User’s Manual

ACH550-CC/CD Packaged Drive with Classic Bypass
Supplement for ACH550-UH HVAC User’s Manual

ACH550 Drive Manuals

GENERAL MANUALS

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Safety

WARNING! The ACH550 adjustable speed AC drive with Classic Bypass should ONLY be installed by a qualified electrician.

WARNING! Even when the motor is stopped, dangerous voltage is present at the Power Circuit terminals U1, V1, W1 and U2, V2, W2 and, depending on the frame size, UDC+ and UDC-, or BRK+ and BRK-

WARNING! Dangerous voltage is present when input power is connected. After disconnecting the supply, wait at least 5 minutes (to let the intermediate circuit capacitors discharge) before removing the cover.

WARNING! Even when power is removed from the input terminals of the ACH550, there may be dangerous voltage (from external sources) on the terminals of the relay outputs.

WARNING! When the control terminals of two or more drive units are connected in parallel, the auxiliary voltage for these control connections must be taken from a single source which can either be one of the units or an external supply.

WARNING! The ACH550 will start up automatically after an input voltage interruption if the external run command is on.

WARNING! When the ACH550 with Classic Bypass is connected to the line power, the Motor Terminals T1, T2, and T3 are live even if the motor is not running. Do not make any connections when the ACH550 with Classic Bypass is connected to the line. Disconnect and lock out power to the drive before servicing the drive. Failure to disconnect power may cause serious injury or death.

Note! For more technical information, contact the factory or your local ABB sales representative.

Use of Warnings and Notes

There are two types of safety instructions throughout this manual:

- Notes draw attention to a particular condition or fact, or give information on a subject.
- Warnings caution you about conditions which can result in serious injury or death and/or damage to the equipment. They also tell you how to avoid the danger. The warning symbols are used as follows:

Dangerous voltage warning warns of high voltage which can cause physical injury and/or damage to the equipment.

General warning warns about conditions, other than those caused by electricity, which can result in physical injury and/or damage to the equipment.

Table of Contents

Installation

Study these installation instructions carefully before proceeding. **Failure to observe the warnings and instructions may cause a malfunction or personal hazard.**

WARNING! Before you begin read "Safety" on page 1.

WARNING! When the ACH550 with Classic Bypass is connected to the line power, the Motor Terminals T1, T2, and T3 are live even if the motor is not running. Do not make any connections when the ACH550 with Classic Bypass is connected to the line. Disconnect and lock out power to the drive before servicing the drive. Failure to disconnect power may cause serious injury or death.

Application

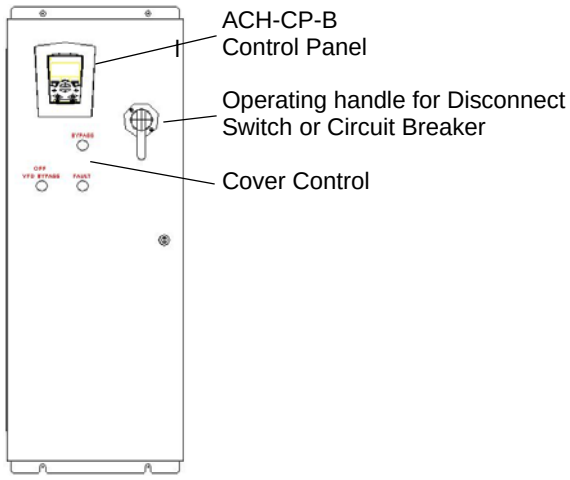
This manual is a supplement to the ACH550-UH User's Manual and documents Classic Bypass configurations.

Classic Bypass Features and Functions

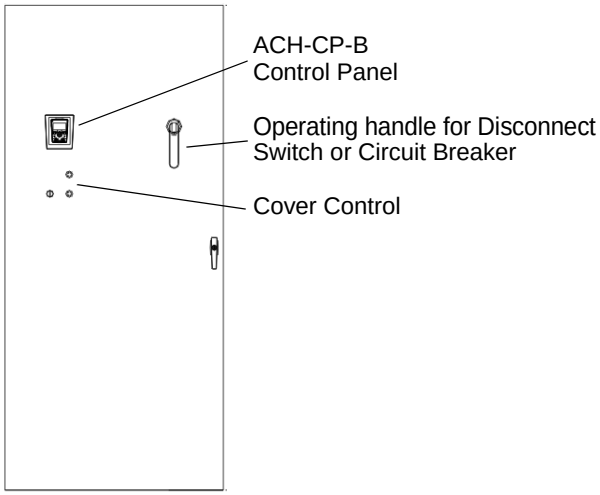
The ACH550 with Classic Bypass is an ACH550 AC adjustable frequency drive in an integrated UL Type 1, UL Type 12, or UL Type 3R package with a bypass function configured entirely of standard industrial control components. The ACH550 with Classic Bypass provides:

- Disconnect switch or circuit breaker with door mounted control lever. The lever can be padlocked in the OFF position (padlock not supplied).
- Electrically interlocked Bypass and drive output contactors
- Class 20 motor overload protection.
- ACH-CP-B drive control panel
  - Cover mounted - UL Type 1 and 12 enclosures
  - Drive mounted - UL Type 3R enclosures
- Bypass cover mounted control
  - Drive-Off-Bypass selector switch
  - Bypass pilot light
  - External Fault/MOL pilot light
- Provisions for external control connections.
- Optional drive service switch (drive input disconnect), the functional equivalent of a three-contactor bypass arrangement.

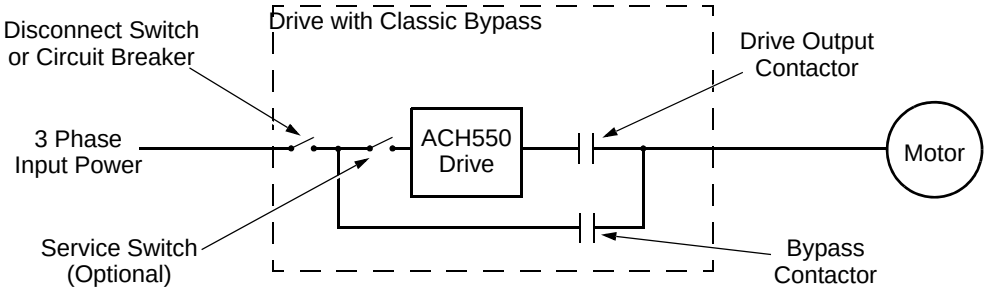
The following shows the front view of a typical ACH550 Classic Bypass wall mount configuration, and identifies the major components.



The following shows the front view of a typical ACH550 Classic Bypass floor mount configuration, and identifies the major components.



The following is a typical power diagram.



Installation Flow Chart

The installation of Classic Bypass Configurations for ACH550 drives follows the outline below. The steps must be carried out in the order shown. At the right of each step are references to the detailed information needed for the correct installation of the unit.

Task	Reference in ACH550-UH User's Manual "Installation" section	Reference in this Manual
PREPARE for installation	"Preparing for Installation"	"Drive Identification" on page 7. "Suitable Mounting Location (Supplement to ACH550-UH User's Manual)" on page 8
PREPARE the Mounting Location	"Prepare the Mounting Location"	--
REMOVE the front cover	"Remove Front Cover"	--
MOUNT the drive	"Mount the Drive"	--
INSTALL wiring	"Wiring Overview" and "Install the Wiring"	"Installing the Wiring (Supplement to ACH550-UH User's Manual)" starting on page 8.
SET overload relay	--	"Motor Overload Relay (Supplement to ACH550-UH User's Manual)" on page 14 .
CHECK installation	"Check Installation"	--
RE-INSTALL the cover	"Re-install Cover"	--
APPLY power	"Apply Power"	--
START-UP	"Start-Up"	--

Preparing for Installation

Drive Identification

Drive Label

To identify the type of device you are installing, refer to the type code number on the device identification label.

