

Variable Speed Drives Series III: Open, Bypass, and Disconnect Models

Product Bulletin

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Overview

Johnson Controls® Variable Speed Drives Series III (VSDs) control the speed of AC induction motors used in fan and pump applications.

VSD Series III include the following key enhancements:

- Sensor/Actuator (SA) bus is built-in. There is no option card.
- Standard conformal coating
- Available 100K short circuit current rating (SCCR) for disconnect and bypass models
- Service switch option on bypass models
- Broken belt software feature
- Damper end switch logic for bypass
- Impact resistant one piece plastic enclosure

Figure 1: Variable Speed Drives Series III complete enclosed product family



Variable Speed Drives Series III features

VSD Series III include the following hardware features:

- Integrated common mode reduction 5% DC link choke with input surge protection
- Variable torque rated for HVAC and HVACR demands
- 110% variable torque overload
- Type 1/IP21 and Type 12/IP54 enclosures available for open drive and drive only models
- Real-time clock to support calendaring and programmable logic controller (PLC) functionality
- Hand-off- auto (HOA) graphic LCD display and keypad to support simple menu navigation and on-screen diagnostics
- Auto operation from keypad and two configurable soft keys
- Conformal coated control and power boards standard provides greater resistance to environmental containments.
- Power the control logic from an external auxiliary control panel for internal drive functions and fieldbus if necessary
- Standard Input/Output (I/O): 8 digital inputs (DI), 1 digital output (DO), 2 analog inputs (AI), 2 analog outputs (AO), 2 form C relays (FC), 1 form A relays (FA)
- Standard communications used to not delay a job as a result of waiting for option cards: BACnet/IP and MS/TP, Modbus TCP, Modbus Remote Terminal Unit (RTU), Johnson Controls SA bus
- Two expansion slots to support additional I/O

- Quick disconnect terminals for I/O connections to support fast and easy installation
- Multi-color pilot light is optional on bypass and standard on disconnect models
- Three contactor manual bypass with multi-color pilot light for when no specification is provided
- Two contactor bypass with isolation fusing, manual bypass and multi-color pilot light to meet isolation fusing specifications
- Redundant Auto, Run and Fault LEDs located to replicate keypad LEDs in the event the keypad is removed
- Two contactor bypass with optional service switch for specification matching
- 100K SCCR for bypass panels as a standard option to keep solution price competitive when 100K SCCR is non-negotiable.

VSD Series III include the following software features:

- Active energy control to minimize energy losses in the motor, resulting in industry-leading energy efficiency for your application
- Energy savings calculator
- Quick Start Wizard upon initial power-up supports fast and easy installation
- Broken belt detects when the equipment requires maintenance
- Standard applications: standard, multi-proportional-integral-derivative (PID), and advanced control.
- Set up multiple drives quickly with the copy and paste functionality on the drive keypad
- Fast and easy installation for most applications through pre-programmed I/O
- Dynamic motor regenerative energy management
- Advanced PC tool with diagnostic capabilities
- Two keypad software keys for easy menu navigation and shortcuts

Ordering information

See Table 1 for ordering information and an explanation of the ordering codes depending on your requirements for the Variable Speed Drives Series III you want to order, using the example of VS3-1D5-2-N1B-2.

Horsepower

Use the relevant hp code to correlate job data with the Variable Speed Drives Series III you want to order. The motor's FLA must not exceed the published current output of the drive you select. Make sure to verify motor FLA in some applications, for example, cooling towers that utilize lower speed motors with 1200 rpm or 900 rpm. See Table 2 to Table 4 for the FLA of the VSD Series III.

Voltage

Bypass and disconnect models default to the 100K SCCR design as a function of hp, changing the order code character from number 1, 2, 4, or 5 to the corresponding 100K SCCR voltage code A, B, C, or D. For example, VS3-050-4-N1B-2 becomes VS3-050-C-N1B-2.

Use the following guidance to generate the correct order code:

- If you order 208 V or 230 V models that use 30 hp and larger, default to voltage order code A or B.
- If you order 480 V models that use 50 hp and larger, default to voltage code C.
- If you order any compact disconnect models (N1C), use the 100K SCCR order code A, B, C, or D.
- If you order 575 V enclosed products, use the 100K SCCR order code D for voltage.

Note: Get the 100K SCCR option on any disconnect or bypass model across the hp range.

Bypass configuration

The bypass configuration two contactor manual bypass with isolation fusing and multi-color pilot light under order code F limits hp to the following:

- 208 V or 230 V models have a limit of 20 hp.
- 480 V models have a limit of 40 hp.
- This is not applicable to 575 V models.

Table 1: Ordering guide

		VS3	-	1D5	-	2	-	N1B	-	2
Product family code										
Horsepower	001	005	020	050	125					
	1D5	7D5	025	060	150					
	002	010	030	075	200					
	003	015	040	100	250					
Voltage	1	208 V	A	208 V 100K SCCR						
	2	230 V	B	230 V 100K SCCR						
	4	480 V	C	480 V 100K SCCR						
	5	575 V	D	575 V 100K SCCR						
Style	N1B	NEMA1 bypass								
	N2B	NEMA 12 bypass								
	N3B	NEMA 3R bypass without space heater								
	S3B	NEMA 3R bypass with space heater								
	N1C	NEMA 1 compact disconnect								
	N1D	NEMA 1 disconnect (includes pilot light)								
	N2D	NEMA 12 disconnect (includes pilot light)								
	N3D	NEMA 3R disconnect without space heater								
	S3D	NEMA 3R disconnect with space heater								
	UL1	NEMA 1 open drive								
	UL2	NEMA 12 open drive								
Bypass configuration	0	None, used for open and disconnect drives								
	2	Two contactor bypass								
	S	Two contactor bypass with service switch								
	3	Three contactor manual bypass with multi-color pilot light								
	F	Two contactor manual bypass with isolation fusing and multi-color pilot light								
	Q	575 V only, three contactor electronic bypass								

Applications

Install open drives inside a customer supplied cabinet. Open drives are a popular choice for installers retrofitting an existing field installation and for OEMs. Open drives are available in NEMA 1 and NEMA 12 enclosures.

Compact disconnect drives add circuit protection to an open drive. The use of a compact disconnect drive is ideal when there is no branch circuit protection, if the existing control panels are too small to house the drive, or if they are strictly low voltage panels. For OEMs that add drives to existing equipment designs compact disconnect drives are also ideal. Compact disconnect drives are available in NEMA 1 enclosures only.

Division 15, 16, or 17 specify bypass drives. Bypass drives are shipped to the job site for field installation. You can run the motor across the line without assistance from the drive with a bypass drive solution. The benefit of a bypass solution is that in the event of drive failure the equipment keeps running if on full speed operation. All bypass drives include a disconnect switch.

Disconnect drives are the same form factor as a bypass drive and include a pilot light to indicate operation status. Disconnect drives are popular in pumping applications.

Bypass and disconnect drives are available in NEMA 1, NEMA 12, and NEMA 3R enclosures.

NEMA 3R enclosures are the only suitable enclosure type for outdoor or rooftop mounting.

Variable Speed Drives Series III model types

Figure 2: Open drive model



Figure 3: Compact disconnect model



Figure 4: Bypass or disconnect model



Selection charts for open drives

Table 2: 200 - 230 V open drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	Output current (A)	Frame size	Weight (lbs)
1	VS3-001-2-UL1-0	VS3-001-2-UL2-0	4.8	1	14
1.5	VS3-1D5-2-UL1-0	VS3-1D5-2-UL2-0	6.6		
2	VS3-002-2-UL1-0	VS3-002-2-UL2-0	7.8		
3	VS3-003-2-UL1-0	VS3-003-2-UL2-0	11		
5	VS3-005-2-UL1-0	VS3-005-2-UL2-0	17.5	2	23
7.5	VS3-7D5-2-UL1-0	VS3-7D5-2-UL2-0	25		
10	VS3-010-2-UL1-0	VS3-010-2-UL2-0	31		
15	VS3-015-2-UL1-0	VS3-015-2-UL2-0	48	3	50
20	VS3-020-2-UL1-0	VS3-020-2-UL2-0	61		
25	VS3-025-2-UL1-0	VS3-025-2-UL2-0	75	4	75
30	VS3-030-2-UL1-0	VS3-030-2-UL2-0	88		
40	VS3-040-2-UL1-0	VS3-040-2-UL2-0	114		
50	VS3-050-2-UL1-0	VS3-050-2-UL2-0	143	5	154
60	VS3-060-2-UL1-0	VS3-060-2-UL1-0	170		
75	VS3-075-2-UL1-0	VS3-075-2-UL2-0	211		
100	VS3-100-2-UL1-0	VS3-100-2-UL2-0	261	6	247
125	VS3-125-2-UL1-0	VS3-125-2-UL2-0	312		

Table 3: 480 V open drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	Output current (A)	Frame size	Weight (lbs)
1.5	VS3-1D5-4-UL1-0	VS3-1D5-4-UL2-0	3.3	1	14
2	VS3-002-4-UL1-0	VS3-002-4-UL2-0	4.3		
3	VS3-003-4-UL1-0	VS3-003-4-UL2-0	5.6		
5	VS3-005-4-UL1-0	VS3-005-4-UL2-0	9	2	23
7.5	VS3-7D5-4-UL1-0	VS3-7D5-4-UL2-0	12		
10	VS3-010-4-UL1-0	VS3-010-4-UL2-0	16		
15	VS3-015-4-UL1-0	VS3-015-4-UL2-0	23		
20	VS3-020-4-UL1-0	VS3-020-4-UL2-0	31	3	50
25	VS3-025-4-UL1-0	VS3-025-4-UL2-0	38		
30	VS3-030-4-UL1-0	VS3-030-4-UL2-0	46		
40	VS3-040-4-UL1-0	VS3-040-4-UL2-0	61	4	78
50	VS3-050-4-UL1-0	VS3-050-4-UL2-0	72		
60	VS3-060-4-UL1-0	VS3-060-4-UL1-0	87		
75	VS3-075-4-UL1-0	VS3-075-4-UL2-0	105	5	154
100	VS3-100-4-UL1-0	VS3-100-4-UL2-0	140		
125	VS3-125-4-UL1-0	VS3-125-4-UL2-0	170		
150	VS3-150-4-UL1-0	VS3-150-4-UL2-0	205	6	247
200	VS3-200-4-UL1-0	VS3-200-4-UL2-0	261		
250	VS3-250-4-UL1-0	VS3-250-4-UL2-0	310		

Table 4: 575 V open drives

hp	NEMA 1 (UL Type)	NEMA 12 (UL Type 12)	Output current (A)	Frame size	Weight (lbs)
3	VS3-003-5-UL1-0	VS3-003-5-UL2-0	4.5	1	14
5	VS3-005-5-UL1-0	VS3-005-5-UL2-0	7.5		
7.5	VS3-7D5-5-UL1-0	VS3-7D5-5-UL2-0	10		
10	VS3-010-5-UL1-0	VS3-010-5-UL2-0	13.5	2	23
15	VS3-015-5-UL1-0	VS3-015-5-UL2-0	18		
20	VS3-020-5-UL1-0	VS3-020-5-UL2-0	22		
25	VS3-025-5-UL1-0	VS3-025-5-UL2-0	27	3	50
30	VS3-030-5-UL1-0	VS3-030-5-UL2-0	34		
40	VS3-040-5-UL1-0	VS3-040-5-UL2-0	41		
50	VS3-050-5-UL1-0	VS3-050-5-UL2-0	52	4	78
60	VS3-060-5-UL1-0	VS3-060-5-UL1-0	62		
75	VS3-075-5-UL1-0	VS3-075-5-UL2-0	80		
100	VS3-100-5-UL1-0	VS3-100-5-UL2-0	100	5	154
125	VS3-125-5-UL1-0	VS3-125-5-UL2-0	125		
150	VS3-150-5-UL1-0	VS3-150-5-UL2-0	144		
200	VS3-200-5-UL1-0	VS3-200-5-UL2-0	208	6	247
250	VS3-250-5-UL1-0	VS3-250-5-UL2-0	250		

Open drive dimensions

Figure 5: Variable Speed Drives Series III Open drive dimensions in inches and mm

