

## AFE2000 安裝說明

### 主動式電源再生單元

請在裝機之前，詳細閱讀本產品說明，並請妥善保存隨機附贈之光碟內容及交由該機器的使用者。

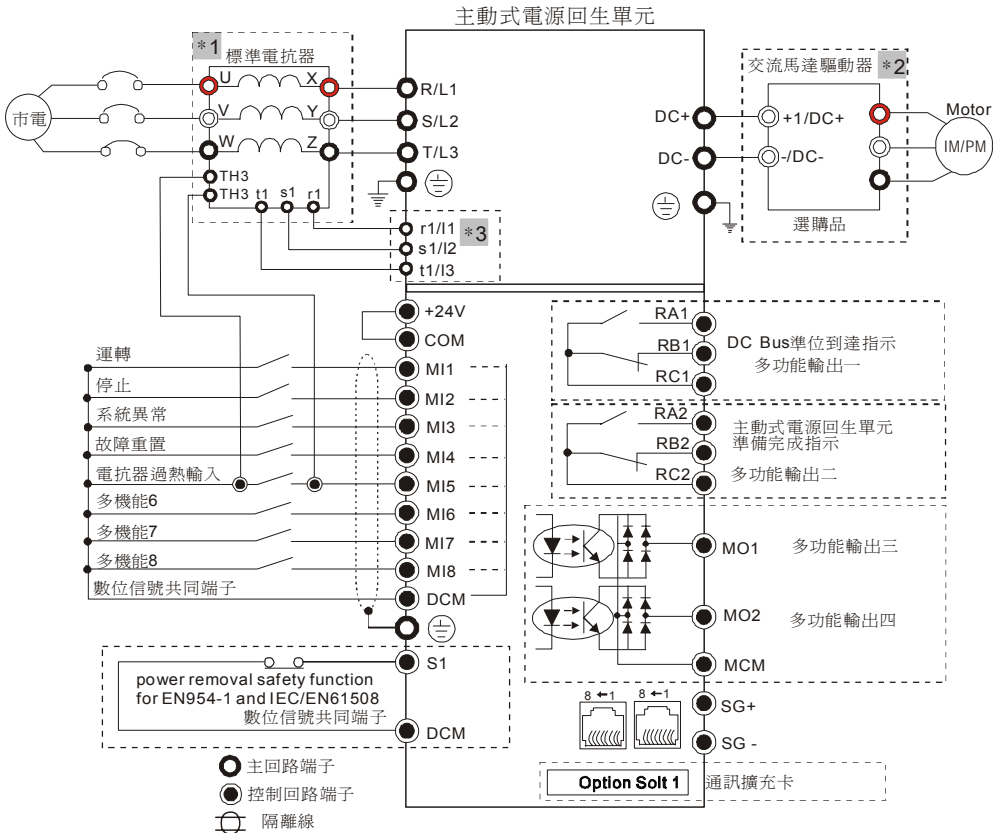
主動式電源再生單元乃精密的電力電子產品，為了操作者及機械設備的安全，請務必交由專業的電機工程人員安裝試車及調整參數，本產品說明中有 [ 危險 ]、[ 注意 ] 等符號說明的地方，請務必仔細研讀，若有任何疑慮的地方請連絡本公司各地的代理商洽詢，我們的專業人員會樂於為您服務。

以下各事項請使用者在操作本產品時特別留意

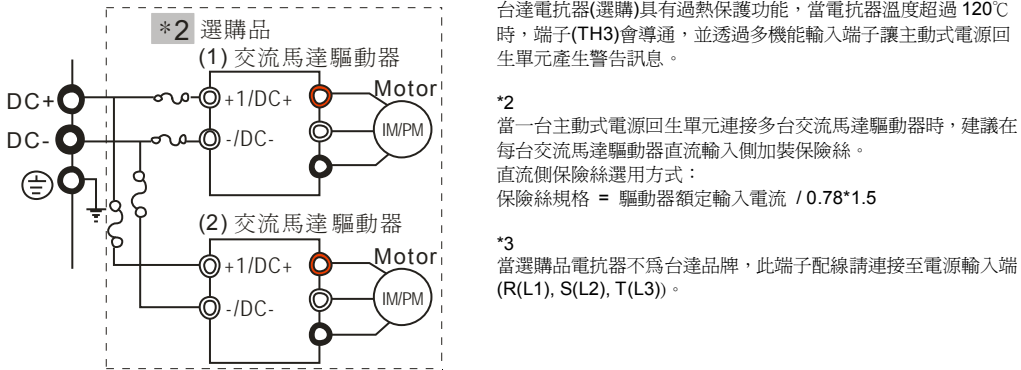
|  |   |
|--|---|
|  | <ul style="list-style-type: none"><li>在操作配線及安裝主動式電源再生單元(AFE2000)時，請務必確認電源是否關閉。</li><li>切斷交流電源後，主動式電源再生單元(AFE2000) POWER 指示燈（位於數位操作器下）未熄滅前，表示內部仍有高壓十分危險，請勿觸摸內部電路及零組件。</li><li>主動式電源再生單元(AFE2000)的內部電路板上各項電路元件易受靜電的破壞，在未做好防靜電措施前，請勿用手觸摸電路板。禁止自行改裝主動式電源再生單元(AFE2000)內部的零件或線路。</li><li>主動式電源再生單元(AFE2000)端子務必正確的接地。230V 系列採用第三種接地，460V 系列採用特種接地。</li><li>主動式電源再生單元(AFE2000)及配件安裝場合應遠離火源發熱體及易燃物。</li></ul> |
|  | <ul style="list-style-type: none"><li>只有合格的電機專業人員才可以安裝、配線及修理保養交流馬達驅動器。</li><li>若為開封使用時並且超過 3 個月時，保存環境周圍溫度不得高於 30℃。這是因為考慮到電解電容器不通電存放時，當環境溫度過高，其特性易劣化。請勿在無通電的狀態下放置一年以上。</li></ul>   |
|  | <p>說明書內文的圖示，為了方便說明事例，會與拿到產品稍有不同，但不會影響客戶權益。</p> <p>由於產品精益求精，當內容規格有所修正時，請洽詢代理商或至台達網站(<a href="http://www.delta.com.tw/industrialautomation/">http://www.delta.com.tw/industrialautomation/</a>)下載最新版本。</p>  |

### 接線圖

一對一（一台主動式電源再生單元+一台交流馬達驅動器）

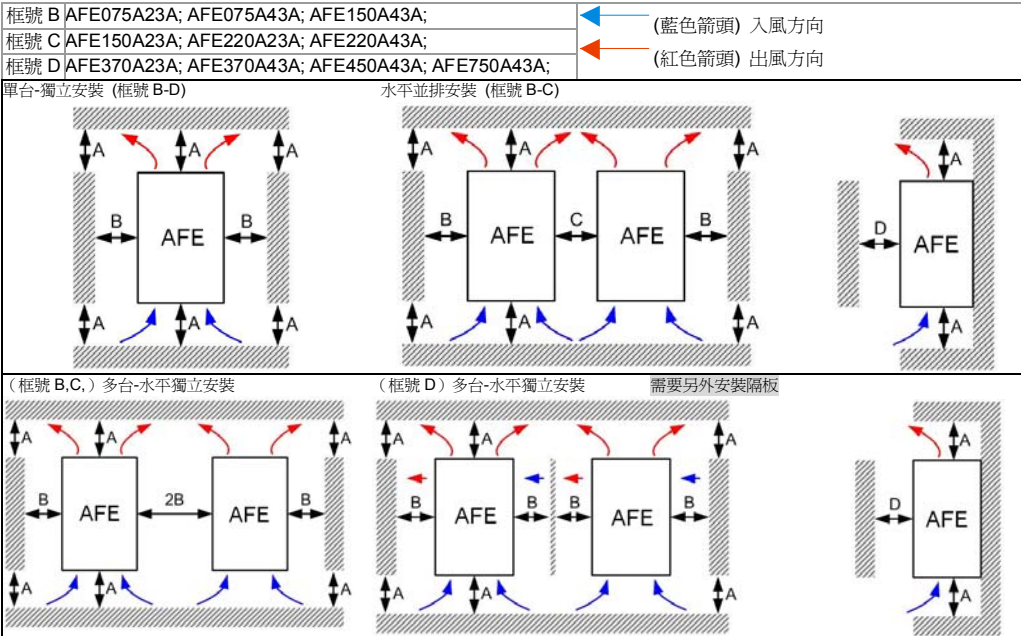


一對多（一台主動式電源再生單元+多台交流馬達驅動器）



### 安裝&配線說明

下列機種圖僅作為說明之用途，如有所差異，請以實際機種為主

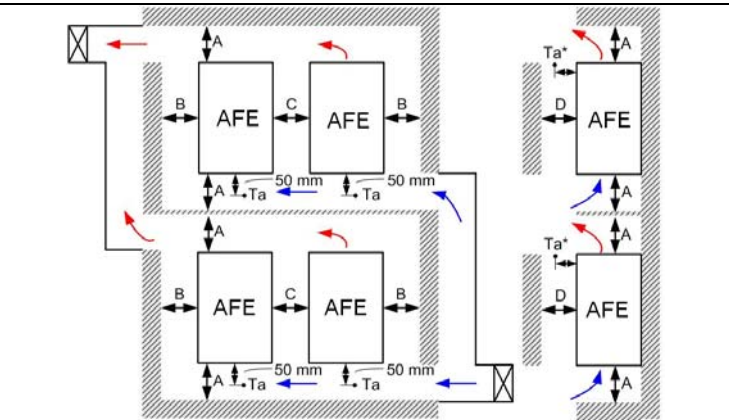
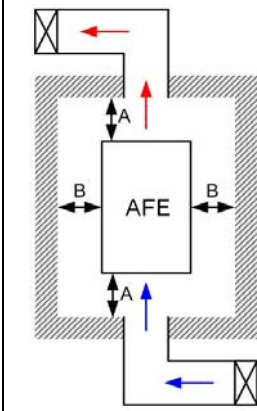


( 框號 B,C, )

多台-垂直並排安裝

若欲垂直獨立多台安裝時，建議應在各層間安裝隔板，隔板尺寸以使風扇入風處溫度低於操作溫度為原則。

(如右圖所示) 操作溫度定義為風扇入口前 50mm 處之溫度。



### 各點的距離

| 框號  | A (mm) | B (mm) | C (mm) | D (mm) |
|-----|--------|--------|--------|--------|
| B~C | 60     | 30     | 10     | 0      |
| D   | 100    | 50     | -      | 0      |

### NOTE

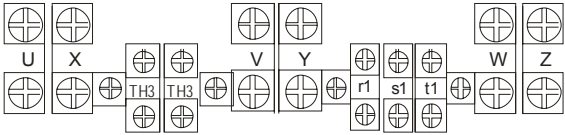
- (如左圖所示) 距離只適用於開放空間。若欲放置於密閉空間（如配盤或機箱），除保持與開放空間相同距離外，請安裝通風設備或空調以保持環境溫度低於操作溫度。
- 表格中為各機型於密閉空間單機安裝時所需通風量。若多機安裝則所需通風量依機台數目已倍數增加。
- 通風設備選用及設計，請參考附表之散熱風量 (Air flow rate for cooling)。
- 空調系統設計，請參考變頻器散熱功率 (Power Dissipation)。
- 以上 B~D 皆為最小所需距離，若低於此距離將會影響風扇性能。

### 配線端子規格 (請參考接線圖)

|          |  |   |   |
|----------|--|---|---|
| ● 控制迴路端子 | 線徑：26-16AWG. (0.1281-1.318mm <sup>2</sup> )                            | 扭力(±10%)：5kg-cm[4.31 lb-in.] (0.49Nm), 5kg-cm[4.31 lb-in.] (0.49Nm) |   |
| ○ 主迴路端子  | UL installations must use 600V, 75℃ or 90℃ wire. Use copper wire only. |   |   |
| 機種 AFE   | 最大線徑   | 最小線徑  | 備註  |
| 075A23A  |  | 6 AWG (13.3mm <sup>2</sup> )  | DC+ & DC-: must use 1kV Wire. UL installations must use 600V, 75℃ or 90℃ wire. Use copper wire only.  |
| 075A43A  |  | 8 AWG (8.4mm <sup>2</sup> )   |   |
| 150A43A  | 4 AWG (21.2mm <sup>2</sup> )   | 6 AWG (13.3mm <sup>2</sup> )  | 端子 r1/I1, s1/I2, t1/I3：線徑：20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ] 扭力 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%) 使用符合 UL 認證的絕緣熱縮套管(可耐 600V, YDPU2)的規格。 Detection wire 7 Max. 3.7 Min. 4 Min. 15 Max. 3.7 Max. 6 Max. Ring lug Heat Shrink Tube WIRE 13 Min. 12 Max. Power wire 14 Max. 5.2 Min. 7 Max. 28 Max. 7.5 Min. 13 Min. 12 Max. Ring lug Heat Shrink Tube WIRE  |
| 150A23A  |  | 1 AWG (42.4mm <sup>2</sup> )  | DC+ & DC-: must use 1kV Wire. UL installations must use 600V, 75℃ or 90℃ wire. Use copper wire only.  |
| 220A23A  |  | 1/0 AWG (53.5mm <sup>2</sup> )                                      | 端子 r1/I1, s1/I2, t1/I3：線徑：20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ] 扭力 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%) 當環境溫度超過 45℃時，AFE220A23A 必須使用 600V, 90℃ 線材。 使用符合 UL 認證的絕緣熱縮套管(可耐 600V, YDPU2)的規格。 Detection wire 7 Max. 3.7 Min. 4 Min. 15 Max. 3.7 Max. 6 Max. Ring lug Heat Shrink Tube WIRE 13 Min. 12 Max. Power wire 24 Max. 8.3 Min. 12 Max. 40 Max. 12.5 Min. 13 Min. 18 Max. Ring lug Heat Shrink Tube WIRE |
| 220A43A  | 1/0 AWG (53.5mm <sup>2</sup> )   | 4 AWG (21.2mm <sup>2</sup> )  | M8 80kg-cm (69.4 lb-in.) (7.848Nm)  |
| 370A23A  |  | 250MCM (126mm <sup>2</sup> )  | DC+ & DC-: must use 1kV Wire.   |
| 370A43A  |  | 1/0 AWG (42.4mm <sup>2</sup> )                                      | 端子 r1/I1, s1/I2, t1/I3：線徑：22AWG [0.3mm <sup>2</sup> ] ~ 16 AWG [1.3mm <sup>2</sup> ] 扭力：5 kg-cm [4.3 lb-in.] (0.49 N.m)   |
| 450A43A  |  | 2/0 AWG (67.4mm <sup>2</sup> )                                      | 使用符合 UL 認證的絕緣熱縮套管(可耐 600V, YDPU2)的規格。   |
| 750A43A  | 300MCM (152mm <sup>2</sup> )   | 300MCM (152mm <sup>2</sup> )  | M8 200kg-cm (173 lb-in.) (19.62Nm) 28 Max. 8.2 Min. 17 Max. 48 Max. 28 Max. 8.2 Min. 13 Min. 48 Max. Ring lug Heat Shrink Tube WIRE   |

