Chapter 2 Installation

2-1 Mounting Clearance

☑ Prevent fiber particles, scraps of paper, shredded wood, sawdust, metal particles, etc. from adhering to the heat sink.

☑ Install the AC motor drive in a metal cabinet. When installing one drive below another one, use a metal separator between the AC motor drives to prevent mutual heating and to prevent the risk of fire accident.

☑ Install the AC motor drive in Pollution Degree 2 environments only:
Normally only nonconductive pollution occurs and temporary conductivity caused by condensation is expected.

The appearances shown in the following figures are for reference only. The actual motor drives may look different.

Airflow direction: ⇦ (Blue arrow) Inflow: ← (Red arrow) Outflow: ↔ (Black) Distance

Single drive installation (Frame A–H)

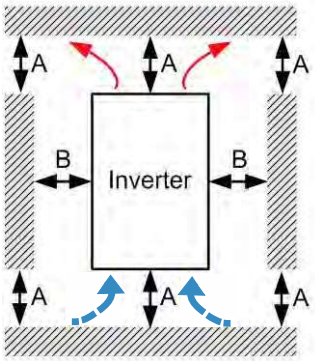

Figure 2-1

Side-by-side horizontal installation (Frame A–C)

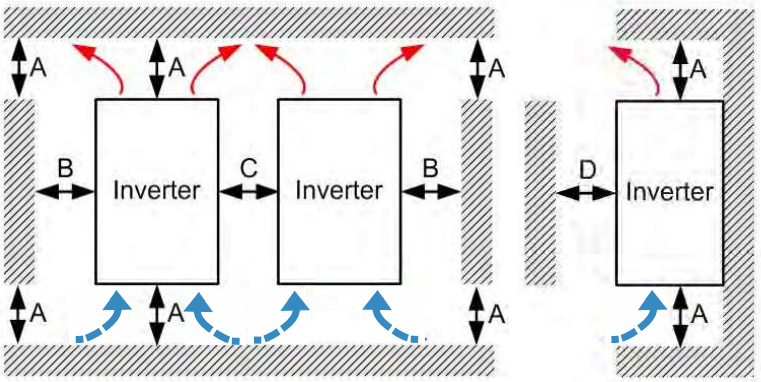

Figure 2-2

Multiple drives, single side-by-side horizontal installation (Frame G, H)

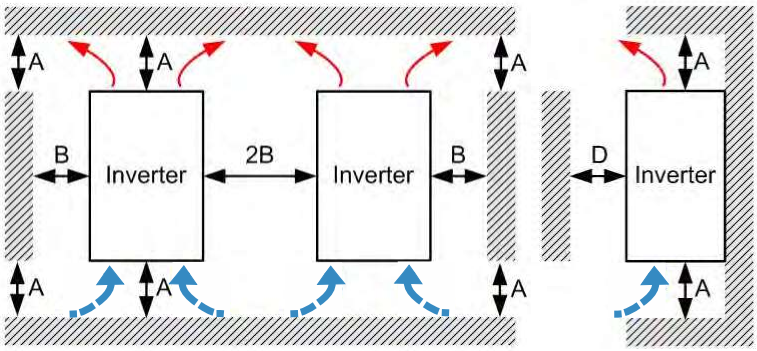

Figure 2-3

Multiple drives, side-by-side installation (Frame D0, D, E, F) Install metal separator between the drives.

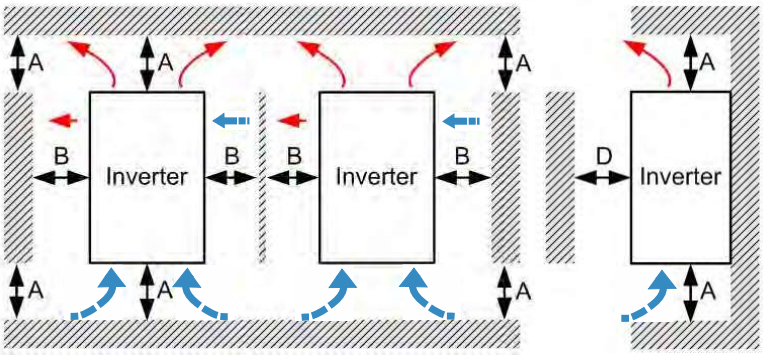

Figure 2-4

Multiple drives side-by-side vertical installation

Ta: Frame A–G Ta*: Frame H

When installing one AC motor drive below another one (top-bottom installation), use a metal separator between the drives to prevent mutual heating. The temperature measured at the fan's inflow side must be lower than the temperature measured at the operation side. If the fan's inflow temperature is higher, use a thicker or larger size of metal seperator. Operation temperature is the temperature measured at 50 mm away from the fan's inflow side (as shown in the figure below).

