



ACH580 Customer/Sales Presentation



ACH580

How ABB's HVAC drives help you.

ABB

ACH580 HVAC Drives

The quality, reliability, and energy savings you expect from ABB drives



Why should I care?



Save time and money

ACH580 HVAC Drive are easy to install, commission, and use

Easy to install

- Same or smaller footprint, by frame size, as the ACH550.
- Color coded I/O terminals reduces wiring mistakes.
- Smaller footprint for Type 12 cabinet allows you to locate drive closer to the application.
- Flange mounting kits for cabinet installation with heat sink outside the enclosure.



Save time and money

ACH580 HVAC Drive are easy to install, commission, and use

Easy to commission

- Primary Settings menu eliminates the need to wade through a long list of parameters.
- Consistent parameter structure within the all-compatible drives family.
- Embedded assistants simplify configuration. No programming experience required.
- Consistent PC tools across the all-compatible drives family minimizes training needs.
- Built in essential features means fewer components to select, set up, and maintain.



Save time and money

ACH580 HVAC Drive are easy to install, commission, and use

Easy to use

Minimize training. ABB all-compatible products provide a consistent user interface. Once you've used one, you can easily use another:

- Parameter structure
- Embedded fieldbus & fieldbus adaptors
- Flange mounting kits
- PC tools



Save time and money

ACH580 HVAC Drive are easy to install, commission, and use

Easy to scale

- ABB's VFD design allows you to seamlessly incorporate additional drives, saving time, money, and headaches.
- All-compatible drives portfolio is scalable for simple to complex HVAC applications.



Save time and money

ACH580 HVAC Drive are easy to install, commission, and use

Easy to connect

Embedded fieldbus with simplified settings allow fast configuration of the most commonly used protocols:

- BACnet MS/TP, Metasys N2, Modbus RTU

Protocols available via optional fieldbus adaptor (FBA) also take advantage of simplified fieldbus settings:

- BACnet/IP, Profibus-DP, LonWorks, DeviceNet, Ethernet/IP, Modbus TCP

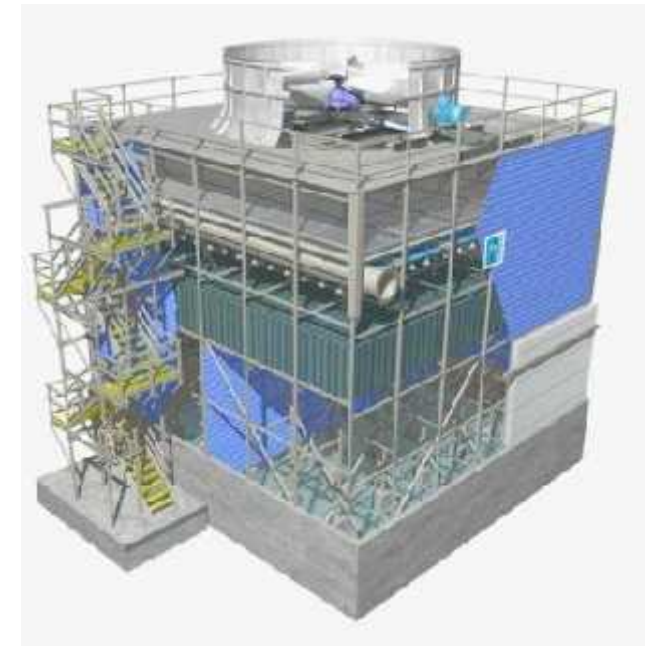


Keep your HVAC system running smoothly

Count on ACH580 reliability

ACH580 reliability keeps your HVAC system up and running

- Designed specifically as a compact solution for harsh environments.
- Control boards are conformal coated for corrosion resistance.
- Proven durability in the harshest environments to minimize downtime.
- Built-in features that relieve motor stress and extend the life of the drive.
- 3-phase current sensing protects the drive from short circuiting motor in all three phases.
- Integrated safe torque off is the foundation for drive-based safety.
- Bluetooth control panel and the Drivetune app provide remote access to real time data from outside the arc flash boundary.

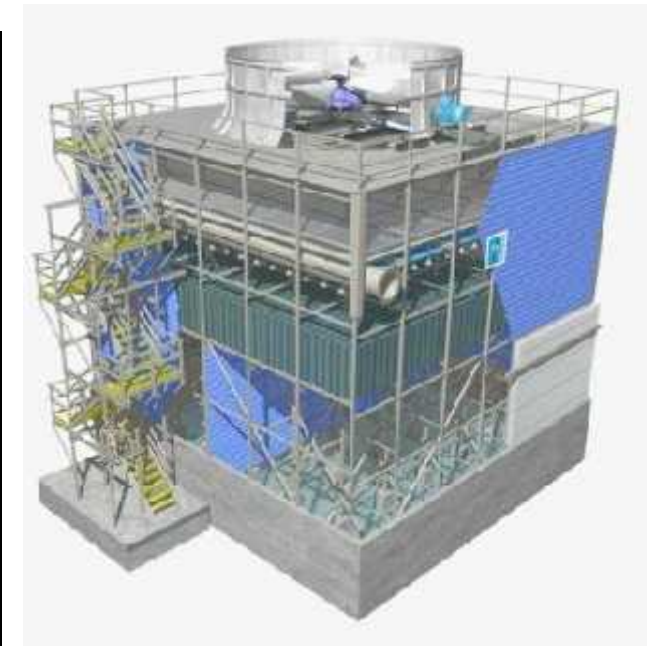


Keep your HVAC system running smoothly

Count on ACH580 reliability

ACH580 reliability keeps your HVAC system up and running

- Extensive reliability testing at full load ensures quality and performance standards for out-of-the box success.
- ABB's preventive maintenance program can minimize equipment breakdown saving you money.
- Rely on ABB for the design and service expertise you need.
- ABB has a highly efficient factory that regularly has short lead times.
- Free 24/7 technical support for peace of mind.