- Wall mounting base drives – label attached on the side surface of the heat sink.
- Packaged drive with screw cover – label attached to outside surface on the left side of enclosure.
- Enclosure with hinged cover/door – label on inside surface of the cover/door.

Type Code

Use the following to interpret the type code found on the identification label.

ACH550-UH-015A-4 +…+…

AC, HVAC Drive = 550 Product Series
Construction
UH = Base Drive
BC = E-Bypass with circuit breaker
BD = E-Bypass with disconnect switch
CC = Classic Bypass with circuit breaker
CD = Classic Bypass with disconnect switch
PC = Drive with circuit breaker
PD = Drive with disconnect switch
VC = Vertical bypass with circuit breaker
VD = Vertical bypass with disconnect switch
Output current rating (See ratings chart for details)
Voltage rating
2 = 208…240 VAC
4 = 380…480 VAC
6 = 500…600 VAC
Enclosure protection class
No specification = UL type/NEMA 1
+B055 = UL type/NEMA 12
+B058 = UL type/NEMA 3R
Power options
+E213 = Line reactor
+F267 = Service switch
Input/Output option modules
+L511 = Relay output extension
+L512 = 115/230 V digital input interface
Imbedded fieldbus protocol
+K465 = BACnet protocol
Fieldbus adaptors
+K451 – DeviceNet Adaptor
+K452 = LonWorks Adaptor
+K454 = Profibus Adaptor
+K462 = ControlNet Adaptor
+K466 = Ethernet Adaptor
Miscellaneous options
+G349 = Bypass damper control

Suitable Mounting Location)

In selecting a suitable mounting location for Classic Bypass configurations, refer to the Technical Data in this manual for the appropriate information on:

- Branch circuit protection
- Dimensions and weights

Installing the Wiring

WARNING!

- **Do not connect or disconnect input or output power wiring, or control wires, when power is applied.**
- **Never connect line voltage to drive output Terminals T1, T2, and T3.**
- **Do not make any voltage tolerance tests (Hi Pot or Megger) on any part of the unit. Disconnect motor wires before taking any measurements in the motor or motor wires.**
- **Make sure that power factor correction capacitors are not connected between the drive and the motor.**

Wiring Requirements

Refer to the “Wiring Requirements” Section in the ACH550 User’s Manual. The requirements apply to all ACH550 drives. In particular:

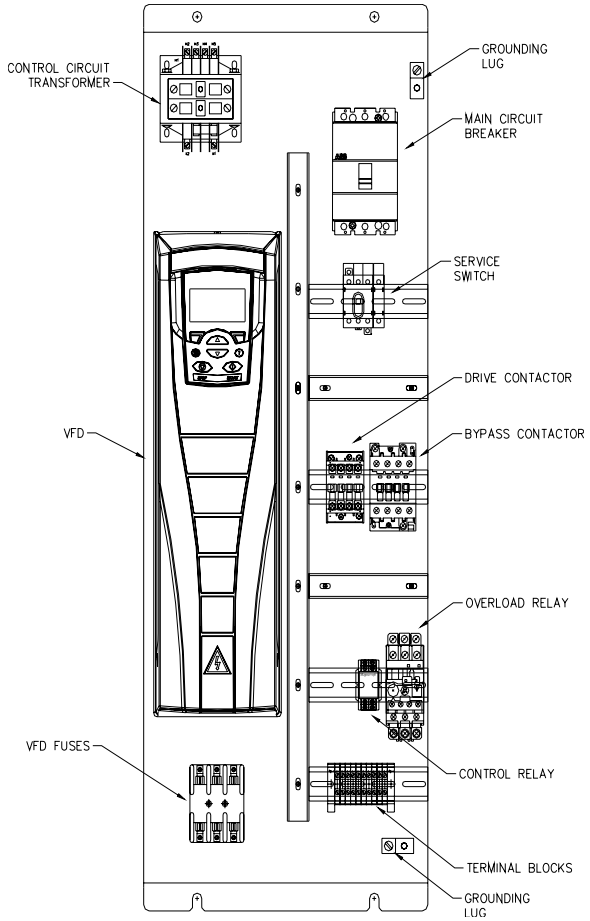
- Use separate, metal conduit runs to keep these three classes of wiring apart:
  - Input power wiring.
  - Motor wiring.
  - Control/communications wiring.
- Properly and individually ground the drive, the motor and cable shields.

Wiring Overview

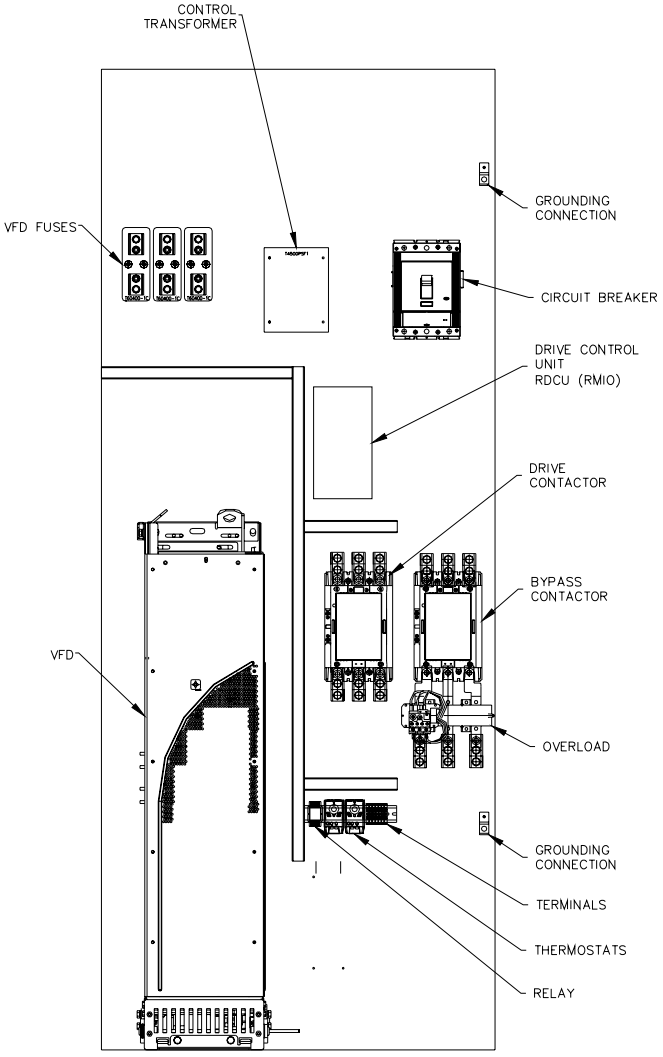
Connection Diagrams –

ACH550-CC/CD units are configured for wiring access from the top or the bottom. The following figures show the wiring connection points. Refer to the ACH550-UH User's Manual for control connections to the drive.

