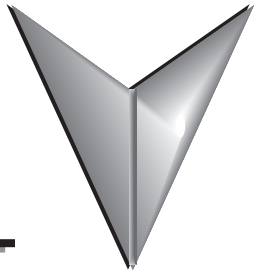
ACCESSORIES



APPENDIX

A

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Line/Load Reactors

When the GS4 drive is connected directly to a large-capacity power transformer (600kVA or above) or when a power correction capacitor is switched on, excessive peak currents may occur in the input power circuit resulting in damage to the GS4 drive.

To avoid this, it is recommended to install a line reactor in series with the GS4 drive on the input side. The installation of a line reactor will reduce input current peaks and improve the output power efficiency.

Line (load) reactors installed on the output side protect the motor insulation against AC drive short circuits and IGBT reflective wave damage, and also allow the motor to run cooler by "smoothing" the motor current waveform. They are recommended for operating "non-inverter-duty" motors, and for any motors where the length of wiring between the AC drive and motor is less than or equal to 100 feet. For AC drive-to-motor wiring distances over 100 feet, use of the VTF series output filter is recommended.

Line/Load Reactors Selection Charts

Supply: 230V, 1Ø, 50/60 Hz (*Constant* Torque; reactor installed *Line* Side)					
GS4 Model	***Derated Output (hp) (1)***	***CT: 1Ø Input Amps (rms) (2)***	***Saturation Amps (rms)***	***Max Motor kW***	***Line Reactor***
GS4-21P0	0.5	4.2	7.6	0.37	***LR-20P5-1PH (3) LR2-20P5-1PH***
GS4-22P0	0.75	5.6	10.1	0.55	***LR-21P0-1PH***
GS4-23P0	1	8.7	15.7	0.75	***LR-21P0-1PH***
GS4-25P0	2	14	25	1.5	***LR-22P0-1PH***
GS4-27P5	3	19	34	2.2	***LR-23P0-1PH***
GS4-2010	3	19	34	2.2	***LR-23P0-1PH***
GS4-2015	5	30	54	3.7	***LR-2010***
GS4-2020	7.5	43	77	5.5	***LR-2015***
GS4-2025	10	57	103	7.5	***LR-2020***
GS4-2030	10	57	103	7.5	***LR-2020***
GS4-2040	10	57	103	7.5	***LR-2020***
GS4-2050	10	57	103	7.5	***LR-2020***
GS4-2060	15	85	153	11	***LR-2025***
GS4-2075	20	113	203	15	***LR-2040***
GS4-2100	25	130	234	18.5	***LR-2050***

1) Drive output HP is derated when supplied single phase.
2) Amperage ratings expressed in the column CT: 1Ph Input Amps (rms) are with a line reactor installed on the line side of the drive.
3) This reactor is recommended for existing installations only; product will be discontinued after existing stock is depleted.

Supply: 230V, 1Ø, 50/60 Hz (*Constant* Torque; reactor installed *Load* Side)					
GS4 Model	***Derated Output (hp) (1)***	***CT: 3Ø Output Amps (rms) (2)***	***Saturation Amps (rms)***	***Max Motor kW***	***Line Reactor***
GS4-21P0	0.5	2.4	4.3	0.37	***LR-20P5 (3) LR2-20P5***
GS4-22P0	0.75	3.2	5.8	0.55	***LR-21P0 (3) LR2-21P0***
GS4-23P0	1	5.0	9.0	0.75	***LR-21P0 (3) LR2-21P0***
GS4-25P0	2	8	14	1.5	***LR-23P0***
GS4-27P5	3	11	20	2.2	***LR-23P0***
GS4-2010	3	11	20	2.2	***LR-23P0***
GS4-2015	5	17	31	3.7	***LR-25P0***
GS4-2020	7.5	25	45	5.5	***LR-27P5***
GS4-2025	10	33	59	7.5	***LR-2010***
GS4-2030	10	33	59	7.5	***LR-2010***
GS4-2040	10	33	59	7.5	***LR-2010***
GS4-2050	10	33	59	7.5	***LR-2010***
GS4-2060	15	49	88	11	***LR-2015***
GS4-2075	20	65	117	15	***LR-2020***
GS4-2100	25	75	135	18.5	***LR-2025***

1) Drive output HP is derated when supplied single phase.
2) Amperage ratings are 3-phase output reactor ratings when the drive is supplied with a single-phase input.
3) This reactor is recommended for existing installations only; product will be discontinued after existing stock is depleted.

LINE/LOAD REACTORS SELECTION CHARTS (CONTINUED)

Supply: 230V, 3Ø, 50/60 Hz (*Variable* Torque; reactor installed *Line* or *Load* Side)					
GS4 Model	**Drive hp**	**VT: 3Ø Output Amps (rms)**	**Saturation Amps (rms)**	**Max Motor kW**	**Line Reactor**
GS4-21P0	1	5	8.7	0.75	**LR-21P0 (1) LR2-21P0**
GS4-22P0	2	8	12.8	1.5	**LR-23P0 (2)**
GS4-23P0	3	11	18	2.2	**LR-23P0**
GS4-25P0	5	17	29	3.7	**LR-25P0**
GS4-27P5	7.5	25	43	5.5	**LR-27P5**
GS4-2010	10	33	56	7.5	**LR-2010**
GS4-2015	15	49	85	11	**LR-2015**
GS4-2020	20	65	112	15	**LR-2020**
GS4-2025	25	75	128	18.5	**LR-2025**
GS4-2030	30	90	155	22	**LR-2040 (2)**
GS4-2040	40	120	205	30	**LR-2040**
GS4-2050	50	146	250	37	**LR-2050**
GS4-2060	60	180	308	45	**LR-2060**
GS4-2075	75	215	367	55	**LR-2075**
GS4-2100	100	255	436	75	**LR-2100**

1) This reactor is recommended for existing installations only; product will be discontinued after existing stock is depleted.
2) Some GS4 drive and reactor combinations do not fit the typical "pattern" of having similar part numbers, due to some GS4 models having higher outputs than previous GS DURApulse drives.

Supply: *460V*, 3Ø, 50/60 Hz (*Variable* Torque; reactor installed *Line* or *Load* Side)					
GS4 Model	**Drive hp**	**VT: 3Ø Output Amps (rms)**	**Saturation Amps (rms)**	**Max Motor kW**	**Line Reactor**
GS4-41P0	1	3	5.2	0.75	**LR-41P0 (1) LR2-41P0**
GS4-42P0	2	4	6.8	1.5	**LR-42P0 (1) LR2-42P0**
GS4-43P0	3	6	10.3	2.2	**LR-43P0 (1) LR2-43P0**
GS4-45P0	5	9	14.6	3.7	**LR-45P0 (1) LR2-45P0**
GS4-47P5	7.5	12	20	5.5	**LR-47P5 (1) LR2-47P5**
GS4-4010	10	18	31	7.5	**LR-4010**
GS4-4015	15	24	41	11	**LR-4015**
GS4-4020	20	32	54	15	**LR-4020**
GS4-4025	25	38	65	18.5	**LR-4025**
GS4-4030	30	45	77	22	**LR-4030**
GS4-4040	40	60	103	30	**LR-4040**
GS4-4050	50	73	124	37	**LR-4050**
GS4-4060	60	91	155	45	**LR-4060**
GS4-4075	75	110	189	55	**LR-4075**
GS4-4100	100	150	257	75	**LR-4100**
GS4-4125	125	180	308	90	**LR-4125**
GS4-4150	150	220	376	110	**LR-4150**
GS4-4175	175	260	445	132	**LR-4200**
GS4-4200	215	310	531	160	**LR-4250**
GS4-4250	250	370	634	185	**LR-4250**
GS4-4300	300	460	787	220	**LR-4300**

1) This reactor is recommended for existing installations only; product will be discontinued after existing stock is depleted.

LINE/LOAD REACTOR SPECIFICATION CHARTS

Line Reactors Specifications 230V Models							
Part Number	***Dimension Dwg #***	***Wire Range AWG***	***Terminal Torque lb·in***	***Fasteners***	***Temperature Range***		***Environment***
					Operating	***Storage***	
LR-20P5-1PH	1	18–12	10	#6-32 x 5/16in flathead screw	-40 to +104°F [-40 to +40°C]	-40 to +149°F [-40 to +65°C]	NEMA: open IP00 no corrosive gases
LR2-20P5-1PH	17	22–12	9	n/a - trapped	122°F [50°C] max		
LR-21P0-1PH	1	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]		
LR-22P0-1PH	2	18–4	20	1/4-28 x 3/8 set screw			
LR-23P0-1PH	2	18–12	20				
LR-20P5	3	18–12	10	#6-32 x 5/16in flathead screw			
LR2-20P5	16	22–12	9	n/a - captive	122°F [50°C] max		
LR-21P0	3	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]		
LR2-21P0	17	22–12	9	n/a - captive	122°F [50°C] max		
LR-22P0	3	18–12	10	n/a - captive	-40 – 104 °F [-40 – 40 °C]		
LR-23P0	3	18–12	10	#6-32 x 5/16 in flathead screw			
LR-25P0	4	18–4	20	1/4 in-28 x 3/8 in setscrew			
LR-27P5	4	18–4	20				
LR-2010	5	18–4	20				
LR-2015	5	18–4	20				
LR-2020	5	18–4	20				
LR-2025	6	18–4	18–16 AWG; 25 14–6 AWG; 30 4AWG; 35	captive Phillips screw			
LR-2030	7	6–2/0 (Al or Cu)	120	7/16 in-20 x 5/8 in setscrew			
LR-2040	7						
LR-2050	8	6 – 250kcmil (Al or Cu)	275				
LR-2060	18	6AWG – 250MCM	275	5/8-18 x 3/4 set screw			
LR-2075	19	4AWG – 600MCM	500	3/4-16 x 3/4 set screw			
LR-2100	19						

Line Reactors Specifications 460V Models							
Part Number	Dimension Dwg #	Wire Range AWG	Terminal Torque lb·in	Fasteners	Temperature Range Operating	Temperature Range Storage	Environment
LR-41P0	3	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]	-40 to +149°F [-40 to +65°C]	NEMA: open IP00 no corrosive gases
LR2-41P0	16	22–12	9	n/a - trapped	122°F [50°C] max		
LR-42P0	3	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]		
LR2-42P0	16	22–12	9	n/a - trapped	122°F [50°C] max		
LR-43P0	3	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]		
LR2-43P0	16	22–12	9	n/a - trapped	122°F [50°C] max		
LR-45P0	3	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]		
LR2-45P0	17	22–12	9	n/a - trapped	122°F [50°C] max		
LR-47P5	3	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]		
LR2-47P5	17	22–12	9	n/a - trapped	122°F [50°C] max		
LR-4010	3	18–12	10	#6-32 x 5/16 in flathead screw	-40 to +104°F [-40 to +40°C]		
LR-4015	4	18–4	20	1/4 in-28 x 3/8 in setscrew			
LR-4020	4						
LR-4025	5						
LR-4030	5						
LR-4040	6						
LR-4050	9	22–4	22–16 AWG; 25 14–6 AWG; 30 4AWG; 35	captive Phillips screw			
LR-4060	9						
LR-4075	7	6–2/0 (Al or Cu)	120	7/16 in - 20 x 5/8 in setscrew			
LR-4100	10	6 – 250kcmil (Al or Cu)	275	5/8 in - 18 x 7/8 in setscrew			
LR-4125	10						
LR-4150	10						
LR-4200	11	(1) 4 – 600kcmil (2) 1/0 – 250kcmil	500	7/8 in - 14 x 1 setscrew			
LR-4250 *	12	(2)* 4 – 350kcmil (AL or CU)	275	5/8 in - 18 x 7/8 in setscrew			
LR-4300 *	12						

** LR-4250 & LR-4300 have dual-connector lugs, and will require multiple conductors per phase of the appropriate size to fit the lugs.*

DC Reactors (Choke) Specification Charts

Supply: 230V, 1Ø, 50/60 Hz DC Reactors*					
GS4 Model	HP	Nominal Amps (rms)	Saturation Amps (rms)	Inductance (mH)	
				3% Impedance	5% Impedance
GS4-21P0	0.5	4.2	7.5	5.284	8.806
GS4-22P0	0.75	5.6	10.0	3.963	6.604
GS4-23P0	1	8.7	15.6	2.536	4.227
GS4-25P0	2	14	25	1.585	2.642
GS4-27P5	3	19	34	1.153	1.921
GS4-2010	3	19	34	1.153	1.921
GS4-2015	5	30	53	0.746	1.243
GS4-2020	7.5	43	78	0.507	0.845
GS4-2025	10	57	103	0.384	0.640
GS4-2030	10	57	103	0.384	0.640
GS4-2040	10	N/A	N/A	N/A	N/A
GS4-2050	10	N/A	N/A	N/A	N/A
GS4-2060	15	N/A	N/A	N/A	N/A
GS4-2075	20	N/A	N/A	N/A	N/A
GS4-2100	25	N/A	N/A	N/A	N/A
** Drive output HP is derated when supplied with single-phase input*					

Supply: 230V, 3Ø, 50/60 Hz DC Reactors					
GS4 Model	HP	Nominal Amps (rms)	Saturation Amps (rms)	Inductance (mH)	
				3% Impedance	5% Impedance
GS4-21P0	1	5.8	8.6	4.392	7.607
GS4-22P0	2	9.2	12.8	2.745	4.754
GS4-23P0	3	13	18	1.996	3.457
GS4-25P0	5	20	29	1.293	2.239
GS4-27P5	7.5	29	43	0.878	1.521
GS4-2010	10	38	56	0.637	1.104
GS4-2015	15	57	85	0.430	0.745
GS4-2020	20	75	112	0.325	0.562
GS4-2025	25	87	128	0.293	0.507
GS4-2030	30	104	155	0.245	0.424
GS4-2040	40	N/A	N/A	N/A	N/A
GS4-2050	50	N/A	N/A	N/A	N/A
GS4-2060	60	N/A	N/A	N/A	N/A
GS4-2075	75	N/A	N/A	N/A	N/A
GS4-2100	100	N/A	N/A	N/A	N/A

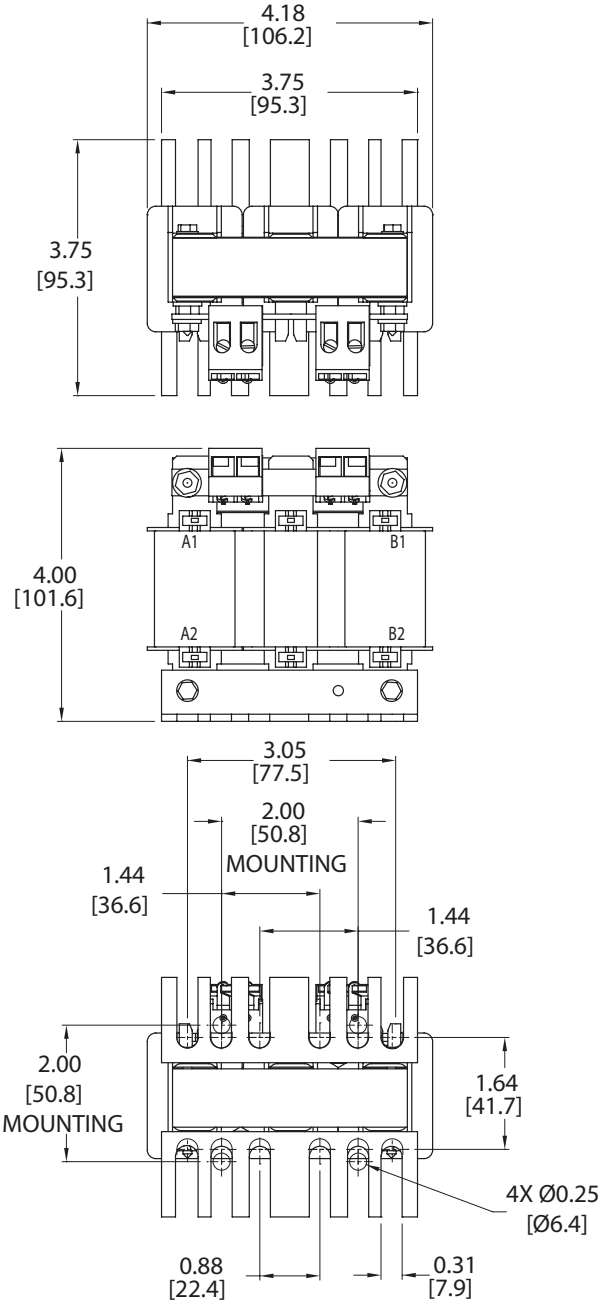
Supply: 460V, 3Ø, 50/60 Hz DC Reactors					
GS4 Model	HP	Nominal Amps (rms)	Saturation Amps (rms)	Inductance (mH)	
				3% Impedance	5% Impedance
GS4-41P0	1	3.5	5.2	14.032	23.387
GS4-42P0	2	4.6	6.8	10.525	17.541
GS4-43P0	3	6.9	10.3	7.015	11.692
GS4-45P0	5	10.4	14.6	4.677	7.795
GS4-47P5	7.5	14	20	3.508	5.846
GS4-4010	10	21	31	2.338	3.897
GS4-4015	15	28	41	1.755	2.925
GS4-4020	20	37	54	1.315	2.191
GS4-4025	25	44	65	1.107	1.846
GS4-4030	30	52	77	0.936	1.560
GS4-4040	40	73	103	0.701	1.169
GS4-4050	50	N/A	N/A	N/A	N/A
GS4-4060	60	N/A	N/A	N/A	N/A
GS4-4075	75	N/A	N/A	N/A	N/A
GS4-4100	100	N/A	N/A	N/A	N/A
GS4-4125	125	N/A	N/A	N/A	N/A
GS4-4150	150	N/A	N/A	N/A	N/A
GS4-4175	175	N/A	N/A	N/A	N/A
GS4-4200	215	N/A	N/A	N/A	N/A
GS4-4250	250	N/A	N/A	N/A	N/A
GS4-4300	300	N/A	N/A	N/A	N/A

Line Reactor Dimensions

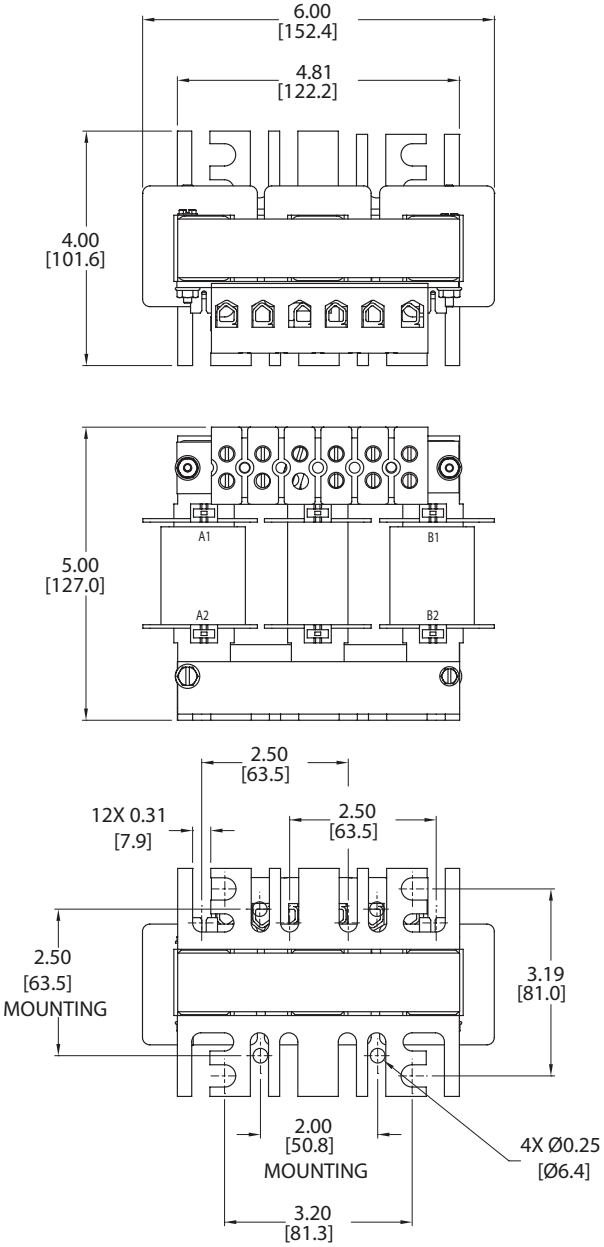
(Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

1) LR(2) Line Reactors Dimension Drawing #1
LR-10P2-1PH, LR-10P5-1PH, LR-20P5-1PH, LR-21P0-1PH



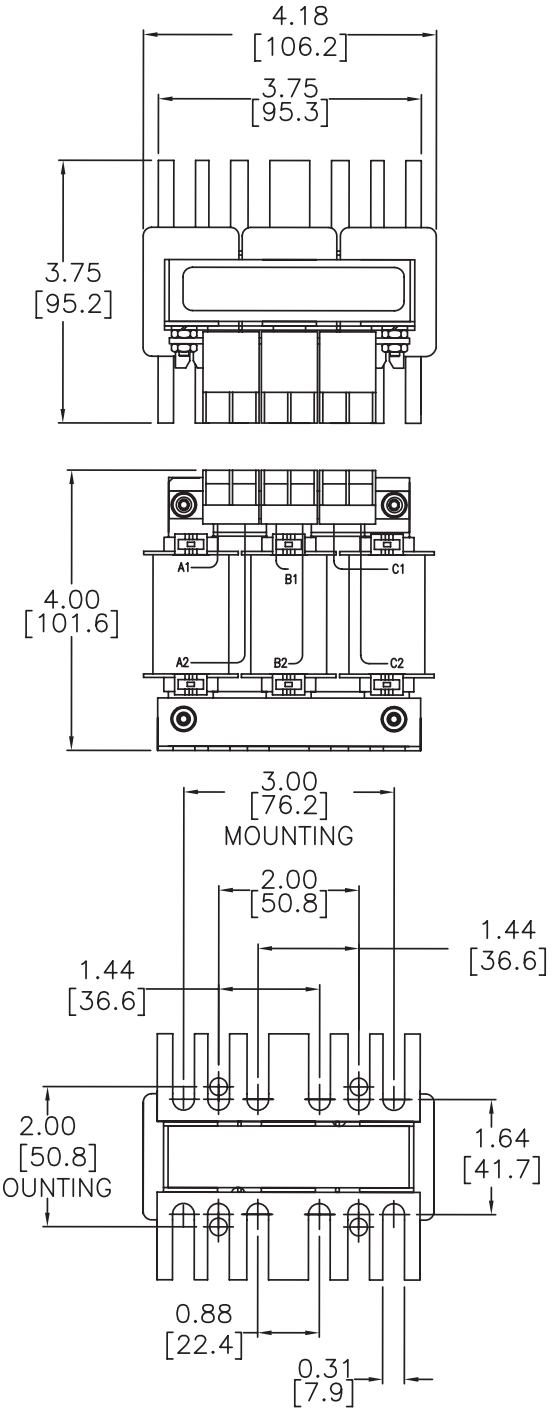
2) LR(2) Line Reactors Dimension Drawing #2
LR-11P0-1PH, LR-22P0-1PH, LR-23P0-1PH



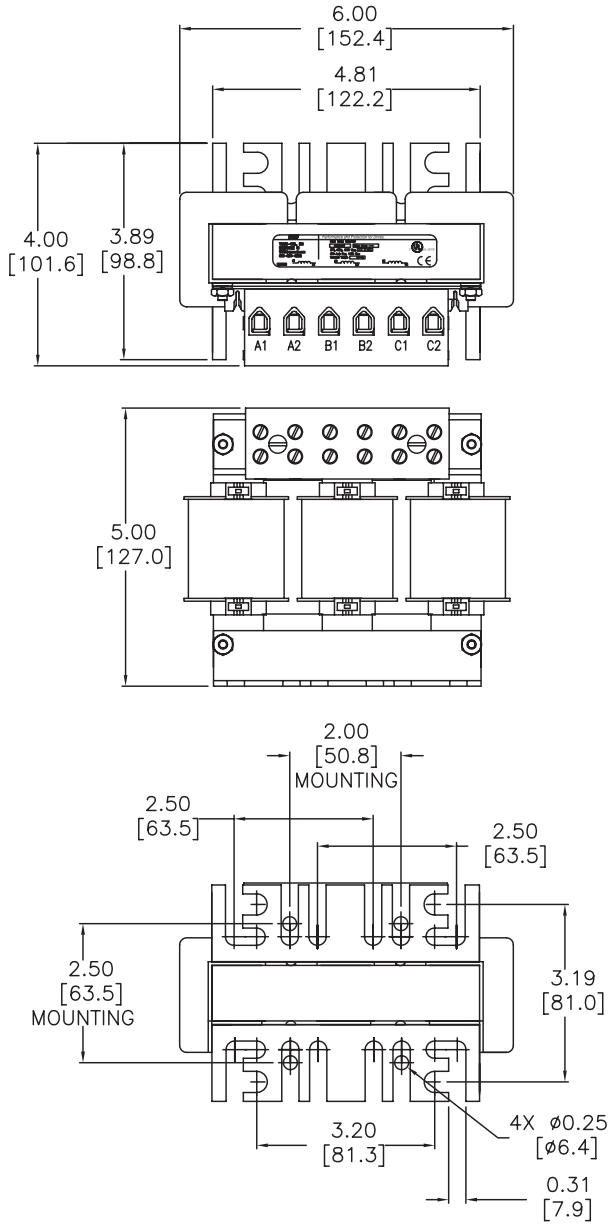
Line Reactor Dimensions (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

3) LR(2) Line Reactors Dimension Drawing #3
LR-20P5, LR-21P0, LR-22P0, LR-23P0, LR-4010, LR-41P0, LR-42P0, LR-43P0, LR-45P0, LR-47P5, LR-5010, LR-51P0, LR-52P0, LR-53P0, LR-55P0



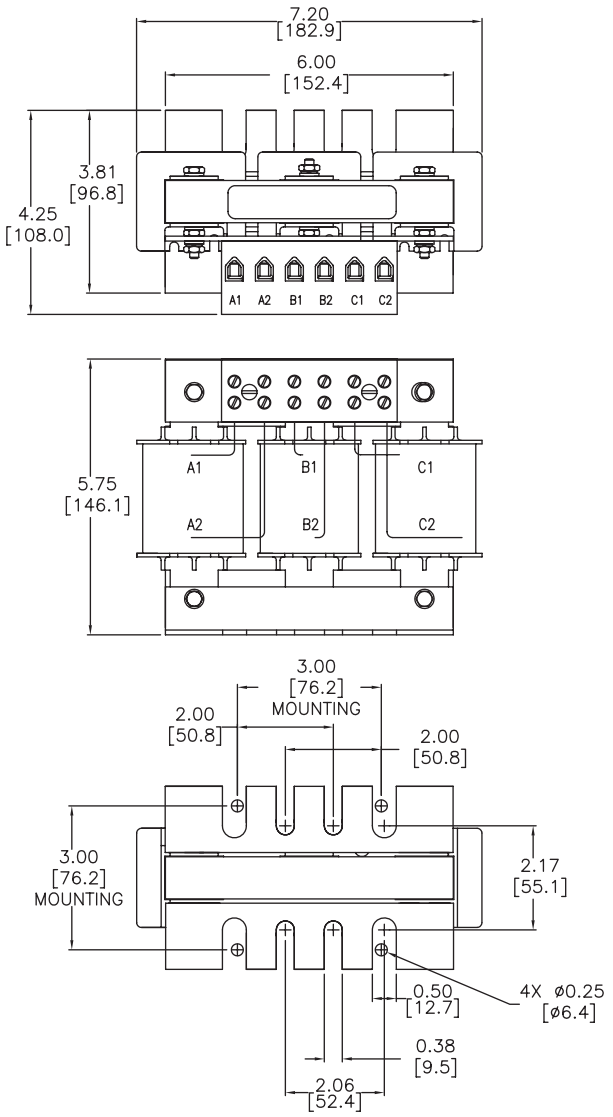
4) LR(2) Line Reactors Dimension Drawing #4
LR-25P0, LR-27P5, LR-4015, LR-4020



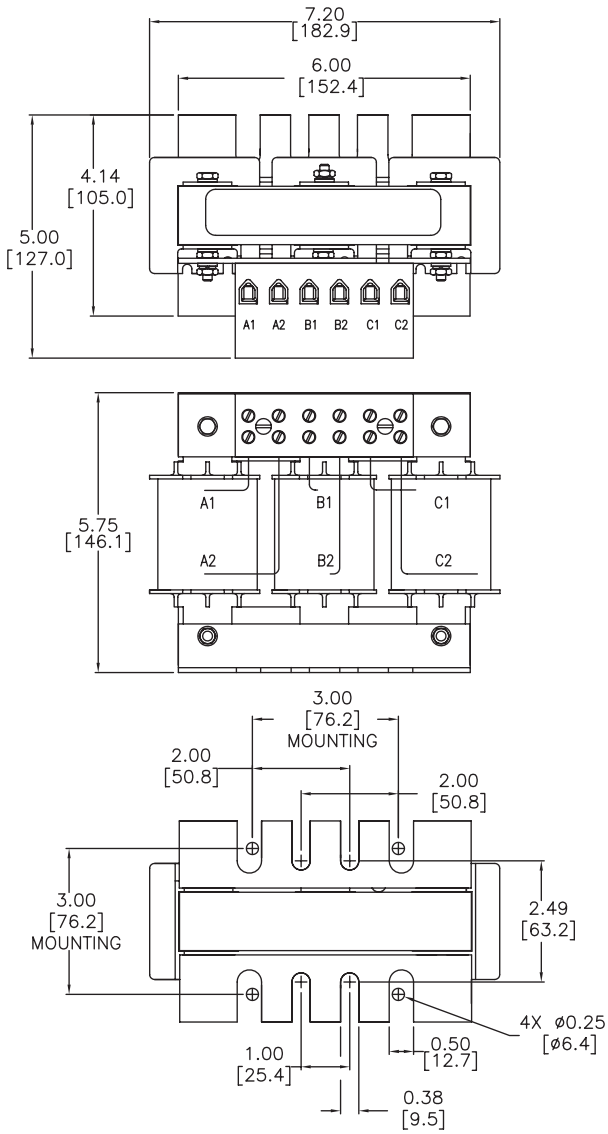
Line Reactor Dimensions (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