Contain costs to improve your bottom line

ACH580 HVAC Drives are good for your bottom line

ACH580 helps you successfully contain costs

- UL Type 12 can be mounted in harsh location vs in a separate enclosure, minimizing installation costs.
- Embedded STO requires less hardware installation and maintenance.
- VFDs provide energy efficiency, reducing your utility bills.
- Reduced commissioning time by leveraging primary settings and assistants.
- Fieldbus adapters, flange mounting kit, and PC tools are consistent across ABB All-Compatible products.
- Built-in swinging choke suppresses the current harmonic content, reducing power system heat losses and facility power and cooling costs.



Contain costs to improve your bottom line

ACH580 HVAC Drives are good for your bottom line

ACH580 helps you successfully contain costs

- Harmonic analysis provided by ABB allows you to make good decisions so you don't over-specify or have to do costly change orders.
- ABB VFDs are reliable, maximizing uptime.
- Easy scalability minimizes cost as your application expands or changes. With the all-compatible platform, commissioning is simplified, and no additional training is required.
- Preventive maintenance and planned obsolescence and upgrades minimizes downtime. Local support will help with the upgrades.
- Training is minimized, keeping your maintenance personnel working.
- ABB continues to support its VFDs beyond the typical VFD lifespan.



Achieve success

ACH580 HVAC Drives come with access to experts and products you need

ABB can provide the expertise you need

- Consult with us to ensure that you are designing functional, cost-effective, and easy-to-maintain systems.
- Rely on ABB and our partners to get the information/expertise you need to specify the product correctly.
- Local regional application engineers (RAEs) and drive specialists.
- Preventive maintenance to keep your system in tip-top shape.
- When an HVAC system goes down, you need service now. That's why ABB has local service that responds quickly.
- Excellent 24/7/365, free, technical support.
- Local delivery and local support. If you need a product replaced, you can get it quickly.



ACH580 HVAC Drives

Help you:



Save time and money



Keep your HVAC system running smoothly



Contain costs to improve your bottom line



Achieve success



ACH580

The value of control

ABB

ACH580 HVAC Drives

Built-in HVAC features



Control interface

- Hand-Off-Auto supported
- Multiple languages
- Easy navigation and monitoring
- Harmonized parameters and common shared functions
- Built-in USB connection for the PC tool



Universal connectivity

- BACnet MS/TP, Metasys® N2 and Modbus RTU as standard
- Wide range of fieldbus options available (BACnet IP etc.)
- Remote monitoring tools



Free entry level PC tool

- Quick and harmonized access to drive settings
- Flexible monitoring capabilities
- Diagnostics support with one mouse click
- Additional settings in Pro version



HVAC features

- HVAC applications built in
- Loop controllers as standard
- New interlock with native HVAC terms
- Override for HVAC applications

Practical design

- Harmonized connections and terminal markings
- No additional cabling parts needed
- HVAC specific I/O (24 V AC signals)

ACH580 intuitive control

A drive that speaks HVAC language

Powerful HVAC control panel

Standard control panel supports 14 different languages

- Fast and simple commissioning with primary settings for most common features
- Standard USB interface for PC and tool connection
- Move information between PC and the drive with no extra hardware

Help button for problem solving

Hand-Off-Auto control and flexibility

Backup drive settings and parameters

- Easily transfer θ f parameters from one drive to another
- Automatic back-up ensures drive settings are not lost
- Optional assistant control panel with Bluetooth capability



ACH580 intuitive control

HVAC control program



- Auto start after power loss
- Run enable/start interlock - (damper monitoring)
- Run permissive
- Start enable (safety switch, de-frost)
- Traditional override for HVAC
- Flow calculation
- Loop controllers for HVAC applications
- Motor flying start and pre-heat
- User definable under and over load curves (broken belt)
- PID loop controllers

ACH580 intuitive control

Primary settings overview



Simple menu to define HVAC application, communication and I/O

- Easier and faster commissioning, configuration and defect tracking
- Define all essential settings without going directly into the parameter list

ACH580 intuitive control

I/O menu



One menu showing all I/O and functions controlled by each terminal

- Fast and simple I/O configuration
- Shows real time status for all terminals including what each terminal logically means to the drive
- Efficient I/O mapping, identify if single terminal is used for multiple functions

ACH580 intuitive control

Diagnostics menu



All essential properties to help with any issues you might have with ACH580

- Active faults and warnings displayed with additional data in one place helping problem solving
- Amplitude and event loggers keep track of issues and irregular behavior

ACH580 intuitive control

Parameters menu



Parameters menu gathers all-compatible harmonized parameters to one place in logical order

- Same parameters list in entire all-compatible portfolio. Learn it once, use it everywhere

Favorites list

- Find the parameters you most often need to change

List of modified parameters

- Easier trouble-shooting

ACH580 intuitive control

Home view



Editable Home view

- Monitor up to three different signals same time on same screen
- Edit Home view to match your needs
- Add up to 18 screens and scroll between screens simply using arrow keys
- Different display styles: numeric, gauge/bar and graph

