H-Max Drives

Contents

H-Max Drives

Product Description

Eaton's H-Max Series VFD has software and hardware designed specifically for the HVAC, pump industry. The ultra-efficient DC capacitor and power structure allows the drive to consume less energy, lowering greenhouse gases.

The I/O configuration is designed with wiring ergonomics in mind by including removable terminal blocks. The main, easily removable, control board used for all drive frames with six digital IN, two analog IN, one analog OUT, three relay OUT accepts two additional I/O or communication board. In addition, the control board has built-in RS-485 and Ethernet communication.

These drives continue the tradition of robust performance, and raise the bar on features and functionality, ensuring the best solution at the right price.

In addition to the Active Energy Control Algorithm to maximize motor efficiency, the drive boasts an ultra-efficient DC capacitor and power structure to allow less energy consumption, lowering greenhouse gases.

Features and Benefits

Hardware

- Thin metal capacitor design—ultra-efficient drive operation and extended self life (up to five years without reforming)
- Integrated 5% DC link choke with Input surge protection—protects against voltage spikes and provides a clean wave form to the motor
- EMI/RFI filters standard on all drives—meets EMC Category 2 for commercial applications
- Real-time clock—supports calendaring and time stamped fault history
- Graphic LCD display and keypad—supports simple menu navigation as well as on-screen diagnostics and troubleshooting
- HAND-OFF-AUTO and drive-bypass selector on keypad—simplifies control
- Standard I/O: 6DI, 2AI, 1AO, 2 Form C RO (NO/NC), 1 Form A RO (NO)—supports requirements for most installations
- Onboard RS 485: Modbus, N2, BACnet—meets needs of most communication requirements
- Onboard Ethernet: BACnet/IP, Modbus/TCP—meets needs of most communication requirements
- Two expansion slots—intended to support additional I/O or communication protocols as necessary
- Quick disconnect terminals for I/O connections—supports fast easy installation

Software

- Active energy control—minimizes energy losses in your motor resulting in industry leading energy efficiency for your application
- Quick Start Wizard upon initial power up—supports fast easy installation
- Copy/paste functionality on drive keypad—allows for fast setup of multiple drives
- Pre-programmed I/O—supports fast easy installation for most applications

Standards and Certifications

Product

- IEC 61800-5-1
- CE
- UL508C
- cUL
- C-Tick Mark
- OSHPD Seismic Certified
- Plenum Rated

Catalog Number Selection

H-Max Series Drives

HMX 3 4 A G 3D4 2 1 - N

Product
HMX = HVAC drive

Phase
3 = Three-phase

Voltage
2 = 200–240 V
4 = 380–480 V
5 = 525–600 V

Software Series
A–Z

Keypad
G = Graphical panel

Input Options Frame and Voltage Specific
2 = EMC C2

Enclosure
1 = Open NEMA Type 1 IP21
2 = Open NEMA Type 12 IP54

Braking/Application
N = No brake chopper (low overload)

Amperes

200–240 Volts	380–480 Volts	525–600 Volts
3D7 = 3.7 A–0.75 hp, 0.55 kW	**3D4** = 3.4 A–1.5 hp, 1.1 kW	**3D9** = 3.9 A, 3 hp, 2.2 kW
4D8 = 4.8 A–1 hp, 0.75 kW	**4D8** = 4.8–2 hp, 1.5 kW	**6D1** = 6.1 A, 5 hp, 3.7 kW
6D6 = 6.6 A–1.5 hp, 1.1 kW	**5D6** = 5.6 A–3 hp, 2.2 kW	**9D0** = 9 A, 7.5 hp, 5.5 kW
8D0 = 8 A–2 hp, 1.5 kW	**8D0** = 8 A–4 hp, 3 kW	**011** = 11 A, 10 hp, 7.5 kW
011 = 11 A–3 hp, 2.2 kW	**9D6** = 9.6 A–5 hp, 4 kW	**018** = 18 A, 15 hp, 11 kW
012 = 12 A–4 hp, 3 kW	**012** = 12 A–7.5 hp, 5.5 kW	**022** = 22 A, 20 hp, 15 kW
018 = 18 A–5 hp, 4 kW	**016** = 16 A–10 hp, 7.5 kW	**027** = 27 A, 25 hp, 18 kW
024 = 24 A–7.5 hp, 5.5 kW	**023** = 23 A–15 hp, 11 kW	**034** = 34 A, 30 hp, 22 kW
031 = 31 A–10 hp, 7.5 kW	**031** = 31 A–20 hp, 15 kW	**041** = 41 A, 40 hp, 30 kW
048 = 48 A–15 hp, 11 kW	**038** = 38 A–25 hp, 18.5 kW	**052** = 52 A, 50 hp, 37 kW
062 = 62 A–20 hp, 15 kW	**046** = 46 A–30 hp, 22 kW	**062** = 62 A, 60 hp, 45 kW
075 = 75 A–25 hp, 18.5 kW	**061** = 61 A–40 hp, 30 kW	**080** = 80 A, 75 hp, 55 kW
088 = 88 A–30 hp, 22 kW	**072** = 72 A–50 hp, 37 kW	**100** = 100 A, 100 hp, 75 kW
105 = 105 A–40 hp, 30 kW	**087** = 87 A–60 hp, 45 kW	**125** = 125 A, 125 hp, 90 kW
140 = 140 A–50 hp, 37 kW	**105** = 105 A–75 hp, 55 kW	**144** = 144 A, 150 hp, 110 kW
170 = 170 A–60 hp, 45 kW	**140** = 140 A–100 hp, 75 kW	**208** = 208 A, 200 hp, 160 kW
205 = 205 A–75 hp, 55 kW	**170** = 170 A–125 hp, 90 kW	
261 = 261 A–100 hp, 75 kW	**205** = 205 A–150 hp, 110 kW	
310 = 310 A–125 hp, 90 kW	**261** = 261 A–200 hp, 132 kW	
	310 = 310 A–250 hp, 160 kW	

Notes

All boards are varnished (conformed coated). Corrosion resistant.
Battery included in all drives for real-time clock.
Keypad kit includes HOA bypass.
Keypad kit includes HOA, back reset for Europe application.
EMI/RFI filters included.
DC link choke included.

Product Selection

H-Max Series Drives—230 Vac

2

NEMA Type 1

NEMA Type 1/IP21

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40 °C	Horsepower	Assigned Motor Ratings Drive kW 230 Vac/50 Hz	230 Vac NEC Amps ①	Low Overload Full Load Amps at 50 °C	Catalog Number
4	3.7	0.75	0.55	3.2	2.6	**HMX32AG3D721-N**
	4.8	1	0.75	4.2	3.7	**HMX32AG4D821-N**
	6.6	1.5	1.1	6.6	4.8	**HMX32AG6D621-N**
	8	2	1.5	6.8	6.6	**HMX32AG8D021-N**
	11	3	2.2	9.6	8	**HMX32AG01121-N**
	12.5	4	3	N/A	11	**HMX32AG01221-N**
5	18	5	4	15.2	12.5	**HMX32AG01821-N**
	24	7.5	5.5	22	18	**HMX32AG02421-N**
	31	10	7.5	28	24	**HMX32AG03121-N**
6	48	15	11	42	31	**HMX32AG04821-N**
	62	20	15	54	48	**HMX32AG06221-N**
7	75	25	18.5	68	62	**HMX32AG07521-N**
	88	30	22	80	75	**HMX32AG08821-N**
	105	40	30	104	88	**HMX32AG10521-N**
8	140	50	37	130	105	**HMX32AG14021-N**
	170	60	45	154	140	**HMX32AG17021-N**
	205	75	55	192	170	**HMX32AG20521-N**
9	261	100	75	248	205	**HMX32AG26121-N**
	310	125	90	N/A	261	**HMX32AG31021-N**

NEMA Type 12

NEMA Type 12/IP54

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40 °C	Horsepower	Assigned Motor Ratings Drive kW 230 Vac/50 Hz	230 Vac NEC Amps ①	Low Overload Full Load Amps at 50 °C	Catalog Number
4	3.7	0.75	0.55	3.2	2.6	**HMX32AG3D722-N**
	4.8	1	0.75	4.2	3.7	**HMX32AG4D822-N**
	6.6	1.5	1.1	6.6	4.8	**HMX32AG6D622-N**
	8	2	1.5	6.8	6.6	**HMX32AG8D022-N**
	11	3	2.2	9.6	8	**HMX32AG01122-N**
	12.5	4	3	N/A	11	**HMX32AG01222-N**
5	18	5	4	15.2	12	**HMX32AG01822-N**
	24	7.5	5.5	22	18	**HMX32AG02422-N**
	31	10	7.5	28	24	**HMX32AG03122-N**
6	48	15	11	42	31	**HMX32AG04822-N**
	62	20	15	54	48	**HMX32AG06222-N**
7	75	25	18.5	68	62	**HMX32AG07522-N**
	88	30	22	80	75	**HMX32AG08822-N**
	105	40	30	104	88	**HMX32AG10522-N**
8	140	50	37	130	105	**HMX32AG14022-N**
	170	60	45	154	140	**HMX32AG17022-N**
	205	75	55	192	170	**HMX32AG20522-N**
9	261	100	75	248	205	**HMX32AG26122-N**
	310	125	90	N/A	261	**HMX32AG31022-N**

Note

① For sizing reference.

H-Max Series Drives—480 Vac

NEMA Type 1

NEMA Type 1/IP21

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40 °C	Horsepower	Assigned Motor Ratings Drive kW 400 Vac/50 Hz	480 Vac NEC Amps ①	Low Overload Full Load Amps at 50 °C	Catalog Number
4	3.4	1.5	1.1	2.1	2.6	**HMX34AG3D421-N**
	4.8	2	1.5	3.4	3.4	**HMX34AG4D821-N**
	5.6	3	2.2	5.6	4.8	**HMX34AG5D621-N**
	8.0	4	3.0	N/A	5.6	**HMX34AG8D021-N**
	9.6	5	4	7.6	8	**HMX34AG9D621-N**
	12	7.5	5.5	11	9.6	**HMX34AG01221-N**
5	16	10	7.5	14	12	**HMX34AG01621-N**
	23	15	11	21	16	**HMX34AG02321-N**
	31	20	15	27	23	**HMX34AG03121-N**
6	38	25	18.5	34	31	**HMX34AG03821-N**
	46	30	22	40	38	**HMX34AG04621-N**
	61	40	30	52	46	**HMX34AG06121-N**
7	72	50	37	65	61	**HMX34AG07221-N**
	87	60	45	77	72	**HMX34AG08721-N**
	105	75	55	96	87	**HMX34AG10521-N**
8	140	100	75	124	105	**HMX34AG14021-N**
	170	125	90	156	140	**HMX34AG17021-N**
	205	150	110	180	170	**HMX34AG20521-N**
9	261	200	132	240	205	**HMX34AG26121-N**
	310	250	160	302	261	**HMX34AG31021-N**

NEMA Type 12

NEMA Type 12/IP54

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40 °C	Horsepower	Assigned Motor Ratings Drive kW 400 Vac/50 Hz	480 Vac NEC Amps ①	Low Overload Full Load Amps at 50 °C	Catalog Number
4	3.4	1.5	1.1	2.1	2.6	**HMX34AG3D422-N**
	4.8	2	1.5	3.4	3.4	**HMX34AG4D822-N**
	5.6	3	2.2	5.6	4.8	**HMX34AG5D622-N**
	8.0	4	3.0	N/A	5.6	**HMX34AG8D022-N**
	9.6	5	4	7.6	8	**HMX34AG9D622-N**
	12	7.5	5.5	11	9.6	**HMX34AG01222-N**
5	16	10	7.5	14	12	**HMX34AG01622-N**
	23	15	11	21	16	**HMX34AG02322-N**
	31	20	15	27	23	**HMX34AG03122-N**
6	38	25	18.5	34	31	**HMX34AG03822-N**
	46	30	22	40	38	**HMX34AG04622-N**
	61	40	30	52	46	**HMX34AG06122-N**
7	72	50	37	65	61	**HMX34AG07222-N**
	87	60	45	77	72	**HMX34AG08722-N**
	105	75	55	96	87	**HMX34AG10522-N**
8	140	100	75	124	105	**HMX34AG14022-N**
	170	125	90	156	140	**HMX34AG17022-N**
	205	150	110	180	170	**HMX34AG20522-N**
9	261	200	132	240	205	**HMX34AG26122-N**
	310	250	160	302	261	**HMX34AG31022-N**

Note

① For sizing reference.

