

**H-Max IntelliPass and IntelliDisconnect Drives****Contents**

<b>Description</b>	<b>Page</b>
H-Max Drives . . . . .	<b>V6-T2-139</b>
H-Max IntelliPass and IntelliDisconnect Drives	
Catalog Number Selection . . . . .	<b>V6-T2-150</b>
Product Selection . . . . .	<b>V6-T2-151</b>
Technical Data and Specifications . . . . .	<b>V6-T2-155</b>
Wiring Diagrams . . . . .	<b>V6-T2-156</b>
Dimensions . . . . .	<b>V6-T2-158</b>

**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 and 12 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.

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

**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
- CE
- cUL

**Safety**

- UL 508C
- EN 61800-5-1
- CE
- cUL

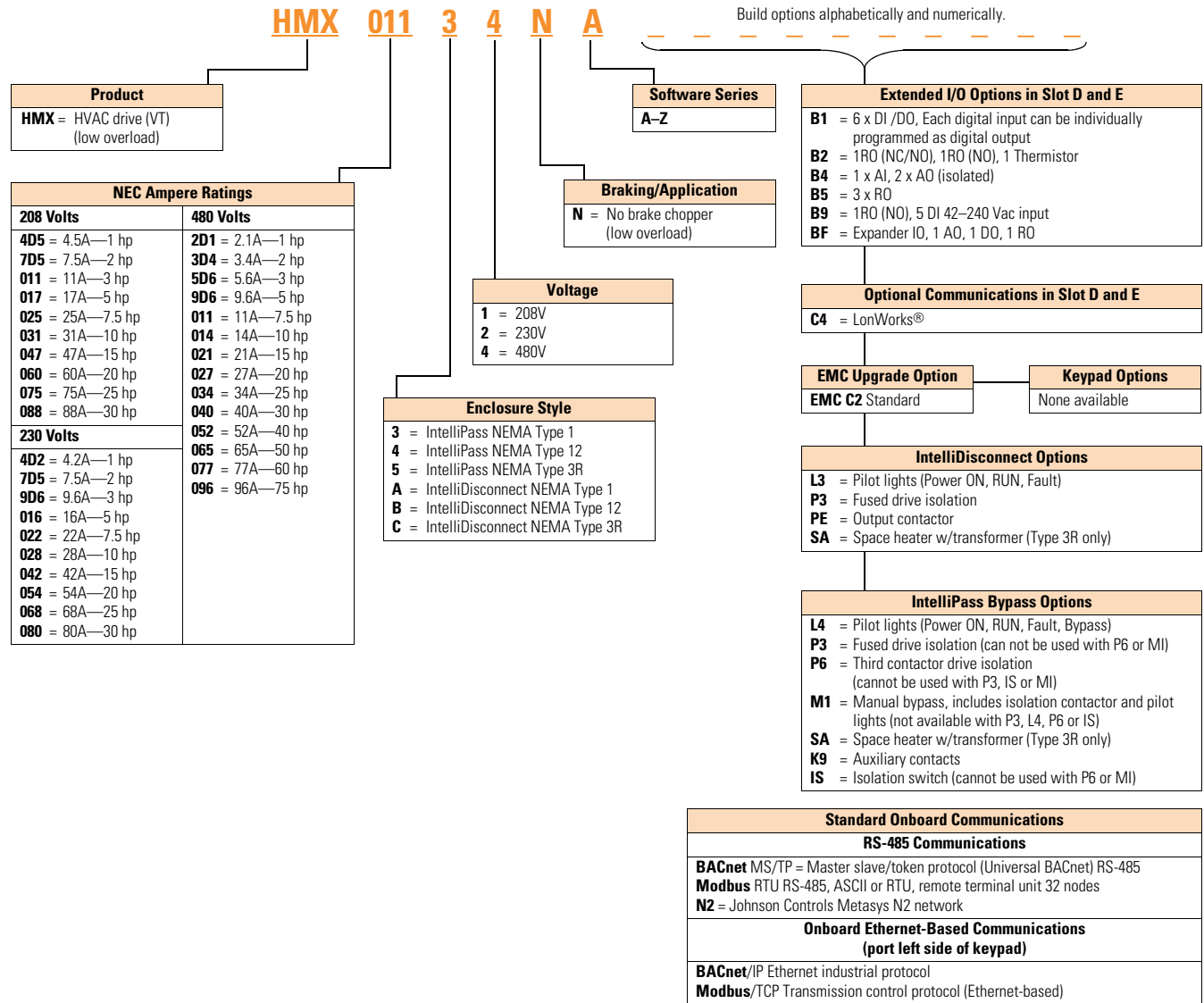


- Plenum Rated

#### Catalog Number Selection

2

#### H-Max Series IntelliPass and IntelliDisconnect Drives



#### 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.

## Product Selection

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

HMX\_



## 208 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.5	HMX4D531NA
	2	7.5	HMX7D531NA
	3	10.6	HMX01131NA
5	5	16.7	HMX01731NA
	7.5	24.2	HMX02531NA
	10	30.8	HMX03131NA
6	15	46.2	HMX04731NA
	20	59.4	HMX06031NA
7	25	74.9	HMX07531NA
	30	88	HMX08831NA