ACH580 intuitive control

HVAC control program features



Stand-alone loop controllers

- Makes ACH580 an independent and self-sufficient logic unit

Loop controller with sleep mode boost function

- Enables even higher savings by extending the PID sleep mode duration

Timed functions to automate tasks

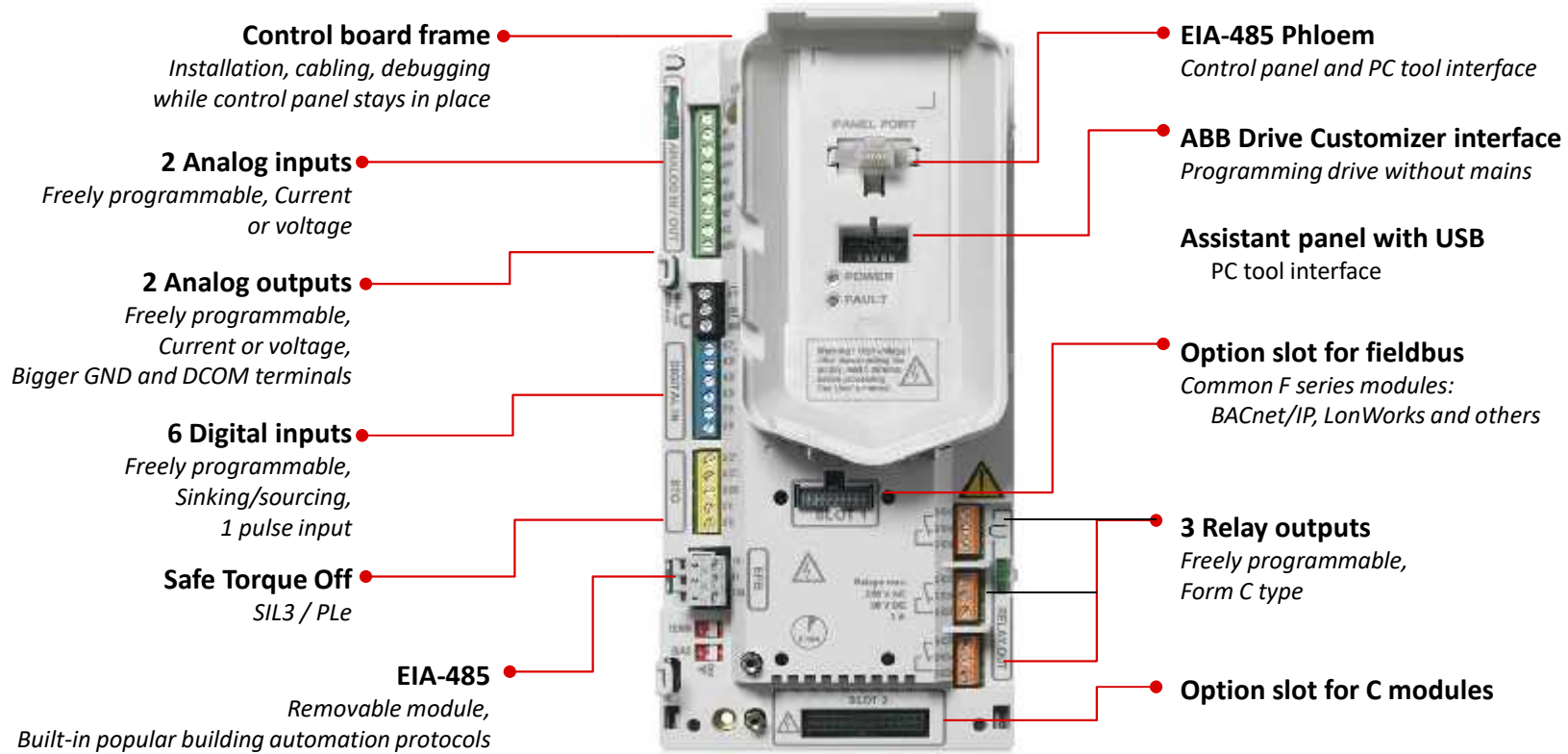
- Switch between different set points based on a schedule eliminating the need to manually operate drive at night time

Load curve for detecting abnormal load situations

- E.g. detect broken fan blades or other problems that won't cause a fault or warning