H-Max Series Drives—600 Vac

NEMA Type 1

NEMA Type 1/IP21

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40 °C	Horsepower	Assigned Motor Ratings Drive kW 575 Vac/50 Hz	575 Vac NEC Amps ①	Low Overload Full Load Amps at 50 °C	Catalog Number
5	3.9	3	2.2	4.6	3.3	**HMX35AG3D921-N**
	6.1	5	3.7	6.8	5.2	**HMX35AG6D121-N**
	9	7.5	5.5	9	7.7	**HMX35AG9D021-N**
	11	10	7.5	10.5	9.4	**HMX35AG01121-N**
6	18	15	11	19.9	15.3	**HMX35AG01821-N**
	22	20	15	23.3	18.7	**HMX35AG02221-N**
	27	25	18	27.2	23	**HMX35AG02721-N**
	34	30	22	32.8	28.9	**HMX35AG03421-N**
7	41	40	30	45.3	34.9	**HMX35AG04121-N**
	52	50	37	53.8	44.2	**HMX35AG05221-N**
	62	60	45	62.2	52.7	**HMX35AG06221-N**
8	80	75	55	90	68	**HMX35AG08021-N**
	100	100	75	106	85	**HMX35AG10021-N**
	125	125	90	127	106.3	**HMX35AG12521-N**
9	144	150	110	156	122.4	**HMX35AG14421-N**
	208	200	160	212	176.8	**HMX35AG20821-N**

NEMA Type 12

NEMA Type 12/IP54

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40 °C	Horsepower	Assigned Motor Ratings Drive kW 575 Vac/50 Hz	575 Vac NEC Amps ①	Low Overload Full Load Amps at 50 °C	Catalog Number
5	3.9	3	2.2	4.6	3.3	**HMX35AG3D922-N**
	6.1	5	3.7	6.8	5.2	**HMX35AG6D122-N**
	9	7.5	5.5	9	7.7	**HMX35AG9D022-N**
	11	10	7.5	10.5	9.4	**HMX35AG01122-N**
6	18	15	11	19.9	15.3	**HMX35AG01822-N**
	22	20	15	23.3	18.7	**HMX35AG02222-N**
	27	25	18	27.2	23	**HMX35AG02722-N**
	34	30	22	32.8	28.9	**HMX35AG03422-N**
7	41	40	30	45.3	34.9	**HMX35AG04122-N**
	52	50	37	53.8	44.2	**HMX35AG05222-N**
	62	60	45	62.2	52.7	**HMX35AG06222-N**
8	80	75	55	90	68	**HMX35AG08022-N**
	100	100	75	106	85	**HMX35AG10022-N**
	125	125	90	127	106.3	**HMX35AG12522-N**
9	144	150	110	156	122.4	**HMX35AG14422-N**
	208	200	160	212	176.8	**HMX35AG20822-N**

Note

① For sizing reference.

Onboard Network Communications

Johnson Controls Metasys N2

H-Max Series provides communication between the drive and a Johnson Controls Metasys™ N2 network. With this connection, the drive can be controlled, monitored and programmed from the Metasys system. N2 can be selected and programmed by the drive keypad.

BACnet

H-Max Series provides communication to BACnet networks. Data transfer is master-slave/token passing (MS/TP) RS-485.

BACnet/IP

100Base-T interface.

Modbus TCP

Ethernet based protocol.

Modbus RTU

H-Max Series provides communication to Modbus RTU RS-485 as a slave on a Modbus network. Other communication parameters include an address range from 1–247; a parity of None, Odd or Even; and the stop bit is 1.

H-Max Series Option Board Kits Available for Slot B

The factory issued relay option board can be replaced with the following option boards to customize the drive for your application needs.

The standard board provides 2 Form C RO (NO/NC) and 1 Form A RO (NO).

Option Boards Mounted in Slot B

Option Kit Description	Option Kit Catalog Number
I/O expander card, 2 RO and thermistor input	**Relay Board 2**

H-Max Series Option Board Kits Available for Slots D and E

Note: Slot C is inactive.

The H-Max Series drives can accommodate a wide selection of expander and adapter option boards to customize the drive for your application needs. The drive's control unit is designed to accept a total of two option boards.

The H-Max Series factory-installed standard board configuration includes an I/O board and a relay output board.

Option Boards Mounted in Slots D and E

Option Kit Description	Option Kit Catalog Number
6 x DI /DO, each digital input can be individually programmed as digital output	**XMX-IO-B1-A**
1RO Form C (NO/NC), 1RO Form A (NO), 1 thermistor	**XMX-IO-B2-A**
1 x AI, 2 x AO (isolated)	**XMX-IO-B4-A**
3 x RO Form A (NO)	**XMX-IO-B5-A**
1RO Form A (NO), 5DI 42–240 Vac input	**XMX-IO-B9-A**
1 x AO, 1 x DO, 1 x RO	**XMX-IO-BF-A**
LonWorks®	**XMX-COM-C4-A**

NEMA Type 1 to NEMA Type 12/IP54 Conversion Kit

The NEMA Type 12/IP54 option kit is used to convert a NEMA Type 1 to a NEMA Type 12 drive.

Kit consists of a drive cover, fan kit and plugs.

NEMA Type 12/IP54 Cover

Option Kit Description	Option Kit Catalog Number
FS4-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS4-N12KIT**
FS5-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS5-N12KIT**
FS6-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS6-N12KIT**

Accessories

Flange Kits

The flange kit is used when the power section heat sink is mounted through the back panel of an enclosure.

Flange Kit NEMA Type 12/IP54

Includes flange, mounting brackets, NEMA Type 12 fan components, air shroud screws and plugs.

Frames FS4–FS7 ①②

Description	Catalog Number
NEMA Type 12/IP54	
FS4 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS4-Flange-N12KIT**
FS5 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS5-Flange-N12KIT**
FS6 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS6-Flange-N12KIT**
FS7 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS7-Flange-N12KIT**

Keypad Accessories

Remote Mounting Keypad Kit

Frames FS4–FS9

Description	Catalog Number
Remote mounting keypad kit—bezel and cable	**OPTRMT-BP-HMAX-WLABL**

Drive Demo

H-Max Series Drive Demo

Demos and Power Supply

Description	Catalog Number
H-Max Series bypass demo	**H-MAX-BYPASS-DEMO**
Hand-held 24 V auxiliary power supply—used to supply power to the control module in order to perform keypad programming before the drive is connected to line voltage	**9000XAUX24 V**

Notes

① For installation of a NEMA Type 1 drive into a NEMA Type 12 oversized enclosure.
② Frame size 8 and 9 must be ordered from the factory as a flange mount unit.

Replacement Parts

Control Board/Keypad

Description	Current Catalog Number
H-Max series graphic bypass, HOA	**KeypadbypassHOA**
H-Max series graphic back, HOA	**KeypadbackHOA**
H-Max control board replacement	**HMX-CONTROLBOARD-B**

PC Cable

Description	Catalog Number
Remote download USB to RJ-45 cable with software driver disk	**REM-USB-Down**

Replacement Relay Board in Slot B

Description	Catalog Number
Replacement relay board qty 2 Form C relay, qty 1 Form A relay	**Relay board 1**

Main Fan

Description	Catalog Number
FS4 main fan	**FS4-Main Fan**
FS5 main fan	**FS5-Main Fan**
FS6 main fan	**FS6-Main Fan**
FS7 main fan	**FS7-Main Fan**
FS8 main fan	**FS8-Main Fan**
FS9 main fan	**FS9-Main Fan**

Internal Fan

Description	Catalog Number
FS4 internal fan (IP54/NEMA 12)	**FS4-Internal Fan**
FS5 internal fan (IP54/NEMA 12)	**FS5-Internal Fan**
FS6 internal fan (IP54/NEMA 12)	**FS6-Internal Fan**
FS7 internal fan (IP54/NEMA 12)	**FS7-Internal Fan**
FS8 internal fan (IP54/NEMA 12)	**FS8-Internal Fan**
FS9 internal fan (IP54/NEMA 12)	**FS9-Internal Fan**

Line and Load Reactors

A line and load reactor is a three-phase inductance filter that can be placed on the line and load side of the AFD to help improve the harmonic performance of the system. Consult the factory for additional filtering options and further technical details.

DR1 Line Reactor

A line reactor helps to provide a moderate reduction in current harmonics similar to a DC choke. It also provides increased input protection for AFD and its semiconductors from line transients helping to extend the life of the AFD.

DR2 Output Reactor

An output filter is used to reduce the transient voltage (dV/dt) at the motor terminals. The output filter is recommended for cable lengths exceeding 100 ft (30 m) with a drive of 3 hp and above and for cable lengths of 33 ft (10 m) with a drive of 2 hp and below.

Line and Load Reactors—Catalog Number Selection

D R1 – 2 2D0 – 0 5

Basic Naming
D = Drive

Device Series
R1 = Line side reactor
R2 = Load side reactor

Input/Output Voltage
2 = 240 V
4 = 480 V

Current Rating
Examples:
2D0 = 2.0 A
4D0 = 4.0 A
8D0 = 8.0 A
012 = 12 A

Environment Rating
0 = Open
1 = NEMA 1

Impedance
3 = 3%
5 = 5%

Line and Load Reactors—240 V

	Open				NEMA 1			
	Load Reactor		Line Reactor		Load Reactor		Line Reactor	
hp (VT)	3%	5%	3%	5%	3%	5%	3%	5%
0.75	DR2-24D0-03	DR2-24D0-05	DR1-23D2-03	DR1-23D2-05	DR2-24D0-13	DR2-24D0-15	DR1-23D2-13	DR1-23D2-15
1	DR2-24D0-03	DR2-28D0-05	DR1-24D2-03	DR1-24D2-05	DR2-24D0-13	DR2-28D0-15	DR1-24D2-13	DR1-24D2-15
1.5	DR2-28D0-03	DR2-28D0-05	DR1-26D0-03	DR1-26D0-05	DR2-28D0-13	DR2-28D0-15	DR1-26D0-13	DR1-26D0-15
2	DR2-28D0-03	DR2-28D0-05	DR1-26D8-03	DR1-26D8-05	DR2-28D0-13	DR2-28D0-15	DR1-26D8-13	DR1-26D8-15
3	DR2-2012-03	DR2-2012-05	DR1-29D6-03	DR1-29D6-05	DR2-2012-13	DR2-2012-15	DR1-29D6-13	DR1-29D6-15
5	DR2-2018-03	DR2-2018-05	DR1-2015-03	DR1-2015-05	DR2-2018-13	DR2-2018-15	DR1-2015-13	DR1-2015-15
7.5	DR2-2025-03	DR2-2025-05	DR1-2022-03	DR1-2022-05	DR2-2025-13	DR2-2025-15	DR1-2022-13	DR1-2022-15
10	DR2-2035-03	DR2-2035-05	DR1-2028-03	DR1-2028-05	DR2-2035-13	DR2-2035-15	DR1-2028-13	DR1-2028-15
15	DR2-2045-03	DR2-2045-05	DR1-2042-03	DR1-2042-05	DR2-2045-13	DR2-2045-15	DR1-2042-13	DR1-2042-15
20	DR2-2055-03	DR2-2055-05	DR1-2054-03	DR1-2054-05	DR2-2055-13	DR2-2055-15	DR1-2054-13	DR1-2054-15
25	DR2-2080-03	DR2-2080-05	DR1-2068-03	DR1-2068-05	DR2-2080-13	DR2-2080-15	DR1-2068-13	DR1-2068-15
30	DR2-2080-03	DR2-2100-05	DR1-2080-03	DR1-2080-05	DR2-2080-13	DR2-2100-15	DR1-2080-13	DR1-2080-15
40	DR2-2100-03	DR2-2100-05	DR1-2104-03	DR1-2104-05	DR2-2100-13	DR2-2100-15	DR1-2104-13	DR1-2104-15
50	DR2-2130-03	DR2-2130-05	DR1-2130-03	DR1-2130-05	DR2-2130-13	DR2-2130-15	DR1-2130-13	DR1-2130-15
60	DR2-2160-03	DR2-2200-15	DR1-2154-03	DR1-2154-05	DR2-2160-13	DR2-2200-15	DR1-2154-13	DR1-2154-15
75	DR2-2200-13	DR2-2200-15	DR1-2192-03	DR1-2192-05	DR2-2200-13	DR2-2200-15	DR1-2192-13	DR1-2192-15
100	DR2-2225-13	DR2-2225-15	DR1-2248-03	DR1-2248-05	DR2-2225-13	DR2-2225-15	DR1-2248-13	DR1-2248-15
125	DR2-2320-13	DR2-2320-15	DR1-2312-03	DR1-2312-05	DR2-2320-13	DR2-2320-15	DR1-2312-13	DR1-2312-15