(Frame A–C)

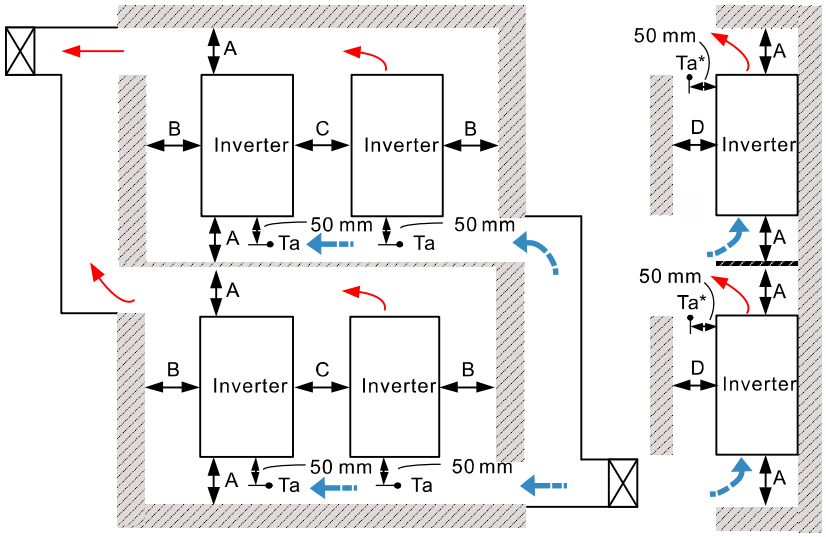

Figure 2-5

(Frame D0–G) Install metal separator between the drives

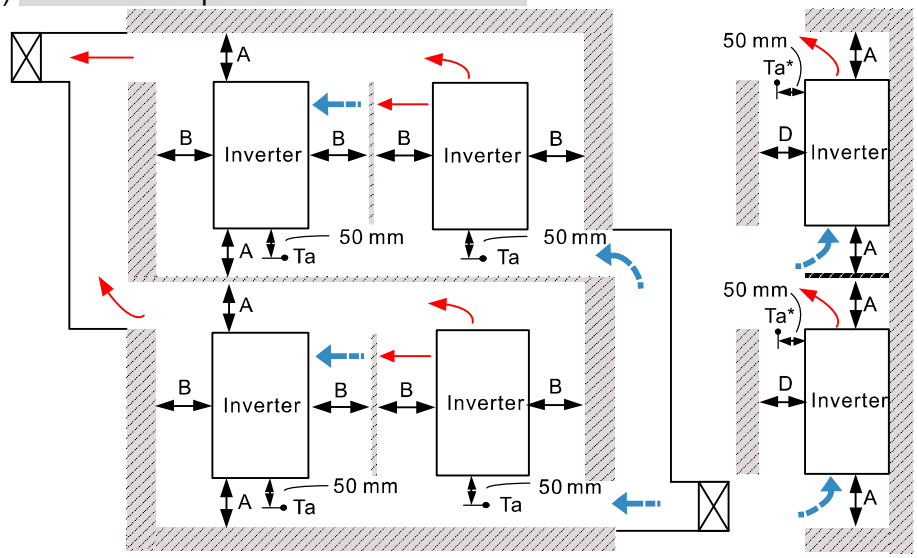

Figure 2-6

Minimum mounting clearance

Frame	A [mm]	B [mm]	C [mm]	D [mm]
A–C	60	30	10	0
D0–F	100	50	-	0
G	200	100	-	0
H	350	0	0	200 (Ta=Ta*=50°C)
H	350	0	0	100 (Ta=Ta*=40°C)

Table 2-1

NOTE

The minimum mounting clearances A–D stated in the table above apply to AC motor drives installation. Failing to follow the minimum mounting clearances may cause the fan to malfunction and heat dissipation problems.