## 230 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.2	HMX4D232NA
	2	7.5	HMX7D532NA
	3	9.6	HMX9D632NA
5	5	15.2	HMX01632NA
	7.5	22	HMX02232NA
	10	28	HMX02832NA
6	15	42	HMX04232NA
	20	54	HMX05432NA
7	25	68	HMX06832NA
	30	80	HMX08032NA

## 480 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	2.1	HMX2D134NA
	2	3.4	HMX3D434NA
	3	5.6	HMX5D634NA
	5	9.6	HMX9D634NA
	7.5	11	HMX01134NA
5	10	14	HMX01434NA
	15	21	HMX02134NA
	20	27	HMX02734NA
6	25	34	HMX03434NA
	30	40	HMX04034NA
	40	52	HMX05234NA
7	50	65	HMX06534NA
	60	77	HMX07734NA
	75	96	HMX09634NA

**Notes**For Wiring Diagrams, see **Page V6-T2-157**.For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-150**.

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**

2

HMX

**208 Vac**

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.5	HMX4D5A1NA
	2	7.5	HMX7D5A1NA
	3	11	HMX011A1NA
5	5	17	HMX017A1NA
	7.5	25	HMX025A1NA
	10	31	HMX031A1NA
6	15	47	HMX047A1NA
	20	60	HMX060A1NA
7	25	75	HMX075A1NA
	30	88	HMX088A1NA

**230 Vac**

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.2	HMX4D2A2NA
	2	7.5	HMX7D5A2NA
	3	9.6	HMX9D6A2NA
5	5	15.2	HMX016A2NA
	7.5	22	HMX022A2NA
	10	28	HMX028A2NA
6	15	42	HMX042A2NA
	20	54	HMX054A2NA
7	25	68	HMX068A2NA
	30	80	HMX080A2NA

**480 Vac**

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	2.1	HMX2D1A4NA
	2	3.4	HMX3D4A4NA
	3	5.6	HMX5D6A4NA
	5	9.6	HMX9D6A4NA
	7.5	11	HMX011A4NA
5	10	14	HMX014A4NA
	15	21	HMX021A4NA
	20	27	HMX027A4NA
6	25	34	HMX034A4NA
	30	40	HMX040A4NA
	40	52	HMX052A4NA
7	50	65	HMX065A4NA
	60	77	HMX077A4NA
	75	96	HMX096A4NA

**Notes**

For Wiring Diagrams, see **Page V6-T2-157**.

For NEMA 12 or 3R enclosures, see Catalog Number Selection on **Page V6-T2-150**.

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**

100 base 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 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**

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

## Extended I/O Options in Slot D and E

2

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

## Optional Communications in Slot D and E

Description	Suffix Number
LonWorks®	<b>C4</b>

## EMC Upgrade Option

Description	Suffix Number
Standard	<b>EMC C2</b>

## Keypad Options

Description	Suffix Number
None available	—

## IntelliDisconnect Options

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

## IntelliPass Bypass Options

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

## Standard Onboard Communications

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

## Technical Data and Specifications

### Primary Design Features

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

### H-Max Series Drives

Description	Specification
<b>Input Ratings</b>	
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
<b>Output Ratings</b>	
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
<b>Control Characteristics</b>	
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 $\pm 1\%$ 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 $T_n$
<b>Ambient Conditions</b>	
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 (1000m); 1% derating for each 328 ft (100m) above 3280 ft (1000m); max. 9842 ft (3000m); 380–480V
Vibration	FS4–FS7: IEC 60068-2-6, 10–150 Hz Displacement amplitude = 1 mm peak-to-peak from 10–15.8 Hz Max. acceleration amplitude = 1G peak from 15.8–150 Hz
Shock	FS4–FS7: IEC 60068-2-27, 15G peak acceleration at 11 ms duration, 1/2-sine. ISTA 1A Certified
Enclosure class	NEMA Type 1/IP21 or NEMA Type 12/IP54 (keypad required for IP54/Type 12)

