

# ABB HVAC E-Bypass and Disconnects

ACH550, 1 - 550 Hp

Technical catalog



## ABB INC. - THE WORLD LEADER IN HVAC DRIVE TECHNOLOGY

ABB is the #1 drives supplier to the VFD market worldwide. In the USA, ABB Inc. New Berlin, Wisconsin, is the HVAC market leader providing a complete line of energy-efficient variable frequency drives and motors to HVAC and commercial customers. Common HVAC single-motor applications include supply, return and exhaust fans, fume hoods, primary and secondary chilled and hot water pumps, centrifugal chillers, condenser fans; multiple-motor applications include multi-cell cooling towers, parallel chilled water, and domestic booster pump systems.

ABB serves customers in manufacturing, process and consumer industries, commercial and property management facilities, utilities, and infrastructure markets. ABB's U.S. operations (see website <http://www.abb.us/drives>) headquartered in Norwalk, Conn., employs over 100,000 people worldwide in more than 100 countries with revenues of \$22.4 billion in 2005.



## DON'T LOSE CONTROL JUST BECAUSE YOU CHOOSE TO GO TO BYPASS!

ABB was the first in the industry to develop and implement an integrated drive and bypass design that is microprocessor-controlled, giving HVAC customers a revolutionary package that is very compact and truly "intelligent". Features like selectable class 20 or 30 overload curves, underload (broken belt) trip, single-phase protection, selectable manual or automatic bypass, fireman's override and damper control. Fast acting fuses exclusive to the ACH550 disconnect the drive from the line prior to clearing upstream branch circuit protection, maintaining bypass capability.

The damper control circuit closes a dry contact upon a run command to open a damper such as an outdoor air damper, fire damper, isolation damper, etc. before the motor is allowed to operate in drive or bypass regardless of the source of the run command. When the damper is fully open, a normally open dry contact closes and allows the motor to operate. A dedicated input is provided for safety interlocks such as firestats, smoke detectors, etc. When this contact opens, the motor stops (in drive or bypass mode) and the damper is commanded to close.

The HVAC Enhanced E-Bypass has two Override modes of operation for critical control situations. The Fireman's Override accepts a normally open

dry contact that forces the motor to run in bypass and ignores all other keypad, internal and external commands. Fireman's Override is designed for "Run to Destruction" operation. The second mode, Bypass Override, forces the motor to start in bypass and ignores keypad commands, but still accepts external and internal safety interlocks.

Another industry first from ABB is the ability to monitor VFD/Bypass mode of operation, the status of the bypass H-O-A switch, bypass fault and fireman's override status over serial communication. The serial link can also force the motor into bypass!



All of these features are in one of the industry's smallest packages!

ABB also offers a variety of enclosure solutions, including NEMA 3R outdoor enclosures. ABB can also provide passive, active and multi-pulse harmonic solutions for your most demanding applications. Contact ABB to find out more.

## BYPASS AND DISCONNECT CONFIGURATIONS

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All ABB E-Bypass and Disconnect Configurations incorporate the ACH550 series microprocessor-based Pulse Width Modulated (PWM) adjustable frequency AC Drive. The ACH550 drive takes advantage of sophisticated microprocessor control and advanced IGBT power switching technology to deliver excellent performance control of AC motors for a wide range of commercial applications. Each ACH550 drive comes equipped with an extensive library of pre-programmed application macros, which, at the touch of a button allow rapid configuration of inputs, outputs, and performance parameters for specific applications to maximize convenience and minimize start-up time.

Every model ACH550 provides 5% equivalent line impedance through the use of swinging chokes. This standard feature reduces reflected harmonics, increasing the total power factor and provides protection against line transients.

ABB's patented swinging choke means the ACH Series Drive reduces harmonics by up to 64% at partial loads when compared to a PWM AFD with no chokes. There is no need to oversize the supply cables, branch circuit wiring, disconnecting means and protection to comply with the National Electric Code (NEC).

### E-BYPASS OPTIONS



#### Vertical - ACH550-VC and ACH550-VD

**1-25Hp 208V / 1-60Hp 460V / 2-60Hp 600V**

This configuration incorporates a space saving design where the VFD and Bypass are assembled vertically. When wall space is at a premium, this is the ideal configuration.

- **UL Type 1 Enclosure**
- **Plenum Rated Drive**
- **Main Circuit Breaker or Input Disconnect Switch (Door Interlocked, Padlockable)**
- **Optional AC Line Reactor, Serial Communications Module**
- **Dedicated, Drive-only Input Fuses**
- **Damper Control and Fireman's Override**



#### E-Bypass - ACH550-BC and ACH550-BD

**1-100Hp 208V / 1-400Hp 460V / 2-150Hp 600V**

- **UL Type 1 or UL Type 12 Enclosures**
- **Plenum Rated Drive**
- **Main Circuit Breaker or Input Disconnect Switch (Door Interlocked, Padlockable)**
- **Dedicated Drive-only Input Fuses**
- **Optional AC Line Reactor**
- **Wall Mounted Through 150HP (@460VAC)**
- **Floor Mounted 200 to 400 HP**
- **Damper Control and Fireman's Override**



## CLASSIC BYPASS



### Classic Bypass - ACH550-CC and ACH550-CD

**1-100Hp 208V / 1-400Hp 460V / 2-150Hp 600V**

This configuration incorporates a bypass function made up entirely of standard industrial control components.