Frame A	VFD007C23A-21; VFD007C43A-21; VFD007C4EA-21; VFD015C23A-21; VFD015C43A-21; VFD015C4EA-21; VFD015C53A-21; VFD022C23A-21; VFD022C43A-21; VFD022C4EA-21; VFD022C53A-21; VFD037C23A-21; VFD037C43A-21; VFD037C4EA-21; VFD037C53A-21; VFD040C43A-21; VFD040C4EA-21; VFD055C43A-21; VFD055C4EA-21
Frame B	VFD055C23A-21; VFD055C53A-21; VFD075C23A-21; VFD075C43A-21; VFD075C4EA-21; VFD075C53A-21; VFD110C23A-21; VFD110C43A-21; VFD110C4EA-21; VFD110C53A-21; VFD150C43A-21; VFD150C4EA-21; VFD150C53A-21
Frame C	VFD150C23A-21; VFD185C23A-21; VFD185C43A-21; VFD185C4EA-21; VFD185C63B-21; VFD220C23A-21; VFD220C43A-21; VFD220C4EA-21; VFD220C63B-21; VFD300C43A-21; VFD300C4EA-21; VFD300C63B-21; VFD370C63B-21
Frame D0	VFD370C43S-00; VFD370C43S-21; VFD450C43S-00; VFD450C43S-21
Frame D	VFD300C23A-00; VFD300C23A-21; VFD370C23A-00; VFD370C23A-21; VFD450C63B-00; VFD450C63B-21; VFD550C43A-00; VFD550C43A-21; VFD550C63B-00; VFD550C63B-21; VFD750C43A-00; VFD750C43A-21
Frame E	VFD450C23A-00; VFD450C23A-21; VFD550C23A-00; VFD550C23A-21; VFD750C23A-00; VFD750C23A-21; VFD750C63B-00; VFD750C63B-21; VFD900C43A-00; VFD900C43A-21; VFD900C63B-00; VFD900C63B-21; VFD1100C43A-00; VFD1100C43A-21; VFD1100C63B-00; VFD1100C63B-21; VFD1320C63B-00; VFD1320C63B-21
Frame F	VFD900C23A-00; VFD900C23A-21; VFD1320C43A-00; VFD1320C43A-21; VFD1600C43A-00; VFD1600C43A-21; VFD1600C63B-00; VFD1600C63B-21; VFD2000C63B-00; VFD2000C63B-21
Frame G	VFD1850C43A-00; VFD1850C43A-21; VFD2000C43A-00; VFD2000C43A-21; VFD2200C43A-00; VFD2200C43A-21; VFD2500C43A-00; VFD2500C43A-21; VFD2500C63B-00; VFD2500C63B-21; VFD3150C63B-00; VFD3150C63B-21
Frame H	VFD2800C43A-00; VFD2800C43C-21; VFD3150C43A-00; VFD3150C43C-21; VFD3550C43A-00; VFD3550C43C-21; VFD4000C43A-00; VFD4000C43C-21; VFD4000C63B-00; VFD4000C63B-21; VFD4500C43A-00; VFD4500C43C-21; VFD4500C63B-00; VFD4500C63B-21; VFD5000C43A-00; VFD5000C43C-21; VFD5600C43A-00; VFD5600C43C-21; VFD5600C63B-00; VFD5600C63B-21; VFD6300C63B-00; VFD6300C63B-21

Table 2-2

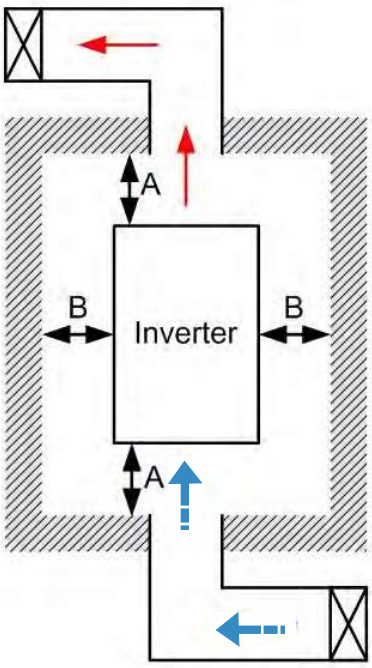

Figure 2-7

NOTE

※ The mounting clearance stated in the figure is for installing the drive in an open area. To install the drive in a confined space (such as cabinet or electric box), follow the following rules: (1) Keep the minimum mounting clearances. (2) Install a ventilation equipment or an air conditioner to keep surrounding temperature lower than operation temperature. (3) Refer to parameter setting and set up Pr.00-16, Pr.00-17, and Pr.06-55.

※ The table below shows the heat dissipation and the required air volume when installing a single drive in a confined space. When installing multiple drives, the required air volume shall be multiplied by the number of the drives.

※ Refer to the table below (Airflow Rate for Cooling) for ventilation equipment design and selection.

※ Refer to the table below (Power Dissipation for AC Motor Drive) for air conditioner design and selection.