Typical Wall Mount



Typical Floor Mount

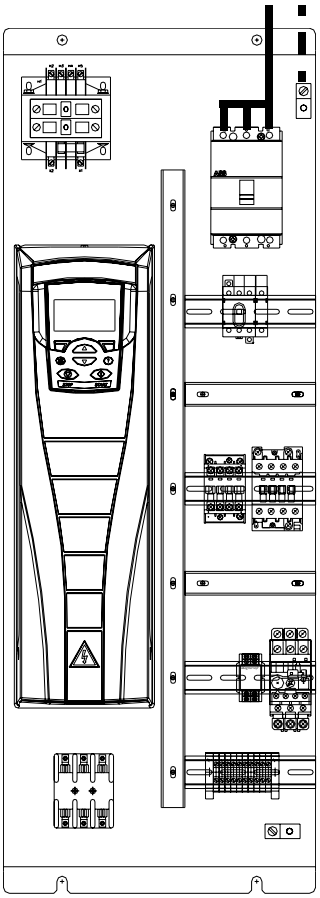


Install the Line Input Wiring

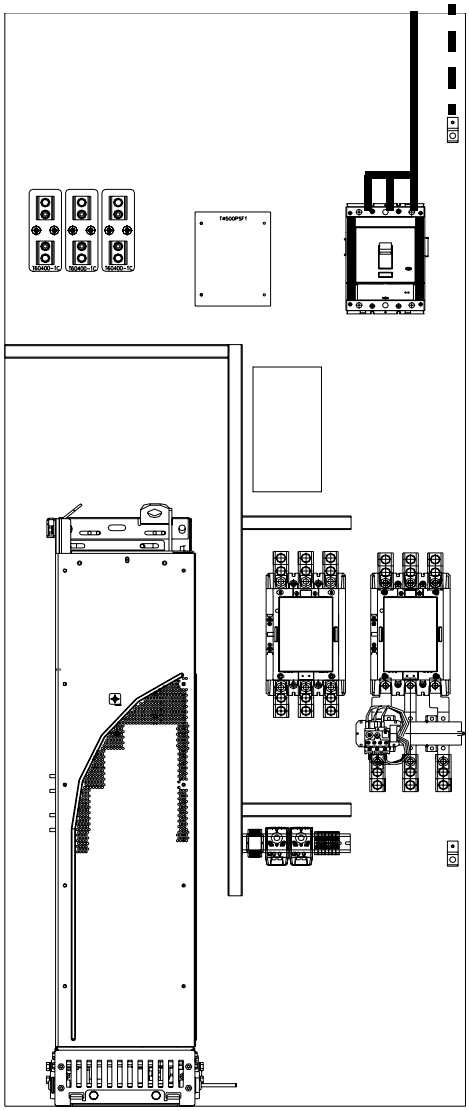
Line Input Connections – Classic Bypass Configurations

Connect input power to the terminals of the disconnect switch or circuit breaker. Connect the equipment grounding conductor to the ground lug at the top of the enclosure. The figures below show the connection points for typical configurations. Units are configured for wiring access from the top or the bottom.

Typical Wall mount



Typical Floor mount



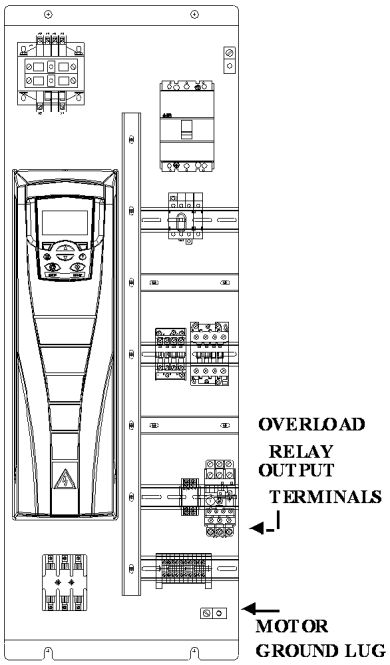
WARNING! Check the motor and motor wiring insulation before connecting the ACH550 to line power. Follow the procedure in the ACH550-UH User's Manual. Before proceeding with the insulation resistance measurements, check that the ACH550 is disconnected from incoming line power. Failure to disconnect line power could result in death or serious injury.

Install the Motor Wiring

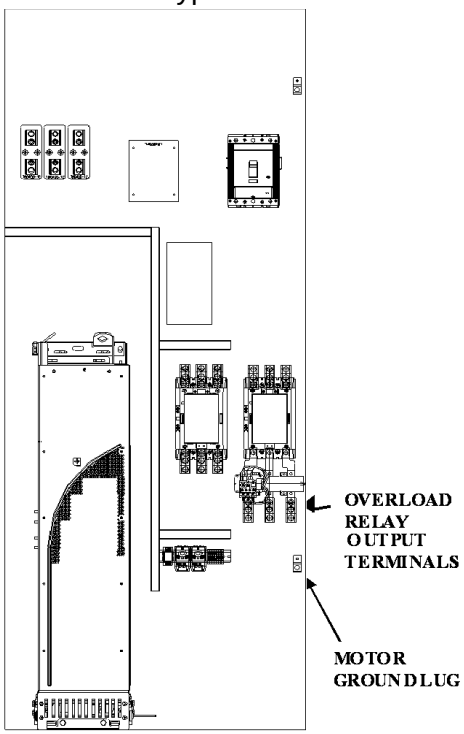
Motor Connections – Classic Bypass Configurations

Connect the motor cables to the motor overload relay output terminals; see the figures below. The motor grounding conductor can be connected to the ground lug near the motor overload relay.

Typical Wall mount



Typical Floor mount



Install the Control Wiring

Connect control wiring to the terminal block 1TB located on the back panel toward the bottom of the enclosure.

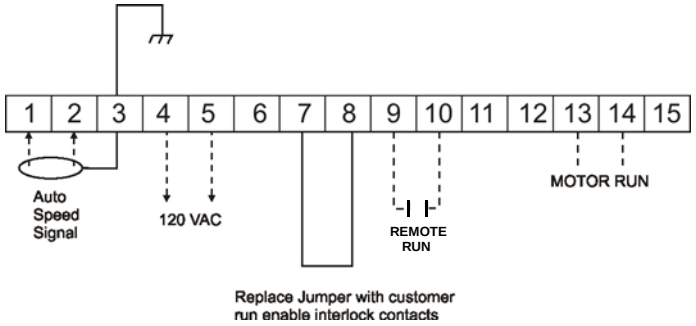
Control Wiring

The control wiring includes connections to an analog speed command signal and start/stop relay contact for controlling the drive in the AUTO mode. There may also be connections to external run enable interlock contacts and a connection from the Motor Run contact to an external status indicating circuit.

Wiring Practices

The external control wiring to 1TB must not be run in the same conduit or raceway with any high power wiring. The external speed reference signal must be wired using a shielded, twisted pair cable. The shield connection must be terminated at the ground terminal provided (1TB:3). The other end of the shield should be cut and taped back at the signal source.

Terminal Block 1TB



Connection Points

All of the basic control connections are made to 1TB, which is a din-rail terminal block on the back panel at the bottom of the enclosure. 1TB includes screw clamp terminals rated for #22-10 AWG stranded or solid wire. Recommended tightening torque is 4.4 - 7.1 in-lbs.

The following figure shows connections 1TB1:1 through 1TB1:15. These connections are described in the following paragraphs.

Terminals 1TB:1 and 1TB:2 are low voltage speed reference signal input terminals (24 VDC maximum). Terminal 1TB:3 is a ground terminal for terminating the shielded cable. Terminals 1TB:4 to 1TB:8 are 120 VAC control circuit terminals connected to 120 VAC control power supplied by the control circuit transformer provided. Terminals 1TB:9 and 1TB:10 are powered at 24VDC to accept an external contact closure to start the drive. Terminals 1TB:11 to 1TB:15 are connected to un-powered relay contacts provided for use with externally powered customer control circuits.

Additional Connections

Analog outputs, additional relay outputs, and additional digital input connections are available on Terminal Block X1 inside the ACH550. Note that the Classic Bypass control circuitry uses inputs and outputs DI1,DI4 and R02. These inputs are not available for any other purpose and must not be reconfigured. Input AI1 and output RO2 are wired to the terminal block, 1TB. AI1, AI2, DI3, DI5, DI6, RO1, and R03 are available for use. Refer to the *ACH550-UH HVAC Drives User's Manual* for information about control connections on Terminal Block X1. When making connections to Terminal Block X1, be careful not to disturb the factory installed wiring between X1 and the Classic Bypass control circuitry.

Analog Input

The external "Auto" speed reference is connected to Terminals 1TB:1 and 1TB:2. The Auto speed reference is factory wired from 1TB to ACH550 analog input AI1.