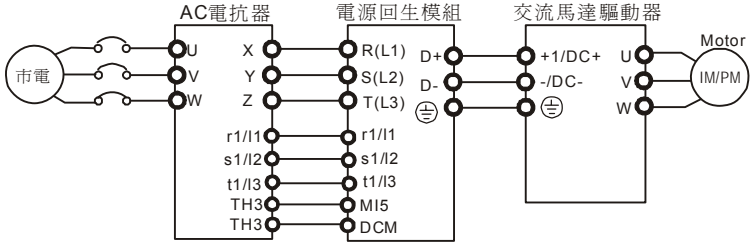
AC 電抗器

端子規格

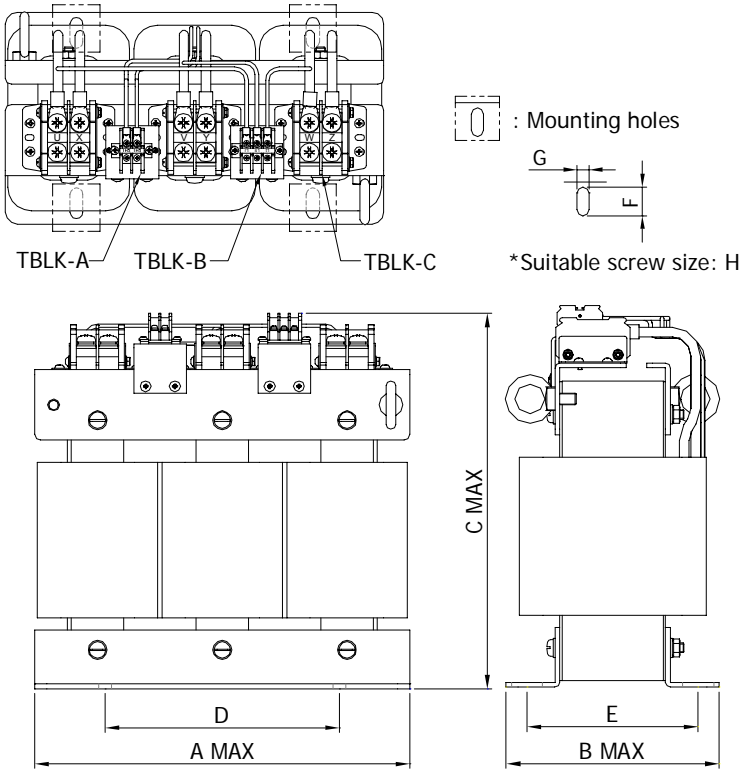


| 230 V<br>電抗器型號 | 框號 | KW  | 適用機種<br>AFE-__A23A | 電感值<br>mH | 額定電流<br>Ams | 扭力 kg-cm / lb-in. / Nm ±10% |                |                  | Wieght<br>Net(Kg) |
|----------------|----|-----|--------------------|-----------|-------------|-----------------------------|----------------|------------------|-------------------|
|                |    |     |                    |           |             | Mounting                    | TBLK-A, B      | TBLK-C           |                   |
| AF-RC075A2     | B  | 7.5 | 075                | 2.1       | 35          | 40.0 /46.1 /3.92            | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28                |
| AF-RC150A2     | C  | 15  | 150                | 1.05      | 70          | 60.0 /69.2 /5.89            | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 52                |
| AF-RC220A2     |    | 22  | 220                | 0.77      | 95          | 80.0 /92.2 /7.85            | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62                |
| AF-RC370A2     | D  | 37  | 370                | 0.5       | 150         | 130.0 /149.9 /12.75         | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87                |
| 460 V<br>電抗器型號 | 框號 | KW  | 適用機種<br>AFE-__A43A | 電感值<br>mH | 額定電流<br>Ams | 扭力 kg-cm / lb-in. / Nm ±10% |                |                  | Wieght<br>Net(Kg) |
|                |    |     |                    |           |             | Mounting                    | TBLK-A, B      | TBLK-C           |                   |
| AF-RC150A4     | B  | 7.5 | 075                | 7.32      | 20          | 60.0 /69.2 /5.89            | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 52                |
| AF-RC220A4     |    | 15  | 150                | 4.18      | 35          | 80.0 /92.2 /7.85            | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62                |
| AF-RC370A4     | C  | 22  | 220                | 2.92      | 50          | 130.0 /149.9 /12.75         | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87                |
| AF-RC450A4     | D  | 37  | 370                | 1.96      | 75          | 160.0 /184.5 /15.70         | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 105               |
| AF-RC750A4     |    | 45  | 450                | 1.54      | 95          | 220.0 /253.7 /21.58         | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 137               |
| AF-RC075A4     |    | 75  | 750                | 0.92      | 160         | 40.0 /46.1 /3.92            | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28                |

接線圖



外觀尺寸圖

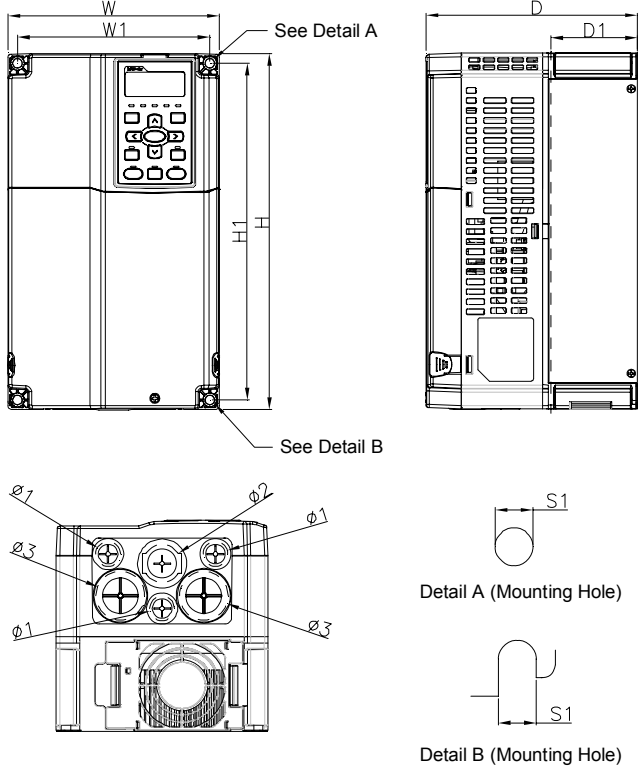


機種尺寸規格

| 機種         | A<br>mm [inch] | B<br>mm [inch] | C<br>mm [inch] | D<br>mm [inch] | E<br>mm [inch] | F<br>mm [inch] | G<br>mm [inch] | H<br>螺絲規格 |
|------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|
| AF-RC075A2 | 305 [12.01]    | 159 [6.26]     | 280 [11.02]    | 150 [5.91]     | 125 [4.92]     | 22 [0.87]      | 11 [0.43]      | M10       |
| AF-RC150A2 | 355 [13.98]    | 180 [7.09]     | 328 [12.91]    | 200 [7.87]     | 139 [5.47]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC220A2 | 355 [13.98]    | 200 [7.87]     | 328 [12.91]    | 200 [7.87]     | 159 [6.26]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC370A2 | 385 [15.16]    | 210 [8.27]     | 385 [15.16]    | 200 [7.87]     | 168 [6.26]     | 25 [1.02]      | 13 [0.51]      | M12       |
| AF-RC075A4 | 305 [12.01]    | 159 [6.26]     | 280 [11.02]    | 150 [5.91]     | 125 [4.92]     | 22 [0.87]      | 11 [0.43]      | M10       |
| AF-RC150A4 | 355 [13.98]    | 180 [7.09]     | 328 [12.91]    | 200 [7.87]     | 139 [5.47]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC220A4 | 355 [13.98]    | 200 [7.87]     | 328 [12.91]    | 200 [7.87]     | 159 [6.26]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC370A4 | 385 [15.16]    | 210 [8.27]     | 385 [15.16]    | 200 [7.87]     | 168 [6.26]     | 25 [1.02]      | 13 [0.51]      | M12       |
| AF-RC450A4 | 385 [15.16]    | 230 [9.06]     | 385 [15.16]    | 200 [7.87]     | 188 [7.40]     | 25 [1.02]      | 13 [0.51]      | M12       |
| AF-RC750A4 | 420 [16.54]    | 240 [9.45]     | 440 [17.32]    | 250 [9.84]     | 200 [7.87]     | 25 [1.02]      | 13 [0.51]      | M12       |

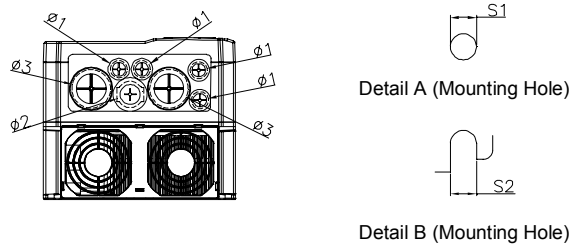
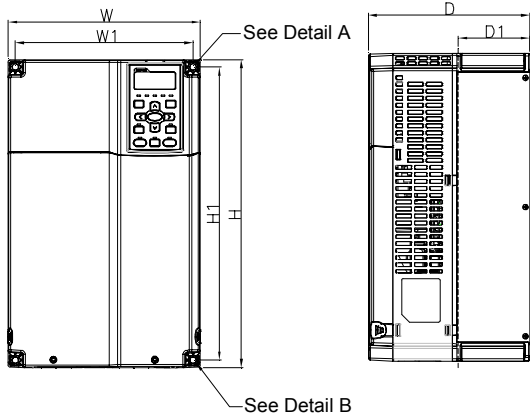
外觀尺寸 (下列尺寸圖以作為說明之用，會與實機的外觀有所差異，請以實際機種為主)

框號 B AFE075A23A; AFE075A43A; AFE150A43A;



| 框號 | W            | H             | D            | W1           | H1            | D1*         | S1         | Φ1          | Φ2          | Φ3          |
|----|--------------|---------------|--------------|--------------|---------------|-------------|------------|-------------|-------------|-------------|
| B1 | 190.0 [7.48] | 320.0 [12.60] | 190.0 [7.48] | 173.0 [6.81] | 303.0 [11.93] | 77.9 [3.07] | 8.5 [0.33] | 22.2 [0.87] | 34.0 [1.34] | 28.0 [1.10] |

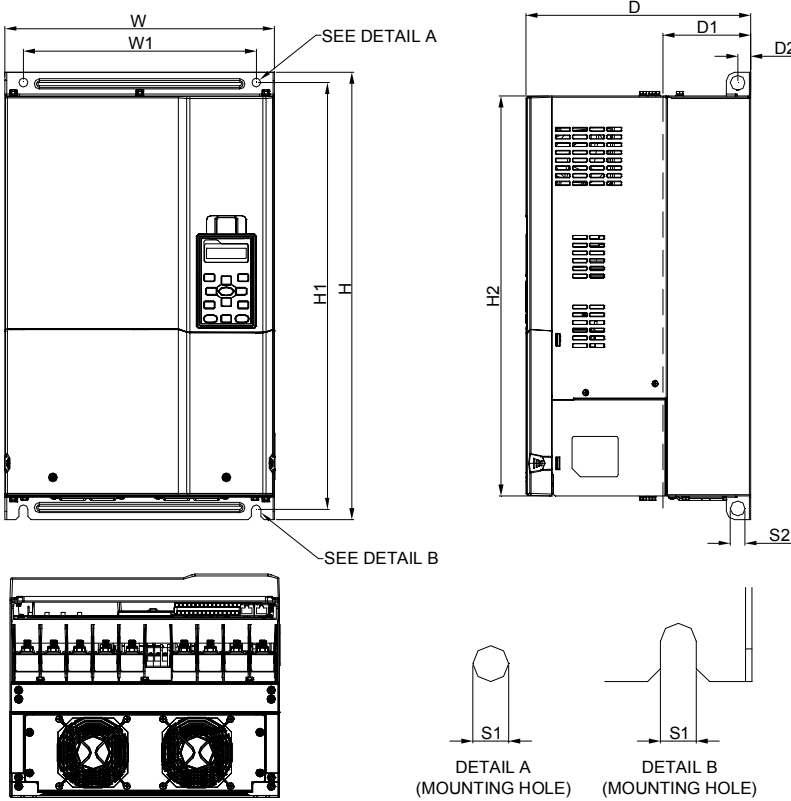
框號 C AFE150A23A; AFE220A23A; AFE220A43A;



| 框號 | W            | H             | D            | W1           | H1            | D1*         | S1         | Φ1          | Φ2          | Φ3          |
|----|--------------|---------------|--------------|--------------|---------------|-------------|------------|-------------|-------------|-------------|
| C1 | 250.0 [9.84] | 400.0 [15.75] | 210.0 [8.27] | 231.0 [9.09] | 381.0 [15.00] | 92.9 [3.66] | 8.5 [0.33] | 22.2 [0.87] | 34.0 [1.34] | 50.0 [1.97] |

D1\*：二階固定面 單位：mm [inch]

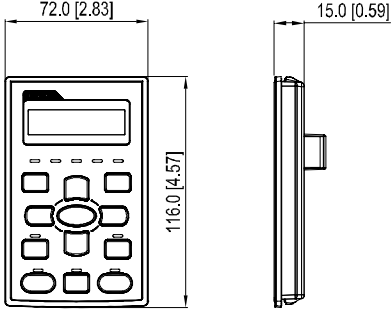
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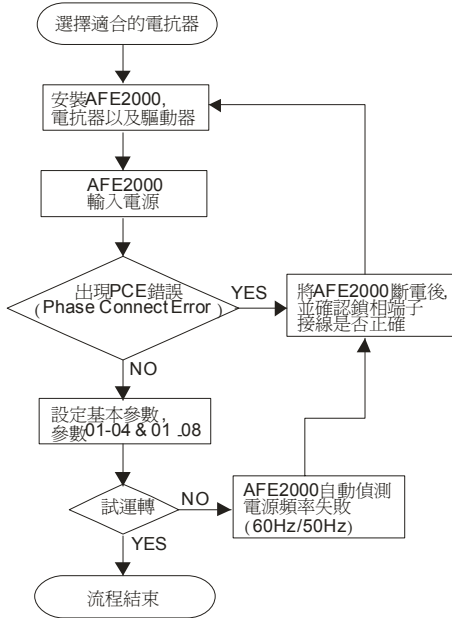
| 框號 | W             | H             | D             | W1            | H1            | H2            | D1*          | D2          | S1          | S2          |
|----|---------------|---------------|---------------|---------------|---------------|---------------|--------------|-------------|-------------|-------------|
| D1 | 330.0 [12.99] | 550.0 [21.65] | 275.0 [10.83] | 285.0 [11.22] | 525.0 [20.67] | 492.0 [19.37] | 107.2 [4.22] | 16.0 [0.63] | 11.0 [0.43] | 18.0 [0.71] |

D1\*：二階固定面 單位：mm [inch]

數位操作器 KPC-CE01



操作流程



參數表

✎表示可在運轉中執行設定功能

| 00 顯示參數 |                 |  |  |   |     |
|---------|-----------------|--|--|---|-----|
| 參數碼     | 參數名稱            | 設定範圍   |  |   | 初始值 |
| 00-00   | 主動式電源再生單元機種代碼識別 | 0：230V, 7.5kW<br>1：460V, 7.5Kw<br>2：230V, 15kW<br>3：460V, 15kW | 4：230V, 22kW<br>5：460V, 22kW<br>6：230V, 37kW | 7：460V, 37kW<br>9：460V, 45kW<br>11：460V, 75kW | 唯讀  |
| 00-01   | 電源再生單元額定電流顯示    | 0：35A<br>1：20A<br>2：70A<br>3：35A                               | 4：95A<br>5：50A<br>6：150A                     | 7：75A<br>9：95A<br>11：160A                     | 唯讀  |
| 00-02   | 軟體版本            | 僅供唯讀   |  |   | 唯讀  |
| 00-03   | 主動式電源再生單元電流     | 僅供讀取   |  |   | 唯讀  |