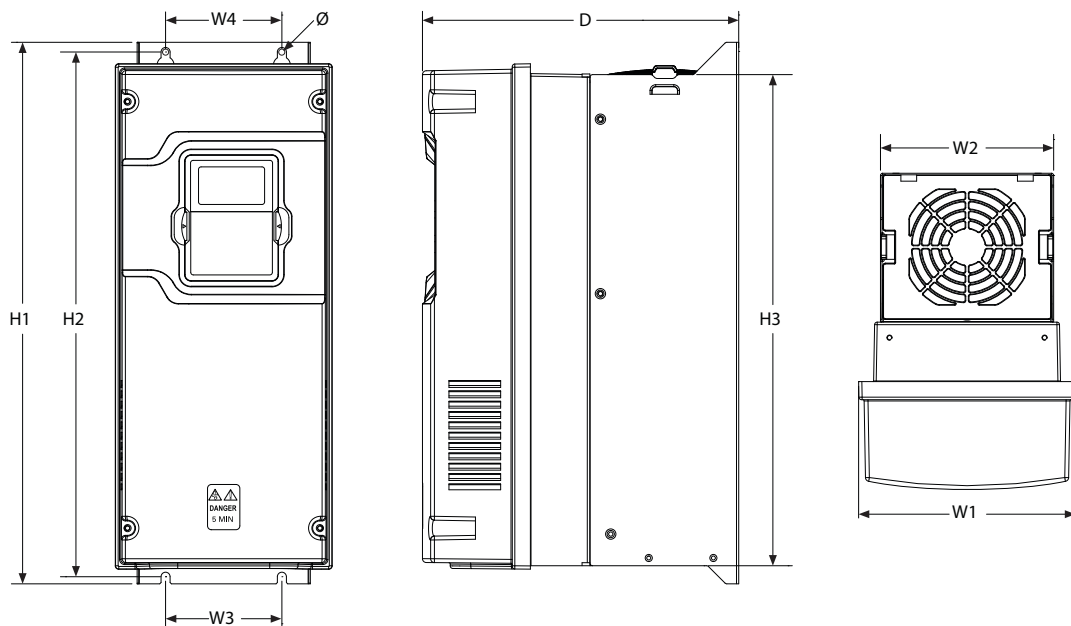


Table 5: Variable Speed Drives Series III Open drive dimensions

Frame (FR)	hp			Inches (mm)							lbs (kg)
	200 V - 230 V	480 V	575 V	D	H1	H2	H3	W1	W2	W3 = W4	Weight
1	1	1.5	3	7.91 (200.9)	12.87 (326.9)	12.28 (311.9)	11.50 (292.1)	6.02 (153.0)	4.80 (121.9)	3.94 (100.1)	14 (6.3)
	2	2	5								
	3	3									
		5									
		7.5									
2	5	10	10	9.63 (244.7)	16.50 (419.1)	15.98 (405.9)	14.96 (380.0)	6.61 (167.8)	5.28 (134.1)	3.54 (90.00)	23 (10.4)
	7.5	15	15								
	10	20	20								
3	15	25	25	10.44 (265.1)	21.97 (558.0)	21.46 (545.0)	20.41 (518.5)	8.06 (204.6)	7.24 (183.9)	4.92 (125.0)	50 (22.7)
	20	30	30								
		40	40								
4	25	50	50	11.57 (294.0)	24.80 (629.9)	24.31 (617.5)	23.27 (591.1)	9.36 (237.7)	9.13 (237.7)	8.07 (205.0)	78 (35.38)
	30	60	60								
	40	75	75								
5	50	100	100	13.41 (340.7)	34.98 (888.5)	29.65 (753.1)	27.83 (706.9)	11.34 (288.0)	11.10 (281.9)	8.66 (220.0)	154 (69.9)
	60	125	125								
	75	150	150								
6	100	200	200	14.61 (371.0)	34.04 (864.5)	33.27 (845.0)	40.75 (1035.0)	19.13 (486.0)	18.90 (480.0)	15.75 (400.0)	247 (112)
	125	250	250								

Selection charts for disconnect drives

Table 6: 208 V compact disconnect drives - NEMA 1 (UL Type 1)

hp	Order code	Output current (A)	Frame size	Weight (lbs)
1	VS3-001-A-N1C-0	4	H1D	19
1.5	VS3-1D5-A-N1C-0	6.8		
2	VS3-002-A-N1C-0	7.5		
3	VS3-003-A-N1C-0	10.6		
5	VS3-005-A-N1C-0	16.7	H2D	28
7.5	VS3-7D5-A-N1C-0	24.3		
10	VS3-010-A-N1C-0	30.8		
15	VS3-015-A-N1C-0	46.2	H3D	55
20	VS3-020-A-N1C-0	59.4		
25	VS3-025-A-N1C-0	74.8	H4D	83
30	VS3-030-A-N1C-0	88		
40	VS3-040-A-N1C-0	114		

Table 7: 230 V compact disconnect drives - NEMA 1 (UL Type 1)

hp	Order code	Output current (A)	Frame size	Weight (lbs)
1	VS3-001-B-N1C-0	4.2	H1D	19
1.5	VS3-1D5-B-N1C-0	6		
2	VS3-002-B-N1C-0	6.8		
3	VS3-003-B-N1C-0	9.6		
5	VS3-005-B-N1C-0	15.2	H2D	28
7.5	VS3-7D5-B-N1C-0	22		
10	VS3-010-B-N1C-0	28		
15	VS3-015-B-N1C-0	42	H3D	55
20	VS3-020-B-N1C-0	54		
25	VS3-025-B-N1C-0	68	H4D	83
30	VS3-030-B-N1C-0	80		
40	VS3-040-B-N1C-0	104		

Table 8: 480 V compact disconnect drives - NEMA 1 (UL Type 1)

hp	Order code	Output current (A)	Frame size	Weight (lbs)
1.5	VS3-1D5-C-N1C-0	3.3	H1D	19
2	VS3-002-C-N1C-0	4.3		
3	VS3-003-C-N1C-0	5.6		
5	VS3-005-C-N1C-0	9		
7.5	VS3-7D5-C-N1C-0	12	H2D	28
10	VS3-010-C-N1C-0	16		
15	VS3-015-C-N1C-0	23		
20	VS3-020-C-N1C-0	31	H3D	55
25	VS3-025-C-N1C-0	38		
30	VS3-030-C-N1C-0	46		
40	VS3-040-C-N1C-0	61		
50	VS3-050-C-N1C-0	72	H4D	83
60	VS3-060-C-N1C-0	87		
75	VS3-075-C-N1C-0	105		

Table 9: 575 V compact disconnected drives - NEMA 1 (UL Type 1)

hp	Order code	Output current (A)	Frame size	Weight (lbs)
3	VS3-003-D-N1C-0	4.5	H1D	19
5	VS3-005-D-N1C-0	7.5		
7.5	VS3-7D5-D-N1C-0	10		
10	VS3-010-D-N1C-0	13.5	H2D	28
15	VS3-015-D-N1C-0	18		
20	VS3-020-D-N1C-0	22		
25	VS3-025-D-N1C-0	27	H3D	55
30	VS3-030-D-N1C-0	34		
40	VS3-040-D-N1C-0	41		

hp	Order code	Output current (A)	Frame size	Weight (lbs)
50	VS3-050-D-N1C-0	52	H4D	83
60	VS3-060-D-N1C-0	62		
75	VS3-075-D-N1C-0	80		

Compact disconnect drive dimensions

Figure 6: Frame size H1D and H2D in inches (mm)

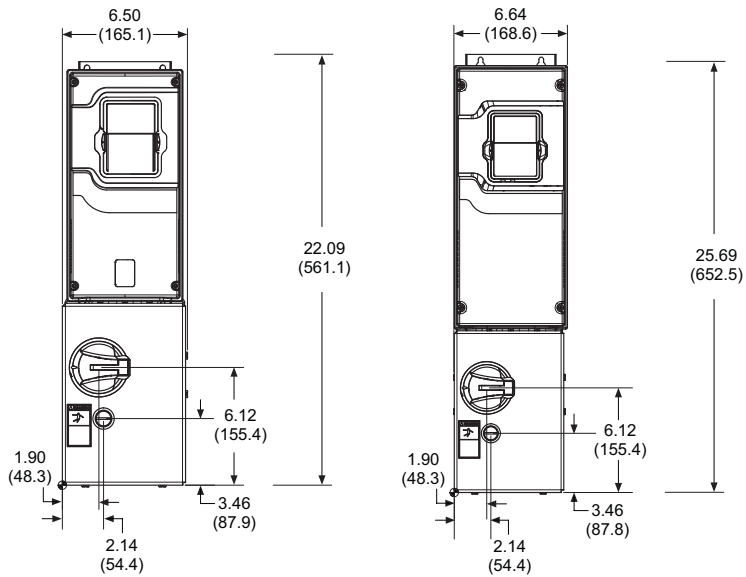
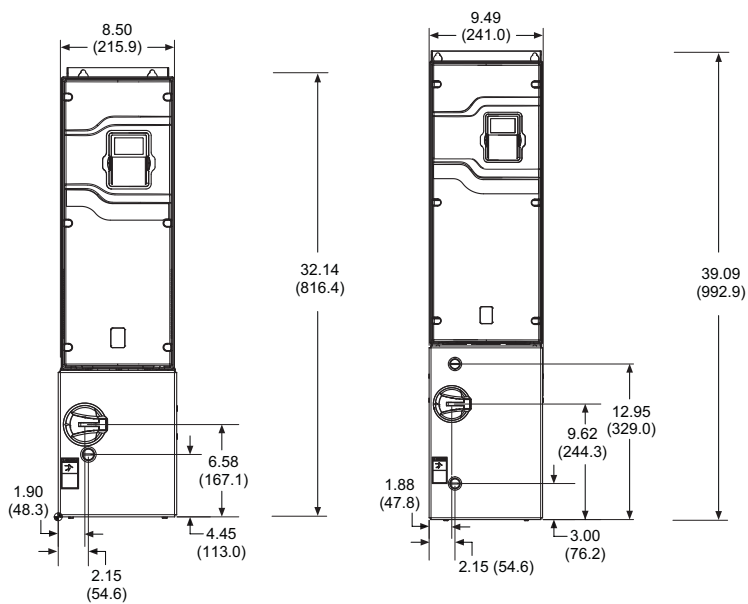


Figure 7: Frame size H3D and H4D in inches (mm)



Note: Depth not shown in the following models:

- H1D: 10.12 in. (257 mm)
- H2D: 11.94 in. (303.2 mm)
- H3D: 12.05 in. (306 mm)
- H4D: 12.53 in. (318.3 mm)

Selection charts

Table 10: 208 V disconnect drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
1	VS3-001-1-N1D-0	VS3-001-1-N2D-0	VS3-001-1-N3D-0	4.6	H1S	H3X
1.5	VS3-1D5-1-N1D-0	VS3-1D5-1-N2D-0	VS3-1D5-1-N3D-0	6.6		
2	VS3-002-1-N1D-0	VS3-002-1-N2D-0	VS3-002-1-N3D-0	7.5		
3	VS3-003-1-N1D-0	VS3-003-1-N2D-0	VS3-003-1-N3D-0	10.6		
5	VS3-005-1-N1D-0	VS3-005-1-N2D-0	VS3-005-1-N3D-0	16.7	H2S	H3X
7.5	VS3-7D5-1-N1D-0	VS3-7D5-1-N2D-0	VS3-7D5-1-N3D-0	24.3		
10	VS3-010-1-N1D-0	VS3-010-1-N2D-0	VS3-010-1-N3D-0	30.8		
15	VS3-015-1-N1D-0	VS3-015-1-N2D-0	VS3-015-1-N3D-0	46.2	H3	H3X
20	VS3-020-1-N1D-0	VS3-020-1-N2D-0	VS3-020-1-N3D-0	59.4		
25	VS3-025-1-N1D-0	VS3-025-1-N2D-0	VS3-025-1-N3D-0	74.8	H4	BX
30	VS3-030-A-N1D-0	VS3-030-A-N2D-0	VS3-030-A-N3D-0	88		
40	VS3-040-A-N1D-0	VS3-040-A-N2D-0	VS3-040-A-N3D-0	114		
50	VS3-050-A-N1D-0	VS3-050-A-N2D-0	VS3-050-A-N3D-0	143	CX	CX
60	VS3-060-A-N1D-0	VS3-060-A-N2D-0	VS3-060-A-N3D-0	169		
75	VS3-075-A-N1D-0	VS3-075-A-N2D-0	VS3-075-A-N3D-0	211		
100	VS3-100-A-N1D-0	VS3-100-A-N2D-0	VS3-100-A-N3D-0	261	DX	DX

Table 11: 230 V disconnect drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
1	VS3-001-2-N1D-0	VS3-001-2-N2D-0	VS3-001-2-N3D-0	4.2	H1S	H3X
1.5	VS3-1D5-2-N1D-0	VS3-1D5-2-N2D-0	VS3-1D5-2-N3D-0	6		
2	VS3-002-2-N1D-0	VS3-002-2-N2D-0	VS3-002-2-N3D-0	6.8		
3	VS3-003-2-N1D-0	VS3-003-2-N2D-0	VS3-003-2-N3D-0	9.6		
5	VS3-005-2-N1D-0	VS3-005-2-N2D-0	VS3-005-2-N3D-0	15.2	H2S	H3X
7.5	VS3-7D5-2-N1D-0	VS3-7D5-2-N2D-0	VS3-7D5-2-N3D-0	22		
10	VS3-010-2-N1D-0	VS3-010-2-N2D-0	VS3-010-2-N3D-0	28		
15	VS3-015-2-N1D-0	VS3-015-2-N2D-0	VS3-015-2-N3D-0	42	H3	H3X
20	VS3-020-2-N1D-0	VS3-020-2-N2D-0	VS3-020-2-N3D-0	54		