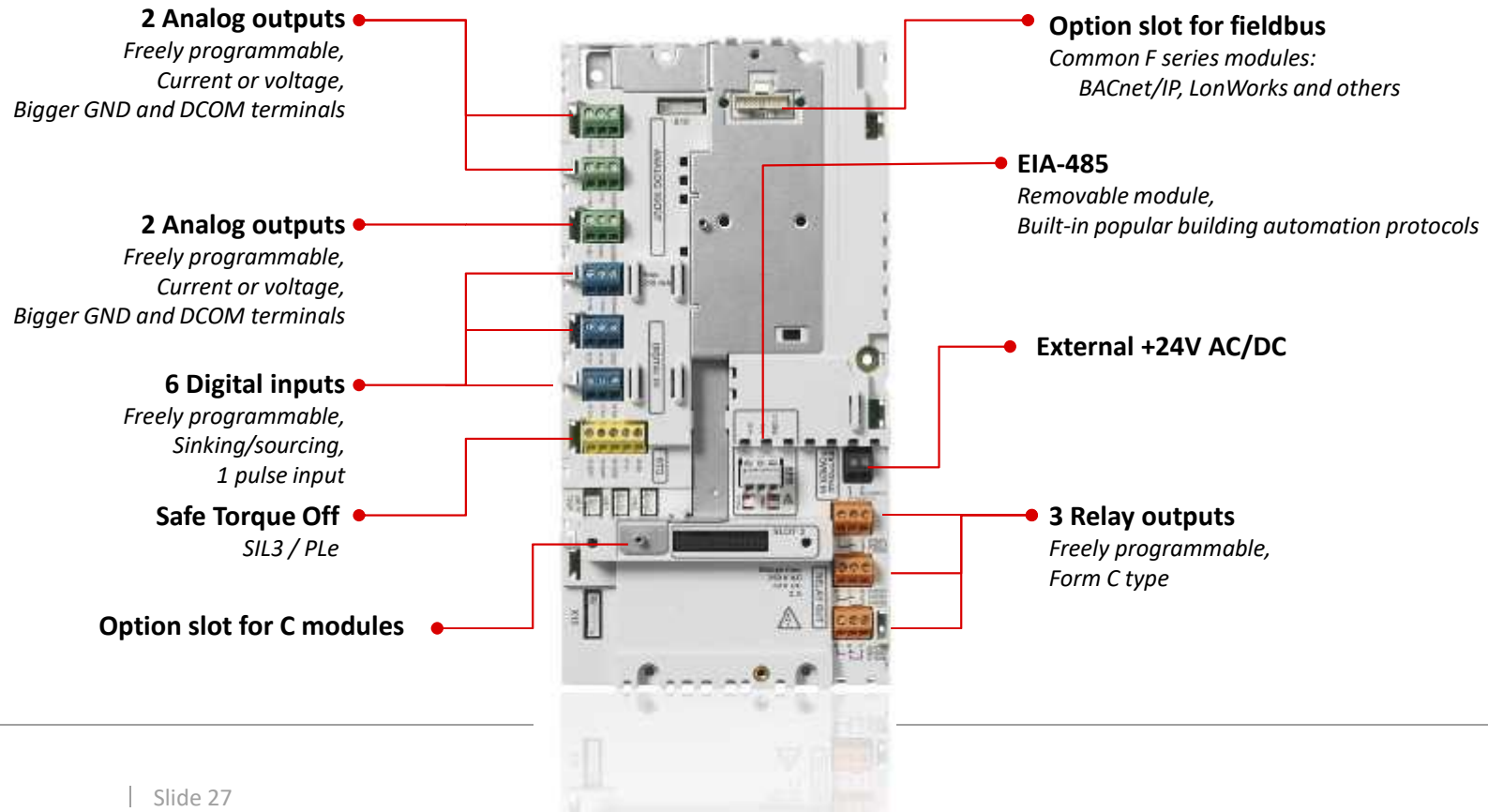
ACH580 hardware control

Standard control connections (R1-R5)



ACH580 hardware control

Standard control connections (R6-R9)



ACH580 motor control

Any motor – any HVAC application

Motor control highlights

- Compatible with the broad range of motors on the market.
- Your critical operations resume immediately thanks to our “flying start” feature—whether an outage is planned or not
- Two modes of motor control
 - Scalar (IM) Vector (IM, PM, SynRM)
 - Flying start for both motor control modes
- Motor heating prevents corrosion in condensing environments
- Reduced motor noise with adjustable switching frequency range
- Take advantage of the highest in efficiency offerings



Environment control

Save energy and the environment

Energy savings of up to 70% – the ACH580 helps to use only the exact amount of energy needed to run the motor.

The energy optimizer feature ensures maximum torque per ampere, reducing energy drawn from the supply by 10 percent.

The drive is compatible with energy-efficient IE4 motor types such as Permanent Magnet (PM) and SynRM motors.

Analyze and optimize processes with built-in energy efficiency calculators.

Life cycle services ensure your processes run efficiently, year after year.

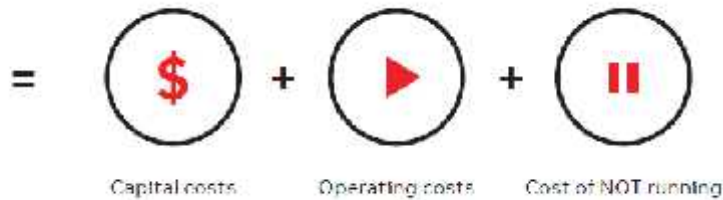


Cost Control

The true cost of ownership of HVAC applications

Cost of ownership is down to three components

**WHOLE
LIFE
COST**



Optimize COO with ACH580 HVAC Drive

Increase energy efficiency

Improve productivity with the right combination of VFDs and high efficiency motors

Ensure reliable operation of HVAC systems to

- Avoid high costs of unplanned outages
- Maximize uptime
- Prevent significant negative impacts on critical zones in facilities such as hospitals or data centers

Use ABB's broad service offering including preventive maintenance so that equipment will not break down unexpectedly.

