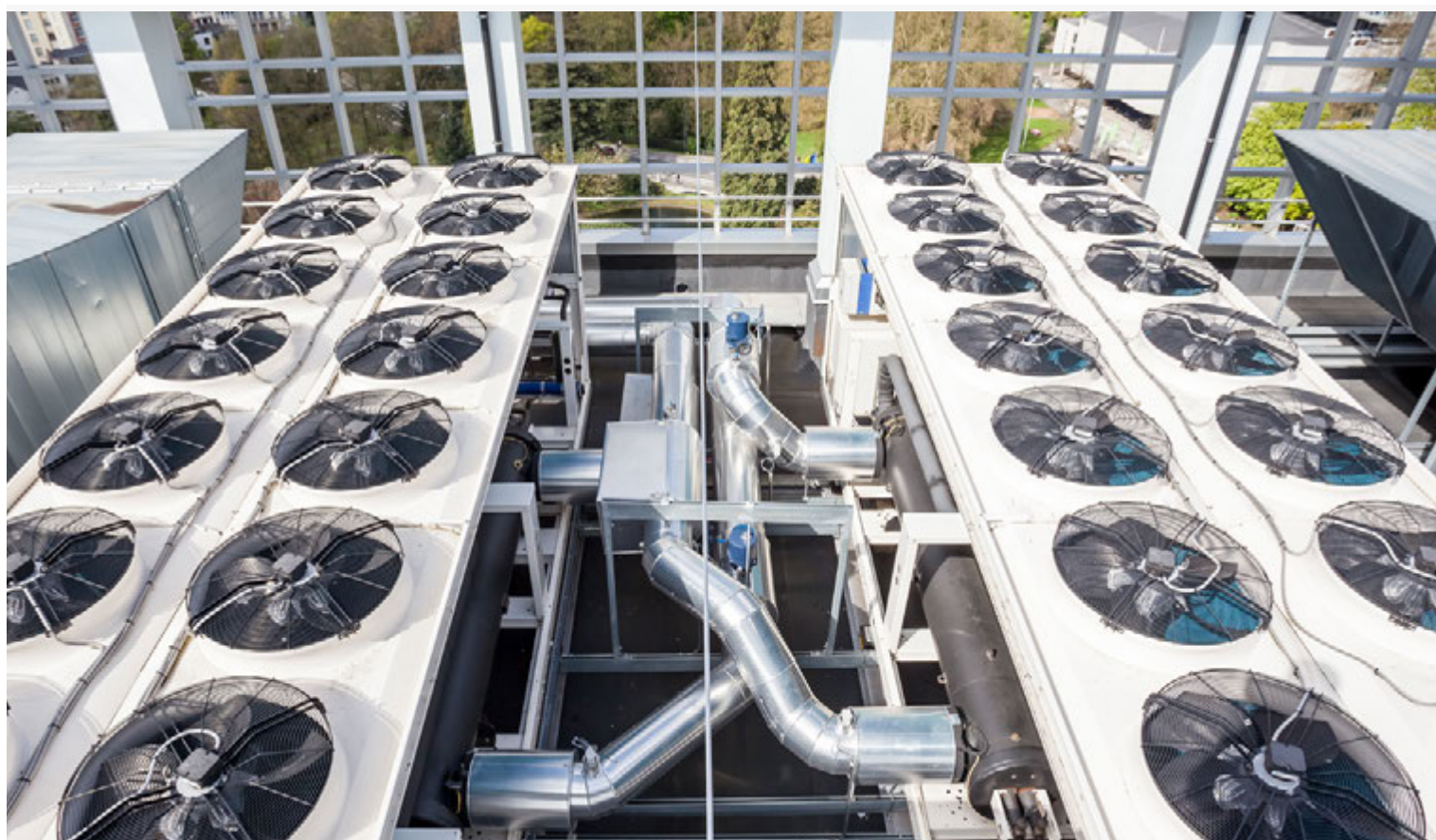


BROCHURE

# Motor starting and protection solutions for HVAC chiller systems

Keep your environment cool



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**Heating and cooling are more than a luxury in today's world, they are a necessity where we live and work in.**

**Our best-in-class solutions and innovative product portfolio for full-speed motor starting and protection provide safety, operational performance, higher availability, easy installation, and energy efficiency to keep your chiller systems always running.**

**So, don't compromise. Keep your environment cool.**



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# Application overview



# Everything counts in HVAC

## The system to keep your environment cool

Your HVAC systems need to work no matter what. Heating and cooling are more than a luxury in today's world. They are a necessity to ensure better air quality and environmental comfort where we live and work in. For this reason, it is more and more crucial to make HVAC systems more efficient every day, to lower energy consumption and keep our environment clean.

Among other applications, chiller systems are increasingly drawing our attention, making compressors more critical in every process and every building.

In fact, compressors are often the largest individual load and chiller systems can easily be designed to operate with efficient and reliable full speed motor starting and protection to start the compressors.

ABB's solutions chose to address this challenge! Our best-in-class solutions and innovative product portfolio of full-speed motor starting and protection provide safety, higher availability, improved operational performance of your chiller system, together with easy installation and energy efficiency.

**So, don't compromise. Keep your environment cool!**



# HVAC main application areas

Where ABB can provide full-speed motor starting and protection solutions

**HVAC - Heating, Ventilation, and Air Conditioning** is about “Climate Control”.

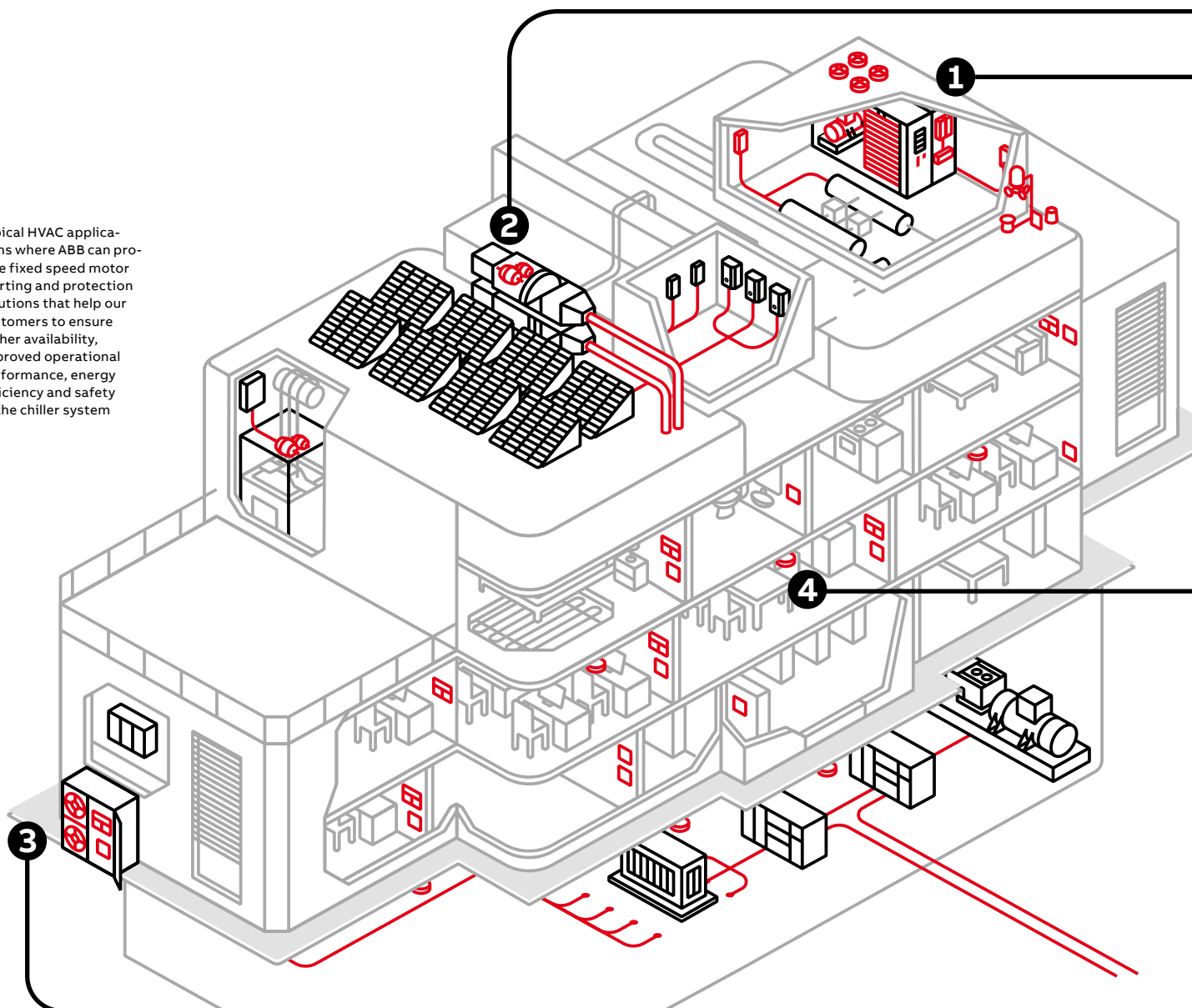
There are two kinds of broad application areas in HVAC systems: Comfort applications and Process applications.

**Comfort applications** ensure that the inside air environment is comfortable for the person by controlling the indoor air quality, balancing temperature, humidity, and air velocity. These sorts of applications not only apply in all types of build-

ings, from residential and public to commercial and industrial buildings, but also in transport like buses, trains, boats, and airplanes.

**Process applications** provide the correct environment for a specific process, regardless of internal heat and humidity loads and external weather conditions. Although often in the same range as that required by comfort applications, it is the defined needs of the process that will determine conditions and not the conditions which humans will find comfortable.

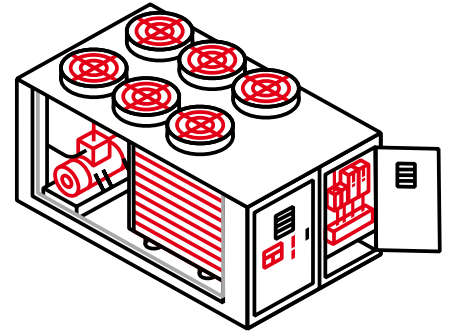
01  
Typical HVAC applications where ABB can provide fixed speed motor starting and protection solutions that help our customers to ensure higher availability, improved operational performance, energy efficiency and safety of the chiller system



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**Chiller system**

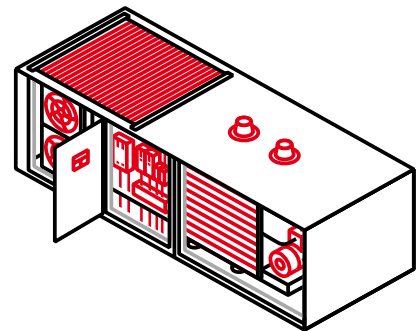
A chiller system is a machine that removes heat from a liquid through vapor compression.



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**AHU - Air Handling Unit**

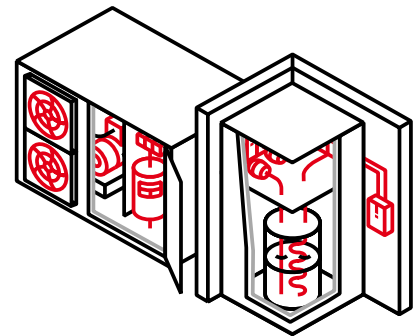
As part of an HVAC system, AHU is used to condition and circulate air.



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**Heat pump-**

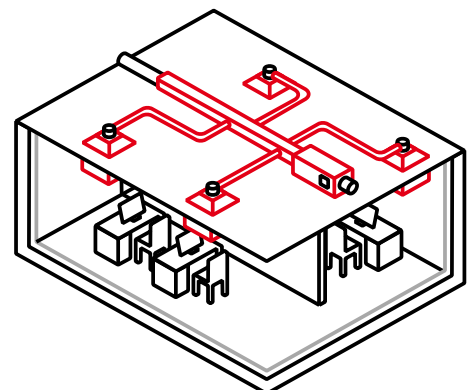
A heat pump is a mechanical-compression cycle refrigeration system that can be reversed to either heat or cool a controlled space.