Line and Load Reactors—480 V

	Open				NEMA 1			
	Load Reactor		Line Reactor		Load Reactor		Line Reactor	
hp (VT)	3%	5%	3%	5%	3%	5%	3%	5%
1.5	DR2-44D0-05	DR2-44D0-05	DR1-43D0-03	DR1-43D0-05	DR2-44D0-13	DR2-44D0-15	DR1-43D0-13	DR1-43D0-15
2	DR2-44D0-03	DR2-44D0-05	DR1-43D4-03	DR1-43D4-05	DR2-44D0-13	DR2-44D0-15	DR1-43D4-13	DR1-43D4-15
3	DR2-48D0-03	DR2-48D0-05	DR1-44D8-03	DR1-44D8-05	DR2-48D0-13	DR2-48D0-15	DR1-44D8-13	DR1-44D8-15
5	DR2-48D0-03	DR2-48D0-05	DR1-47D6-03	DR1-47D6-05	DR2-48D0-13	DR2-48D0-15	DR1-47D6-13	DR1-47D6-15
7.5	DR2-4012-03	DR2-4012-05	DR1-4011-03	DR1-4011-05	DR2-4012-13	DR2-4012-15	DR1-4011-13	DR1-4011-15
10	DR2-4018-03	DR2-4018-05	DR1-4014-03	DR1-4014-05	DR2-4018-13	DR2-4018-15	DR1-4014-13	DR1-4014-15
15	DR2-4025-03	DR2-4025-05	DR1-4021-03	DR1-4021-05	DR2-4025-13	DR2-4025-15	DR1-4021-13	DR1-4021-15
20	DR2-4025-03	DR2-4025-05	DR1-4027-03	DR1-4027-05	DR2-4025-13	DR2-4025-15	DR1-4027-13	DR1-4027-15
25	DR2-4035-03	DR2-4035-05	DR1-4034-03	DR1-4034-05	DR2-4035-13	DR2-4035-15	DR1-4034-13	DR1-4034-15
30	DR2-4045-03	DR2-4045-05	DR1-4040-03	DR1-4040-05	DR2-4045-13	DR2-4045-15	DR1-4040-13	DR1-4040-15
40	DR2-4055-03	DR2-4055-05	DR1-4052-03	DR1-4052-05	DR2-4055-13	DR2-4055-15	DR1-4052-13	DR1-4052-15
50	DR2-4080-03	DR2-4080-05	DR1-4065-03	DR1-4065-05	DR2-4080-13	DR2-4080-15	DR1-4065-13	DR1-4065-15
60	DR2-4100-03	DR2-4080-05	DR1-4077-03	DR1-4077-05	DR2-4100-13	DR2-4080-15	DR1-4077-13	DR1-4077-15
75	DR2-4100-03	DR2-4100-05	DR1-4096-03	DR1-4096-05	DR2-4100-13	DR2-4100-15	DR1-4096-13	DR1-4096-15
100	DR2-4130-03	DR2-4130-05	DR1-4124-03	DR1-4124-05	DR2-4130-13	DR2-4130-15	DR1-4124-13	DR1-4124-15
125	DR2-4160-03	DR2-4160-05	DR1-4156-03	DR1-4156-05	DR2-4160-13	DR2-4160-15	DR1-4156-13	DR1-4156-15
150	DR2-4200-13	DR2-4200-15	DR1-4180-03	DR1-4180-05	DR2-4200-13	DR2-4200-15	DR1-4180-13	DR1-4180-15
200	DR2-4250-13	DR2-4250-15	DR1-4240-03	DR1-4240-05	DR2-4250-13	DR2-4250-15	DR1-4240-13	DR1-4240-15

Technical Data and Specifications

H-Max Series Drives

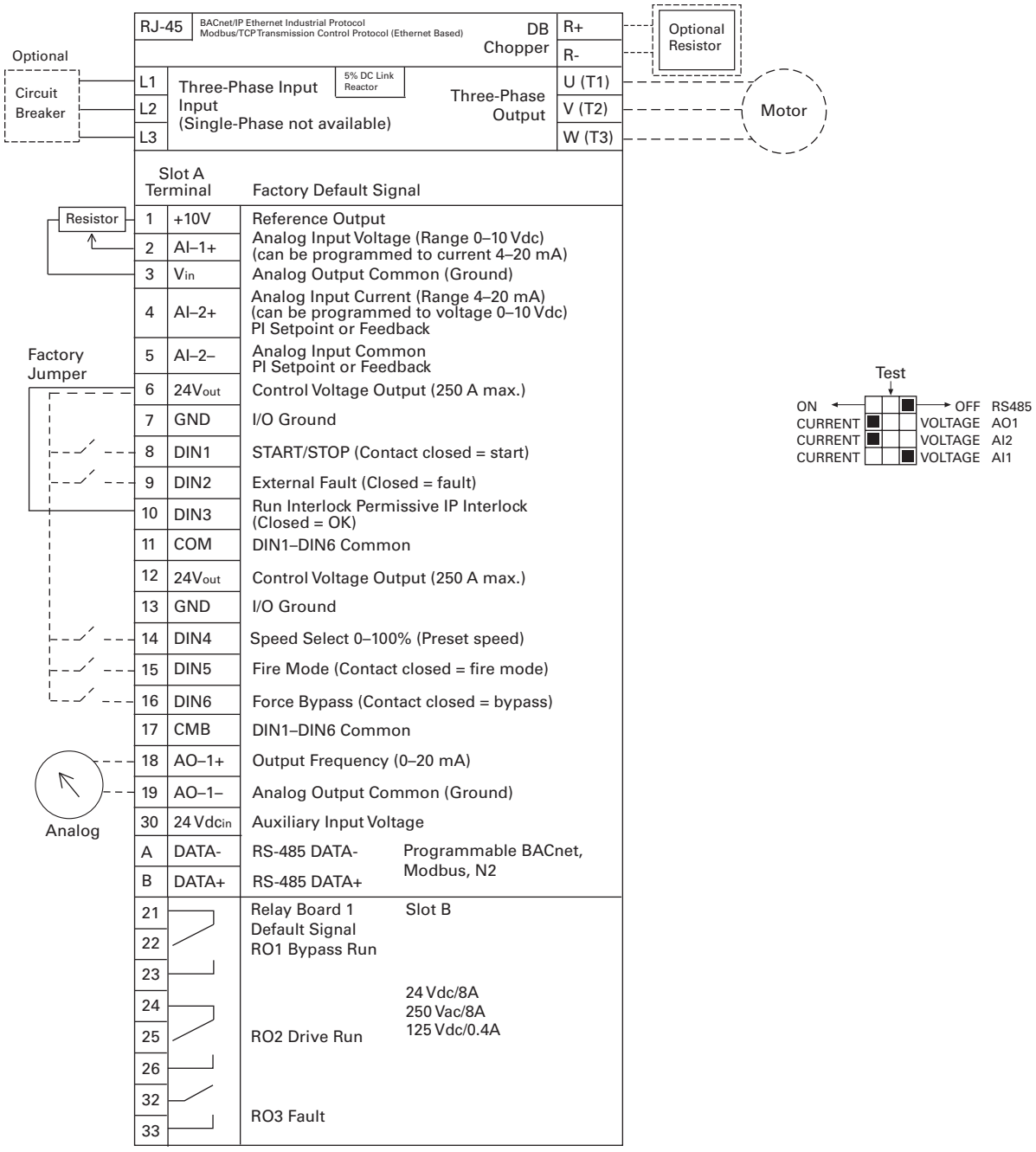
Description	Specification
Input Ratings	
Input voltage (V_{in})	200–240 Vac, 380–480 Vac, 525–600 Vac, –10%/+10%
Input frequency (f_{in})	50/60 Hz (variation up to 47–66 Hz)
Connection to power	Once per minute or less (typical operation)
Short-circuit withstand rating	100 kAIC
Output Ratings	
Output voltage	0 to V_{in}/U_{in} line voltage in
Continuous output current	Ambient temperature max. 104 °F (40 °C)
I_L overload	1.1 x I_L (1 min./10 min.)
Overload current	110% (1 min./10 min.)
Initial output current	150% for two seconds
Output frequency	0 to 320 Hz
Frequency resolution	0.01 Hz
Control Characteristics	
Control method	Frequency control (V/f) open loop sensorless vector control
Switching frequency	1–310 amps FS4–9: default 6 kHz
Frequency reference	Analog input: Resolution 0.1% (10-bit), accuracy ±1% Panel reference: Resolution 0.01 Hz
Field weakening point	8 to 320 Hz
Acceleration time	0.1 to 3000 seconds
Deceleration time	0.1 to 3000 seconds
Braking torque	DC brake: 30% x T_n
Ambient Conditions	
Ambient operating temperature	FS4–FS9: 14 °F (–10 °C), no frost to 104 °F (40 °C) (Drive can operate at 122 °F (50 °C), see **Pages V6-T2-172** and **V6-T2-173**)
Storage temperature	–40° to 158 °F (–40° to 70 °C)
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Air quality	Chemical vapors: IEC 60721-3-3, unit in operation, Class 3C2; Mechanical particles: IEC 60721-3-3, unit in operation, Class 3S2
Altitude	100% load capacity (no derating) up to 3280 ft (1000 m); 1% derating for each 328 ft (100 m) above 3280 ft (1000 m); max. 9842 ft (3000 m); 380–480 V
Vibration	FS4–FS9: EN 61800-5-1, EN 60068-2-6; 5 to 150 Hz, displacement amplitude 1 mm (peak) at 5 to 15.8 Hz, max. acceleration amplitude 1G at 15.8 to 150 Hz
Shock	EN 61800-5-1, EN 60068-2-27 UPS Drop test (for applicable UPS weights) Storage and shipping: max. 15 g, 11 ms (in package)
Enclosure class	NEMA Type 1/IP21 or NEMA Type 12/IP54 (keypad required for IP54/Type 12)
Standards	
EMC	Immunity: Fulfills all EMC immunity requirements; Emissions: EN 61800-3, LEVEL H (EMC C2)
Emissions	EMC level dependent— +EMC 2: EN61800-3 (2004) Category C2 Delivered with Class C2 EMC filtering as default.
Efficiency	97.5% at 480 V 96.6% at 208/230 V

Description	Specification
Control Connections	
Analog input voltage	0 to 10 V, R = 200 kohms differential Resolution 0.1%; Accuracy ±1% DIP switch selection (voltage/current)
Analog input current	0(4) to 20 mA; R_i –250 ohms differential
Digital inputs (6)	Positive or negative logic; 18 to 30 Vdc
Auxiliary voltage	+24 V ±10%, max. 250 mA
Output reference voltage	+10 V +3%, max. load 10 mA
Analog output	0–10 V, 0(4) to 20 mA; R_L max. 500 ohms; Resolution 10 bit; Accuracy ±2% DIP switch selection (voltage/current)
Relay outputs	3 programmable, 2 Form C, 1 Form A relay outputs Switching capacity: 24 Vdc/8 A, 250 Vac/8 A, 125 Vdc/0.4 A
Hard wire jumper	Between terminal 6 and 10 factory default
DIP switch setting default	RS-485 = off A01 = current A12 = current A11 = voltage
Protections	
Overcurrent protection	Yes
Overvoltage protection	Yes
DC bus regulation anti-trip	Yes (accelerates or decelerates the load)
Undervoltage protection	Yes
Earth fault protection	Yes (in case of earth fault in motor or motor cable, only the frequency converter is protected)
Input phase supervision	Yes (trips if any of the input phases are missing)
Motor phase supervision	Yes (trips if any of the output phases are missing)
Overtemperature protection	Yes
Motor overload protection	Yes
Motor stall protection	Yes
Motor underload protection	Yes
Short-circuit protection	Yes
Surge protection	Yes (varistor input)
Conformed coated (varnished) boards	Yes (prevents corrosion)