5) LR(2) Line Reactors Dimension Drawing #5
LR-2010, LR-2015, LR-2020, LR-4025, LR-4030



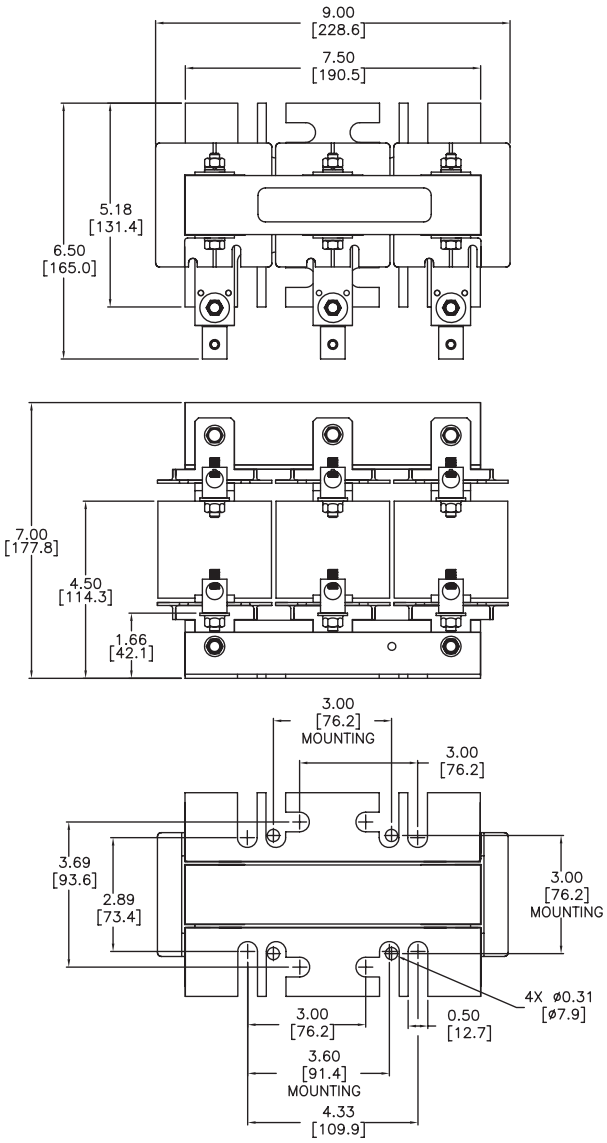
6) LR(2) Line Reactors Dimension Drawing #6
LR-2025, LR-4040



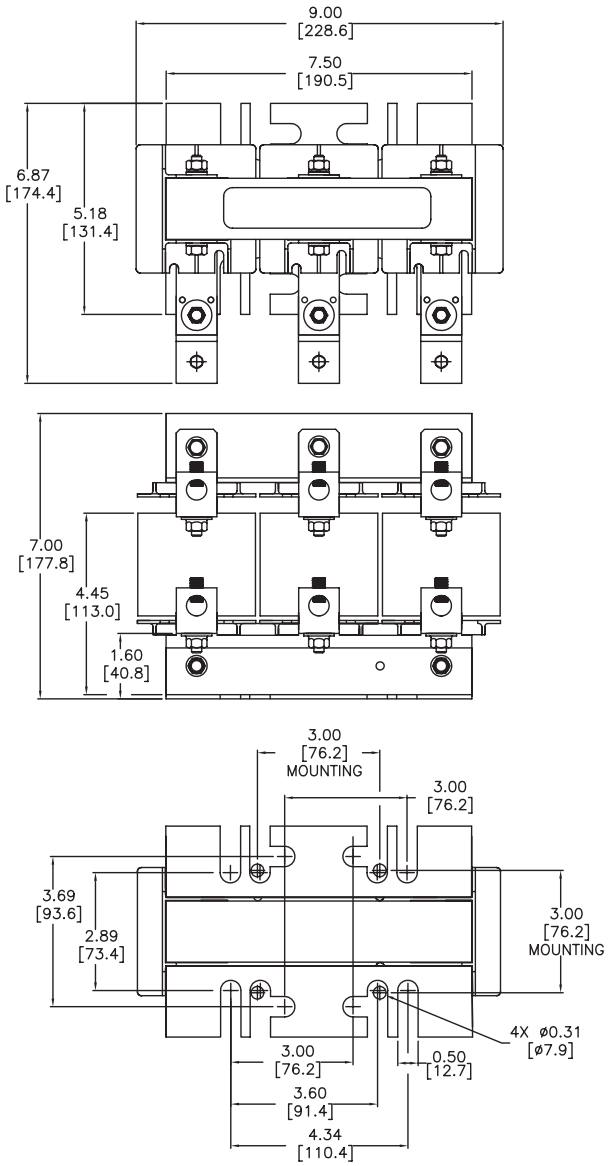
Line Reactor Dimensions (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

7) LR(2) Line Reactors Dimension Drawing #7
LR-2030, LR-2040, LR-4075



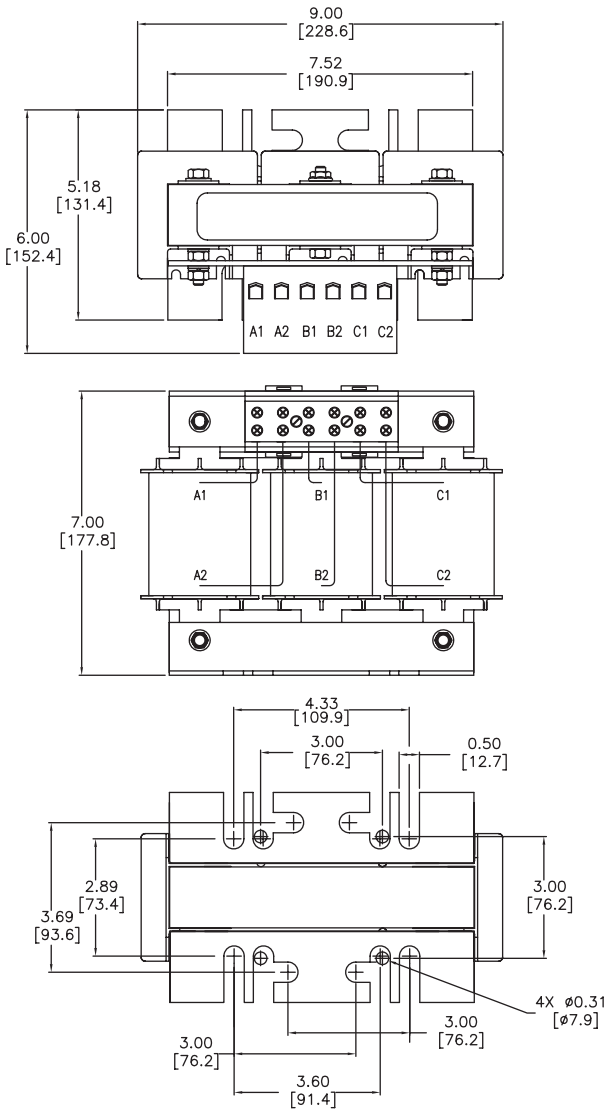
8) LR(2) Line Reactors Dimension Drawing #8
LR-2050



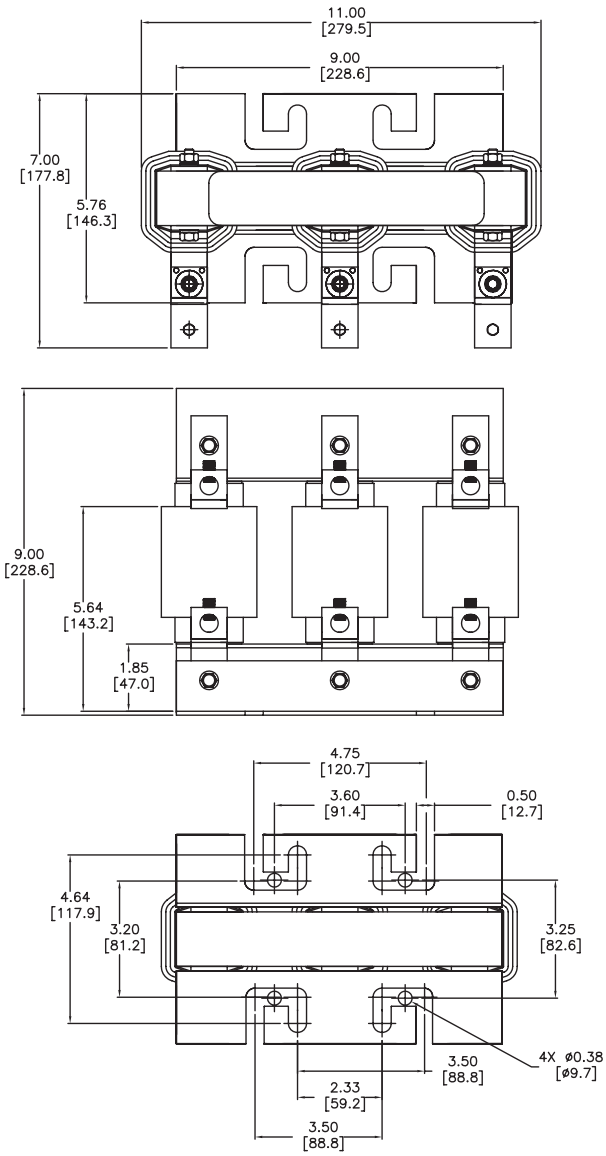
LINE REACTOR DIMENSIONS (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

9) LR(2) Line Reactors Dimension Drawing #9
LR-4050, LR-4060



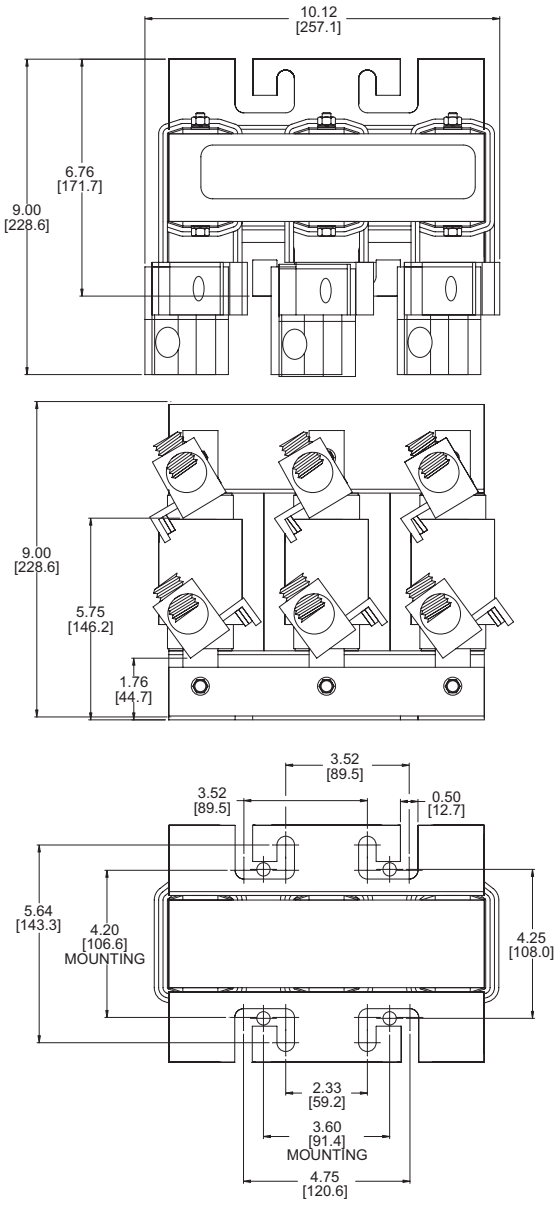
10) LR(2) Line Reactors Dimension Drawing #10
LR-4100, LR-4125, LR-4150



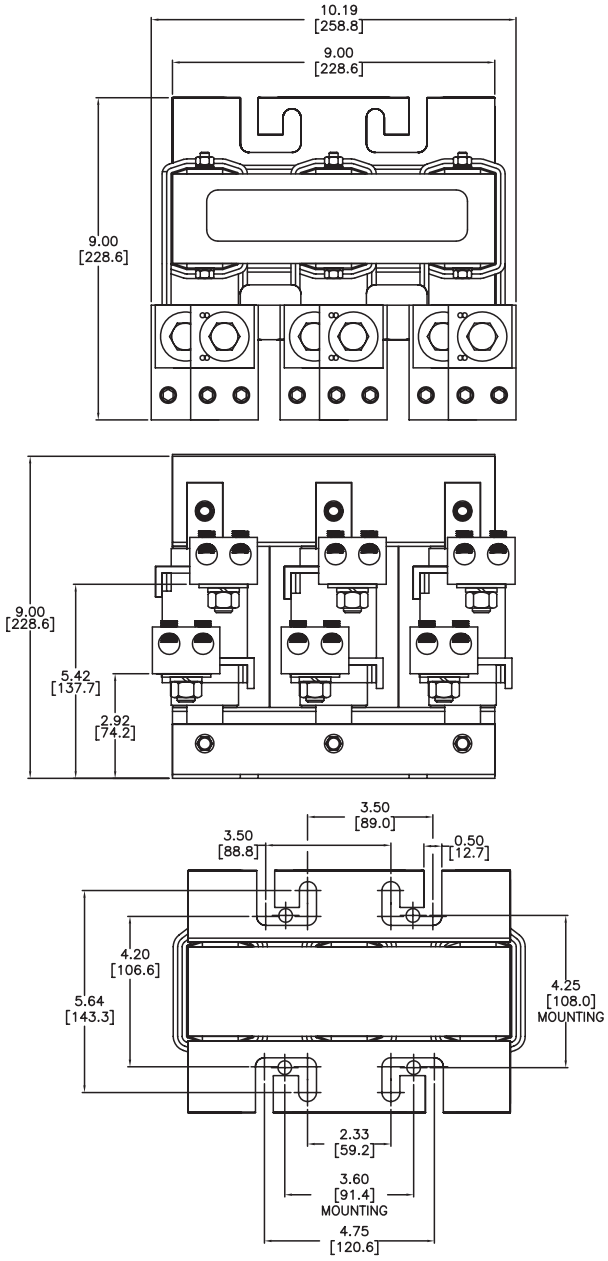
Line Reactor Dimensions (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

11) LR(2) Line Reactors Dimension Drawing #11
LR-4200



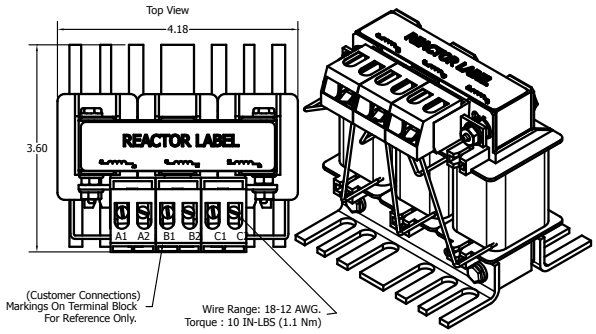
12) LR(2) Line Reactors Dimension Drawing #12
LR-4250, LR-4300

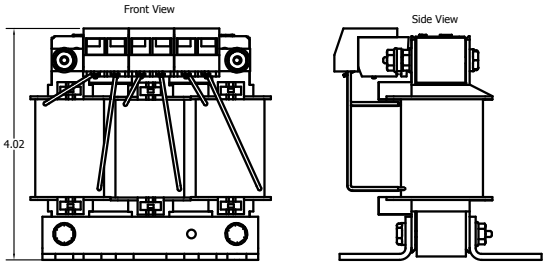


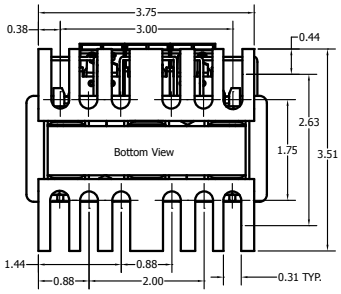
LINE REACTOR DIMENSIONS (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

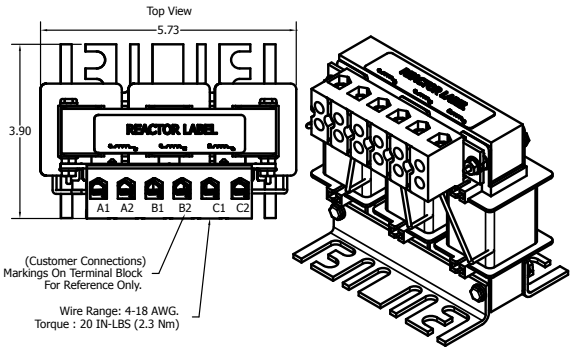
13) LR(2) Line Reactors Dimension Drawing #13
LR2-10P2-1PH, LR2-10P5-1PH, LR2-21P0-1PH, LR2-21P5-1PH

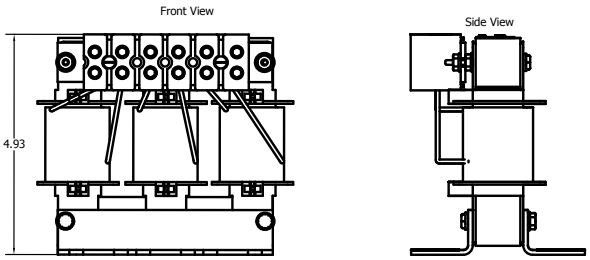


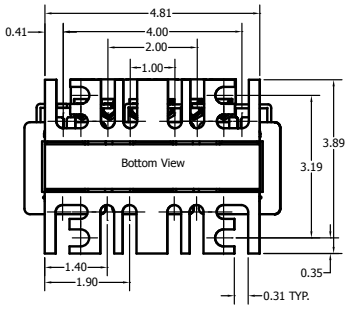




14) LR(2) Line Reactors Dimension Drawing #14
LR2-11P0-1PH, LR2-22P0-1PH



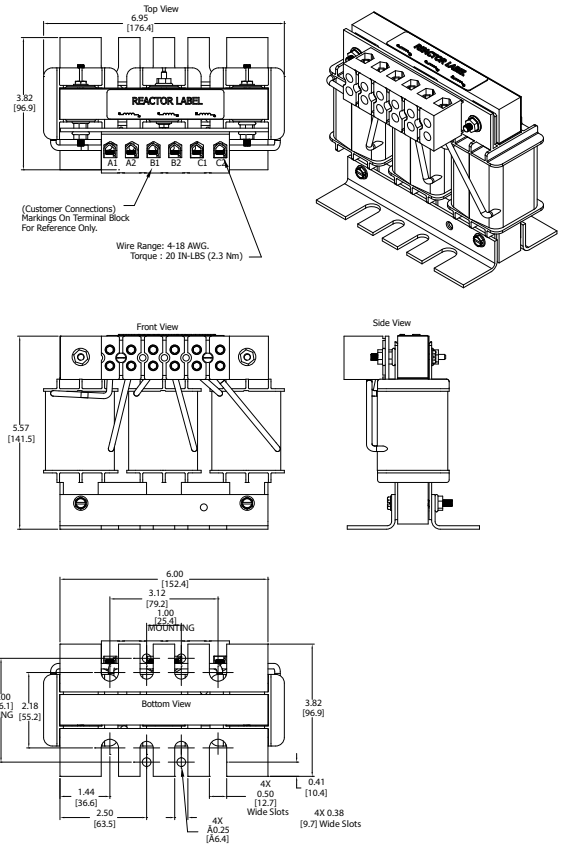




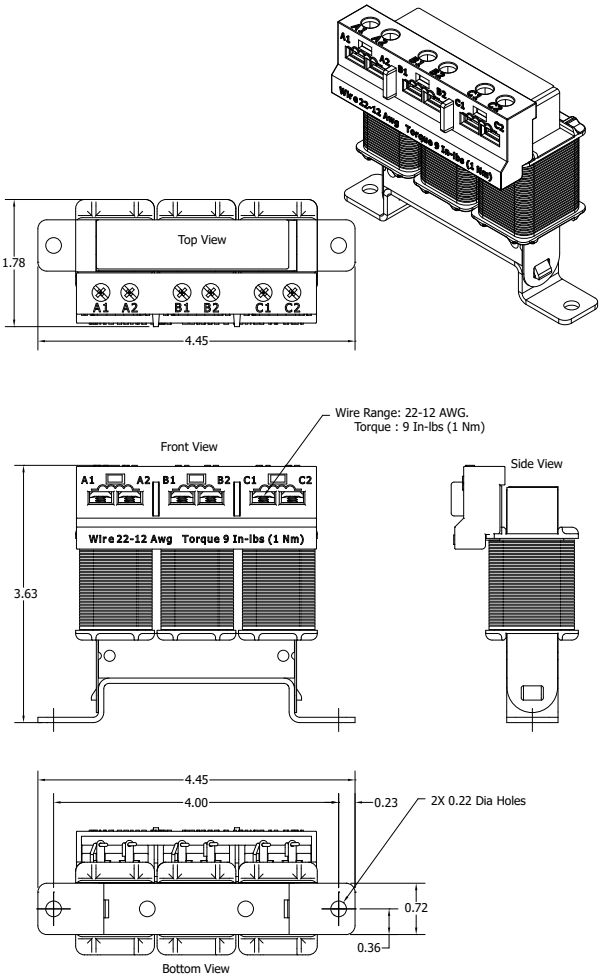
Line Reactor Dimensions (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

15) LR(2) Line Reactors Dimension Drawing #15
LR2-11P5-1PH



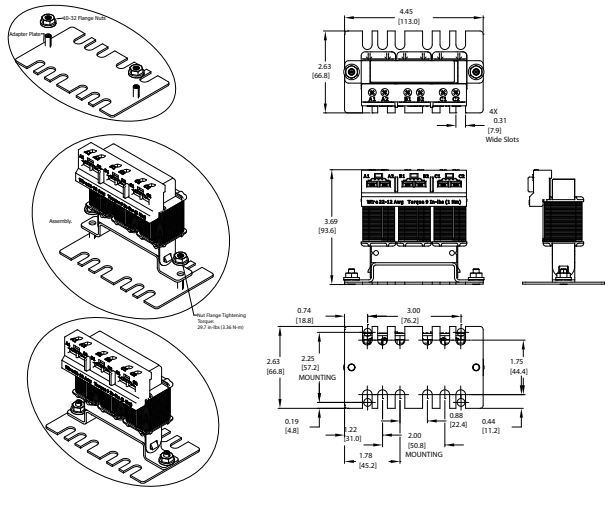
16) LR(2) Line Reactors Dimension Drawing #16
LR2-20P2-1PH, LR2-20P2, LR2-20P5, LR2-40P2, LR2-40P3, LR2-40P5, LR2-40P7, LR2-41P0, LR2-41P5, LR2-42P0, LR2-43P0, LR2-51P0, LR2-51P5, LR2-52P0



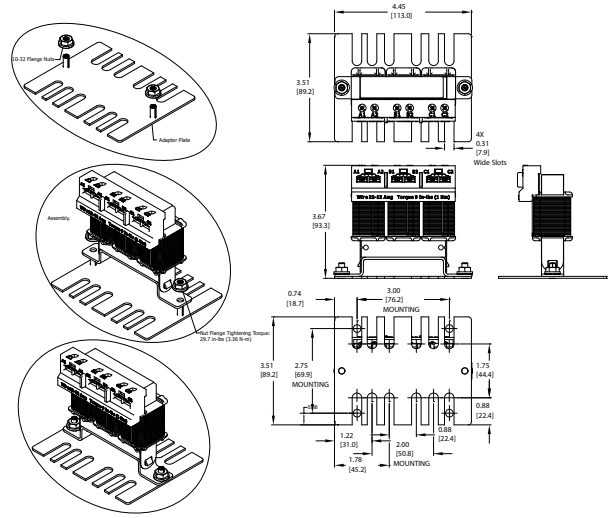
LINE REACTOR DIMENSIONS (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

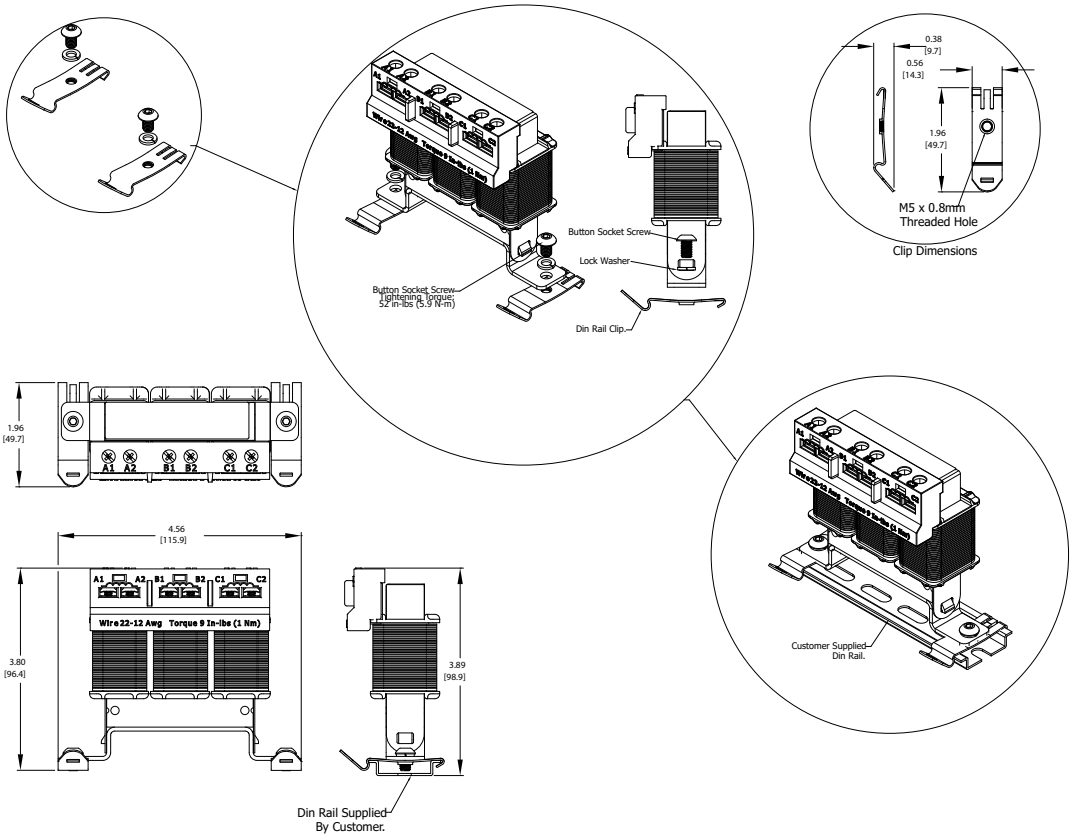
16a) LR(2) Line Reactors Dimension Drawing #16a
LR2-AP1 Adapter Plate for Universal Mounting for:
LR2-20P2-1PH, LR2-20P2, LR2-20P5, LR2-40P2, LR2-40P3, LR2-40P5, LR2-40P7, LR2-41P0, LR2-41P5, LR2-42P0, LR2-43P0, LR2-51P0, LR2-51P5, LR2-52P0



16b) LR(2) Line Reactors Dimension Drawing # 16b
LR2-AP2 Adapter Plate for Universal Mounting for:
LR2-20P2-1PH, LR2-20P2, LR2-20P5, LR2-40P2, LR2-40P3, LR2-40P5, LR2-40P7, LR2-41P0, LR2-41P5, LR2-42P0, LR2-43P0, LR2-51P0, LR2-51P5, LR2-52P0



16c) LR(2) Line Reactors Dimension Drawing #16c
LR2-DR1 Hardware Kit for DIN Rail Mounting for:
LR2-20P2-1PH, LR2-20P2, LR2-20P5, LR2-40P2, LR2-40P3, LR2-40P5, LR2-40P7, LR2-41P0, LR2-41P5, LR2-42P0, LR2-43P0, LR2-51P0, LR2-51P5, LR2-52P0

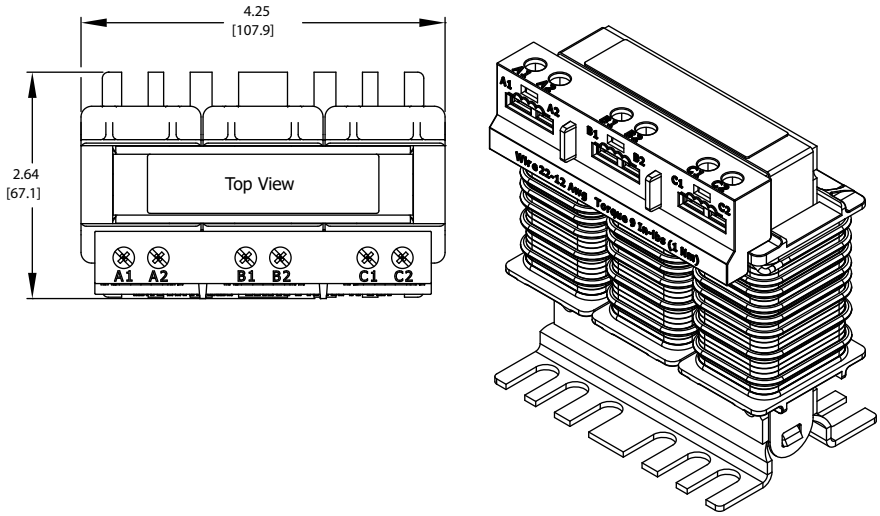


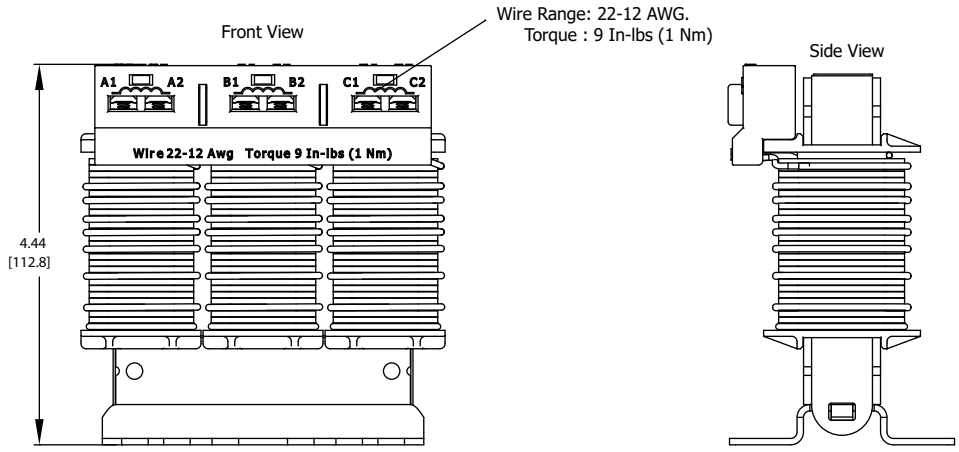
Line Reactor Dimensions (Units = in [mm])

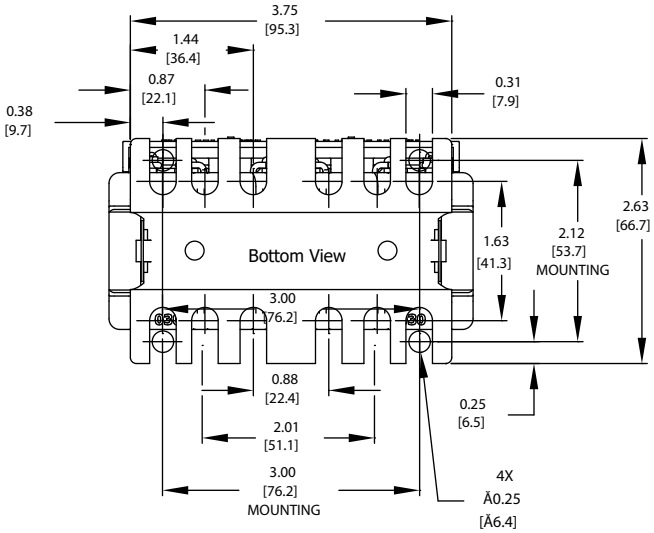
See our website: www.AutomationDirect.com for complete engineering drawings.