Application Control

Highlight features for HVAC applications

Standard features



Harmonics and EMC

- Optimized DC choke built in to limit harmonics
- Complies with standard EN61000-3-12
- EMC C2 filter allows installation in 1st environment



Assistant control panel and primary settings

- ACH-AP-H assistant control panel speaks 14 different languages
- Easily accessible USB interface for PC and tool connection
- Help button for problem solving



Scalar and vector control for process control

- Scalar control for effortless process control
- Vector control for accurate and energy efficient speed and torque control in demanding applications
- Support for AM, PM and SynRM motors

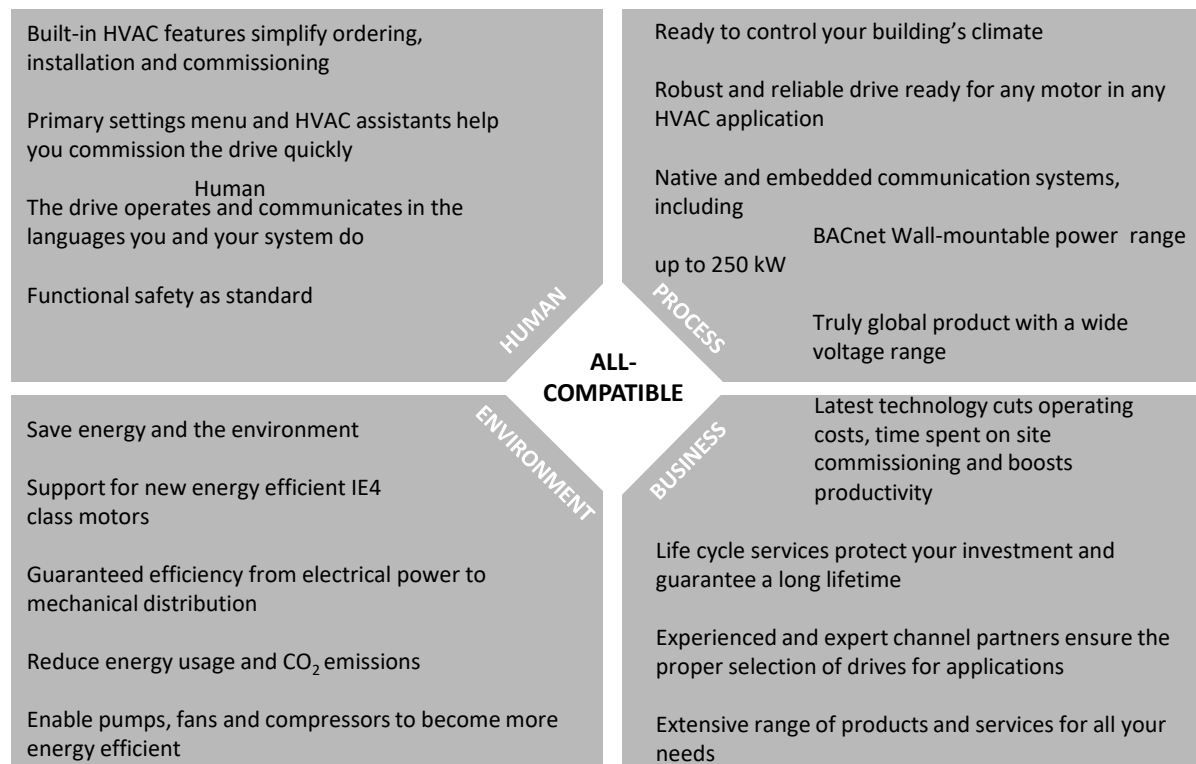


Override functionality

- Control of indoor climate, even in extreme and critical situations
- Increased life and property safety
- Time and cost savings (e.g. minimized fire damage and restoration costs) for building owners

Compatibility control

New common drives architecture driving ease of use



Total control

Climate – Quality – Operation – Service support

Comprehensive climate control
Designed for HVAC market with low harmonics

Simple operation
We speak the languages you and your system do

Proven quality
Quality that has been proved with over 600 000 running installations
worldwide

Global support
Truly global service and support network in over 100 countries



ACH580

ABB's HVAC drive applications

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Comfort Applications



Retail Facilities



Commercial & Public Buildings



Tall Buildings



Places of Assembly



Educational Facilities



Hotels, Motels and Dormitories



Health Care Facilities



Justice Facilities

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Non-Comfort Applications



Laboratories



Data Centers



**Museums, Galleries,
Archives, & Libraries**



**Enclosed Vehicular
Facilities**



Clean Spaces



**Drying and Storing
Selected Farm Crops**



**Environmental
Control for Animals
and Plants**



Kitchen Ventilation

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Comprehensive range of HVAC software features

HVAC control program

- Auto start after power loss
- Run permissive - (damper monitoring)
- 4 Start interlocks - (safety switches, freeze status)
- Start and stop delays (e.g. when no damper feedback available)
- Under-/overload curves (broken belt, dry pump supervision)
- User definable supervisions to monitor any value
- Override for HVAC with constant/PID loop/AI reference
- Flow calculation with sensors
- PID closed-loop controllers for HVAC applications
 - Integration of external controller features
 - Sleep and sleep boost available
- Motor flying start and motor pre-heat
- Energy Optimizer – lower motor iron losses at part load
- BACnet MS/TP embedded, BACnet/IP optional