|       |                         |                               |             |             |
|-------|-------------------------|-------------------------------|-------------|-------------|
| 00-04 | 市電頻率(線頻率)               | 僅供讀取                          |             | 唯讀          |
| 00-05 | 直流側之電壓值 DC-BUS 電壓       | 僅供讀取                          |             | 唯讀          |
| 00-06 | 顯示輸入 AFE2000 之功率 kW     | -300.0 ~300.0                 |             | 唯讀          |
| 00-07 | 顯示輸入 AFE2000 耗功 kWh 高位數 | 0~9999                        |             | 唯讀          |
| 00-08 | 顯示輸入 AFE2000 耗功 kWh 低位數 | 0 ~ 9999                      |             | 唯讀          |
| 00-09 | 顯示 AFE2000 回生之功 kWh 高位數 | 0 ~ 9999                      |             | 唯讀          |
| 00-10 | 顯示 AFE2000 回生之功 kWh 低位數 | 0 ~ 9999                      |             | 唯讀          |
| 00-11 | 顯示 AFE2000 總功 kWh 高位數   | -9999 ~ 9999                  |             | 唯讀          |
| 00-12 | 顯示 AFE2000 總功 kWh 低位數   | -9999 ~ 9999                  |             | 唯讀          |
| 00-13 | 顯示 AFE2000 內部溫度 ℃       | 僅供讀取                          |             | 唯讀          |
| 00-14 | 功率模組 IGBT 溫度 ℃          | 僅供讀取                          |             | 唯讀          |
| 00-15 | 數位輸入 ON/OFF 狀態          | 僅供讀取                          |             | 唯讀          |
| 00-16 | 數位輸出 ON/OFF 狀態          | 僅供讀取                          |             | 唯讀          |
| 00-17 | 故障時直流側電壓值               | 僅供讀取                          |             | 唯讀          |
| 00-18 | 故障時市電頻率                 | 僅供讀取                          |             | 唯讀          |
| 00-19 | 故障時電流值                  | 僅供讀取                          |             | 唯讀          |
| 00-20 | 最近第一異常記錄                |                               | Fault Retry | Fault Reset |
| 00-21 | 最近第二異常記錄                | 0：無異常記錄                       | ○           | ○           |
| 00-22 | 最近第三異常記錄                | 3：ocn                         |             | 唯讀          |
| 00-23 | 最近第四異常記錄                | 4：GFF                         | ○           | ○           |
| 00-24 | 最近第五異常記錄                | 5：occ (僅 frame D)             | ○           | ○           |
| 00-25 | 最近第六異常記錄                | 6：ocs                         | ○           | ○           |
|       |                         | 9：oVn                         | ○           | ○           |
|       |                         | 10：oVs                        | ○           | ○           |
|       |                         | 13：LVn                        |             |             |
|       |                         | 14：LVs                        | ○           | ○           |
|       |                         | 15：PHL 輸入欠相                   | ○           | ○           |
|       |                         | 16：oH1 (IGBT 模組過熱)            | ○           | ○           |
|       |                         | 17：oH2 (內部環溫過熱)               | ○           | ○           |
|       |                         | 18：ot1 電路異常                   |             |             |
|       |                         | 19：ot2 電路異常                   |             |             |
|       |                         | 21：oL (150% 1Min, AFE2000 過載) | ○           | ○           |
|       |                         | 30：cF1 記憶體寫入異常                |             |             |
|       |                         | 31：cF2 記憶體讀出異常                |             |             |
|       |                         | 32：cd0 lsum 電流偵測異常            |             |             |
|       |                         | 33：cd1 U 相電流偵測異常              |             |             |
|       |                         | 34：cd2 V 相電流偵測異常              |             |             |
|       |                         | 35：cd3 W 相電流偵測異常              |             |             |
|       |                         | 36：Hd0 cc 電流偵測異常              |             |             |
|       |                         | 37：Hd1 oc 電流偵測異常              |             |             |
|       |                         | 38：Hd2 ov 電壓偵測異常              |             |             |
|       |                         | 47：S1 enable Error            |             | ○           |
|       |                         | 48：BST 升壓異常                   |             | ○           |
|       |                         | 49：EF1                        | ○           | ○           |
|       |                         | 52：PcodE 密碼錯誤                 |             | ○           |
|       |                         | 54：cE1 通訊異常(warn)             | ○           | ○           |
|       |                         | 55：cE2 通訊異常(warn)             | ○           | ○           |
|       |                         | 56：cE3 通訊異常(warn)             | ○           | ○           |
|       |                         | 57：cE4 通訊異常(warn)             | ○           | ○           |
|       |                         | 58：cE10 通訊 Time Out(warn)     | ○           | ○           |
|       |                         | 59：cP10 PU 面板 Time out(warn)  | ○           | ○           |
|       |                         | 65：PCE 相位接線異常                 |             | ○           |
|       |                         | 66：PLE 鎖相異常                   | ○           | ○           |
|       |                         | 67：LDC 控制電壓過低                 | ○           | ○           |
|       |                         | 68：RIP Dcbus 連波過大             | ○           | ○           |
| 00-26 | 電費低位數                   | 僅供讀取                          |             | 唯讀          |
| 00-27 | 電費高位數                   | 僅供讀取                          |             | 唯讀          |
| 00-28 | 輸入交流電壓                  | 0~6553.5                      |             | 唯讀          |

01 基本參數

| 參數碼   | 參數名稱           | 設定範圍   |   |  | 初始值  |
|-------|----------------|--|---|--|--|
| 01-00 | 參數重置設定         | 0：無功能<br>1：參數不可寫入<br>8：面板操作無效<br>10：參數重置   |   |  | 0  |
| 01-01 | 開機顯示畫面選擇       | 0：市電頻率(線頻率)<br>1：DC BUS 電壓<br>2：輸出電流   |   |  | 0  |
| 01-02 | 參數保護解碼輸入       | 1~9998，10000~65535<br>0~2：記錄密碼錯誤次數   |   |  | 0  |
| 01-03 | 參數保護密碼設定       | 1~9998，10000~65535<br>0：未設定密碼鎖或 00-07 密碼輸入成功<br>1：參數已被鎖定   |   |  | 0  |
| 01-04 | 運轉指令來源設定       | 1：由外部端子操作<br>2：由通訊 RS-485 或數位操作面板(KPVL-CC01)輸入   |   |  | 2  |
| 01-05 | 控制模式選擇         | 0：AFE mode<br>1：Regenerate mode  |   |  | 0  |
| 01-06 | 加速時間設定         | 0.00~600.00 秒  |   |  | 2  |
| 01-07 | 減速時間設定         | 0.00~600.00 秒  |   |  | 2  |
| 01-08 | DC BUS 電壓命令    | 220V：300~370V<br>440V：600~740V   |   |  | 340<br>680   |
| 01-09 | DC BUS P 增益百分比 | 0~100%   |   |  | 100  |
| 01-10 | DC BUS I 增益百分比 | 0~100%   |   |  | 100  |
| 01-11 | DC BUS 控制頻寬    | 0~75<br>230V, 7.5kW<br>460V, 7.5kW<br>460V, 15kW<br><br>230V, 15kW<br>230V, 22kW<br>460V, 22kW<br>230V, 37kW<br>460V, 37kW<br>460V, 45kW<br>460V, 75kW |   |  | 18<br>18<br>18<br><br>22<br>22<br>22<br>22<br>22<br>22<br>22 |
| 01-12 | 電抗器電感值         | 0(230V, 7.5kW): 2.10<br>1(460V, 7.5kW): 7.32<br>2(230V, 15kW): 1.32<br>3(460V, 15kW): 5.28   | 4(230V, 22kW): 0.88<br>5(460V, 22kW): 3.52<br>6(230V, 37kW): 0.50 | 7(460V, 37kW): 1.96<br>9(460V, 45kW): 1.76<br>11(460V, 75kW): 1.02 | 0.88   |

02 數位輸入/輸出參數

| 參數碼   | 參數名稱                                  | 設定範圍                                     | 初始值   |
|-------|---------------------------------------|--|-------|
| 02-00 | 多功能輸入指令二(MI1)                         | 0：無功能                                    | 1     |
| 02-01 | 多功能輸入指令二(MI2)                         | 1：RUN                                    | 2     |
| 02-02 | 多功能輸入指令三(MI3)                         | 2：STOP                                   | 3     |
| 02-03 | 多功能輸入指令四(MI4)                         | 3：EF1                                    | 4     |
| 02-04 | 多功能輸入指令五(MI5)                         | 4：RESET                                  | 0     |
| 02-05 | 多功能輸入指令六(MI6)                         | 5：MASTER/SLAVE (暫無支援)                    | 0     |
| 02-06 | 多功能輸入指令七(MI7)                         | 6：ENABLE                                 | 0     |
| 02-07 | 多功能輸入指令八(MI8)                         | 7: EF2<br>8: EF3<br>9: oH3               |       |
| 02-08 | 數位輸入響應時間                              | 0.001~ 30.000 秒                          | 0.005 |
| 02-09 | 數位輸入工作方向                              | 0~65535                                  | 0     |
| 02-10 | 多 功 能 輸 出 1 RA1, RB1, RC1<br>(Relay1) | 0：無功能<br>1：運轉中指示                         | 2     |
| 02-11 | 多 功 能 輸 出 2 RA2, RB2, RC2<br>(Relay2) | 2：DCBUS 命令準位到達<br>3：(鎖相完成)準備完成<br>4：故障指示 | 3     |
| 02-12 | 多功能輸出 3 (MO1)                         | 5：過熱警告 (03-05&03-06)<br>6：警告輸出           | 0     |
| 02-13 | 多功能輸出 4 (MO2)                         | 7：Drive / Regen<br>8：Fault Reset         | 0     |
| 02-14 | 多功能輸出方向                               | 0~65535                                  | 0     |

03 特殊保護參數

| 參數碼   | 參數名稱                              | 設定範圍  | 初始值        |
|-------|-----------------------------------|---|------------|
| 03-00 | 低電壓位準                             | 230V 機種：160.0~220.0Vdc<br>460V 機種：320.0~440.0Vdc        | 180<br>360 |
| 03-01 | 驅動方向電流限制                          | 0~250%  | 150        |
| 03-02 | 回升方向電流限制                          | 0~250%  | 150        |
| 03-03 | 鎖相頻率誤差準位                          | 0.00~10.00Hz  | 4.00       |
| 03-04 | 鎖相頻率誤差時間                          | 0~1000ms  | 150        |
| 03-05 | IGBT 溫度警告準位                       | 0.0~110.0 ℃   | 100.0      |
| 03-06 | 環境溫度警告準位                          | 0.0~110.0 ℃   | 60.0       |
| 03-07 | 異常再啓動次數                           | 0~10  | 0          |
| 03-08 | 異常再啓動次數回歸時間                       | 1~600s  | 600        |
| 03-09 | 冷卻散熱風扇控制方式<br>(Frame B 只有 ON OFF) | 0：風扇持續運轉<br>1：停機運轉一分鐘後停止<br>2：隨驅動器運轉/停止動作<br>3：依散熱片溫度運轉 | 2          |

|       |        |                |     |
|-------|--------|----------------|-----|
|       |        | 4：永不啓動         |     |
| 03-10 | 升壓異常準位 | 0.0V ~15.0V    | 5.0 |
| 03-11 | 升壓異常時間 | 200ms~1000ms   | 200 |
| 03-12 | 做功清除   | 0：參數復歸<br>1：清除 | 0   |
| 03-13 | 電費度數   | 0~6553.5       | 3.0 |

04 通訊參數

| 參數碼   | 參數名稱                 | 設定範圍   | 初始值  |
|-------|----------------------|--|------|
| 04-00 | 通訊位址                 | 1~254  | 1    |
| 04-01 | 通訊傳送速度(Keypad)       | 4.8~115.2Kbps  | 19.2 |
| 04-02 | 傳輸錯誤處理(Keypad)       | 0：警告並繼續運轉<br>1：警告且減速停車<br>2：保留<br>3：不處理也不顯示  | 3    |
| 04-03 | 逾時檢出(Keypad)         | 0.0~100.0 秒  | 0    |
| 04-04 | 通訊格式(Keypad)         | 0: 7N1 (ASCII)<br>1: 7N2 (ASCII)<br>2: 7E1 (ASCII)<br>3: 7O1 (ASCII)<br>4: 7E2 (ASCII)<br>5: 7O2 (ASCII)<br>6: 8N1 (ASCII)<br>7: 8N2 (ASCII)<br>8: 8E1 (ASCII)<br>9: 8O1 (ASCII)<br>10: 8E2 (ASCII)<br>11: 8O2 (ASCII)<br>12: 8N1 (RTU)<br>13: 8N2 (RTU)<br>14: 8E1 (RTU)<br>15: 8O1 (RTU)<br>16: 8E2 (RTU)<br>17: 8O2 (RTU) | 13   |
| 04-05 | 通訊回應延遲時間             | 0.0~200.0ms  | 2    |
| 04-06 | COM2 通訊傳送速度(Keypad)  | 4.8~115.2Kbps  | 19.2 |
| 04-07 | COM2 傳輸錯誤處理(Keypad)  | 0：警告並繼續運轉<br>1：警告且減速停<br>2：警告且自由停車<br>3：不警告並繼續運轉   | 3    |
| 04-08 | COM2 逾時檢出(Keypad)    | 0.0~100.0 秒  | 0.0  |
| 04-09 | COM2 通訊格式(Keypad)    | 0: 7N1 (ASCII)<br>1: 7N2 (ASCII)<br>2: 7E1 (ASCII)<br>3: 7O1 (ASCII)<br>4: 7E2 (ASCII)<br>5: 7O2 (ASCII)<br>6: 8N1 (ASCII)<br>7: 8N2 (ASCII)<br>8: 8E1 (ASCII)<br>9: 8O1 (ASCII)<br>10: 8E2 (ASCII)<br>11: 8O2 (ASCII)<br>12: 8N1 (RTU)<br>13: 8N2 (RTU)<br>14: 8E1 (RTU)<br>15: 8O1 (RTU)<br>16: 8E2 (RTU)<br>17: 8O2 (RTU) | 13   |
| 04-10 | 通訊卡的識別               | 0：無通訊卡<br>1：DeviceNet Slave<br>2：Profibus-DP Slave<br>3：CANopen Slave/Master<br>4：Modbus-TCP Slave<br>5：EtherNet/IP Slave<br>6~8：保留  | 0    |
| 04-11 | CANopen 速率           | 0：1M<br>1：500k<br>2：250k<br>3：125k<br>4：100k (台達自有)<br>5：50k   | 0    |
| 04-12 | CANopen 從站位址         | 0: Disable<br>1~127  | 0    |
| 04-13 | CANopen 通訊狀態         | 0：節點復歸狀態 (Node Reset State)<br>1：通訊復歸狀態 (Com Reset State)<br>2：復歸完成狀態 (Boot up State)<br>3：預操作狀態 (Pre Operation State)<br>4：操作狀態 (Operation State)<br>5：停止狀態 (Stop State)  | 0    |
| 04-14 | CANopen 警告紀錄         | bit 0：CANopen Guarding Time out<br>bit 1：CANopen Heartbeat Time out<br>bit 2：CANopen SYNC Time out<br>bit 3：CANopen SDO Time out<br>bit 4：CANopen SDO buffer overflow<br>bit 5：Can Bus Off<br>bit 6：Error protocol of CANopen  | 0    |
| 04-15 | 通訊卡版本                | 唯讀   | ##   |
| 04-16 | 產品碼                  | 唯讀   | ##   |
| 04-17 | 錯誤碼                  | 唯讀   | ##   |
| 04-18 | 通訊卡位址                | DeviceNet: 0-63<br>Profibus-DP: 1-125  | 1    |
| 04-19 | 通訊卡速率                | Standard DeviceNet:<br>0: 100Kbps<br>1: 125Kbps<br>2: 250Kbps<br>3: 1Mbps (台達自有)<br><br>Non standard DeviceNet: (台達自有)<br>0: 10Kbps<br>1: 20Kbps<br>2: 50Kbps<br>3: 100Kbps<br>4: 125Kbps<br>5: 250Kbps<br>6: 500Kbps<br>7: 800Kbps<br>8: 1Mbps  | 2    |
| 04-20 | 通訊卡速率額外設定            | 0: 無功能<br><br>此種模式下，波特率僅可以設置為 0，1，2，3 為標準 DeviceNet 方式<br><br>1: 致能<br>此種擴充模式下，DeviceNet 波特率可以設置與 CANopen 相同(0-8)。   | 0    |
| 04-21 | 通訊卡 IP Configuration | 0：靜態 IP<br>1：動態 IP (DHCP)  | 0    |
| 04-22 | 通訊卡 IP 位址 1          | 0~255  | 0    |
| 04-23 | 通訊卡 IP 位址 2          | 0~255  | 0    |
| 04-24 | 通訊卡 IP 位址 3          | 0~255  | 0    |
| 04-25 | 通訊卡 IP 位址 4          | 0~255  | 0    |
| 04-26 | 通訊卡遮罩位址 1            | 0~255  | 0    |
| 04-27 | 通訊卡遮罩位址 2            | 0~255  | 0    |
| 04-28 | 通訊卡遮罩位址 3            | 0~255  | 0    |
| 04-29 | 通訊卡遮罩位址 4            | 0~255  | 0    |
| 04-30 | 通訊卡 Getway 位址 1      | 0~255  | 0    |
| 04-31 | 通訊卡 Getway 位址 2      | 0~255  | 0    |
| 04-32 | 通訊卡 Getway 位址 3      | 0~255  | 0    |
| 04-33 | 通訊卡 Getway 位址 4      | 0~255  | 0    |
| 04-34 | 通訊卡密碼 (Low word)     | 0~255  | 0    |
| 04-35 | 通訊卡密碼 (High word)    | 0~255  | 0    |
| 04-36 | 通訊卡重置                | 0：無功能<br>1：回復出廠設定值   | 0    |
| 04-37 | 通訊卡額外設定              | Bit 0: Enable IP Filter :<br>Bit 1: Internet parameters enable(1bit)<br>當網路端參數設定完畢時，Enable。通訊卡更新參數完畢時，此 bit 會改爲 Disable。<br>Bit 2: Login password enable(1bit)<br>當登入密碼輸入完畢時，Enable。通訊卡更新參數完畢時，此 bit 會改爲 Disable。  | 0    |
| 04-38 | 通訊卡狀態                | Bit 0: password enable<br>當通訊卡有設定密碼時，Enable。通訊卡有設定密碼時，會設定此 bit 爲 Enable。通訊卡清除密碼時，會設定此 bit 爲 Disable。   | 0    |