17) LR(2) Line Reactors Dimension Drawing #17

LR2-20P5-1PH, LR2-20P7, LR2-21P0, LR2-21P5, LR2-22P0, LR2-44P0, LR2-45P0, LR2-47P5, LR2-53P0, LR2-54P0, LR2-55P0, LR2-57P5



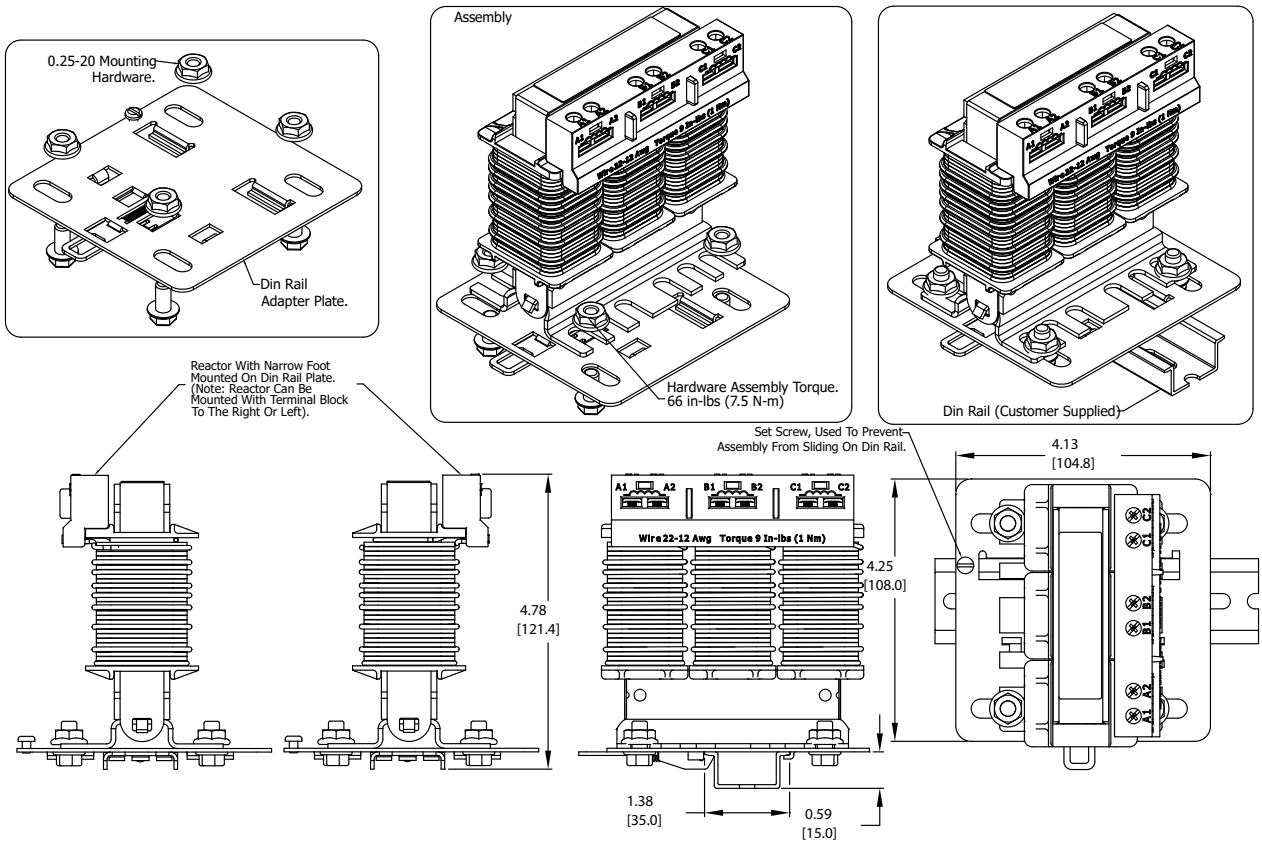




LINE REACTOR DIMENSIONS (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

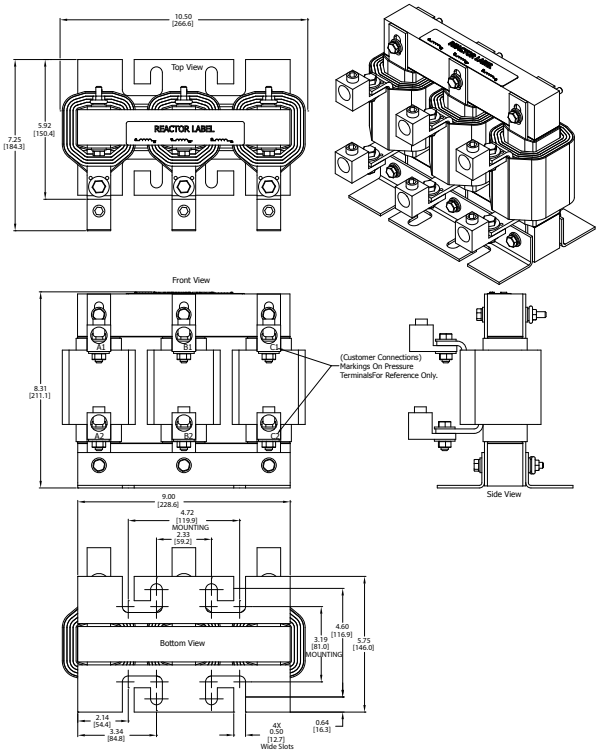
17a) LR(2) Line Reactors Dimension Drawing #17a
LR2-DR2 Hardware Kit for DIN Rail Mounting for:
LR2-20P5-1PH, LR2-20P7, LR2-21P0, LR2-21P5, LR2-22P0, LR2-44P0, LR2-45P0, LR2-47P5, LR2-53P0, LR2-54P0, LR2-55P0, LR2-57P5



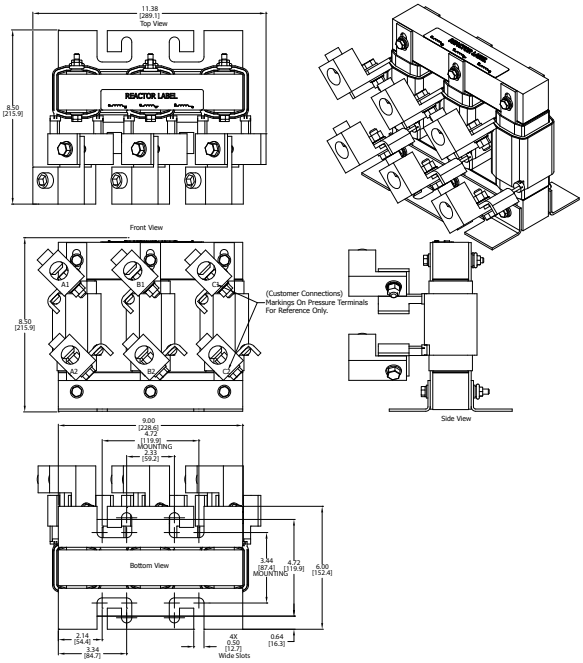
Line Reactor Dimensions (Units = in [mm])

See our website: www.AutomationDirect.com for complete engineering drawings.

18) LR(2) Line Reactors Dimension Drawing #18
LR-2060



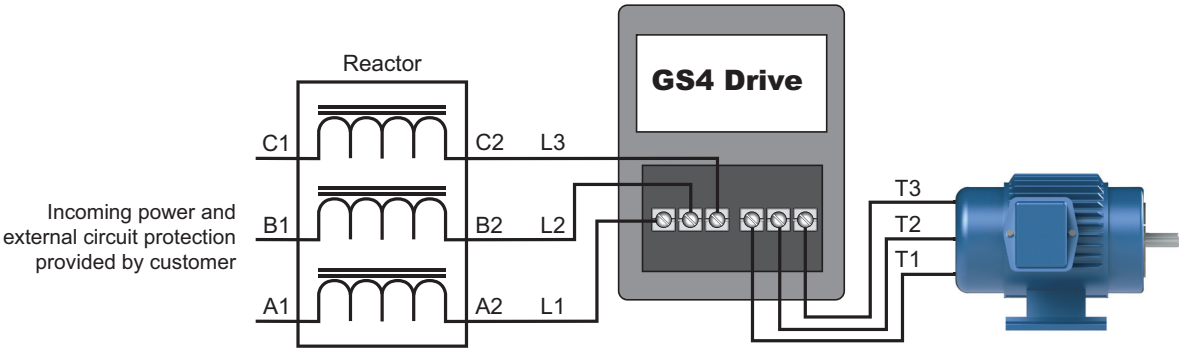
19) LR(2) Line Reactors Dimension Drawing #19
LR2075, LR2100



Line Reactor Applications and Wiring Connections

Input Side of AC Drive

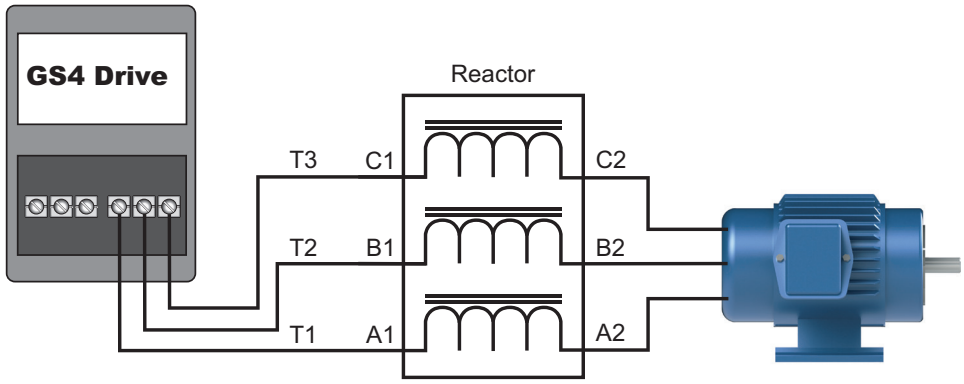
When installed on the input side of the GS4 drive, a line reactor will reduce line notching, current peaks, voltage spikes and surges from the incoming line, as well as reduce the available short circuit current. A line reactor will also reduce harmonic distortion from the GS4 drive onto the line. The line reactor is installed in front of the GS4 drive as shown.



Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS4 drive.

Output Side of AC Drive

When installed on the output side of the GS4 drive, line (load) reactors help to protect the GS4 drive from short circuits at the load. Voltage and current waveforms from the GS4 drive are enhanced, reducing motor overheating and noise emissions.

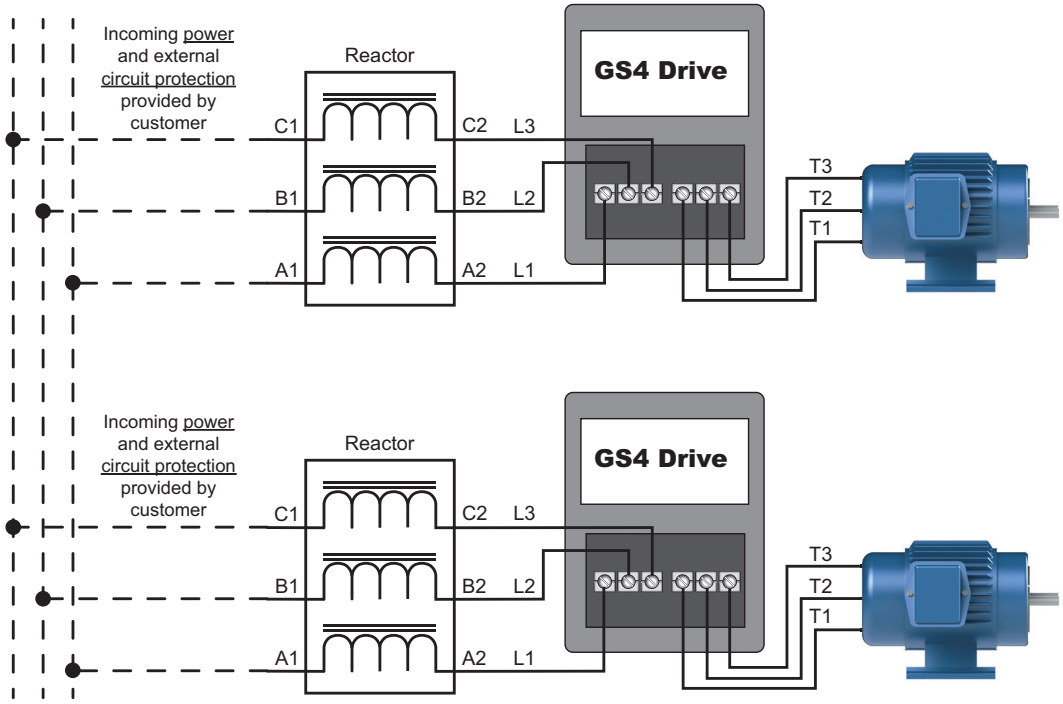


Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS4 drive.

Single phase line reactors should NOT be installed on the output side of an AC Drive. Use only three-phase reactors on drive outputs, and only for three-phase motors.

Multiple AC Drives

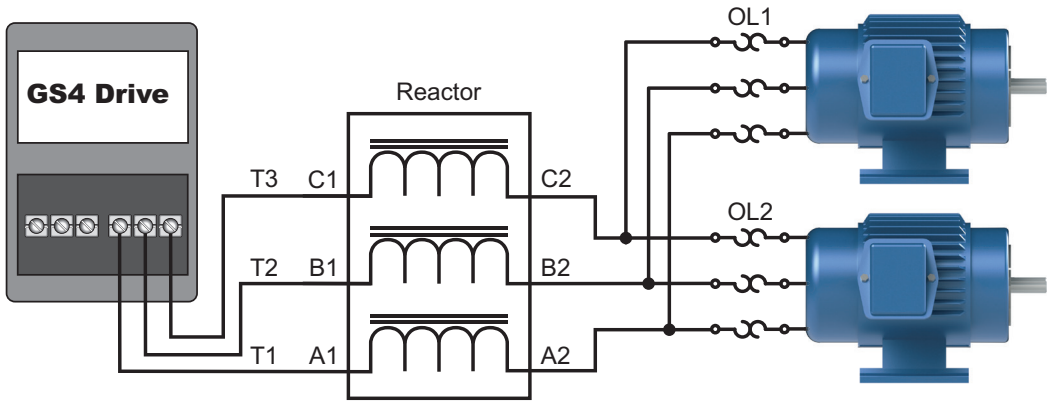
Individual line reactors are recommended when installing multiple GS4 drives on the same power line. Individual line reactors eliminate cross-talk between multiple GS4 drives and provide isolated protection for each GS4 drive for its own specific load.



Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS4 drive.

Multiple Motors

A single output (load) reactor can be used with multiple motors on the same GS4 drive, but only if the motors operate simultaneously. Size the reactor based upon the total horsepower of all the motors, and select a reactor with a current rating greater than the sum of the motor full-load currents. Overload relays are required for use in multi-motor applications.

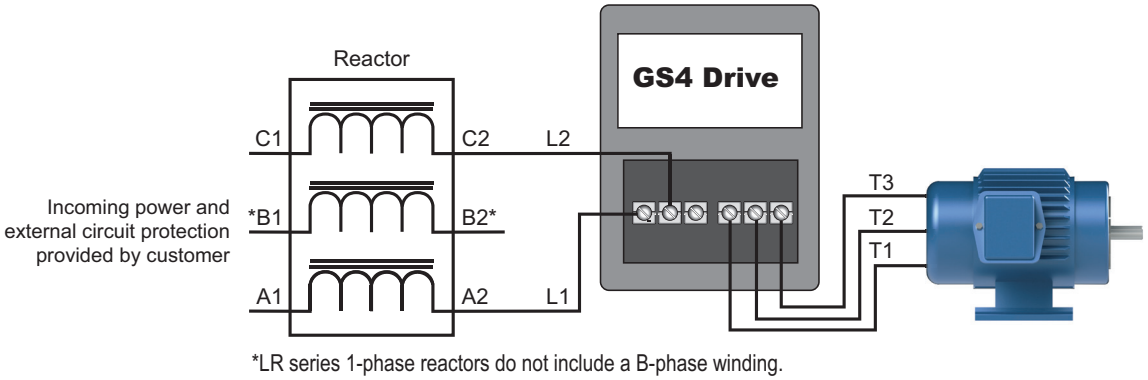


Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS4 drive.

A single reactor should be used with multiple motors ONLY when the motors will operate simultaneously from a single AC drive. OVERLOAD RELAYS are required for use in multiple motor applications.

Single-Phase Applications

Some three-phase line reactors are listed for use with single-phase input power. Follow the connection diagram shown below. Make sure that terminals B1 and B2, if present, are properly insulated before any connections are made. If a 3-phase reactor is used on the line side of a single-phase input drive application, ensure that the actual single-phase current does not exceed the Line Reactor's current rating (example: a 3-phase, 5hp Line Reactor and 3-phase 5hp drive will not handle enough current to power a 5hp motor on a single-phase supply - both the drive and the Line Reactor will have to be upsized).



Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS4 drive.

Ensure that you properly insulate terminals B1 and B2 before making any connections to single-phase power.

Drive Output Filters

Extend the life of your motors and cables by reducing the harmful effects of voltage spikes due to voltage wave reflection. Voltage wave reflection is a function of the voltage rise time (dV/dT) and the length of the motor cables.

AutomationDirect VTF series drive output filters protect motors and cables by combining a patented dampening circuit with a low pass filter to increase the voltage rise time (dT out of dV/dT), thereby preventing voltage spikes from exceeding 1,000V.

- *Protect cable runs and reduce motor heating, noise, and vibration.*
- *Prevent motor failure with protection against motor insulation breakdown.*
- *Reduce Common Mode by a minimum of 30%.*
- *Improve system productivity and increase bearing life and up-time.*
- *Protect long lead lengths up to 1,000 feet.*

NOTE: Install Drive Output Filters on the output side of the AC Drive only. The Output Filters are to provide a dV/dT solution for leads up to 1,000 ft. For lengths in excess of 1000 feet, please consult technical support.

VTF Part Number Explanation

VTF	–	xxx	–	xxx

HP @ corresponding Voltage:
A = 0.25
B = 0.33
C = 0.5
D = 0.75
E = 1
F = 1.5
G = 2
H = 3
J = 5
K = 7.5
L = 10
M = 15
N = 20
P = 25
Q = 30
R = 40
S = 50
T = 60
U = 75
V = 100
W = 125

VOLTAGE:
2 = 220/230/240 VAC
4 = 440/460/480 VAC
6 = 575/600 VAC

SERIES NAME:
VTF = Voltage Time Filter

For example:
Model VTF-246-SVW is a
Voltage Time Filter for a
230V/50hp, or 460V/100hp, or 575V/125hp AC Drive

VTF Specifications

Electrical Specifications & Drive Compatibility

VTF Series Drive Output Filters – Electrical Specifications & Drive Compatibility									
Part Number	Rated HP			Max Rated Amps	Max Rated Voltage	Phases	GS4 Drive *		Drive HP
	230V	460V	575V				w 1Ø Input	w 3Ø Input	
VTF-46-DE	–	0.75	1	2	600	3	–	–	–
VTF-246-CFG	0.5	1.5	2	3			GS4-21P0 –	– GS4-41P0	0.5 1
VTF-246-DGH	0.75	2	3	4			GS4-22P0 –	– GS4-42P0	0.75 2
VTF-24-FH	1.5	3	–	6			GS4-23P0 –	GS4-21P0 GS4-43P0	1 3
VTF-246-GJJ	2	5	5	8			GS4-25P0 –	GS4-22P0 GS4-45P0	2 5
VTF-246-HKL	3	7.5	10	12			GS4-27P5 GS4-2010 –	GS4-23P0 – GS4-47P5	3 3 7.5
VTF-24-JL	5	10	–	16			–	–	–
VTF-46-LM	–	10	15	18			GS4-2015 –	GS4-25P0 GS4-4010	5 10
VTF-4-M	–	15	–	21			–	GS4-4015	15
VTF-246-KMN	7.5	15	20	25			GS4-2020 –	GS4-27P5 GS4-2010	7.5 10
VTF-46-NP	–	20	25	27			–	GS4-4020	20
VTF-246-LPQ	10	25	30	35			GS4-2025 GS4-2030 GS4-2040 GS4-2050 –	– – – – GS4-4025	10 10 10 10 25
VTF-246-MQR	15	30	40	45			–	GS4-4030	30
VTF-246-NRS	20	40	50	55			GS4-2060 –	GS4-2015 GS4-4040	15 40
VTF-246-PSU	30	60	75	80			GS4-2075 GS4-2100 – –	GS4-2020 GS4-2025 GS4-4050 GS4-4060	20 25 50 60
VTF-246-RUV	40	75	100	110			– –	GS4-2030 GS4-4075	30 75
VTF-246-SVW	50	100	125	130			–	GS4-2040	40
* VTF drive output filters are not available for GS4-4100 thru -4300, nor for 3Ø input GS4-2050 thru -2100.									

Electrical Specifications & Drive Compatibility

VTF Series Drive Output Filters – Additional Specifications					
Part Number	Wire Range (AWG)	Terminal Torque (lb·in)	Fasteners	Weight (lb)	Dimension Drawing #
VTF-46-DE VTF-246-CFG VTF-246-DGH VTF-24-FH VTF-246-GJJ VTF-246-HKL	14–12	10	6/40 x 5/16 flathead	8	1
VTF-24-JL	12–4	20	1/4-28 x 3/8	12	2
VTF-46-LM VTF-4-M	10–4				
VTF-246-KMN	8–4				
VTF-46-NP				14	
VTF-246-LPQ	8–6			17	3
VTF-246-MQR	6				
VTF-246-NRS	4–1				
VTF-246-PSU	3–1	35	n/a (captive)	23	4
VTF-246-RUV	1/0 – 2/0	50	7/16-20 x 9/16	40	5
VTF-246-SVW	2/0			55	6

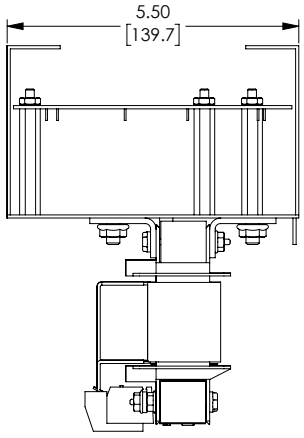
Output Filter Dimensions – VTF Series

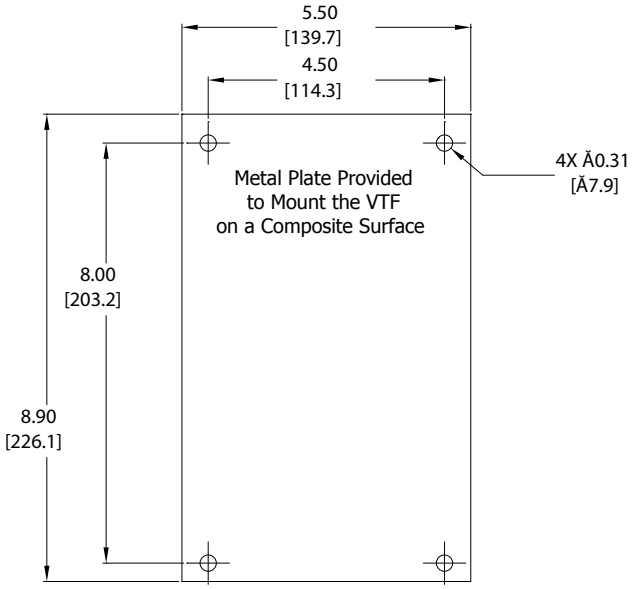
1) VTF Filters Dimension Drawing #1

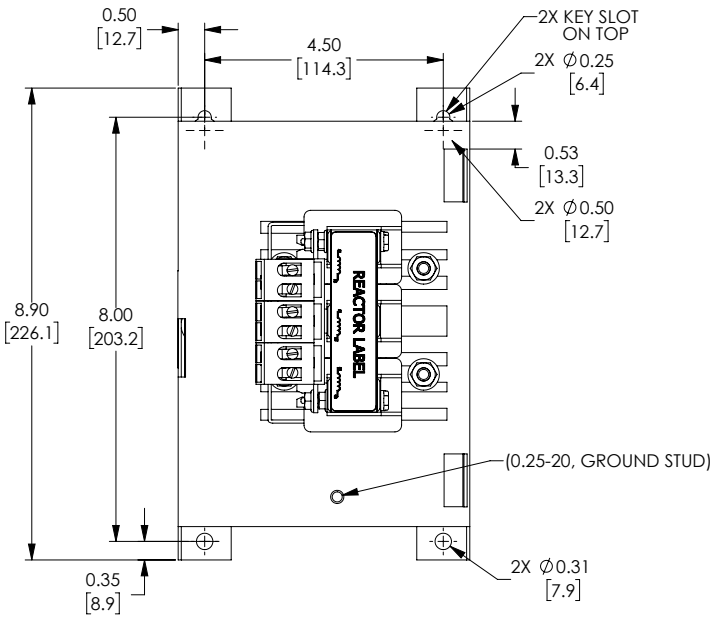
VTF-46-DE, VTF-246-CFG, VTF-246-DGH, VTF-24-FH, VTF-246-GJJ, VTF-246-HKL

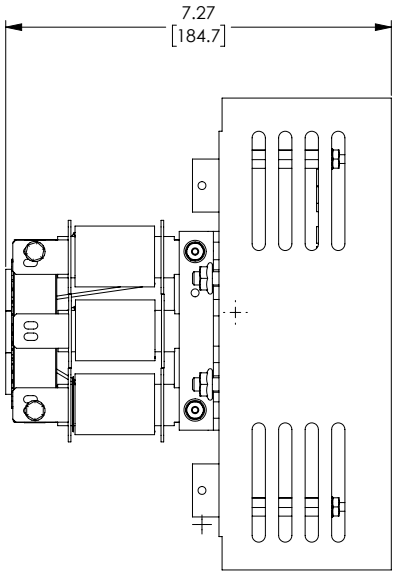
See our website: www.AutomationDirect.com for complete engineering drawings.