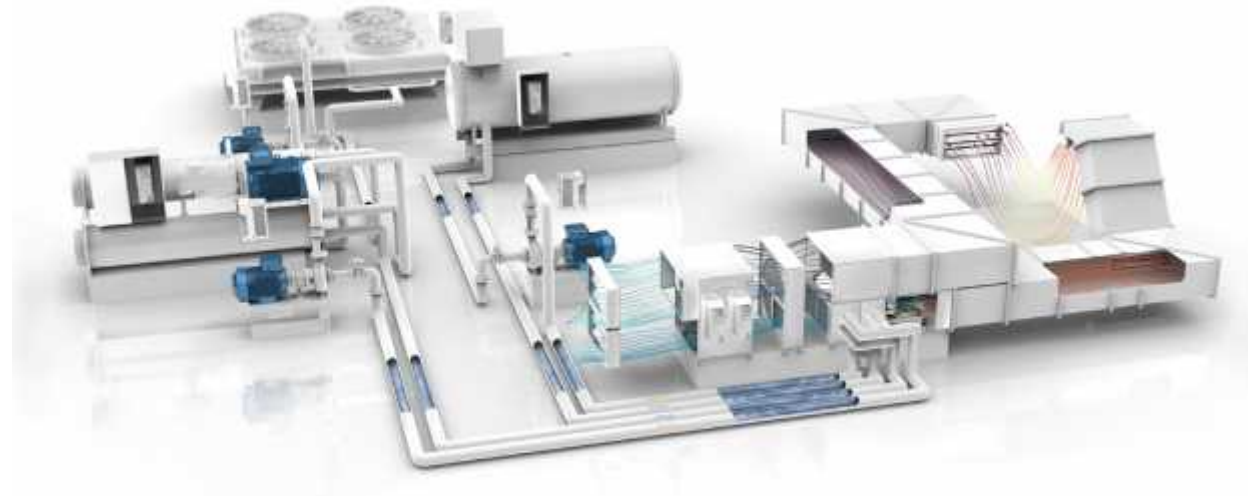


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Premier air handling

Benefits with value

- **Effortless startup** of your HVAC system
- **Improved safety** thanks to built-in safety functionality, such as override mode, supply disconnect switch and safe torque off
- **Reduced costs** by adjusting the speed of the fan and using only the energy that is actually needed
- **Optimal system efficiency** thanks to low harmonic content and ability to control power factor.

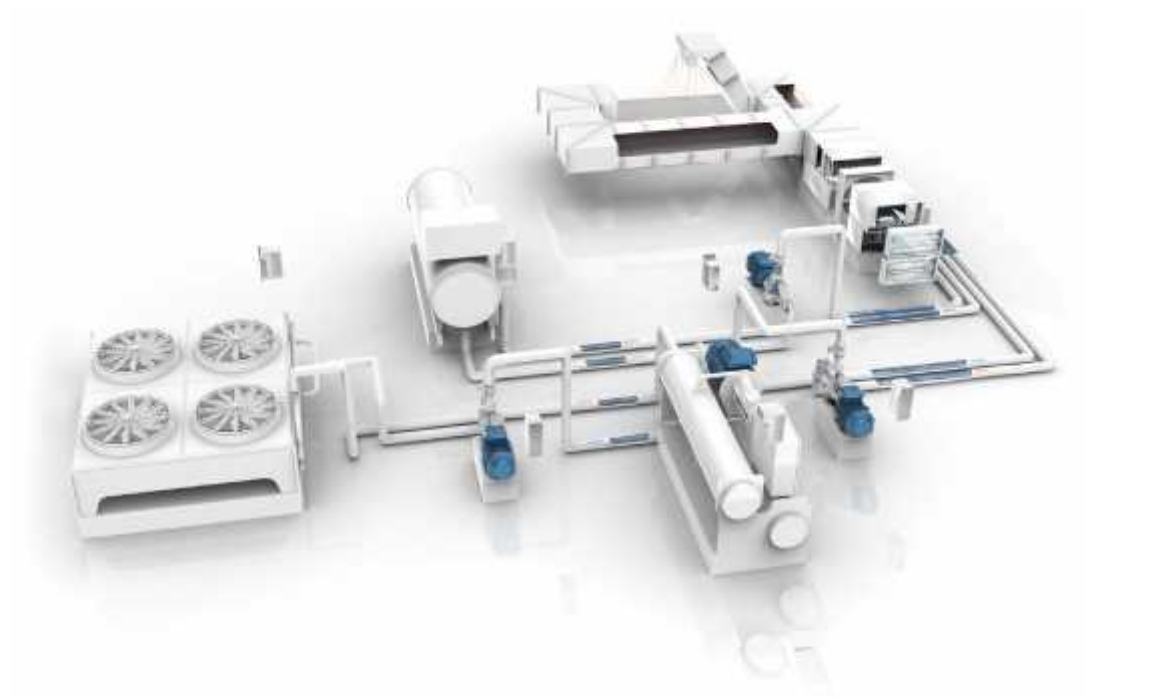


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Precise water flow control

Benefits with value

- **Motor monitoring prevents problems** before they actually happen
- **Protection of your equipment** and extension of the equipment's lifetime thanks to state-of-the-art motor control and smooth system startup
- **System optimization** by adjusting the water flow to the current demand



ACH580 features for fans

MNS9

Fans are typically variable torque applications

Fans – standard features

Compact Type 12 devices with coated PCBs for stand alone installation

EMC level C2 for installation in the 1st environment

Optimized chokes for harmonic mitigation in partial loads

Software features

- Support for high efficiency and SynRM motors
- Sensorless vector control
- Flying start in vector and scalar control to catch rotating motor
- Supervision and protection functions
- Process PID controller (2 different sets) and external PID controller, PID sleep / boost



MNS9 Add customer value
Mary N. Symes, 8/30/2018

ACH580 features for pumps

Pumps are typically variable torque applications

Pumps – standard features

Power range up to 350hp in different enclosure versions

Motor cables up to 1,000 feet

Built-in choke as standard in all ACH580 drives

STO for machinery safety

ACH580 Software features for pumps

- Support for high efficiency motors and sensorless vector control
- Supervision and protection functions for pump protection
- Multiple ramp sets for submersible pump control
- Motor heating mode for motor condensation prevention
- Possibility to control up to 4 pumps simultaneously with PFC function
- Process PID controller (2 different sets) and external PID controller, PID sleep / boost