## AFE2000 安装说明

### 主动式电源再生单元

请在装机之前，详细阅读本产品说明，并请妥善保存随机附赠之光盘内容及交由该机器的使用者。

主动式电源再生单元乃精密的电力电子产品，为了操作者及机械设备的安全，请务必交由专业的电机工程人员安装试车及调整参数，本产品说明中有 [ 危险 ]、[ 注意 ]等符号说明的地方，请务必仔细研读，若有任何疑问的地方请连络本公司各地的代理商洽询，我们的专业人员会乐于为您服务。

以下各事项请使用者在操作本产品时特别留意



- 在操作配线及安装主动式电源再生单元(AFE2000)时，请务必确认电源是否关闭。
- 切断交流电源后，主动式电源再生单元(AFE2000) POWER 指示灯（位于数字操作器下）未熄灭前，表示内部仍有高压十分危险，请勿触摸内部电路及零组件。
- 主动式电源再生单元(AFE2000)的内部电路板上各项电路组件易受静电的破坏，在未做好防静电措施前，请勿用手触摸电路板。禁止自行改装主动式电源再生单元(AFE2000)内部的零件或线路。
- 主动式电源再生单元(AFE2000)端子 务必正确的接地。230V 系列采用第三种接地，460V 系列采用特种接地。
- 主动式电源再生单元(AFE2000)及配件安装场合应远离火源发热体及易燃物。



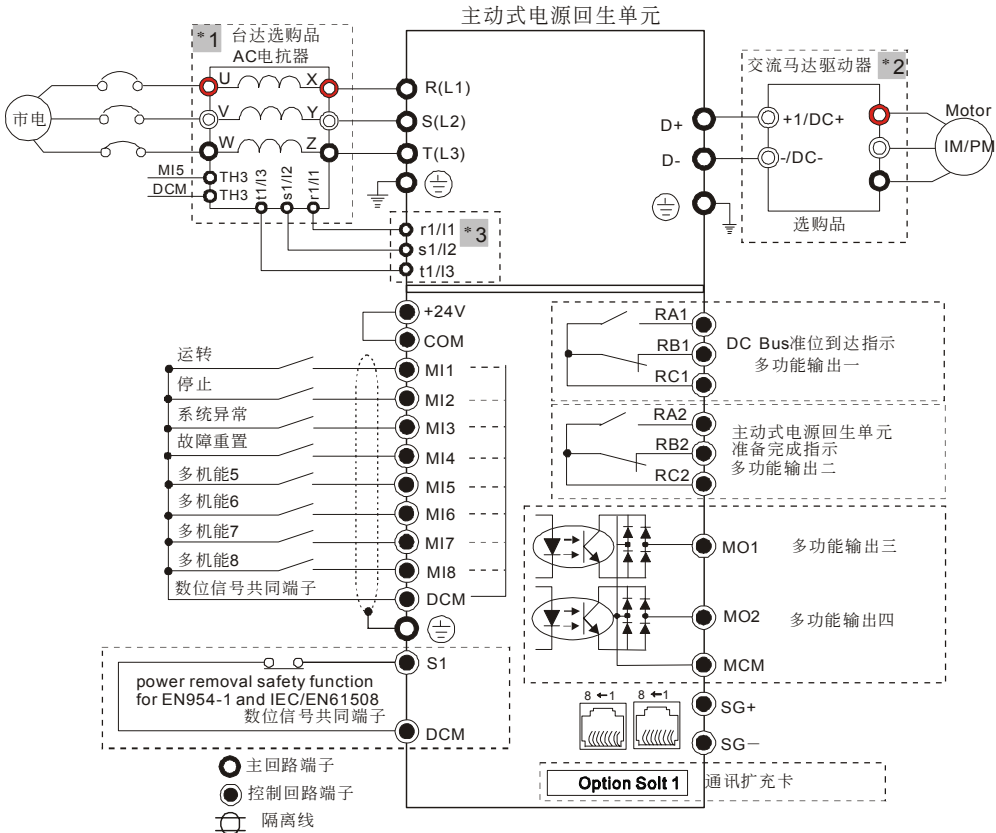
- 只有合格的电机专业人员才可以安装、配线及修理保养交流马达驱动器。
- 若为开封使用时并且超过 3 个月时，保存环境周围温度不得高于 30℃。这是因为考虑到电解电容器不通电存放时，当环境温度过高，其特性易劣化。请勿在无通电的状态下放置一年以上。

#### NOTE

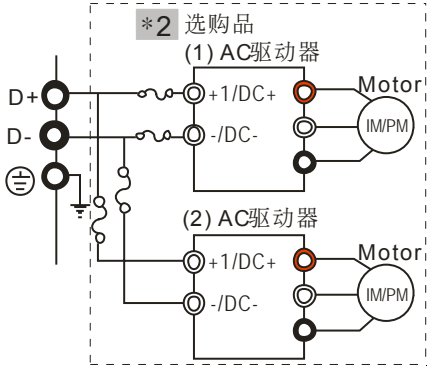
- 说明书内文的图标，为了方便说明事例，会与拿到产品稍有不同，但不会影响客户权益。
- 由于产品精益求精，当内容规格有所修正时，请洽询代理商或至台达网站(<http://www.delta.com.tw/industrialautomation/>)下载最新版本。

#### 接线图

一对一（一台主动式电源再生单元+一台交流马达驱动器）



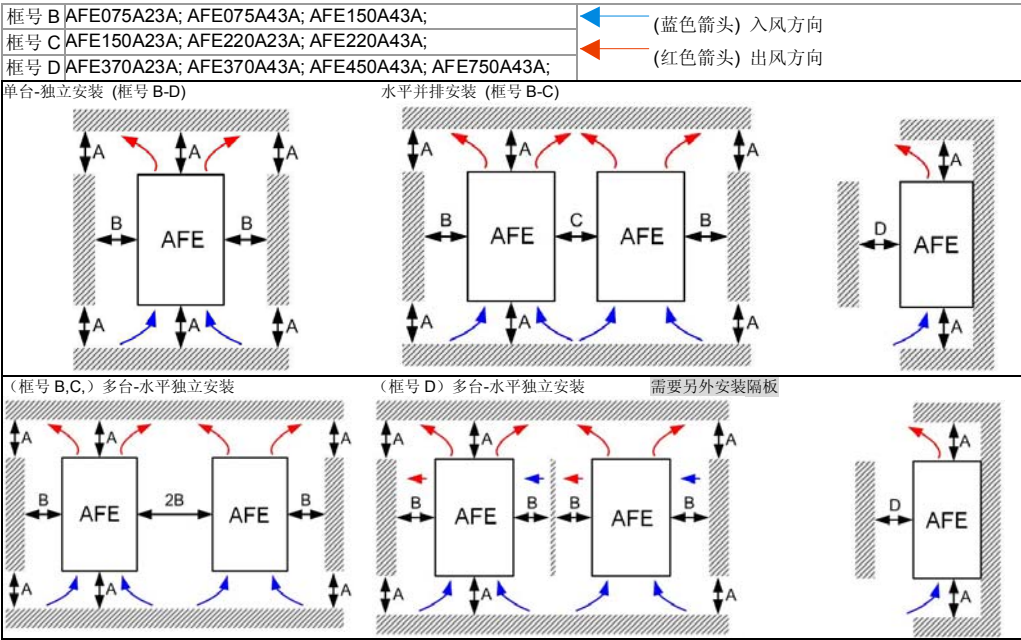
一对多  
(一台主动式电源再生单元+多台交流马达驱动器)



#### NOTE

- \*1 台达电抗器(选购)具有过热保护功能，当电抗器温度超过 120℃ 时，端子(TH3)会导通，并透过多机输入端子让主动式电源再生单元产生警告讯息。
- \*2 当一台主动式电源再生单元连接多台交流马达驱动器时，建议在每台交流马达驱动器直流输入侧加装保险丝。直流感测保险丝选用方式：保险丝规格 = 驱动器额定输入电流 / 0.78\*1.5
- \*3 当选购品电抗器不为台达品牌，此端子配线请连接至电源输入端 (R(L1), S(L2), T(L3))。

安装&配线说明 下列机种图仅作为说明之用途，如有所差异，请以实际机种为主

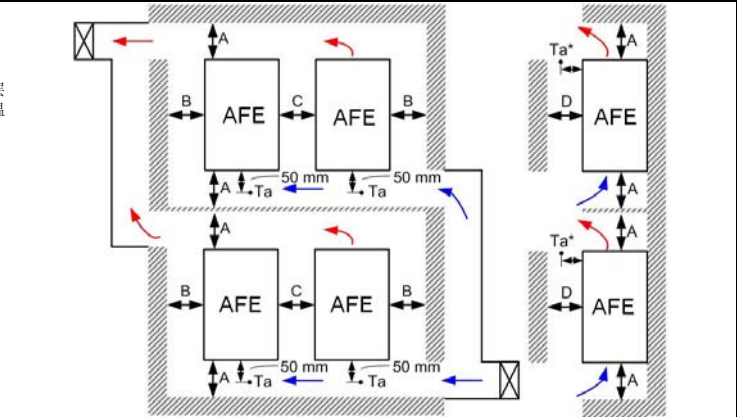
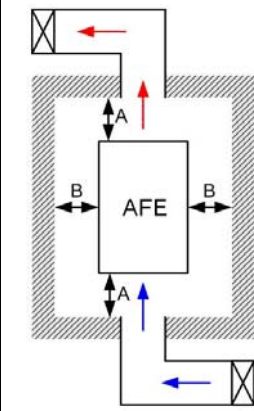


(框号 B,C,)

多台-垂直并排安装

若欲垂直独立多台安装时，建议应在各层间安装隔板，隔板尺寸以使风扇入风处温度低于操作温度为原则。

(如右图所示) 操作温度定义为风扇入口前 50mm 处之温度。



#### 各点的距离

| 框号  | A (mm) | B (mm) | C (mm) | D (mm) |
|-----|--------|--------|--------|--------|
| B~C | 60     | 30     | 10     | 0      |
| D   | 100    | 50     | -      | 0      |

#### NOTE

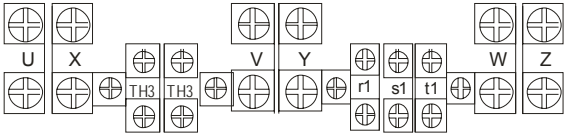
- (如左图所示) 距离只适用于开放空间。若欲放置于密闭空间（如配盘或机箱），除保持与开放空间相同距离外，请安装通风设备或空调以保持环境温度低于操作温度。
- 表格中为各机型于密闭空间单机安装时需通风量。若多机安装则所需通风量依机台数目已倍数增加。
- 通风设备选用及设计，请参考附表之散热风量 (Air flow rate for cooling)。
- 空调系统设计，请参考变频器散热功率 (Power Dissipation)。
- 以上 B~D 皆为最小所需距离，若低于此距离将会影响风扇性能。

#### 配线端子规格 (请参考接线图)

|  |                                |                                |  |   |
|--|--------------------------------|--------------------------------|--|---|
| ●控制回路端子 线径: 26-16AWG. (0.1281-1.318mm <sup>2</sup> )<br>扭力(±10%): 5kg-cm[4.31 lb-in.] (0.49Nm), 5kg-cm[4.31 lb-in.] (0.49Nm) |                                |                                |  |   |
| ○主回路端子 UL installations must use 600V, 75℃ or 90℃ wire. Use copper wire only.  |                                |                                |  |   |
| 机种 AFE   | 最大线径                           | 最小线径                           | 扭力(±10%)                                     | 备注  |
| 075A23A  |                                | 6 AWG (13.3mm <sup>2</sup> )   |  | DC+ & DC-: must use 1kV Wire.<br>UL installations must use 600V, 75℃ or 90℃ wire. Use copper wire only.   |
| 075A43A  |                                | 8 AWG (8.4mm <sup>2</sup> )    |  |   |
|  |                                | 6 AWG (13.3mm <sup>2</sup> )   |  | 端子 r1/11, s1/12, t1/13: 线径: 20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ]<br>扭力 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%)<br>使用符合 UL 认证的绝缘热缩套管(可耐 600V, YDPU2)的规格。<br>Detection wire<br>Power wire  |
| 150A43A  | 4 AWG (21.2mm <sup>2</sup> )   |                                | M5<br>35kg-cm<br>(30.4 lb-in.)<br>(3.4335Nm) |   |
| 150A23A  |                                | 1 AWG (42.4mm <sup>2</sup> )   |  | DC+ & DC-: must use 1kV Wire.<br>UL installations must use 600V, 75℃ or 90℃ wire. Use copper wire only.   |
| 220A23A  |                                | 1/0 AWG (53.5mm <sup>2</sup> ) |  | 端子 r1/11, s1/12, t1/13: 线径: 20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ]<br>扭力 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%)<br>当环境温度超过 45℃ 时，AFE220A23A 必须使用 600V, 90℃ 线材。<br>使用符合 UL 认证的绝缘热缩套管(可耐 600V, YDPU2)的规格。<br>Detection wire<br>Power wire |
| 220A43A  | 1/0 AWG (53.5mm <sup>2</sup> ) | 4 AWG (21.2mm <sup>2</sup> )   | M8<br>80kg-cm<br>(69.4 lb-in.)<br>(7.848Nm)  |   |
| 370A23A  |                                | 250MCM (126mm <sup>2</sup> )   |  | DC+ & DC-: must use 1kV Wire.   |
| 370A43A  |                                | 1/0 AWG (42.4mm <sup>2</sup> ) |  | 端子 r1/11, s1/12, t1/13: 线径: 22AWG [0.3mm <sup>2</sup> ] ~ 16 AWG [1.3mm <sup>2</sup> ]<br>扭力: 5 kg-cm [4.3 lb-in.] (0.49 N.m)   |
| 450A43A  |                                | 2/0 AWG (67.4mm <sup>2</sup> ) |  | 使用符合 UL 认证的绝缘热缩套管(可耐 600V, YDPU2)的规格。   |
|  | 300MCM (152mm <sup>2</sup> )   |                                | M8<br>200kg-cm<br>(173 lb-in.)<br>(19.62Nm)  |   |
| 750A43A  |                                | 300MCM (152mm <sup>2</sup> )   |  |   |