(Units = inches [mm])







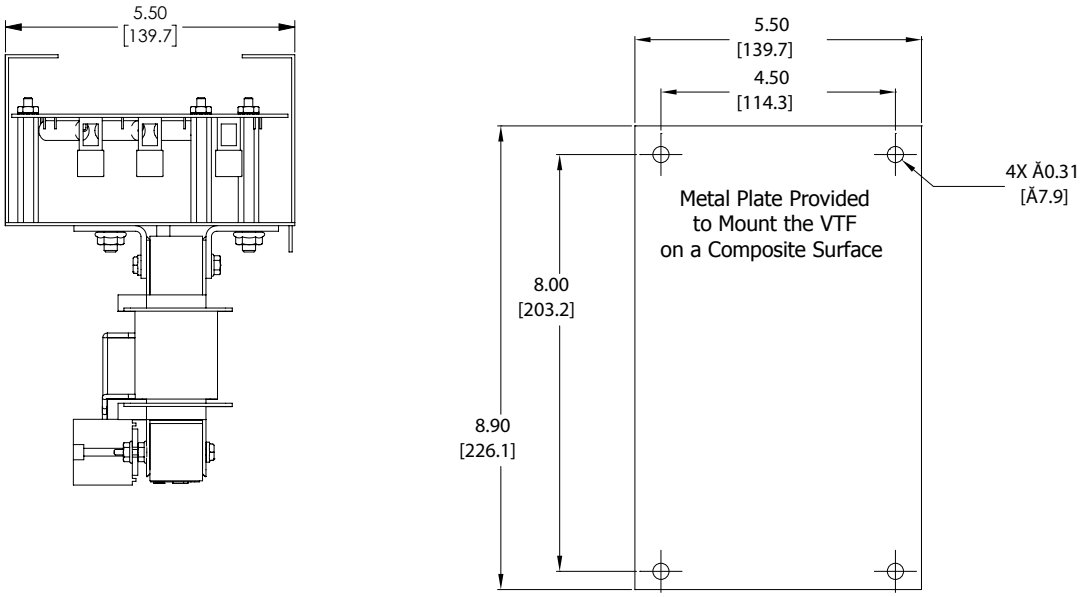


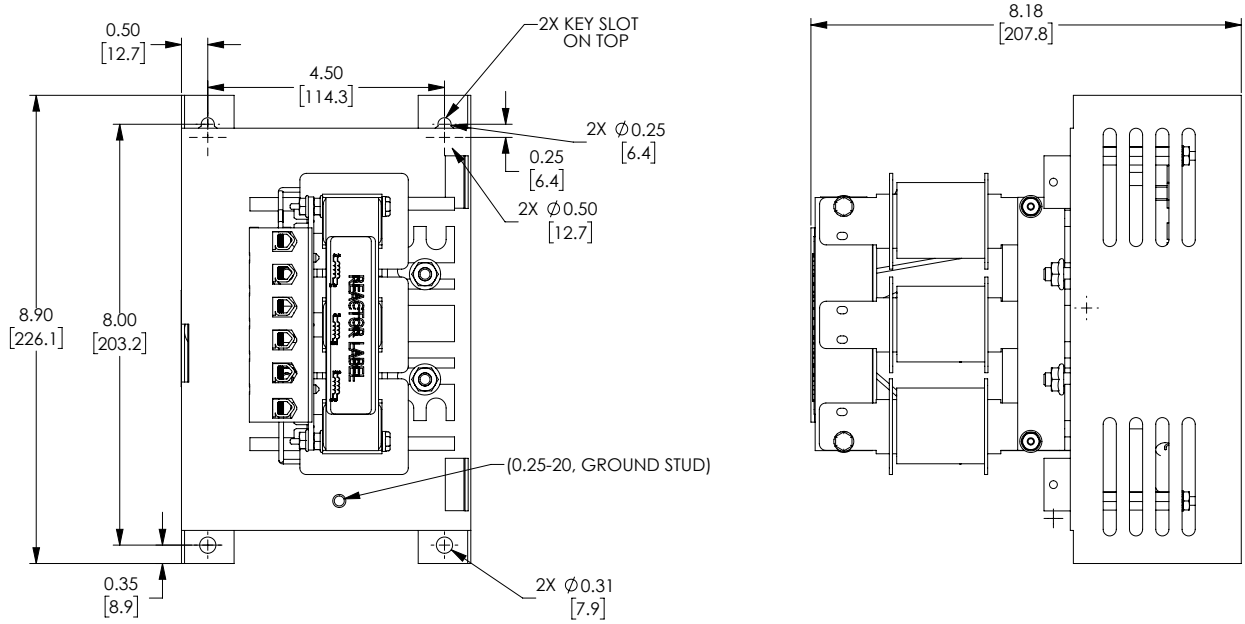
2) VTF Filters Dimension Drawing #2

VTF-24-JL, VTF-246-KMN, VTF-46-LM, VTF-4-M, VTF-46-NP

See our website: www.AutomationDirect.com for complete engineering drawings.

(Units = inches [mm])



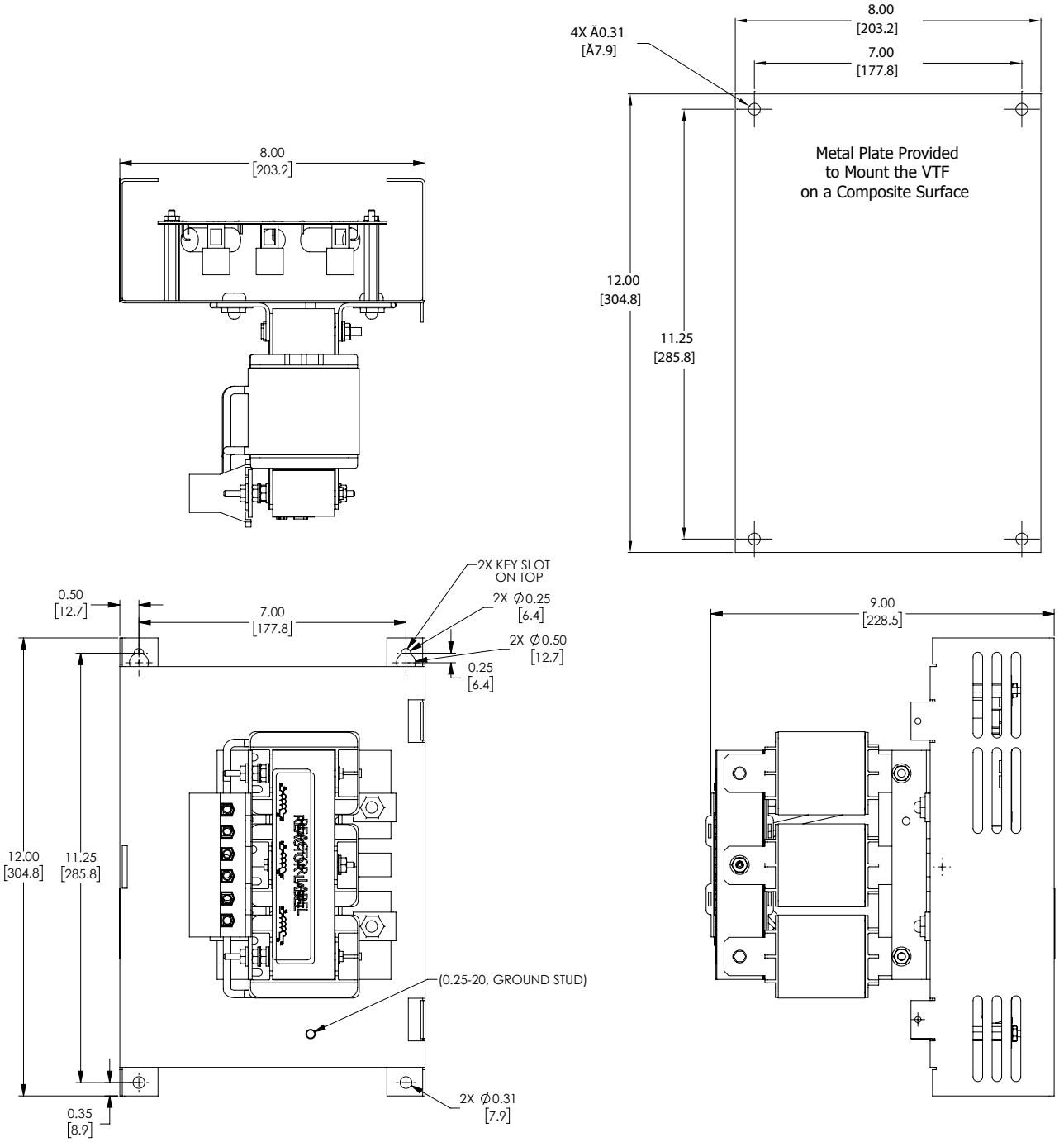


3) VTF Filters Dimension Drawing #3

VTF-246-LPQ, VTF-246-MQR, VTF-246-NRS

See our website: www.AutomationDirect.com for complete engineering drawings.

(Units = inches [mm])

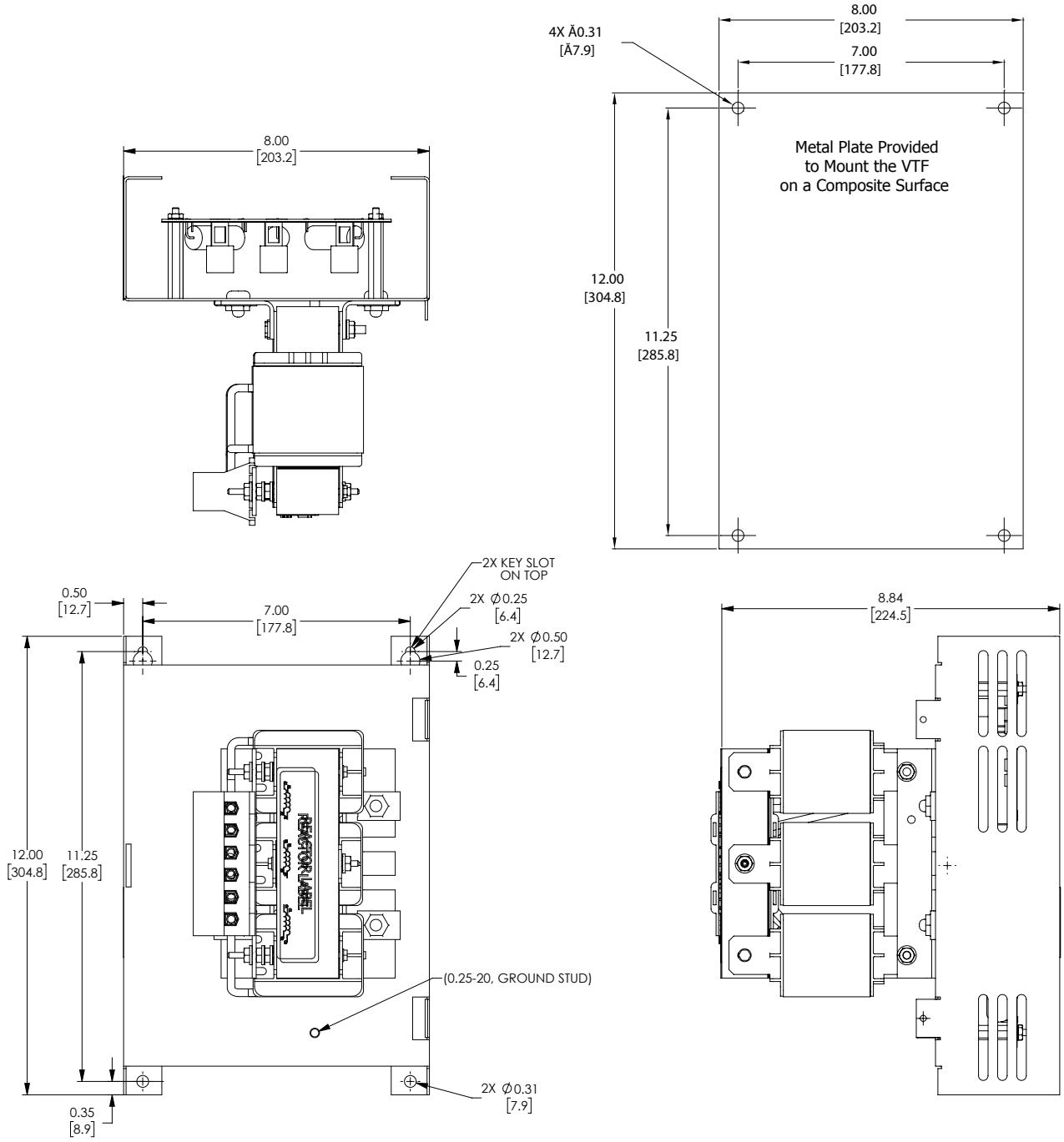


4) VTF Filters Dimension Drawing #4

VTF-246-PSU

See our website: www.AutomationDirect.com for complete engineering drawings.

(Units = inches [mm])

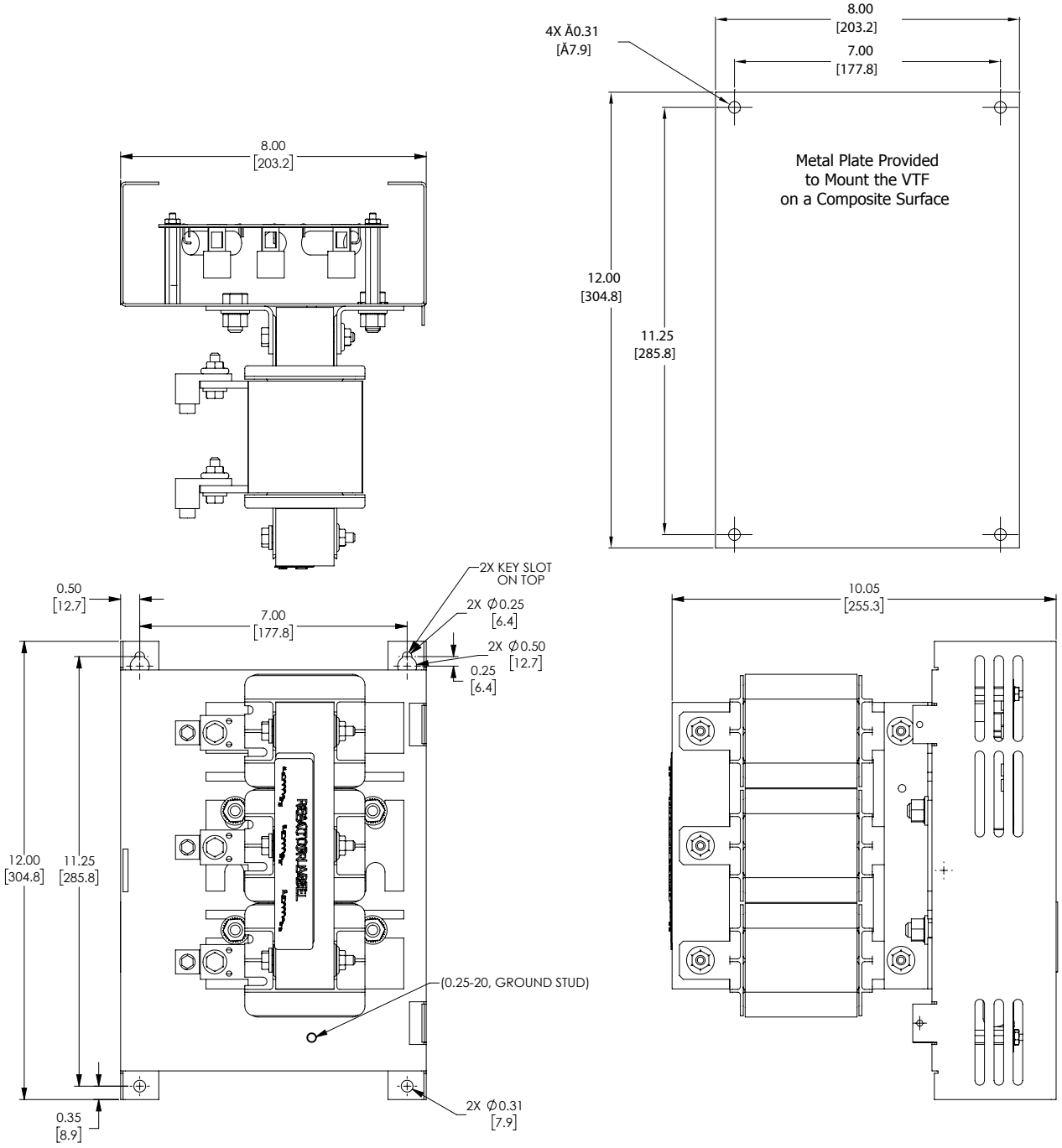


5) VTF Filters Dimension Drawing #5

VTF-246-RUV

See our website: www.AutomationDirect.com for complete engineering drawings.

(Units = inches [mm])

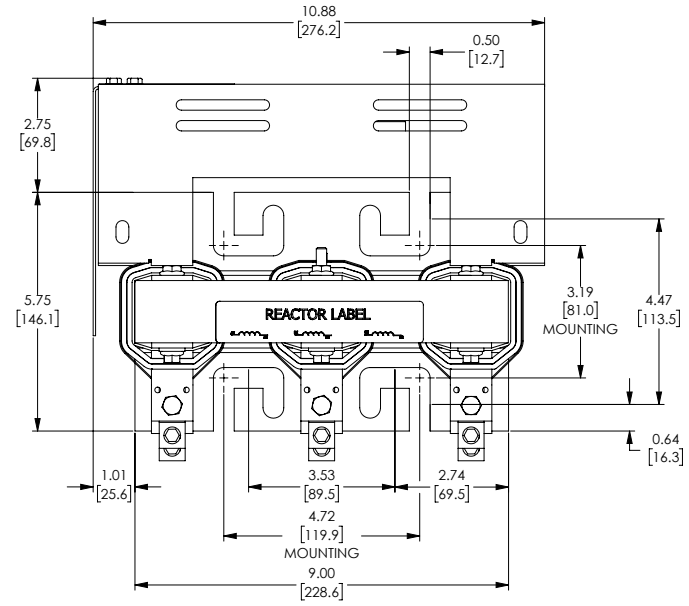


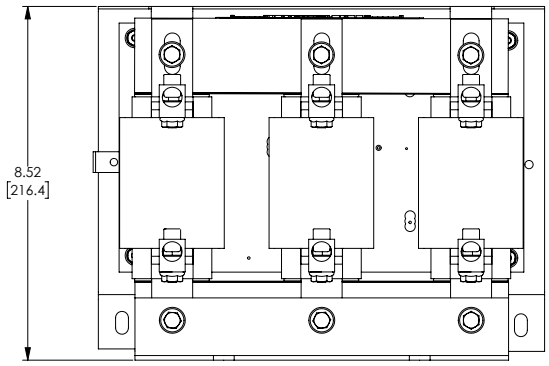
6) VTF Filters Dimension Drawing #6

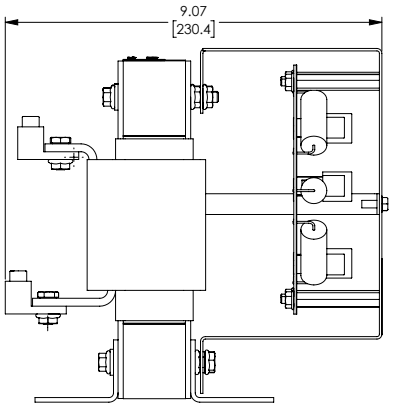
VTF-246-SVW

See our website: www.AutomationDirect.com for complete engineering drawings.

(Units = inches [mm])







EMI Input Filters

The optional accessories listed in this chapter are available for use with the GS4 drive. Selection of these accessories is application specific and may improve drive performance. Additional information regarding filter installation and operation is available in the AutomationDirect white paper, "Applied EMI/RFI Techniques Overview."

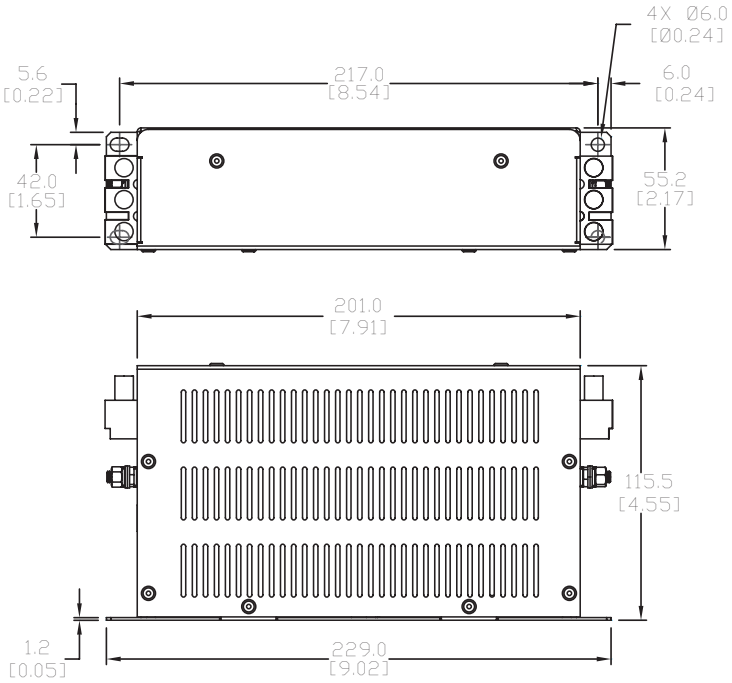
EMI Filters Selection					
Model*	***Description***	***EMI Filter***	***Max Power kW (max/ph)***	***Max Terminal Torque N·m [lb·in]***	***SCCR Rating (kA)***
GS4-41P0	460V 3ph 1.0 hp	***KMF318A***	14.9 / 4.3	2 [17.7]	5
GS4-42P0	460V 3ph 2.0 hp				
GS4-43P0	460V 3ph 3.0 hp				
GS4-45P0	460V 3ph 5.0 hp				
GS4-47P5	460V 3ph 7.5 hp				
GS4-21P0	230V 3ph 1.0 hp	***KMF325A***	20.8 / 6	2 [17.7]	5
GS4-22P0	230V 3ph 2.0 hp				
GS4-23P0	230V 3ph 3.0 hp				
GS4-25P0	230V 3ph 5.0 hp				
GS4-4010	460V 3ph 10hp	***KMF350A***	41.5 / 12	5 [44.3]	10
GS4-4015	460V 3ph 15hp				
GS4-4020	460V 3ph 20hp				
GS4-27P5	230V 3ph 7.5 hp	***KMF370A***	58.1 / 16.8	5 [44.3]	5
GS4-2010	230V 3ph 10hp				
GS4-2015	230V 3ph 15hp				
GS4-4025	460V 3ph 25hp				
GS4-4030	460V 3ph 30hp				
GS4-4040	460V 3ph 40hp				
GS4-2020	230V 3ph 20hp	***KMF3100A***	83 / 24	5 [44.3]	10
GS4-2025	230V 3ph 25hp				
GS4-2030	230V 3ph 30hp				
GS4-4050	460V 3ph 50hp	***MIF375***	62.3 / 18	6 [53.1]	10
GS4-4060	460V 3ph 60hp	***MIF3100***	83 / 24	6 [53.1]	10
GS4-2040	230V 3ph 40hp	***MIF3150***	124.6 / 36	20 [177.0]	10
GS4-2050	230V 3ph 50hp				
GS4-4075	460V 3ph 75hp				
GS4-4100	460V 3ph 100hp				
GS4-2060	230V 3ph 60hp	***MIF3400B***	332.2 / 96	30 [265.5]	30
GS4-2075	230V 3ph 75hp				
GS4-2100	230V 3ph 100hp				
GS4-4125	460V 3ph 125hp				
GS4-4150	460V 3ph 150hp				
GS4-4175	460V 3ph 175hp				
GS4-4200	460V 3ph 200hp				
GS4-4250	460V 3ph 250hp	***MIF3800 & Qty. 3 TOR254***	664.3 / 192	30 [265.5]	30
GS4-4300	460V 3ph 300hp				

** EMI filter selections for GS4-2xxx models are the same whether that particular model is supplied 1-Phase or 3-Phase 230VAC.*

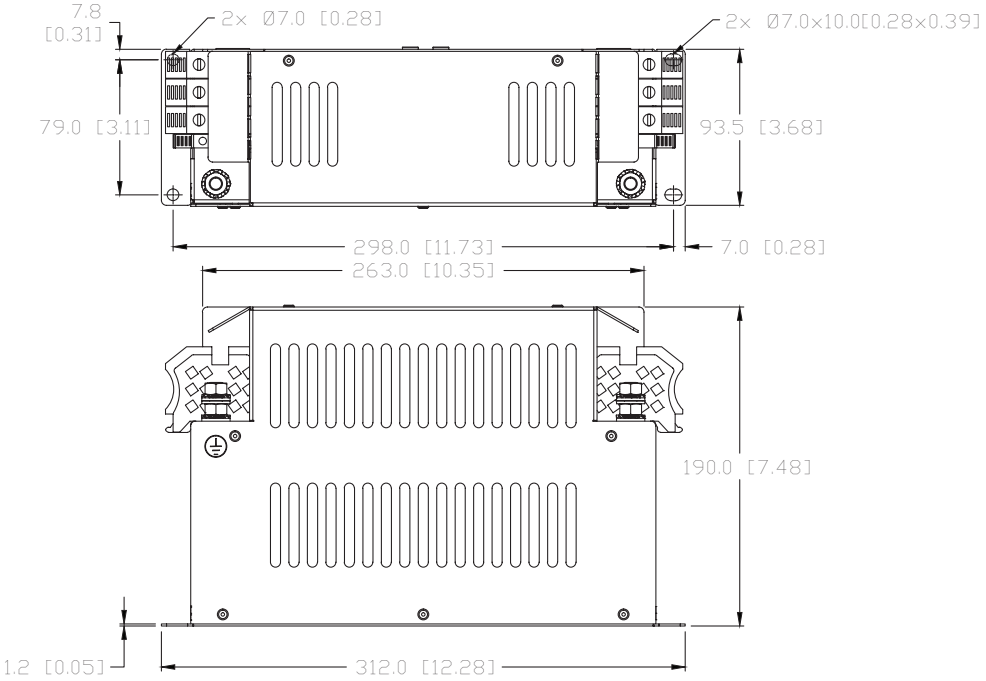
EMI Filter Dimensions

(Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.



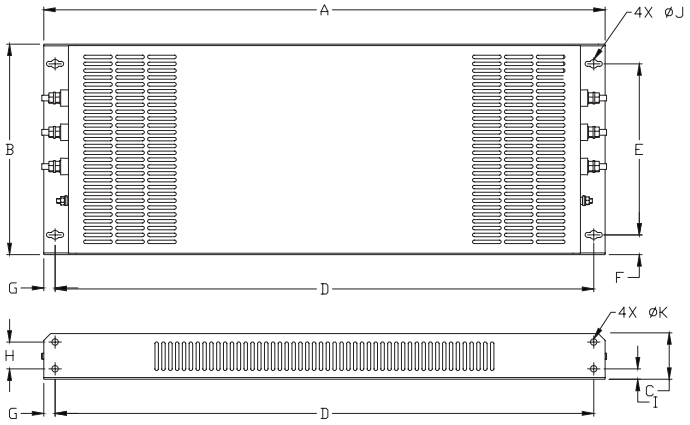
KMF318A KMF325A



KMF350A KMF370A KMF3100A

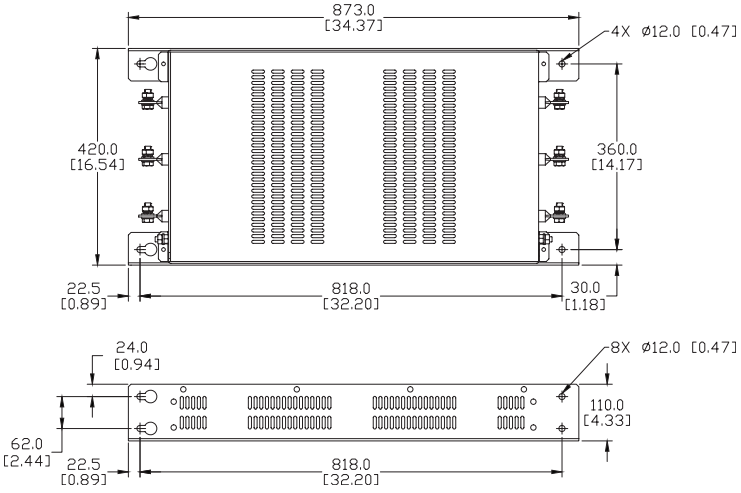
EMI Filter Dimensions (Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.

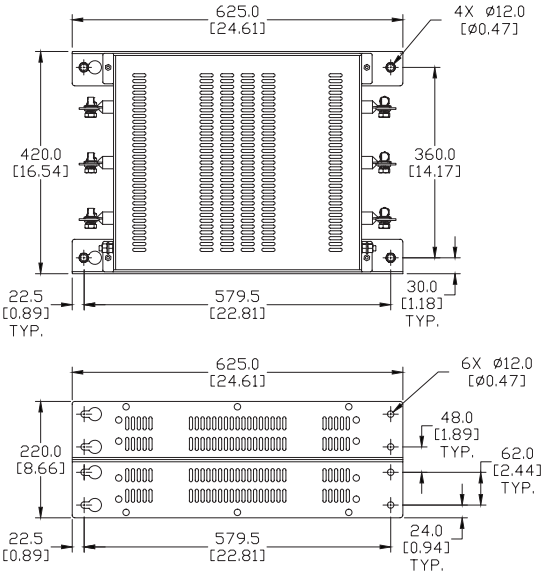


MIF350
MIF375
MIF3150

PART NUMBER	A	B	C	D	E	F	G	H	I	ØJ	ØK
MIF375	686.0 [27.00]	260.9 [10.27]	68.2 [2.68]	646.0 [25.42]	192.0 [7.56]	34.5 [1.36]	20.0 [0.79]	35.0 [1.38]	18.2 [0.72]	12.7 [0.50]	9.0 [0.35]
MIF3100	785.0 [30.89]	274.8 [10.81]	80.2 [3.16]	741.0 [29.16]	215.0 [8.46]	29.9 [1.18]	22.0 [0.87]	47.0 [1.85]	18.2 [0.72]	13.0 [0.51]	9.0 [0.35]
MIF3150	984.0 [38.72]	369.0 [14.52]	81.4 [3.20]	944.0 [37.15]	300.0 [11.81]	34.5 [1.36]	20.0 [0.79]	47.0 [1.85]	18.2 [0.72]	15.0 [0.59]	11.0 [0.43]



MIF3400B



MIF3800

EMI Filter Installation

Electrical equipment like the GS4 drive, will generate electrical noise when in operation and may interfere with the normal operation of peripheral equipment. The use of an EMI filter will mitigate this type of power supply interference. Other measures may be required for reduction or mitigation of radiated emissions. Roxburgh EMI filters have been tested with the GS4 family of drives and are recommended for the mitigation of interference and the highest performance (Please refer to the "Input Side of AC Drive" section of the "Line Reactor Applications and Wiring Connections" chapter in this appendix.