The analog input can accept a voltage signal (0 – 10 VDC) or a current signal (0 – 20 mA). Jumper J1, located on the Control Board in the ACH550, determines the signal type. J1 can be set in either the voltage or current position according to the type of external signal that will be connected. *Refer to the ACH550 User's Manual.*

Run Enable Interlocks

Run Enable interlocks, such as Freeze, Fire and Smoke protection are normally closed un-powered contacts connected in series between 1TB:7 and 1TB:8. When any of these contacts opens, the motor will stop, whether in DRIVE or BYPASS. The unit is shipped with a jumper installed from 1TB:7 to 1TB:8. This jumper must be removed before connecting external contacts.

Auto Start Contact

To start the ACH550 by means of an external un-powered contact (maintained), connect the contact to 1TB:9 and 1TB:10. Closing this contact will start the motor when the drive is in the AUTO mode.

Relay Contact Output

A “Motor Running” relay contact output is provided at terminals 1TB:13 and 1TB:14 for external indication of the motor status. The output consists of a normally open auxiliary contact on the bypass contactor and a normally open “Drive Running” contact from the ACH550. The two contacts are connected in parallel so that a contact closure is provided whenever the motor is running.

Refer to “Control Connections” in the *ACH550-UH HVAC Drives User’s Manual* Technical Data where relay contacts are used to control inductive loads.

Motor Overload Relay

The ACH550 with Classic Bypass includes a motor overload relay to provide thermal motor protection. It is connected in both drive and bypass modes of operation. For motor full load currents up to 80 amperes, the Motor Overload Relay is an adjustable trip, bimetallic overload relay with a class 20 trip characteristic. Above 80 amperes, the Motor Overload Relay is an adjustable trip, electronic overload relay with selectable class 10, 20 or 30 trip characteristic.

Suggested Settings

Current

Set the current adjustment to the value of the full load current shown on the motor nameplate.

Auto/Man

It is recommended the overload relay be set to the Manual Reset mode of operation. In the Auto Reset mode, the Overload Relay contacts re-close automatically when the bi-metals of bi-metallic versions cool or when the timer function within the electronic versions times out. If power is applied and the switches and contacts in the control circuit are commanding the motor to run, the motor will start as soon as the overload relay resets.

Class

The class 20 setting on the electronic overload relays would be the appropriate choice for the majority of the motors used in North America.

Resetting the Overload Relay

In the event an overload relay set in the Manual Reset mode trips, it is necessary to open the door of the enclosure and push the Reset button on the front of the overload relay to reset it.

WARNING: If power is applied and the switches and contacts in the control circuit are commanding the motor to run, the motor will start as soon as the overload relay resets. Use caution when manually resetting the overload relay to make sure it is safe to start the motor.

Maintenance

Maintenance Interval

If installed in an appropriate environment, the drive requires very little maintenance. The table lists the routine maintenance intervals recommended by ABB. The information shown below is supplemental and in addition to that shown in the ACH550-UH HVAC User's Manual.

Maintenance	**Application**	**Interval**
Check/replace enclosure inlet air filter	UL Type 12 and 3R enclosures	Check every 3 months. Replace as needed
Check/replace enclosure exhaust air filter	UL Type 12 and 3R enclosures	Check every 6 months. Replace as needed.
Replace enclosure vent fan(s).	UL Type 12 and 3R enclosures	Every three years
Replace enclosure air circulation fan	Frames R4 through R6 in UL Type 1 enclosures	Every three years

Technical Data

Input Power Connections

Branch Circuit Protection

Input power is connected to the ACH550 with Classic Bypass through either a non-fusible disconnect switch or a circuit breaker.

The circuit providing power to an ACH550 with Classic Bypass having a non-fusible switch disconnect must include an appropriate branch circuit protective device to provide short circuit and ground fault protection for the motor when operating in the bypass mode.

In the ACH550 with Classic Bypass having a circuit breaker disconnecting means, the circuit breaker provides the branch circuit short circuit and ground fault protection for the motor operating in the bypass mode.

Fuses

Drive input fuses are provided to disconnect the drive from power in the event that a component fails in the drive's power circuitry. Since fast-acting fuses are provided, the branch circuit protection will not clear when the drive input fuses blow. If the drive input fuses blow, the motor can be switched to Bypass without replacing fuses or resetting a circuit breaker. The drive's electronic protection circuitry is designed to clear drive output short circuits and ground faults without blowing the drive input fuses. Drive input fuses are shown in the following tables.

NOTE! Although fuses listed are similar in functional characteristics to fuses listed in the ACH550-UH User's Manual, physical characteristics may differ. Fuses from other manufacturers can be used if they meet the functional characteristics of those shown in the tables.

208…240 Volt Fuses

208… 240 Volt		Frame Size	Drive Input Fuse Ratings	
HP	Identification[1]		Amps (600V)	Bussmann Type
1	ACH550-Cx-04A6-2	R1	15	KTK-R-15
1.5	ACH550-Cx-06A6-2	R1	15	KTK-R-15
2	ACH550-Cx-07A5-2	R1	15	KTK-R-15
3	ACH550-Cx-012A-2	R1	15	KTK-R-15
5	ACH550-Cx-017A-2	R1	30	KTK-R-30

1. "Cx" represents both CC and CD.

208… 240 Volt		Frame Size	Drive Input Fuse Ratings	
HP	**Identification[1]**		**Amps (600V)**	**Bussmann Type**
7.5	ACH550-Cx-024A-2	R2	30	KTK-R-30
10	ACH550-Cx-031A-2	R2	50	JJS-50
15	ACH550-Cx-046A-2	R3	80	JJS-80
20	ACH550-Cx-059A-2	R3	80	JJS-80
25	ACH550-Cx-075A-2	R4	100	JJS-100
30	ACH550-Cx-088A-2	R4	110	JJS-110
40	ACH550-Cx-114A-2	R4	150	JJS-150
50	ACH550-Cx-143A-2	R6	200	JJS-200
60	ACH550-Cx-178A-2	R6	250	JJS-250
75	ACH550-Cx-221A-2	R6	300	JJS-300
100	ACH550-Cx-248A-2	R6	350	JJS-350

380…480 Volt Fuses

380… 480 Volt		Frame Size	Drive Input Fuse Ratings	
HP	**Identification[1]**		**Amps (600V)**	**Bussmann Type**
1/1.5	ACH550-Cx-03A3-4	R1	15	KTK-R-15
2	ACH550-Cx-04A1-4	R1	15	KTK-R-15
3	ACH550-Cx-06A9-4	R1	15	KTK-R-15
5	ACH550-Cx-08A8-4	R1	15	KTK-R-15
7.5	ACH550-Cx-012A-4	R1	15	KTK-R-15
10	ACH550-Cx-015A-4	R2	30	KTK-R-30
15	ACH550-Cx-023A-4	R2	30	KTK-R-30
20	ACH550-Cx-031A-4	R3	50	JJS-50
25	ACH550-Cx-038A-4	R3	50	JJS-50
30	ACH550-Cx-045A-4	R3	100	JJS-100
30	ACH550-Cx-044A-4	R4	100	JJS-100
40	ACH550-Cx-059A-4	R4	100	JJS-100
50	ACH550-Cx-072A-4	R4	100	JJS-100
60	ACH550-Cx-078A-4	R4	100	JJS-100
75	ACH550-Cx-097A-4	R4	125	JJS-125
75	ACH550-Cx-096A-4	R5	125	JJS-125
100	ACH550-Cx-125A-4	R5	175	JJS-175
100	ACH550-Cx-124A-4	R6	175	JJS-175
125	ACH550-Cx-157A-4	R6	200	JJS-200
150	ACH550-Cx-180A-4	R6	250	JJS-250
200	ACH550-Cx-245A-4	R7	400	JJS-400

1. “Cx” represents both CC and CD.