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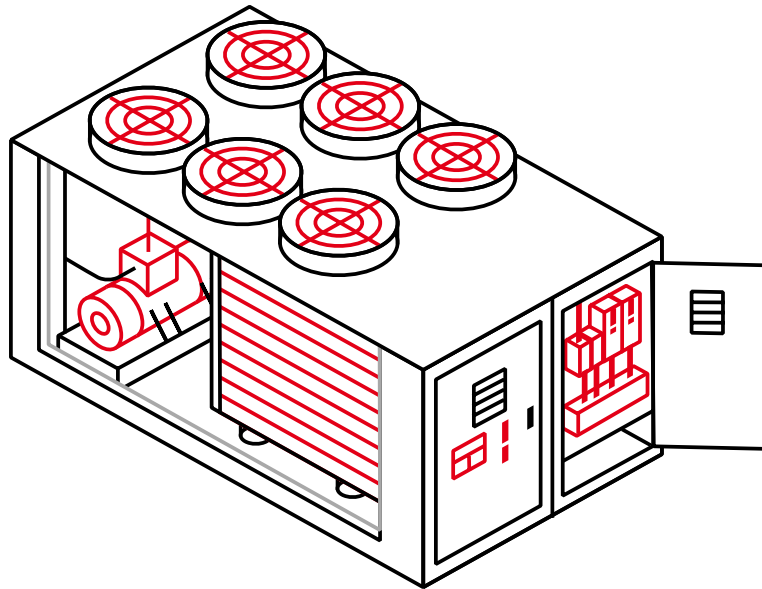
**Ventilation system**

Ventilation is the process of exchanging or replacing air in any space to provide high indoor air quality.



# Chiller System

02  
Close-up of a typical  
Chiller System

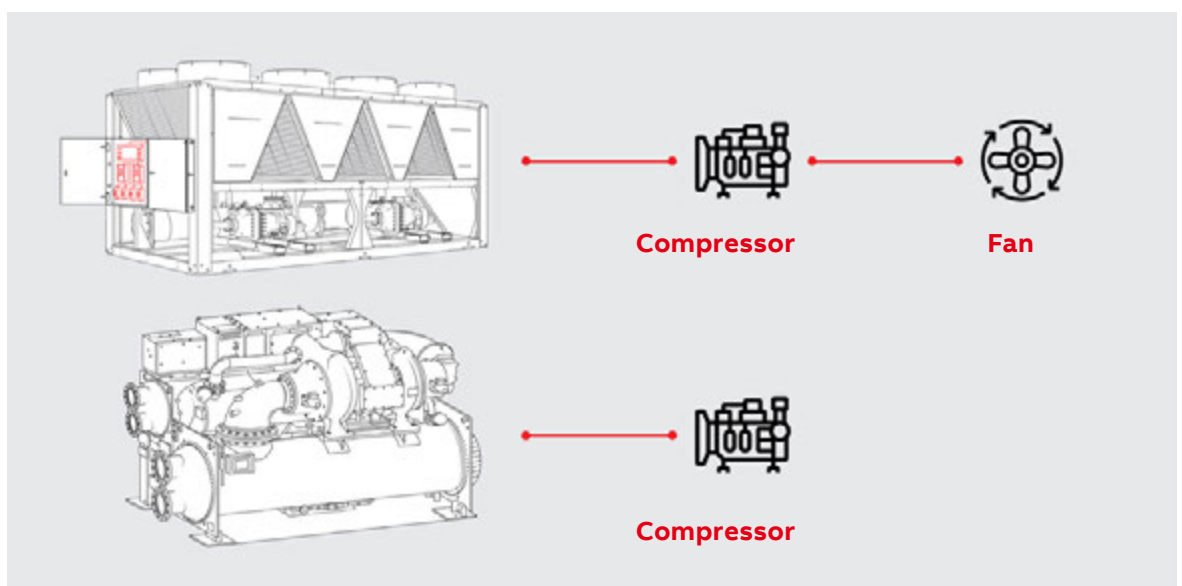


A **Chiller System** is a machine that removes heat from a liquid coolant via a vapor-compression or absorption refrigeration cycle. This liquid can then be circulated through an AHU to condition and circulate air.

**Vapor compression chillers** may use different types of compressors but the most common today are the **hermetic scroll**, **semi-hermetic screw**, or **centrifugal compressors**.

Chillers can then be divided into rooftop and basement chillers. Rooftop chillers are usually **"Air-cooled"**, whereas basement chillers are usually **"Water-cooled"** but they both perform the same function: to generate cold water for air conditioning by removing the unwanted heat from the building.

03  
Scope of application  
in "Water-cooled" and  
"Air-cooled" chillers

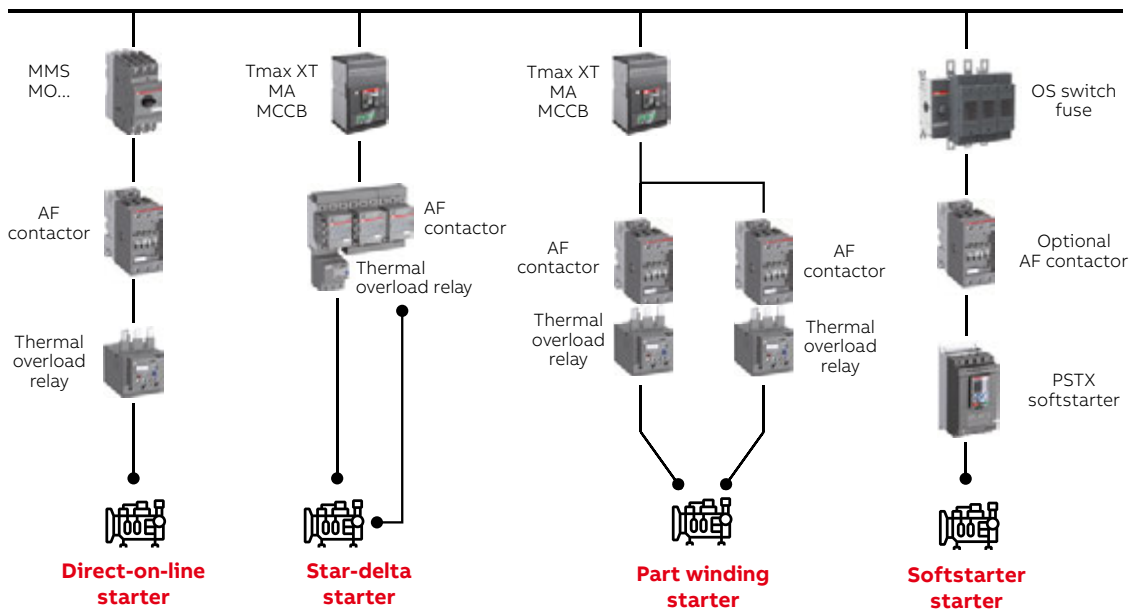




### Compressor

The compressor **is the heart of the air conditioning system**. It is responsible for moving the refrigerant between the evaporator and condenser coils, ensuring that the refrigerant changes to gas or liquid as needed. The refrigerant gas is compressed into higher pressure and higher temperature gas by the compressor.

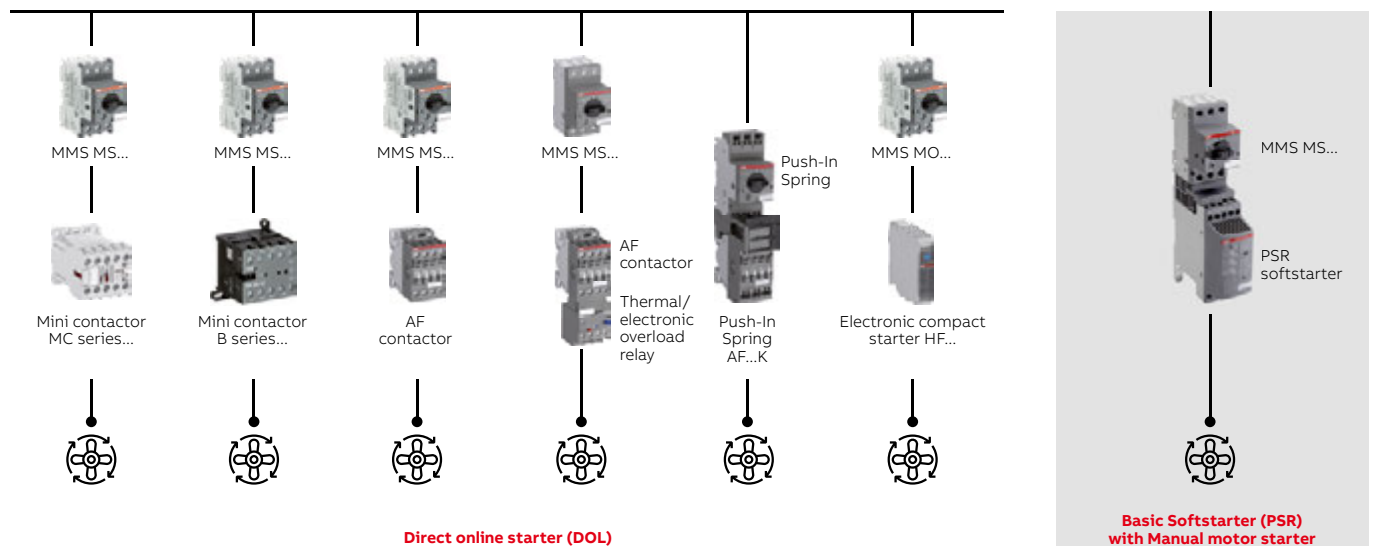
04  
Full speed motor  
starting and protection,  
recommended starter  
type for compressor



### Condenser fan

The condenser fan **is the key to the lifespan of your HVAC unit**. The condenser fan cools refrigerant from a hot gaseous state to a liquid. When the condenser fan is well-maintained, it prolongs the life of the entire HVAC unit.

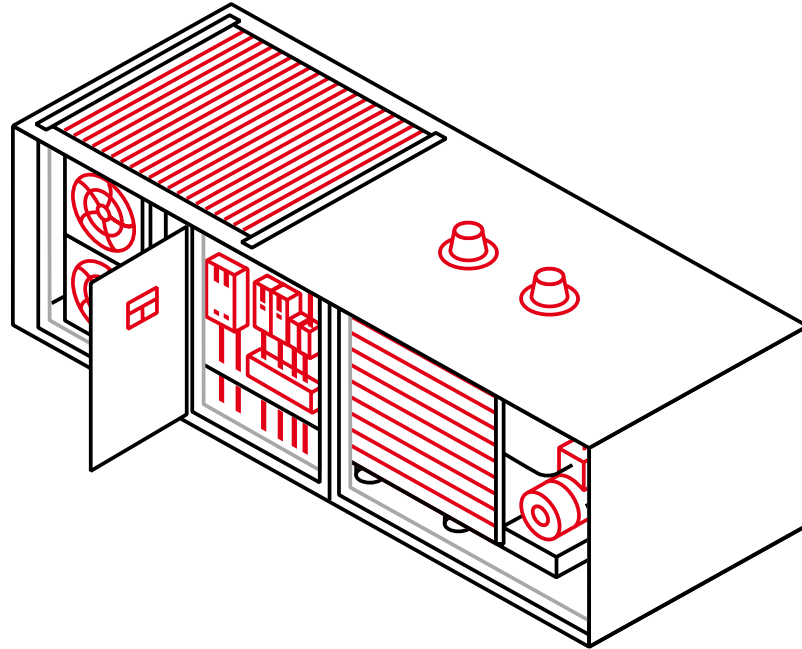
05  
Full speed motor  
starting and protection,  
recommended starter  
type for condenser fan



Note:  
MMS = Manual Motor Starter      MO = Magnetic protection      MS = Magnetic & Thermal protection