※ Different control mode affects the derating. See Pr.06-55 for more information.

※ Ambient temperature durating curve shows the dertaing status in different temperature in relation to different protection level.

※ Refer to Section 9-7 for ambient temperature derating curve and derating curves under different control modes.

※ If UL Type 1 models need side-by-side installation, remove the top cover for Frame A–C. Do NOT install the conduit box for Frame D and above.

2-2 Airflow and Power Dissipation

Model No.	Airflow Rate for Cooling						Power Dissipation for AC Motor Drive		
	Flow Rate (Unit: cfm)			Flow Rate (Unit: m^3 / hr)			Power Dissipation (Unit: watt)		
	External	Internal	Total	External	Internal	Total	Loss External (Heat sink)	Internal	Total
VFD007C23A-21	-	-	-	-	-	-	33	27	61
VFD015C23A-21	14	-	14	24	-	24	56	31	88
VFD022C23A-21	14	-	14	24	-	24	79	36	115
VFD037C23A-21	10	-	10	17	-	17	113	46	159
VFD055C23A-21	40	14	54	68	24	92	197	67	264
VFD075C23A-21	66	14	80	112	24	136	249	86	335
VFD110C23A-21	58	14	73	99	24	124	409	121	529
VFD150C23A-21	166	12	178	282	20	302	455	161	616
VFD185C23A-21	166	12	178	282	20	302	549	184	733
VFD220C23A-21	166	12	178	282	20	302	649	216	865
VFD300C23A-00 VFD300C23A-21	179	30	209	304	51	355	913	186	1099
VFD370C23A-00 VFD370C23A-21	179	30	209	304	51	355	1091	220	1311
VFD450C23A-00 VFD450C23A-21	228	73	301	387	124	511	1251	267	1518
VFD550C23A-00 VFD550C23A-21	228	73	301	387	124	511	1401	308	1709
VFD750C23A-00 VFD750C23A-21	246	73	319	418	124	542	1770	369	2139
VFD900C23A-00 VFD900C23A-21	224	112	336	381	190	571	2304	484	2788
VFD007C43A-21 VFD007C4EA-21	-	-	-	-	-	-	33	25	59
VFD015C43A-21 VFD015C4EA-21	-	-	-	-	-	-	45	29	74
VFD022C43A-21 VFD022C4EA-21	14	-	14	24	-	24	71	33	104
VFD037C43A-21 VFD037C4EA-21	10	-	10	17	-	17	103	38	141
VFD040C43A-21 VFD040C4EA-21	10	-	10	17	-	17	116	42	158
VFD055C43A-21 VFD055C4EA-21	10	-	10	17	-	17	134	46	180
VFD075C43A-21 VFD075C4EA-21	40	14	54	68	24	92	216	76	292
VFD110C43A-21 VFD110C4EA-21	66	14	80	112	24	136	287	93	380
VFD150C43A-21 VFD150C4EA-21	58	14	73	99	24	124	396	122	518
VFD185C43A-21 VFD185C4EA-21	99	21	120	168	36	204	369	138	507
VFD220C43A-21 VFD220C4EA-21	99	21	120	168	36	204	476	158	635
VFD300C43A-21 VFD300C4EA-21	126	21	147	214	36	250	655	211	866
VFD370C43S-00 VFD370C43S-21	179	30	209	304	51	355	809	184	993
VFD450C43S-00 VFD450C43S-21	179	30	209	304	51	355	929	218	1147
VFD550C43A-00 VFD550C43A-21	179	30	209	304	51	355	1156	257	1413
VFD750C43A-00 VFD750C43A-21	186	30	216	316	51	367	1408	334	1742