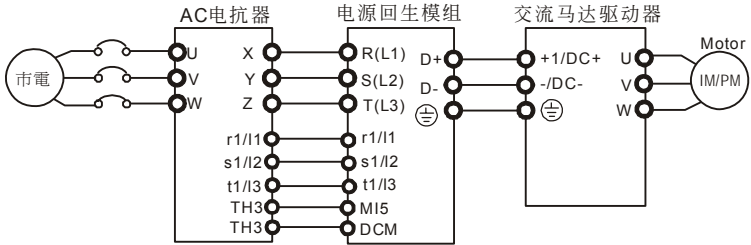
## AC 电抗器

### 端子规格

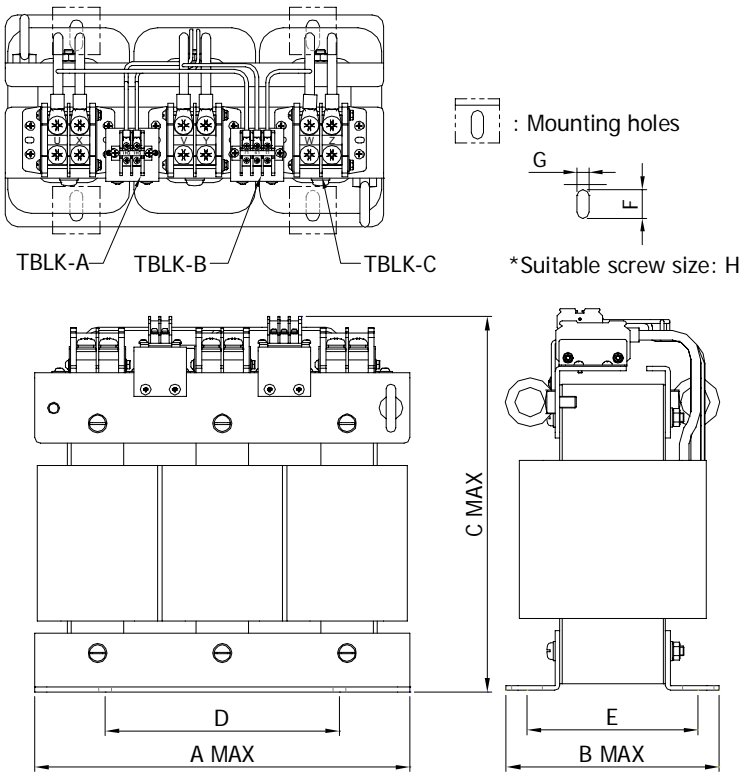


| 230 V      |  | 框号 | KW  | 适用机种        | 扭 力 kg-cm / lb-in. / Nm ±10% |                |                  | Wieght(Kg) |
|------------|--|----|-----|-------------|------------------------------|----------------|------------------|------------|
| 电抗器型号      |  |    |     | AFE-___A23A | Mounting                     | TBLK-A, B      | TBLK-C           |            |
| AF-RC075A2 |  | B  | 7.5 | 075         | 40.0 /46.1 /3.92             | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28         |
| AF-RC150A2 |  | C  | 15  | 150         | 60.0 /69.2 /5.89             | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 52         |
| AF-RC220A2 |  |    | 22  | 220         | 80.0 /92.2 /7.85             | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62         |
| AF-RC370A2 |  | D  | 37  | 370         | 130.0 /149.9 /12.75          | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87         |
| 460 V      |  | 框号 | KW  | 适用机种        | 扭 力 kg-cm / lb-in. / Nm ±10% |                |                  | Wieght(Kg) |
| 电抗器型号      |  |    |     | AFE-___A43A | Mounting                     | TBLK-A, B      | TBLK-C           |            |
| AF-RC150A4 |  | B  | 7.5 | 075         | 60.0 /69.2 /5.89             | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 52         |
| AF-RC220A4 |  |    | 15  | 150         | 80.0 /92.2 /7.85             | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62         |
| AF-RC370A4 |  | C  | 22  | 220         | 130.0 /149.9 /12.75          | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87         |
| AF-RC450A4 |  | D  | 37  | 370         | 160.0 /184.5 /15.70          | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 105        |
| AF-RC750A4 |  |    | 45  | 450         | 220.0 /253.7 /21.58          | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 137        |
| AF-RC075A4 |  |    | 75  | 750         | 40.0 /46.1 /3.92             | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28         |

### 接线图



外观尺寸图

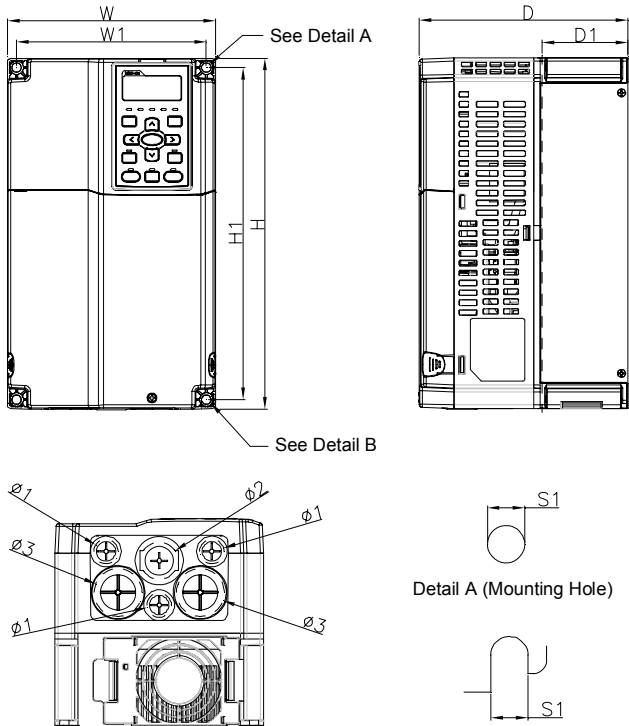


### 机种尺寸规格

| 机种         | A           | B          | C           | D          | E          | F         | G         | H    |
|------------|-------------|------------|-------------|------------|------------|-----------|-----------|------|
|            | mm [inch]   | mm [inch]  | mm [inch]   | mm [inch]  | mm [inch]  | mm [inch] | mm [inch] | 螺丝规格 |
| AF-RC075A2 | 305 [12.01] | 159 [6.26] | 280 [11.02] | 150 [5.91] | 125 [4.92] | 22 [0.87] | 11 [0.43] | M10  |
| AF-RC150A2 | 355 [13.98] | 180 [7.09] | 328 [12.91] | 200 [7.87] | 139 [5.47] | 26 [1.02] | 11 [0.43] | M10  |
| AF-RC220A2 | 355 [13.98] | 200 [7.87] | 328 [12.91] | 200 [7.87] | 159 [6.26] | 26 [1.02] | 11 [0.43] | M10  |
| AF-RC370A2 | 385 [15.16] | 210 [8.27] | 385 [15.16] | 200 [7.87] | 168 [6.26] | 25 [1.02] | 13 [0.51] | M12  |
| AF-RC075A4 | 305 [12.01] | 159 [6.26] | 280 [11.02] | 150 [5.91] | 125 [4.92] | 22 [0.87] | 11 [0.43] | M10  |
| AF-RC150A4 | 355 [13.98] | 180 [7.09] | 328 [12.91] | 200 [7.87] | 139 [5.47] | 26 [1.02] | 11 [0.43] | M10  |
| AF-RC220A4 | 355 [13.98] | 200 [7.87] | 328 [12.91] | 200 [7.87] | 159 [6.26] | 26 [1.02] | 11 [0.43] | M10  |
| AF-RC370A4 | 385 [15.16] | 210 [8.27] | 385 [15.16] | 200 [7.87] | 168 [6.26] | 25 [1.02] | 13 [0.51] | M12  |
| AF-RC450A4 | 385 [15.16] | 230 [9.06] | 385 [15.16] | 200 [7.87] | 188 [7.40] | 25 [1.02] | 13 [0.51] | M12  |
| AF-RC750A4 | 420 [16.54] | 240 [9.44] | 440 [17.32] | 250 [9.84] | 200 [7.87] | 25 [1.02] | 13 [0.51] | M12  |

**外观尺寸** (下列尺寸图以作为说明之用, 会与实机的外观有所差异, 请以实际机种为主)

框号 B    AFE075A23A; AFE075A43A; AFE150A43A;

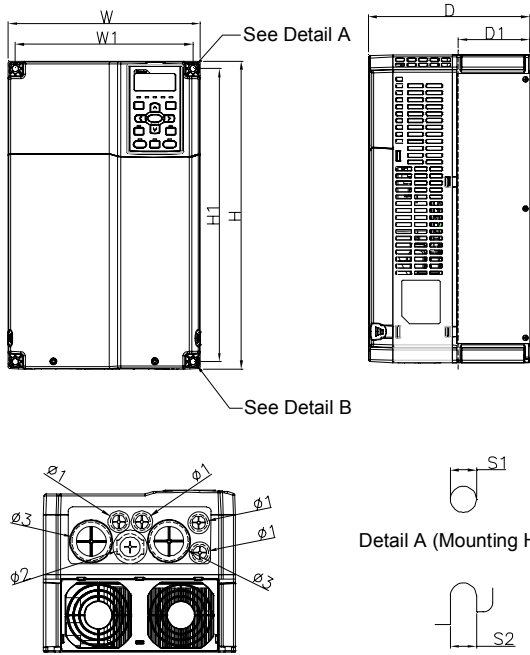


| 桩号 | W            | H             | D            | W1           | H1            | D1*         | S1         | Φ1          | Φ2          | Φ3          |
|----|--------------|---------------|--------------|--------------|---------------|-------------|------------|-------------|-------------|-------------|
| B1 | 190.0 [7.48] | 320.0 [12.60] | 190.0 [7.48] | 173.0 [6.81] | 303.0 [11.93] | 77.9 [3.07] | 8.5 [0.33] | 22.2 [0.87] | 34.0 [1.34] | 28.0 [1.10] |

D1\*: 二阶固定面 单位: mm [inch]

D1\*: 二阶固定面 单位: mm [inch]

框号 C AFE150A23A; AFE220A23A; AFE220A43A;

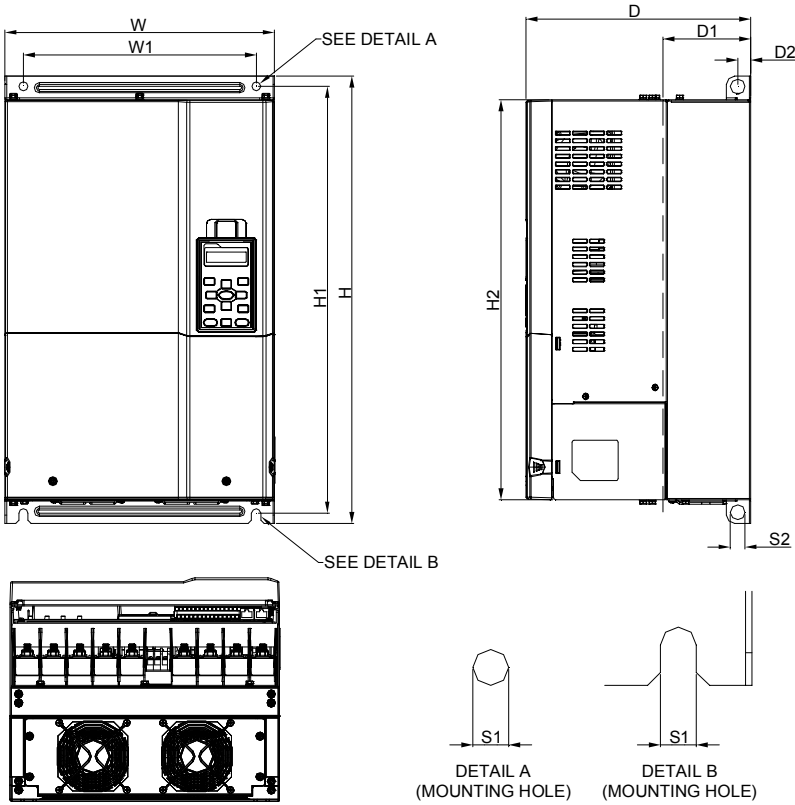


| 桩号 | W            | H             | D            | W1           | H1            | D1*         | S1         | Φ1          | Φ2          | Φ3          |
|----|--------------|---------------|--------------|--------------|---------------|-------------|------------|-------------|-------------|-------------|
| C1 | 250.0 [9.84] | 400.0 [15.75] | 210.0 [8.27] | 231.0 [9.09] | 381.0 [15.00] | 92.9 [3.66] | 8.5 [0.33] | 22.2 [0.87] | 34.0 [1.34] | 50.0 [1.97] |

D1\*: 二阶固定面 单位: mm [inch]

D1\*: 二阶固定面 单位: mm [inch]

框号 D AFE370A23A; AFE370A43A; AFE450A43A; AFE750A43A;

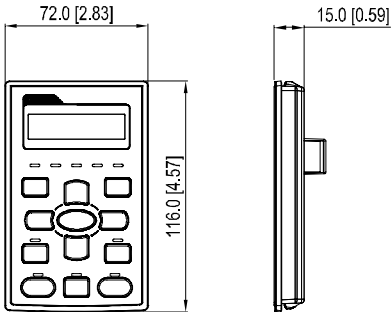


| 桁号 | W             | H             | D             | W1            | H1            | H2            | D1*          | D2          | S1          | S2          |
|----|---------------|---------------|---------------|---------------|---------------|---------------|--------------|-------------|-------------|-------------|
| D1 | 330.0 [12.99] | 550.0 [21.65] | 275.0 [10.83] | 285.0 [11.22] | 525.0 [20.67] | 492.0 [19.37] | 107.2 [4.22] | 16.0 [0.63] | 11.0 [0.43] | 18.0 [0.71] |

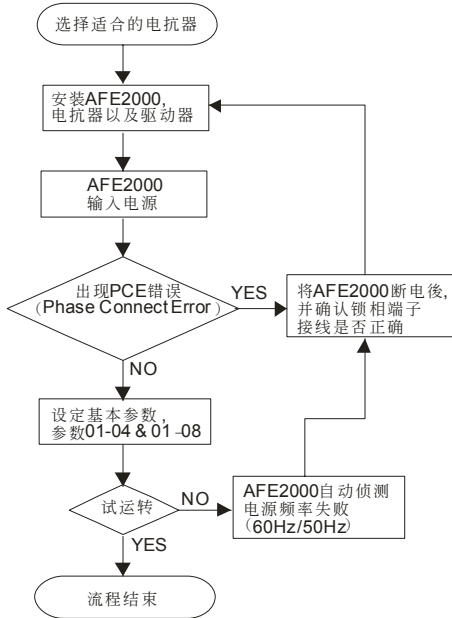
D1\*: 二階固定面 単位: mm[inch]

D1\*: 二阶固定面 单位: mm[inch]

## 数字操作器 KPC-CE01



## 操作流程



## 参数表

✱表示可在运转中执行设定功能

## 00 显示参数

| 参数码   | 参数名称            | 设定范围   |   |  | 初始值 |
|-------|-----------------|--|---|--|-----|
| 00-00 | 主动式电源再生单元机种代码识别 | 0: 230V, 7.5kW<br>1: 460V, 7.5Kw<br>2: 230V, 15kW<br>3: 460V, 15kW | 4: 230V, 22kW<br>5: 460V, 22kW<br>6: 230V, 37kW | 7: 460V, 37kW<br>9: 460V, 45kW<br>11: 460V, 75kW | 只读  |
| 00-01 | 电源再生单元额定电流显示    | 0: 35A<br>1: 20A<br>2: 70A<br>3: 35A                               | 4: 95A<br>5: 50A<br>6: 150A                     | 7: 75A<br>9: 95A<br>11: 160A                     | 只读  |
| 00-02 | 软件版本            | 仅供只读   |   |  | 只读  |