Wiring Diagram

2

Control Input/Output, PID Application



Standards

- Digital inputs D1–D6, relay out, analog in/out are freely programmed
- The user can assign a single input to multiple functions

Includes

- Six digital input
- Two analog input
- One analog output
- Three relay output
- RS-485
- Ethernet (BACnet and Modbus)

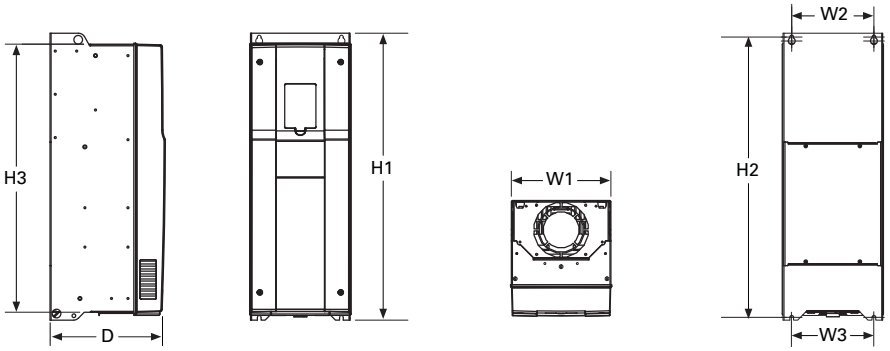
Reliability

- Pretested components
- Conformal coated (varnished) boards
- 40 °C rated
- 110% overload for one minute
- Eaton Electrical Services & Systems national network of AF drive specialists

Dimensions

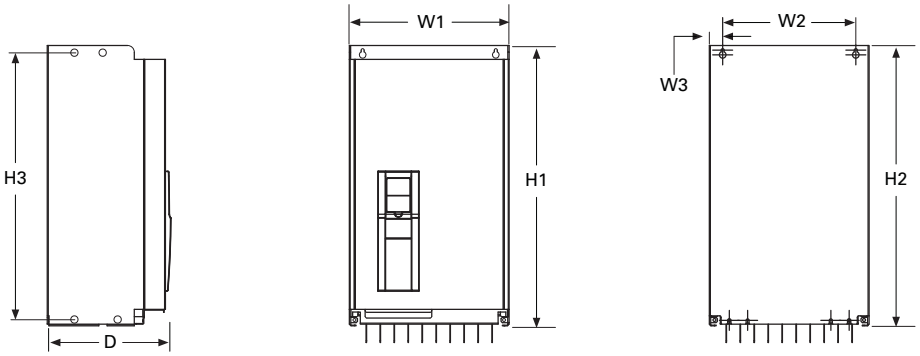
Approximate Dimensions in Inches (mm)

H-Max Series Frames FS4–FS7



Voltage	hp	kW	Amps	D	H1	Hole Center-to-Center H2	H3	W1	W2	W3	Weight in Lbs (kg)
FS4											
230 Vac	0.75–4	0.55–3.0	3.7–12.5	7.77 (197.3)	12.89 (327.5)	12.32 (313.0)	11.22 (285.0)	5.04 (128.0)	3.94 (100.0)	3.94 (100.0)	13.2 (6)
480 Vac	1.5–7.5	1.1–5.5	3.4–12								
FS5											
230 Vac	5–10	4–7.5	18–31	8.73 (221.6)	16.50 (419.0)	15.98 (406.0)	15.04 (382.0)	5.67 (144.0)	4.53 (115.0)	3.94 (100.0)	22.0 (10)
480 Vac	10–20	7.5–15	16–31								
FS6											
230 Vac	15–20	11–15	48–62	9.29 (236.0)	21.93 (557.0)	21.28 (540.5)	20.24 (514.0)	7.68 (195.0)	5.83 (148.0)	5.83 (148.0)	44.1 (20)
480 Vac	25–40	18.5–30	38–61								
FS7											
230 Vac	25–30	18.5–30	75–105	10.49 (266.5)	25.98 (660.0)	25.39 (645.0)	24.29 (617.0)	9.06 (230.0)	7.48 (190.0)	7.48 (190.0)	82.6 (37.5)
480 Vac	50–75	37–55	72–105								

H-Max Series Frames FS8 and FS9



Voltage	hp	kW	Amps	D	H1	Hole Center-to-Center H2	H3	W1	W2	W3	Weight in Lbs (kg)
FS8											
230 Vac	50–75	37–55	140–205	13.76 (349.6)	38.02 (965.7)	37.26 (946.4)	37.26 (946.4)	11.42 (290.1)	9.29 (236.0)	1.42 (36.0)	154.3 (70)
480 Vac	100–150	75–110									
FS9											
230 Vac	100–120	75–90	261–310	14.63 (371.6)	33.09 (890.4)	31.89 (810.0)	31.89 (810.0)	18.90 (480.0)	15.75 (400.0)	1.57 (40.0)	238.1 (108)
480 Vac	200–250	132–160									

Note: For flange dimension, please reference User Manual.

H-Max IntelliPass and IntelliDisconnect Drives

Contents

H-Max IntelliPass and IntelliDisconnect Drives

Product Description

The IntelliPass electronic bypass is a two or optional three contactor design using a 24 Vdc ***XT*** Series contactor with an optional manual override switch that allows the unit to run in bypass without the H-Max Series drive.

The IntelliPass software parameters utilize engineering units common to the HVAC industry. Onboard startup wizard guarantees flawless commissioning with plug-and-play screen entry. Available in NEMA/UL Type 1, Type 12 and Type 3R with optional pre-engineered operator devices to meet all customized specification requirements.

The IntelliPass construction features allow for easy installation, reliable operation and serviceability with additional onboard wire space, and removable conduit plates with knockouts.

Features and Benefits

Industry-leading energy saving solution—uses the Eaton H-Max drive with Active Energy Control algorithm.

Built to be as tough as the application—Eaton's robust design boasts an industrial grade enclosure and industry proven components.

- Industrial Power Supply
- ***XT*** Contactors
- 22 mm Pilot Devices

Built-in electronic bypass capability with external 24 Vdc power supply allows the H-Max drive to control the bypass circuit through the keypad, digital input or BMS communications and in fault conditions.

Designed with Our Customers in Mind

- Removable top and bottom entry panels
- Door-mounted graphic display and keypad
- Easily accessible connection terminals with removable I/O terminal connections

Engineered Product Solution

- The Eaton H-Max IntelliPass and IntelliDisconnect products are available with a variety of factory tested and certified options meeting or exceeding UL508C requirements

Standards and Certifications

Product

- IEC 61800-5-1
- UL508C
- cUL
- OSHPD Seismic Certified

Catalog Number Selection

H-Max Series IntelliPass and IntelliDisconnect Drives

HMX 011 3 4 N A _ _ _ _ _ _ _ _ _ _

Build options alphabetically and numerically.

Product

HMX = HVAC drive (VT) (low overload)

NEC Ampere Ratings

208 Volts	480 Volts
4D6 = 4.6 A–1 hp	**2D1** = 2.1 A–1 hp
7D5 = 7.5 A–2 hp	**3D4** = 3.4 A–2 hp
011 = 11 A–3 hp	**5D6** = 5.6 A–3 hp
017 = 17 A–5 hp	**7D6** = 7.6 A–5 hp
025 = 25 A–7.5 hp	**011** = 11 A–7.5 hp
031 = 31 A–10 hp	**014** = 14 A–10 hp
047 = 47 A–15 hp	**021** = 21 A–15 hp
060 = 60 A–20 hp	**027** = 27 A–20 hp
075 = 75 A–25 hp	**034** = 34 A–25 hp
088 = 88 A–30 hp	**040** = 40 A–30 hp
114 = 114 A–40 hp	**052** = 52 A–40 hp
143 = 143 A–50 hp	**065** = 65 A–50 hp
169 = 169 A–60 hp	**077** = 77 A–60 hp
211 = 211 A–75 hp	**096** = 96 A–75 hp
273 = 273 A–100 hp	**124** = 124 A–100 hp
230 Volts	**156** = 156 A–125 hp
4D2 = 4.2 A–1 hp	**180** = 180 A–150 hp
6D8 = 6.8 A–2 hp	**240** = 240 A–200 hp
9D6 = 9.6 A–3 hp	**302** = 302 A–250 hp
016 = 16 A–5 hp	
022 = 22 A–7.5 hp	
028 = 28 A–10 hp	
042 = 42 A–15 hp	
054 = 54 A–20 hp	
068 = 68 A–25 hp	
080 = 80 A–30 hp	
104 = 104 A–40 hp	
130 = 130 A–50 hp	
154 = 154 A–60 hp	
192 = 192 A–75 hp	
248 = 248 A–100 hp	

Voltage

1 = 208V
2 = 230 V
4 = 480 V

Enclosure Style

3 = IntelliPass NEMA Type 1
4 = IntelliPass NEMA Type 12
5 = IntelliPass NEMA Type 3R
6 = IntelliPass oversized NEMA Type 1
7 = IntelliPass oversized NEMA Type 12
A = IntelliDisconnect NEMA Type 1
B = IntelliDisconnect NEMA Type 12
C = IntelliDisconnect NEMA Type 3R
D = IntelliDisconnect oversized NEMA Type 1
E = IntelliDisconnect oversized NEMA Type 12

Braking/Application

N = No brake chopper (low overload)

Software Series

A–Z

Extended I/O Options in Slot D and E

B1 = 6 x DI /DO, Each digital input can be individually programmed as digital output
B2 = 1RO (NC/NO), 1RO (NO), 1 Thermistor
B4 = 1 x AI, 2 x AO (isolated)
B5 = 3 x RO
B9 = 1RO (NO), 5 DI 42–240 Vac input
BF = Expander IO, 1 AO, 1 DO, 1 RO

Optional Communications in Slot D and E

C4 = LonWorks

EMC Upgrade Option

EMC C2 Standard

Keypad Options

None available

IntelliDisconnect Options

L3 = Pilot lights (Power ON, RUN, Fault)
P3 = Fused drive isolation
PE = Output contactor
SA = Space heater w/transformer (Type 3R only)

IntelliPass Bypass Options

L4 = Pilot lights (Power ON, RUN, Fault, Bypass)
P3 = Fused drive isolation (can not be used with IS, P6 or M1)
P6 = Third contactor drive isolation (cannot be used with P3, IS or MI)
M1 = Manual bypass, includes isolation contactor and pilot lights (not available with P3, L4, P6 or IS)
SA = Space heater w/transformer (Type 3R only)
K9 = Auxiliary contacts
IS = Isolation switch (cannot be used with P3, P6 or M1)

Standard Onboard Communications

RS-485 Communications

BACnet MS/TP = Master slave/token protocol (Universal BACnet) RS-485
Modbus RTU RS-485, ASCII or RTU, remote terminal unit 32 nodes
N2 = Johnson Controls Metasys N2 network

Onboard Ethernet-Based Communications (port left side of keypad)

BACnet/IP Ethernet industrial protocol
Modbus/TCP Transmission control protocol (Ethernet-based)

Notes

IntelliPass—two contactor electronic bypass standard.
All boards are varnished. Corrosion resistant.
Battery included in all drives for real-time clock. Three year lifetime.
Keypad kit includes HOA bypass.
EMI/RFI filters included.
DC link choke included.
IntelliDisconnect includes 1 Form C and 1 Form A
IntelliPass includes 1 Form A.
When L3 or L4 option is selected, 1 Form A relay is used as well.
For more relays required, select/order the B5 option card.