- UL Type 1, UL Type 12, or UL Type 3R Enclosure
- Plenum Rated Drive
- Main Circuit Breaker or Input Disconnect Switch (Door Interlocked, Padlockable)
- Dedicated Drive-only Input Fuses
- Optional AC Line Reactor, Serial Communications Module



## DISCONNECT OPTIONS



### Drive with Input Disconnect Switch and Fuses - ACH550-PD

**1-100Hp 208V / 1-550HP 460 V / 2-150Hp 600V**

This product design provides a mean of disconnecting power to the drive system by using a door interlocked, padlockable disconnect switch and fast-acting fuses.

- UL Type 1, UL Type 12, or UL Type 3R Enclosure
- Plenum Rated Drive
- Main Disconnect Switch (Door Interlocked, Padlockable)
- Input Fuses (except Circuit Breaker version)



### Drive with Circuit Breaker - ACH550-PC

**1-100Hp 208V / 1-550HP 460 V / 2-150Hp 600V**

This product design provides a mean of disconnecting power to the drive system by using a door interlocked, padlockable circuit breaker.

- UL Type 1, UL Type 12, or UL Type 3R Enclosure
- Plenum Rated Drive
- Main Circuit Breaker (Door Interlocked, Padlockable)

Bypass and Disconnect Comparisons			
■-Indicates Standard	HVAC Enhanced E-Bypass	Classic Bypass	Disconnect
HP Ratings	1Hp-100Hp @ 208V 1Hp-400Hp @ 460V 2Hp-150Hp @ 600V	1Hp-100Hp @ 208V 1Hp-400Hp @ 460V 2Hp-150Hp @ 600V	1Hp-100Hp @ 208V 1Hp-550Hp @ 460V 2Hp-150Hp @ 600V
Features			
Interlocked Output and Bypass Contactors	■	■	N/A
Auto Bypass Function	Selectable	Optional	N/A
Control Power	24V DC	120 VAC	N/A
24 VDC Interface	■		■
120 VAC Inputs	■	■	
Drive Operator Panel	Keypad	Keypad	Keypad
Bypass Operator Panel	Keypad	Mechanical Switches	N/A
Drive Service Switch	Optional	Optional	N/A
Enclosure Types	UL Type 1 or 12	UL Type 1, 12 or 3R	UL Type 1, 12 or 3R
Input Power Options	Circuit Breaker or Disconnect	Circuit Breaker or Disconnect	Circuit Breaker or Disconnect
Drive Fuses	■	■	■
5% Line Impedance	1 HP to 150 HP	1 HP to 150 HP	1 HP to 150 HP
3% Line Impedance	200 HP to 400 HP	200 HP to 400 HP	200 HP to 550 HP
Bypass Voltage Tolerance	Plus or Minus 30% <sup>1</sup>	Plus or Mixus 15%	N/A
Dimension Comparison for 15hp (R2), 460 VAC	48"H x 6"W x 10"D-Vertical 34"H x 17"W x 13"D-Standard	38"H x 14"W x 14"D	31"H x 10"W x 12"D
Protective Features			
Overload in Bypass	Adjustable	Fixed	N/A
MOL Class	20/30-Selectable	20	N/A
Underload in Bypass	Adjustable		N/A
Single Phase Protection	■ <sup>2</sup>		■
Dedicated Safeties Input	■	■	■
Damper Endswitch Permissive	■		■
HVAC Control Features			
Fireman's Override	■		■
Damper Actuator Output	■		■
Bypass (monitor and control) Serial Communication Capabilities	■		N/A
Status Indicators For			
Power On	■		■
System Enabled	■		■
Drive Selected	■		N/A
Bypass Selected	■	■	N/A
Drive Running	■	■	■
Bypass Running	■		N/A
Drive Fault	■	■	■
Bypass Fault	■	■	N/A
Bypass HOA	■		N/A
Automatic Bypass Mode Selected	■		N/A
Relay Functions			
System Run	■		■
Drive Fault	■		■
Bypass Fault	■		N/A
Bypass HOA	■		N/A
System Started	■		■
Bypass/Override Selected	Selectable		N/A

<sup>1</sup> Plus or Minus 15%, 30Hp to 100Hp @ 208V, 75Hp to 400Hp @ 460V, 75Hp to 150Hp @ 600V

<sup>2</sup> VFD & Bypass, 1Hp to 25Hp @ 208V, 1Hp to 60Hp @ 460V, 2Hp to 60Hp @ 600V

## New Berlin, Wisconsin Facility

- ABB's New Berlin facility is one of the largest, most advanced drives facilities of its type in North America
- Established in 1982
- ISO 9001, 14001 and 18001 certified



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