|       |                         |                                |      |             |             |    |    |
|-------|-------------------------|--------------------------------|------|-------------|-------------|----|----|
| 00-03 | 主动式电源回生单元电流             | 仅供读取                           |      |             | 只读          |    |    |
| 00-04 | 市电频率(线频率)               | 仅供读取                           |      |             | 只读          |    |    |
| 00-05 | 直流侧之电压值 DC-BUS 电压       | 仅供读取                           |      |             | 只读          |    |    |
| 00-06 | 显示输入 AFE2000 之功率 kW     | -300.0 ~300.0                  |      |             | 只读          |    |    |
| 00-07 | 显示输入 AFE2000 耗功 kWh 高位数 | 0~9999                         |      |             | 只读          |    |    |
| 00-08 | 显示输入 AFE2000 耗功 kWh 低位数 | 0 ~ 9999                       |      |             | 只读          |    |    |
| 00-09 | 显示 AFE2000 回生之功 kWh 高位数 | 0 ~ 9999                       |      |             | 只读          |    |    |
| 00-10 | 显示 AFE2000 回生之功 kWh 低位数 | 0 ~ 9999                       |      |             | 只读          |    |    |
| 00-11 | 显示 AFE2000 总功 kWh 高位数   | -9999 ~ 9999                   |      |             | 只读          |    |    |
| 00-12 | 显示 AFE2000 总功 kWh 低位数   | -9999 ~ 9999                   |      |             | 只读          |    |    |
| 00-13 | 显示 AFE2000 内部温度 ℃       | 仅供读取                           |      |             | 只读          |    |    |
| 00-14 | 功率模块 IGBT 温度 ℃          | 仅供读取                           |      |             | 只读          |    |    |
| 00-15 | 数字输入 ON/OFF 状态          | 仅供读取                           |      |             | 只读          |    |    |
| 00-16 | 数字输出 ON/OFF 状态          | 仅供读取                           |      |             | 只读          |    |    |
| 00-17 | 故障时直流侧电压值               | 仅供读取                           |      |             | 只读          |    |    |
| 00-18 | 故障时市电频率                 | 仅供读取                           |      |             | 只读          |    |    |
| 00-19 | 故障时电流值                  | 仅供读取                           |      |             | 只读          |    |    |
| 00-20 | 最近第一异常记录                |                                |      | Fault Retry | Fault Reset | 只读 |    |
| 00-21 | 最近第二异常记录                | 0: 无异常记录                       |      | ○           | ○           | 只读 |    |
| 00-22 | 最近第三异常记录                | 3: ocn                         |      |             |             | 只读 |    |
| 00-23 | 最近第四异常记录                | 4: GFF                         |      | ○           | ○           | 只读 |    |
| 00-24 | 最近第五异常记录                | 5: occ (仅 frame D)             |      | ○           | ○           | 只读 |    |
| 00-25 | 最近第六异常记录                | 6: ocs                         |      | ○           | ○           | 只读 |    |
|       |                         | 9: oVn                         |      | ○           | ○           |    |    |
|       |                         | 10: oVs                        |      | ○           | ○           |    |    |
|       |                         | 13: LVn                        |      |             |             |    |    |
|       |                         | 14: LVs                        |      | ○           | ○           |    |    |
|       |                         | 15: PHL 输入欠相                   |      | ○           | ○           |    |    |
|       |                         | 16: oH1 (IGBT 模块过热)            |      | ○           | ○           |    |    |
|       |                         | 17: oH2 (内部环温过热)               |      | ○           | ○           |    |    |
|       |                         | 18: ot1 电路异常                   |      |             |             |    |    |
|       |                         | 19: ot2 电路异常                   |      |             |             |    |    |
|       |                         | 21: oL (150% 1Min, AFE2000 过载) |      | ○           | ○           |    |    |
|       |                         | 30: cF1 内存写入异常                 |      |             |             |    |    |
|       |                         | 31: cF2 内存读出异常                 |      |             |             |    |    |
|       |                         | 32: cd0 lsum 电流侦测异常            |      |             |             |    |    |
|       |                         | 33: cd1 U 相电流侦测异常              |      |             |             |    |    |
|       |                         | 34: cd2 V 相电流侦测异常              |      |             |             |    |    |
|       |                         | 35: cd3 W 相电流侦测异常              |      |             |             |    |    |
|       |                         | 36: Hd0 cc 电流侦测异常              |      |             |             |    |    |
|       |                         | 37: Hd1 oc 电流侦测异常              |      |             |             |    |    |
|       |                         | 38: Hd2 ov 电压侦测异常              |      |             |             |    |    |
|       |                         | 47: S1 enable Error            |      |             |             | ○  |    |
|       |                         | 48: BST 升压异常                   |      |             |             | ○  |    |
|       |                         | 49: EF1                        |      |             | ○           | ○  |    |
|       |                         | 52: PcodeE 密码错误                |      |             |             | ○  |    |
|       |                         | 54: cE1 通讯异常(warn)             |      |             | ○           | ○  |    |
|       |                         | 55: cE2 通讯异常(warn)             |      |             | ○           | ○  |    |
|       |                         | 56: cE3 通讯异常(warn)             |      |             | ○           | ○  |    |
|       |                         | 57: cE4 通讯异常(warn)             |      |             | ○           | ○  |    |
|       |                         | 58: cE10 通讯 Time Out(warn)     |      |             | ○           | ○  |    |
|       |                         | 59: cP10 PU 面板 Time out(warn)  |      |             | ○           | ○  |    |
|       |                         | 65: PCE 相位接线异常                 |      |             |             | ○  |    |
|       |                         | 66: PLE 锁相异常                   |      |             | ○           | ○  |    |
|       |                         | 67: LDC 控制电压过低                 |      |             | ○           | ○  |    |
|       |                         | 68: RIP Dcbus 涟波过大             |      |             | ○           | ○  |    |
|       | 00-26                   | 电费低位数                          | 仅供读取 |             |             |    | 只读 |
|       | 00-27                   | 电费高位数                          | 仅供读取 |             |             |    | 只读 |
| 00-28 | 输入交流电压                  | 0~6553.5                       |      |             |             | 只读 |    |

01 基本参数

| 参数码   | 参数名称           | 设定范围  | 初始值  |
|-------|----------------|---|--|
| 01-00 | 参数重置设定         | 0：无功能<br>1：参数不可写入<br>8：面板操作无效<br>10：参数重置  | 0  |
| 01-01 | 开机显示画面选择       | 0：市电频率(线频率)<br>1：DC BUS 电压<br>2：输出电流  | 0  |
| 01-02 | 参数保护解码输入       | 1~9998， 10000~65535<br>0~2：记录密码错误次数   | 0  |
| 01-03 | 参数保护密码设定       | 1~9998， 10000~65535<br>0：未设定密码锁或 00-07 密码输入成功<br>1：参数已被锁定   | 0  |
| 01-04 | 运转指令来源设定       | 1：由外部端子操作<br>2：由通讯 RS-485 或数字操作面板(KPVL-CC01)输入  | 2  |
| 01-05 | 控制模式选择         | 0：AFE mode<br>1：Regenerate mode   | 0  |
| 01-06 | 加速时间设定         | 0.00~600.00 秒   | 2  |
| 01-07 | 减速时间设定         | 0.00~600.00 秒   | 2  |
| 01-08 | DC BUS 电压命令    | 220V：300~370V<br>440V：600~740V  | 340<br>680   |
| 01-09 | DC BUS P 增益百分比 | 0~100%  | 100  |
| 01-10 | DC BUS I 增益百分比 | 0~100%  | 100  |
| 01-11 | DC BUS 控制频宽    | 0~75<br>230V, 7.5kW<br>460V, 7.5kW<br>460V, 15kW<br><br>230V, 15kW<br>230V, 22kW<br>460V, 22kW<br>230V, 37kW<br>460V, 37kW<br>460V, 45kW<br>460V, 75kW  | 18<br>18<br>18<br><br>22<br>22<br>22<br>22<br>22<br>22<br>22 |
| 01-12 | 电抗器电感值         | 0(230V, 7.5kW): 2.10<br>1(460V, 7.5kW): 7.32<br>2(230V, 15kW): 1.32<br>3(460V, 15kW): 5.28<br><br>4(230V, 22kW): 0.88<br>5(460V, 22kW): 3.52<br>6(230V, 37kW): 0.50<br><br>7(460V, 37kW): 1.96<br>9(460V, 45kW): 1.76<br>11(460V, 75kW): 1.02 | 0.88   |

02 数字输入/输出参数

| 参数码   | 参数名称                               | 设定范围                                     | 初始值   |
|-------|------------------------------------|--|-------|
| 02-00 | 多功能输入指令二(MI1)                      | 0：无功能                                    | 1     |
| 02-01 | 多功能输入指令二(MI2)                      | 1：RUN                                    | 2     |
| 02-02 | 多功能输入指令三(MI3)                      | 2：STOP                                   | 3     |
| 02-03 | 多功能输入指令四(MI4)                      | 3：EF1                                    | 4     |
| 02-04 | 多功能输入指令五(MI5)                      | 4：RESET                                  |       |
| 02-05 | 多功能输入指令六(MI6)                      | 5：MASTER/SLAVE (暂无支援)                    | 0     |
| 02-06 | 多功能输入指令七(MI7)                      | 6：ENABLE                                 | 0     |
| 02-07 | 多功能输入指令八(MI8)                      | 7：EF2<br>8：EF3<br>9：oH3                  |       |
| 02-08 | 数字输入响应时间                           | 0.001~ 30.000 秒                          | 0.005 |
| 02-09 | 数字输入工作方向                           | 0~65535                                  | 0     |
| 02-10 | 多 功 能 输 出 1 RA1, RB1, RC1 (Relay1) | 0：无功能<br>1：运转中指示                         | 2     |
| 02-11 | 多 功 能 输 出 2 RA2, RB2, RC2 (Relay2) | 2：DCBUS 命令准位到达<br>3：(锁相完成)准备完成           | 3     |
| 02-12 | 多功能输出 3 (MO1)                      | 4：故障指示<br>5：过热警告 (03-05&03-06)<br>6：警告输出 | 0     |
| 02-13 | 多功能输出 4 (MO2)                      | 7：Drive / Regen<br>8：Fault Reset         | 0     |
| 02-14 | 多功能输出方向                            | 0~65535                                  | 0     |

03 特殊保护参数

| 参数码   | 参数名称                           | 设定范围   | 初始值        |
|-------|--------------------------------|--|------------|
| 03-00 | 低电压位准                          | 230V 机种：160.0~220.0Vdc<br>460V 机种：320.0~440.0Vdc | 180<br>360 |
| 03-01 | 驱动方向电流限制                       | 0~250%   | 150        |
| 03-02 | 回升方向电流限制                       | 0~250%   | 150        |
| 03-03 | 锁相频率误差准位                       | 0.00~10.00Hz                                     | 4.00       |
| 03-04 | 锁相频率误差时间                       | 0~1000ms   | 150        |
| 03-05 | IGBT 温度警告准位                    | 0.0~110.0 ℃                                      | 100.0      |
| 03-06 | 环境温度警告准位                       | 0.0~110.0 ℃                                      | 60.0       |
| 03-07 | 异常再启动次数                        | 0~10   | 0          |
| 03-08 | 异常再启动次数回归时间                    | 1~600s   | 600        |
| 03-09 | 冷却散热风扇控制方式 (Frame B 只有 ON OFF) | 0：风扇持续运转<br>1：停机运转一分钟后停止<br>2：随驱动器运转/停止动作        | 2          |

|       |        |                      |     |
|-------|--------|----------------------|-----|
|       |        | 3：依散热片温度运转<br>4：永不启动 |     |
| 03-10 | 升压异常准位 | 0.0V ~15.0V          | 5.0 |
| 03-11 | 升压异常时间 | 200ms~1000ms         | 200 |
| 03-12 | 做功清除   | 0：参数复归<br>1：清除       | 0   |
| 03-13 | 电费度数   | 0~6553.5             | 3.0 |

04 通讯参数

| 参数码   | 参数名称                 | 设定范围   | 初始值  |
|-------|----------------------|--|------|
| 04-00 | 通讯地址                 | 1~254  | 1    |
| 04-01 | 通讯传送速度(Keypad)       | 4.8~115.2Kbps  | 19.2 |
| 04-02 | 传输错误处理(Keypad)       | 0：警告并继续运转<br>1：警告且减速停车<br>2：保留<br>3：不处理也不显示  | 3    |
| 04-03 | 逾时检出(Keypad)         | 0.0~100.0 秒  | 0    |
| 04-04 | 通讯格式(Keypad)         | 0：7N1 (ASCII)<br>1：7N2 (ASCII)<br>2：7E1 (ASCII)<br>3：7O1 (ASCII)<br>4：7E2 (ASCII)<br>5：7O2 (ASCII)<br>6：8N1 (ASCII)<br>7：8N2 (ASCII)<br>8：8E1 (ASCII)<br>9：8O1 (ASCII)<br>10：8E2 (ASCII)<br>11：8O2 (ASCII)<br>12：8N1 (RTU)<br>13：8N2 (RTU)<br>14：8E1 (RTU)<br>15：8O1 (RTU)<br>16：8E2 (RTU)<br>17：8O2 (RTU) | 13   |
| 04-05 | 通讯响应延迟时间             | 0.0~200.0ms  | 2    |
| 04-06 | COM2 通讯传送速度(Keypad)  | 4.8~115.2Kbps  | 19.2 |
| 04-07 | COM2 传输错误处理(Keypad)  | 0：警告并继续运转<br>1：警告且减速停<br>2：警告且自由停车<br>3：不警告并继续运转   | 3    |
| 04-08 | COM2 逾时检出(Keypad)    | 0.0~100.0 秒  | 0.0  |
| 04-09 | COM2 通讯格式(Keypad)    | 0：7N1 (ASCII)<br>1：7N2 (ASCII)<br>2：7E1 (ASCII)<br>3：7O1 (ASCII)<br>4：7E2 (ASCII)<br>5：7O2 (ASCII)<br>6：8N1 (ASCII)<br>7：8N2 (ASCII)<br>8：8E1 (ASCII)<br>9：8O1 (ASCII)<br>10：8E2 (ASCII)<br>11：8O2 (ASCII)<br>12：8N1 (RTU)<br>13：8N2 (RTU)<br>14：8E1 (RTU)<br>15：8O1 (RTU)<br>16：8E2 (RTU)<br>17：8O2 (RTU) | 13   |
| 04-10 | 通讯卡的识别               | 0：无通讯卡<br>1：DeviceNet Slave<br>2：Profibus-DP Slave<br>3：CANopen Slave/Master<br>4：Modbus-TCP Slave<br>5：EtherNet/IP Slave<br>6~8：保留  | 0    |
| 04-11 | CANopen 速率           | 0：1M<br>1：500k<br>2：250k<br>3：125k<br>4：100k (台达自有)<br>5：50k   | 0    |
| 04-12 | CANopen 从站地址         | 0：Disable<br>1~127   | 0    |
| 04-13 | CANopen 通讯状态         | 0：节点复归状态 (Node Reset State)<br>1：通讯复归状态 (Com Reset State)<br>2：复归完成状态 (Boot up State)<br>3：预操作状态 (Pre Operation State)<br>4：操作状态 (Operation State)<br>5：停止状态 (Stop State)  | 0    |
| 04-14 | CANopen 警告纪录         | bit 0：CANopen Guarding Time out<br>bit 1：CANopen Heartbeat Time out<br>bit 2：CANopen SYNC Time out<br>bit 3：CANopen SDO Time out<br>bit 4：CANopen SDO buffer overflow<br>bit 5：Can Bus Off<br>bit 6：Error protocol of CANopen  | 0    |
| 04-15 | 通讯卡版本                | 只读   | ##   |
| 04-16 | 产品码                  | 只读   | ##   |
| 04-17 | 错误码                  | 只读   | ##   |
| 04-18 | 通讯卡地址                | DeviceNet: 0-63<br>Profibus-DP: 1-125  | 1    |
| 04-19 | 通讯卡速率                | Standard DeviceNet:<br>0：100Kbps<br>1：125Kbps<br>2：250Kbps<br>3：1Mbps (台达自有)<br><br>Non standard DeviceNet: (台达自有)<br>0：10Kbps<br>1：20Kbps<br>2：50Kbps<br>3：100Kbps<br>4：125Kbps<br>5：250Kbps<br>6：500Kbps<br>7：800Kbps<br>8：1Mbps   | 2    |
| 04-20 | 通讯卡速率额外设定            | 0：无功能<br>此种模式下，波特率仅可以设置为 0，1，2，3 为标准 DeviceNet 方式<br>1：致能<br>此种扩充模式下，DeviceNet 波特率可以设置与 CANopen 相同(0-8)。   | 0    |
| 04-21 | 通讯卡 IP Configuration | 0：静态 IP<br>1：动态 IP (DHCP)  | 0    |
| 04-22 | 通讯卡 IP 地址 1          | 0~255  | 0    |
| 04-23 | 通讯卡 IP 地址 2          | 0~255  | 0    |
| 04-24 | 通讯卡 IP 地址 3          | 0~255  | 0    |
| 04-25 | 通讯卡 IP 地址 4          | 0~255  | 0    |
| 04-26 | 通讯卡屏蔽地址 1            | 0~255  | 0    |
| 04-27 | 通讯卡屏蔽地址 2            | 0~255  | 0    |
| 04-28 | 通讯卡屏蔽地址 3            | 0~255  | 0    |
| 04-29 | 通讯卡屏蔽地址 4            | 0~255  | 0    |
| 04-30 | 通讯卡 Getway 地址 1      | 0~255  | 0    |
| 04-31 | 通讯卡 Getway 地址 2      | 0~255  | 0    |
| 04-32 | 通讯卡 Getway 地址 3      | 0~255  | 0    |
| 04-33 | 通讯卡 Getway 地址 4      | 0~255  | 0    |
| 04-34 | 通讯卡密码 (Low word)     | 0~255  | 0    |
| 04-35 | 通讯卡密码 (High word)    | 0~255  | 0    |
| 04-36 | 通讯卡重置                | 0：无功能<br>1：回复出厂设定值   | 0    |
| 04-37 | 通讯卡额外设定              | Bit 0：Enable IP Filter：<br>Bit 1：Internet parameters enable(1bit)<br>当网络端参数设定完毕时，Enable。通讯卡更新参数完毕时，此 bit 会改为 Disable。<br>Bit 2：Login password enable(1bit)<br>当登入密码输入完毕时，Enable。通讯卡更新参数完毕时，此 bit 会改为 Disable。  | 0    |
| 04-38 | 通讯卡状态                | Bit 0：password enable<br>当通讯卡有设定密码时，Enable。通讯卡有设定密码时，会设定此 bit 为 Enable。通讯卡清除密码时，会设定此 bit 为 Disable。  | 0    |



## AFE2000 Series Installation Instruction

### Active Front End Unit

- Please read this instruction sheet thoroughly before installation and keep this instruction sheet and the CD shipped with the product at hand and distribute to all users for reference.
- To ensure the safety of operators and equipment, only qualified personnel familiar with AC motor drives are allowed to do installation, trial run and parameter settings. Always read this instruction sheet thoroughly before using the AC motor drive, especially the WARNING, DANGER and CAUTION notes. If you have any questions, please contact your dealer.