Product Selection

H-Max Series IntelliPass NEMA Type 1—Two Contactor Bypass Standard

2

HMX_

208 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.6	**HMX4D631NA**
	2	7.5	**HMX7D531NA**
	3	11	**HMX01131NA**
FS5	5	17	**HMX01731NA**
	7.5	25	**HMX02531NA**
	10	31	**HMX03131NA**
FS6	15	47	**HMX04731NA**
FS7	20	60	**HMX06031NA**
	25	75	**HMX07531NA**
	30	88	**HMX08831NA**

230 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.2	**HMX4D232NA**
	2	6.8	**HMX6D832NA**
	3	9.6	**HMX9D632NA**
FS5	5	16	**HMX01632NA**
	7.5	22	**HMX02232NA**
	10	28	**HMX02832NA**
FS6	15	42	**HMX04232NA**
FS7	20	54	**HMX05432NA**
	25	68	**HMX06832NA**
	30	80	**HMX08032NA**

480 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	2.1	**HMX2D134NA**
	2	3.4	**HMX3D434NA**
	3	5.6	**HMX5D634NA**
	5	7.6	**HMX7D634NA**
	7.5	11	**HMX01134NA**
FS5	10	14	**HMX01434NA**
	15	21	**HMX02134NA**
	20	27	**HMX02734NA**
FS6	25	34	**HMX03434NA**
	30	40	**HMX04034NA**
	40	52	**HMX05234NA**
FS7	50	65	**HMX06534NA**
	60	77	**HMX07734NA**
	75	96	**HMX09634NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

H-Max Series IntelliPass NEMA Type 12—Two Contactor Bypass Standard

HMX_

208 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.6	**HMX4D641NA**
	2	7.5	**HMX7D541NA**
	3	11	**HMX01141NA**
FS5	5	17	**HMX01741NA**
	7.5	25	**HMX02541NA**
	10	31	**HMX03141NA**
FS6	15	47	**HMX04741NA**
FS7	20	60	**HMX06041NA**
	25	75	**HMX07541NA**
	30	88	**HMX08841NA**
D	40	114	**HMX11471NA**
	50	143	**HMX14371NA**
	60	169	**HMX16971NA**
5	75	211	**HMX21171NA**
	100	273	**HMX27371NA**

230 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.2	**HMX4D242NA**
	2	6.8	**HMX6D842NA**
	3	9.6	**HMX9D642NA**
FS5	5	16	**HMX01642NA**
	7.5	22	**HMX02242NA**
	10	28	**HMX02842NA**
FS6	15	42	**HMX04242NA**
FS7	20	54	**HMX05442NA**
	25	68	**HMX06842NA**
	30	80	**HMX08042NA**
D	40	104	**HMX10472NA**
	50	130	**HMX13072NA**
	60	154	**HMX15472NA**
	75	192	**HMX19272NA**
5	100	248	**HMX24872NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

HMX_

480 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	2.1	**HMX2D144NA**
	2	3.4	**HMX3D444NA**
	3	5.6	**HMX5D644NA**
	5	7.6	**HMX7D644NA**
	7.5	11	**HMX01144NA**
FS5	10	14	**HMX01444NA**
	15	21	**HMX02144NA**
	20	27	**HMX02744NA**
FS6	25	34	**HMX03444NA**
	30	40	**HMX04044NA**
	40	52	**HMX05244NA**
FS7	50	65	**HMX06544NA**
	60	77	**HMX07744NA**
	75	96	**HMX09644NA**
D	100	124	**HMX12747NA**
	125	156	**HMX15674NA**
	150	180	**HMX18074NA**
5	200	240	**HMX24074NA**
	250	302	**HMX30274NA**

H-Max Series IntelliPass NEMA Type 3R—Two Contactor Bypass Standard

HMX_

208 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
A	1	4.6	**HMX4D651NA**
	2	7.5	**HMX7D551NA**
	3	11	**HMX01151NA**
A	5	17	**HMX01751NA**
	7.5	25	**HMX02551NA**
	10	31	**HMX03151NA**
B	15	47	**HMX04751NA**
C	20	60	**HMX06051NA**
	25	75	**HMX07551NA**
	30	88	**HMX08851NA**
D	40	114	**HMX11451NA**
	50	143	**HMX14351NA**
	60	169	**HMX16951NA**
F	75	211	**HMX21151NA**
	100	273	**HMA27351NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

HMX_

230 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
A	1	4.2	**HMX4D252NA**
	2	6.8	**HMX6D852NA**
	3	9.6	**HMX9D652NA**
A	5	16	**HMX01652NA**
	7.5	22	**HMX02252NA**
	10	28	**HMX02852NA**
	15	42	**HMX04252NA**
B	20	54	**HMX05452NA**
C	25	68	**HMX06852NA**
	30	80	**HMX08052NA**
D	40	104	**HMX10452NA**
	50	130	**HMX13052NA**
	60	154	**HMX15452NA**
	75	192	**HMX19252NA**
F	100	248	**HMX24852NA**

480 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
A	1	2.1	**HMX2D154NA**
	2	3.4	**HMX3D454NA**
	3	5.6	**HMX5D654NA**
	5	7.6	**HMX7D654NA**
	7.5	11	**HMX01154NA**
A	10	14	**HMX01454NA**
	15	21	**HMX02154NA**
	20	27	**HMX02754NA**
B	25	34	**HMX03454NA**
	30	40	**HMX04054NA**
	40	52	**HMX05254NA**
C	50	65	**HMX06554NA**
	60	77	**HMX07754NA**
	75	96	**HMX09654NA**
D	100	124	**HMX12544NA**
	125	156	**HMX15654NA**
	150	180	**HMX18054NA**
F	200	240	**HMX24054NA**
	250	302	**HMX30254NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

H-Max Series IntelliDisconnect NEMA Type 1—Main Disconnect Standard

HMX_

208 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.6	**HMX4D6A1NA**
	2	7.5	**HMX7D5A1NA**
	3	11	**HMX011A1NA**
FS5	5	17	**HMX017A1NA**
	7.5	25	**HMX025A1NA**
	10	31	**HMX031A1NA**
FS6	15	47	**HMX047A1NA**
FS7	20	60	**HMX060A1NA**
	25	75	**HMX075A1NA**
	30	88	**HMX088A1NA**

230 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.2	**HMX4D2A2NA**
	2	6.8	**HMX6D8A2NA**
	3	9.6	**HMX9D6A2NA**
FS5	5	16	**HMX016A2NA**
	7.5	22	**HMX022A2NA**
	10	28	**HMX028A2NA**
FS6	15	42	**HMX042A2NA**
FS7	20	54	**HMX054A2NA**
	25	68	**HMX068A2NA**
	30	80	**HMX080A2NA**

480 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	2.1	**HMX2D1A4NA**
	2	3.4	**HMX3D4A4NA**
	3	5.6	**HMX5D6A4NA**
	5	7.6	**HMX7D6A4NA**
	7.5	11	**HMX011A4NA**
FS5	10	14	**HMX014A4NA**
	15	21	**HMX021A4NA**
	20	27	**HMX027A4NA**
FS6	25	34	**HMX034A4NA**
	30	40	**HMX040A4NA**
	40	52	**HMX052A4NA**
FS7	50	65	**HMX065A4NA**
	60	77	**HMX077A4NA**
	75	96	**HMX096A4NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

H-Max Series IntelliDisconnect NEMA Type 12—Main Disconnect Standard

HMX_

208 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.6	**HMX4D6B1NA**
	2	7.5	**HMX7D5B1NA**
	3	11	**HMX011B1NA**
FS5	5	17	**HMX017B1NA**
	7.5	25	**HMX025B1NA**
	10	31	**HMX031B1NA**
FS6	15	47	**HMX047B1NA**
FS7	20	60	**HMX060B1NA**
	25	75	**HMX075B1NA**
	30	88	**HMX088B1NA**
D	40	114	**HMX114E1NA**
	50	143	**HMX143E1NA**
	60	169	**HMX169E1NA**
5	75	211	**HMX211E1NA**
	100	273	**HMA273E1NA**

230 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	4.2	**HMX4D2B2NA**
	2	6.8	**HMX6D8B2NA**
	3	9.6	**HMX9D6B2NA**
FS5	5	16	**HMX016B2NA**
	7.5	22	**HMX022B2NA**
	10	28	**HMX028B2NA**
FS6	15	42	**HMX042B2NA**
FS7	20	54	**HMX054B2NA**
	25	68	**HMX068B2NA**
	30	80	**HMX080B2NA**
D	40	104	**HMX104E2NA**
	50	130	**HMX130E2NA**
	60	154	**HMX154E2NA**
	75	192	**HMX192E2NA**
5	100	248	**HMX248E2NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

HMX_

480 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
FS4	1	2.1	**HMX2D1B4NA**
	2	3.4	**HMX3D4B4NA**
	3	5.6	**HMX5D6B4NA**
	5	7.6	**HMX7D6B4NA**
	7.5	11	**HMX011B4NA**
FS5	10	14	**HMX014B4NA**
	15	21	**HMX021B4NA**
	20	27	**HMX027B4NA**
FS6	25	34	**HMX034B4NA**
	30	40	**HMX040B4NA**
	40	52	**HMX052B4NA**
FS7	50	65	**HMX065B4NA**
	60	77	**HMX077B4NA**
	75	96	**HMX096B4NA**
D	100	124	**HMX12E44NA**
	125	156	**HMX156E4NA**
	150	180	**HMX180E4NA**
5	200	240	**HMX240E4NA**
	250	302	**HMX302E4NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

H-Max Series IntelliDisconnect NEMA Type 3R—Main Disconnect Standard

HMX_

208 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
A	1	4.6	**HMX4D6C1NA**
	2	7.5	**HMX7D5C1NA**
	3	11	**HMX011C1NA**
A	5	17	**HMX017C1NA**
	7.5	25	**HMX025C1NA**
	10	31	**HMX031C1NA**
	15	47	**HMX047C1NA**
B	20	60	**HMX060C1NA**
C	25	75	**HMX075C1NA**
	30	88	**HMX088C1NA**
D	40	114	**HMX114C1NA**
	50	143	**HMX143C1NA**
	60	169	**HMX169C1NA**
F	75	211	**HMX211C1NA**
	100	273	**HMA273C1NA**

230 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
A	1	4.2	**HMX4D2C2NA**
	2	6.8	**HMX6D8C2NA**
	3	9.6	**HMX9D6C2NA**
A	5	16	**HMX016C2NA**
	7.5	22	**HMX022C2NA**
	10	28	**HMX028C2NA**
	15	42	**HMX042C2NA**
B	20	54	**HMX054C2NA**
C	25	68	**HMX068C2NA**
	30	80	**HMX080C2NA**
D	40	104	**HMX104C2NA**
	50	130	**HMX130C2NA**
	60	154	**HMX154C2NA**
	75	192	**HMX192C2NA**
F	100	248	**HMX248C2NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

HMX_

480 Vac

Enclosure Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
A	1	2.1	**HMX2D1C4NA**
	2	3.4	**HMX3D4C4NA**
	3	5.6	**HMX5D6C4NA**
	5	7.6	**HMX7D6C4NA**
	7.5	11	**HMX011C4NA**
A	10	14	**HMX014C4NA**
	15	21	**HMX021C4NA**
	20	27	**HMX027C4NA**
B	25	34	**HMX034C4NA**
	30	40	**HMX040C4NA**
	40	52	**HMX052C4NA**
C	50	65	**HMX065C4NA**
	60	77	**HMX077C4NA**
	75	96	**HMX096C4NA**
D	100	124	**HMX124C4NA**
	125	156	**HMX156C4NA**
	150	180	**HMX180C4NA**
F	200	240	**HMX240C4NA**
	250	302	**HMX302C4NA**

Notes

For Wiring Diagrams, see **Page V6-T2-196**.
For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-183**.
Call Technical Support for NEMA 3R specifics. Enclosure size and weight differ from NEMA 1 and 12 products.

Onboard Network Communications

Johnson Controls Metasys N2

H-Max Series provides communication between the drive and a Johnson Controls Metasys™ N2 network. With this connection, the drive can be controlled, monitored and programmed from the Metasys system. N2 can be selected and programmed by the drive keypad.

BACnet

H-Max Series provides communication to BACnet networks. Data transfer is master-slave/token passing (MS/TP) RS-485.

BACnet/IP

100Base-T interface.

Modbus TCP

Ethernet based protocol.

Modbus RTU

H-Max Series provides communication to Modbus RTU RS-485 as a slave on a Modbus network. Other communication parameters include an address range from 1 to 247; a parity of None, Odd or Even; and the stop bit is 1.

H-Max Series Option Board Kits Available for Slots D and E

The H-Max Series drives can accommodate a wide selection of expander and adapter option boards to customize the drive for your application needs. The drive's control unit is designed to accept a total of two option boards.

The H-Max Series factory-installed standard board configuration includes an I/O board and a relay output board.