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
25	VS3-025-2-N1D-0	VS3-025-2-N2D-0	VS3-025-2-N3D-0	68	H4	BX
30	VS3-030-B-N1D-0	VS3-030-B-N2D-0	VS3-030-B-N3D-0	80		
40	VS3-040-B-N1D-0	VS3-040-B-N2D-0	VS3-040-B-N3D-0	104		
50	VS3-050-B-N1D-0	VS3-050-B-N2D-0	VS3-050-B-N3D-0	130	CX	CX
60	VS3-060-B-N1D-0	VS3-060-B-N2D-0	VS3-060-B-N3D-0	154		
75	VS3-075-B-N1D-0	VS3-075-B-N2D-0	VS3-075-B-N3D-0	192		
100	VS3-100-B-N1D-0	VS3-100-B-N2D-0	VS3-100-B-N3D-0	248	DX	DX
125	VS3-125-B-N1D-0	VS3-125-B-N2D-0	VS3-125-B-N3D-0	312		

Table 12: 480 V disconnect drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
1.5	VS3-1D5-4-N1D-0	VS3-1D5-4-N2D-0	VS3-1D5-4-N3D-0	3	H1S	H3X
2	VS3-002-4-N1D-0	VS3-002-4-N2D-0	VS3-002-4-N3D-0	3.4		
3	VS3-003-4-N1D-0	VS3-003-4-N2D-0	VS3-003-4-N3D-0	4.8		
5	VS3-005-4-N1D-0	VS3-005-4-N2D-0	VS3-005-4-N3D-0	7.6		
7.5	VS3-7D5-4-N1D-0	VS3-7D5-4-N2D-0	VS3-7D5-4-N3D-0	11		
10	VS3-010-4-N1D-0	VS3-010-4-N2D-0	VS3-010-4-N3D-0	14	H2	
15	VS3-015-4-N1D-0	VS3-015-4-N2D-0	VS3-015-4-N3D-0	21		
20	VS3-020-4-N1D-0	VS3-020-4-N2D-0	VS3-020-4-N3D-0	27		
25	VS3-025-4-N1D-0	VS3-025-4-N2D-0	VS3-025-4-N3D-0	34	H3	
30	VS3-030-4-N1D-0	VS3-030-4-N2D-0	VS3-030-4-N3D-0	40		
40	VS3-040-4-N1D-0	VS3-040-4-N2D-0	VS3-040-4-N3D-0	52		
50	VS3-050-C-N1D-0	VS3-050-C-N2D-0	VS3-050-C-N3D-0	65	H4	BX
60	VS3-060-C-N1D-0	VS3-060-C-N2D-0	VS3-060-C-N3D-0	77		
75	VS3-075-C-N1D-0	VS3-075-C-N2D-0	VS3-075-C-N3D-0	96		
100	VS3-100-C-N1D-0	VS3-100-C-N2D-0	VS3-100-C-N3D-0	124	CX	CX
125	VS3-125-C-N1D-0	VS3-125-C-N2D-0	VS3-125-C-N3D-0	156		
150	VS3-150-C-N1D-0	VS3-150-C-N2D-0	VS3-150-C-N3D-0	180		
200	VS3-200-C-N1D-0	VS3-200-C-N2D-0	VS3-200-C-N3D-0	240	DX	DX
250	VS3-250-C-N1D-0	VS3-250-C-N2D-0	VS3-250-C-N3D-0	302		

Table 13: 575 V disconnect drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
3	VS3-003-D-N1D-0	VS3-003-D-N2D-0	VS3-003-D-N3D-0	3.9	H1	H3X
5	VS3-005-D-N1D-0	VS3-005-D-N2D-0	VS3-005-D-N3D-0	6.1		
7.5	VS3-7D5-D-N1D-0	VS3-7D5-D-N2D-0	VS3-7D5-D-N3D-0	9		
10	VS3-010-D-N1D-0	VS3-010-D-N2D-0	VS3-010-D-N3D-0	11		
15	VS3-015-D-N1D-0	VS3-015-D-N2D-0	VS3-015-D-N3D-0	17	H2	H3X
20	VS3-020-D-N1D-0	VS3-020-D-N2D-0	VS3-020-D-N3D-0	22		
25	VS3-025-D-N1D-0	VS3-025-D-N2D-0	VS3-025-D-N3D-0	27	H3	
30	VS3-030-D-N1D-0	VS3-030-D-N2D-0	VS3-030-D-N3D-0	32		
40	VS3-040-D-N1D-0	VS3-040-D-N2D-0	VS3-040-D-N3D-0	41		
50	VS3-050-D-N1D-0	VS3-050-D-N2D-0	VS3-050-D-N3D-0	52	H4	BX
60	VS3-060-D-N1D-0	VS3-060-D-N2D-0	VS3-060-D-N3D-0	62		
75	VS3-075-D-N1D-0	VS3-075-D-N2D-0	VS3-075-D-N3D-0	77		
100	VS3-100-D-N1D-0	VS3-100-D-N2D-0	VS3-100-D-N3D-0	99	CX	CX
125	VS3-125-D-N1D-0	VS3-125-D-N2D-0	VS3-125-D-N3D-0	125		
150	VS3-150-D-N1D-0	VS3-150-D-N2D-0	VS3-150-D-N3D-0	144		
200	VS3-200-D-N1D-0	VS3-200-D-N2D-0	VS3-200-D-N3D-0	192	DX	DX
250	VS3-250-D-N1D-0	VS3-250-D-N2D-0	VS3-250-D-N3D-0	242		

Table 14: 208 V bypass drive

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
1	VS3-001-1-N1B-x	VS3-001-1-N2B-x	VS3-001-1-x3B-x	4.6	H1S	H3X
1.5	VS3-1D5-1-N1B-x	VS3-1D5-1-N2B-x	VS3-1D5-1-x3B-x	6.6		
2	VS3-002-1-N1B-x	VS3-002-1-N2B-x	VS3-002-1-x3B-x	7.5		
3	VS3-003-1-N1B-x	VS3-003-1-N2B-x	VS3-003-1-x3B-x	10.6		
5	VS3-005-1-N1B-x	VS3-005-1-N2B-x	VS3-005-1-x3B-x	16.7	H2S	H3X
7.5	VS3-7D5-1-N1B-x	VS3-7D5-1-N2B-x	VS3-7D5-1-x3B-x	24.3		
10	VS3-010-1-N1B-x	VS3-010-1-N2B-x	VS3-010-1-x3B-x	30.8		
15	VS3-015-1-N1B-x	VS3-015-1-N2B-x	VS3-015-1-x3B-x	46.2	H3	
20	VS3-020-1-N1B-x	VS3-020-1-N2B-x	VS3-020-1-x3B-x	59.4		
25	VS3-025-1-N1B-x	VS3-025-1-N2B-x	VS3-025-1-x3B-x	74.8	H4	CX
30	VS3-030-A-N1B-x	VS3-030-A-N2B-x	VS3-030-A-x3B-x	88		
40	VS3-040-A-N1B-x	VS3-040-A-N2B-x	VS3-040-A-x3B-x	114		

					Frame size	
hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	NEMA 1	NEMA 12 and NEMA 3R
50	VS3-050-A-N1B-x	VS3-050-A-N2B-x	VS3-050-A-x3B-x	143	DX	DX
60	VS3-060-A-N1B-x	VS3-060-A-N2B-x	VS3-060-A-x3B-x	169		
75	VS3-075-A-N1B-x	VS3-075-A-N2B-x	VS3-075-A-x3B-x	211		
100	VS3-100-A-N1B-x	VS3-100-A-N2B-x	VS3-100-A-x3B-x	261		

Table 15: 230 V bypass drives

					Frame size	
hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	NEMA 1	NEMA 12 and NEMA 3R
1	VS3-001-2-N1B-x	VS3-001-2-N2B-x	VS3-001-2-x3B-x	4.2	H1S	H3X
1.5	VS3-1D5-2-N1B-x	VS3-1D5-2-N2B-x	VS3-1D5-2-x3B-x	6		
2	VS3-002-2-N1B-x	VS3-002-2-N2B-x	VS3-002-2-x3B-x	6.8		
3	VS3-003-2-N1B-x	VS3-003-2-N2B-x	VS3-003-2-x3B-x	9.6		
5	VS3-005-2-N1B-x	VS3-005-2-N2B-x	VS3-005-2-x3B-x	15.2	H2S	
7.5	VS3-7D5-2-N1B-x	VS3-7D5-2-N2B-x	VS3-7D5-2-x3B-x	22		
10	VS3-010-2-N1B-x	VS3-010-2-N2B-x	VS3-010-2-x3B-x	28		
15	VS3-015-2-N1B-x	VS3-015-2-N2B-x	VS3-015-2-x3B-x	42	H3	
20	VS3-020-2-N1B-x	VS3-020-2-N2B-x	VS3-020-2-x3B-x	54		
25	VS3-025-2-N1B-x	VS3-025-2-N2B-x	VS3-025-2-x3B-x	68	H4	CX
30	VS3-030-B-N1B-x	VS3-030-B-N2B-x	VS3-030-B-x3B-x	80		
40	VS3-040-B-N1B-x	VS3-040-B-N2B-x	VS3-040-B-x3B-x	104		
50	VS3-050-B-N1B-x	VS3-050-B-N2B-x	VS3-050-B-x3B-x	130		
60	VS3-060-B-N1B-x	VS3-060-B-N2B-x	VS3-060-B-x3B-x	154	DX	DX
75	VS3-075-B-N1B-x	VS3-075-B-N2B-x	VS3-075-B-x3B-x	192		
100	VS3-100-B-N1B-x	VS3-100-B-N2B-x	VS3-100-B-x3B-x	248		
125	VS3-125-B-N1B-x	VS3-125-B-N2B-x	VS3-125-B-x3B-x	312		

Table 16: 480 V bypass drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
1.5	VS3-1D5-4-N1B-x	VS3-1D5-4-N2B-x	VS3-1D5-4-x3B-x	3	H1S	H3X
2	VS3-002-4-N1B-x	VS3-002-4-N2B-x	VS3-002-4-x3B-x	3.4		
3	VS3-003-4-N1B-x	VS3-003-4-N2B-x	VS3-003-4-x3B-x	4.8		
5	VS3-005-4-N1B-x	VS3-005-4-N2B-x	VS3-005-4-x3B-x	7.6		
7.5	VS3-7D5-4-N1B-x	VS3-7D5-4-N2B-x	VS3-7D5-4-x3B-x	11		
10	VS3-010-4-N1B-x	VS3-010-4-N2B-x	VS3-010-4-x3B-x	14	H2	
15	VS3-015-4-N1B-x	VS3-015-4-N2B-x	VS3-015-4-x3B-x	21		
20	VS3-020-4-N1B-x	VS3-020-4-N2B-x	VS3-020-4-x3B-x	27		
25	VS3-025-4-N1B-x	VS3-025-4-N2B-x	VS3-025-4-x3B-x	34	H3	
30	VS3-030-4-N1B-x	VS3-030-4-N2B-x	VS3-030-4-x3B-x	40		
40	VS3-040-4-N1B-x	VS3-040-4-N2B-x	VS3-040-4-x3B-x	52		
50	VS3-050-C-N1B-x	VS3-050-C-N2B-x	VS3-050-C-x3B-x	65	H4	CX
60	VS3-060-C-N1B-x	VS3-060-C-N2B-x	VS3-060-C-x3B-x	77		
75	VS3-075-C-N1B-x	VS3-075-C-N2B-x	VS3-075-C-x3B-x	96		
100	VS3-100-C-N1B-x	VS3-100-C-N2B-x	VS3-100-C-x3B-x	124	DX	DX
125	VS3-125-C-N1B-x	VS3-125-C-N2B-x	VS3-125-C-x3B-x	156		
150	VS3-150-C-N1B-x	VS3-150-C-N2B-x	VS3-150-C-x3B-x	180		
200	VS3-200-C-N1B-x	VS3-200-C-N2B-x	VS3-200-C-x3B-x	240		
250	VS3-250-C-N1B-x	VS3-250-C-N2B-x	VS3-250-C-x3B-x	302		

Table 17: 575 V bypass drives

hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	Frame size	
					NEMA 1	NEMA 12 and NEMA 3R
3	VS3-003-D-N1B-x	VS3-003-D-N2B-x	VS3-003-D-x3B-x	3.9	H1	H3X
5	VS3-005-D-N1B-x	VS3-005-D-N2B-x	VS3-005-D-x3B-x	6.1		
7.5	VS3-7D5-D-N1B-x	VS3-7D5-D-N2B-x	VS3-7D5-D-x3B-x	9		
10	VS3-010-D-N1B-x	VS3-010-D-N2B-x	VS3-010-D-x3B-x	11	H2	
15	VS3-015-D-N1B-x	VS3-015-D-N2B-x	VS3-015-D-x3B-x	17		
20	VS3-020-D-N1B-x	VS3-020-D-N2B-x	VS3-020-D-x3B-x	22		
25	VS3-025-D-N1B-x	VS3-025-D-N2B-x	VS3-025-D-x3B-x	27	H3	
30	VS3-030-D-N1B-x	VS3-030-D-N2B-x	VS3-030-D-x3B-x	32		
40	VS3-040-D-N1B-x	VS3-040-D-N2B-x	VS3-040-D-x3B-x	41		
50	VS3-050-D-N1B-x	VS3-050-D-N2B-x	VS3-050-D-x3B-x	52	H4	
60	VS3-060-D-N1B-x	VS3-060-D-N2B-x	VS3-060-D-x3B-x	62		
75	VS3-075-D-N1B-x	VS3-075-D-N2B-x	VS3-075-D-x3B-x	77		

					Frame size	
hp	NEMA 1 (UL Type 1)	NEMA 12 (UL Type 12)	NEMA 3R	Output current (A)	NEMA 1	NEMA 12 and NEMA 3R
100	VS3-100-D-N1B-x	VS3-100-D-N2B-x	VS3-100-D-x3B-x	99	DX	DX
125	VS3-125-D-N1B-x	VS3-125-D-N2B-x	VS3-125-D-x3B-x	125		
150	VS3-150-D-N1B-x	VS3-150-D-N2B-x	VS3-150-D-x3B-x	144		
200	VS3-200-D-N1B-x	VS3-200-D-N2B-x	VS3-200-D-x3B-x	192		
250	VS3-250-D-N1B-x	VS3-250-D-N2B-x	VS3-250-D-x3B-x	242		

Disconnect and bypass drive dimensions

The following dimension diagrams show the different frame sizes and their packaged weight. All measurements are in inches and millimeters. Figure 8, 9, 10, 11, 12, and 14 show the top view of each frame size. The bottom including mounting holes is a mirror image of the top view. Figure 13, 15, 16, 17, 18, 19, and 20 show only the bottom view of each frame size.