# AHU - Air Handling Unit

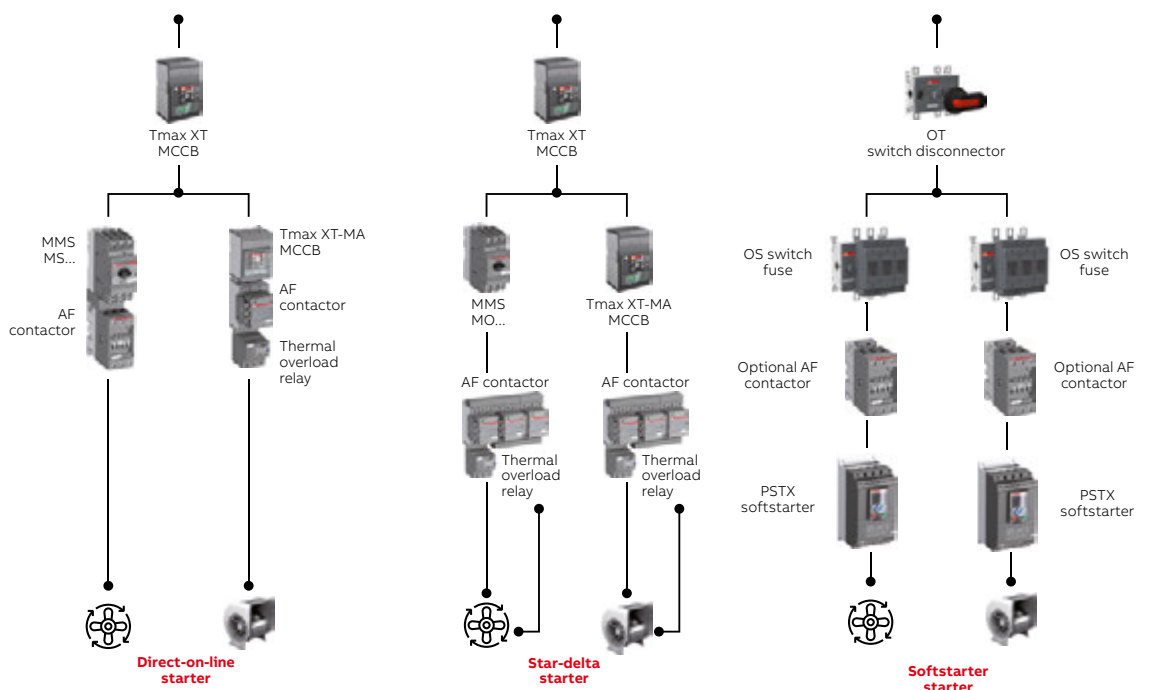
06  
Close-up of a typical  
AHU - Air Handling Unit



**AHU** is used to condition and circulate air as part of an HVAC system. An AHU usually contains a **fan/blower, heating or cooling elements, filter racks or chambers, sound attenuators, and dampers**. AHU is usually connected to a ductwork

ventilation system, that distributes the conditioned air through the building and returns it to the AHU as part of an HVAC system.

07  
Full speed motor  
starting and protection,  
recommended starter  
type for ECM fan/blower



Note:

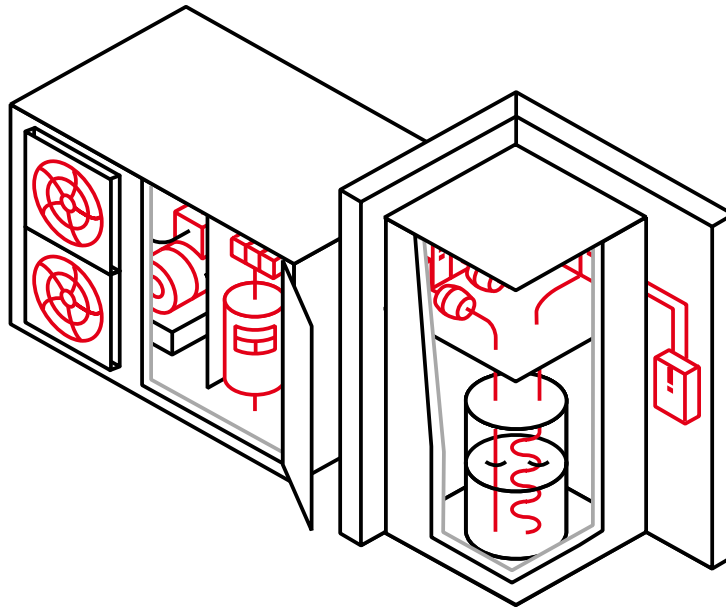
MMS = Manual Motor Starter

MO = Magnetic protection

MS = Magnetic & Thermal protection

# Heat Pump

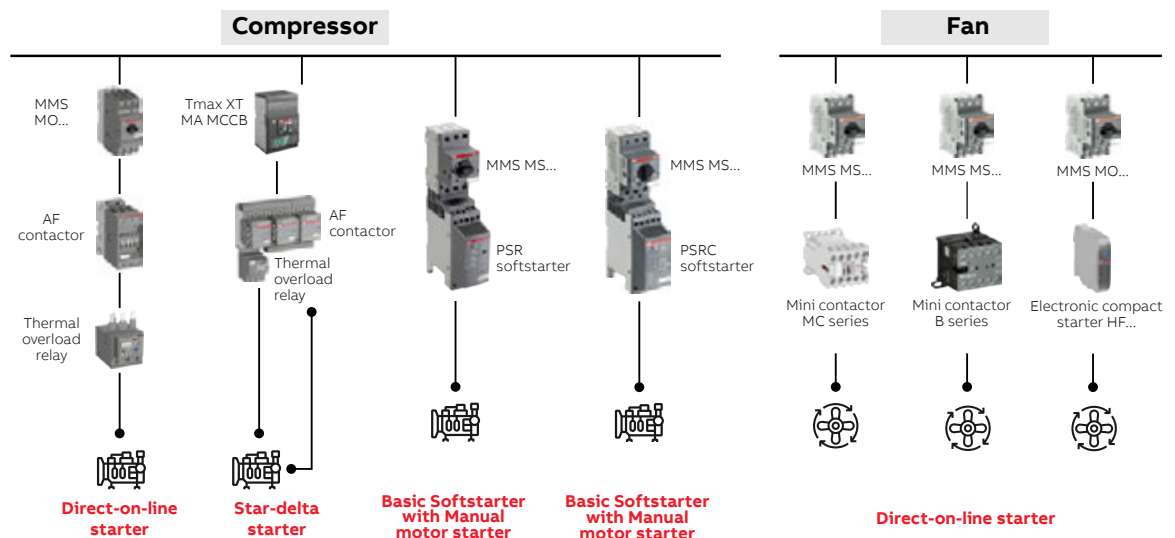
08  
Close-up of a typical  
Heat pump



A **heat pump** is a mechanical-compression cycle refrigeration system that can be reversed to either heat or cool a controlled space. The heat pump both brings heat into an occupied space and takes it out. A heat pump able to provide both heating and cooling is called a reversible heat pump. In the cooling mode, a heat pump works in the same way as an ordinary air condi-

tion. When a heat pump is used for heating, it employs the same basic refrigeration-type cycle used by an air conditioner or a refrigerator but in the opposite direction, releasing heat into the conditioned space rather than the surrounding environment. In this use, heat pumps generally draw heat from the cooler external air or the ground.

09  
Full speed motor starting and protection, recommended starter type for Compressor & Fan



Note:

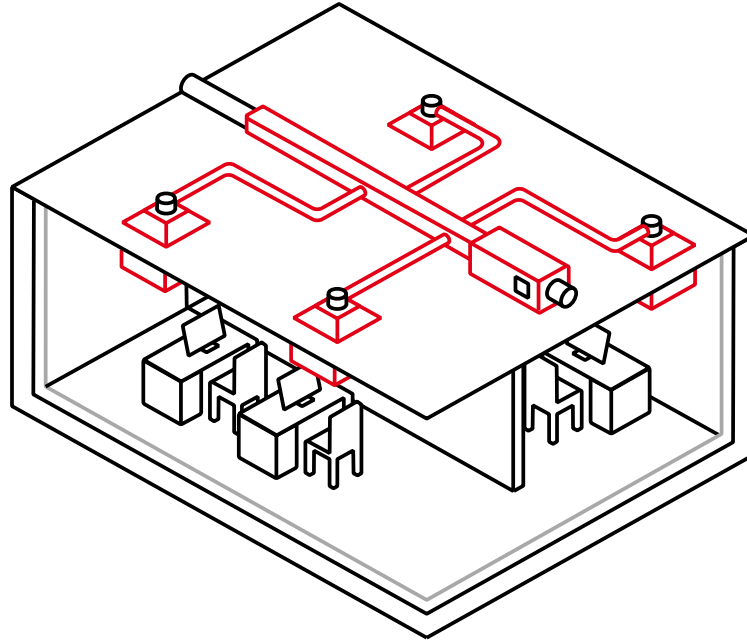
MMS = Manual Motor Starter

MO = Magnetic protection

MS = Magnetic & Thermal protection

# Ventilation System

—  
10  
Close-up of a typical  
Ventilation System



**Ventilation** is the process of exchanging or replacing air in any space to provide high indoor air quality. This process involves temperature control, oxygen replenishment, and removal of moisture, odors, smoke, heat, dust, airborne bacteria, carbon dioxide, and other gases. Ventilation removes unpleasant smells and excessive moisture, introduces outside air, keeps interior building air circulating, and prevents stagnation of the interior air.

Ventilation often refers to the intentional delivery of the outside air to the building's indoor environment. It is one of the most important factors for maintaining acceptable indoor air quality in buildings.

The ventilation system is mainly made of mechanical components, such as ducts and filtering systems. These systems control the airflow rate and temperature inside the buildings, by switching On and Off the small motor or damper control. The small motor or damper model/type depends on the design of the ventilation system.





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# **ABB's solutions for chiller systems**



# Chiller systems

## A critical process in your HVAC installations

Providing a comfortable environment has become essential in the buildings where we live and work, in order to guarantee the wellness of employees and occupants.

Since they are responsible for preserving the right temperature and humidity levels in buildings, chiller systems have become one of the most critical components in HVAC installations. Today, they are used in any HVAC system in a wide variety of commercial facilities, including hotels, restaurants, hospitals, sporting arenas, industrial and manufacturing plants, etc.

This not only makes them responsible for the wellness of billion of people around the world so that we need to find solutions to ensure their continuous operation but also the single largest consumer of electricity in most facilities so that we

need to strive to reduce heating and cooling wastefulness and increase energy efficiency.

Discover ABB's wide product portfolio for full-speed motor starting and protection to keep running your chiller systems with improved safety and operational performance, together with increased energy efficiency and easier installation.



# A complete solution for your chiller system

Make the difference with continuous operation and energy efficiency

Everyone involved in designing and managing HVAC installations faces new challenges every day, from ensuring higher availability of the chiller system to improving its operational performance while delivering the most compact design.

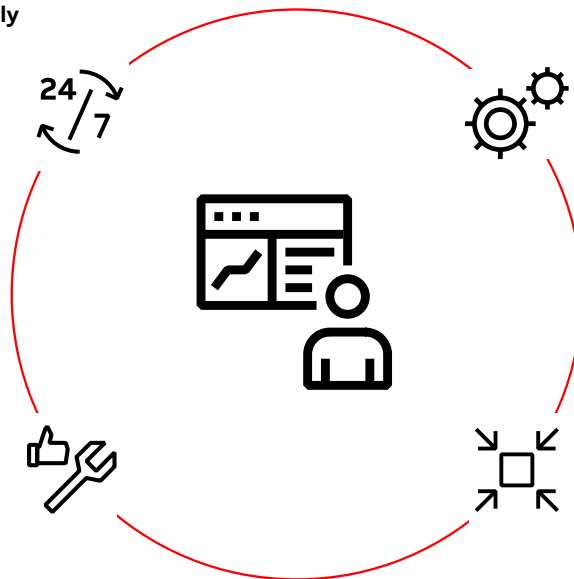
—  
11  
Nowadays key  
challenges for  
chiller systems

**Higher availability of the chiller system, especially for process and critical segment**

**Increase energy efficiency**

**Easy installation and fast commissioning to accelerate production and easy turnover**

**Compact design of components due to limited space in the control panels**



Our best-in-class solutions are designed to improve the performance of your chiller systems and make it easy for you to keep them running no matter what.





**10%**

### Continuous Operation

Reduce chances of failure of your chiller system by **10%** and ensure its higher availability with reliable connections and coordinated products from a reliable supplier.



**80%**

### Energy efficiency

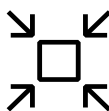
Reduce energy consumption in the control circuit system by up to **80%**, thanks to our solutions that can be operated with less power supply, and to the AF technology that ensures less heat dissipation and a reduction in temperature rise.



**50%**

### Easy installation

Reduce control panel assembly time by up to **50%** with our wide range of easy-to-use accessories and connection sets. This provides savings on labor costs, cuts the total cost of the installation, and reduces time to market.