#### PLEASE READ PRIOR TO INSTALLATION FOR SAFETY.

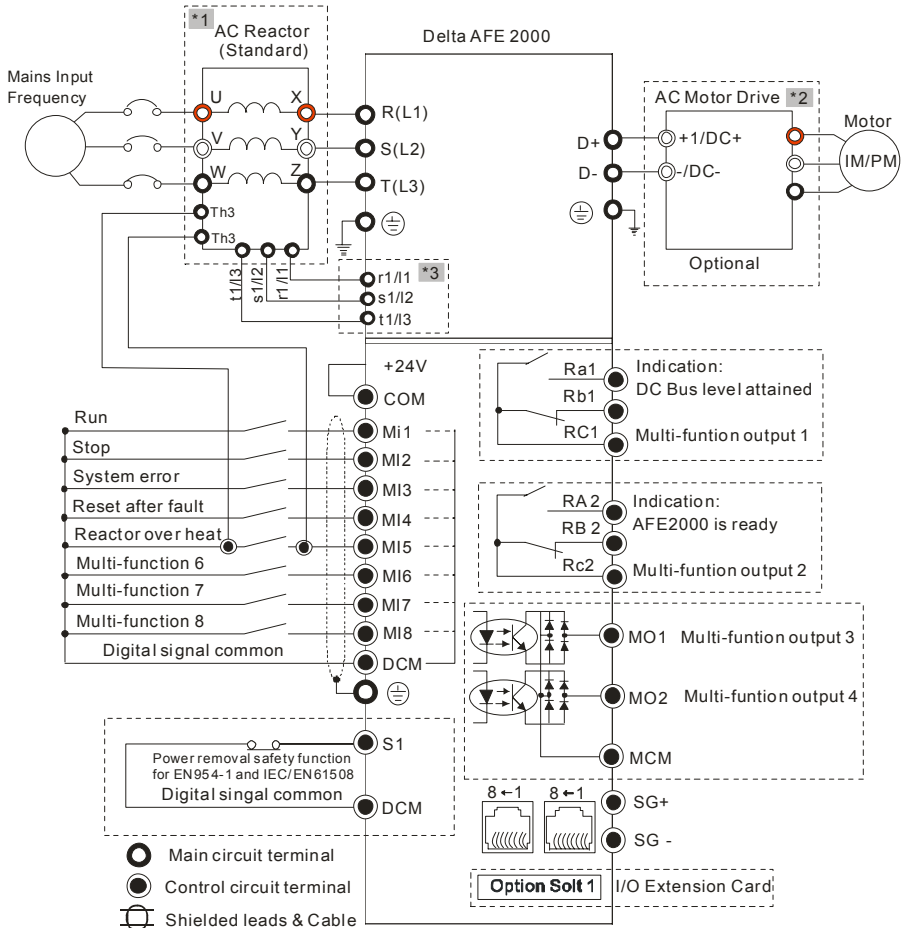


#### NOTE

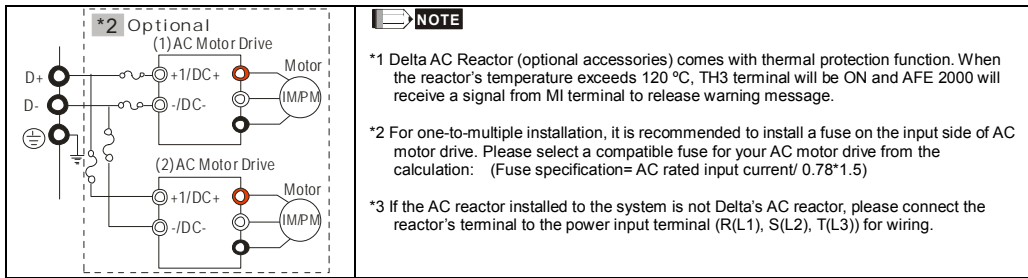
- The figures shown in this instruction are only for reference, they may be slightly different from the one you have but it will not affect your customer rights.
- The installation instruction may revise without prior notice. Please refer to the local distributors or download the updated version at <http://www.delta.com.tw/industrialautomation/>.

#### Wiring Diagram

One to One Installation (AFE2000\*1 + AC motor drive\*1)



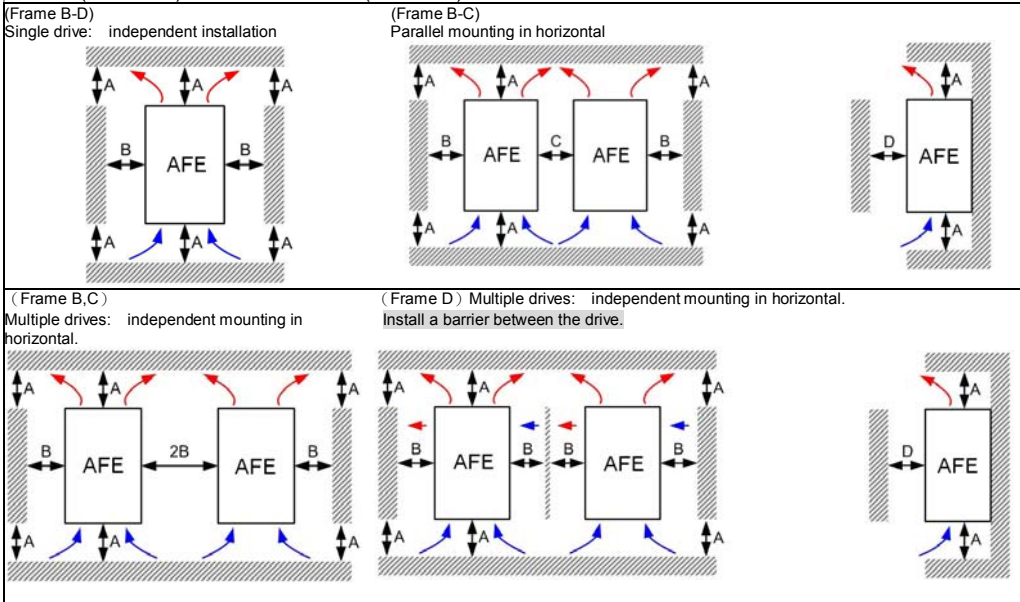
One to Multiple Installation (AFE2000\*1 + AC motor drive\* n)



#### Drive Installation (Appearances shown in the following figures are only for reference)

|         |  |
|---------|--|
| Frame B | AFE075A23A; AFE075A43A; AFE150A43A             |
| Frame C | AFE150A23A; AFE220A23A; AFE220A43A/E           |
| Frame D | AFE370A23A; AFE370A43A; AFE450A43A; AFE750A43A |

(Blue arrow) air inflow (Red arrow) air outflow



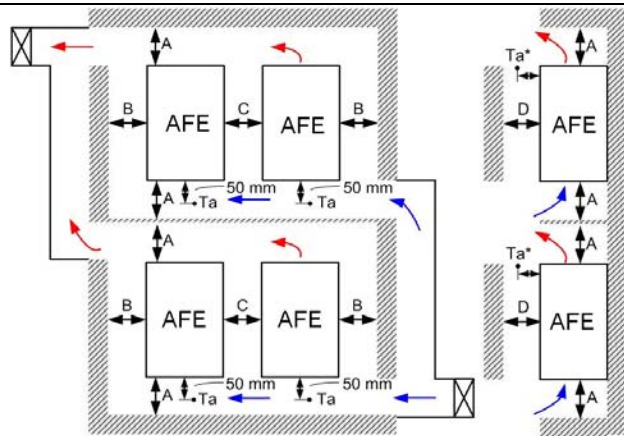
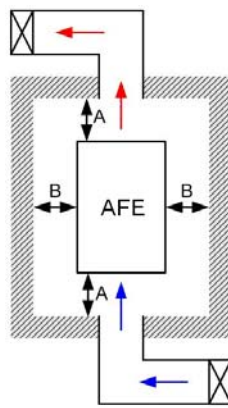
(Frame B,C)

Multiple drive- parallel mounting in vertical.

It is suggested to install a barrier between the drives. Please use a barrier that is thick enough to balance out the temperature of the fan on the inflow side to lower than the operation temperature.

(Refer to the figure on the right.)

Operation temperature is defined as the temperature measured at 50mm away from the inflow side of the fan.



#### Minimum Mounting Clearances

| Frame | A (mm) | B (mm) | C (mm) | D (mm) |
|-------|--------|--------|--------|--------|
| B-C   | 60     | 30     | 10     | 0      |
| D     | 100    | 50     | -      | 0      |

#### NOTE

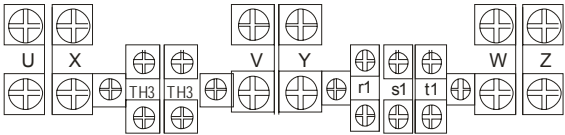
- ✓ The mounting clearances shown in the left figure are **NOT** for installing the drive in a confined space (such as cabinet or electric box). When installing in a confined space, besides the same minimum mounting clearances, it needs to have the ventilation equipment or air conditioner to keep the surrounding temperature lower than the operation temperature.
- ✓ The following table shows 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 the drives.
- ✓ Refer to the chart (Air flow rate for cooling) for ventilation equipment design and selection.
- ✓ Refer to the chart (Power Dissipation) for air conditioner design and selection.
- ✓ It is the minimum distance required for frame B-D. If drives are installed closer than the minimum mounting clearance, the fan may not function properly.

#### Wiring Terminals Specifications (Please refer to the wiring diagram.)

| Control circuit terminals; Wire Gauge 26-16AWG. (0.1281-1.318mm <sup>2</sup> ); Torque(±10%): 5cm[4.31 lb-in.] (0.49Nm), 5kg-cm[4.31 lb-in.] (0.49Nm) |                                |                                |  |  |
|---|--------------------------------|--------------------------------|--|--|
| Main circuit terminals  |                                |                                |  |  |
| AFE Model   | Max. Wire Gauge                | Min. Wire Gauge                | Torque (±10%)                          | Note   |
| 075A23A   | 4 AWG (21.2mm <sup>2</sup> )   | 6 AWG (13.3mm <sup>2</sup> )   | M5<br>35kg-cm (30.4 lb-in.) (3.4335Nm) | DC+ & DC-: must use 1kV Wire.<br>UL installations must use 600V, 75°C or 90°C wire. Use copper wire only.<br>Terminal r1/I1, s1/I2, t1/I3: Wire Gauge: 20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ]<br>Torque: 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%)<br>Please use the specified insulated heat shrink tubing that complies with UL standard (600C, YDPU2).<br>Detection wire   |
| 075A43A   |                                | 8 AWG (8.4mm <sup>2</sup> )    |  |  |
| 150A43A   |                                | 6 AWG (13.3mm <sup>2</sup> )   |  |  |
| 150A23A   | 1/0 AWG (53.5mm <sup>2</sup> ) | 1 AWG (42.4mm <sup>2</sup> )   | M8<br>80kg-cm (69.4 lb-in.) (7.848Nm)  | DC+ & DC-: must use 1kV Wire.<br>UL installations must use 600V, 75°C or 90°C wire. Use copper wire only.<br>Terminal r1/I1, s1/I2, t1/I3: Wire Gauge: 20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ]<br>Torque: 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%)<br>When ambient temperature exceeds 45°C, use 600V,90°C wire for the AFE220A23A model<br>Please use the specified insulated heat shrink tubing that complies with UL standard (600C, YDPU2).<br>Detection wire |
| 220A23A   |                                | 1/0 AWG (53.5mm <sup>2</sup> ) |  |  |
| 220A43A   |                                | 4 AWG (21.2mm <sup>2</sup> )   |  |  |
| 370A23A   | 300MCM (152mm <sup>2</sup> )   | 250MCM (126mm <sup>2</sup> )   | M8<br>200kg-cm (173 lb-in.) (19.62Nm)  | UL installations must use 600V, 75°C or 90°C wire. Use copper wire only.<br>DC+ & DC-: must use 1kV Wire.<br>Terminal r1/I1, s1/I2, t1/I3: Wire Gauge: 22AWG [0.3mm <sup>2</sup> ] ~ 16 AWG [1.3mm <sup>2</sup> ]<br>Torque: 5 kg-cm [4.3 lb-in.] (0.49 N.m)<br>Please use the specified insulated heat shrink tubing that complies with UL standard (600C, YDPU2).  |
| 370A43A   |                                | 1/0 AWG (42.4mm <sup>2</sup> ) |  |  |
| 450A43A   |                                | 2/0 AWG (67.4mm <sup>2</sup> ) |  |  |
| 750A43A   |                                | 300MCM (152mm <sup>2</sup> )   |  |  |

AC Reactor

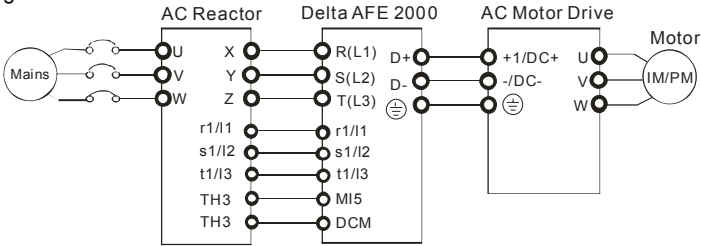
Terminal Specification



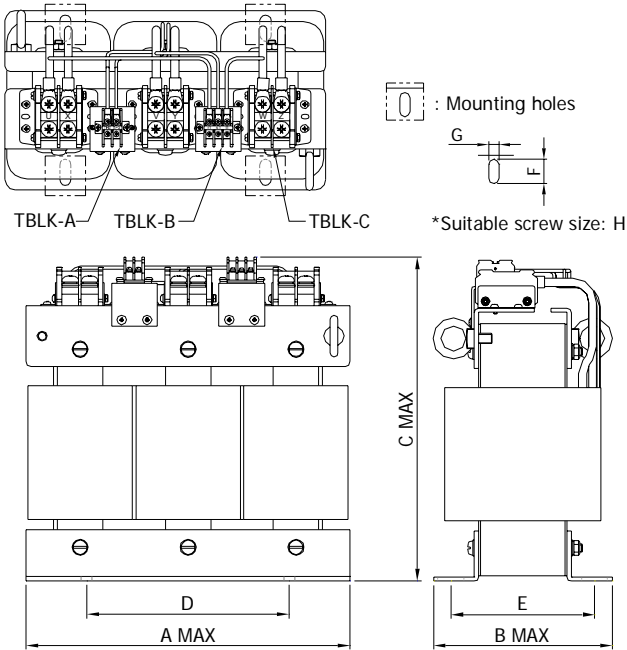
| 230 V<br>Reactor Model | Frame | KW  | Applicable Model<br>AFE-__A23A | Inductance<br>mH | Rated<br>Current<br>Arms | Torque: kg-cm / lb-in... / Nm ±10% |                |                  | Weight<br>Net(Kg) |
|------------------------|-------|-----|--------------------------------|------------------|--------------------------|------------------------------------|----------------|------------------|-------------------|
|                        |       |     |                                |                  |                          | Mounting                           | TBLK-A, B      | TBLK-C           |                   |
| AF-RC075A2             | B     | 7.5 | 075                            | 2.1              | 35                       | 40.0 /46.1 /3.92                   | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28                |
| AF-RC150A2             | C     | 15  | 150                            | 1.05             | 70                       | 60.0 /69.2 /5.89                   | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 52                |
| AF-RC220A2             |       | 22  | 220                            | 0.77             | 95                       | 80.0 /92.2 /7.85                   | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62                |
| AF-RC370A2             | D     | 37  | 370                            | 0.5              | 150                      | 130.0 /149.9 /12.75                | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87                |

| 460 V<br>Reactor Model | Frame | KW  | Applicable Model<br>AFE-__A43A | Inductance<br>mH | Rated<br>Current<br>Arms | Torque: kg-cm / lb-in... / Nm ±10% |                |                  | Weight<br>Net(Kg) |
|------------------------|-------|-----|--------------------------------|------------------|--------------------------|------------------------------------|----------------|------------------|-------------------|
|                        |       |     |                                |                  |                          | Mounting                           | TBLK-A, B      | TBLK-C           |                   |
| AF-RC075A4             | B     | 7.5 | 075                            | 7.32             | 20                       | 40.0 /46.1 /3.92                   | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28                |
| AF-RC150A4             |       | 15  | 150                            | 4.18             | 35                       | 60.0 /69.2 /5.89                   | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 52                |
| AF-RC220A4             | C     | 22  | 220                            | 2.92             | 50                       | 80.0 /92.2 /7.85                   | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62                |
| AF-RC370A4             | D     | 37  | 370                            | 1.96             | 75                       | 130.0 /149.9 /12.75                | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87                |
| AF-RC450A4             |       | 45  | 450                            | 1.54             | 95                       | 160.0 /184.5 /15.70                | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 105               |
| AF-RC750A4             |       | 75  | 750                            | 0.92             | 160                      | 220.0 /253.7 /21.58                | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 137               |