Figure 8: H1S 49.3 lbs

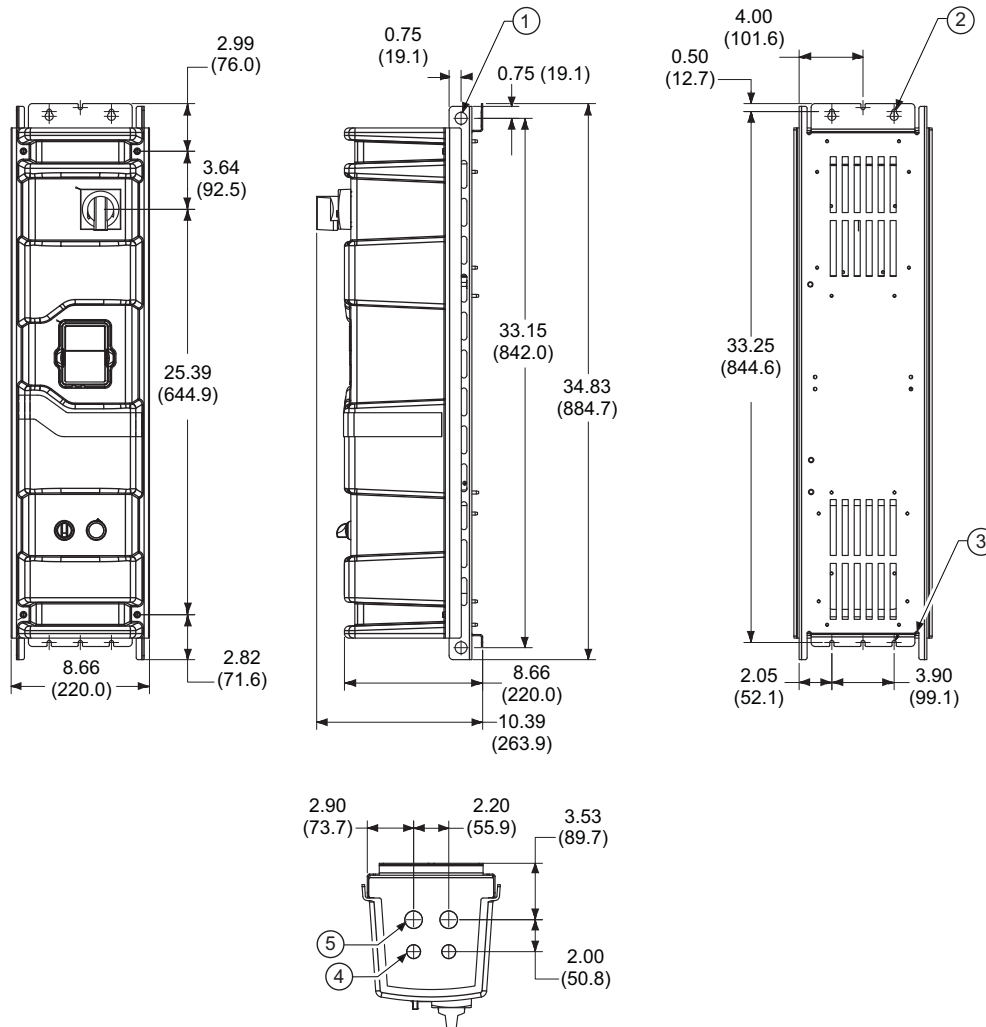


Table 18: Lifting holes and mounting slot diameters of the frame size H1S

Number	Description
1	Ø 0.75 in. (Ø 19.1 mm), lifting holes, four places
2	Ø 0.30 in. (Ø 7.6 mm), mounting slot, two places
3	Ø 0.27 in. (Ø 6.9 mm), mounting slot, two places
4	Ø 0.875 in. (Ø 22.2 mm), two places
5	Ø 1.109 in. (Ø 28.2 mm), two places

Figure 9: H1 62.8 lbs

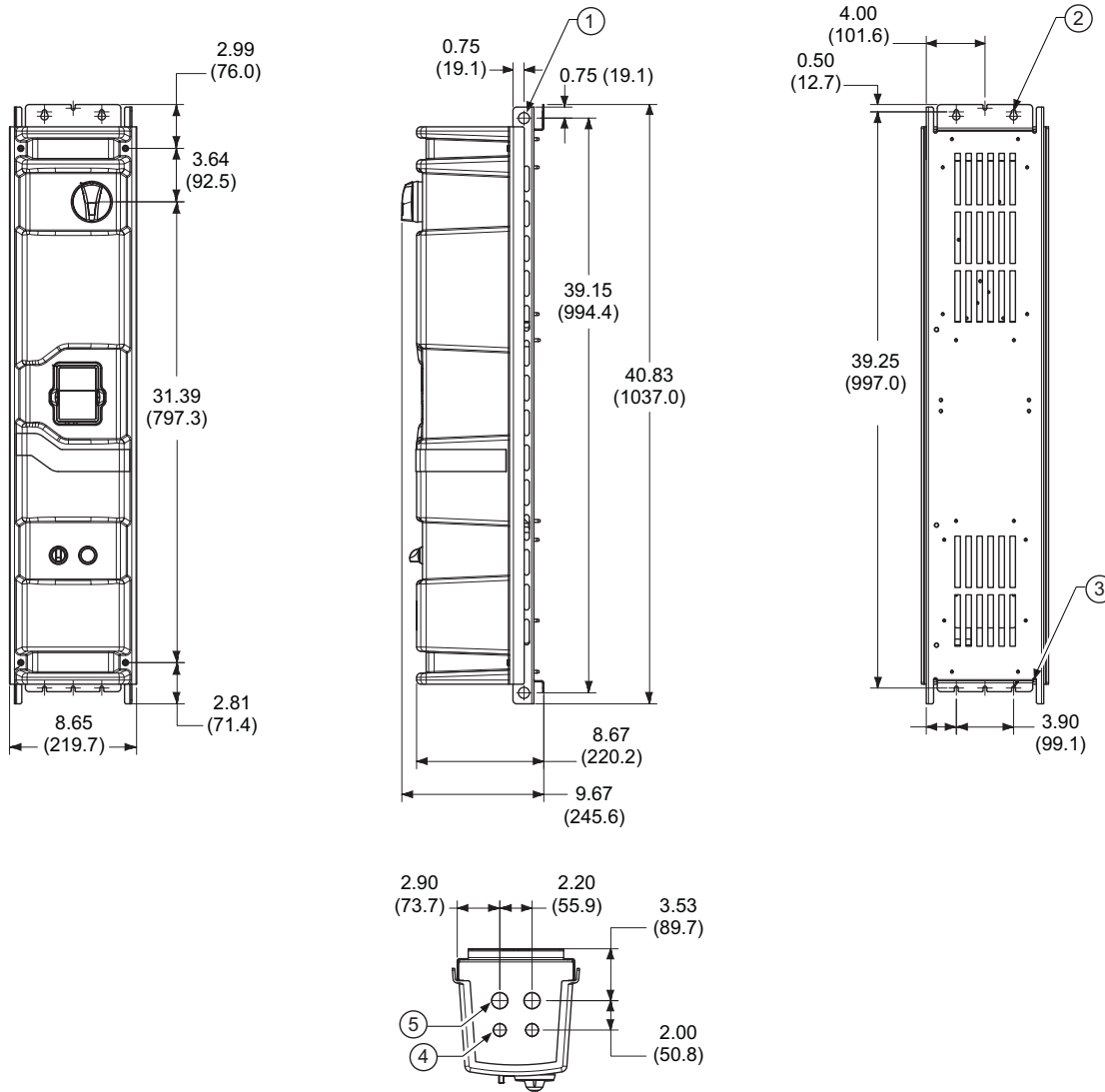


Table 19: Lifting holes and mounting slot diameters of the frame size H1

Number	Description
1	Ø 0.75 in. (Ø 19.1 mm), lifting holes, four places
2	Ø 0.30 in. (Ø 7.6 mm), mounting slot, two places
3	Ø 0.27 in. (Ø 6.9 mm), mounting slot, two places
4	Ø 0.875 in. (Ø 22.2 mm), two places
5	Ø 1.109 in. (Ø 28.2 mm), two places

Figure 10: H2S 66.2 lbs

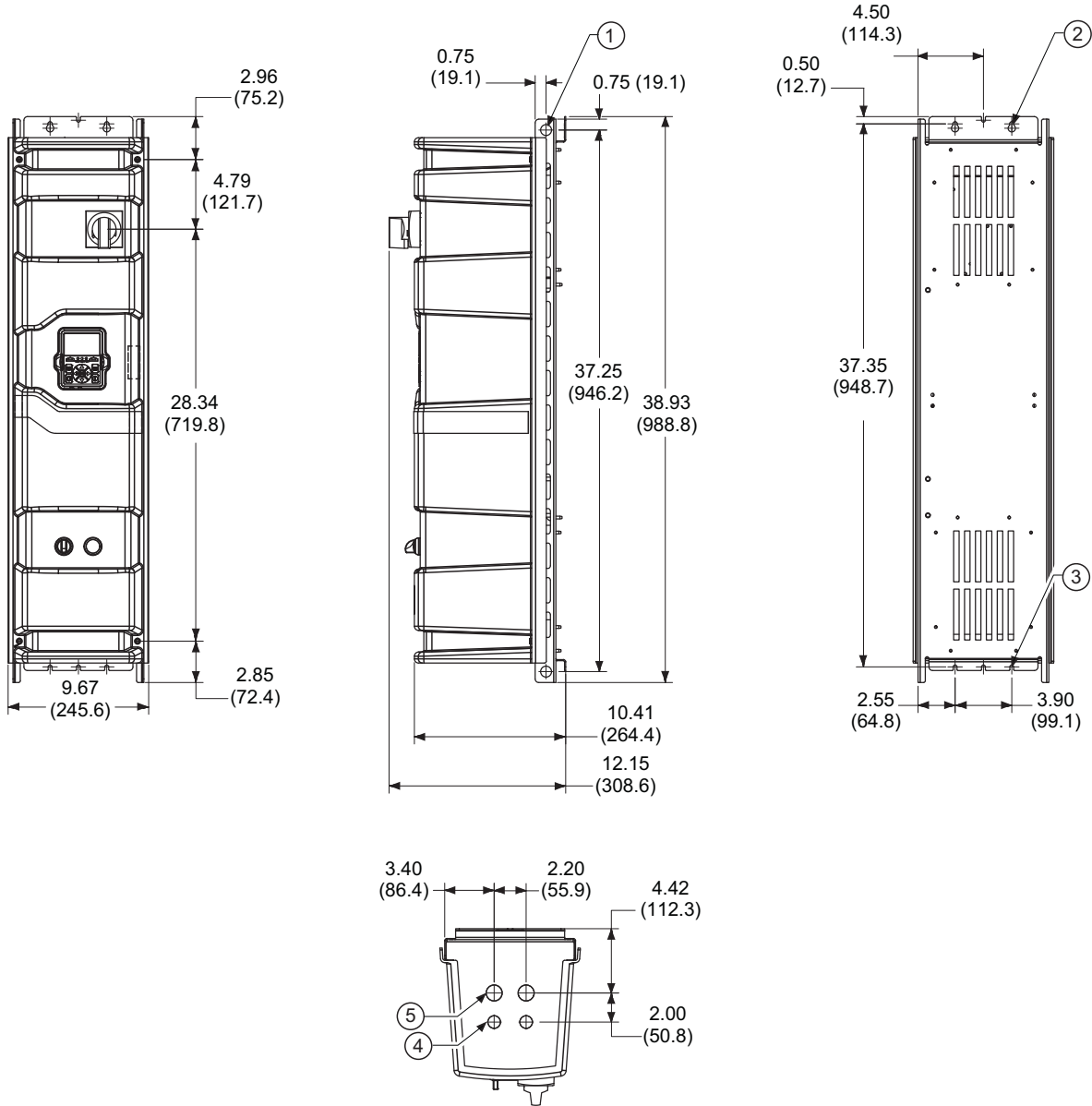


Table 20: Lifting holes and mounting slot diameters of the frame size H2S

Number	Description
1	Ø 0.75 in. (Ø 19.1 mm), lifting holes, four places
2	Ø 0.30 in. (Ø 7.6 mm), mounting slot, two places
3	Ø 0.27 in. (Ø 6.9 mm), mounting slot, two places
4	Ø 0.875 in. (Ø 22.2 mm), two places
5	Ø 1.109 in. (Ø 28.2 mm), two places