**35%**

### Compact Design

Save up to **35%** of the space in the control panel of your chiller system thanks to our solutions with the most compact design that easily fits into your application and allows you to reduce control panel dimensions and costs.





# ABB's offerings

# Motor starting and protection solutions for HVAC chiller systems

## Keep your chiller system always running

ABB offers a wide range of products to keep your HVAC chiller systems running with protection and control at every level. With the Essential, Enhanced, and Advanced offer, ABB has the right solution for every customer's need.

### Essential Solution | Get the essentials right with fast and reliable installations

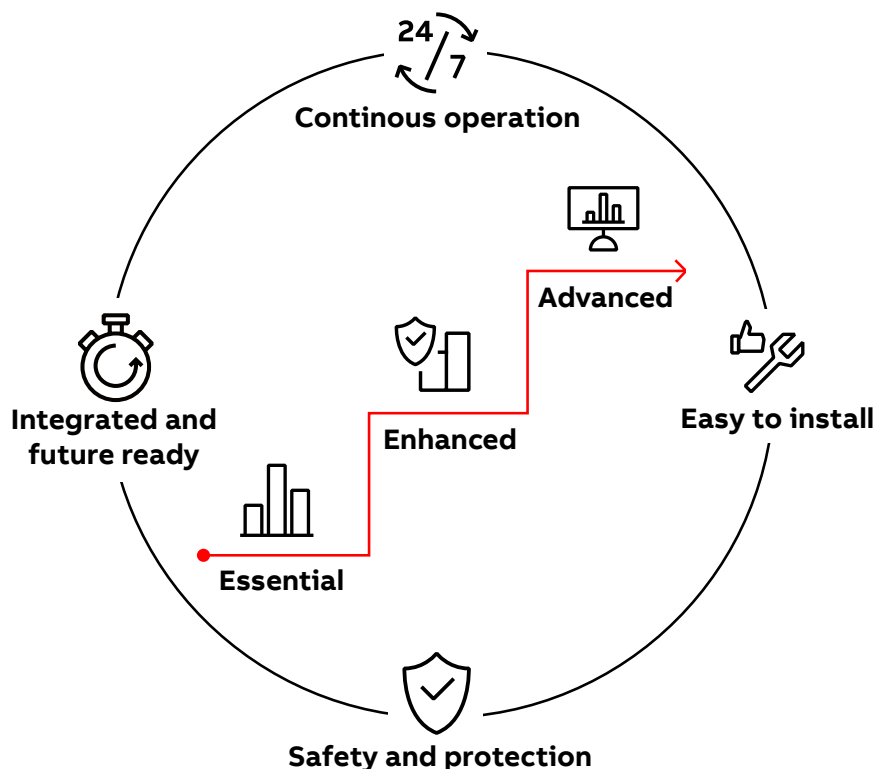
With this basic solution, we ensure that combinations of core power devices work in coordination. They provide continuous operation and guarantee easy installation. This category typically covers requirements for stand-alone machinery.

### Enhanced Solution | Get robust protection with enhanced safety, control, and monitoring

With the enhanced solution, we add enhanced control, safety, and monitoring for applications in the field of discrete automation. This solution in the HVAC systems includes the thermistor motor protection relay and under or over voltage monitoring relay. Other requirements can be addressed.

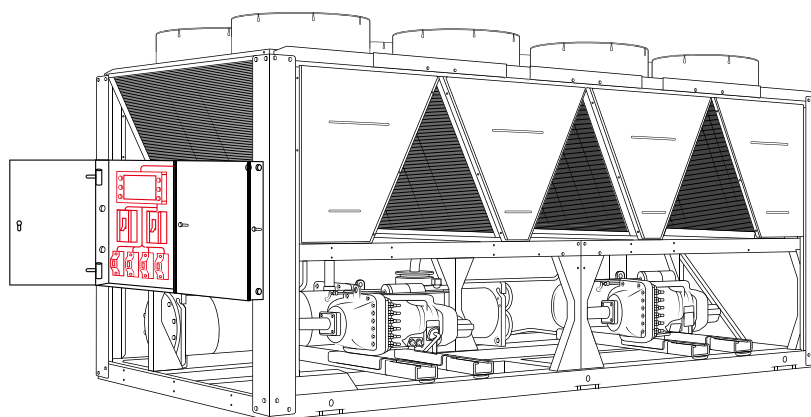
### Advanced Solution | Get ahead with smart data and predictive applications, to keep your planning running

The Advanced solution consists of integrated and future-ready motor control and protection solutions that are required for various industrial processes. Choosing the Advanced solution for your HVAC system means: integrated and future-ready motor protection, and flexible motor control, fault diagnostics and maintenance as well as compatibility with major communication protocols.

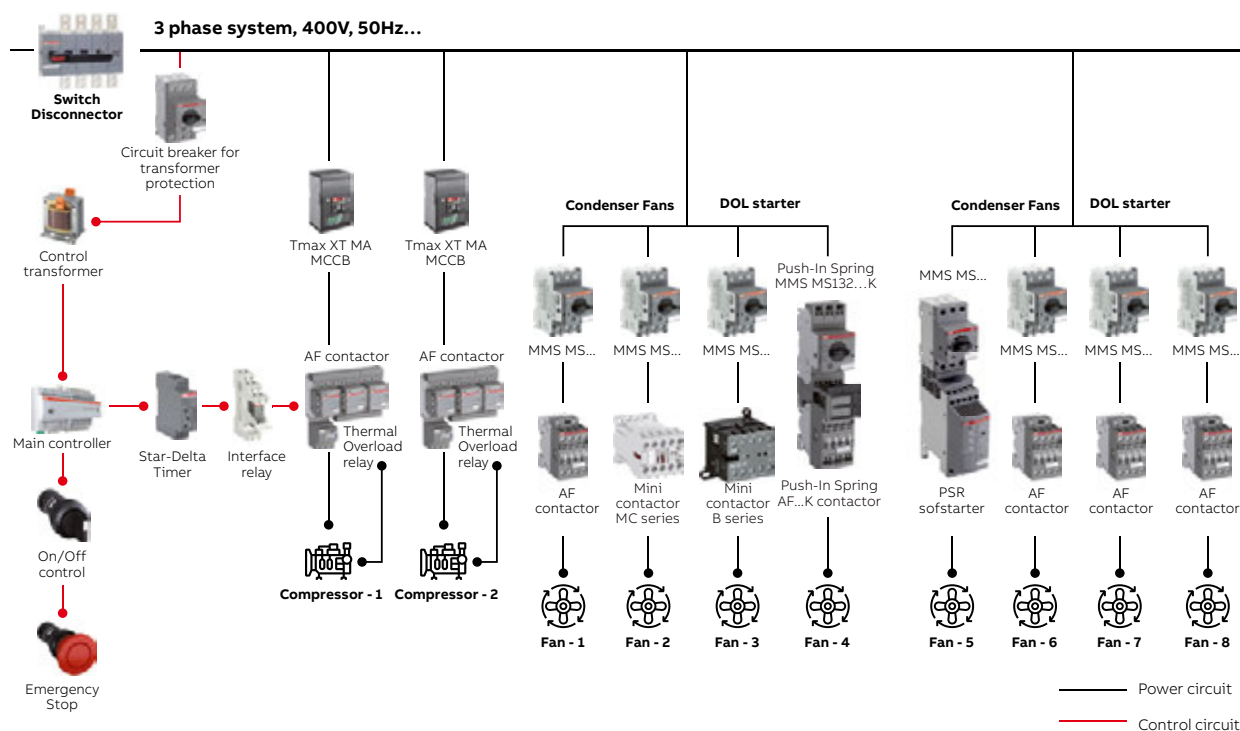


Keep your chiller system running with protection and control at every level

— Typical Air-cooled chiller



Offerings for motor rating 0.06 up to 560 kW



**Note:**

**MMS = Manual Motor Starter**

MO = Magnetic protection

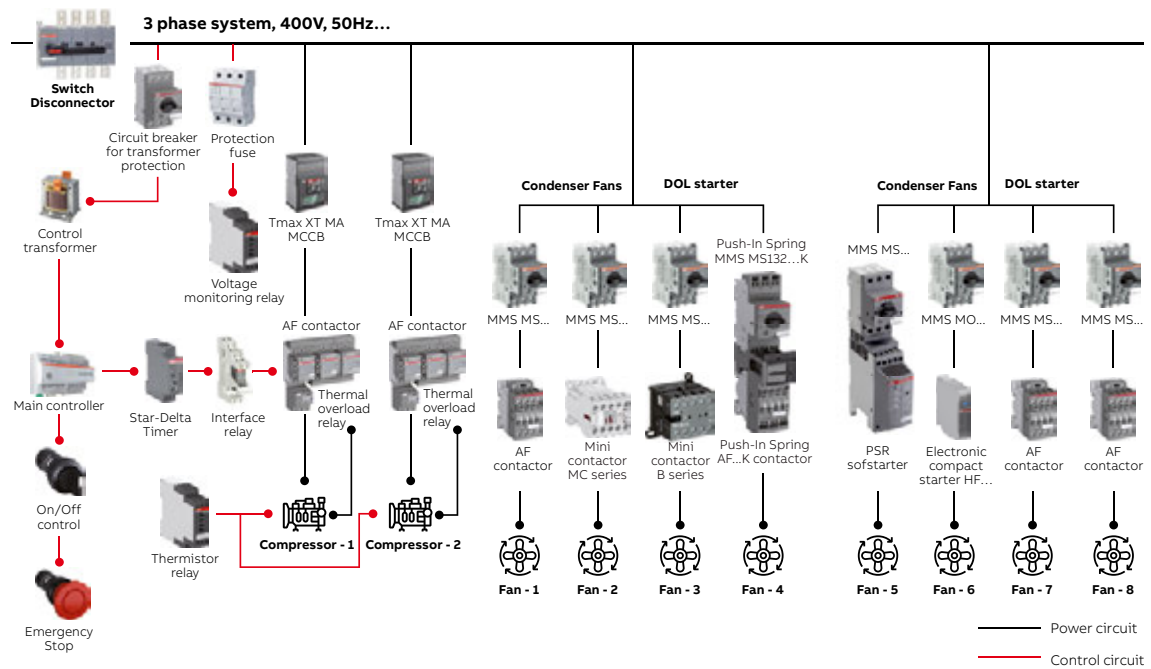
MS = Magnetic & Thermal protection





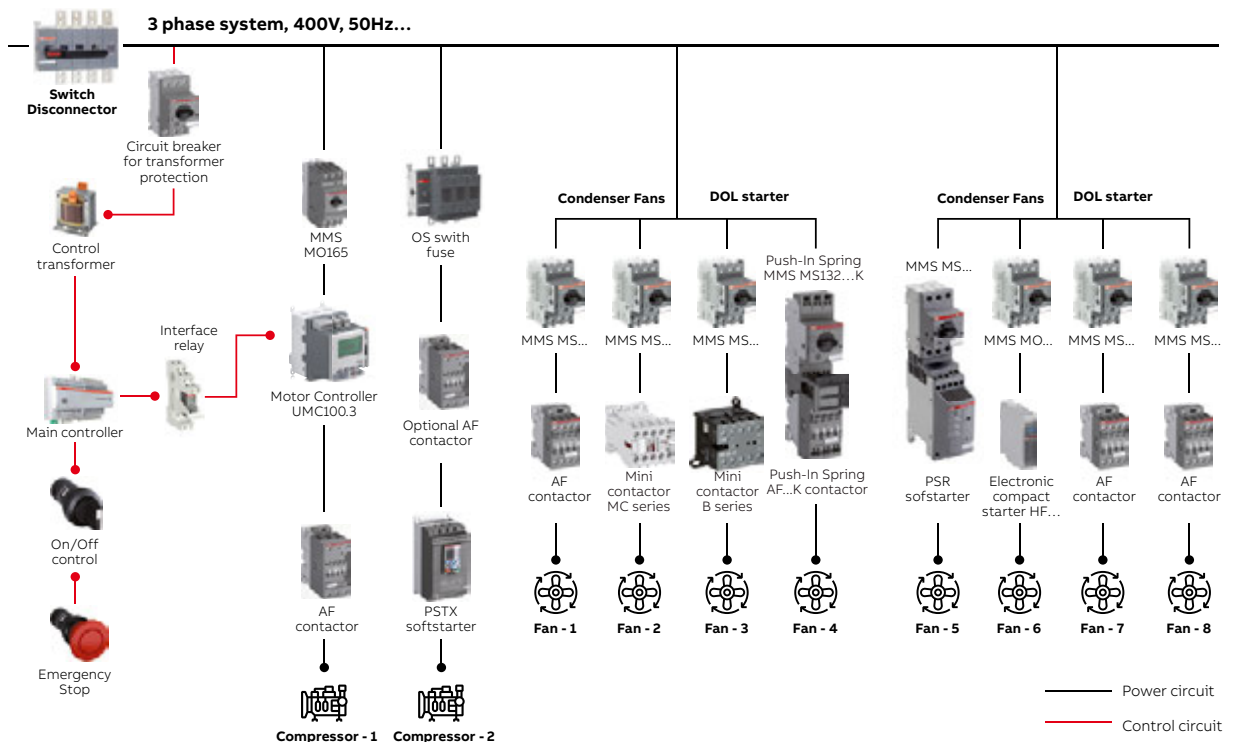
### ABB's Enhanced solution for motor starting