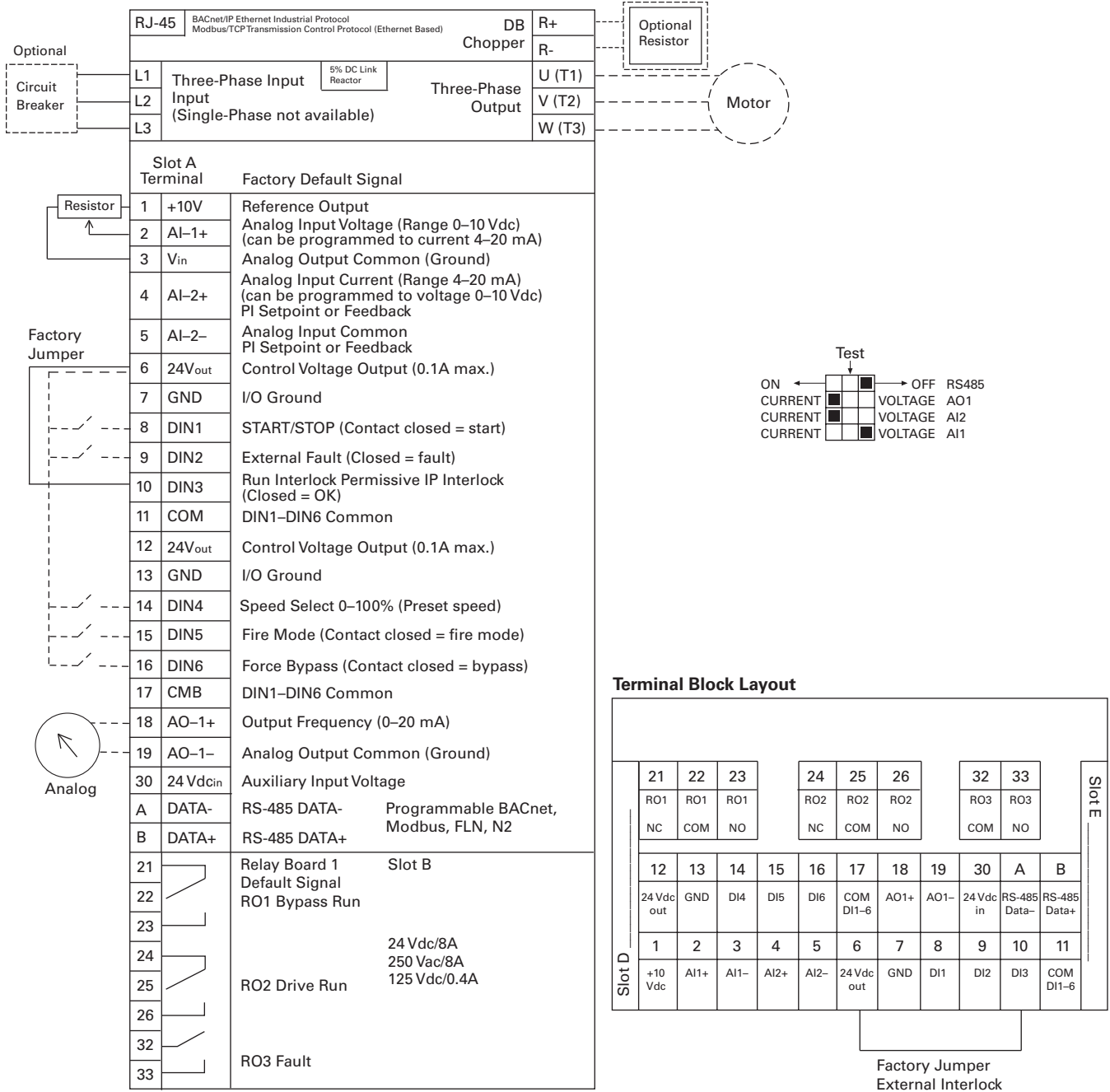
Description	IntelliPass	IntelliDisconnect
Isolation switch	Optional	N/A
Top entry (power)	Standard	Standard
Bottom entry (power)	Standard	Standard
Output contactor	Standard	Optional

Description	Specification
<b>Standards</b>	
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.
<b>Control Connections</b>	
Analog input voltage	0 to 10V, R = 200 kohms differential Resolution 0.1%; Accuracy $\pm 1\%$ 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	+24V $\pm 10\%$ , max. 250 mA
Output reference voltage	+10V +3%, max. load 10 mA
Analog output	0–10V, 0(4) to 20 mA; $R_L$ max. 500 ohms; Resolution 10 bit; Accuracy $\pm 2\%$ ; Dip switch selection (voltage/current)
Relay outputs	3 programmable, 2 Form C, 1 Form A relay outputs Switching capacity: 24 Vdc/8A, 250 Vac/8A, 125 Vdc/0.4A
Hard wire jumper	Between terminal 6 and 10 factory default
Dip switch setting default	RS485 = off A01 = current A12 = current A11 = voltage
<b>Protections</b>	
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