380… 480 Volt		Frame Size	Drive Input Fuse Ratings	
HP	Identification[1]		Amps (600V)	Bussmann Type
250	ACH550-Cx-316A-4	R8	400	JJS-400
300	ACH550-Cx-368A-4	R8	400	JJS-400
350	ACH550-Cx-414A-4	R8	600	JJS-600
400	ACH550-Cx-486A-4	R8	600	JJS-600

Fuses, 500…600 Volt, Fuses

500…600 Volt		Frame Size	Drive Input Fuse Ratings	
HP	Identification[1]		Amps (600V)	Bussmann Type
2	ACH550-Cx-02A7-6	R2	15	KTK-R-15
3	ACH550-Cx-03A9-6	R2	15	KTK-R-15
5	ACH550-Cx-06A1-6	R2	15	KTK-R-15
7.5	ACH550-Cx-09A0-6	R2	15	KTK-R-15
10	ACH550-Cx-011A-6	R2	30	KTK-R-30
15	ACH550-Cx-017A-6	R2	30	KTK-R-30
20	ACH550-Cx-022A-6	R3	50	JJS-50
25	ACH550-Cx-027A-6	R3	50	JJS-50
30	ACH550-Cx-032A-6	R4	100	JJS-100
40	ACH550-Cx-041A-6	R4	100	JJS-100
50	ACH550-Cx-052A-6	R4	100	JJS-100
60	ACH550-Cx-062A-6	R4	100	JJS-100
75	ACH550-Cx-077A-6	R6	100	JJS-100
100	ACH550-Cx-099A-6	R6	150	JJS-150
125	ACH550-Cx-125A-6	R6	175	JJS-175
150	ACH550-Cx-144A-6	R6	200	JJS-200

1. “Cx” represents both CC and CD.

Line Reactor

The ACH550 Classic Bypass may contain an optional input line reactor to provide additional input impedance on the VAC line. This impedance is in addition to the approximate 5% input impedance provided by internal reactors that are standard in the drive.

Power Connection Terminals

The following tables show maximum wire size and required tightening torque for incoming power, motor terminals, and grounding terminal lug information.

208…240 Volt, Terminals

208…240 Volt, Power Connection Terminal Data						
208…240 Volt		Drive Frame Size	Power Wiring Data			
HP	Type Code[1]		Circuit Breaker	Disconnect Switch	Overload Relay	Ground Lugs
1	ACH550-Cx-04A6-2	R1	#10[2]	#10 7 in-lbs	#10 13 in-lbs	#2 15 in-lbs (#14 - #12) 40 in-lbs (#10 - #6) 50 in-lbs (#4 - #2)
1.5	ACH550-Cx-06A6-2	R1				
2	ACH550-Cx-07A5-2	R1				
3	ACH550-Cx-012A-2	R1				
5	ACH550-Cx-017A-2	R1				
7.5	ACH550-Cx-024A-2	R2	#6[2]	#8 7 in-lbs		
10	ACH550-Cx-031A-2	R2		#6 18 in-lbs	#8 21 in-lbs	
15	ACH550-Cx-046A-2	R3	#3[2]	#3 18 in-lbs	#3 36 in-lbs	
20	ACH550-Cx-059A-2	R3				
25	ACH550-Cx-075A-2	R4	#1/0[2]	#1/0 55 in-lbs	#2 36 in-lbs	
30	ACH550-Cx-088A-2	R4	#2/0 274 in-lbs	#1/0 70 in-lbs	#2/0 300 in-lbs	
40	ACH550-Cx-114A-2	R4		#2/0 200 in-lbs		
50	ACH550-Cx-143A-2	R6	300 MCM 274 in-lbs	300 MCM 200 in-lbs	250 MCM 300 in-lbs	#2/0 275 in-lbs (#6 - #2) 375 in-lbs (#1 - #2/0)
60	ACH550-Cx-178A-2	R6				
75	ACH550-Cx-221A-2	R6	2 x 250 MCM 275 in-lbs	2 x 250 MCM 275 in-lbs	2 x 250 MCM 375 in-lbs	350 MCM 100 in-lbs
100	ACH550-Cx-248A-2	R6				

1. “Cx” represents both CC and CD.

2. Tightening Torque - 50 in-lbs for #3 to #1/0, 45 in-lbs for #6 to #4, 40 in-lbs for #8, 35 in-lbs for #14 to #10.

380…480 Volt, Terminals

<table>
<tr><th colspan="6">380…480 Volt, Power Connection Terminal Data</th></tr>
<tr><th colspan="2">380…480 Volt</th><th rowspan="2">Drive Frame Size</th><th colspan="3">Power Wiring Data</th></tr>
<tr><th>HP</th><th>Type Code[1]</th><th>Circuit Breaker</th><th>Disconnect Switch</th><th>Overload Relay</th><th>Ground Lugs</th></tr>
<tr><td>1/1.5</td><td>ACH550-Cx-03A3-4</td><td>R1</td><td rowspan="5">#10[2]</td><td rowspan="5">#10
7 in-lbs</td><td rowspan="7">#10
13 in-lbs</td><td rowspan="14">#2
15 in-lbs
(#14 - #12)
40 in-lbs
(#10 - #6)
50 in-lbs
(#4 - #2)</td></tr>
<tr><td>2</td><td>ACH550-Cx-04A1-4</td><td>R1</td></tr>
<tr><td>3</td><td>ACH550-Cx-06A9-4</td><td>R1</td></tr>
<tr><td>5</td><td>ACH550-Cx-08A8-4</td><td>R1</td></tr>
<tr><td>7.5</td><td>ACH550-Cx-012A-4</td><td>R1</td></tr>
<tr><td>10</td><td>ACH550-Cx-015A-4</td><td>R2</td><td rowspan="2">#6[2]</td><td rowspan="2">#8
7 in-lbs</td></tr>
<tr><td>15</td><td>ACH550-Cx-023A-4</td><td>R2</td></tr>
<tr><td>20</td><td>ACH550-Cx-031A-4</td><td>R3</td><td rowspan="3">#3[2]</td><td rowspan="3">#3
18 in-lbs</td><td>#8
21 in-lbs</td></tr>
<tr><td>25</td><td>ACH550-Cx-038A-4</td><td>R3</td><td rowspan="2">#3
36 in-lbs</td></tr>
<tr><td>30</td><td>ACH550-Cx-045A-4</td><td>R3</td></tr>
<tr><td>30</td><td>ACH550-Cx-044A-4</td><td>R4</td><td rowspan="4">#1/0[2]</td><td>#1
18 in-lbs</td><td rowspan="4">#2
36 in-lbs</td></tr>
<tr><td>40</td><td>ACH550-Cx-059A-4</td><td>R4</td></tr>
<tr><td>50</td><td>ACH550-Cx-072A-4</td><td>R4</td><td>#1/0
55 in-lbs</td></tr>
<tr><td>60</td><td>ACH550-Cx-078A-4</td><td>R4</td></tr>
<tr><td>75</td><td>ACH550-Cx-097A-4</td><td>R4</td><td rowspan="6">300 MCM
274 in-lbs</td><td>#1/0
70 in-lbs</td><td rowspan="6">250 MCM
300 in-lbs</td></tr>
<tr><td>75</td><td>ACH550-Cx-096A-4</td><td>R5</td><td rowspan="4">300 MCM
200 in-lbs</td></tr>
<tr><td>100</td><td>ACH550-Cx-125A-4</td><td>R5</td></tr>
<tr><td>100</td><td>ACH550-Cx-124A-4</td><td>R6</td></tr>
<tr><td>125</td><td>ACH550-Cx-157A-4</td><td>R6</td><td rowspan="2">#2/0
275 in-lbs
(#6 - #2)
375 in-lbs
(#1 - #2/0)</td></tr>
<tr><td>150</td><td>ACH550-Cx-180A-4</td><td>R6</td></tr>
<tr><td>200</td><td>ACH550-Cx-245A-4</td><td>R7</td><td rowspan="2">2 x 250 MCM
275 in-lbs</td><td rowspan="2">2 x 250 MCM
275 in-lbs</td><td rowspan="2">2 x 250 MCM
375 in-lbs</td><td rowspan="5">350 MCM
100 in-lbs</td></tr>
<tr><td>250</td><td>ACH550-Cx-316A-4</td><td>R8</td></tr>
<tr><td>300</td><td>ACH550-Cx-368A-4</td><td>R8</td><td rowspan="3">2 x 500 MCM
275 in-lbs</td><td rowspan="3">2 x 500 MCM
275 in-lbs</td><td rowspan="3">2 x 500 MCM
375 in-lbs</td></tr>
<tr><td>350</td><td>ACH550-Cx-414A-4</td><td>R8</td></tr>
<tr><td>400</td><td>ACH550-Cx-486A-4</td><td>R8</td></tr>
</table>

1. “Cx” represents both CC and CD.