Offerings for motor rating 0.06 up to 560 kW



### ABB's Advanced solution for motor starting

Offerings for motor rating 0.06 up to 1200\* kW



\* 1200kW for Softstarter connected in inside delta

Note:

MMS = Manual Motor Starter

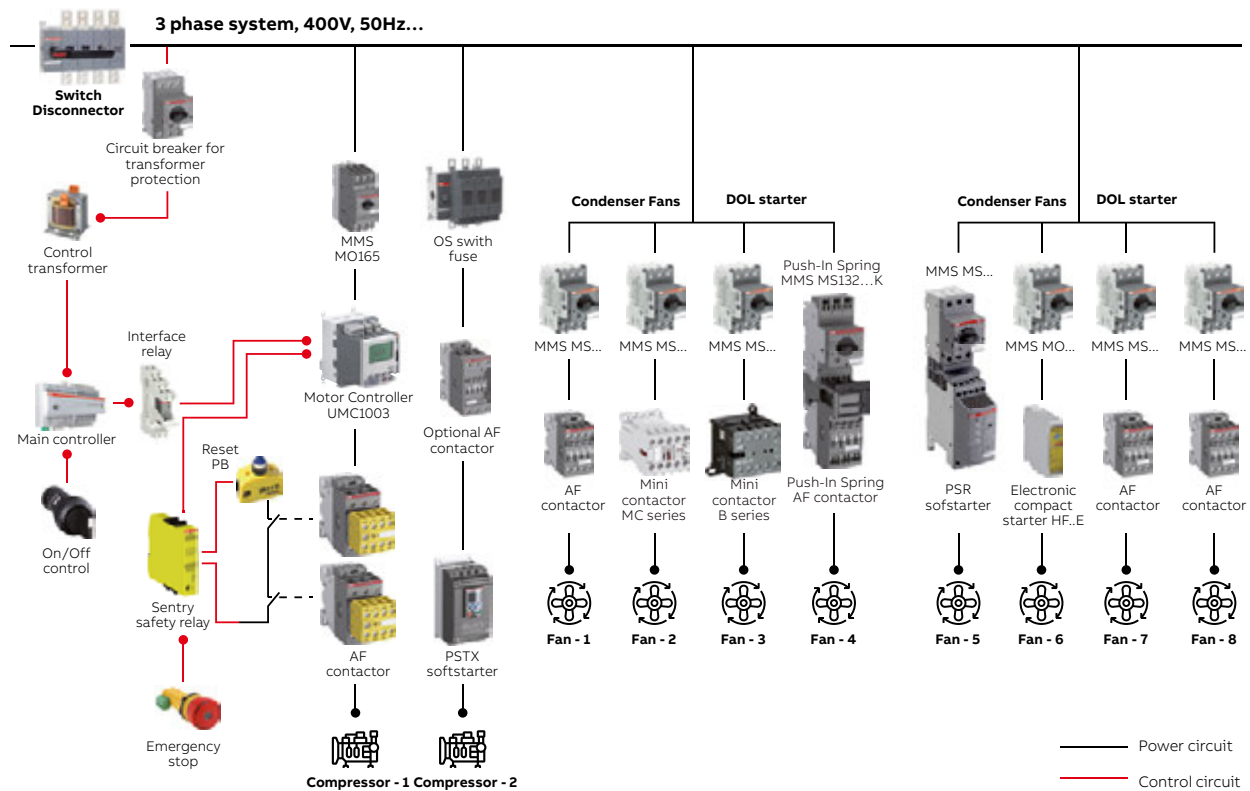
MO = Magnetic protection

MS = Magnetic & Thermal protection



### ABB's Advanced Safety solution for motor starting

Offerings for motor rating 0.06 up to 1200\* kW



\* 1200kW for Softstarter connected in inside delta

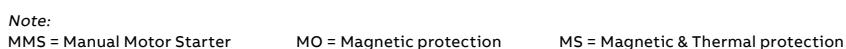
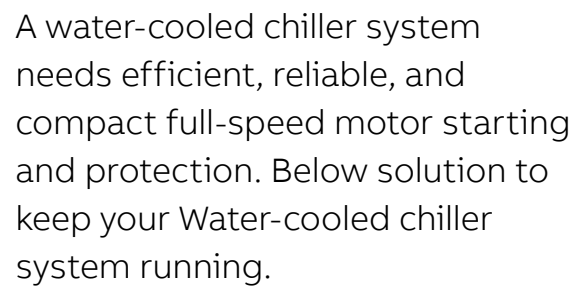
Note:

MMS = Manual Motor Starter

MO = Magnetic protection

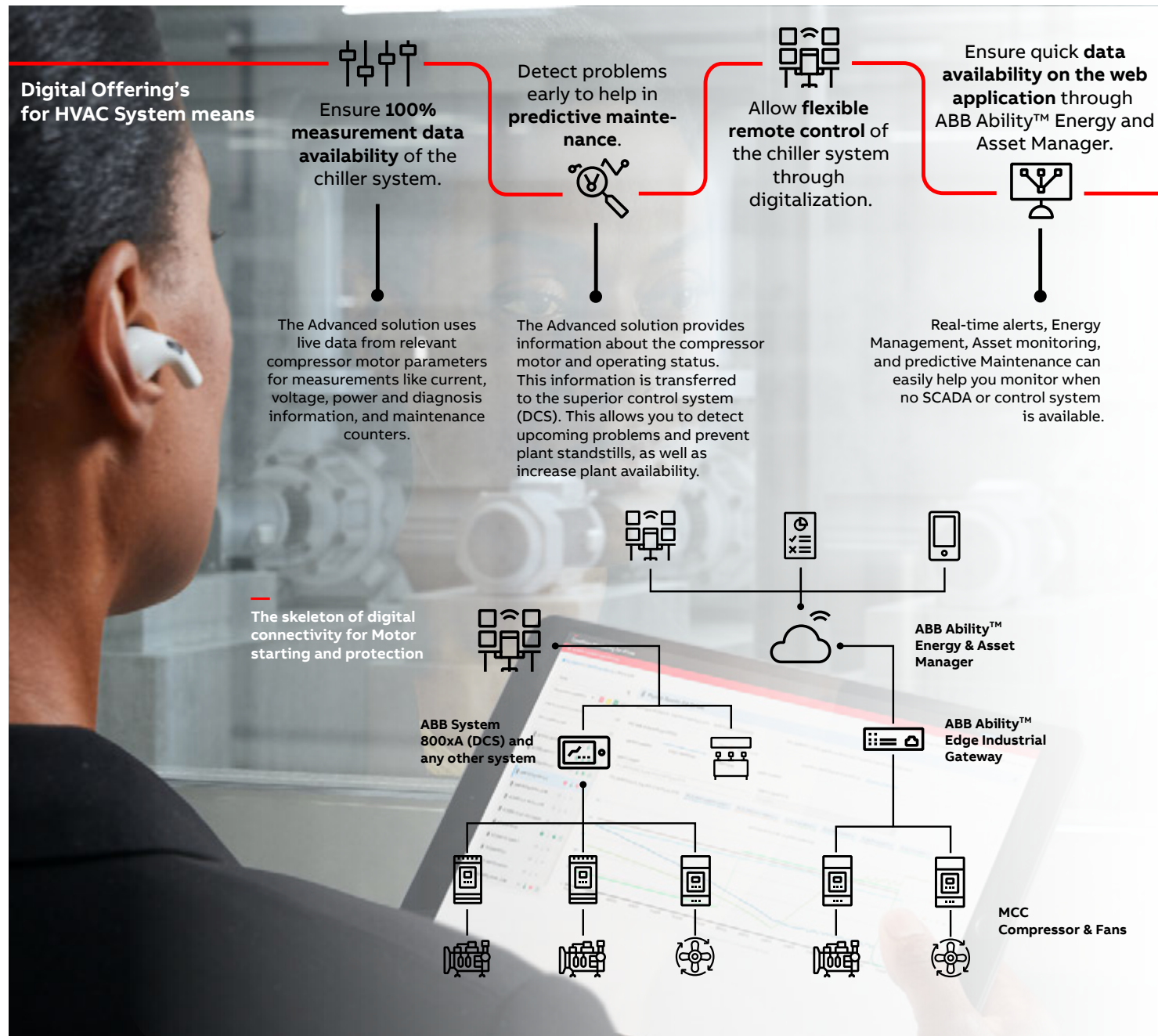
MS = Magnetic & Thermal protection

Keep your chiller system running with protection and control at every level



# ABB's digital offerings with advanced motor starting solutions

Our digital offering for Advanced motor starting solutions will help you digitally connect your chiller systems and monitor them with 100% data availability.





## 12 ABB's digital offerings for motor rating from 0.15 up to 1200\* kW

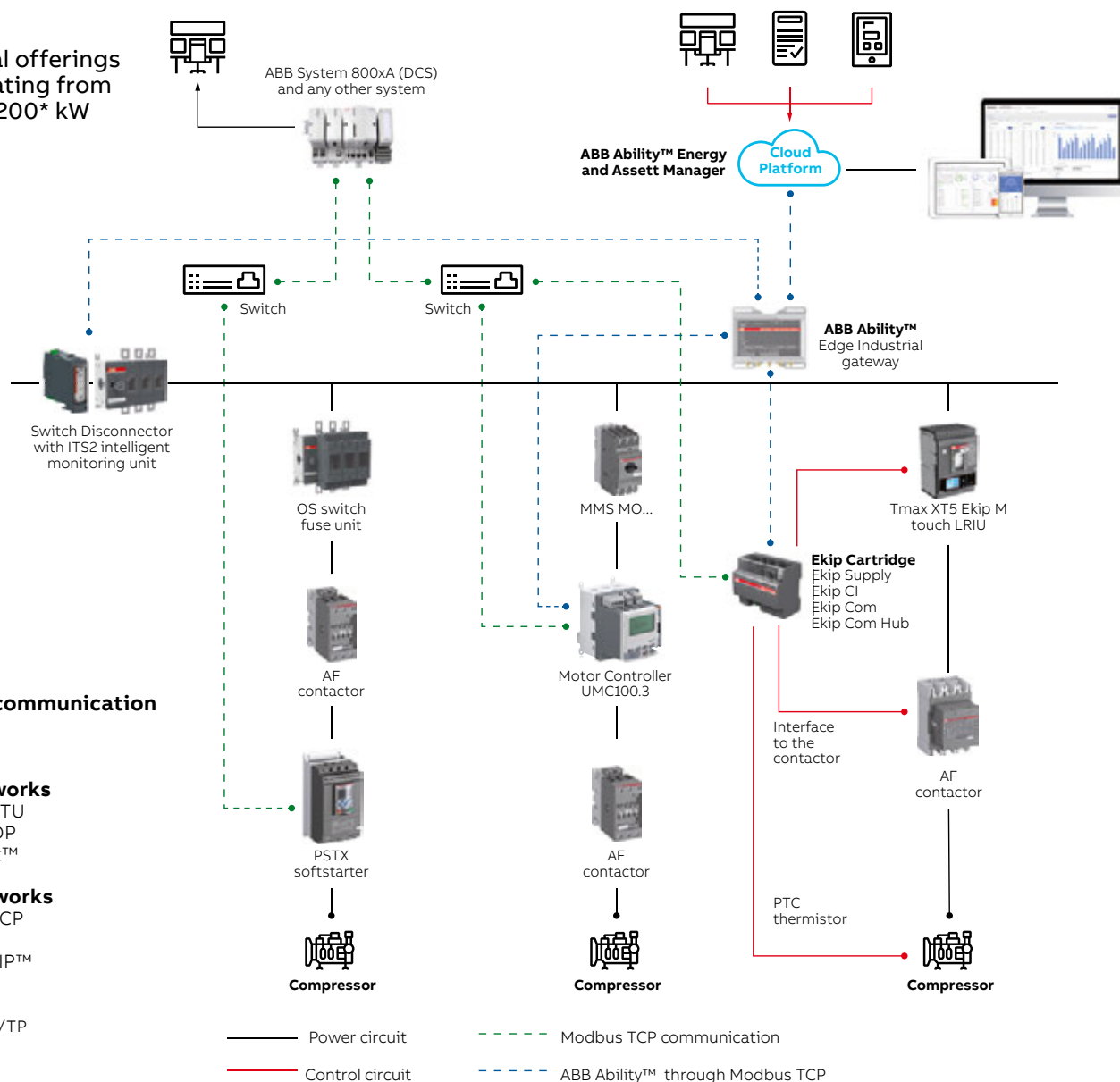
### Supporting communication protocols

#### Fieldbus networks

- Modbus RTU
- Profibus DP
- DeviceNet™

#### Ethernet networks

- Modbus TCP
- Profinet
- Ethernet/IP™
- EtherCAT
- BACnet IP
- BACnet MS/TP
- IEC 61850