ACH580 features for compressors

Many compressors are variable torque applications

Compressors – standard features

Wide support for different fieldbus protocols

STO for machinery safety

Power range up to 350hp

Software features

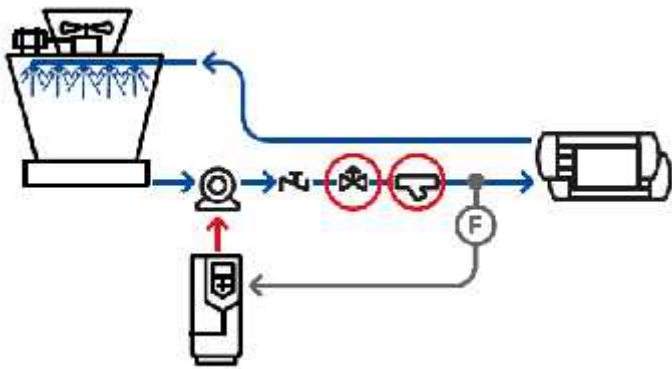
- Support for high efficiency motors and sensorless vector control
- High starting torque at low speeds
- Maintenance counters
- Stall protection
- Load curve for detecting abnormal load situations
- Configurable supervision functions
- Motor temperature monitoring



ACH580 – ABB HVAC drives

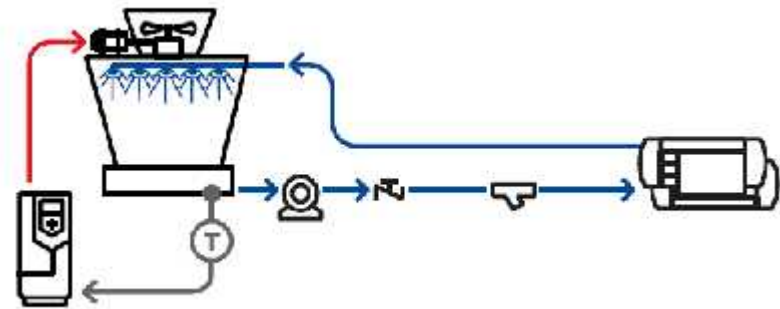
Application examples: Cooling tower

Condenser water pump



- The pump speed can be controlled to maintain a constant flow as the strainer loads
- The drive can also indicate when the strainer needs to be cleaned
- If a throttling valve was used to adjust the flow, the VFD can save additional energy

Cooling tower fan

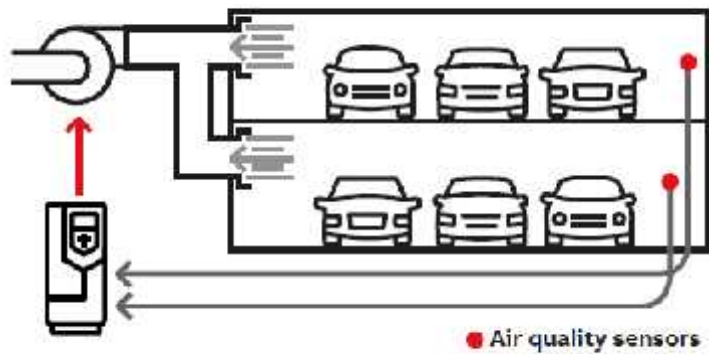


- Generally controlled by the return water temperature
- Saves electrical energy
- Reduces mechanical stress
- Reduces the need for make-up water
- Reversing for de-icing the tower
- Pre-heat protects motor insulation

ACH580 – ABB HVAC drives

Application examples: Ventilation fan

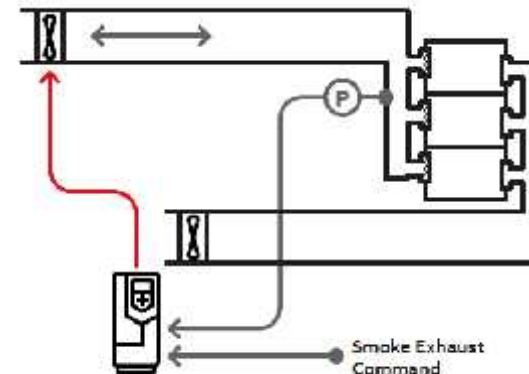
Parking ventilation fan



● Air quality sensors

- Automatically adjusts the amount of ventilation based on the air quality
- Can be tied into a fire system to control the air flow as required

Smoke extraction fan



- During normal operation, the fan turns forward
- When a smoke exhaust command is given, the VFD decelerates the fan to a stop
- The VFD smoothly accelerates the fan in the opposite direction
- Override function can be used to control the smoke extraction as long as needed