Option Boards Mounted in Slots D and E

Option Kit Description	Option Kit Catalog Number
6 x DI /DO, each digital input can be individually programmed as digital output	**XMX-IO-B1-A**
1RO Form C (NO/NC), 1RO Form A (NO), 1 thermistor	**XMX-IO-B2-A**
1 x AI, 2 x AO (isolated)	**XMX-IO-B4-A**
3 x RO Form A (NO)	**XMX-IO-B5-A**
1RO Form A (NO), 5DI 42–240 Vac input	**XMX-IO-B9-A**
LonWorks	**XMX-COM-C4-A**
1 x AO, 1 x DO, 1 x RO	**XMX-IO-BF-A**

Extended I/O Options in Slot D and E

Description	Suffix Number
6 x DI /DO, Each digital input can be individually programmed as digital output	**B1**
1RO (NC/NO), 1RO (NO), 1 Thermistor	**B2**
1 x AI, 2 x AO (isolated)	**B4**
3 x RO	**B5**
1RO (NO), 5 DI 42–240 Vac input	**B9**
Expander IO, 1 AO, 1 DO, 1 RO	**BF**

Optional Communications in Slot D and E

Description	Suffix Number
LonWorks	**C4**

IntelliDisconnect Options

Description	Suffix Number
Pilot lights (Power ON, RUN, Fault)	**L3**
Fused drive isolation (cannot be used with PE)	**P3**
Output contactor (cannot be used with P3)	**PE**
Space heater w/transformer (Type 3R only)	**SA**

IntelliPass Bypass Options

Description	Suffix Number
Pilot lights (Power ON, RUN, Fault)	**L4**
Fused drive isolation (can not be used with P6)	**P3**
Third contactor drive isolation (cannot be used with P3 or IS)	**P6**
Manual bypass switch located on front door	**M1**
Space heater w/transformer (Type 3R only)	**SA**
Auxiliary contacts	**K9**
Isolation switch	**IS**

Standard Onboard Communications

Description	Suffix Number
RS-485 Communications	
BACnet MS/TP = Master slave/token protocol (Universal BACnet) RS-485	**BACnet**
Modbus RTU RS-485, ASCII or RTU, remote terminal unit 32 nodes	**Modbus**
Johnson Controls Metasys N2 network	**N2**
Onboard Ethernet-Based Communications (port left side of keypad)	
BACnet/IP Ethernet industrial protocol	**BACnet**
Modbus/TCP Transmission control protocol (Ethernet-based)	**Modbus**

Technical Data and Specifications

Primary Design Features

Description	IntelliPass	IntelliDisconnect
CB MMP	Standard	Standard
2 contactor bypass	Standard	N/A
Electrical interlock	Standard	N/A
Third contactor (isolation)	Optional	N/A

Description	IntelliPass	IntelliDisconnect
Isolation switch	Optional	N/A
Top entry (power)	Standard	Standard
Bottom entry (power)	Standard	Standard
Output contactor	Standard	Optional

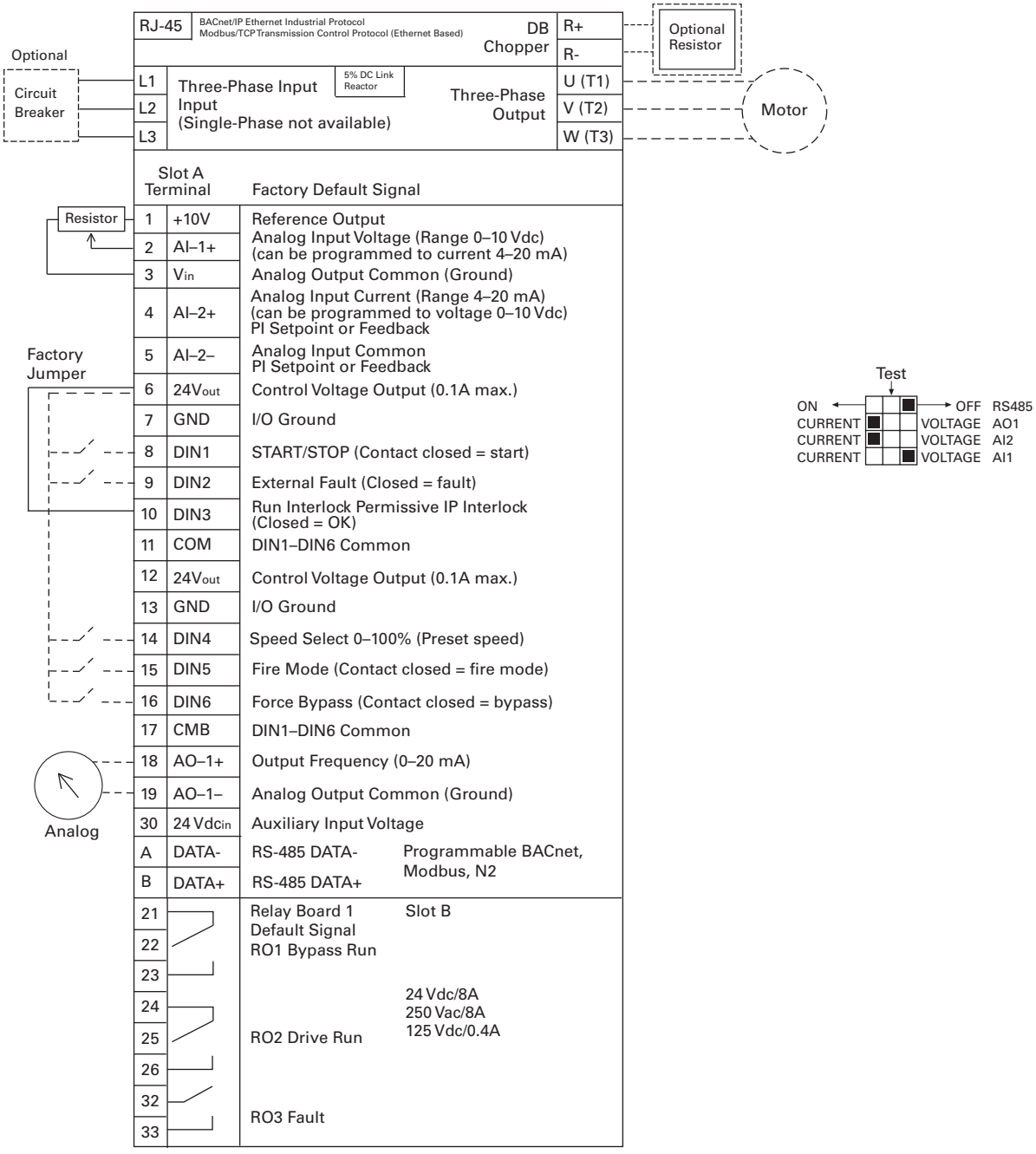
H-Max Series Drives

Description	Specification
Input Ratings	
Input voltage (V_{in})	208, 230, 480 Vac, –10%/+10%
Input frequency (f_{in})	50/60 Hz (variation up to 47–66 Hz)
Connection to power	Once per minute or less (typical operation)
Short-circuit withstand rating	65 kAIC combination
Output Ratings	
Output voltage	0 to V_{in}/U_{in} line voltage in
Continuous output current	Ambient temperature max. 104 °F (40 °C)
I_L overload	1.1 x I_L (1 min./10 min.)
Overload current	110% (1 min./10 min.)
Initial output current	150% for two seconds
Output frequency	0 to 320 Hz
Frequency resolution	0.01 Hz
Control Characteristics	
Control method	Frequency control (V/f) open loop sensorless vector control
Switching frequency	1–310 amps; adjustable with parameter 2.6.9 FS4–FS7: default 6 kHz
Frequency reference	Analog input: Resolution 0.1% (10-bit), accuracy ±1% Panel reference: Resolution 0.01 Hz
Field weakening point	8 to 320 Hz
Acceleration time	0.1 to 3000 seconds
Deceleration time	0.1 to 3000 seconds
Braking torque	DC brake: 30% x T_n
Ambient Conditions	
Ambient operating temperature	FS4–FS7: 14 °F (–10 °C), no frost to 104 °F (40 °C) (Drive can operate at 122 °F (50 °C)
Storage temperature	–40° to 158 °F (–40° to 70 °C)
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Air quality	Chemical vapors: IEC 60721-3-3, unit in operation, Class 3C2; Mechanical particles: IEC 60721-3-3, unit in operation, Class 3S2
Altitude	100% load capacity (no derating) up to 3280 ft (1000 m); 1% derating for each 328 ft (100 m) above 3280 ft (1000 m); max. 9842 ft (3000 m); 380–480 V
Enclosure class	NEMA Type 1/IP21 or NEMA Type 12/IP54 (keypad required for IP54/Type 12)

Description	Specification
Standards	
EMC	Immunity: Fulfills all EMC immunity requirements; Emissions: EN 61800-3, LEVEL H (EMC C2)
Emissions	EMC level dependent— +EMC 2: EN61800-3 (2004) Category C2 Delivered with Class C2 EMC filtering as default.
Control Connections	
Analog input voltage	0 to 10 V, R = 200 kohms differential Resolution 0.1%; Accuracy ±1% DIP switch selection (voltage/current)
Analog input current	0(4) to 20 mA; R_i –250 ohms differential
Digital inputs (6)	Positive or negative logic; 18 to 30 Vdc
Auxiliary voltage	+24 V ±10%, max. 250 mA
Output reference voltage	+10 V +3%, max. load 10 mA
Analog output	0–10 V, 0(4) to 20 mA; R_L max. 500 ohms; Resolution 10 bit; Accuracy ±2%; DIP switch selection (voltage/current)
Relay outputs	IntelliDisconnect: 2 programmable, 1 Form C, 1 Form A IntelliPass: 1 programmable, 1 Form A With L3 or L4 option, 1 Form A relay is used Switching capacity: 24 Vdc/8 A, 250 Vac/8 A, 125 Vdc/0.4 A
Hard wire jumper	Between terminal 6 and 10 factory default
DIP switch setting default	RS-485 = off A01 = current A12 = current A11 = voltage
Protections	
Overcurrent protection	Yes
Overvoltage protection	Yes
DC bus regulation anti-trip	Yes (accelerates or decelerates the load)
Undervoltage protection	Yes
Earth fault protection	Yes (in case of earth fault in motor or motor cable, only the frequency converter is protected)
Input phase supervision	Yes (trips if any of the input phases are missing)
Motor phase supervision	Yes (trips if any of the output phases are missing)
Overtemperature protection	Yes
Motor overload protection	Yes
Motor stall protection	Yes
Motor underload protection	Yes
Short-circuit protection	Yes
Surge protection	Yes (varistor input)
Conformed coated (varnished) board	Yes (prevents corrosion)

Wiring Diagrams

Control Input/Output, PID Application



Standards

- Digital inputs D1–D6, relay out, analog in/out are freely programmed
- The user can assign a single input to multiple functions

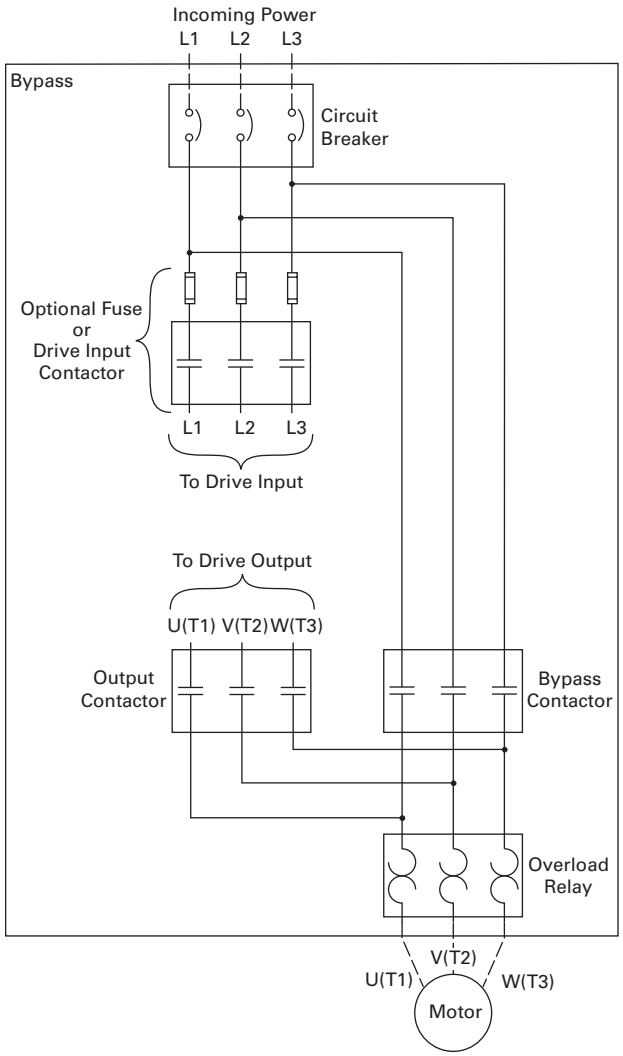
Includes

- Six digital input
- Two analog input
- One analog output
- Three relay outputs (2 relays are factory wired for bypass operation in IntelliPass configurations)
- RS-485
- Ethernet