Model No.	Airflow Rate for Cooling						Power Dissipation for AC Motor Drive		
	Flow Rate (Unit: cfm)			Flow Rate (Unit: m^3 / hr)			Power Dissipation (Unit: watt)		
	External	Internal	Total	External	Internal	Total	Loss External (Heat sink)	Internal	Total
VFD900C43A-00 VFD900C43A-21	257	73	330	437	124	561	1693	399	2092
VFD1100C43A-00 VFD1100C43A-21	223	73	296	379	124	503	2107	491	2599
VFD1320C43A-00 VFD1320C43A-21	224	112	336	381	190	571	2502	579	3081
VFD1600C43A-00 VFD1600C43A-21	289	112	401	491	190	681	3096	687	3783
VFD1850C43A-00 VFD1850C43A-21			454			771			4589
VFD2000C43A-00 VFD2000C43A-21			454			771			5050
VFD2200C43A-00 VFD2200C43A-21			454			771			5772
VFD2500C43A-00 VFD2500C43A-21			454			771			6063
VFD2800C43A-00 VFD2800C43C-21			769			1307			6381
VFD3150C43A-00 VFD3150C43C-21			769			1307			7156
VFD3550C43A-00 VFD3550C43C-21			769			1307			8007
VFD4000C43A-00 VFD4000C43C-21			769			1307			9025
VFD4500C43A-00 VFD4500C43C-21			769			1307			11894
VFD5000C43A-00 VFD5000C43C-21			952.9			1618.9			12500
VFD5600C43A-00 VFD5600C43C-21			952.9			1618.9			14350
VFD015C53A-21	-	-	-	-	-	-	39.5	13.0	53
VFD022C53A-21	-	-	-	-	-	-	55.0	22.0	77
VFD037C53A-21	0.006	-	0.006	13.6	-	13.6	86.8	42.7	130
VFD055C53A-21	0.019	0.007	0.026	40.0	14.5	54.5	124.6	67.9	193
VFD075C53A-21	0.019	0.007	0.026	40.0	14.5	54.5	143.5	119.0	263
VFD110C53A-21	0.019	0.007	0.026	40.0	14.5	54.5	222.2	162.8	385
VFD150C53A-21	0.019	0.007	0.026	40.0	14.5	54.5	308.5	216.5	525
VFD185C63B-21	90.0	21.3	111.4	153.0	36.2	189.2	317.5	145.0	462.5
VFD220C63B-21	90.0	21.3	111.4	153.0	36.2	189.2	408.2	141.8	550.0
VFD300C63B-21	90.0	21.3	111.4	153.0	36.2	189.2	492.7	257.3	750.0
VFD370C63B-21	89.0	21.3	110.3	151.2	36.2	187.5	641.6	283.4	925.0
VFD450C63B-00 VFD450C63B-21	175.9	36.4	212.3	298.8	61.8	360.6	718.2	406.8	1125.0
VFD550C63B-00 VFD550C63B-21	175.9	36.4	212.3	298.8	61.8	360.6	890.1	484.9	1375.0
VFD750C63B-00 VFD750C63B-21	264.6	90.6	355.2	449.6	153.9	603.5	1356.0	519.0	1875.0
VFD900C63B-00 VFD900C63B-21	264.6	90.6	355.2	449.6	153.9	603.5	1652.8	597.2	2250.0
VFD1100C63B-00 VFD1100C63B-21	264.6	90.6	355.2	449.6	153.9	603.5	1960.3	789.7	2750.0
VFD1320C63B-00 VFD1320C63B-21	264.6	90.6	355.2	449.6	153.9	603.5	2230.8	1069.2	3300.0
VFD1600C63B-00 VFD1600C63B-21	248.1	135.3	383.4	421.6	229.9	651.4	2627.3	1372.7	4000.0

Model No.	Airflow Rate for Cooling						Power Dissipation for AC Motor Drive		
	Flow Rate (Unit: cfm)			Flow Rate (Unit: m^3 / hr)			Power Dissipation (Unit: watt)		
	External	Internal	Total	External	Internal	Total	Loss External (Heat sink)	Internal	Total
VFD2000C63B-00 VFD2000C63B-21	248.1	135.3	383.4	421.6	229.9	651.4	3415.0	1585.0	5000.0
VFD2500C63B-00 VFD2500C63B-21			409.7			696.0	4751.7	1498.3	6250.0
VFD3150C63B-00 VFD3150C63B-21			409.7			696.0	5695.4	2179.6	7875.0
VFD4000C63B-00 VFD4000C63B-21			563.0			956.4	6796.2	3203.8	10000.0
VFD4500C63B-00 VFD4500C63B-21			952.9			1618.9	7313.6	3936.4	11250.0
VFD5600C63B-00 VFD5600C63B-21			952.9			1618.9	9553.4	4446.6	14000.0
VFD6300C63B-00 VFD6300C63B-21			952.9			1618.9	11042.4	4707.6	15750.0

※ The required airflow shown in the table is for installing single drive in a confined space.
※ When installing multiple drives, the required air volume should be the required air volume for single drive X the number of the drives.

※ The heat dissipation shown in the table is for installing single drive in a confined space.
※ When installing multiple drives, volume of heat dissipation should be the heat dissipated for single drive X the number of the drives.
※ Heat dissipation for each model is calculated by rated voltage, current and default carrier.

Table 2-3