2



#### Standards

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

#### Includes

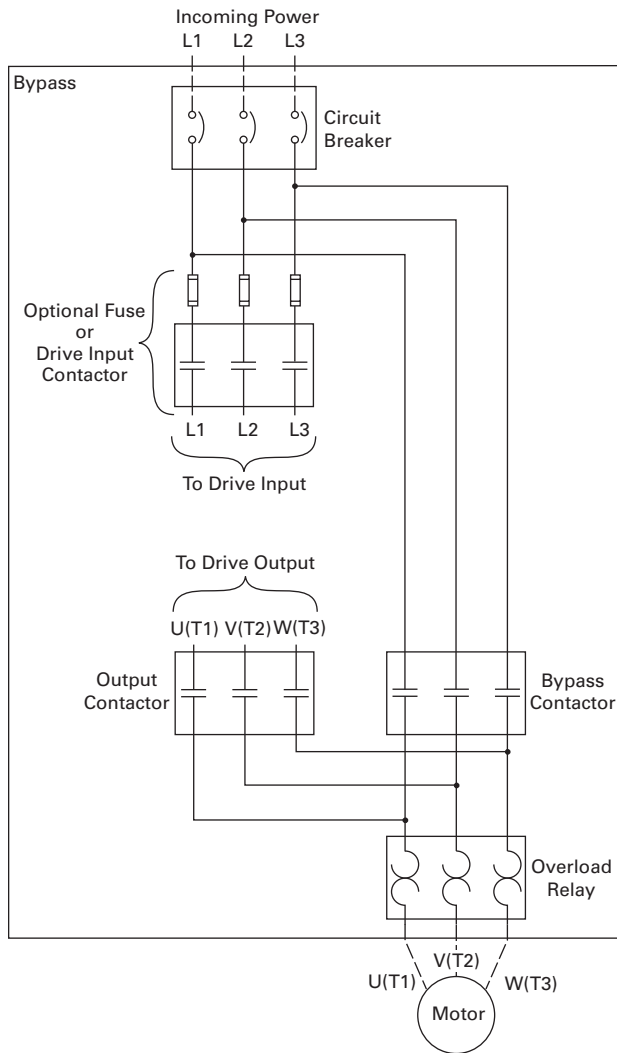
- Six digital input
- Two analog input
- One analog output
- Three relay output
- RS-485
- Ethernet

#### Reliability

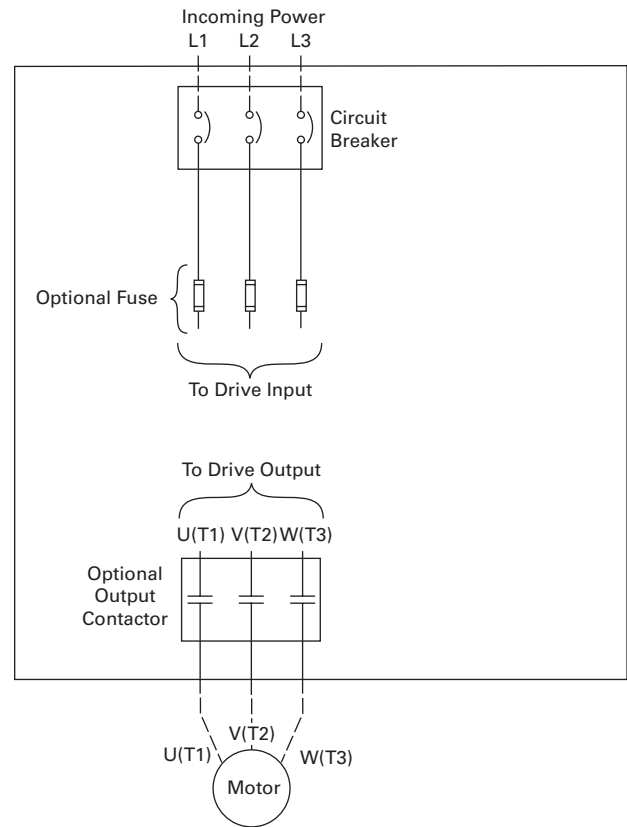
- Pretested components
- Conformal coated (varnished) boards
- 40°C rated
- 110% overload for one minute
- Eaton Electrical Services & Systems national network of AF drive specialists