Note:

\*UMC100.3 supports ABB ability through MTQ22 (Modbus TCP)

### ABB Ability™ Energy and Asset Manager

is a state-of-the-art cloud solution that integrates energy and asset management in a single intuitive dashboard. Providing full remote visibility of asset and electrical-system behavior, ABB Ability™ Energy and Asset Manager provides insights that help you minimize cost and risk and maximize performance and safety across your operations.



# Product offerings

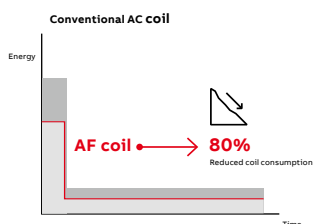
# Contactors

ABB's contactor range offers exceptional reliability and performance in a brilliant space-saving design. Use it for motor starting applications up to 1060A 400V AC-3, or for power switching up to 2850A 690V AC-1.



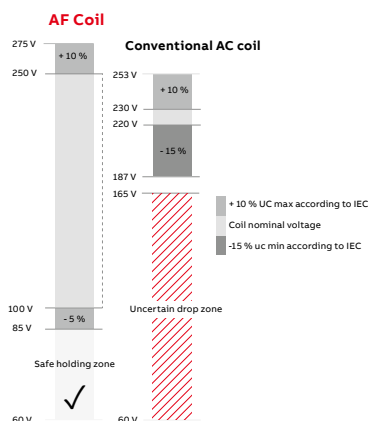
## Reliable in all networks

The electronic system within the AF contactor continuously monitors the current and voltage applied to the coil. The contactor is safely operated in an always optimized condition and hum-free.



## Reduced coil consumption

AF coil and energy consumption is reduced up to 80%. This allows a reduction of the temperature rise, the size of control transformers, and the size of cabinets.



## Wide control voltage range

With conventional contactor technology, different contactors are needed for different network voltages. Thanks to the wide operating range of the AF contactor, it can operate just as well in Europe as in Asia or North America. The core coil of the AF contactor range covers 100-250 V AC / DC, 50 / 60 Hz.



## Built-in surge suppression

With conventional contactor technology, it is recommended to use an external surge suppressor, an accessory that could cost as much as half of the contactor. With the AF technology, the surges are handled by the contactor and never reach the control circuit. One less product and one less complication to worry about.

## Contactors

M and B mini

AF09..K ... AF38..K

AF09 ... AF1650 (AC-3)\*<sup>1</sup>



## Motor power at 400 V AC (IEC) and at 480 V AC (UL)

From 4 up to 5.5 kW, From 3 up to 7.5 hp

From 4 up to 18.5 kW, from 5 up to 25 hp

From 4 up to 560 kW, From 5 up to 900 hp\*

## Key features

Very compact dimensions, several connection types, reversing solutions available, standard/low consumption/extended operating limit coils, wide set of accessories.

Push-in Spring terminals, vibration proof, electronic AC/DC coil, wide control voltage range, only 4 coils cover 24 V–500 V AC and 20 V–500 V DC.

Electronic AC/DC coil, wide control voltage range, only 4 coils cover 24 V–500 V AC and 20 V–500 V DC.

Note:

\*<sup>1</sup> AC-1 ratings are available up to 2850 A.

\*<sup>2</sup> UL CSA - HVAC 3-phase definite purpose heating rating, air conditioning rating, and AC Resistance air heating available for AF09 up to AF370 3-pole contactors.

**Safety Contactors**

AFS09Z... AFS38Z

AFS09... AFS750

**Motor power at 400 V AC (IEC) and at 480 V AC (UL)**From 4 up to 18.5 kW,  
from 5 up to 25 hpFrom 4 up to 400 kW,  
from 5 up to 600 hp**Key features**

Dedicated for safety applications: mirror and mechanically linked contacts, factory-mounted, cover-shield, guaranteeing the right contactor status and preventing unexpected operations. Versions for PLC 24 V DC  $\geq 250$  mA: low consumption coil, 24 V DC fast operating time.

Dedicated for safety applications: mirror and mechanically linked contacts, factory-mounted, cover-shield, guaranteeing the right contactor status and preventing unexpected operations, electronic AC/DC coil, wide control voltage range, built-in PLC interface available AFS116...AFS750.

**Contactors with low consumption coil**

AF09Z ... AF38Z

AF09Z..K ... AF38Z..K

AF40 ... AF1650

**Motor power at 400 V AC (IEC) and at 480 V AC (UL)**From 4 up to 18.5 kW,  
from 5 up to 25 hp\*From 4 up to 18.5 kW,  
from 5 up to 25 hpFrom 18.5 up to 560 kW,  
from 30 up to 900 hp\***Key features**

Versions for PLC 24 V DC  $\geq 250$  mA, or other specific applications: low consumption coil, 24 V DC fast operating time. Semi F47: immunity from voltage dips and sags.

Push-in Spring terminal, vibration proof, versions for PLC 24 V DC  $\geq 250$  mA, or other specific applications: low consumption coil, 24 V DC fast operating time. Semi F47: immunity from voltage dips and sags.

Built-in or external PLC interface, electronic AC/DC coil, wide control voltage range, only 4 coils cover 24 V–500 V AC and 20 V–500 V DC.

\*UL CSA - HVAC 3-phase definite purpose heating rating, air conditioning rating, and AC Resistance air heating available for AF09 up to AF370 3-pole contactors.

**Overload relays**

TF - Thermal overload relay

EF - Electronic overload relay

**Motor power at 400 V AC (IEC) and at 480 V AC (UL)**

From 0.06 up to 110 kW and from 1/2 up to 150 hp

From 0.06 up to 710 kW and from 1/2 up to 900 hp

**Key features**

Trip class 10, separate stop button, manual / automatic reset selectable, test function, sealable cover, ATEX & IECEx certified types

Trip class 10E, 20E, 30E, separate stop button, manual / automatic reset selectable, test function, sealable cover, ATEX & IECEx certified types

**Catalog links:**

- [Main catalog Motor protection and control \(abb.com\)](http://abb.com)
- [Push-in Spring motor starting solution catalog PDF \(abb.com\)](#)

**QR Code:**

# Manual motor starters

The full range of manual motor starters offers fuseless motor protection from 0.1 A to up to 80 A is designed to perfectly combine with ABB contactors.

## Short-circuit protection

MO132

MO165



## Motor power at 400 V AC (IEC) and at 480 V AC (UL)

From 0.03 up to 15 kW,  
from ¾ up to 20 hp

From 4 up to 45 kW,  
from 7 ½ up to 60 hp

## Key features

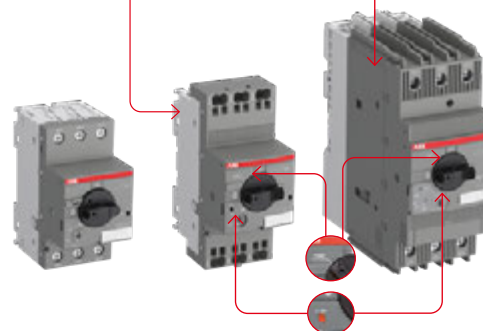
Switch position ON/OFF/Trip, common accessories throughout the complete MS/MO range, UL type F ratings with AF contactors, and EF/TF overload relays.

## Troubleshooting made easy

MS132 and MS165 feature a magnetic trip indicator. This way, every tripping event will be distinguished, making troubleshooting a lot easier and faster.

## High performance in compact size

MS132 and MS165 manual motor starters cover short-circuit breaking capacities up to 100 kA. In addition, every manual motor starter is temperature compensated up to 60 °C.



## Short-circuit and overload protection with single devices

MS116

MS132

MS132-K

MS165



## Motor power at 400 V AC (IEC) and at 480 V AC (UL)

From 0.03 up to 15 kW,  
from ¾ up to 20 hp

From 0.03 up to 15 kW,  
from ¾ up to 20 hp

From 0.03 up to 15 kW,  
from ¾ up to 20 hp

From 4 up to 45 kW,  
from 7 ½ up to 60 hp

## Key features

Phase loss sensitivity, switch position ON/OFF, common accessories throughout the complete MS/MO range.

Phase loss sensitivity, switch position ON/OFF/Trip, magnetic trip indication, common accessories throughout the complete MS/MO range, ATEX & IECEx certified, UL type E ratings and UL type F with AF contactors.

Push-in Spring terminals, vibration-proof according to IEC 60068-2-27 and IEC 60068-2-6, self-tightening terminals, tool-less connecting links, phase loss sensitivity, switch position ON/OFF/Trip, UL type E ratings.

Phase loss sensitivity, switch position ON/OFF/Trip, magnetic trip indication, common accessories throughout the complete range, ATEX & IECEx certified, UL type E ratings, and UL type F with AF contactors.

## Catalog links:

- [Main catalog Motor protection and control \(abb.com\)](http://abb.com)

## QR Code:





# Molded case circuit-breakers

A cutting-edge molded case circuit-breaker range delivering a brand new product experience, with extreme performance and protection features up to 1600A, maximizing ease of use, integration, and connectivity. Designed to deliver safety, reliability, and quality.

The Tmax XT trip units are designed to be used in a wide range of applications. This complete, flexible protection trip unit can be adapted to the actual level of the required protection, independently of the complexity of the system.

The range is available for three level of performances, to meet any requirement, from simple to advanced applications.

- **TM, thermal-magnetic trip unit**
- **Ekip Dip, electronic trip unit**
- **Ekip Touch/Hi-Touch, electronic trip units**



## SACE Tmax XT

### Motor power at 400 V AC (IEC) and at 480 V AC (UL)

From 0.25 up to 450 kW,  
from ½ up to 900 hp

### Key features

Thermal magnetic MA/MF trip unit supports up to 630A Ekip M Dip I trip unit supports up to 1600A Ekip M Dip LIU trip unit supports up to 800A Ekip M Touch LRIU trip unit supports up to 1600A, Wide range of internal and external accessories, high breaking capacity. Ekip M Touch LRIU enables connectivity through several communication protocols. Ekip M Touch LRIU also allows measuring of the main parameters of the system with extreme accuracy (current, voltage, energy, power, power factor, etc.).

### Catalog links:

- [SACE Tmax XT IEC Low voltage molded case circuit-breakers \(abb.com\)](https://www.abb.com/products/low-voltage/molded-case-circuit-breakers/sace-tmax-xt)

### QR Code:



# Switch-disconnectors

ABB's switch disconnector can be used as main switches for the HVAC applications that need to be isolated from the network. They are suitable for different types of environments in industrial, commercial, or residential applications.