2. Tightening Torque - 50 in-lbs for #3 to #1/0, 45 in-lbs for #6 to #4, 40 in-lbs for #8, 35 in-lbs for #14 to #10.

500…600 Volt, Terminals

500…600 Volt, Power Connection Terminal Data						
500…600 Volt		**Drive Frame Size**	**Power Wiring Data**			
HP	**Type Code[1]**		**Circuit Breaker**	**Disconnect Switch**	**Overload Relay**	**Ground Lugs**
2	ACH550-Cx-02A7-6	R2	#6 62 in-lbs	#8 7 in-lbs	#10 13 in-lbs	#2 15 in-lbs (#14 - #12) 40 in-lbs (#10 - #6) 50 in-lbs (#4 - #2)
3	ACH550-Cx-03A9-6	R2				
5	ACH550-Cx-06A1-6	R2				
7.5	ACH550-Cx-09A0-6	R2				
10	ACH550-Cx-011A-6	R2				
15	ACH550-Cx-017A-6	R2				
20	ACH550-Cx-022A-6	R3	#3 62 in-lbs	#3 18 in-lbs		
25	ACH550-Cx-027A-6	R3			#8 21 in-lbs	
30	ACH550-Cx-032A-6	R4	#1/0 62 in-lbs	#1 18 in-lbs		
40	ACH550-Cx-041A-6	R4			#2 36 in-lbs	
50	ACH550-Cx-052A-6	R4		#1/0 55 in-lbs		
60	ACH550-Cx-062A-6	R4				
75	ACH550-Cx-077A-6	R6	300 MCM 200 in-lbs	#1/0 70 in-lbs		
100	ACH550-Cx-099A-6	R6				
125	ACH550-Cx-125A-6	R6		300 MCM 200 in-lbs	250 MCM 300 in-lbs	#2/0 275 in-lbs (#6 - #2) 375 in-lbs (#1 - #2/0)
150	ACH550-Cx-144A-6	R6				

1. “Cx” represents both CC and CD.

Motor Connections

Motor Terminals

See preceding “Power Connection Terminal Data” tables.

Bypass Contactors

The bypass circuit in the ACH550 Classic Bypass includes two contactors. One contactor is the bypass contactor (2M) that can be used to connect the motor directly to the incoming power line in the event that the ACH550 is out of service. The other contactor is the ACH550 output contactor (1M) that disconnects the ACH550 from the motor when the motor is operating in the Bypass mode. The drive output contactor and the bypass contactor are electrically interlocked to prevent “back feeding,” applying line voltage to the ACH550 output terminals.

Motor Overload Protection

The ACH550 with Classic Bypass includes a motor overload relay to provide thermal motor protection. It is connected in both drive and bypass modes of operation. For motor full load currents through 80 amperes, the Motor Overload Relay is an adjustable trip, bimetallic overload relay with a class 20 trip characteristic. Above 80 amperes, the Motor Overload Relay is an adjustable trip, electronic overload relay with selectable class 10, 20 or 30 trip characteristic. The class 20 setting on the electronic overload relays is the appropriate choice for the majority of the motors used in North America.

WARNING: If power is applied and the switches and contacts in the control circuit are commanding the motor to run, the motor will start as soon as the overload relay is reset.
Use caution when resetting the relay protection to make sure it is safe to start the motor.

Dimensions and Weights

Dimensional References

The following tables contain dimensional references that will be needed to identify the dimensional information applying to a given device type code.

208/230V Classic Bypass Packages

HP	Type Code	Amp	Frame	UL Type (NEMA) 1 Dim. Ref. Page 25	UL Type (NEMA) 12 Dim. Ref. Page 26	UL Type (NEMA) 3R Dim. Ref. Page 27
1	ACH550-Cx-04A6-2	4.6	R1	CX1-1	CX12-1	CX3R-1
1.5	ACH550-Cx-06A6-2	6.6	R1	CX1-1	CX12-1	CX3R-1
2	ACH550-Cx-07A5-2	7.5	R1	CX1-1	CX12-1	CX3R-1
3	ACH550-Cx-012A-2	12	R1	CX1-1	CX12-1	CX3R-1
5	ACH550-Cx-017A-2	17	R1	CX1-1	CX12-1	CX3R-1
7.5	ACH550-Cx-024A-2	24	R2	CX1-3	CX12-3	CX3R-3
10	ACH550-Cx-031A-2	31	R2	CX1-3	Cx12-3	CX3R-3
15	ACH550-Cx-046A-2	46	R3	CX1-4	CX12-5	CX3R-5
20	ACH550-Cx-059A-2	59	R3	CX1-4	CX12-5	CX3R-5
25	ACH550-Cx-075A-2	75	R4	CX1-6	CX12-6	CX3R-6
30	ACH550-Cx-088A-2	88	R4	CX1-9	CX12-6	CX3R-6
40	ACH550-Cx-114A-2	114	R4	CX1-9	CX12-7	CX3R-7
50	ACH550-Cx-143A-2	143	R6	CX1-10	CX12-10	CX3R-10
60	ACH550-Cx-178A-2	178	R6	CX1-10	CX12-10	CX3R-10
75	ACH550-Cx-221A-2	221	R6	CX1-10	CX12-11	CX3R-11
100	ACH550-Cx-248A-2	248	R6	CX1-10	CX12-11	CX3R-11