When the GS4 drive and Roxburgh EMI filter are installed and wired according to the user manual, the installation will conform to the following rules:

- *EN61000-6-4*
- *EN61800-3: 1996*
- *EN55011 (1991) Class A Group 1 (1st Environment, restricted distribution)*

General precaution

1) *Install the EMI filter and GS4 drive on the same subpanel or metal plate.*
2) *Install the EMI filter as close as possible to the GS4 drive.*
3) *Keep wiring between the EMI filter and GS4 drive as short as possible.*
4) *The subpanel or metal plate used to support the EMI filter and GS4 drive should be well grounded (minimal resistance to ground is typically less then 1Ω).*
5) *To insure that the EMI filter and GS4 drive are adequately grounded, insure that both are securely attached to the subpanel or plate.*

Choose suitable motor cable and precautions

Proper installation and the the choice of good motor cable will positively affect the performance of the filter. When selecting motor cable, please observe the following precautions.

1) *Cable shielding (double shielding is best).*
2) *Ground the shield on both ends of the motor cable. Maintain minimum length and employ strong mechanical connection to ground.*
3) *Remove paint on the metal saddle, subpanel or plate to insure good contact to ground.*

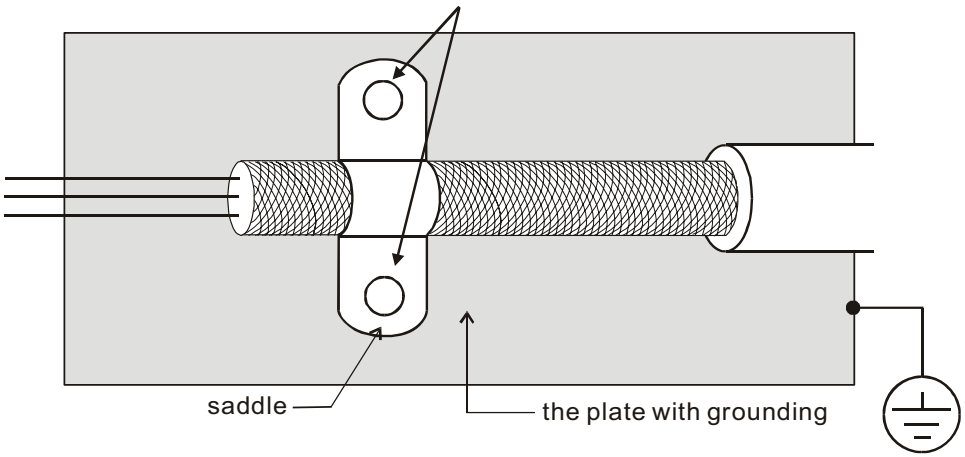


Figure 1

EMI Filter Installation (continued)

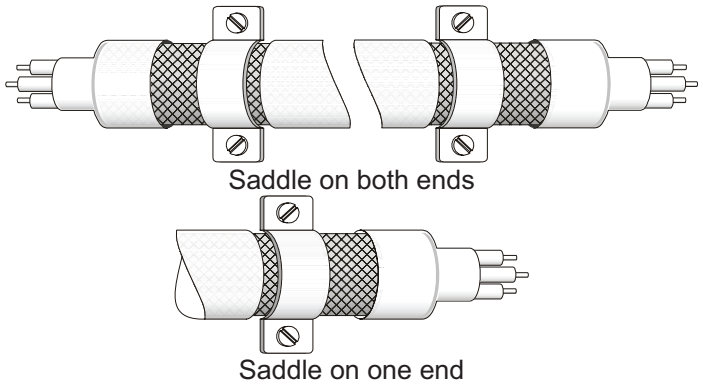


Figure 2

Reflective Wave Phenomenon

The inverter section of a PWM drive like the GS4 does not produce sinusoidal output voltage wave forms. Rather, the output voltage produced is a continuous train of width modulated pulses, sent to the motor terminals via the motor cable.

Peak pulse voltage at the GS4 drive is equal to the drive DC bus voltage and contains steep rise and fall times, the result of the IGBT switching device used in the drive inverter section.

Peak pulse voltage at the motor terminals may exceed the drive DC bus voltage and is dependent on the dynamics of the drive output voltage rise time, cable transmission line characteristics, cable length and motor impedance.

The voltage pulse train at the motor terminals experiences momentary transient over voltage as the IGBT transistors switch. The result being voltage levels at the motor terminals double that of the drive bus voltage.

Over voltage of this type has the potential to stress the motor insulation, damaging the motor.

Recommended Motor Cable Length

1) Never connect phase lead capacitors or surge absorbers to the output terminals of the drive.
2) As cable length increases, capacitance between cables will increase and may result in leakage current and over current faults with the possibility of damage to the GS4 drive.
3) If more than one motor is connected to the drive, the total cable length is the sum of the cable lengths from the GS4 drive to each motor.
4) Should an overload relay malfunction occur, lower the GS4 drive carrier frequency (P2.10) or install an output reactor.
5) When operating an AC motor with a PWM drive like the GS4, the motor may experience reflective wave as described above. To prevent this situation, please observe the recommendations below:
   a) Use a motor with enhanced insulation. (1000V, 1200V, 1600V, higher is better)
   b) Connect an output reactor (optional) to the output terminals of the drive.
   c) Keep motor cable length as short as possible. (65ft, 20m, or less)
   d) Where motor cable lengths will exceed 65ft (20m), refer to the following Recommended Cable Length tables.

Motor Cable Length Charts

Maximum Recommended Cable Length - GS4 - Supplied 230VAC, Single Phase						
GS4 Model	*kW*	*hp*	*Without Output AC Reactor (ft [m])*		*With 3% Output AC Reactor (ft [m])*	
			Shielded Cable	*Unshielded Cable*	*Shielded Cable*	*Unshielded Cable*
GS4-21P0	0.37	0.5	164 [50]	246 [75]	246 [75]	377 [115]
GS4-22P0	0.55	0.75	164 [50]	246 [75]	246 [75]	377 [115]
GS4-23P0	0.75	1	164 [50]	246 [75]	246 [75]	377 [115]
GS4-25P0	1.5	2	164 [50]	246 [75]	246 [75]	377 [115]
GS4-27P5	2.2	3	164 [50]	246 [75]	246 [75]	377 [115]
GS4-2010	2.2	3	164 [50]	246 [75]	246 [75]	377 [115]
GS4-2015	3.7	5	164 [50]	246 [75]	246 [75]	377 [115]
GS4-2020	5.5	7.5	164 [50]	246 [75]	246 [75]	377 [115]
GS4-2025	7.5	10	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2030	7.5	10	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2040	7.5	10	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2050	7.5	10	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2060	11	15	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2075	15	20	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2100	18.5	25	328 [100]	492 [150]	492 [150]	738 [225]

Maximum Recommended Cable Length - GS4 - Supplied 230VAC, Three Phase						
GS4 Model	*kW*	*hp*	*Without Output AC Reactor (ft [m])*		*With 3% Output AC Reactor (ft [m])*	
			Shielded Cable	*Unshielded Cable*	*Shielded Cable*	*Unshielded Cable*
GS4-21P0	0.75	1	164 [50]	246 [75]	246 [75]	377 [115]
GS4-22P0	1.5	2	164 [50]	246 [75]	246 [75]	377 [115]
GS4-23P0	2.2	3	164 [50]	246 [75]	246 [75]	377 [115]
GS4-25P0	3.7	5	164 [50]	246 [75]	246 [75]	377 [115]
GS4-27P5	5.5	7.5	164 [50]	246 [75]	246 [75]	377 [115]
GS4-2010	7.5	10	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2015	11	15	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2020	15	20	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2025	18.5	25	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2030	22	30	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2040	30	40	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2050	37	50	328 [100]	492 [150]	492 [150]	738 [225]
GS4-2060	45	60	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-2075	55	75	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-2100	75	100	492 [150]	738 [225]	738 [225]	1066 [325]

Maximum Recommended Cable Length - GS4 - Supplied 460VAC, Three Phase						
GS4 Model	*kW*	*hp*	*Without Output AC Reactor (ft [m])*		*With 3% Output AC Reactor (ft [m])*	
			Shielded Cable	*Unshielded Cable*	*Shielded Cable*	*Unshielded Cable*
GS4-41P0	0.75	1	164 [50]	246 [75]	246 [75]	377 [115]
GS4-42P0	1.5	2	164 [50]	246 [75]	246 [75]	377 [115]
GS4-43P0	2.2	3	164 [50]	246 [75]	246 [75]	377 [115]
GS4-45P0	3.7	5	164 [50]	246 [75]	246 [75]	377 [115]
GS4-47P5	5.5	7.5	164 [50]	246 [75]	246 [75]	377 [115]
GS4-4010	7.5	10	328 [100]	492 [150]	492 [150]	738 [225]
GS4-4015	11	15	328 [100]	492 [150]	492 [150]	738 [225]
GS4-4020	15	20	328 [100]	492 [150]	492 [150]	738 [225]
GS4-4025	18.5	25	328 [100]	492 [150]	492 [150]	738 [225]
GS4-4030	22	30	328 [100]	492 [150]	492 [150]	738 [225]
GS4-4040	30	40	328 [100]	492 [150]	492 [150]	738 [225]
GS4-4050	37	50	328 [100]	492 [150]	492 [150]	738 [225]
GS4-4060	45	60	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4075	55	75	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4100	75	100	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4125	90	125	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4150	110	150	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4175	132	175	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4200	160	215	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4250	185	250	492 [150]	738 [225]	738 [225]	1066 [325]
GS4-4300	220	300	492 [150]	738 [225]	738 [225]	1066 [325]

Fuses

Protection devices are essential to prevent damage to your GS4 drive and application equipment. Please use the fuse specification chart below to select fuses that are applicable to your GS4 drive. Only use UL-certified fuses which comply with your local regulations.

Fuse Specification Chart GS4 *DURApulse* Drives

Drive Model	For Three-Phase Input Power							For Single-Phase Input Power						
	HP	Input Power			Input Fuse			HP	Input Power			Input Fuse		
		Ø	Volts	GS4 Amps	Fuse Amps	Fast Acting Class T	Edison Class J*		Ø	Volts	GS4 Amps	Fuse Amps	Fast Acting Class T	Edison Class J*
GS4-21P0	1	3	230	6.4	10	TJN10	JHL10	0.5	1	230	6.4	10	TJN10	JHL10
GS4-22P0	2	3	230	12	15	TJN15	JHL15	0.75	1	230	9.7	15	TJN15	JHL15
GS4-23P0	3	3	230	16	25	TJN25	JHL25	1	1	230	15	20	TJN20	JHL20
GS4-25P0	5	3	230	20	35	TJN35	JHL35	2	1	230	20	30	TJN30	JHL30
GS4-27P5	7.5	3	230	28	50	TJN50	JHL50	3	1	230	26	40	TJN40	JHL40
GS4-2010	10	3	230	36	70	TJN70	JHL70	3	1	230	26	40	TJN40	JHL40
GS4-2015	15	3	230	52	100	TJN100	JHL100	5	1	230	40	70	TJN70	JHL70
GS4-2020	20	3	230	72	125	TJN125	JHL125	7.5	1	230	58	100	TJN100	JHL100
GS4-2025	25	3	230	83	150	TJN150	JHL150	10	1	230	76	125	TJN125	JHL125
GS4-2030	30	3	230	99	175	TJN175	JHL175	10	1	230	76	125	TJN125	JHL125
GS4-2040*	40	3	230	124	175	TJN175	JHL175	10	1	230	63	90	TJN90	JHL90
GS4-2050*	50	3	230	143	200	TJN200	JHL200	10	1	230	63	90	TJN90	JHL90
GS4-2060	60	3	230	171	250	TJN250	JHL250	15	1	230	94	150	TJN150	JHL150
GS4-2075	75	3	230	206	300	TJN300	JHL300	20	1	230	124	175	TJN175	JHL175
GS4-2100	100	3	230	245	350	TJN350	JHL350	25	1	230	143	200	TJN200	JHL200
GS4-41P0	1	3	460	4.3	6	TJS6	JHL6	n/a						
GS4-42P0	2	3	460	5.9	10	TJS10	JHL10							
GS4-43P0	3	3	460	8.7	15	TJS15	JHL15							
GS4-45P0	5	3	460	14	20	TJS20	JHL20							
GS4-47P5	7.5	3	460	17	25	TJS25	JHL25							
GS4-4010	10	3	460	20	35	TJS35	JHL35							
GS4-4015	15	3	460	26	45	TJS45	JHL45							
GS4-4020	20	3	460	35	60	TJS60	JHL60							
GS4-4025	25	3	460	40	70	TJS70	JHL70							
GS4-4030	30	3	460	47	90	TJS90	JHL90							
GS4-4040*	40	3	460	63	125	TJS100	JHL100							
GS4-4050	50	3	460	74	100	TJS110	JHL110							
GS4-4060	60	3	460	101	125	TJS150	JHL150							
GS4-4075	75	3	460	114	150	TJS150	JHL150							
GS4-4100	100	3	460	157	200	TJS200	JHL200							
GS4-4125	125	3	460	167	250	TJS250	JHL250							
GS4-4150	150	3	460	207	300	TJS300	JHL300							
GS4-4175	175	3	460	240	350	TJS350	JHL350							
GS4-4200	200	3	460	300	450	TJS450	JHL450							
GS4-4250	250	3	460	380	500	TJS500	JHL500							
–	–					***Fast Acting Current Limiting Class L***								
GS4-4300	300	3	460	400	700	LCU700								

** High-speed Class J.*

Note: JHL fuses can be used with GS and DURApulse drives in non-UL applications. Fuse the drive according to NEC guidelines (NEC Article 430). For UL applications, GS, and DURApulse drives require Class T fuses (refer to the drive's user manual for details).

*** Includes DC choke*

Dynamic Braking

Dynamic braking resistors dissipate the regeneration energy of AC motors when they are being controlled to a stop faster than a coasting stop. All GS4 drives have this feature. The need for a Dynamic Braking Unit is determined by the drive size and shown in the chart below. To utilize dynamic braking:

1) Wire the appropriate braking resistor to terminals B1/B2 (refer to page 2–19)
2) Set parameter P06.28 for Dynamic Braking Voltage Level for the application. When the DC bus voltage rises above this setpoint, the dynamic braking circuit will activate.

To avoid possible injury, please refer to chapter 2 of this user manual for correct wiring of the resistors and dynamic braking units.

Dynamic Unit Braking Specifications

GS4 AC Drive Dynamic Braking Specifications

Drive Rating	Motor Power (hp)	Motor Power (kW)	Drive Model	Dynamic Braking Unit Qty.	Dynamic Braking Unit Pt#	Drive Braking Circuit B1/B2 Min Resistor Value (Ω)	Drive Braking Circuit B1/B2 Max Total Brake Current (A)	Drive Braking Circuit B1/B2 Peak Power (kW)	Compatible Brake Resistors** (125% Torque, 10% Duty Cycle)
230V	1	0.7	GS4-21P0	–	n/a	63.3	6	2.3	Click here
	2	1.5	GS4-22P0			47.5	8	3.0	
	3	2.2	GS4-23P0			38.0	10	3.8	
	5	3.7	GS4-25P0			19.0	20	7.6	
	7.5	5.5	GS4-27P5			14.6	26	9.9	
	10	7.5	GS4-2010			14.6	26	9.9	
	15	11	GS4-2015			13.6	28	10.6	
	20	15	GS4-2020			8.3	46	17.5	
	25	18	GS4-2025			8.3	46	17.5	
	30	22	GS4-2030			5.8	66	25.1	
	40	30	GS4-2040	2	GS-1DBU	4.8*	80*	30.4*	
	50	37	GS4-2050	2	GS-2DBU	3.2*	120*	45.6*	
	60	45	GS4-2060	2	GS-2DBU	3.2*	120*	45.6*	
	75	55	GS4-2075	3	GS-2DBU	2.1*	180*	68.4*	
	100	75	GS4-2100	4	GS-2DBU	1.6*	240*	91.2*	
460V	1	0.7	GS4-41P0	–	n/a	190	4	3.0	
	2	1.5	GS4-42P0			126.7	6	4.6	
	3	2.2	GS4-43P0			108.6	7	5.3	
	5	3.7	GS4-45P0			84.4	9	6.8	
	7.5	5.5	GS4-47P5			54.3	14	10.6	
	10	7.5	GS4-4010			47.5	16	12.2	
	15	11	GS4-4015			42.2	18	13.7	
	20	15	GS4-4020			26.2	29	22.0	
	25	18	GS4-4025			23.0	33	25.1	
	30	22	GS4-4030			23.0	33	25.1	
	40	30	GS4-4040			14.1	54	41.0	
	50	40	GS4-4050	1	GS-4DBU	12.7*	60*	45.6*	
	60	45	GS4-4060	1	GS-4DBU	12.7*	60*	45.6*	
	75	55	GS4-4075	2	GS-3DBU	9.5*	80*	60.8*	
	100	75	GS4-4100	2	GS-4DBU	6.3*	120*	91.2*	
	125	90	GS4-4125	2	GS-4DBU	6.3*	120*	91.2*	
	150	110	GS4-4150	1	GS-5DBU	6.0*	126*	95.8*	
	175	132	GS4-4175	1	GS-6DBU	4.0*	190*	144.4*	
	200	160	GS4-4200	1	GS-6DBU	4.0*	190*	144.4*	
	250	185	GS4-4250	1	GS-7DBU	3.4*	225*	172.1*	
	300	220	GS4-4300	2	GS-5DBU	3.0*	252*	190.5*	

** These values are per individual DBU, as seen between DBU terminals B1 and B2.*
*** 10% Duty Cycle with maximum ON (braking) time of 10 seconds.*

For a full list of all brake resistors compatible with GS4 drives, please see the GS4 series braking technical specification: https://cdn.automationdirect.com/static/specs/gs4accbrake.pdf.

Please refer to the Dynamic Braking User Manual for detailed information on DBU installation and wiring: https://cdn.automationdirect.com/static/manuals/gs3dbm/gs-db_ump.pdf

USB to RS-485 PC Adapter

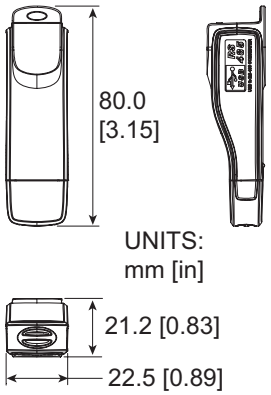
Convenient 2-wire USB to RS-485 serial communication adapter for universal RS-485. Does not require an external power supply or complicated configuration process.

USB-485M Adapter Specifications	
Adapter Part #	USB-485M
Power Supply	No external power supply needed
Power Consumption	0.4 W
Voltage Isolation	3000VDC
Baud Rates Supported	75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (bps)
Transmission Type	RS-485 half-duplex (2-wire)
LED Display	Steady Green LED ON: power is ON. Blinking orange LED: data is transmitting.
USB Connector	Type A (plug)
RS-485 Connector	RJ45
Compatibility	USB v6.7.4 specification
PC Compatibility	Windows Operating System required for bridge & driver installation: Windows 7/8/8.1/10 (v6.7.4) Windows XP/Server 2003/Vista/7/8/8.1 (v6.7)

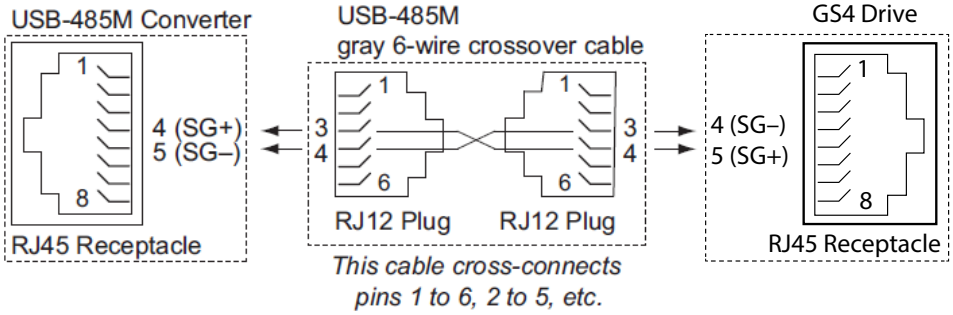
Note:

For the 2-wire cable (RJ12 to flying leads) included with the USB-485M; Red wire plugs into terminal SG+ on the drive. Green wire plugs into SG- on the drive.

Also, the included 6-conductor RJ12 crossover cable connects the USB-485M directly to the RS485 RJ45 ports on the GS4. (the drives' RJ45 ports can accept 6-conductor RJ12 connectors).



USB-485M to GS4 Wiring and Pin-out



Conduit Box Kit

Optional conduit box kits can be ordered separately. The kits bolt onto the bottom of the applicable GS4 drive to provide a convenient connection point for conduit entry.

Note: Frames A through C have integral conduit box space built into the drive. No separate conduit box is available.

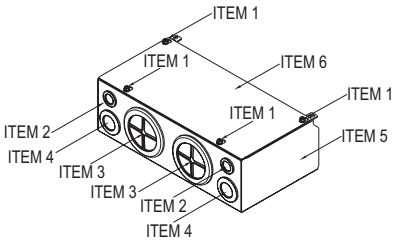
Frame D

Applicable models

GS4-2040; GS4-2050;
GS4-4075; GS4-4100

Model GS4-CBX-D

ITEM	*Description*	*Qty.*
1	Screw M5x0.8x10L	4
2	Bushing Rubber 28	2
3	Bushing Rubber 44	2
4	Bushing Rubber 88	2
5	Conduit box cover	1
6	Conduit box base	1



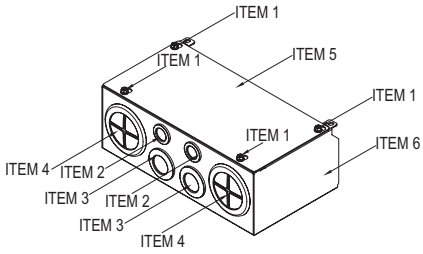
Frame D0

Applicable models

GS4-4060, GS4-4050

Model GS4-CBX-D0

ITEM	*Description*	*Qty.*
1	Screw M5x0.8x10L	4
2	Bushing Rubber 28	2
3	Bushing Rubber 44	2
4	Bushing Rubber 73	2
5	Conduit box cover	1
6	Conduit box base	1



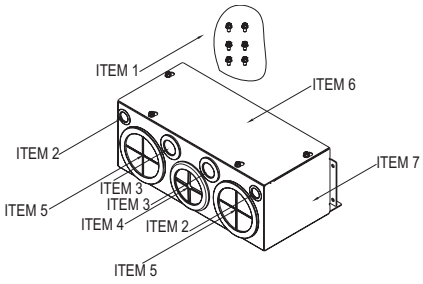
Frame E

Applicable models

GS4-2060; GS4-2075; GS4-2100;
GS4-4125; GS4-4150

Model GS4-CBX-E

ITEM	*Description*	*Qty.*
1	Screw M5x0.8x10L	6
2	Bushing Rubber 28	2
3	Bushing Rubber 44	4
4	Bushing Rubber 100	2
5	Conduit box cover	1
6	Conduit box base	1



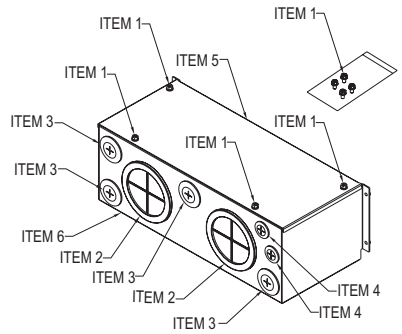
Frame F

Applicable models

GS4-4150; GS4-4200

Model GS4-CBX-F

ITEM	*Description*	*Qty.*
1	Screw M5x0.8x10L	8
2	Bushing Rubber 28	2
3	Bushing Rubber 44	4
4	Bushing Rubber 100	2
5	Conduit box cover	1
6	Conduit box base	1



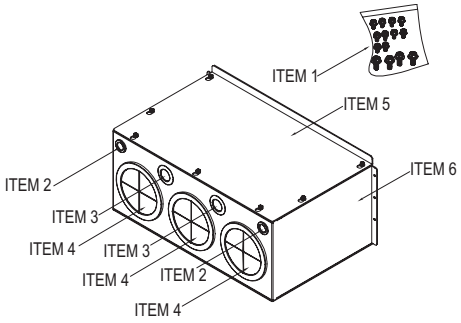
Frame G

Applicable models

GS4-4250; GS4-4300

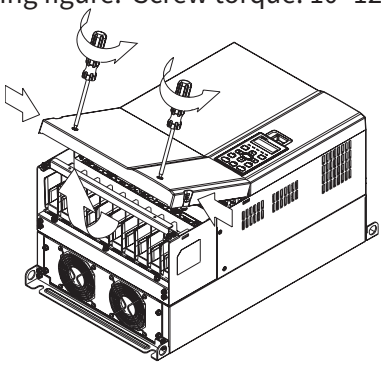
Model GS4-CBX-G

ITEM	*Description*	*Qty.*
1	Screw M5x0.8x 10L	10
1	Screw M8x1.25x10L	4
2	Bushing Rubber 28	2
3	Bushing Rubber 44	2
4	Bushing Rubber 130	3
5	Conduit box base	1
6	Conduit box cover	1

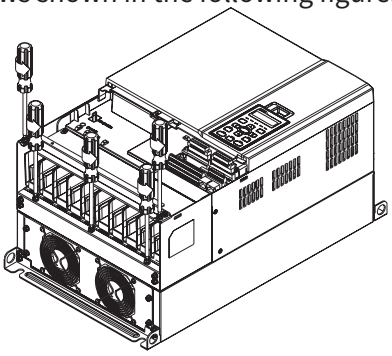


Conduit Box Installation – Frames D0 and D

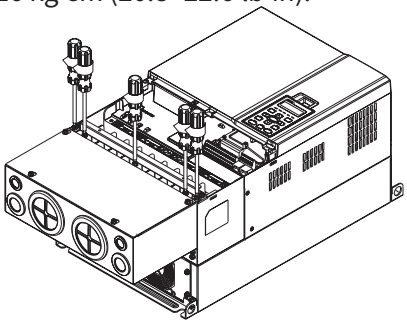
Loosen the cover screws and press the tabs on each side of the cover to remove the cover, as shown in the following figure. Screw torque: 10~12 kg·cm (8.66~10.39 lb·in).



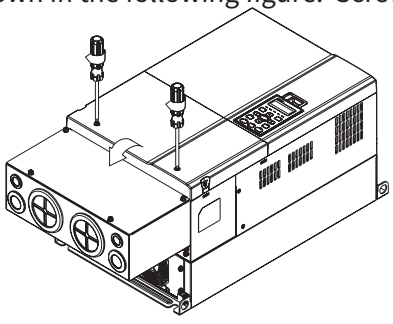
Remove the 5 screws shown in the following figure. Screw torque: 24~26 kg·cm (20.8~22.6 lb·in).



Install the conduit box by fastening the 5 screws shown in the following figure.
Screw torque: 24~26 kg·cm (20.8~22.6 lb·in).



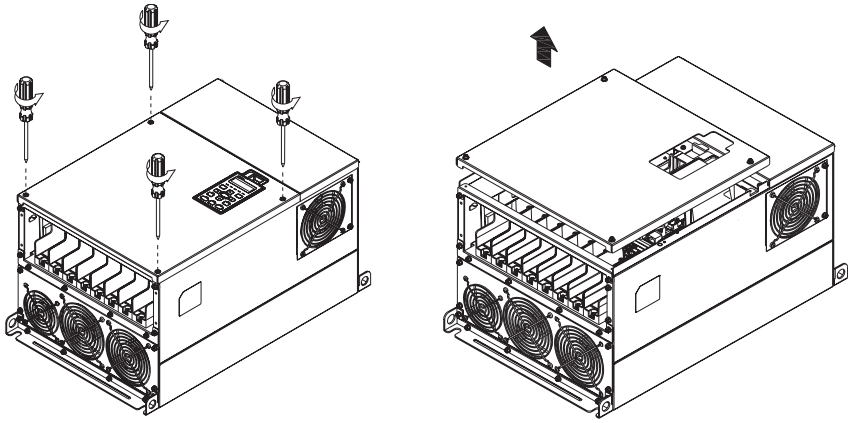
Fasten 2 screws shown in the following figure. Screw torque: 10~12 kg·cm (8.66~10.39 lb·in).



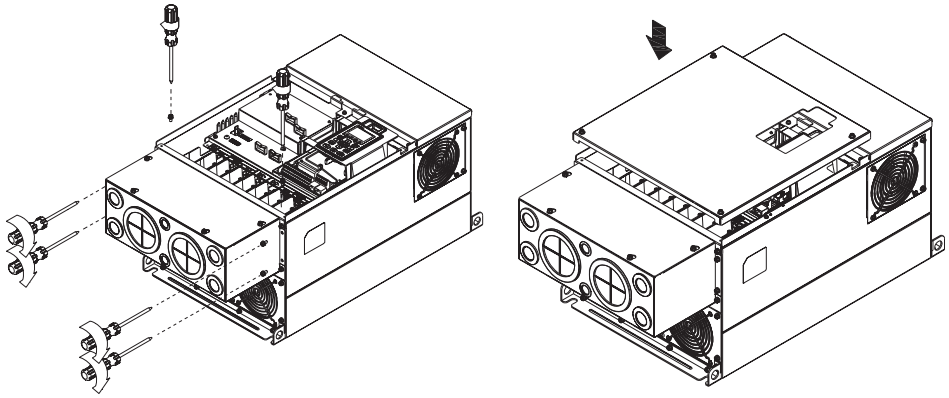
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Conduit Box Installation – Frame E

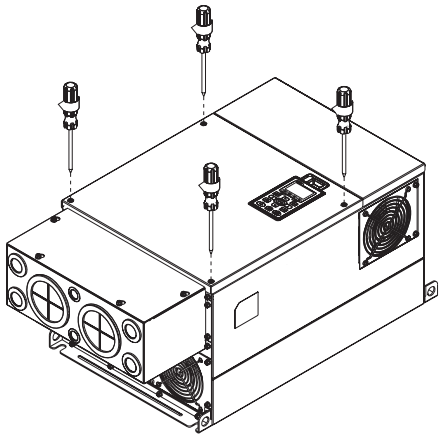
Loosen the 4 cover screws and lift the cover. Screw torque: 12~15 kg·cm (10.4~13 lb·in).