Figure 11: H2 63.7 lbs

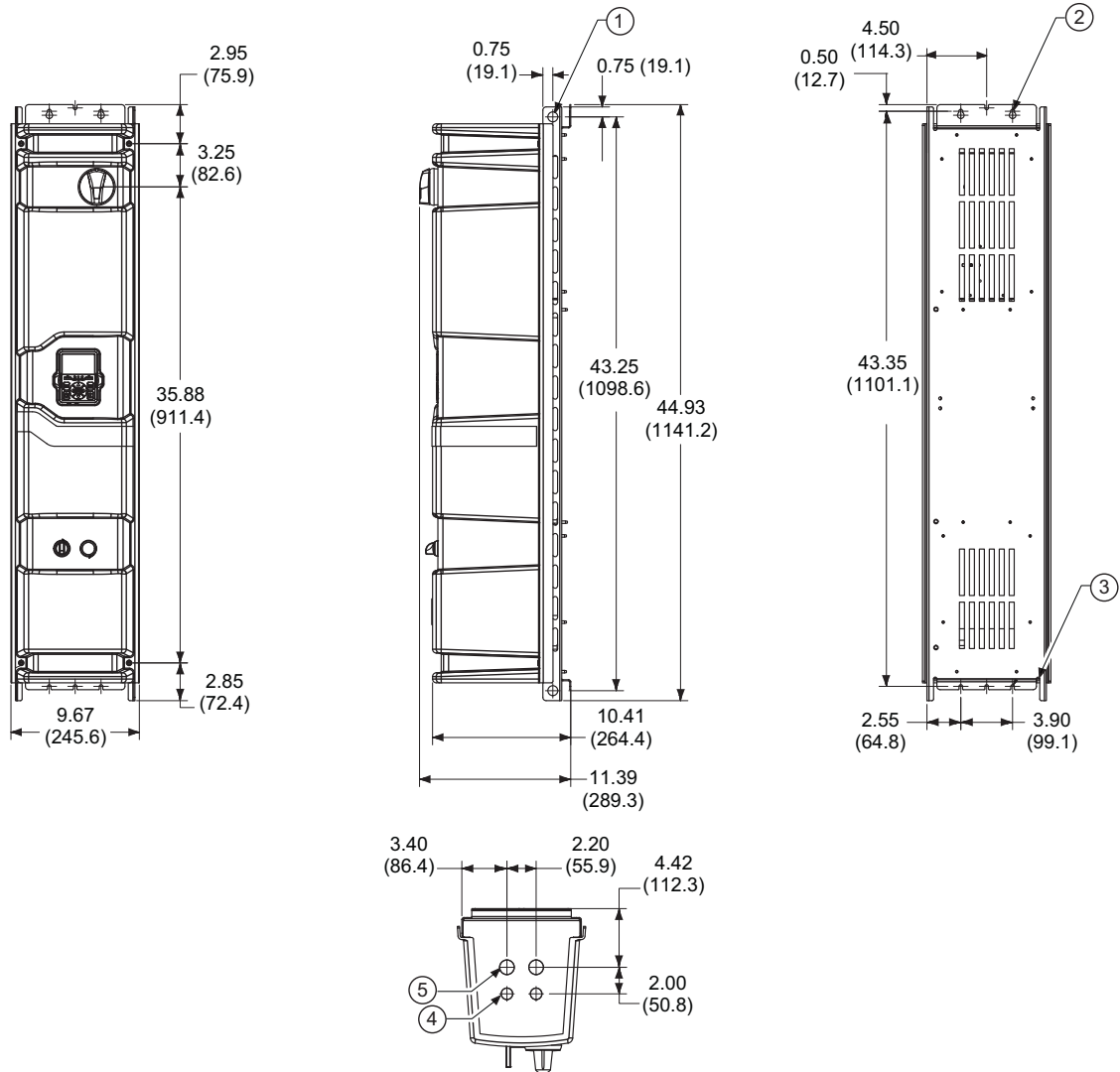


Table 21: Lifting holes and mounting slot diameters of the frame size H2

Number	Description
1	Ø 0.75 in. (Ø 19.1 mm), lifting holes, four places
2	Ø 0.30 in. (Ø 7.6 mm), mounting slot, two places
3	Ø 0.27 in. (Ø 6.9 mm), mounting slot, two places
4	Ø 0.875 in. (Ø 22.2 mm), two places
5	Ø 1.109 in. (Ø 28.2 mm), two places

Figure 12: H3 153 lbs

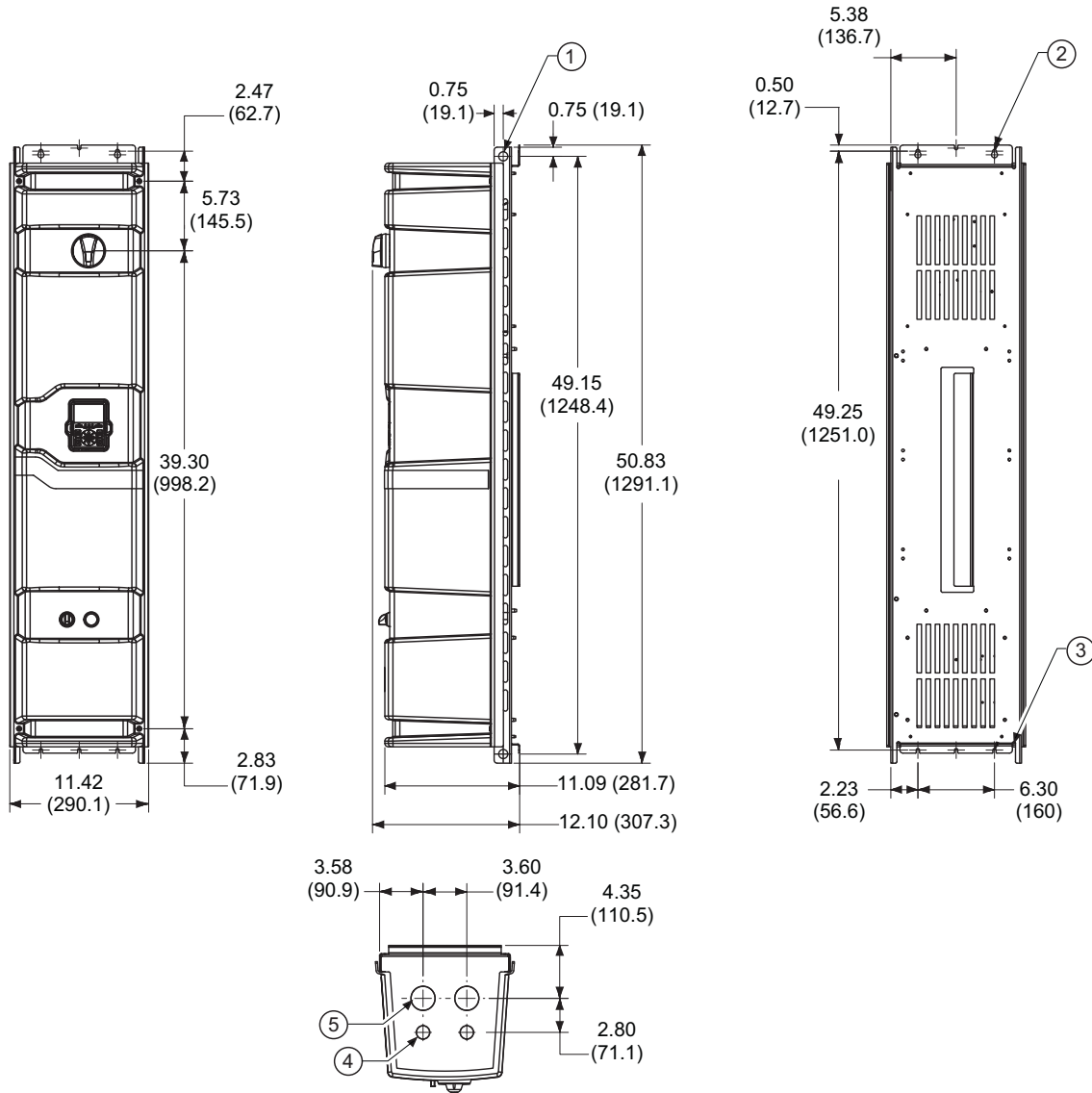


Table 22: Lifting holes and mounting slot diameters of the frame size H3

Number	Description
1	Ø 0.75 in. (Ø 19.1 mm), lifting holes, four places
2	Ø 0.30 in. (Ø 7.6 mm), mounting slot, two places
3	Ø 0.27 in. (Ø 6.9 mm), mounting slot, two places
4	Ø 1.109 in. (Ø 28.2 mm), two places
5	Ø 1.984 in. (Ø 50.4 mm), two places

Figure 13: H3X Type 12 206 lbs; Type 3R 216 lbs

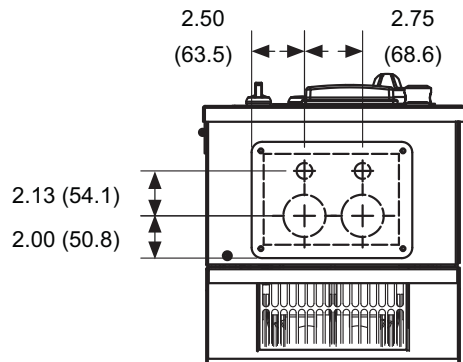
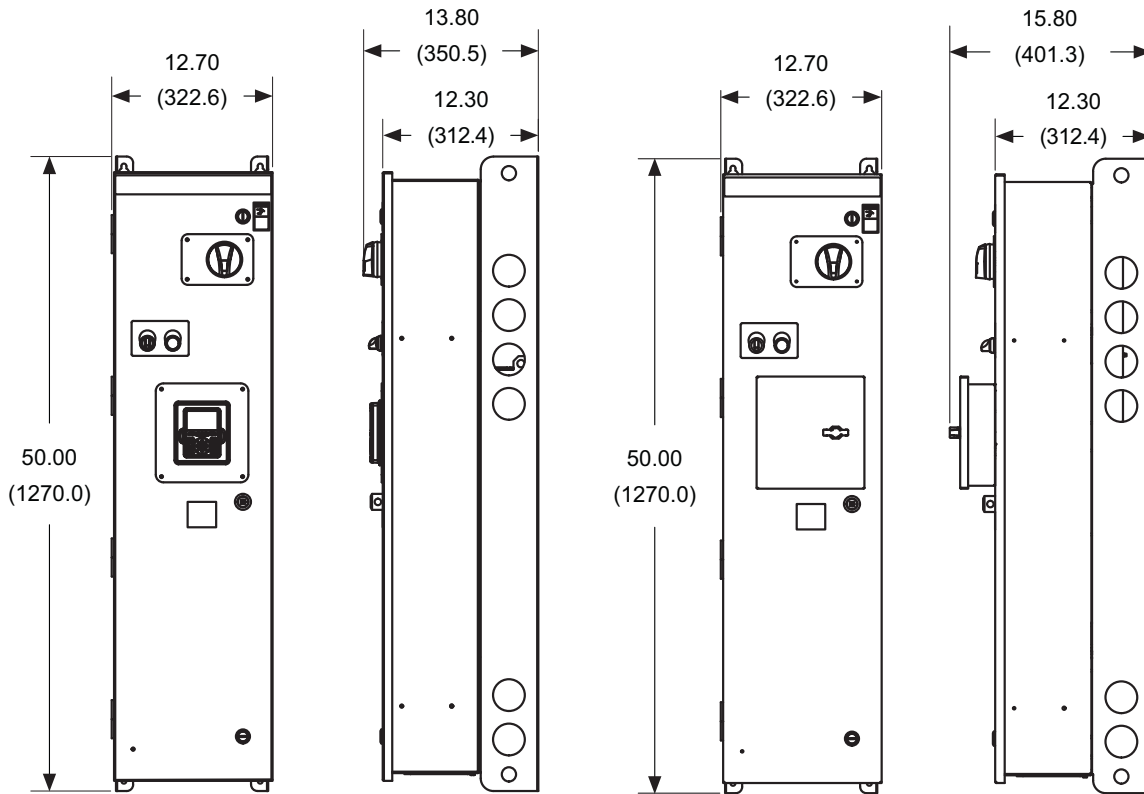