## Switch-disconnectors

OT Series



### Motor power at 400 V AC (IEC)

From 7.5 up to 710 kW

### Key features

16 A Up to 4000 A (AC). Designed, built and tested for the best possible performance and with a modular, space-saving design. Installation in any direction. Durability has been ensured by testing switches against the IEC60947-3, UL508, UL98, and CSA standards.

## Fuse switch disconnectors

EasyLine XLP

OS switch fuse



### Motor power at 400 V AC (IEC)

From 1.2 up to 110 kW

From 5.5 up to 1000 kW

### Key features

Supports IEC fuse standard NH Fuses 000-4a. Available as base mounted and for different busbar distances. Electronic fuse monitoring available. Wide range of cable connection terminals and other snap-on accessories.

Supports many IEC and UL fuse standards. Front, side and motor operated versions. Special terminals: left-right or back-back. Knife contact technology, modular structure. Adjustable shaft, interlocked fuse cover, wide range of accessories.

### Catalog links:

- [Switches, Switch fuses OS and OSM, OS1GB 24-06. \(abb.com\)](https://www.abb.com/switches-switch-fuses-os-and-osm)
- [EasyLine XLP Fuse Switch Disconnector 1-2-3-4 poles \(abb.com\)](https://www.abb.com/easylinxlp)
- [Switches, Switch-disconnectors OT and OTM. Catalogue OT8GB 07-07 \(abb.com\)](https://www.abb.com/switches-switch-disconnectors-ot-and-otm)

### QR Code:



# Softstarters

A softstarter can do wonders with your HVAC applications. Packed with useful features, it reduces the wear of your equipment, improves the reliability of your processes, and increases overall productivity.



## Softstarters

### PSR softstarter

### PSRC Softstarter dedicated to Scroll compressor

### PSE softstarter

### PSTX softstarter



### Motor power at 400 V AC (IEC) and at 480 V AC (UL)

From 1.5 up to 55 kW, from 2.0 up to 75 hp

From 1.5 up to 55 kW, from 2.0 up to 75 hp

From 7.5 up to 200 kW, from 10 up to 300 hp

From 7.5 up to 1200 kW\*, from 10 up to 1800 hp

### Key features

Two-phase controlled, soft start and stop with voltage ramp, built-in bypass for energy saving and easy installation, easy set-up by three potentiometers, run and top of ramp relays available for monitoring.

Easy and reliable, 60 °C ambient temperature, temper proof: no risk of parameters getting changed after installation.

Voltage ramp and torque control for both start and stop, phase-controlled, current limit, kick-start, built-in by-pass for energy saving and easy installation, analog output for display of motor current, built-in Modbus RTU.

Complete motor protection. Built-in application enhanced features. Three types of current limit. Built-in bypass saves time and energy. HMI: A user-friendly and clear display. Coated PCBs protecting from dust, moisture, and corrosive atmospheres. Built-in Modbus and as an option Anybus for all major communication protocols.

\*1200 kW for Softstarter connected in inside delta

### Catalog links:

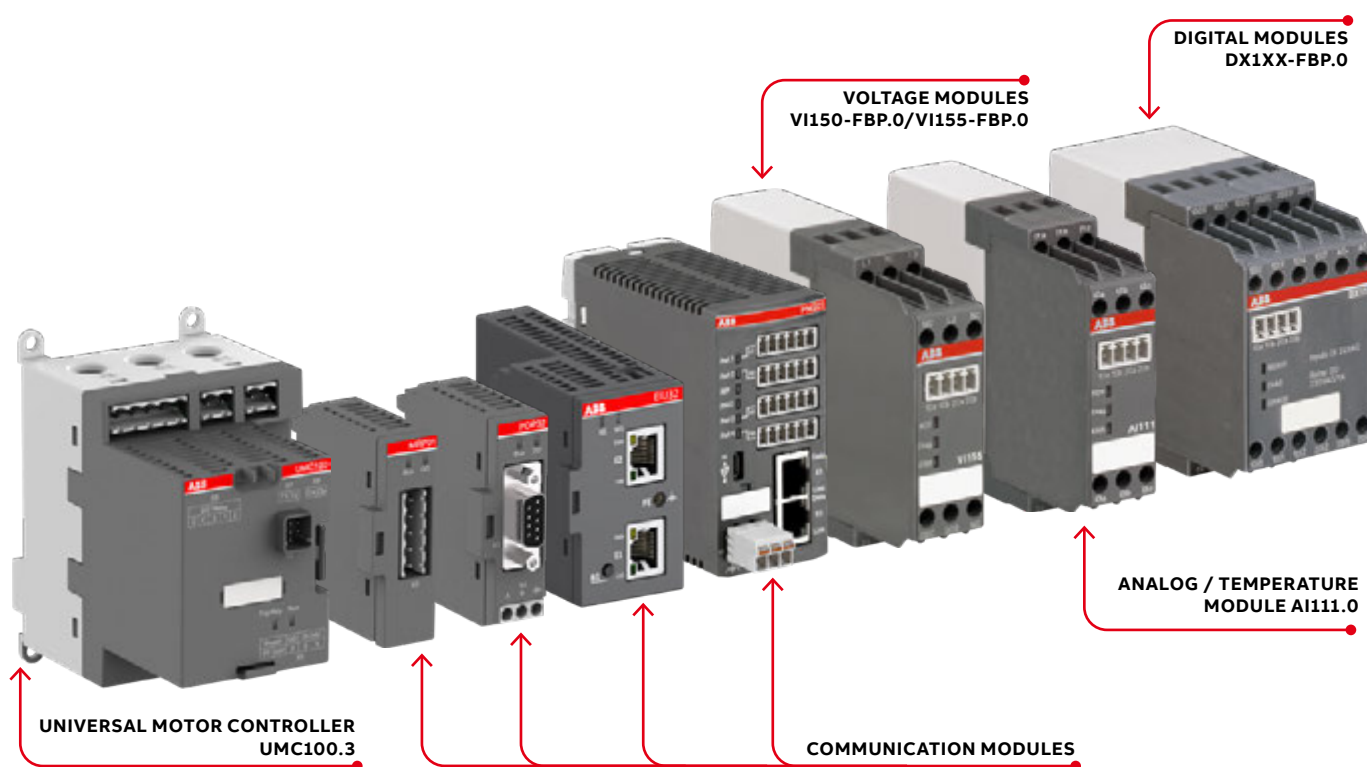
- [Softstarter main catalog \(abb.com\)](https://www.abb.com/softstarter)

### QR Code:



# Universal motor controller UMC100.3

Universal motor controller UMC100.3 combines intelligent motor protection and control functions, Fieldbus and Ethernet communication, and fault diagnosis in a single device. The Universal Motor Controller provides detailed operational, diagnostic, and service data in real-time, giving your chiller system an effective data source for predictive maintenance.



## Universal Motor Controller

### UMC100.3

#### Motor power at 400 V AC (IEC) and at 480 V AC (UL)

From 0.24 up to 850A

#### Key features

Max 1000 V AC motor voltage with complete motor protection; Suitable for single- and three-phase motors; Rated motor current from 0.24 to 63 A, with inbuilt CT; 63 ... 850 A with external motor transformer CT4L/CT5L; Tripping classes 5, 10, 20, 30, 40 in accordance with EN/IEC 60947-4-1; Flexible mounting of communication interfaces; Standard Fieldbus connection and wiring.

#### Catalog links:

- [Brochure Universal Motor Controller UMC100.3 \(abb.com\)](#)

#### QR Code:



# Electronic compact starters

ABB’s electronic compact starter packs more functions into less space. Direct-on-line and reversed starters with overload protection and emergency stop versions are available, making the range a perfect fit for high frequent and reliable long-life switching of HVAC applications up to 3 kW motor rating.



Electronic Compact Starter	
HF starter with overload protection	HF emergency stop application
Motor power at 400 V AC (IEC) and at 480 V AC (UL)	
From 0.18 up to 3 kW, from 0.4 up to 3 hp	From 0.18 up to 3 kW, from 0.4 up to 3 hp
Key features	
Width of only 22.5 mm, direct and reverse switching of motors up to 3 kW/400 V AC, integrated overload (trip class 10 A) and phase unbalance protection, automatic, manual, or remote reset after thermal trip, LED indication. Electrical life: 30 million operating cycles. Confirming to IEC / EN 60947-1, IEC / EN 60947-4-3.	Safety variants offer same functionality as standard variants, emergency-stop rated up to SIL 3 (IEC 61508-1) and PL e (ISO 13849-1), ATEX certification.

Catalog links:

- [Electronic compact starter HF series manual \(abb.com\)](#)








# Measuring and monitoring relays

The relays inform users about abnormal conditions and allow them to take necessary corrective actions before severe and costly failures of the HVAC system. ABB offers the broadest range of measuring and monitoring relays in the market.



Electronic relays		
CM-MSS	CM-MPS	CM-ENS
		
<b>Thermistor motor protection</b>	<b>Three phase monitoring relay</b>	<b>Liquid Level Relay</b>
Dynamic interrupted wire detection, short-circuit monitoring of sensor circuit, non-volatile fault storage, remote reset, screw or push-in terminals available, ATEX-certified.	Over-/under voltage, phase unbalance, phase sequence monitoring, phase failure detection, screw or push-in terminals available.	Control of one or two liquid levels (min/max), Fill (UP) or Drain (DOWN), adjustable via front-face potentiometer. Adjustable response sensitivity 0.1-1000 kΩ. Selectable ON- or OFF-delay, 2 c/o (SPDT) contacts, 3 LEDs for the indication of operational states. Devices with wide rated control supply voltage 24-240 V AC/CD.

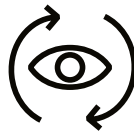


# Smart temperature monitoring relays

CM-TCN temperature monitoring relays can measure temperatures of solids, liquids, and gaseous media in up to three sensor circuits using various types of sensors.



## One...



### look

**to have the information needed**

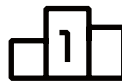
the display shows the measured values and relay status at a glance. The symbol-based menu structure and presettings make parametrization simple.



### touch

**for up to 80% faster setup**

for easy and intuitive parameterization via NFC with the ABB EPiC smartphone app—even if the relay is not powered.



### device

**for a wide range of applications**

is all you need, because one relay covers all temperature monitoring needs for many different applications.

NFC



## CM-TCN

### Key features

#### Temperature monitoring relays

Wide measuring range from -200...850°C, different types of sensors like PT100, PT1000, PTC, NTC, and monitoring functions (over-/under-temperature, window monitoring), open- or closed-circuit principle contact configurable, short-circuit monitoring and interrupted wire detection.

### Catalog link:

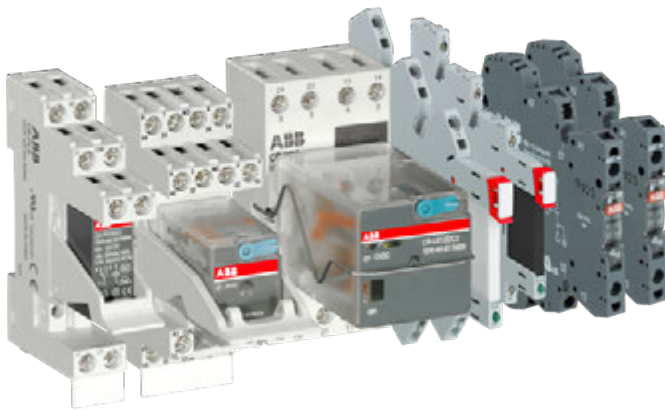
- [Electronic Relays and Controls \(abb.com\)](https://www.abb.com/electronic-relays-and-controls)

### QR Code:



# Interface relays and optocouplers

ABB's interface relays and optocouplers ensure a reliable voltage conversion between process peripherals and higher-level control systems, and offers a wide range of interface relays and optocouplers for increased flexibility and choice to support HVAC applications.



## Pluggable Interface Relays

### CR & R600 Series

#### Key features

12 different coil voltages, 1 c/o contact, 2 c/o contacts, 3 c/o contacts, 4 c/o contacts, optocoupler output: transistor, MOS-FET, Triac, optional gold-plated version available, with LED or without LED indications, integrated test button, accessories like jumper bars, markers and separators available.