Fasten the 6 screws shown in the following figure and place the cover back to the original position. Screw torque: 24~26 kg·cm (20.8~22.6 lb·in).



Fasten the 4 screws shown in the following figure. Screw torque: 12~15 kg·cm (10.4~13 lb·in)

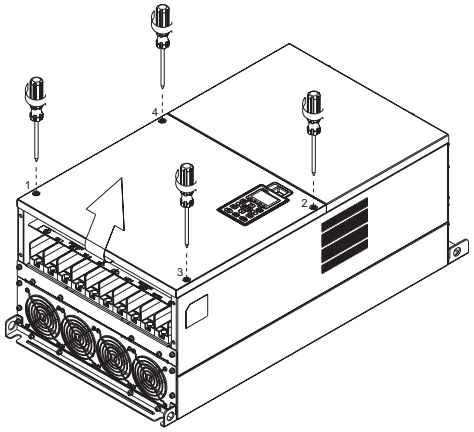


REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Conduit Box Installation – Frame F

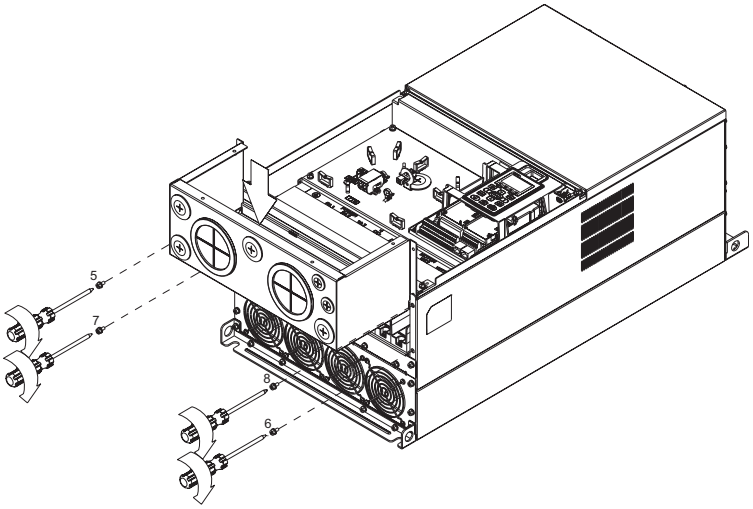
Loosen the cover screws to remove the cover, as shown.

Screw torque: 14~16 kg·cm (12.2~13.9 lb·in)



Install the conduit box by fastening the 4 screws, as shown.

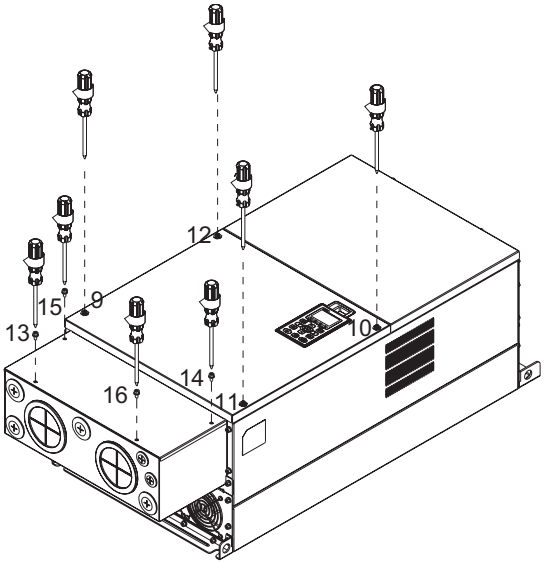
Screw torque:
24~26 kg·cm (20.8~22.6 lb·in)



Install the covers of conduit box and driver by fastening all the screws as shown.

Screw **#9~12** torque:
14~16 kg·cm (12.2~13.9 lb·in.)

Screw **#13~16** Torque:
24~26 kg·cm (20.8~22.6 lb·in.)

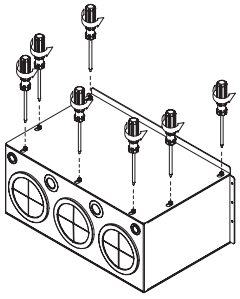


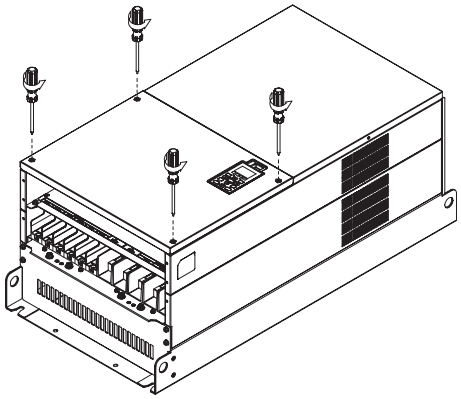
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Conduit Box Installation – Frame G

On the conduit box, loosen 7 of the cover screws and remove the cover, as shown.

Screw torque:
24~26 kg·cm (20.8~22.6 lb·in)



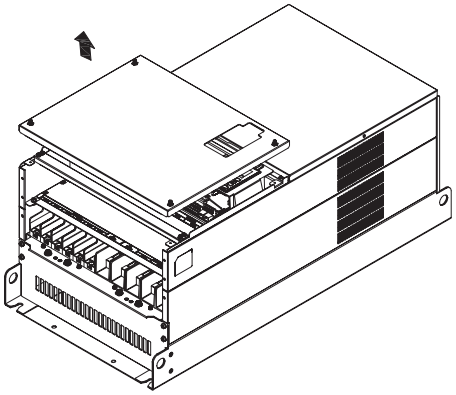


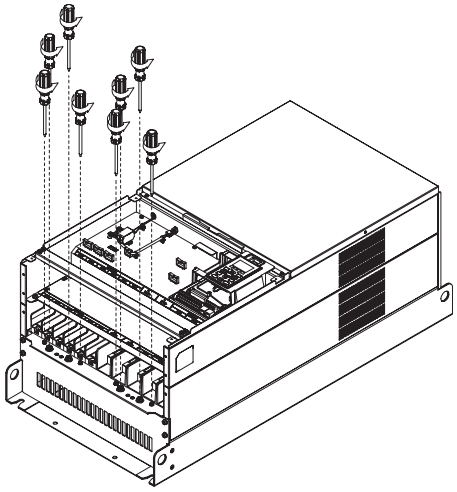
On the drive, loosen 4 of the cover screws to remove the cover, as shown.

Screw torque:
12~15 kg·cm (10.4~13 lb·in).

Remove the top cover and loosen the screws, as shown.

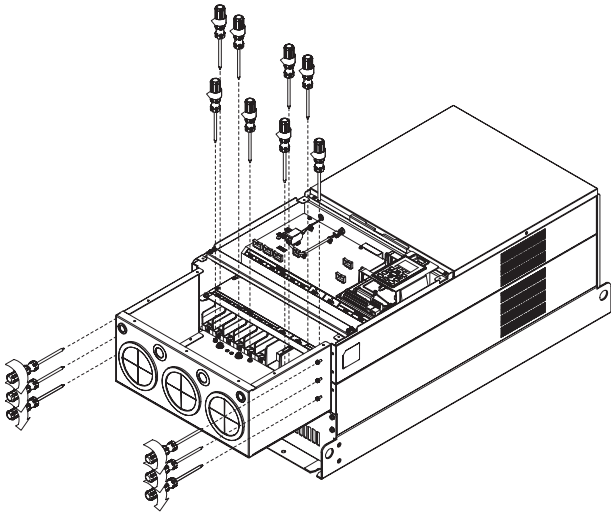
Screw torque:
M5:
24~26 kg·cm
(20.8~22.6 lb·in)
M8:
100~120 kg·cm
(86.7~104.2 lb·in)





Install the conduit box by fastening all the screws shown.

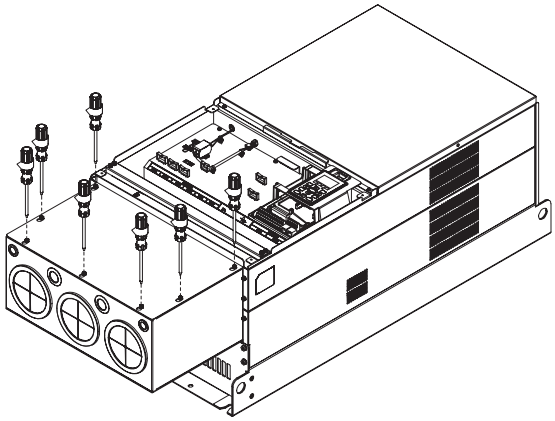
Screw torque:
M5:
24~26 kg·cm (20.8~22.6 lb·in)
M8:
100~120 kg·cm (86.7~104.2 lb·in)



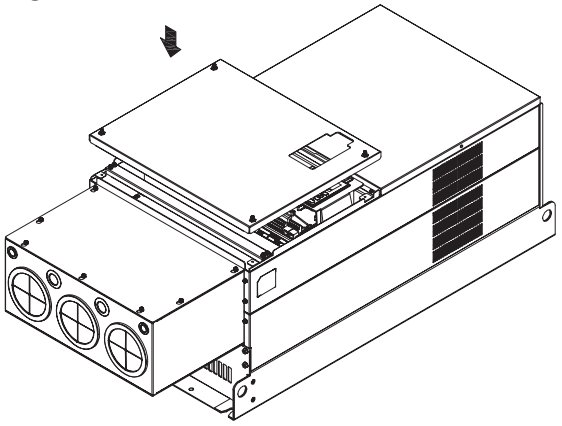
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

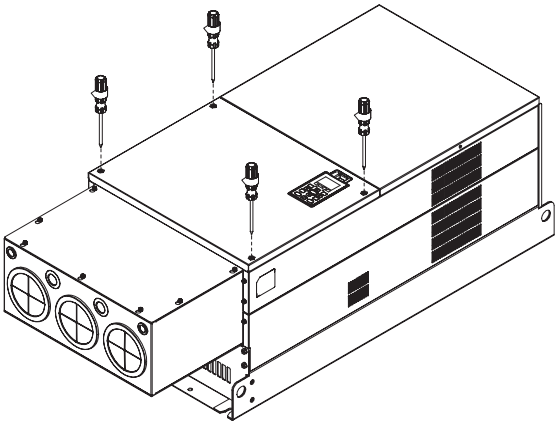
Frame G Conduit Box Installation (continued)

Fasten all the screws. Screw torque: 24~26 kg·cm (20.8~22.6 lb·in).



Place the cover back to the top and fasten the screws (as shown in the figure).
Screw torque: 12~15 kg·cm (10.4~13 lb·in).





REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

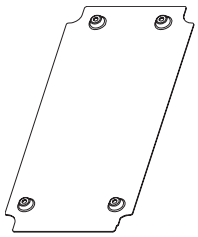
Flange Mounting Kits (Frames A, B, C)

Optional GS4 drive flange mounting kits allow the heat sinks on the back of select GS4 drives to be positioned through the back of the control enclosure. Since a majority of the heat generated by the GS4 drive will be outside the enclosure, heat load will be reduced and a smaller enclosure may possibly be used. These flange mounting kits are applicable to GS4 drive frame sizes A through C. Frames D0, D, E, and F have integral flange mounting hardware (see cutout dimensions below). Frame size G cannot be flange-mounted.

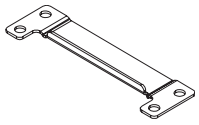
Flange Mounting Kits – Frame A

GS4-FMKIT-1

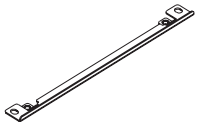
Applicable models: GS4-22P0; GS4-23P0; GS4-43P0



Accessory 1 - Qty. 1



Accessory 2 - Qty. 2



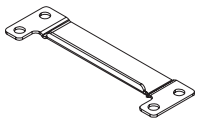
Accessory 3 - Qty. 2

Screw 1 - Qty. 4
M3*P 0.5; L=6mm

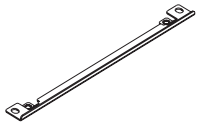
Screw 2 - Qty. 8
M6*P 1.0; L=16mm

GS4-FMKIT-A

Applicable models: GS4-21P0; GS4-25P0; GS4-41P0; GS4-42P0; GS4-45P0; GS4-47P5



Accessory 2 - Qty. 2



Accessory 3 - Qty. 2

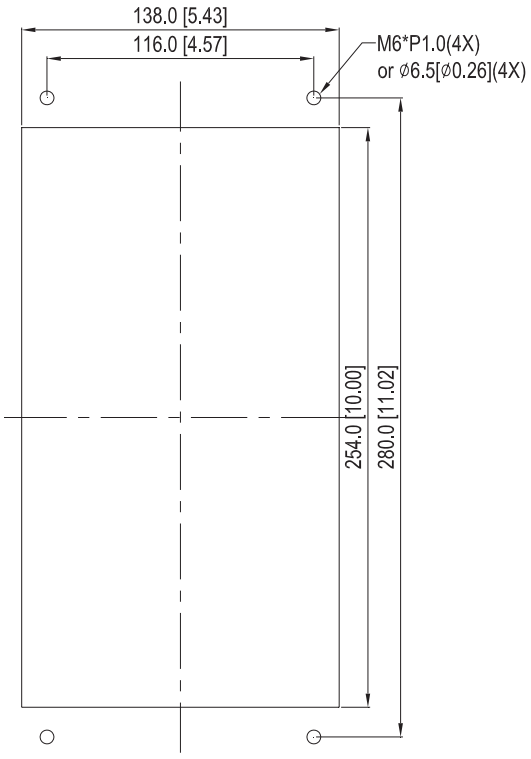
Screw 2 - Qty. 8
M6*P 1.0; L=16mm

Protection Ratings

Top Cover Removed:
IP20/UL Open Type

Standard w/Top Cover:
IP20/UL Type 1/NEMA 1

Frame A Cutout Dimensions _ mm [in]

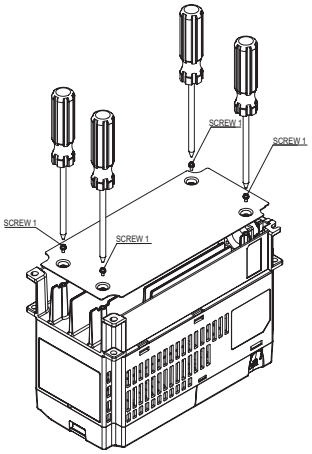


GS4-FMKIT-1 INSTALLATION

STEP 1

Install **accessory 1** by fastening 4 of the **screws s1**(M3).

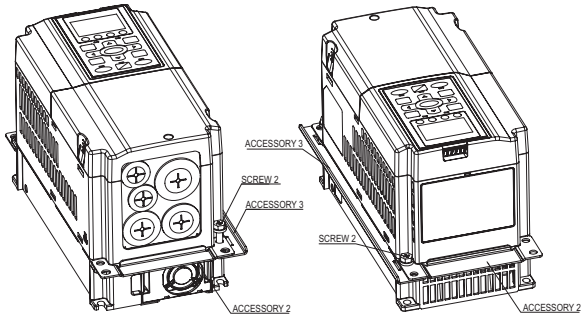
Screw torque:
6 - 8 kg·cm (5.21 - 6.94 lb·in).



STEP 2

Install **accessories 2 and 3** by fastening 2 of the **screws 2**(M6).

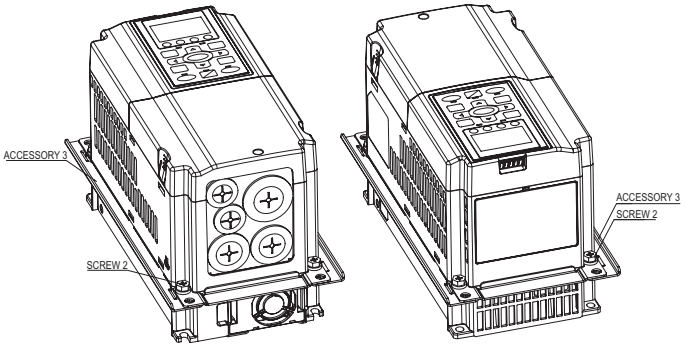
Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).



STEP 3

Install **accessories 2 and 3** by fastening 2 of the **screws 2**(M6).

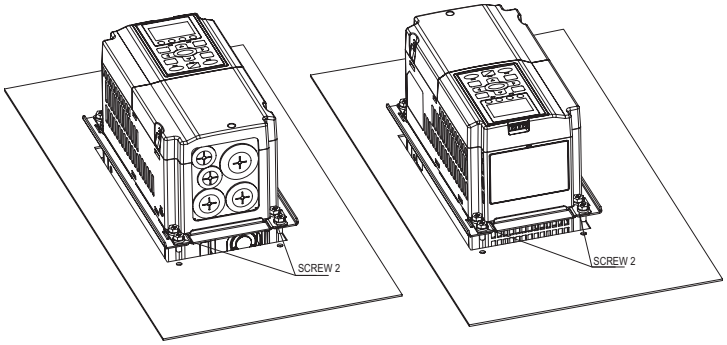
Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).



STEP 4

For plate installation, place 4 of the **screw 2** (M6) through **accessories 2 and 3** and the plate then fasten the screws.

Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).

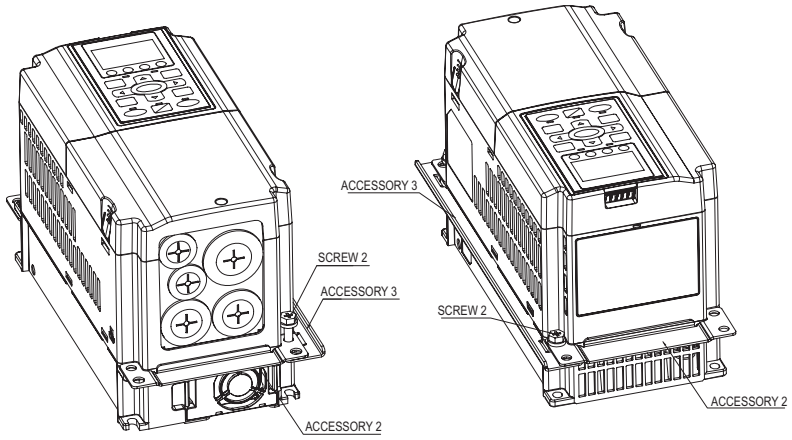


GS4-FMKIT-A INSTALLATION

STEP 1

Install **accessories 2 and 3** by fastening 2 of the **screws 2**(M6).

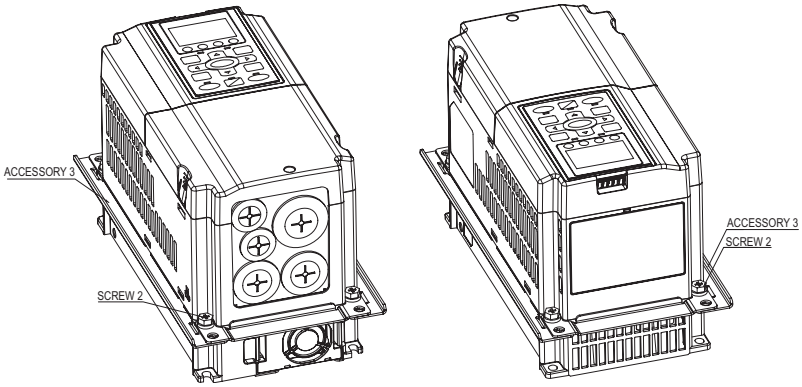
Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).



STEP 2

Install **accessories 2 and 3** by fastening 2 of the **screws 2**(M6).

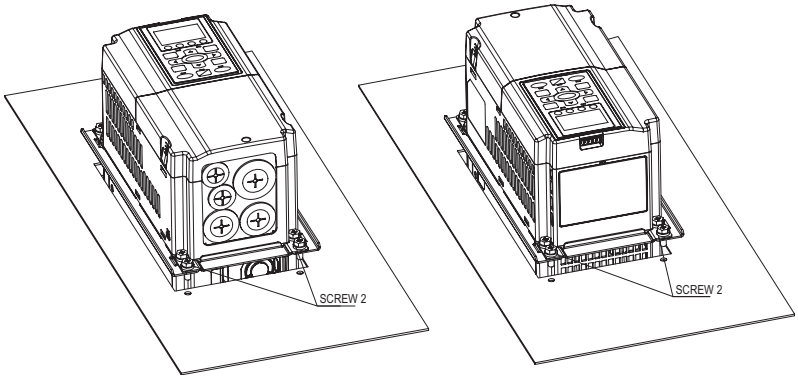
Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).



STEP 3

For plate installation, place 4 of the **screws 2** (M6) through **accessories 2 and 3** and the plate, then fasten the screws.

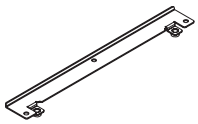
Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).



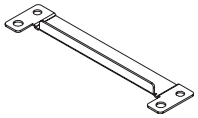
Flange Mounting Kits – Frame B

GS4-FMKIT-B

Applicable models: GS4-27P5; GS4-2010; GS4-2015; GS4-4010; GS4-4015; GS4-4020



Accessory 1 - Qty. 2



Accessory 2 - Qty. 2

Screw 1 - Qty. 4
Size M8xP 1.25

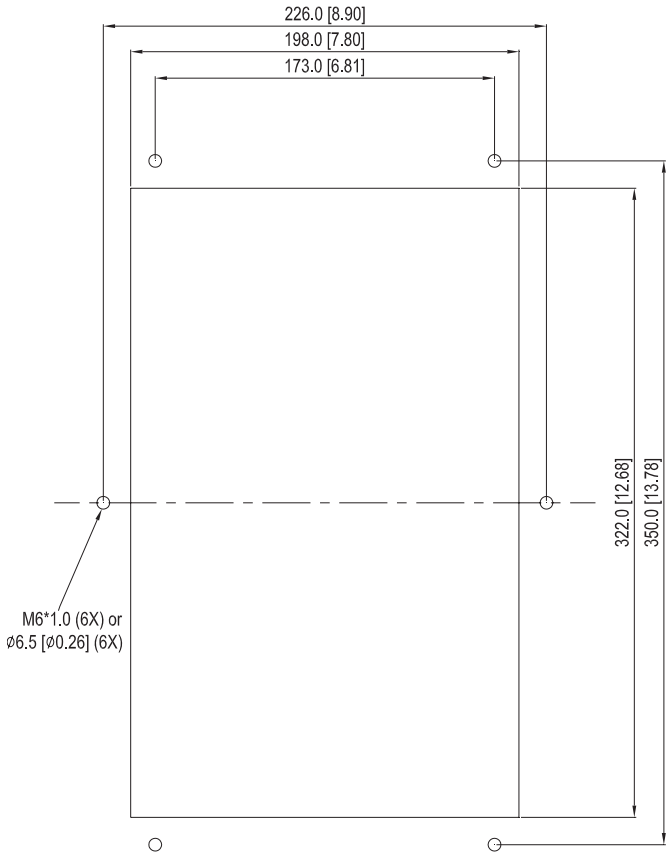
Screw 2 - Qty. 6
Size M6xP 1.0

Protection Ratings

Top Cover Removed:
IP20/UL Open Type

Standard w/Top Cover:
IP20/UL Type 1/NEMA 1

Frame B Cutout Dimensions _ mm [in]

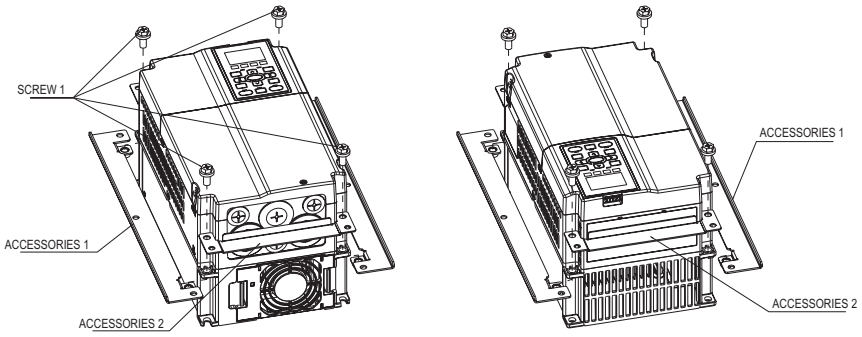


GS4-FMKIT-B INSTALLATION

STEP 1

Install **accessories 1 and 2** by fastening 4 of the **screws 1** (M8).

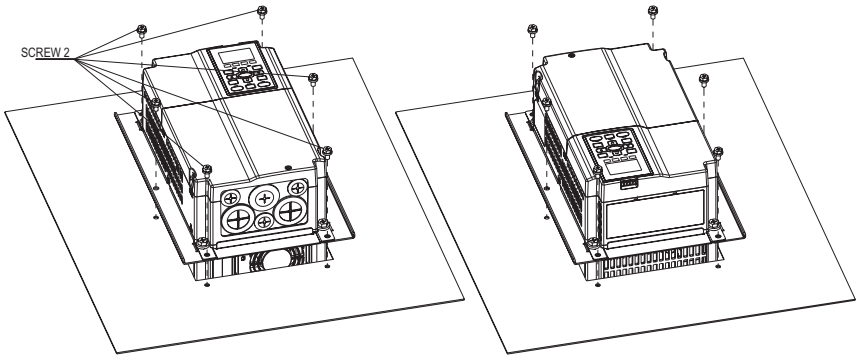
Screw torque:
40 - 45 kg·cm (34.7 - 39.0 lb·in).



STEP 2

For plate installation, place 6 of the **screws 2** (M6) through **accessories 1 and 2** and fasten to the plate.

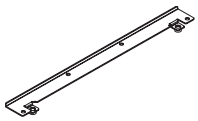
Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).



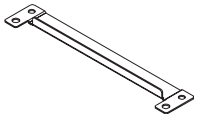
Flange Mounting Kits – Frame C

GS4-FMKIT-C

Applicable models: GS4-2020; GS4-2025; GS4-2030; GS4-4025; GS4-4030; GS4-4040



Accessory 1 - Qty. 2



Accessory 2 - Qty. 2

Screw 1 - Qty. 4
Size M8xP 1.25

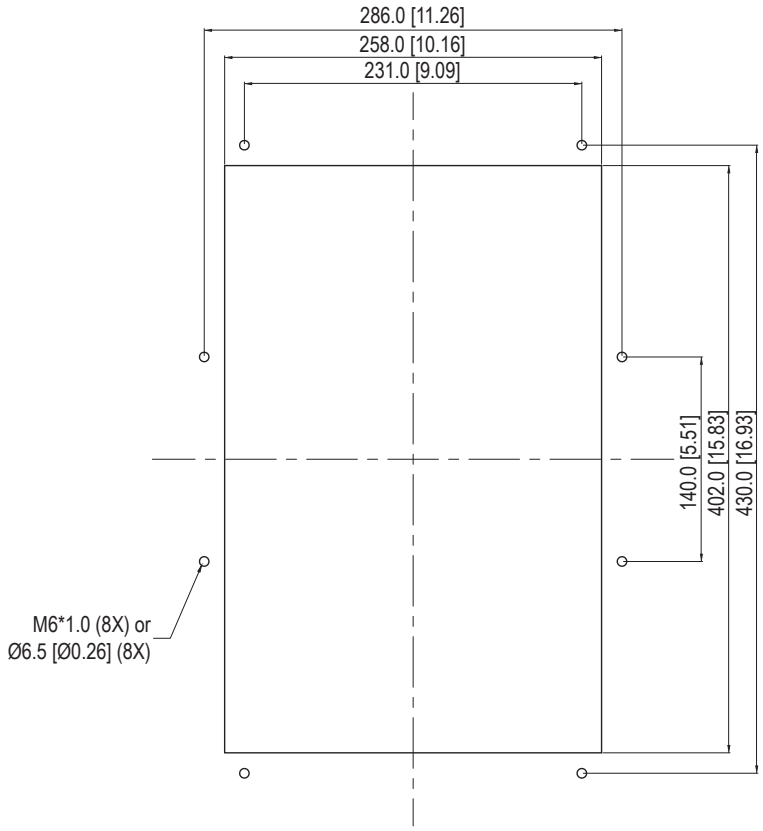
Screw 2 - Qty. 8
Size M6xP 1.0

Protection Ratings

Top Cover Removed:
IP20/UL Open Type

Standard w/Top Cover:
IP20/UL Type 1/NEMA 1

Frame C Cutout Dimensions _ mm [in]

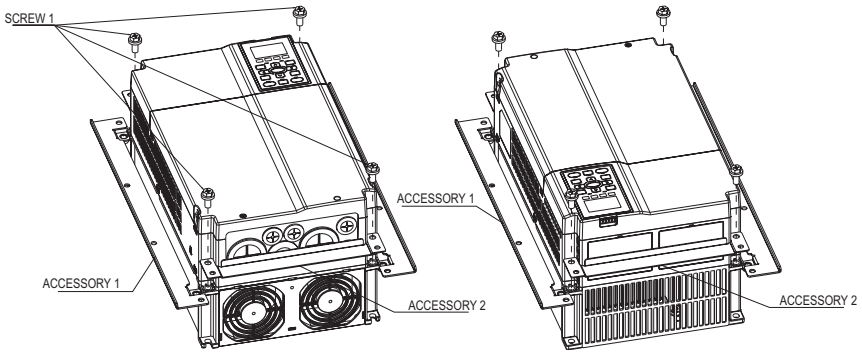


GS4-FMKIT-C INSTALLATION

STEP 1

Install **accessories 1 and 2** by fastening 4 of the **screws 1** (M8).