Figure 14: H4 215 lbs

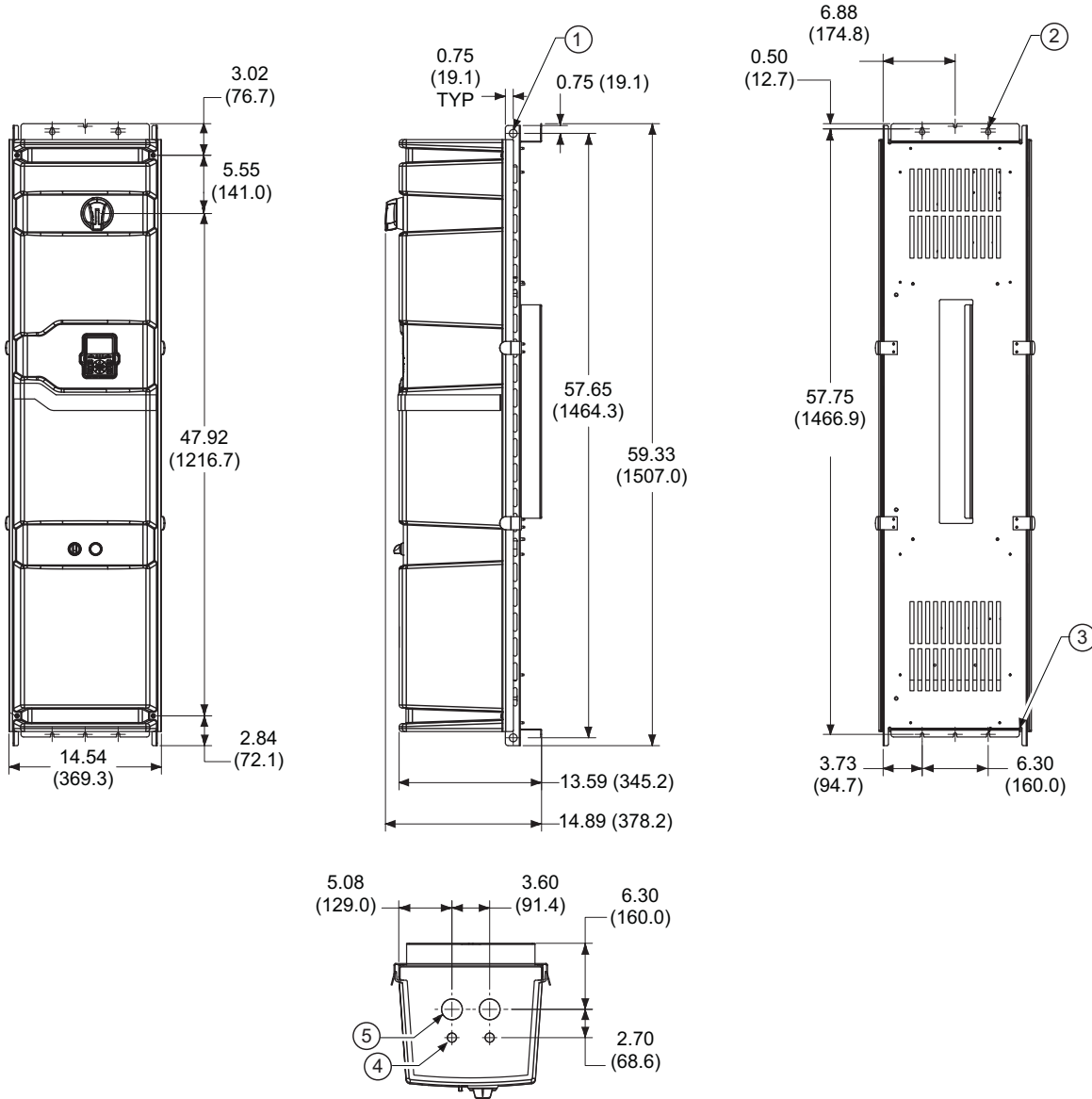


Table 23: Lifting holes and mounting slot diameters of the frame size H4

Number	Description
1	Ø 0.75 in. (Ø 19.1 mm), lifting holes, four places
2	Ø 0.30 in. (Ø 7.6 mm), mounting slot, two places
3	Ø 0.27 in. (Ø 6.9 mm), mounting slot, two places
4	Ø 0.875 in. (Ø 22.2 mm), two places
5	Ø 1.984 in. (Ø 50.4 mm), two places

Figure 15: BX Type 12 311 lbs

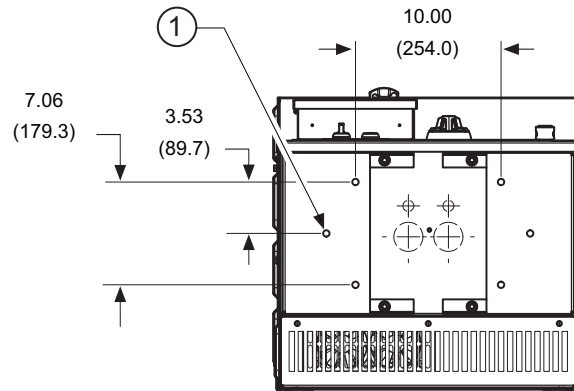
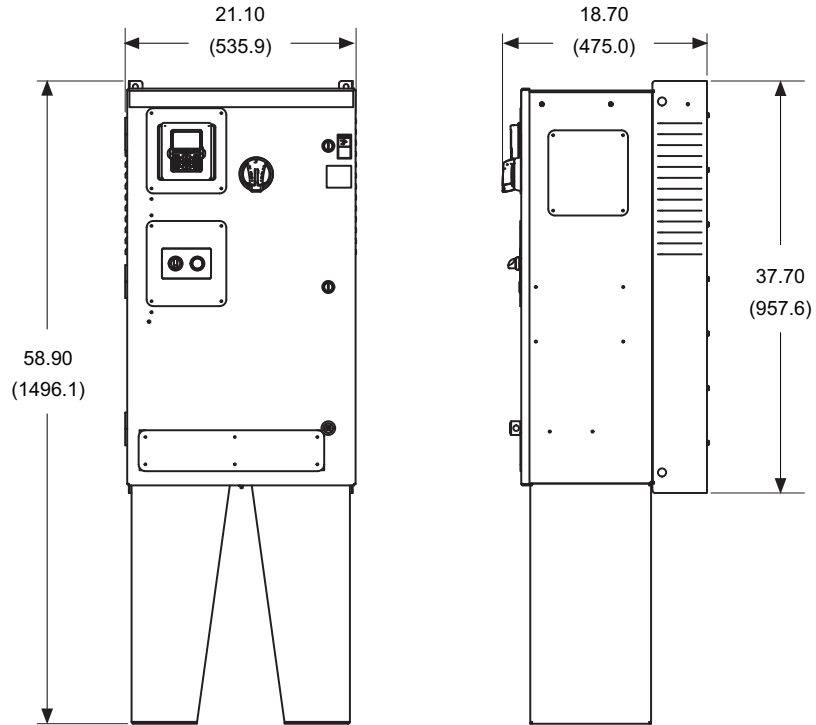


Table 24: Mounting slot diameter of the frame size BX Type 12

Number	Description
1	Ø 0.44 in. (Ø 11.2 mm), mounting for six 3/8 hex hd bolts

Figure 16: BX Type 3R 335 lbs

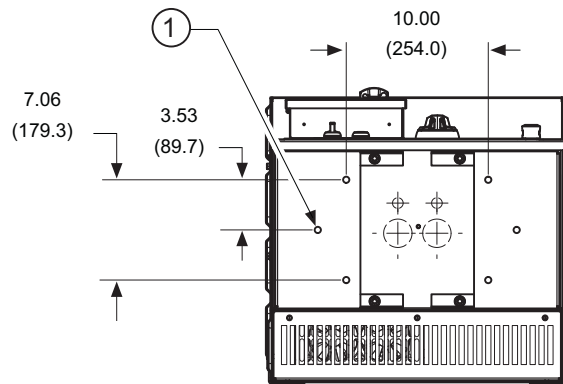
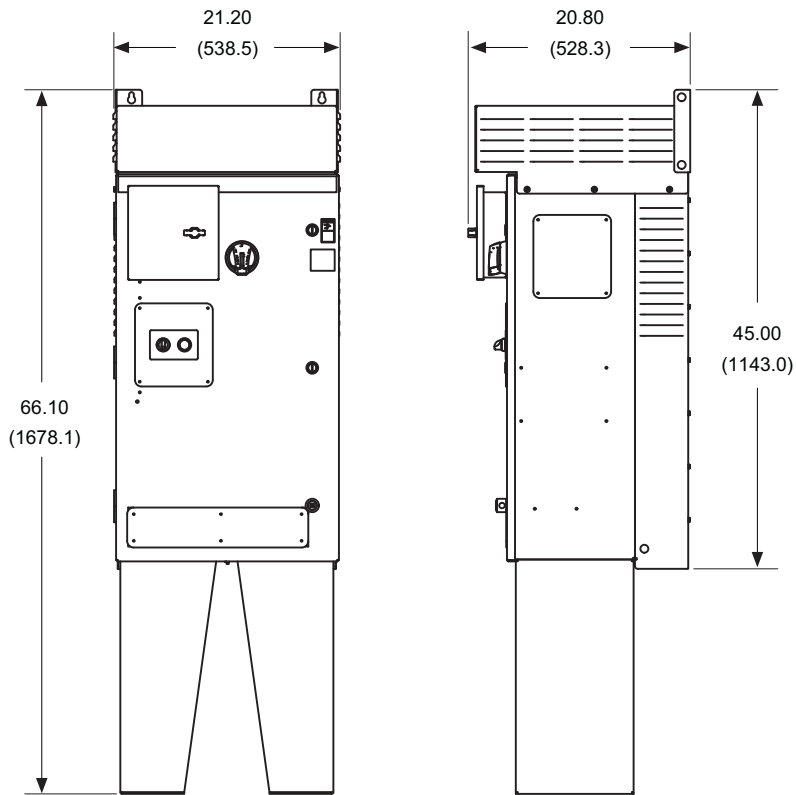


Table 25: Mounting slot diameter of the frame size BX Type 3R

Number	Description
1	Ø 0.44 in. (Ø 11.2 mm), mounting for six 3/8 hex hd bolts

Figure 17: CX Type 1 and CX Type 12 536 lbs

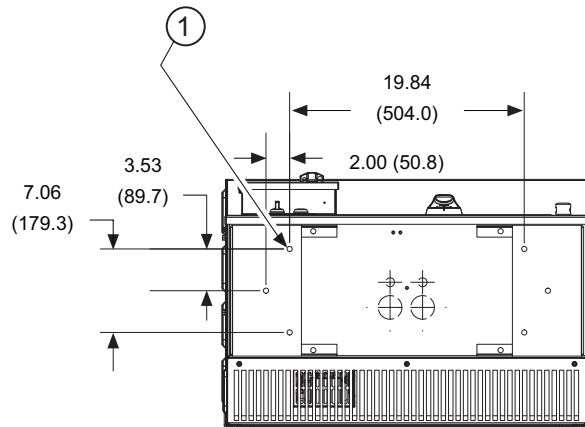
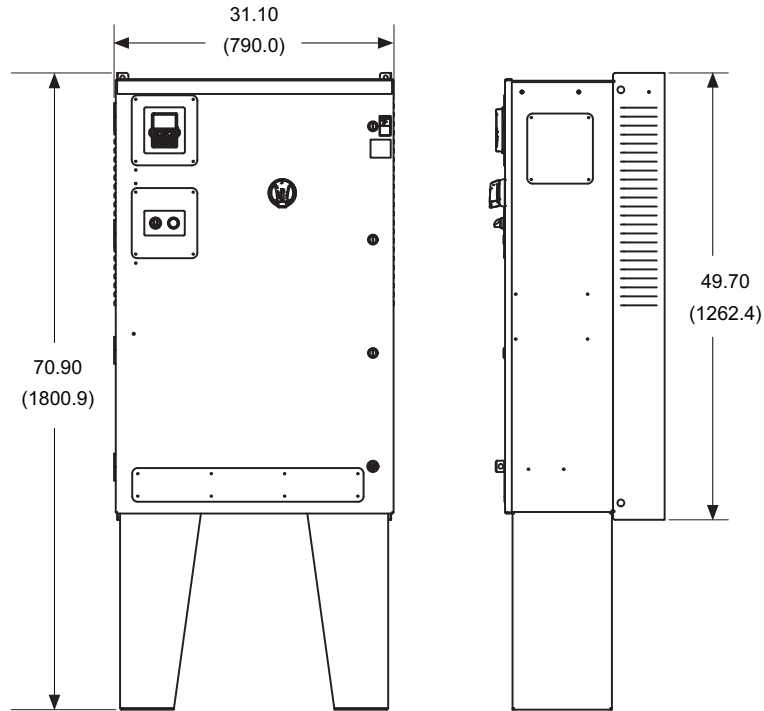