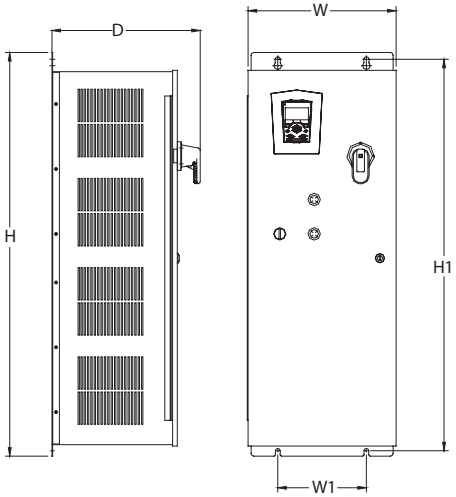
480V Classic Bypass Packages

HP	Type Coxe	Amp	Frame	UL Type (NEMA) 1 Dim. Ref. Page 25	UL Type (NEMA) 12 Dim. Ref. Page 26	UL Type (NEMA) 3R Dim. Ref. Page 27
1	ACH550-Cx-03A3-4	3.3	R1	CX1-1	CX12-1	CX3R-1
1.5	ACH550-Cx-03A3-4	3.3	R1	CX1-1	CX12-1	CX3R-1
2	ACH550-Cx-04A1-4	4.1	R1	CX1-1	CX12-1	CX3R-1
3	ACH550-Cx-06A9-4	6.9	R1	CX1-1	CX12-1	CX3R-1
5	ACH550-Cx-08A8-4	8.8	R1	CX1-1	CX12-1	CX3R-1
7.5	ACH550-Cx-012A-4	12	R1	CX1-1	CX12-1	CX3R-1
10	ACH550-Cx-015A-4	15	R2	CX1-2	CX12-2	CX3R-2
15	ACH550-Cx-023A-4	23	R2	CX1-2	CX12-2	CX3R-2
20	ACH550-Cx-031A-4	31	R3	CX1-4	CX12-4	CX3R-4
25	ACH550-Cx-038A-4	38	R3	CX1-4	CX12-4	CX3R-4
30	ACH550-Cx-044A-4	44	R4	CX1-5	CX12-6	CX3R-6
40	ACH550-Cx-059A-4	59	R4	CX1-5	CX12-6	CX3R-6
50	ACH550-Cx-072A-4	72	R4	CX1-5	CX12-6	CX3R-6
60	ACH550-Cx-078A-4	78	R4	CX1-5	CX12-6	CX3R-6
75	ACH550-Cx-096A-4	96	R5	CX1-7	CX12-8	CX3R-8
100	ACH550-Cx-124A-4	124	R6	CX1-8	CX12-9	CX3R-9
125	ACH550-Cx-157A-4	157	R6	CX1-10	CX12-9	CX3R-9
150	ACH550-Cx-180A-4	180	R6	CX1-10	CX12-9	CX3R-9
200	ACH550-Cx-245A-4	245	R7	CX1-11	CX12-12	Consult Factory
250	ACH550-Cx-316A-4	316	R8	CX1-12	CX12-13	
300	ACH550-Cx-368A-4	368	R8	CX1-13	CX12-14	
350	ACH550-Cx-414A-4	414	R8	CX1-13	CX12-14	
400	ACH550-Cx-486A-4	486	R8	CX1-13	CX12-14	

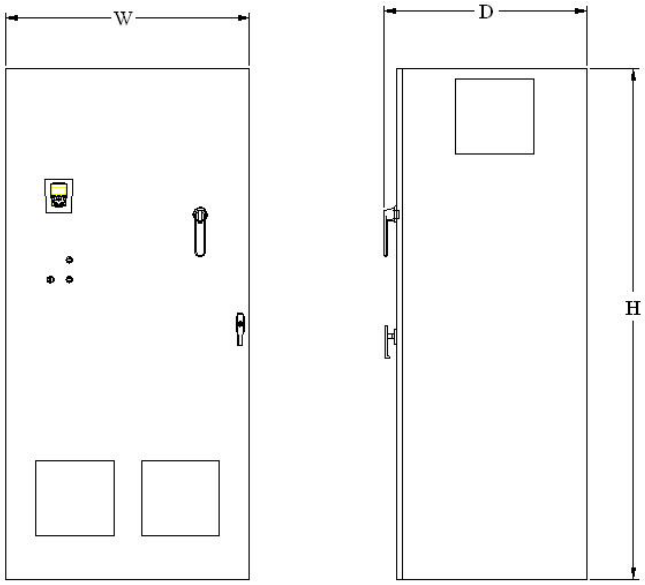
600V Classic Bypass Packages

HP	Type Code	Amp	Frame	UL Type (NEMA) 1 Dim. Ref. Page 25	UL Type (NEMA) 12 Dim. Ref. Page 26	UL Type (NEMA) 3R Dim. Ref. Page 27
2	ACH550-Cx-02A7-6	2.7	R2	CX1-2	CX12-2	CX3R-2
3	ACH550-Cx-03A9-6	3.9	R2	CX1-2	CX12-2	CX3R-2
5	ACH550-Cx-06A1-6	6.1	R2	CX1-2	CX12-2	CX3R-2
7.5	ACH550-Cx-09A0-6	9	R2	CX1-2	CX12-2	CX3R-2
10	ACH550-Cx-011A-6	11	R2	CX1-2	CX12-2	CX3R-2
15	ACH550-Cx-017A-6	17	R2	CX1-2	CX12-2	CX3R-2
20	ACH550-Cx-022A-6	22	R3	CX1-4	CX12-4	CX3R-4
25	ACH550-Cx-027A-6	27	R3	CX1-4	CX12-4	CX3R-4
30	ACH550-Cx-032A-6	32	R4	CX1-5	CX12-6	CX3R-6
40	ACH550-Cx-041A-6	41	R4	CX1-5	CX12-6	CX3R-6
50	ACH550-Cx-052A-6	52	R4	CX1-5	CX12-6	CX3R-6
60	ACH550-Cx-062A-6	62	R4	CX1-5	CX12-6	CX3R-6
75	ACH550-Cx-077A-6	77	R6	CX1-8	CX12-9	CX3R-9
100	ACH550-Cx-099A-6	99	R6	CX1-8	CX12-9	CX3R-9
125	ACH550-Cx-125A-6	125	R6	CX1-10	CX12-9	CX3R-9
150	ACH550-Cx-144A-6	144	R6	CX1-10	CX12-9	CX3R-9

Dimensions: ACH550-CX UL Type 1/NEMA 1 R1 through R8 Frame Size



CX1-1 to CX1-8 Wall Mounted

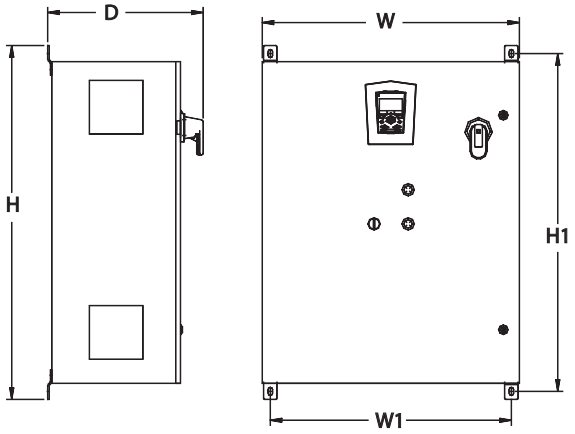


CX1-9 to CX1-13 Free Standing

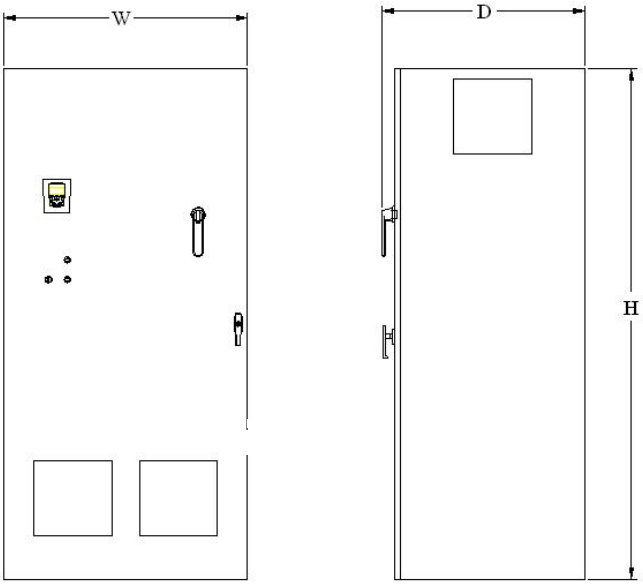
	H1	W1	Height (H)	Width (W)	Depth (D)	Weight
CX1-1	920 [36.2]	208 [8.2]	948 [37.3]	348 [13.7]	349 [13.7]	35 [76]
CX1-2	920 [36.2]	208 [8.2]	948 [37.3]	348 [13.7]	349 [13.7]	37 [82]
CX1-3	1352 [53.2]	254 [10]	1380 [54.3]	414 [16.3]	371 [14.6]	49 [107]
CX1-4	1352 [53.2]	254 [10]	1380 [54.3]	414 [16.3]	371 [14.6]	61 [135]
CX1-5	1352 [53.2]	254 [10]	1380 [54.3]	414 [16.3]	371 [14.6]	76 [168]
CX1-6	1568 [61.7]	330 [13]	1596 [62.8]	491 [19.3]	489 [19.2]	90 [198]
CX1-7	1568 [61.7]	330 [13]	1596 [62.8]	491 [19.3]	489 [19.2]	119 [262]
CX1-8	1568 [61.7]	330 [13]	1596 [62.8]	491 [19.3]	489 [19.2]	154 [339]
CX1-9	Free Standing	Free Standing	1883 [74.1]	889 [35]	527 [20.7]	126 [277]
CX1-10	Free Standing	Free Standing	1883 [74.1]	889 [35]	527 [20.7]	190 [418]
CX1-11	Free Standing	Free Standing	2134 [84]	914 [36]	847 [33.4]	443 [975]
CX1-12	Free Standing	Free Standing	2134 [84]	914 [36]	847 [33.4]	579 [1273]
CX1-13	Free Standing	Free Standing	2134 [84]	1524 [60]	847 [33.4]	662 [1456]

Allow 4-6 inches between enclosures for venting.