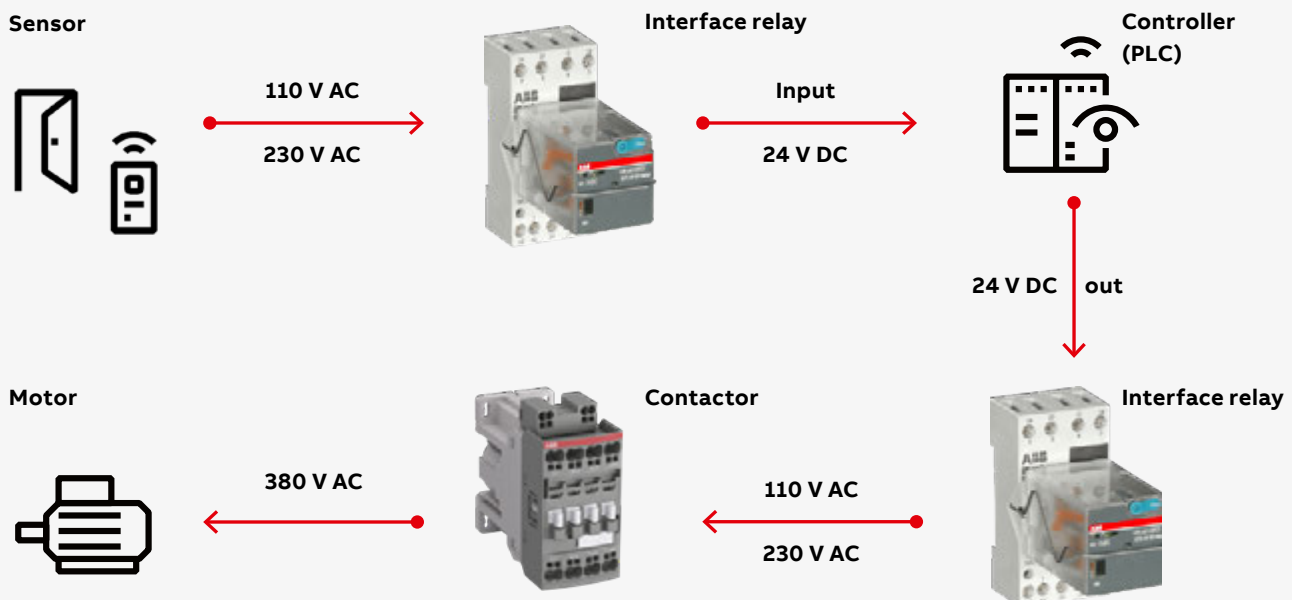
#### Catalog link:

- [Electronic Relays and Controls \(abb.com\)](https://www.abb.com/electronic-relays-and-controls)

QR Code:



**Billions**  
of relays operate and  
interface between control  
circuits and electrical loads



# Time relays

ABB time relays provide simple, reliable, and economical control solutions for HVAC applications. They are typically used to provide time-delayed switching to start a motor, control a load or manage a process.



## Time Relays

### CT SERIES

#### Key features

Wide time range from 0.05 s up to 300 h, single and multifunctional types, variants with semiconductor output capable of AC/DC switching and supporting fast switching cycles, supply voltage range: 24-48 V DC and 24-240 V AC.

#### Catalog link:

- [Electronic Relays and Controls \(abb.com\)](https://www.abb.com/electronic-relays-and-controls)

#### QR Code:





# Sentry safety relays

Sentry safety relays are used in both simple and more advanced safety solutions when safety devices need to be monitored according to the requirements of functional safety standards.



## Sentry Safety Relays

### Key features

A universal model for all common safety applications reduces stock and saves warehouse space, multi-voltage models offer flexibility and less stock, compact size -all models are only 22.5 mm wide, detachable terminal blocks speed up connection and replacement, manual or automatic reset easily selectable by the switch, powerful outputs allow to drive larger contactors and saves the use of an intermediary contactor, 3-color LEDs and display simplify troubleshooting and enables preset configurations, advanced timer functions with an accuracy of  $\pm 1\%$ .

### Catalog link:

- [ABB safety products catalog](#)

### QR Code:



# Pilot devices

## Modular plastic range

A versatile selection of operators with high levels of flexibility and a broad choice of electrical ratings. Find the perfect solution for almost every application.



## Modular metal range

ABB's modular metal range combines ultimate reliability with the total flexibility of a modular range. For mining, construction, and heavy industry applications.



## Compact range

The most efficient solution available, reducing installation time and cost. The compact range has the highest level of dust and water resistance on the market.

Modular plastic range	Modular metal range	Compact range
<b>Key features</b>		
More flexibility: last-minute changes made easy, up to 6 contact blocks, NO and NC, save up to 30% installation time with unique tools-free snap-on components, simple solutions nuts require no tools, wide choice of operators and bezels, high AC15 electrical ratings 6 A at 230 V, high resistance to water intrusion with IP66.	Tool-free, snap-on components make mounting and dismantling quick and easy, snap-on holder for 3 or 5 contact blocks, full satin chrome metal body and nut, high friction nut and metal stops make sure the operator stays in place, IP66 high dust and water protection rating.	Fewer order codes make selection easy and save time, improve reliability: higher protection levels with IP66, IP67 and IP69K classification and 4X (Nema), compact: just 42 mm built in-depth.

Catalog link:

- [Pilot Devices the complete offering, Main Catalogue \(abb.com\)](#)



# HVAC controller

## Cylon® CBXi Series

The CBXi Series is a freely programmable range of BACnet® Controllers with native BACnet/IP communications support. The CBXi Series is designed for a wide range of energy management applications for intelligent control of HVAC equipment and the electrical system.



### HVAC controller

### Cylon® CBXi Series - CBX-8R8 / 8R8-H

#### Key features

8 universal inputs + Relays, hardware connections that can be used as inputs, outputs or relays (software selectable), 8 universal Inputs (supports a variety of thermistors and RTDs that range from 0 to 450 Ω), CBX-8R8-H additionally includes Hand/Off/Auto Local override Function, flexible onboard UniPut technology allows expandable I/O configurations from 16 to 64 points through connected FLX modules multi-protocol communications support for BACnet MS/TP and Modbus RTU, LED status on all I/O channels provides indication of fault or override status. The controllers are BTL listed BACnet Building Controller (B-BC).

### Application

The CBXi Series is designed for a wide range of energy management applications for intelligent control of:

- HVAC equipment such as Central Plant, Boilers, Chillers, Cooling Towers, Pump Systems, Air Handling Units (Constant Volume, Variable Air Volume and Multi-zone), and Rooftop Units.
- Electrical systems such as lighting control, variable frequency drives and metering.

The CBXi Series can be used as an integration platform and natively supports the routing of either BACnet MS/TP to BACnet/IP or Modbus RTU to Modbus TCP without the need for gateways or additional hardware.

The controller accommodates available pre-engineered strategies or can be tailored to custom applications using CXpro<sup>HD</sup> programming software.

### Catalog link:

- [Data sheet \(.PDF\) \[EN\]](#)  
[CBXi-System \(abb.com\)](#)

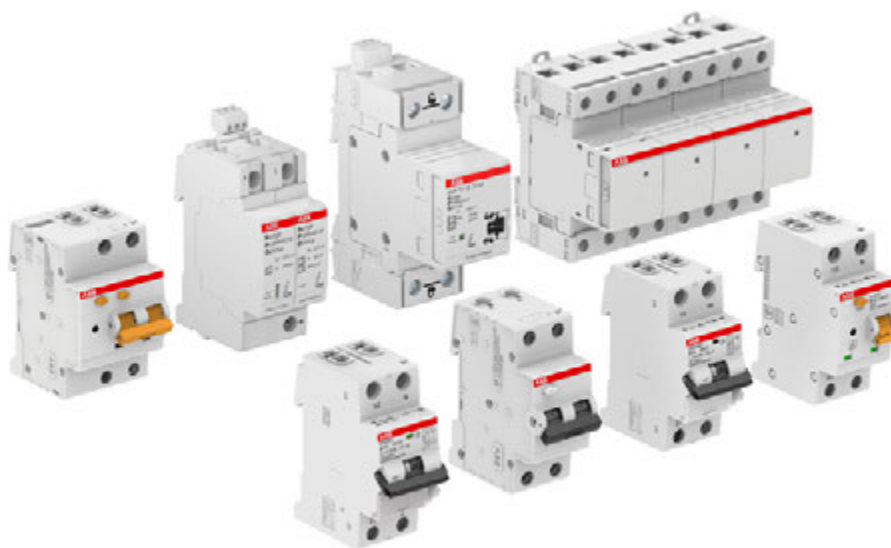
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# Modular DIN-Rail products

## The established System pro M portfolio

Every day, professionals face the challenge of providing the best solution for the protection of the end users' life and property, as well as smart solutions for controlling and monitoring electricity and energy efficiency. With System pro M, they find a complete assortment of first-class quality products.



### Other control products

MCB'S

Residual current devices - RCCBs

Fuses

Control Transformer



### System Pro M Compact® MCB

2 different tripping mechanisms: delayed thermal tripping mechanism for overload protection, magnetic tripping mechanism for short circuit protection, 6 up to 25 kA as B, C, D, K and Z-type characteristic in rated currents for 0.5 or 6 up to 63 A, rated voltage 230/440 V AC; UMAX 72 V DC (1P); 125 V DC (2... 4 P), customary number of poles from 1 to 4, 1 and 3 poles are available with disconnecting neutral compliant to worldwide product standards (IEC, UL, CSA).

### F200 series

Rated current: from 16 A to 125A, Sensitivities available: 30,300 and 500 mA, Pollution degree 3 (for 16-63 A devices, 30-300 mA), Instantaneous and selective ranges available, 5,35 and 50 mm<sup>2</sup> system pro M compact terminals for challenging industrial usage, compliance to the worldwide product standard: EN 61008 and EN 62423, Suitable for installation in either single-phase networks or three-phase networks with or without neutral.

### E90 series

E 90 Fuse holders - 1P+N in one module and 3P+N in three modules. The most suitable solution for the protection of circuits and devices inside switchboards. Very compact design optional blown fuse indicator sealable in closed position and padlockable in open position.

### TM series

Transformer for supplying control circuits, for example commands, signaling, interlocks, etc. Reference standard: CEI EN 61558-2-2 Non-short-circuit proof control transformer a, rated power from 50 to 2500 VA, continuous operations 230/400 V a.c.

### Catalog link:

- [Electrical installation solutions for buildings 9AKK107991A8329 part A \(PDF\) \(abb.com\)](#)

### QR Code:





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## Drives

The ABB ACH series is a complete dedicated low voltage AC drive, especially for 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.



For more information please visit:

- <https://new.abb.com/drives/segments/hvac>

QR Code:



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## Motors

### IEC low voltage motors for HVAC industry

Motors are designed to meet the demands of HVAC applications, from heavy-duty industrial designs to commercial applications.

These applications include ventilators, direct-drive and belted fans, exhaust fans, unit heaters, air conditioning units, smoke ventilation fans, and commercial refrigeration condensers.



For more information please visit:

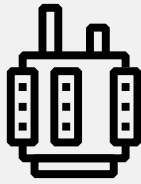
- <https://new.abb.com/motors-generators/iec-low-voltage-motors/industries-applications/hvac>

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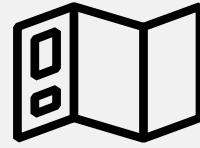


# Supporting tools



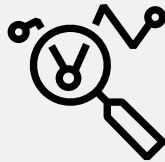
Web site

[Low Voltage  
Products | ABB](#)



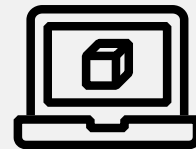
Brochure

[Motor starting and  
protection](#)



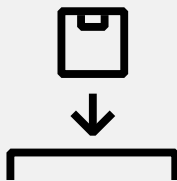
Selection tool

- [Selected optimized  
Coordination tool \(SOC\)](#)
- [E-configure](#)



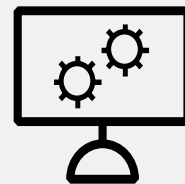
Design tool

- [E-design](#)
- [2D and 3D drawings -  
Cadenas](#)



Software

- [Softstarter selection tool -  
Prosoft](#)
- [Softstarter Care - PSTX/PSE](#)
- [Free trial software - ABB  
Field Information Manager  
\(FIM\) for UMC100.3](#)



Simulator

[PSTX simulator](#)



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**ABB Ltd.**

Electrification Business Area

Smart Power Division

**[new.abb.com/low-voltage](http://new.abb.com/low-voltage)**

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