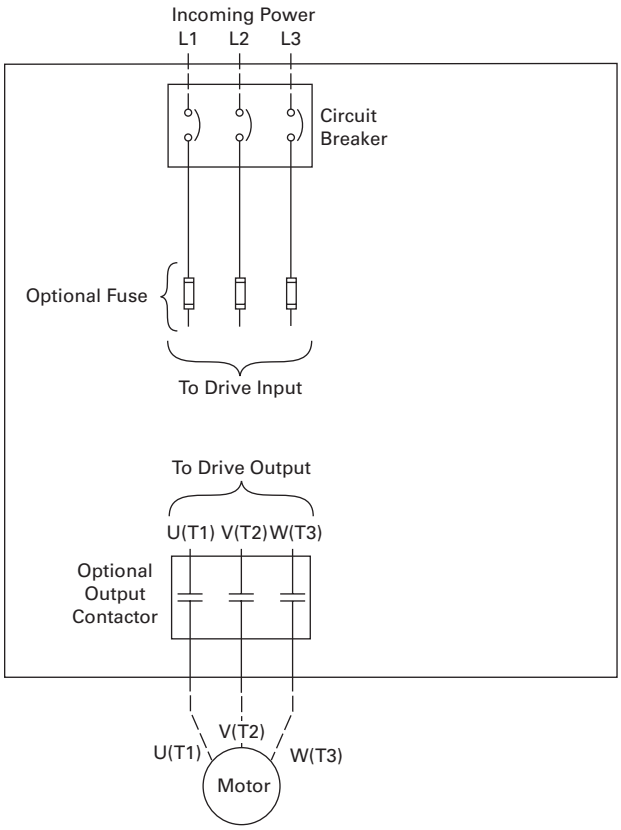
Reliability

- Pretested components
- Conformal coated (varnished) boards
- 40 °C rated
- 110% overload for one minute
- Eaton Electrical Services & Systems national network of AF drive specialists

H-Max Series IntelliPass



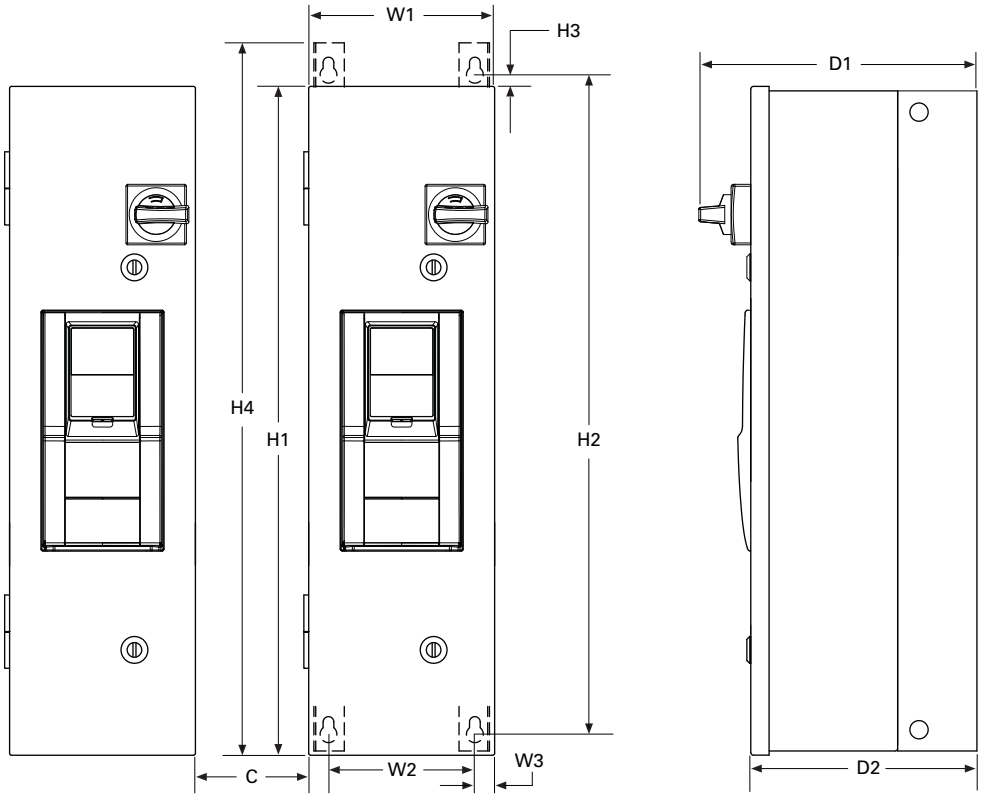
H-Max Series IntelliDisconnect Power Wiring



Dimensions

Approximate Dimensions in Inches (mm)

H-Max Series IntelliPass and IntelliDisconnect Drives



Distance to mount multiple drives.

	Top	Bottom
FR4	4.00 (101.6)	2.00 (50.8)
FR5	4.75 (120.7)	2.50 (63.5)
FR6	6.50 (165.1)	3.25 (82.6)
FR7	10.00 (254.0)	4.00 (101.6)

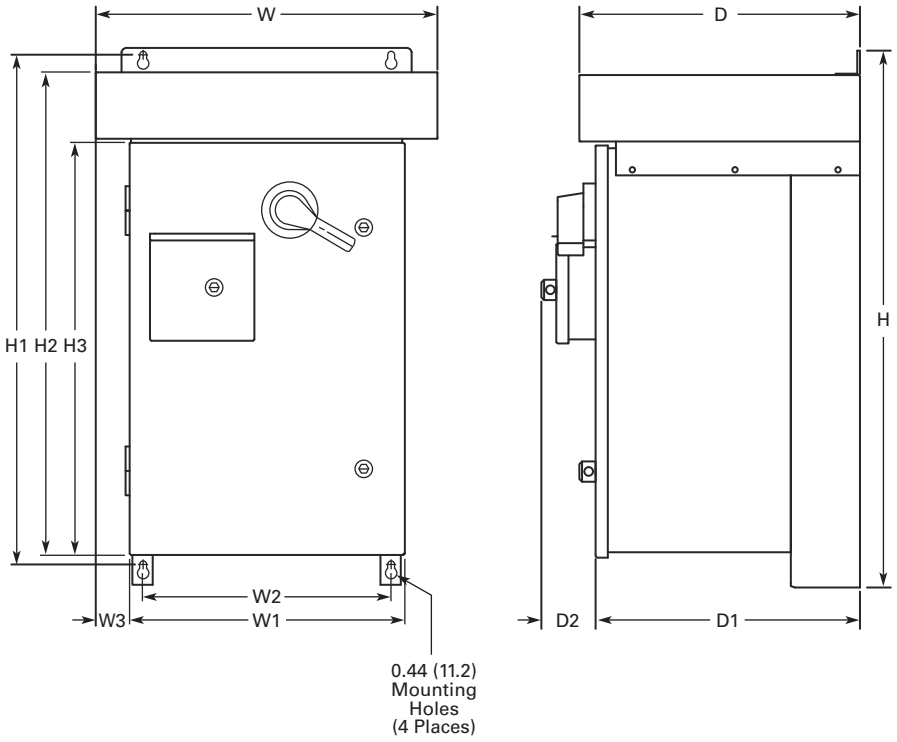
Consult factory or use manual for final dimensions.

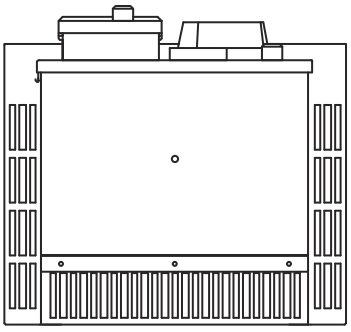
Frame Size	Voltage	Horsepower (I_L)	H1	H2	H3	H4	C	W1	W2	W3	D1	D2	Weight in Lbs (kg)
FS4	208	1–3	30.00 (762.0)	29.41 (747.1)	0.25 (6.35)	31.00 (787.4)	3.00 (76.2)	7.88 (200.2)	6.25 (158.8)	0.75 (19.1)	12.49 (317.2)	10.36 (263.1)	45 (20.41)
	230	1–3											
	480	1–7.5											
FS5	208	5–10	37.00 (939.8)	36.72 (932.7)	0.25 (6.35)	38.31 (973.0)	3.00 (76.2)	9.60 (243.8)	7.97 (202.4)	0.75 (19.1)	15.35 (390.0)	13.22 (335.8)	57.5 (26.10)
	230	5–10											
	480	10–20											
FS6	208	15–20	45.45 (1154.4)	44.81 (1138.2)	0.25 (6.35)	46.4 (1178.6)	4.00 (101.6)	11.44 (290.6)	9.75 (247.6)	0.75 (19.1)	15.80 (401.3)	13.67 (347.2)	98.0 (44.45)
	230	15–20											
	480	25–40											
FS7	208	25–30	58.51 (1486.2)	57.87 (1470.0)	0.25 (6.35)	59.46 (1510.3)	5.00 (127.0)	14.52 (368.8)	12.83 (325.9)	0.75 (19.1)	15.68 (398.3)	13.72 (348.5)	165.0 (74.84)
	230	25–30											
	480	50–75											

Note: C distance is spacing required to mount multiple drives.

Approximate Dimensions in Inches (mm)

Enclosure Box A NEMA Type 3R

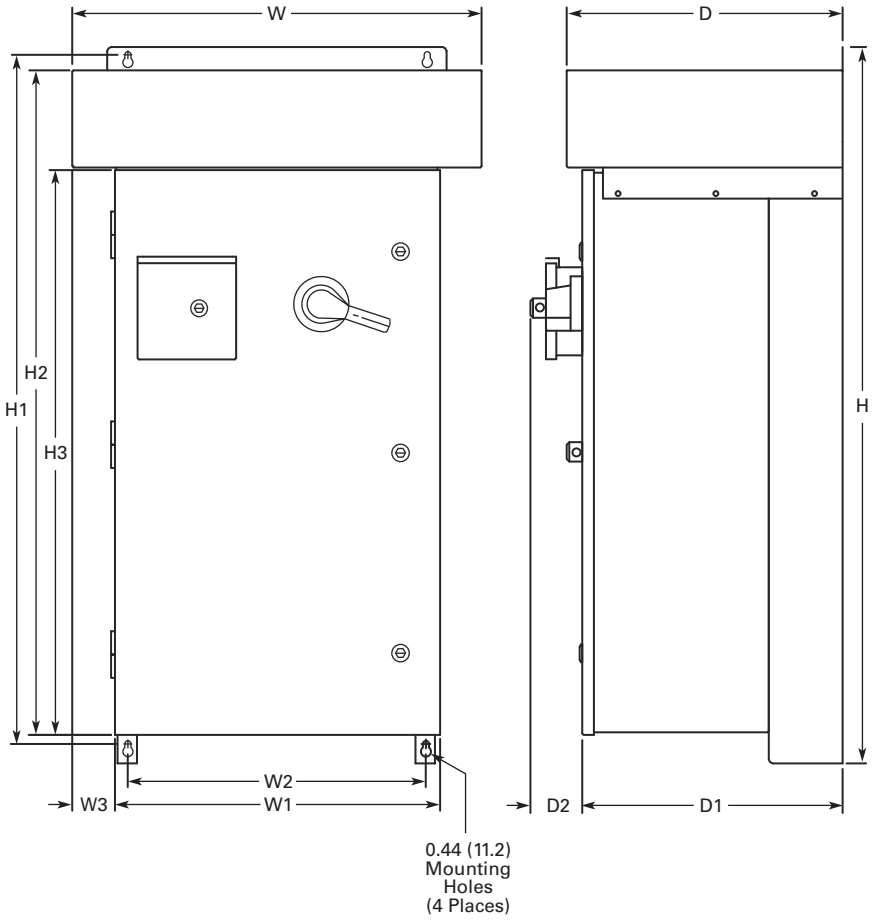


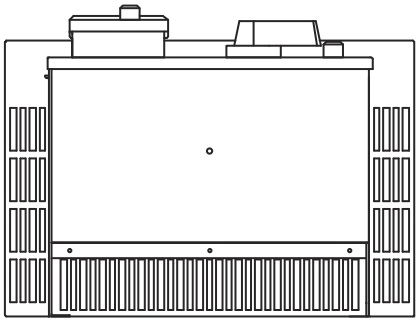


Voltage AC	hp (I_L)	H	H1	H2	H3	W	W1	W2	W3	D	D1	D2	Approx. Weight Lbs (kg)	Approx. Shipping Weight Lbs (kg)
Three-Phase														
208 V	1–10	33.00 (838.2)	31.36 (796.5)	29.67 (753.6)	25.35 (643.9)	21.05 (534.7)	16.92 (429.8)	15.30 (388.6)	2.07 (52.6)	17.24 (437.9)	16.26 (413.0)	3.31 (84.1)	170 (77)	215 (98)
230 V	1–10													
480 V	1–20													