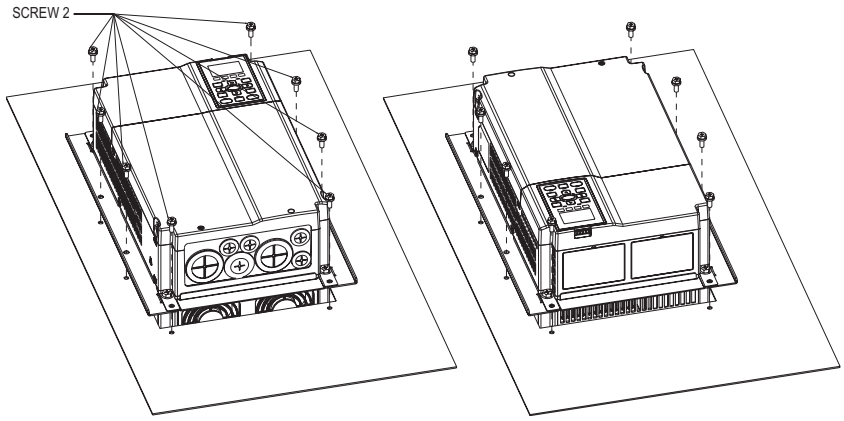
Screw torque:
50 - 55 kg·cm (43.4 - 47.7 lb·in).



STEP 2

For plate installation, place 8 of the **screws 2** (M6) through **accessories 1 and 2** and then fasten to the plate.

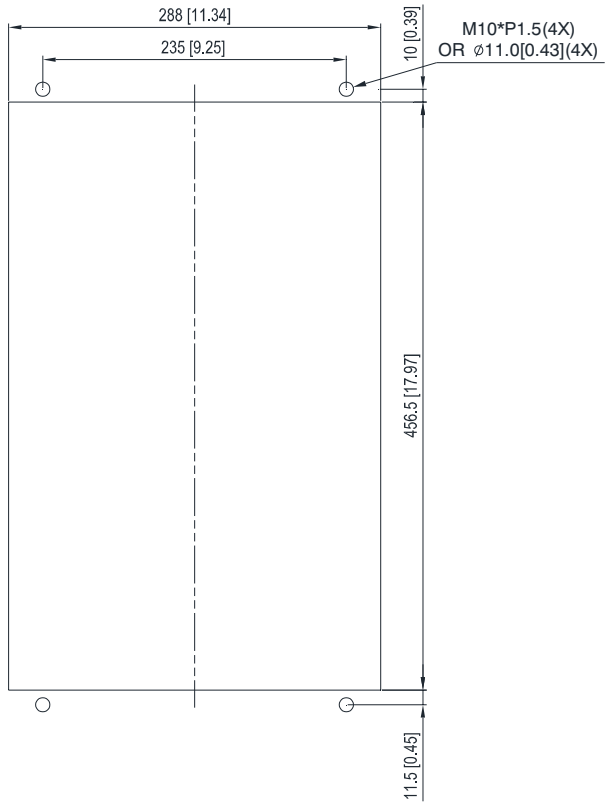
Screw torque:
25 - 30 kg·cm (5.21 - 6.94 lb·in).



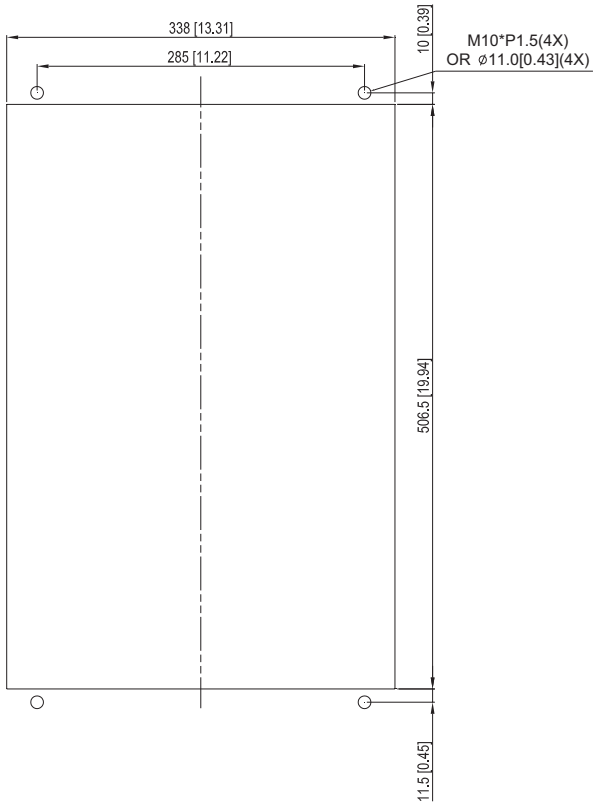
Instructions for Built-in Flange Mounting (Frames D0, D, E, F)

Cutout Dimensions

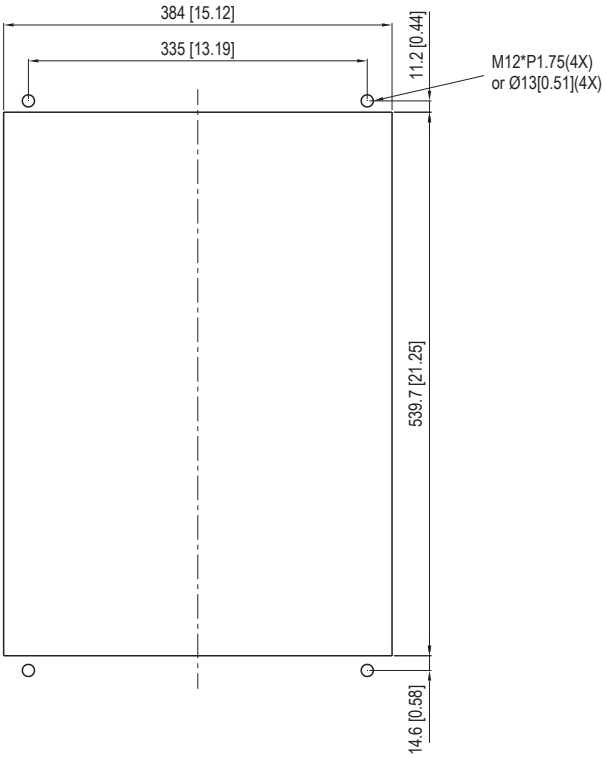
Frame D0 Cutout Dimensions _ mm [in]



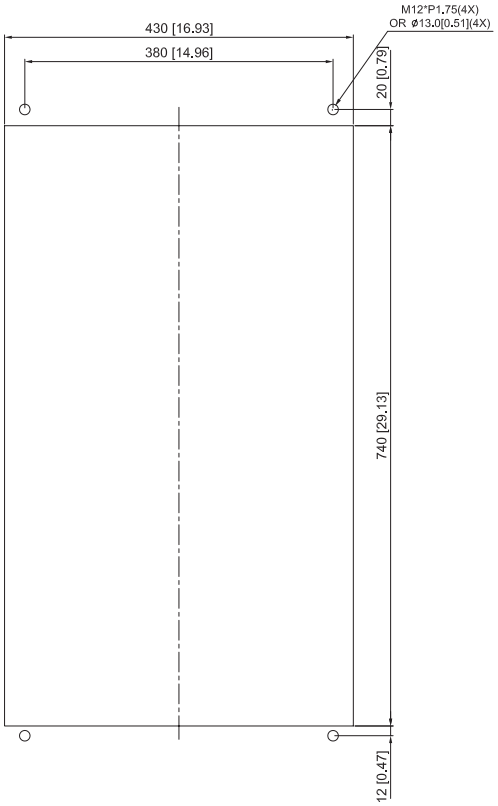
Frame D Cutout Dimensions _ mm [in]



Frame E Cutout Dimensions _ mm [in]



Frame F Cutout Dimensions _ mm [in]

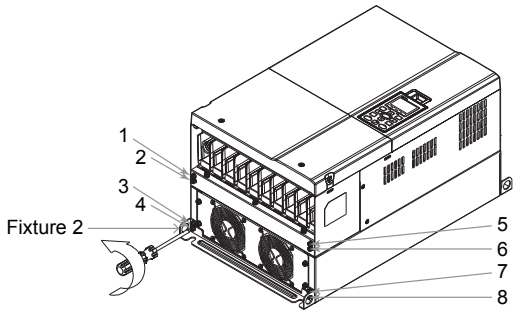


Flange Mounting Instructions – Frames D0, D, E

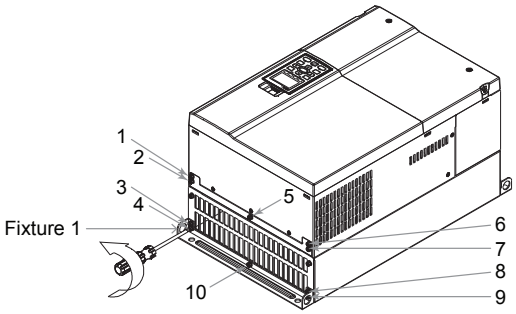
Applicable models: GS4- 2040, 2050, 2060, 2075, 2100, 4050, 4060, 4075, 4100, 4125, 4150

In order to flange mount the drive, move the upper and lower mounting fixtures forward from the base of the integral drive heat sink to the base of the drive itself (as described below).

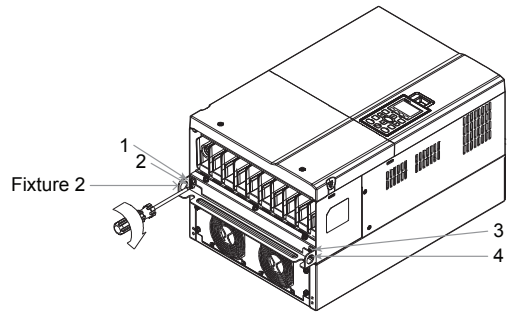
1) (Bottom) Loosen 8 screws and remove Fixture 2 from behind the fans:



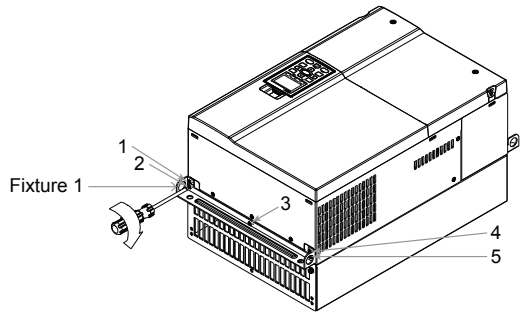
2) (Top) Loosen 10 screws and remove Fixture 1 from behind the vents:



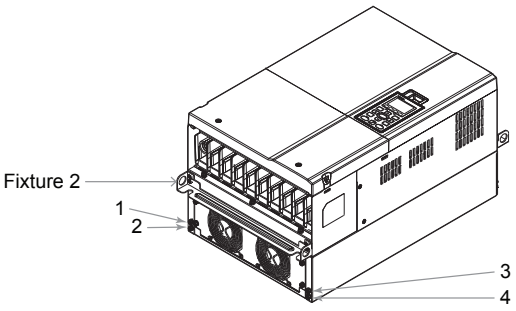
3) (Bottom) Move Fixture 2 forward of the fans and fasten 4 screws [screw torque: 30~32 kg·cm (26.0~27.8 lb·in)]:



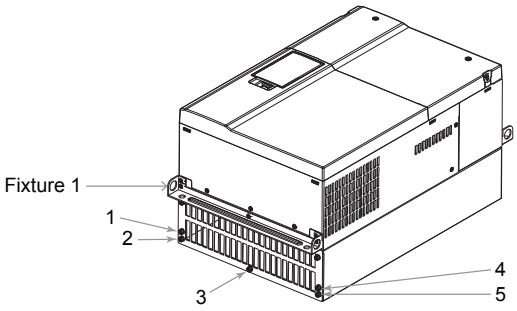
4) (Top) Move Fixture 1 forward of the vents and fasten 5 screws [screw torque: 30~32 kg·cm (26.0~27.8 lb·in)]:



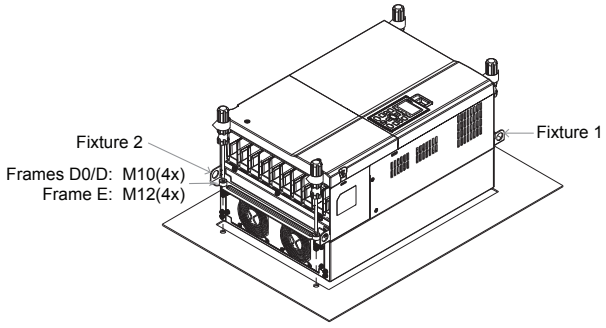
5) (Bottom) Fasten 4 screws rearward of the fans [screw torque: 24~26 kg·cm (20.8~22.6 lb·in)]:



6) (Top) Fasten 5 screws rearward of the vents [screw torque: 24~26 kg·cm (20.8~22.6 lb·in)]:



7) Place 4 screws (M10) through Fixtures 1 & 2 and the plate, and then fasten the screws:
[Frames D0 & D – M10*4 – Screw torque: 200~240 kg·cm (173.6~208.3 lb·in)]
[Frame E – M12*4 – Screw torque: 300~400 kg·cm (260~347 lb·in)]

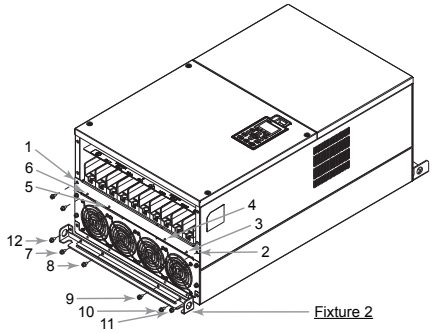


Flange Mounting Instructions – Frame F

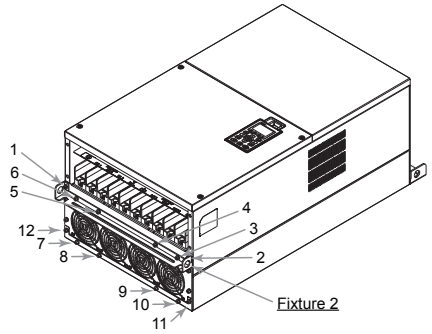
Applicable models: GS4- 4175, 4200

In order to flange mount the drive, move the upper and lower mounting fixtures forward from the base of the integral drive heat sink to the base of the drive itself (as described below).

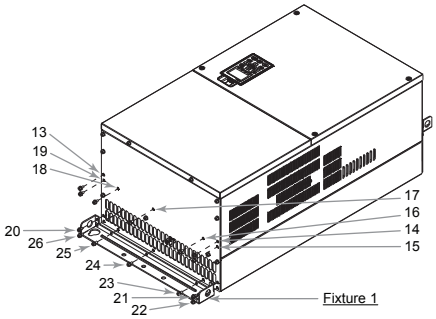
1) (Bottom) Loosen 12 screws and remove Fixture 2 from behind the fans:



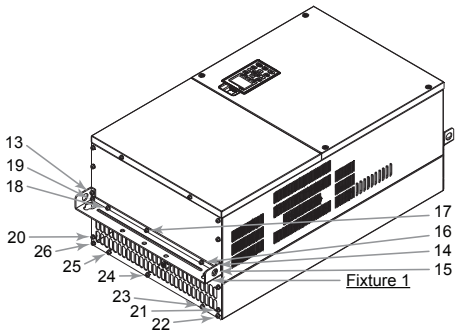
2) (Bottom) Move Fixture 2 forward of the fans and fasten 12 screws [screw torque: 24~26 kg·cm (20.8~22.6 lb·in)]:



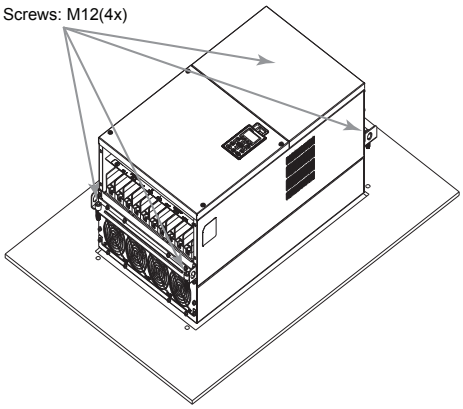
3) (Top) Loosen screws 13~26 and remove Fixture 1 from behind the vents:



4) (Top) Move Fixture 1 forward of the vents and fasten screws 13~26 [screw torque: 24~26 kg·cm (20.8~22.6 lb·in)]:



5) Place 4 screws (M12) through Fixtures 1 & 2 and the plate, and then fasten the screws [screw torque: 300~400 kg·cm (260~347 lb·in)]:

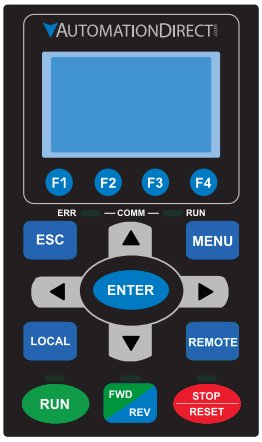


Spare Keypad

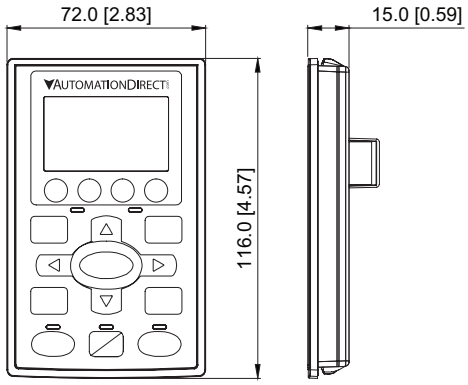
GS4-KPD

Spare or replacement keypad for GS4 drives. The embedded keypad can be installed flat on the surface of the control box (with or without bezel GS4-BZL). The front cover is IP56 rated. The maximum RJ45 extension lead is 5m (16ft). The keypad communication connection back to the drive when mounted remotely can be accomplished by using a standard RJ45 CAT5e straight through patch cable. No other wiring, including power is required. The small RJ45 plastic connector that comes standard with each drive is included with each GS4-KPD kit.

All GS4-KPDs with a date code of +W2242xxxxx or earlier will have FW version 1.12. The FW Code on the KPD will read F112H01.
All GS4-KPDs with a date of +W2243xxxxx or newer with have FW version 1.13. The FW Code on the KPD will read F113H01.
The difference is due to a material change in the keypad itself, and does not change its function. The FW versions are not cross compatible. Please contact Automation Direct technical support with any questions.



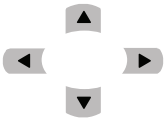
RJ45 Connector (included)



Dimensions mm [in]

Descriptions of Keypad Functions	
RUN	**RUN Key** 1) It is only valid when the source of operation command is from the keypad. 2) It can operate the AC motor drive by the function setting and the RUN LED will be ON. 3) RUN can be pressed even when drive is in process of stopping. 4) When enabling "LOCAL" mode, it is only valid when the source of operation command is from the keypad.
STOP RESET	**STOP/RESET Key** *This key has the highest processing priority in any situation.* 1) When it receives STOP command, whether or not the AC drive is in operation or stop status, the AC motor drive will execute a "STOP" command. 2) The RESET key can be used to reset the drive after the fault occurs. For those faults that can't be reset by the RESET key, see the fault records after pressing MENU key for details.
FWD REV	**Operation Direction Key** 1) This key only controls the operation direction and does NOT activate the drive. FWD: forward. REV: reverse. 2) Refer to the LED descriptions for more details.
ENTER	**ENTER Key** Press ENTER and go to the next menu level. If it is the last level, then press ENTER to execute the command.
ESC	**ESC Key** The ESC key function serves to leave the current menu and return to the last menu. It also functions as a return key while in the sub-menu.

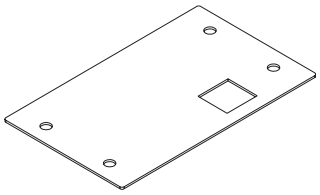
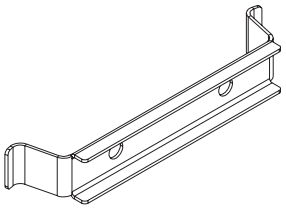
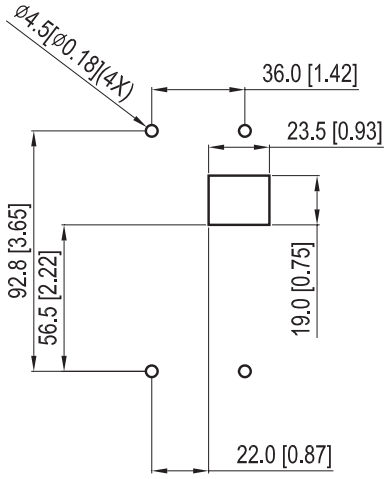
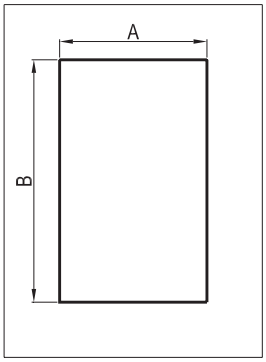
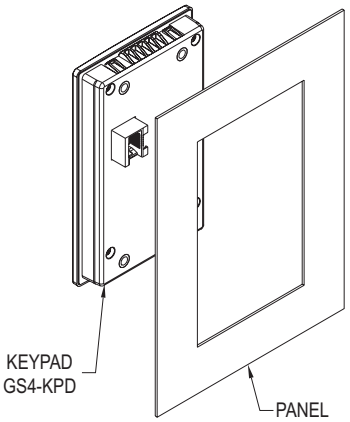
Continued on next page.

Descriptions of Keypad Functions (*continued*)	
MENU	**MENU Key** Press MENU to return to the main menu. Menu Content: 1) Param Setup 2) Quick Start 3) Keypad Lock 4) Fault Record 5) PLC 6) Copy Param 7) Copy PLC 8) Displ Setup 9) Time Setup 10) Language 11) Start-up
	**Direction: Left/Right/Up/Down** 1) In the numeric value setting mode, it is used to move the cursor and change the numeric value. 2) In the menu/text selection mode, it is used for item selection.
	**Function Keys** 1) F1 is JOG function 2) The F2, F3, F4 keys are reserved for future use.
LOCAL	**LOCAL Key** 1) This key is executed by the parameter settings of the source of Local frequency and Local operation. The factory settings of both source of Local frequency and Local operation are the digital keypad. 2) Pressing the LOCAL key with the drive stopped will switch the operation and frequency to the LOCAL source. Pressing the LOCAL key with the drive running will stop the drive, with "AHSP" warning displayed and when stopped, will switch the operation and frequency source to the LOCAL source. 3) The selected mode, LOCAL or REMOTE, will be displayed on the GS4-KPD. 4) When P3.58=0 then LOCAL correlates to HAND mode. The Digital Input Definition must not be set to 33 (LOC/REM Switch). *Refer to P3.58 for more detail and other options on how the drive behaves when switching between LOCAL and REMOTE.*
REMOTE	**REMOTE Key** 1) This key is executed by the parameter settings of the source of Remote frequency and Remote operation. The factory settings of both source of Remote frequency and Remote operation are the External Terminals (FWD and REV terminals) and Analog In 1 speed signal. 2) Pressing the REMOTE key with the drive stopped will switch the operation and frequency to the REMOTE source. Pressing the REMOTE key with the drive running will stop the drive, with “AHSP” warning displayed and when stopped, will switch the operation and frequency source to the REMOTE source. 3) The selected mode, LOCAL or REMOTE, will be displayed on the GS4-KPD. 4) When P3.58=0 then LOCAL correlates to HAND mode. The Digital Input definition must not be set to 33 (LOC/REM Switch). *Refer to P3.58 for more detail and other options on how the drive behaves when switching between LOCAL and REMOTE.*

Descriptions of LED Functions	
RUN	**Steady ON**: Operation indicator of the AC motor drive, including DC brake, zero speed, standby, restart after fault and speed search. **Blinking**: Drive is decelerating to stop or in the status of base block. **Steady OFF**: Drive is not currently executing an operational (RUN) command.
STOP RESET	**Steady ON**: Stop indicator of the AC motor drive. **Blinking**: Drive is in the standby status. **Steady OFF**: Drive is not currently executing an operational (STOP) command.
FWD REV	**Operation Direction LED** 1) Green light is on, the drive is running forward or will run forward when given a run command. 2) Red light is on, the drive is running backwards or will run backwards when given a run command. 3) Alternating green/red light: the drive is changing direction.
ERR — COMM — RUN	**ERR_COMM_RUN** Descriptions reserved for future use.

Keypad Panel Mounting Kit GS4-BZL

This panel mounting kit can be used for wall mounting or embedded mounting of the GS4-KPD.

Wall Mounting	Embedded Mounting
Accessory 1  Screws: (4) M4*p 0.7 *L8mm Torque: 10-12 kg·cm (8.7-10.4lb-in.)	Accessory 2  Screws: (4) M4*p 0.7 *L8mm Torque: 10-12 kg·cm (8.7-10.4 lb·in)
 Panel cutout dimensions mm [in]	  Normal cutout dimension

Panel Thickness	1.2 mm	1.6 mm	2.0 mm
A	66.4 [2.614]		
B	110.2 [4.339]	111.3 [4.382]	112.5 [4.429]

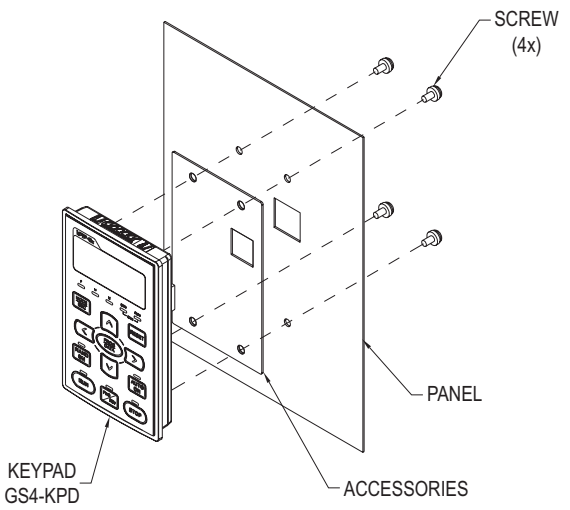
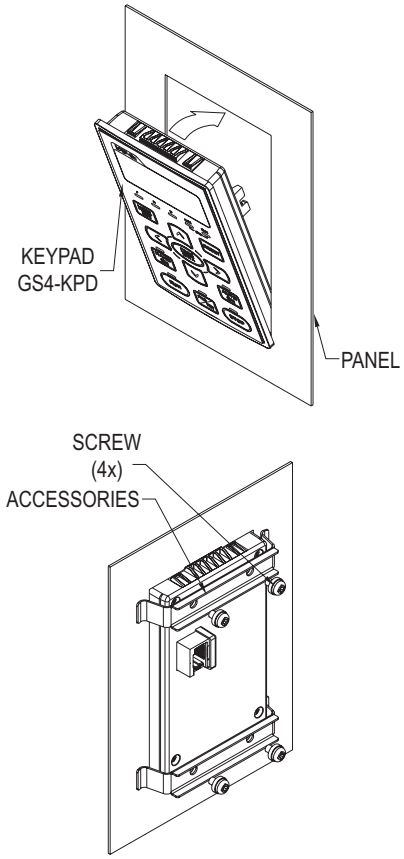
* Deviation: ± 0.15 mm / ± 0.0059 in

Cutout dimension (Waterproof level: IP56)

Panel Thickness	1.2 mm	1.6 mm	2.0 mm
A	66.4 [2.614]		
B	110.8 [4.362]		

* Deviation: ± 0.15 mm / ± 0.0059 in

Continued on next page.

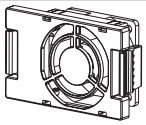
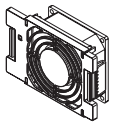
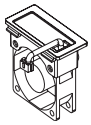
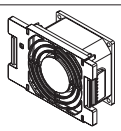
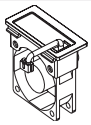
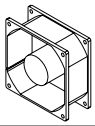
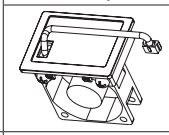
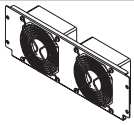
Wall Mounting	Embedded Mounting
	

Spare Fan Kits

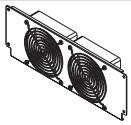
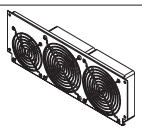
Most GS4 drives have built-in cooling fans, and replacement fans are also available. These fans are direct replacements for the internal factory-installed fans.

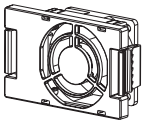
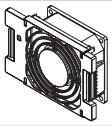
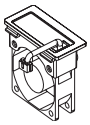
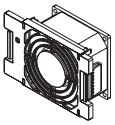
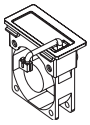
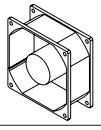
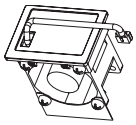
Installation instructions are included in this Appendix.

Fan replacement should only be performed by personnel skilled in the disassembly and repair of variable frequency AC drives.