### H-Max Series IntelliPass



### H-Max Series IntelliDisconnect Power Wiring



# 2.5

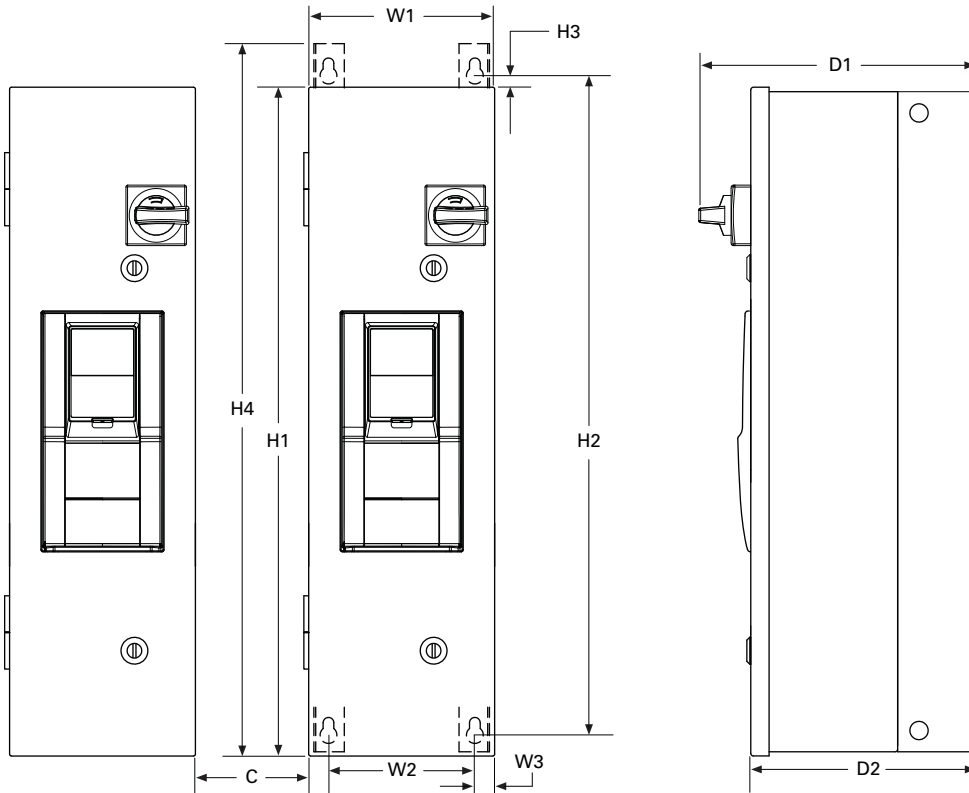
## Adjustable Frequency Drives

### H-Max Series Drives

#### Dimensions

Approximate Dimensions in Inches (mm)

#### 2 H-Max Series IntelliPass and IntelliDisconnect Drives



Consult factory or use manual for final dimensions.

Frame Size	Voltage	Horsepower (I <sub>L</sub> )	H1	H2	H3	H4	C	W1	W2	W3	D1	D2	Weight in Lbs (kg)
FS4	208	1–3	29.69	37.12	0.25	31.00	3.00	7.88	6.33	0.75	11.40	9.27	45 (20.41)
	230	1–3	(754.1)	(942.9)	(6.35)	(914.4)	(76.2)	(200.2)	(160.8)	(19.1)	(289.6)	(235.5)	
	480	1–7.5											
FS5	208	5–10	37.00	34.47	0.25	38.31	3.00	9.40	7.75	0.75	15.30	13.17	57.5 (26.10)
	230	5–10	(939.8)	(875.5)	(6.35)	(973.0)	(76.2)	(238.8)	(196.9)	(19.1)	(388.6)	(334.6)	
	480	10–20											
FS6	208	15–20	45.08	40.28	0.25	46.4	4.00	10.90	9.35	0.75	15.75	13.62	98.0 (44.45)
	230	15–20	(1145.0)	(1023.1)	(6.35)	(1178.6)	(101.6)	(276.9)	(327.5)	(19.1)	(400.0)	(346.0)	
	480	25–40											
FS7	208	25–30	58.32	56.30	0.25	59.46	5.00	13.98	12.35	0.75	15.50	13.55	165.0 (74.84)
	230	25–30	(1481.3)	(1430.0)	(6.35)	(1510.3)	(127.0)	(355.1)	(313.7)	(19.1)	(393.7)	(244.2)	
	480	50–75											

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