Approximate Dimensions in Inches (mm)

Enclosure Box B NEMA Type 3R

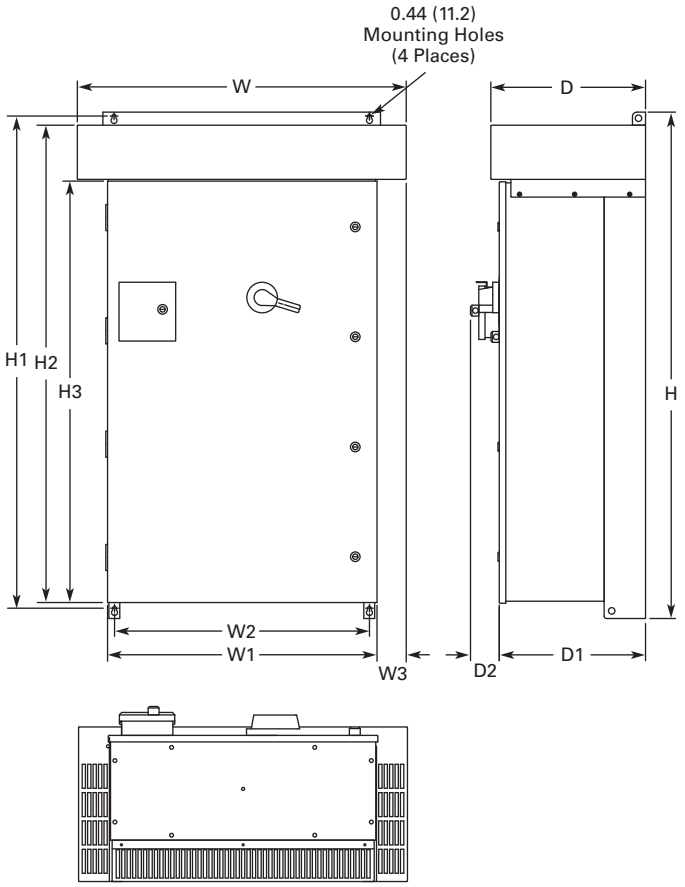




Voltage AC	hp (I_L)	H	H1	H2	H3	W	W1	W2	W3	D	D1	D2	Approx. Weight Lbs (kg)	Approx. Shipping Weight Lbs (kg)
Three-Phase														
208 V	15	46.09 (1170.7)	44.45 (1129.0)	42.77 (1086.4)	36.35 (923.3)	26.31 (668.3)	20.92 (531.4)	19.30 (490.2)	2.69 (68.3)	17.74 (450.6)	16.76 (425.7)	3.31 (84.1)	235 (107)	290 (132)
230 V	15													
480 V	25–40													

Approximate Dimensions in Inches (mm)

Enclosure Box C NEMA Type 3R



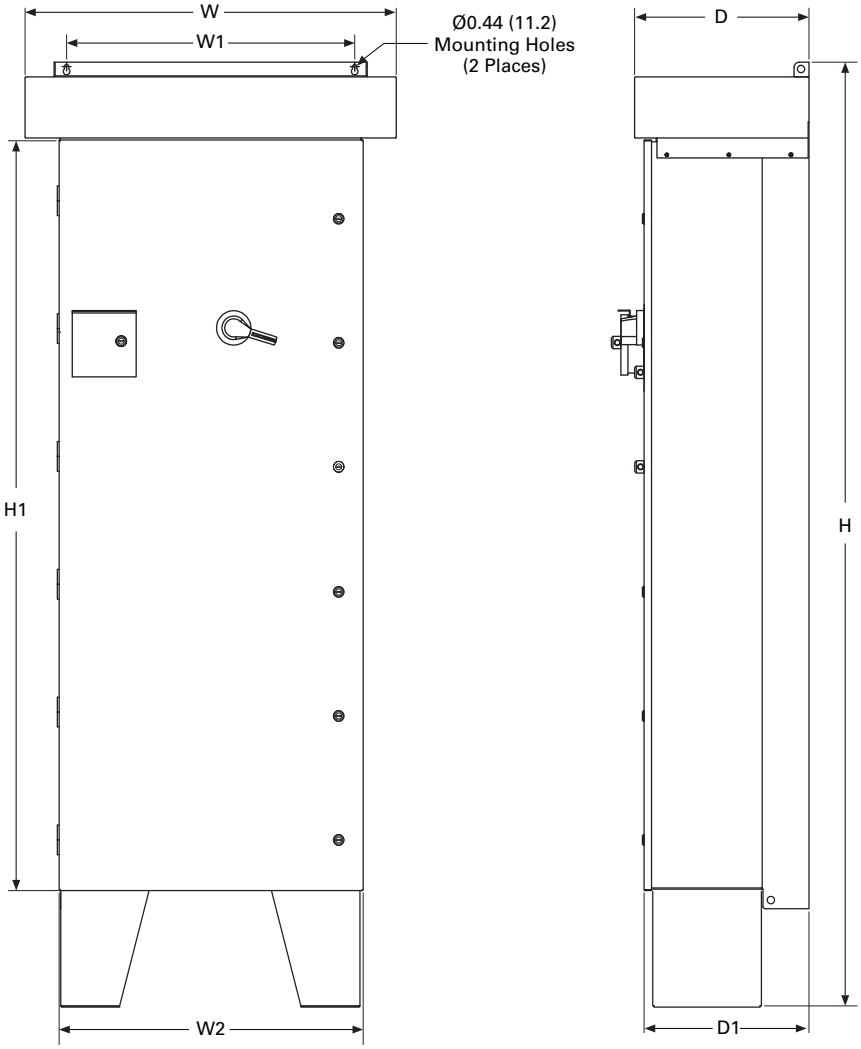
Voltage AC	hp (I_L)	H	H1	H2	H3	W	W1	W2	W3	D	D1	D2	Approx. Weight Lbs (kg)
Three-Phase													
208	20–30	58.09 (1475.5)	56.45 (1433.8)	54.77 (1391.2)	48.35 (1228.1)	37.73 (958.3)	30.92 (785.4)	29.30 (744.2)	3.34 (84.8)	17.74 (450.6)	16.77 (426.0)	3.31 (84.1)	①
230	20–30												
480	50–75												

Note

① Consult factory.

Approximate Dimensions in Inches (mm)

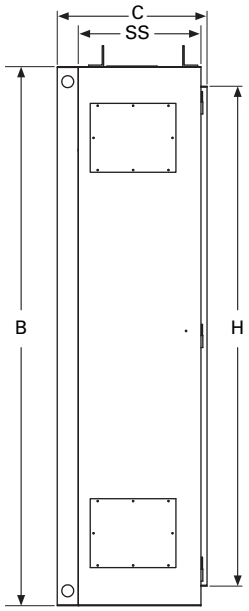
Enclosure Box D

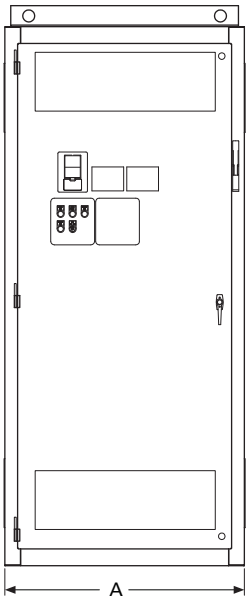


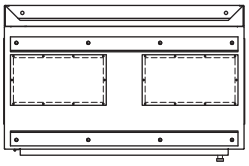
Voltage AC	hp (I_L)	H	H1	W	W1	W2	D	D1	Approx. Weight Lbs (kg)
NEMA Type 12									
208	40–60	80.00 (2032.0)	76.27 (1937.3)	31.00 (787.4)	29.30 (744.2)	30.92 (785.4)	16.76 (425.7)	16.76 (425.7)	850 (386)
230	40–75								
480	100–150								
NEMA Type 3R									
208	40–60	96.00 (2438.4)	76.27 (1937.3)	37.73 (958.3)	29.30 (744.2)	30.92 (785.4)	17.74 (450.6)	16.76 (425.7)	900 (409)
230	40–75								
480	100–150								

Approximate Dimensions in Inches (mm)

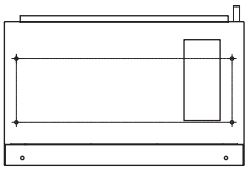
Enclosure Box 5







Top View

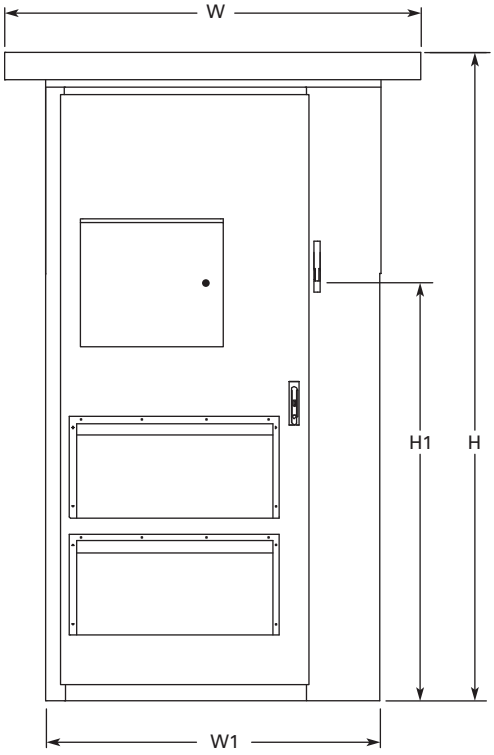


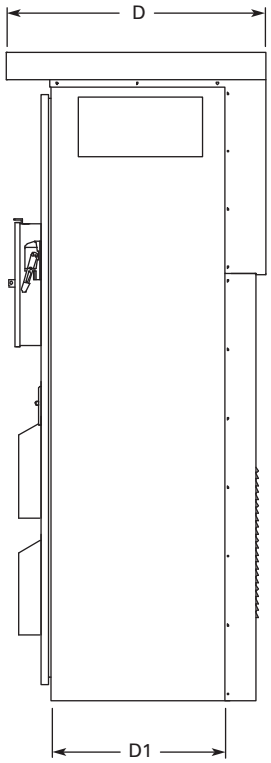
Bottom View

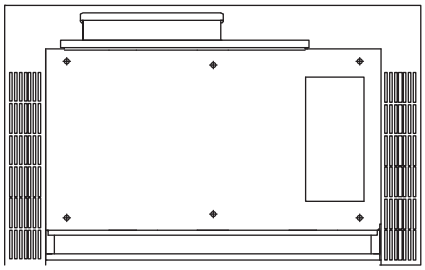
Voltage AC	hp (I_L)	Wide A	High B	Deep C	SS	Mounting D	D1	F	G	Door Height (H)	Approx.Weight Lbs (kg)
Three-phase											
208	75–100	40.00 (1016.0)	90.00 (2286.0)	25.00 (635.0)	20.50 (520.7)	36.00 (914.4)	2.00 (50.8)	8.00 (203.2)	10.80 (274.3)	83.45 (2119.6)	1275 (578)
230	100										
480	200–250										

Approximate Dimensions in Inches (mm)

Enclosure Box F







Voltage AC	hp (I_L)	H	H1	W	W1	D	D1	Approx. Weight Lbs (kg)
Three-Phase								
208	75–100	93.58 (2377.0)	69.51 (1765.5)	60.00 (1524.0)	48.00 (1219.2)	37.50 (952.5)	26.00 (660.4)	1700 (772)
230	100							
480	200–250							