Table 26: Mounting slot diameter of the frame size CX Type 1 and the CX Type 12

Number	Description
1	Ø 0.44 in. (Ø 11.2 mm), mounting for six 3/8 hex hd bolts

Figure 18: CX Type 3R 560 lbs

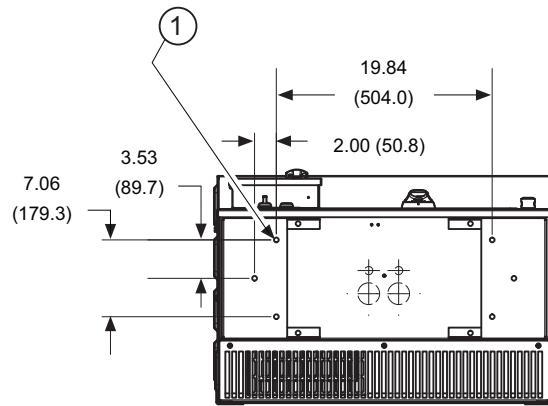
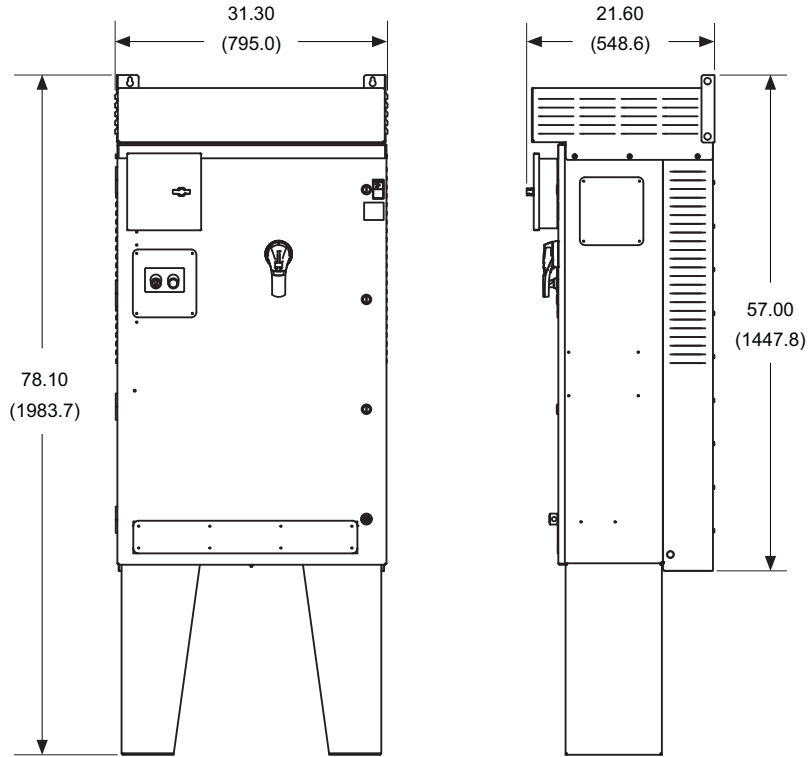


Table 27: Mounting slot diameter of the frame size CX Type 3R

Number	Description
1	Ø 0.44 in. (Ø 11.2 mm), mounting for six 3/8 hex hd bolts

Figure 19: DX Type 1 and DX Type 12 1003 lbs

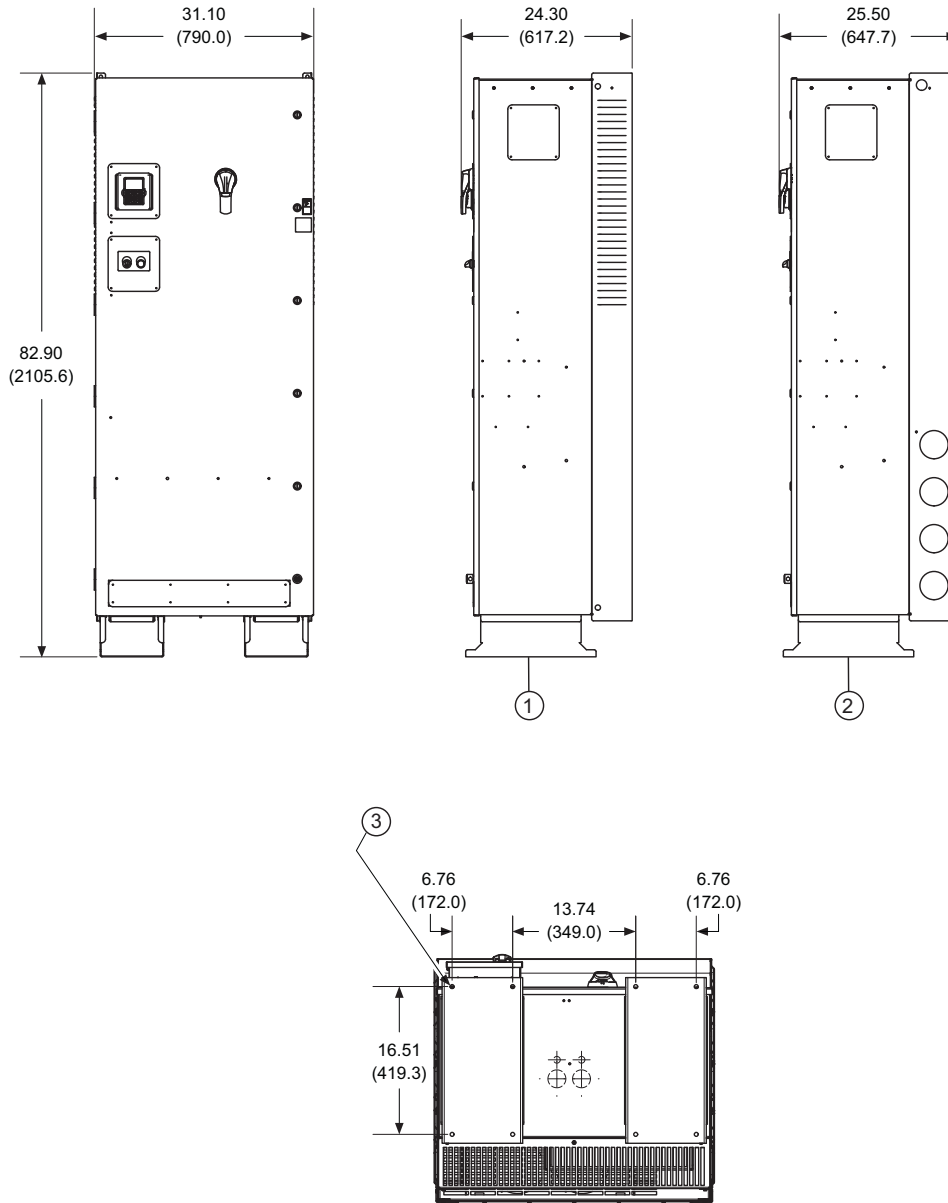


Table 28: Mounting slot diameter of the frame size DX Type 1 and DX Type 12

Number	Description
1	Frame 5
2	Frame 6
3	Ø 0.44 in. (Ø 11.2 mm), mounting for six 3/8 hex hd bolts

Figure 20: DX Type 3R 1053 lbs

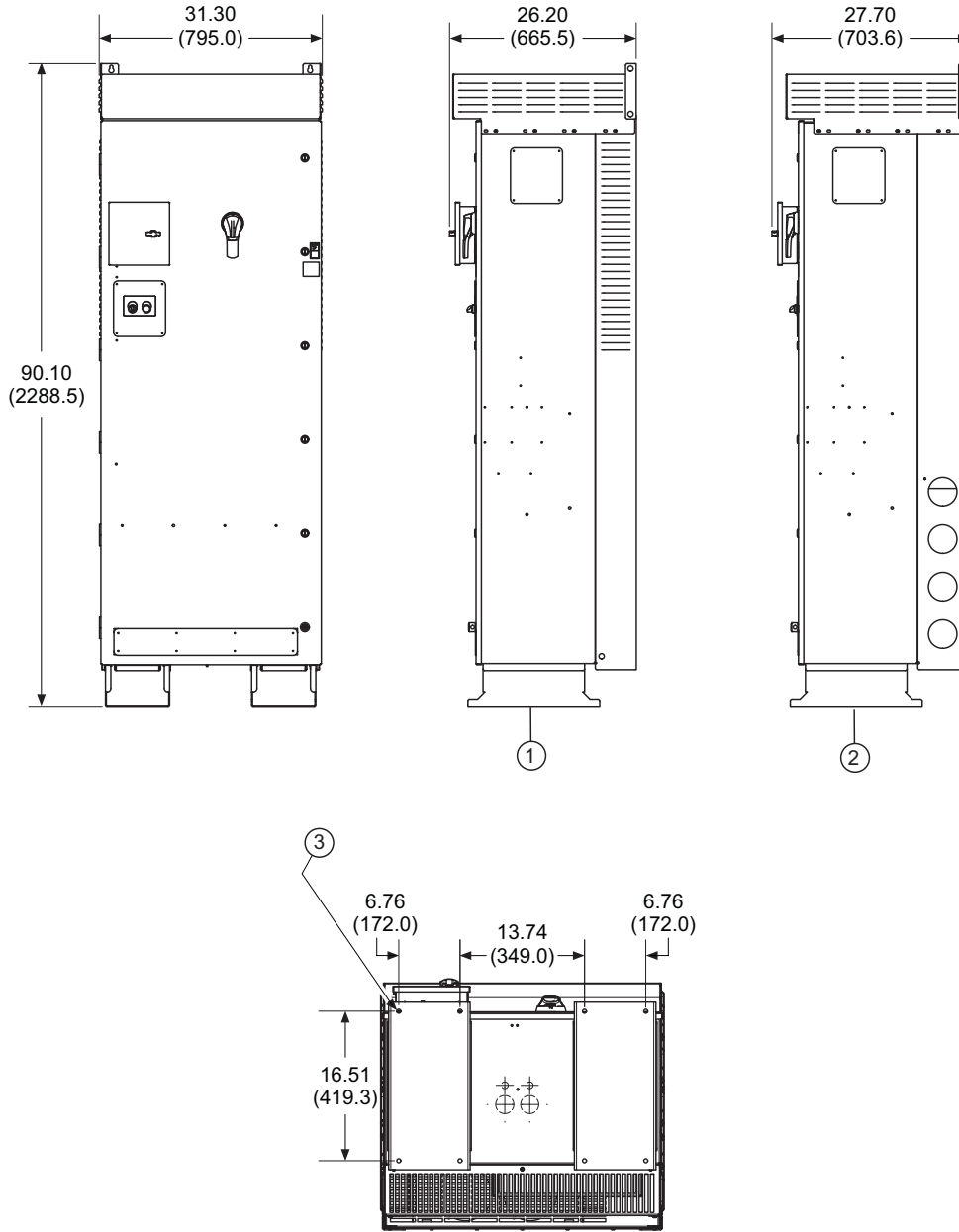


Table 29: Frame sizes and mounting slot diameter

Number	Description
1	Frame 5
2	Frame 6
3	Ø 0.44 in. (Ø 11.2 mm), mounting for six 3/8 hex hd bolts

Typical enclosed drive configuration

Figure 21: Bypass model

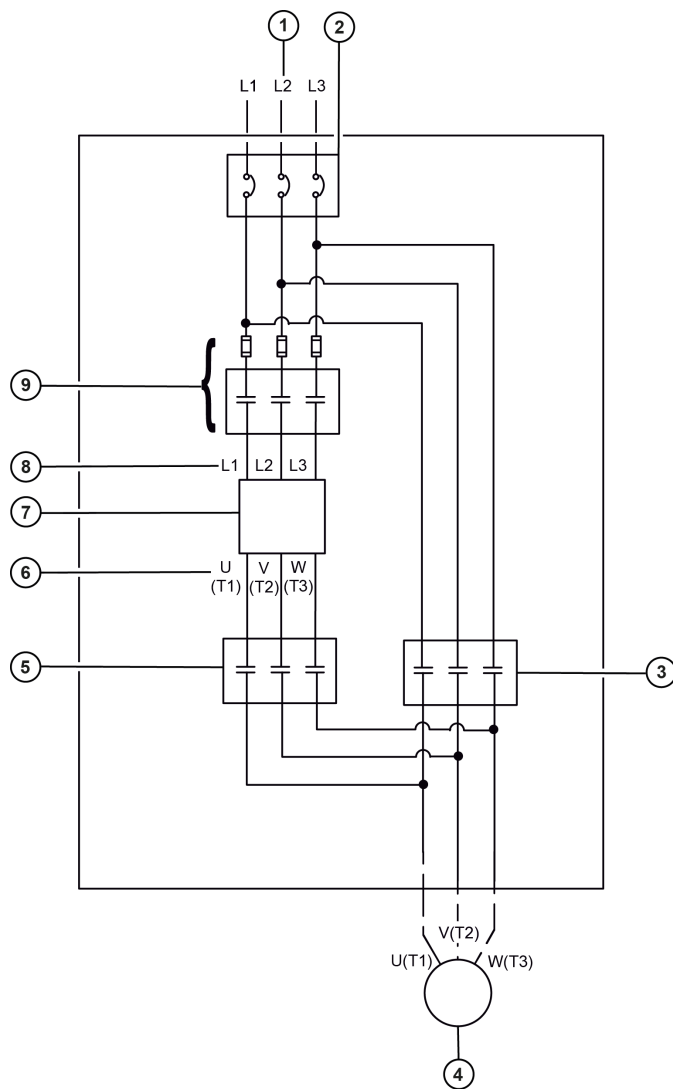


Table 30: IntelliPass Power and motor terminal wiring

Number	Description
1	Incoming power
2	Circuit breaker or disconnect (manual motor protector)
3	Bypass contactor
4	Motor
5	Output contactor
6	Output
7	Drive
8	Input
9	Optional fuse or drive input contactor