ACH580 – ABB HVAC drives

Application example: Override mode for increased safety

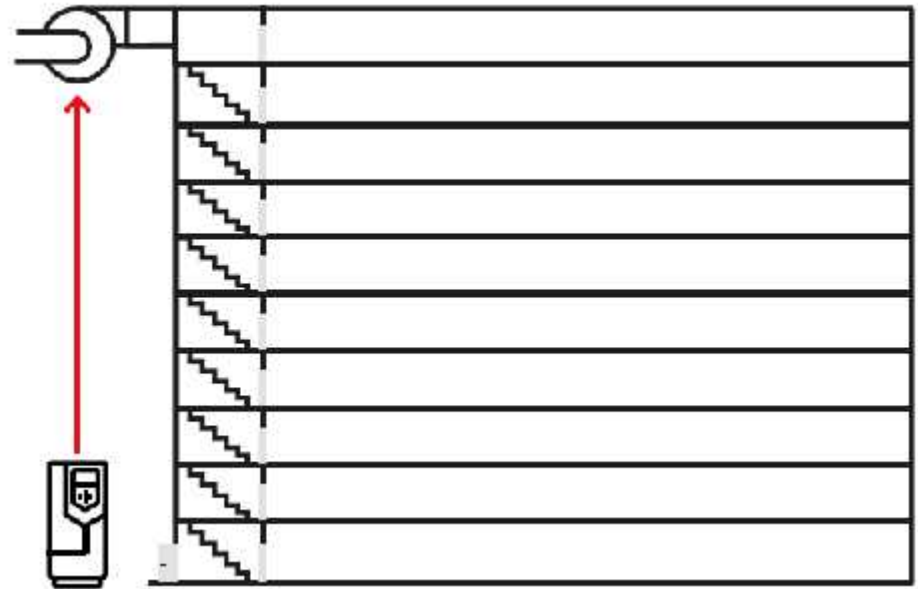
Stair well pressurization

Override mode is used to keep the motor running, ignoring other interlocks, alarms and other inputs

Stairwell pressurization keeps the escape paths free from smoke to make it safe for persons to escape the building

Full speed operation is not always a good idea, since the pressure may make it impossible to open the fire exit doors

During override it is possible to run preset speed, follow analog speed reference or follow speed reference from PID loop controller.



ACH580 – ABB HVAC drives

ACH580 Ultra-low harmonic drives for HVAC

Harmonics pollute the electrical network and make equipment connected to it behave erratically.

HVAC system needs to work despite harmonics, especially in buildings where cooling is essential to the equipment in the building like data centers.

Harmonics can cause reduce system efficiency due to overheating the system components.



ACH580 Ultra-low harmonic drive

Critical Facility Applications

Data centers



- Cooling is critical
- Sensitive equipment that are susceptible for harmonic disturbances

Hospitals



- Good indoor air quality is important to guarantee patient safety
- Medical equipment can be damaged due harmonics

Airports



- Huge need for HVAC system
- Communication equipment that might be interrupted by harmonics

Tunnel ventilation

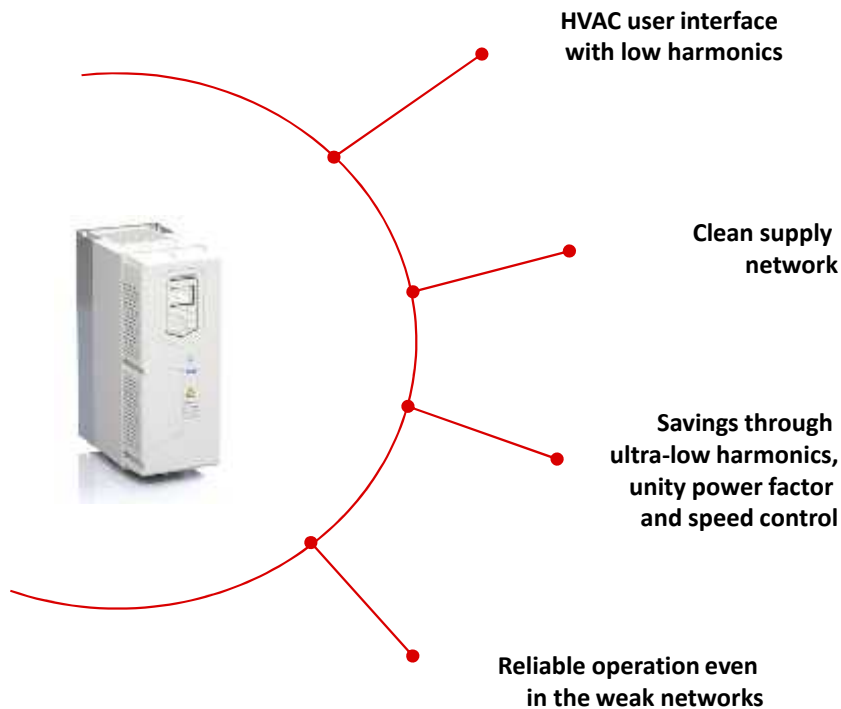


- Long cables might cause voltage drops, drive has ability to boost output voltage to provide nominal voltage to motor

These examples and other commercial buildings benefit from low harmonic content in the network

ACH580 Ultra-low harmonic drive

The value of ultra-low harmonic drives for HVAC



- Easy, controlled, reliable, everything inside low harmonic solution without additional components.
- Familiar, user friendly HVAC interface for sensitive systems.
- For example, override, low level of harmonics and voltage boost for tunnel fans, and BACnet, low level of harmonics for datacenters and hospitals.
- The drive guarantees low harmonic content in the network, which further prevents breakdowns of sensitive equipment connected to the same network.
- The drive exceeds IEC61000-3-12 harmonic standard requirements and enables the system to comply with IEEE519 and G5/4 harmonic guidelines.
- Low level of harmonics and the ability to adjust the motor speed to actual needs improve the overall system efficiency.
- Unity power factor means there's no need to overdimension system components like cables, fuses and transformers. The ability to correct the power factor means there's no need for additional capacitor banks and no additional utility penalty fees.
- Boost the voltage to full level even in fluctuating or weak networks, like in tunnels or rural areas.
- If the supply voltage has dropped, boosting it reduces the motor thermal load and increases motor lifetime comparing to other drive solutions.



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