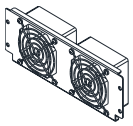
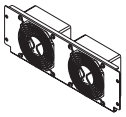
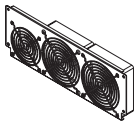
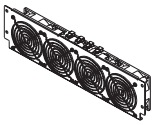
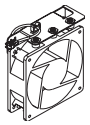
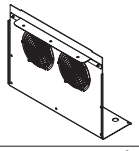
GS4 230V Models – (GS4-2xxx) – Fan Selection Table							
Drive Model	***Fan Model ****		***Description***	***Size***	***Voltage***	***Amps / Fan***	***Fans / Kit***
GS4-22P0 GS4-23P0 GS4-25P0		**GS4-FAN-AM**	Frame A main	40mm	24	0.15	1
GS4-27P5		**GS4-FAN-BM1**	Frame B main	80mm	24	0.33	1
		**GS4-FAN-BB**	Frame B board level	40mm	24	0.18	1
GS4-2010 GS4-2015		**GS4-FAN-BM2**	Frame B main	80mm	24	0.51	1
		**GS4-FAN-BB**	Frame B board level	40mm	24	0.18	1
GS4-2020 GS4-2025 GS4-2030		**GS4-FAN-CM**	Frame C main	92mm	24	0.75	1
		**GS4-FAN-CB1**	Frame C board level	40mm	24	0.18	1
GS4-2040 GS4-2050		**GS4-FAN-DM**	Frame D main	92mm	24	0.75	2
		**GS4-FAN-DB**	Frame D board level	70mm	24	0.33	1
** Electrical connectors are included.*							

(continued next page)

GS4 230V Models – (GS4-2xxx) – Fan Selection Table (continued)							
Drive Model	**Fan Model ***		**Description**	**Size**	**Voltage**	**Amps / Fan**	**Fans / Kit**
GS4-2060 GS4-2075		GS4-FAN-EM1	Frame E main	120mm	24	1.08	2
		GS4-FAN-EB	Frame E board level	120mm	24	0.76	1
GS4-2100		GS4-FAN-EM2	Frame E main	92mm 120mm 120mm	24	0.75 1.08 1.08	3
		GS4-FAN-EB	Frame E board level	120mm	24	0.76	1
* Electrical connectors are included.							

GS4 460V Models - (GS4-4xxx) - Fan Selection Table							
Drive Model	**Fan Model ***		**Description**	**Size**	**Voltage**	**Amps / Fan**	**Fans / Kit**
GS4-43P0 GS4-45P0 GS4-47P5		GS4-FAN-AM	Frame A main	40mm	24	0.15	1
GS4-4010		GS4-FAN-BM1	Frame B main	80mm	24	0.33	1
		GS4-FAN-BB	Frame B board level	40mm	24	0.18	1
GS4-4015 GS4-4020		GS4-FAN-BM2	Frame B main	80mm	24	0.51	1
		GS4-FAN-BB	Frame B board level	40mm	24	0.18	1
GS4-4025 GS4-4030 GS4-4040		GS4-FAN-CM	Frame C main	92mm	24	0.75	1
		GS4-FAN-CB2	Frame C board level	40mm	12	0.60	1
* Electrical connectors are included.							

(continued next page)

GS4, 460V Models - (GS4-4xxx) - Fan Selection Table (continued)							
Drive Model	**Fan Model ***		**Description**	**Size**	**Voltage**	**Amps / Fan**	**Fans / Kit**
GS4-4050 GS4-4060		**GS4-FAN-D0M**	Frame D0 main	80mm	24	0.75	2
		**GS4-FAN-DB**	Frame D board level	70mm	24	0.33	1
GS4-4075 GS4-4100		**GS4-FAN-DM**	Frame D main	92mm	24	0.75	2
		**GS4-FAN-DB**	Frame D board level	70mm	24	0.33	1
GS4-4125 GS4-4150		**GS4-FAN-EM2**	Frame E main	92mm 120mm 120mm	24	0.75 1.08 1.08	3
		**GS4-FAN-EB**	Frame E board level	120mm	24	0.76	1
GS4-4175 GS4-4200		**GS4-FAN-FM**	Frame F main	92mm	24	0.76	4
		**GS4-FAN-FB**	Frame F board level	120mm	24	1.08	1
GS4-4250 GS4-4300		**GS4-FAN-GM**	Frame G main	250mm	48	2.2	2
** Electrical connectors are included.*							

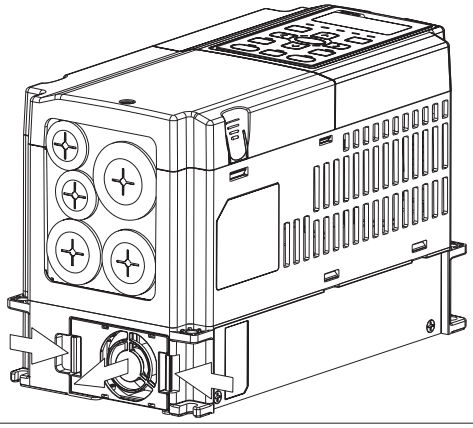
GS4 Fans Screw Specifications		
Fan Part #	**Thread Dimensions**	**Qty**
GS4-FAN-AM	–	–
GS4-FAN-BB		
GS4-FAN-BM1		
GS4-FAN-BM2		
GS4-FAN-CB1		
GS4-FAN-CB2		
GS4-FAN-CM	M4* P0.7* L45	2
GS4-FAN-D0M	M5* P0.8* L10	4
GS4-FAN-DB	–	–
GS4-FAN-DM	M5* P0.8* L10	4
GS4-FAN-EB	M5* P0.8* L10	2
GS4-FAN-EM1	M5* P0.8* L10	4
GS4-FAN-EM2	M5* P0.8* L10	4
GS4-FAN-FB	–	–
GS4-FAN-FM	M5* P0.8* L10	4
GS4-FAN-GM	M4* P0.7* L10	3
	M6* P1.0* L12	5

Fan Removal

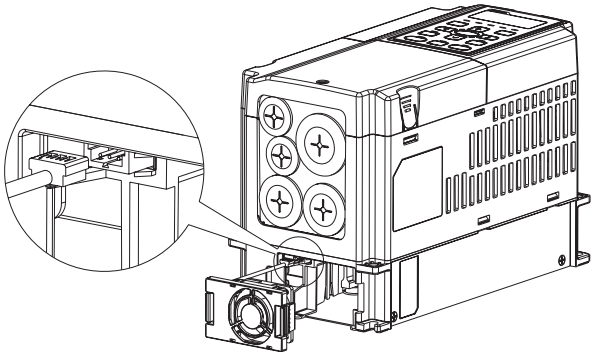
Frame A

Applicable models:
GS4-22P0, GS4-23P0, GS4-25P0
(Other Frame A drives do not have fans - they are convection cooled)

1 Press the tabs on both sides of the fan to successfully remove the fan. (The arrow)



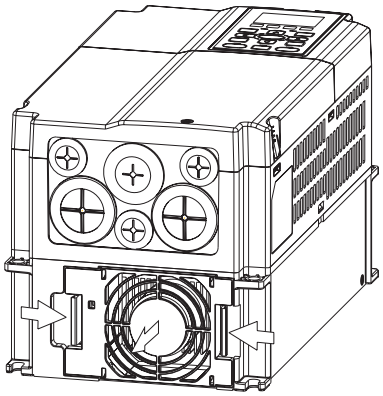
2 Disconnect the power terminal before removing the fan. (As shown below)



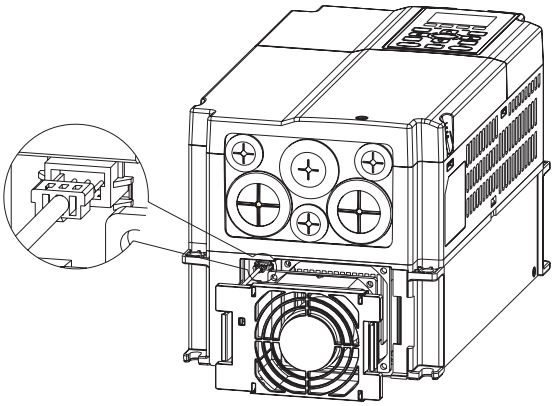
Frame B

Applicable models:
GS4-27P5, GS4-2010, GS4-2015

1 Press the tab on both sides of the fan to successfully remove the fan.



2 Disconnect the power terminal before removing the fan.

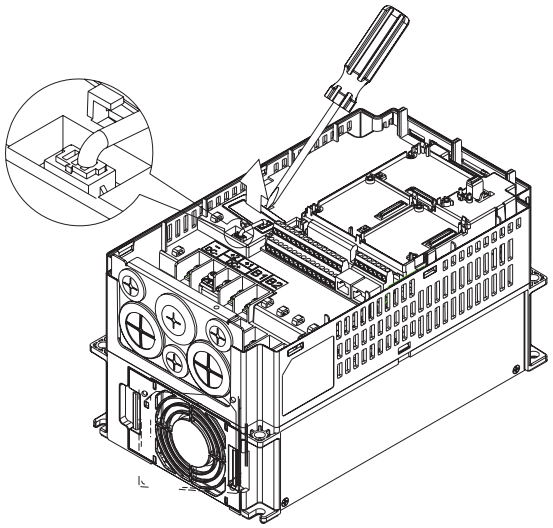


REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Fan Removal (continued)

Frame B&C

Applicable models:
GS4-27P5, GS4-2010, GS4-2015, GS4-2020, GS4-2025, GS4-2030,
GS4-4010, GS4-4015, GS4-4020, GS4-4025, GS4-4030, GS4-4040
Disconnect the power terminal with slotted screwdriver to remove the fan cover.



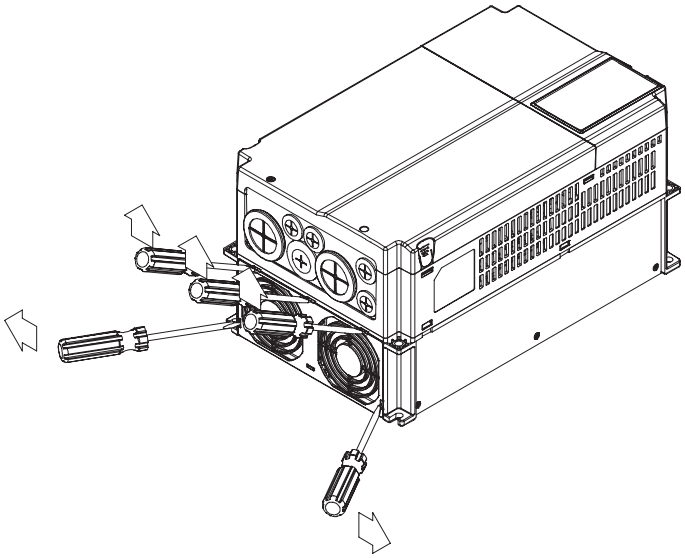
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Fan Removal (continued)

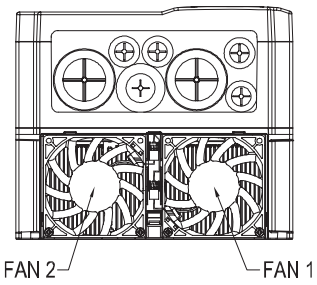
Frame C

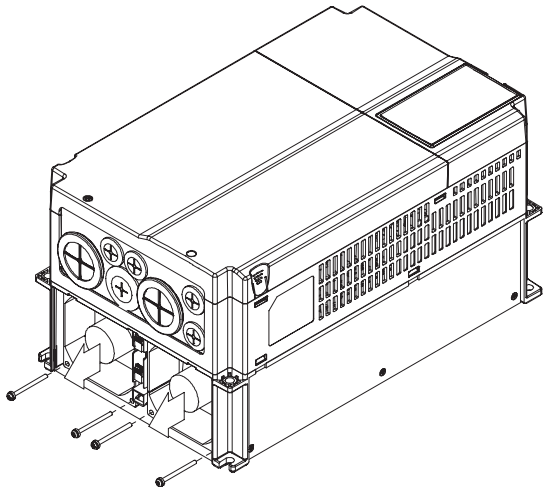
Applicable models:
GS4-4025, GS4-4030, GS4-2020, GS4-2025, GS4-2030

1 Use slotted screwdriver to remove cover.



2 Disconnect the fan power. Pull out the fan after loosening screws. The fan label should face towards the inside of the drive. Screw torque 10 - 12 kg·cm (8.7 - 10.4 lb·in)





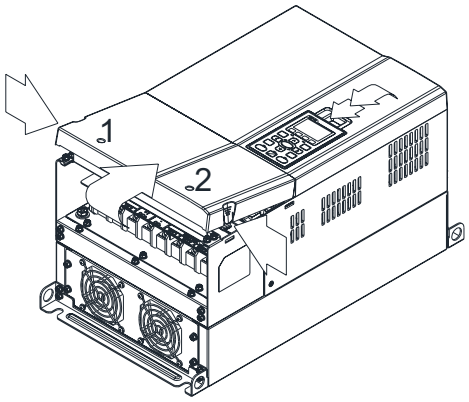
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Fan Removal (continued)

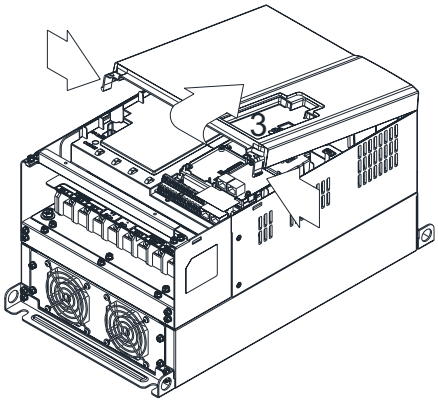
FRAME D0

Applicable models:
GS4-4050, GS4-4060

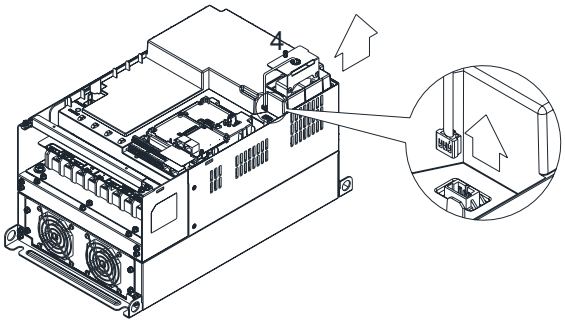
1 Loosen screws 1 and 2, press the tab on the right and the left to remove the cover, follow the direction the arrows indicate. Press the tab on top of digital keypad GS4-KPD to properly remove the keypad.
Screw torque: 10 - 12 kg·cm (8.6 - 10.4 lb·in)



2 Loosen screw 3, press the tab on the right and the left to remove the cover.
Screw torque: 6 - 8 kg·cm (5.2 - 6.9 lb·in)

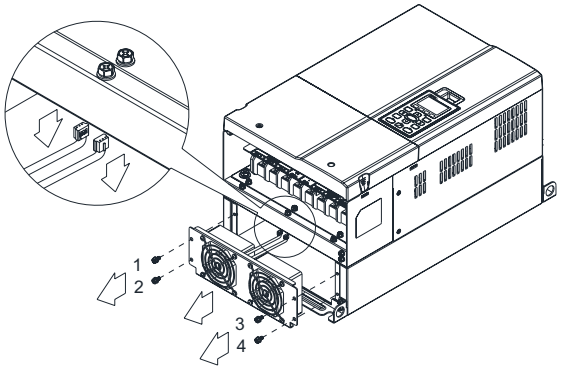


3 Loosen screw 4 and disconnect the fan power.
Screw torque: 10 -12 kg·cm (8.6 - 10.4 lb·in)



4 For heat sink fan:
Step 1. Loosen the screws.
Screw torque: 24 - 26 kg·cm (20.8 - 22.6 lb·in)

Step 2. Disconnect fan power and pull out the fan.



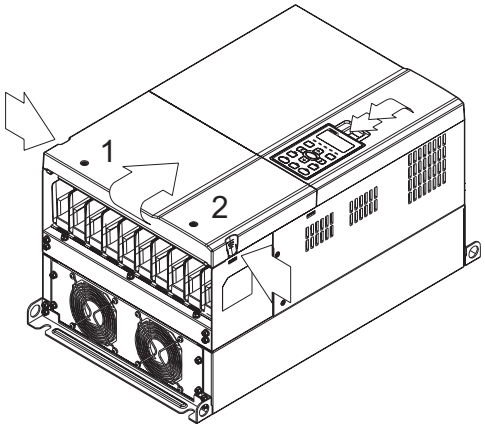
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Fan Removal (continued)

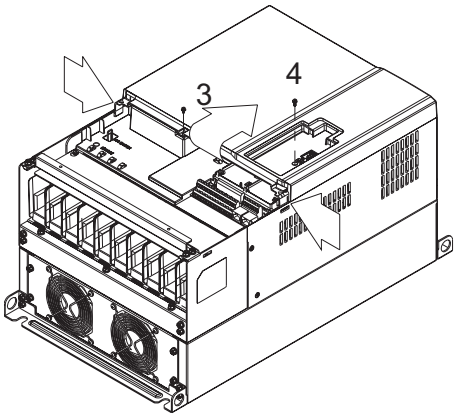
FRAME D

Applicable models:
GS4-2040, GS4-2050, GS4-4075, GS4-4100

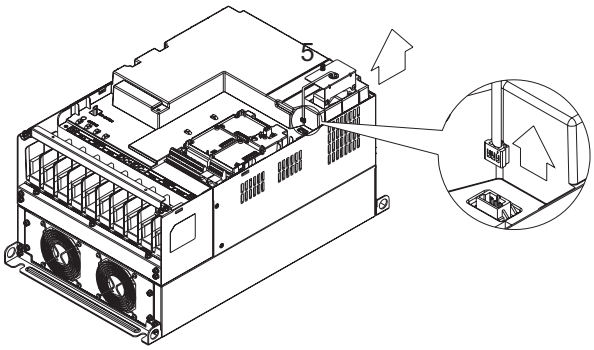
1 Loosen screw 1 and 2, press the tab on the right and the left to remove the cover, follow the direction the arrows indicate. Press the tab on top of digital keypad GS4-KPD to properly remove the keypad.
Screw torque: 10 - 12 kg·cm (8.6 - 10.4 lb·in)



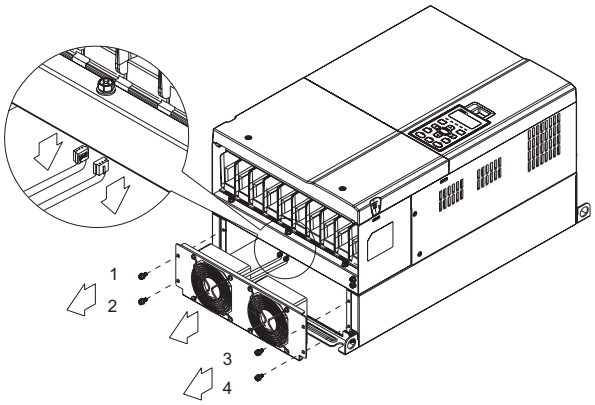
2 Loosen screw 3 and 4, press the tab on the right and the left to remove the cover.
Screw torque: 6 - 8 kg·cm (5.2 - 6.9 lb·in)



3 Loosen screw 5 and disconnect the fan power.
Screw torque: 10 - 12 kg·cm (8.6 - 10.4 lb·in)



4 For heat sink fan:
Step 1. Loosen the screws.
Screw torque: 24 - 26 kg·cm (20.8 - 22.6 lb·in)
Step 2. Disconnect fan power and pull out the fan.



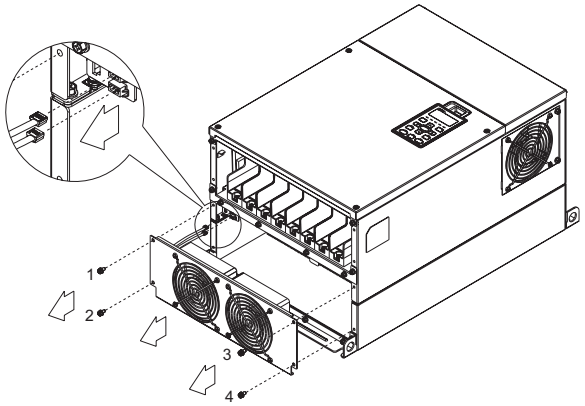
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Fan Removal (continued)

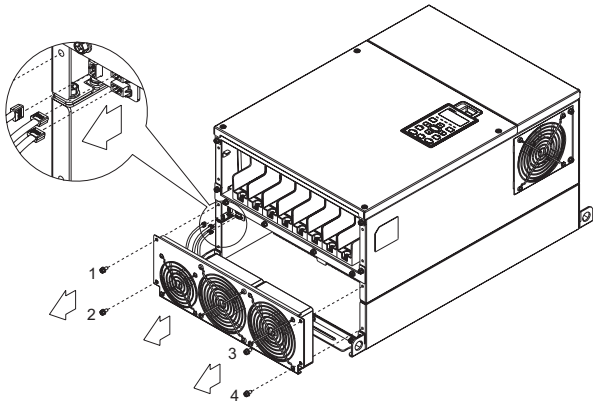
Frame E

Applicable models:
GS4-2060, GS4-2075, GS4-2100, GS4-4125, GS4-4150

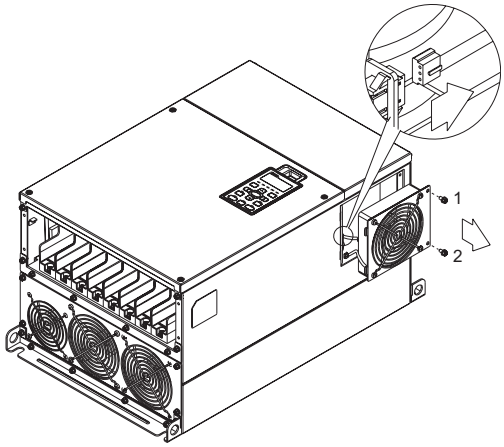
1 Loosen screw 1-4 (as shown in the figure below), and disconnect the fan power then remove the fan.
Screw torque: 24 - 26 kg·cm (20.8 - 22.6 lb·in)



2 Loosen screw 1 - 4 (as shown in the figure below), and disconnect the fan power then remove the fan.
Screw torque: 24 - 26 kg·cm (20.8 - 22.6 lb·in)



3 Loosen screw 1 and screw 2 (as shown in the figure below), and disconnect fan power before removing the fan.
Screw torque: 24 - 26 kg·cm (20.8 - 22.6 lb·in)



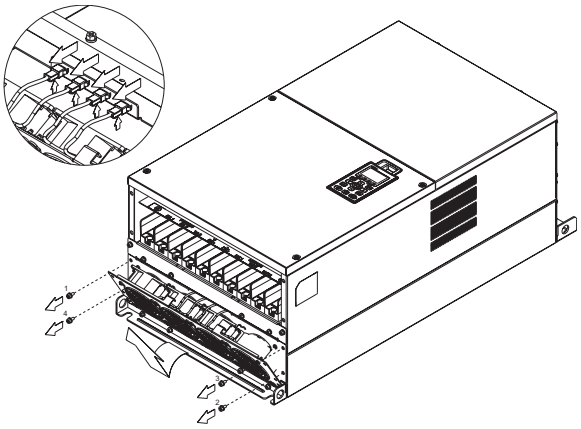
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Fan Removal (continued)

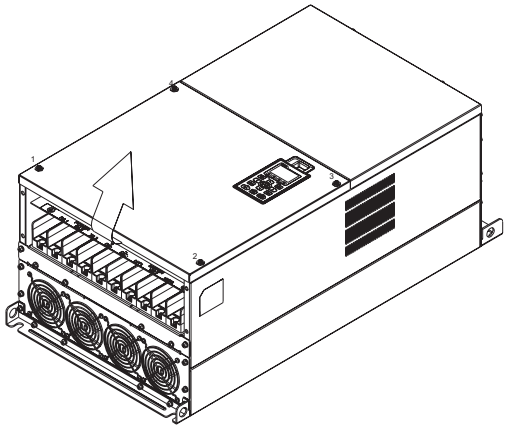
FRAME F

Applicable models:
GS4-4175, GS4-4200

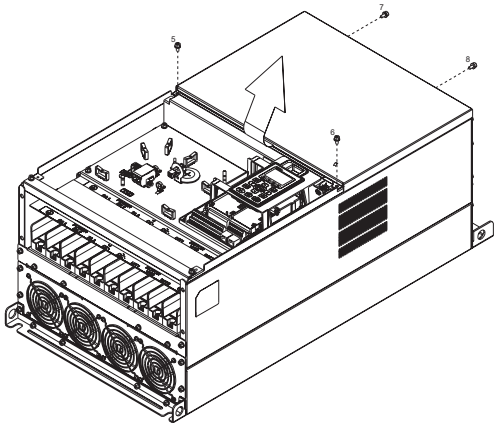
1 Loosen the screws, disconnect the fan power, then remove the fan.
Screw torque: 24 - 26 kg·cm (20.8 - 22.6 lb·in)



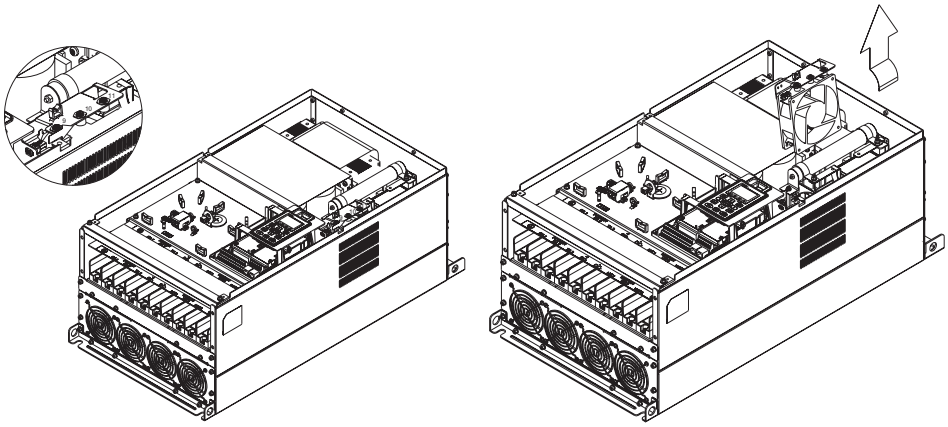
2 Loosen the screw and remove the cover.
Screw torque: 14 - 16 kg·cm (12.2 - 13.9 lb·in)



3 Loosen the screw and remove the cover.
Screw torque: 24 - 26 kg·cm (20.8 - 22.6 lb·in)



4 Loosen the screws and disconnect the fan power, then remove the fan.
Screw torque: 14 - 16 kg·cm (12.2 - 13.9 lb·in)



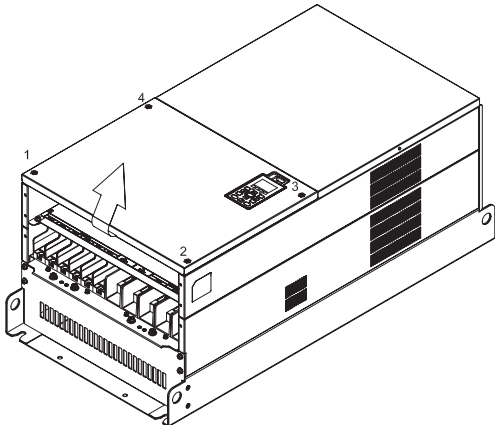
REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.

Fan Removal (continued)

FRAME G

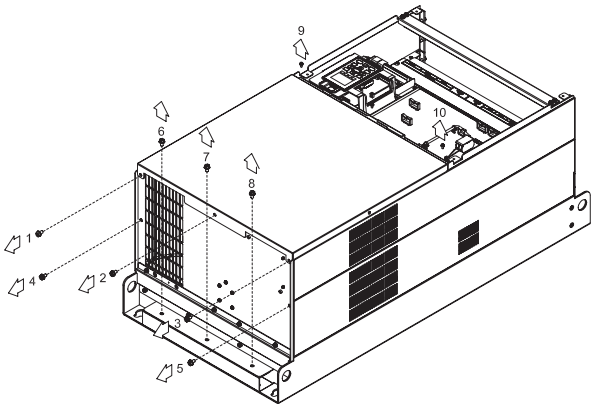
Applicable models:
GS4-4250, GS4-4300

1 Loosen the screw and remove the cover.
Screw torque: 12 - 15 kg·cm (10.4 - 13 lb·in)

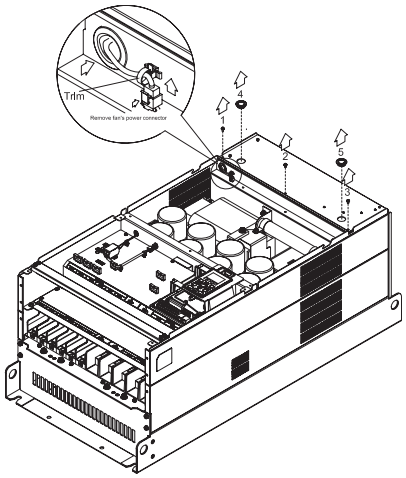


2 For 1-8 shown in the figure: Loosen the screws
Screw torque: 35 - 40 kg·cm (30.4 - 34.7 lb·in)

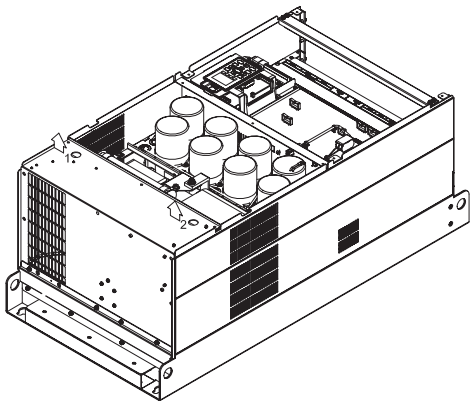
For 9-10 shown in the figure: Loosen the screws and remove the cover.
Screw torque: 14 - 16 kg·cm (12.2 - 13.9 lb·in)



3 Loosen screw 1 - 3 , remove bushing 4 and 5, and disconnect the fan power.
Screw torque: 14 -16 kg·cm (12.2 - 13.9 lb·in).



4 Pull out the fan.



REMOVE POWER FROM DRIVE PRIOR TO INSTALLATION AND/OR REMOVAL OF ACCESSORIES.