Figure 22: Disconnect model

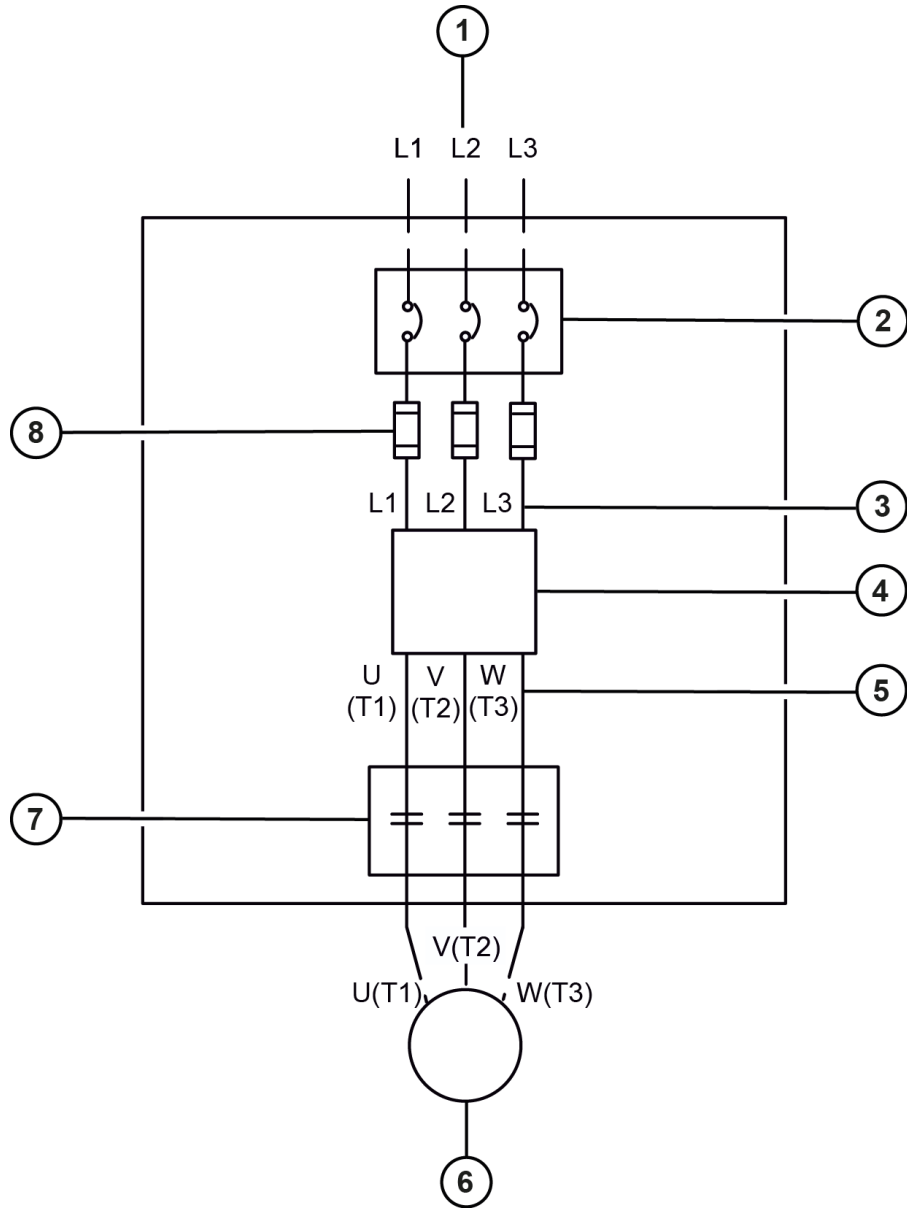


Table 31: IntelliDisconnect power wiring

Number	Description
1	Incoming power
2	Circuit breaker or disconnect (manual motor protector)
3	Input
4	Drive
5	Output
6	Motor
7	Optional output contactor
8	Optional fuses

Factory-set control terminal functions

Table 32: I/O connection

Pin	Signal name	Signal	Default setting	Description
1	+10 V	Reference output voltage	—	10 VDC supply source
2	AI1+	Analog input 1	0 V – 10 V	Voltage speed reference Programmable to 4 mA – 20 mA
3	AI1–	Analog input 1 ground	—	Analog input 1 common Ground
4	AI2+	Analog input 2	4 mA – 20 mA	Current speed reference Programmable to 0 V – 10 V
5	AI2–	Analog input 2 ground	—	Analog input 2 common Ground
6	GND	I/O signal ground	—	I/O ground for reference and control
7	DIN5	Digital input 5	Preset speed B0	Sets frequency output to preset speed 1
8	DIN6	Digital input 6	Preset speed B1	Sets frequency output to preset speed 2
9	DIN7	Digital input 7	—	—
10	DIN8	Digital input 8	Force remote	Input takes variable-frequency drive (VFD) from local to remote
11	CMB	DI5 to DI8 common	Grounded	Allows source input
12	GND	I/O signal ground	—	I/O ground for reference and control
13	24 V	+24 VDC output	—	Control voltage output 100 mA max
14	DO1	Digital output 1	Ready	Shows the drive is ready to run
15	24 Vo	+24 VDC output	—	Control voltage output 100 mA max
16	GND	I/O signal ground	—	I/O ground for reference and control
17	AO1+	Analog output 1	Output frequency	Shows output frequency to motor 0 Hz – 60 Hz 4 mA – 20 mA
18	AO2+	Analog output 2	Motor current	Shows motor current of motor 0 to FLA 4 mA – 20 mA
19	24 Vi	+24 VDC input	—	External control voltage input
20	DIN1	Digital input 1	Run forward	Input starts drive in forward direction Start enable
21	DIN2	Digital input 2	Run reverse	Input starts drive in reverse direction Start enable
22	DIN3	Digital input 3	External fault	Input causes drive to fault
23	DIN4	Digital input 4	Fault reset	Input resets active faults
24	CMA	DI1 to DI4 common	Grounded	Allows source input
25	A	RS-485 signal A	—	Fieldbus communication Modbus, BACnet
26	B	RS-485 signal B	—	Fieldbus communication Modbus, BACnet
27	R3NO	Relay 3 normally open	At speed	Relay output 3 shows VFD is at reference frequency

Table 32: I/O connection (Continued)

Pin	Signal name	Signal	Default setting	Description
28	R1NC	Relay 1 normally closed	Run	Relay output 1 shows VFD is in a run state
29	R1CM	Relay 1 common		
30	R1NO	Relay 1 normally open		
31	R3CM	Relay 3 common	At speed	Relay output 3 shows VFD is at reference frequency
32	R2NC	Relay 2 normally closed	Fault	Relay output 2 shows VFD is in a fault state
33	R2CM	Relay 2 common		
34	R2NO	Relay 2 normally open		

Figure 23: Variable Speed Drives Series III keypad

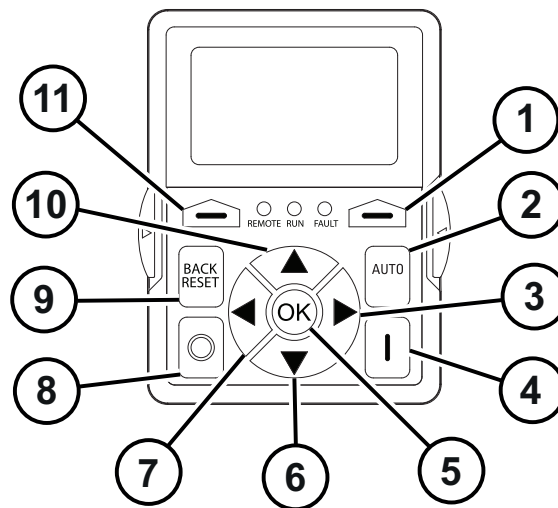


Table 33: VSD Series III keypad buttons

Number	Button
1	Programmable soft key 2
2	Auto control place select
3	Move cursor right
4	Start or Hand button
5	Enter Menu or confirm selection
6	Decrease value or scroll down in menu
7	Move cursor left
8	Stop or Off button
9	Back or Reset button
10	Increase value or scroll up in menu
11	Programmable soft key 1

Variable Speed Drives Series III open drive technical specifications

Attribute	Description	Specification
Input ratings	Input voltage U_{in}	208 V – 240 V, 380 V – 500 V – 600 V, -15% to 10%
	Input frequency	50 Hz – 60 Hz Variation up to 45 Hz – 66 Hz
	Connection to power	Once per minute or less
	Starting delay	3 s for Frame 1 to Frame 2, 4 s for Frame 3, 5 s for Frame 4, 6 s for Frame 5 and Frame 6
	Short-circuit withstand rating	100 kilo ampere interrupting capacity (kAIC); 5 kAIC without fuses or breakers
Output ratings	Output voltage	0 to U_{in}
	Continuous output current	I_L : ambient temperature maximum 104°F (40°C), up to 140°F (60°C) with derating, overload 1.1 x I_L (1 min/10 min)
	Overload current	110% for variable torque
	Initial output current	200% (2 s/20 s)
	Output frequency	0 Hz – 400 Hz
	Frequency resolution	0.01 Hz
Control characteristics	Control methods	Frequency control Speed control Open-loop speed control Open-loop torque control
	Switching frequency	230 V/480 V range: Frame 1 to Frame 3: 1 kHz – 12 kHz Frame 4 to Frame 6: 1 kHz – 10 kHz 230 V/480 V defaults: Frame 1 to Frame 3: 4 kHz Frame 4 to Frame 5: 3.6 kHz Frame 6: 2 kHz 575 V range: Frame 1 to Frame 6: 1 kHz – 6 kHz 575 V defaults: Frame 1 to Frame 4: 3 kHz Frame 5 to Frame 6: 2 kHz Automatic switching frequency derating in case of overload.
	Frequency reference	Analog input: resolution 0.1% (10-bit), accuracy +1% Analog output: resolution 0.1% (10-bit), accuracy +1% Panel reference: resolution 0.01 Hz
	Field weakening point	20 Hz – 400 Hz
	Acceleration time	0.1 s – 3000 s
	Deceleration time	0.1 s – 3000 s
	Braking torque	DC brake 30% x motor rated torque (T_n) (without brake chopper) Dynamic braking (with optional brake chopper using an external brake resistor): 100% continuous maximum rating

Attribute	Description	Specification
Ambient conditions	Ambient operating temperature	14°F or no frost to 122°F, up to 140°F (-10°C or no frost to 50°C, up to 60°C) with derating constant torque (CT) 14°F or no frost to 122°F, up to 140°F (-10°C or no frost to 40°C, up to 60°C) with derating variable torque (VT)
	Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Relative humidity	0% - 95% RH, noncondensing, non-corrosive
	Air quality: • Chemical vapors • Mechanical particles	Tested according to IEC 600068-2-60 test key: Flowing mixed gas corrosion test, Method 1 (H ₂ S [hydrogen sulfide] and SO ₂ [sulfur dioxide]) Designed according to: IEC 60721-3-3, unit in operation, class 3C2 IEC 60721-3-3, unit in operation, class 3S2
	Altitude	100% load capacity without 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) 2000 m for corner grounded earth main systems For 575 V product, maximum altitude is 6561 ft (2000 m) regardless of main system
	Vibration: • EN 61800-5-1 • EN 60668-2-6	5 Hz – 150 Hz Displacement amplitude: 1 mm; peak at 5 Hz –15.8 Hz Frame 1 to Frame 6 Maximum acceleration amplitude: 1 g at 15.8 Hz – 150 Hz Frame 1 to Frame 6
	Shock: • ISTA 1 A • EN 60068-2-27	Storage and shipping: maximum 15 g, 11 ms in package
	Overvoltage	Overvoltage category III
	Pollution degree	Pollution degree 2
	Enclosure class for open drives and drive only models	IP21/Type 1 standard in entire kW/hp range IP54/Type 12 option Note: Keypad or keypad hole plug required to be mounted in drive for IP54/Type 12 rating
	Immunity	Fulfills EN 61800-3 (2004), first and second environment
	MTBF	Frame 1: 165,457 hours Frame 2: 134,833 hours Frame 3: 102,515 hours Frame 4: 121,567 hours Frame 5: 108,189 hours Frame 6: 100,000 hours
	Noise	Frame 1: 51.2 dB Frame 2: 58.6 dB Frame 3: 61 dB Frame 4: 68 dB Frame 5: 69.1 dB Frame 6: 73.2 dB
Standards	Safety	UL 508C, CSA C22.2 No. 274-13 and EN 61800-5-1

Attribute	Description	Specification
	EMC	FCC Part 15 Subpart B, ICES-003 and EN 618000-3, Category C2 The drive can be modified for IT networks and corner grounding TN system
	Electrostatic discharge	Second environment, IEC 61000-4-2, 4 kV CD or 8 kV AD, Criterion B
	Fast transient burst	Second environment, IEC 61000-4-4, 2 kV/5 kHz, Criterion B
	Dielectrical strength	Primary to secondary: 3600 VAC/5100 VDC
	Approvals	RCM, RoHS, CE, UL and cUL (see nameplate for more detailed approvals)
Fieldbus connections		Onboard: BACnet/IP, BACnet MS/TP, Modbus TCP, Modbus RTU



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