Dimensions: ACH550-CX UL Type 12 / NEMA 12 R1 through R8 Frame Size



CX12-1 to CX12-10 Wall Mounted

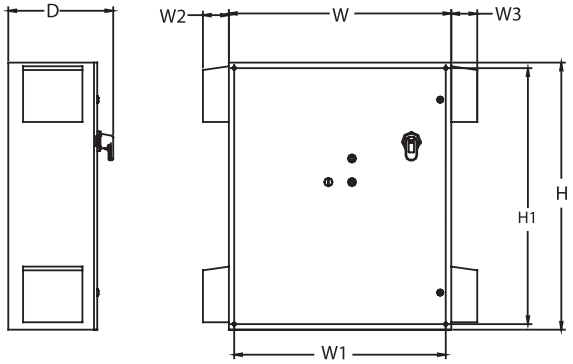


CX12-11 to CX12-14 Free Standing

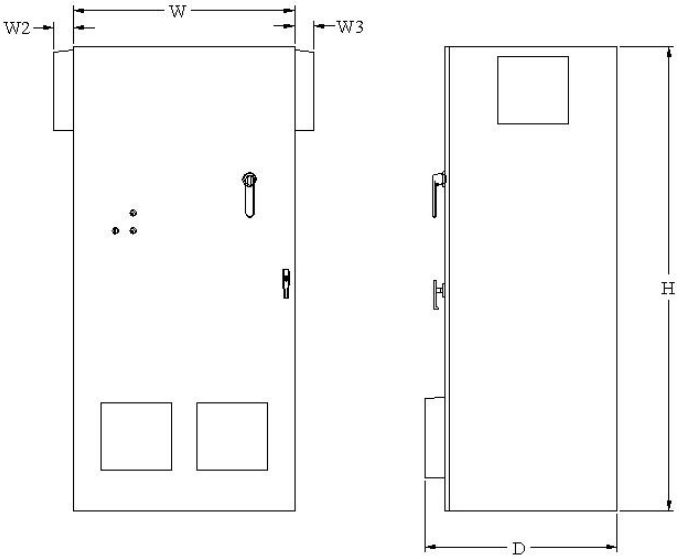
	H1	W1	Height (H)	Width (W)	Depth (D)	Weight
CX12-1	648 [25.5]	419 [16.5]	686 [27]	457 [18]	369 [14.5]	36 [78]
CX12-2	648 [25.5]	419 [16.5]	686 [27]	457 [18]	369 [14.5]	38 [84]
CX12-3	800 [31.5]	572 [22.5]	838 [33]	610 [24]	369 [14.3]	51 [113]
CX12-4	800 [31.5]	572 [22.5]	838 [33]	610 [24]	369 [14.3]	64 [141]
CX12-5	953 [37.5]	724 [28.5]	991 [39]	762 [30]	369 [14.3]	78 [172]
CX12-6	953 [37.5]	724 [28.5]	991 [39]	762 [30]	369 [14.3]	93 [205]
CX12-7	1257 [49.5]	724 [28.5]	1304 [51.4]	914 [36]	572 [22.5]	118 [259]
CX12-8	1257 [49.5]	724 [28.5]	1304 [51.4]	914 [36]	572 [22.5]	147 [323]
CX12-9	1257 [49.5]	724 [28.5]	1304 [51.4]	914 [36]	572 [22.5]	182 [400]
CX12-10	1562 [61.5]	876 [34.5]	1600 [63]	914 [36]	594 [23.4]	212 [467]
CX12-11	Free Standing	Free Standing	2134 [84]	914 [36]	847 [33.4]	356 [782]
CX12-12	Free Standing	Free Standing	2134 [84]	914 [36]	847 [33.4]	443 [975]
CX12-13	Free Standing	Free Standing	2134 [84]	914 [36]	847 [33.4]	579 [1273]
CX12-14	Free Standing	Free Standing	2134 [84]	1524 [60]	847 [33.4]	662 [1456]

Allow 4-6 inches between enclosures for venting.

Dimensions: ACH550-CX UL Type 3R /NEMA 3R R1 through R6 Frame



CX3R-1 to CX3R-10 Wall Mounted



CX3R-11 Free Standing

	H1	W1	Height (H)	Width (W)	Width (W2)	Width (W3)	Depth (D)	Weight
CX3R-1	572 [22.5]	419 [16.5]	610 [24]	457 [18]	89 [3.5]	N/A N/A	359 [14.1]	37 [82]
CX3R-2	572 [22.5]	419 [16.5]	610 [24]	457 [18]	89 [3.5]	N/A N/A	359 [14.1]	40 [88]
CX3R-3	724 [28.5]	572 [22.5]	762 [30]	610 [24]	89 [3.5]	N/A N/A	359 [14.1]	53 [117]
CX3R-4	724 [28.5]	572 [22.5]	762 [30]	610 [24]	89 [3.5]	N/A N/A	359 [14.1]	66 [145]
CX3R-5	876 [34.5]	725 [28.5]	914 [36]	762 [30]	89 [3.5]	89 [3.5]	359 [14.1]	82 [180]
CX3R-6	876 [34.5]	725 [28.5]	914 [36]	762 [30]	89 [3.5]	89 [3.5]	359 [14.1]	97 [213]
CX3R-7	1181 [46.5]	876 [34.5]	1219 [48]	914 [36]	89 [3.5]	89 [3.5]	562 [22.1]	121 [267]
CX3R-8	1181 [46.5]	876 [34.5]	1219 [48]	914 [36]	89 [3.5]	89 [3.5]	562 [22.1]	151 [331]
CX3R-9	1181 [46.5]	876 [34.5]	1219 [48]	914 [36]	89 [3.5]	89 [3.5]	562 [22.1]	186 [408]
CX3R-10	1486 [58.5]	877 [34.5]	1524 [60]	914 [36]	89 [3.5]	89 [3.5]	533 [23.6]	217 [477]
CX3R-11	Free Standing	Free Standing	2134 [84]	914 [36]	89 [3.5]	89 [3.5]	884 [34.8]	360 [792]

Applicable Standards

Drive compliance with the following standards is identified by the standards “marks” on the type code label.

Mark	Applicable Standards	
	UL 508C and C22.2 No. 14	UL Standard for Safety, Power Conversion Equipment, and CSA Standard for Industrial Control Equipment
	UL 508A	UL Standard for Safety, Industrial Control Panels
	C22.2 No. 14	CSA Standard for Industrial Control Equipment

Compliance is valid with the following provisions:

- The motor and control cables are chosen as specified in this manual.
- The installation rules of this manual are followed.

Index

S

T

U

V

W

ACH550-PNMU01U-EN REV A
3AUA0000014757 REV A / EN
EFFECTIVE: March 1, 2007

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