Wiring Diagram



Frame Structure



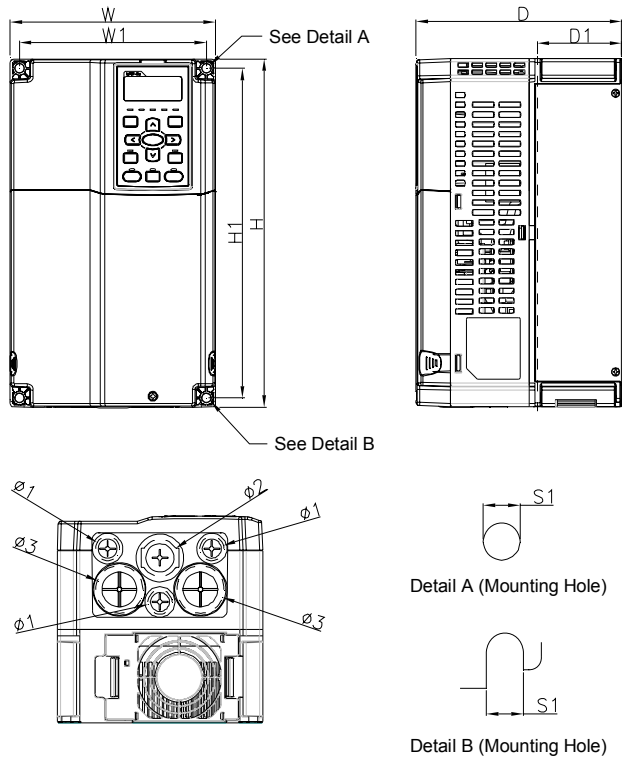
Models Specifications

| Model      | A<br>mm [inch] | B<br>mm [inch] | C<br>mm [inch] | D<br>mm [inch] | E<br>mm [inch] | F<br>mm [inch] | G<br>mm [inch] | H<br>Screw |
|------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------|
| AF-RC075A2 | 305 [12.01]    | 159 [6.26]     | 280 [11.02]    | 150 [5.91]     | 125 [4.92]     | 22 [0.87]      | 11 [0.43]      | M10        |
| AF-RC150A2 | 355 [13.98]    | 180 [7.09]     | 328 [12.91]    | 200 [7.87]     | 139 [5.47]     | 26 [1.02]      | 11 [0.43]      | M10        |
| AF-RC220A2 | 355 [13.98]    | 200 [7.87]     | 328 [12.91]    | 200 [7.87]     | 159 [6.26]     | 26 [1.02]      | 11 [0.43]      | M10        |
| AF-RC370A2 | 385 [15.16]    | 210 [8.27]     | 385 [15.16]    | 200 [7.87]     | 168 [6.26]     | 25 [1.02]      | 13 [0.51]      | M12        |
| AF-RC075A4 | 305 [12.01]    | 159 [6.26]     | 280 [11.02]    | 150 [5.91]     | 125 [4.92]     | 22 [0.87]      | 11 [0.43]      | M10        |
| AF-RC150A4 | 355 [13.98]    | 180 [7.09]     | 328 [12.91]    | 200 [7.87]     | 139 [5.47]     | 26 [1.02]      | 11 [0.43]      | M10        |
| AF-RC220A4 | 355 [13.98]    | 200 [7.87]     | 328 [12.91]    | 200 [7.87]     | 159 [6.26]     | 26 [1.02]      | 11 [0.43]      | M10        |
| AF-RC370A4 | 385 [15.16]    | 210 [8.27]     | 385 [15.16]    | 200 [7.87]     | 168 [6.26]     | 25 [1.02]      | 13 [0.51]      | M12        |
| AF-RC450A4 | 385 [15.16]    | 230 [9.06]     | 385 [15.16]    | 200 [7.87]     | 188 [7.40]     | 25 [1.02]      | 13 [0.51]      | M12        |
| AF-RC750A4 | 420 [16.54]    | 240 [9.45]     | 440 [17.32]    | 250 [9.84]     | 200 [7.87]     | 25 [1.02]      | 13 [0.51]      | M12        |

Dimensions (The appearances shown in the following figures are for reference only. The actual AC motor drive might be slightly different.)

Frame B

AFE075A23A; AFE075A43A; AFE150A43A

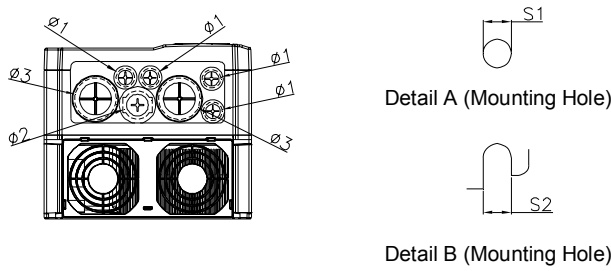
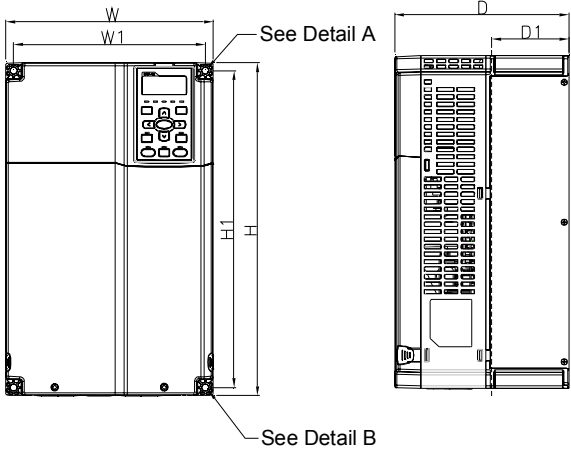


| Frame | W            | H             | D            | W1           | H1            | D1*         | S1         | Φ1          | Φ2          | Φ3          |
|-------|--------------|---------------|--------------|--------------|---------------|-------------|------------|-------------|-------------|-------------|
| B1    | 190.0 [7.48] | 320.0 [12.60] | 190.0 [7.48] | 173.0 [6.81] | 303.0 [11.93] | 77.9 [3.07] | 8.5 [0.33] | 22.2 [0.87] | 34.0 [1.34] | 28.0 [1.10] |

D1\*: This dimension is a reference for flange mounting application Unit: mm [inch]

Frame C

AFE150A23A; AFE220A23A; AFE220A43A

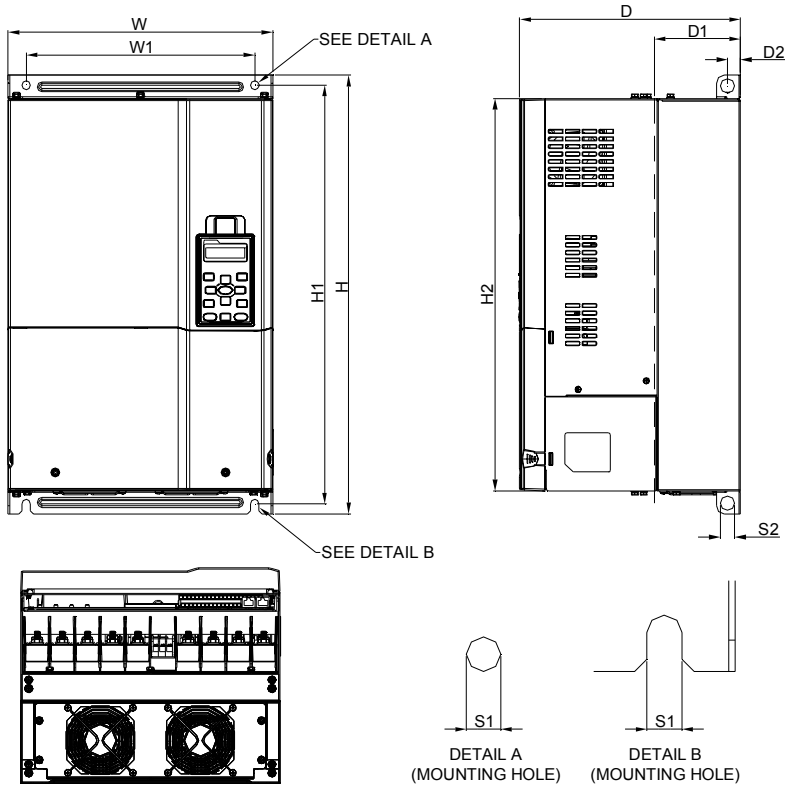


| Frame | W            | H             | D            | W1           | H1            | D1*         | S1         | Φ1          | Φ2          | Φ3          |
|-------|--------------|---------------|--------------|--------------|---------------|-------------|------------|-------------|-------------|-------------|
| C1    | 250.0 [9.84] | 400.0 [15.75] | 210.0 [8.27] | 231.0 [9.09] | 381.0 [15.00] | 92.9 [3.66] | 8.5 [0.33] | 22.2 [0.87] | 34.0 [1.34] | 50.0 [1.97] |

D1\*: This dimension is a reference for flange mounting application Unit: mm [inch]

Frame D

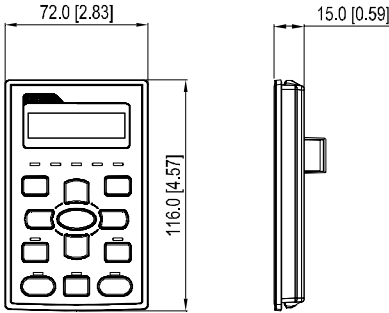
AFE370A23A; AFE370A43A; AFE450A43A; AFE750A43A



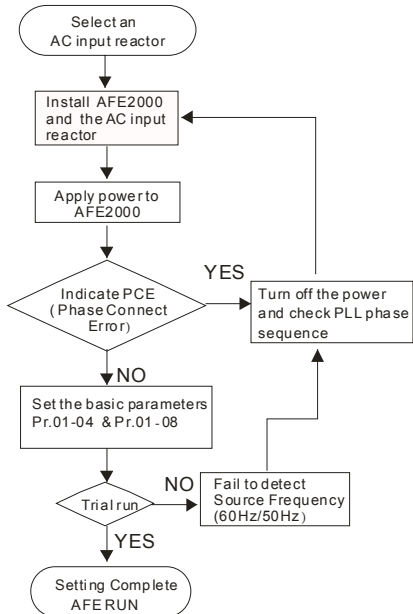
| Frame | W             | H             | D             | W1            | H1            | H2            | D1*          | D2          | S1          | S2          |
|-------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|-------------|-------------|-------------|
| D1    | 330.0 [12.99] | 550.0 [21.65] | 275.0 [10.83] | 285.0 [11.22] | 525.0 [20.67] | 492.0 [19.37] | 107.2 [4.22] | 16.0 [0.63] | 11.0 [0.43] | 18.0 [0.71] |

D1\*: This dimension is a reference for flange mounting application Unit: mm [inch]

Digital Keypad KPC-CE01



Operation Procedure



Summary of Parameter Setting

| 00 Display Parameter |                                   | Settings   |   |  |           |
|----------------------|-----------------------------------|--|---|--|-----------|
| Parameter            | Explanation                       |  |   |  |           |
| 00-00                | Identity Code of AFE Unit         | 0: 230V, 7.5kW<br>1: 460V, 7.5kW<br>2: 230V, 15kW<br>3: 460V, 15kW | 4: 230V, 22kW<br>5: 460V, 22kW<br>6: 230V, 37kW | 7: 460V, 37kW<br>9: 460V, 45kW<br>11: 460V, 75kW | Read only |
| 00-01                | Rated Current Display of AFE Unit | 0: 35A<br>1: 20A<br>2: 70A<br>3: 35A                               | 4: 95A<br>5: 50A<br>6: 150A                     | 7: 75A<br>9: 95A<br>11: 160A                     | Read only |



|       |  |   |   |
|-------|--|---|---|
| 00-02 | Software version   | Read only                               | Read only                               |
| 00-03 | Current of AFE Unit  | Read only                               | Read only                               |
| 00-04 | Mains Input Frequency  | Read only                               | Read only                               |
| 00-05 | DC-BUS voltage   | Read only                               | Read only                               |
| 00-06 | Display the Input Power of AFE2000 (kW )   | -300.0 ~300.0                           | Read only                               |
| 00-07 | Display the Amount of Power Consumed kWh (High Word)                                       | 0~9999                                  | Read only                               |
| 00-08 | Display the Amount of Power Consumed kWh (Low Word)  | 0 ~ 9999                                | Read only                               |
| 00-09 | Display the Amount of Power Regenerated kWh (High Word)                                    | 0 ~ 9999                                | Read only                               |
| 00-10 | Display the Amount of Power Regenerated kWh (Low Word)                                     | 0 ~ 9999                                | Read only                               |
| 00-11 | Display Total Power kWh (High Word)<br>* Total Power = Power Consumed + Power Regenerated) | -9999 ~ 9999                            | Read only                               |
| 00-12 | Display Total Power AAA kWh (Low Word)<br>*Total Power = Power Consumed+ Power Regenerated | -9999 ~ 9999                            | Read only                               |
| 00-13 | Display AFE2000 Internal Temperature (℃ )  | Read only                               | Read only                               |
| 00-14 | IGBT Temperature (℃ )  | Read only                               | Read only                               |
| 00-15 | Digital Input Status (ON/OFF )   | Read only                               | Read only                               |
| 00-16 | Digital Output Status (ON/OFF)   | Read only                               | Read only                               |
| 00-17 | DC Bus Voltage at Fault  | Read only                               | Read only                               |
| 00-18 | Mains Input Frequency at Fault   | Read only                               | Read only                               |
| 00-19 | Current value at Fault   | Read only                               | Read only                               |
| 00-20 | 1 <sup>st</sup> Recent Fault Record  |   | Fault Retry    Fault Reset<br>Read only |
| 00-21 | 2 <sup>nd</sup> Recent Fault Record  | 0: No Fault Record                      | ○    ○    Read only                     |
| 00-22 | 3 <sup>rd</sup> Recent Fault Record  | 3 : ocn                                 | Read only                               |
| 00-23 | 4 <sup>th</sup> Recent Fault Record  | 4: GFF                                  | ○    ○    Read only                     |
| 00-24 | 5 <sup>th</sup> Recent Fault Record  | 5 : occ (only for frame D)              | ○    ○    Read only                     |
| 00-25 | 6 <sup>th</sup> Recent Fault Record  | 6: ocs                                  | ○    ○    Read only                     |
|       |  | 9: oVn                                  | ○    ○                                  |
|       |  | 10: oVs                                 | ○    ○                                  |
|       |  | 13 : LVn                                |   |
|       |  | 14: LVs                                 | ○    ○                                  |
|       |  | 15: PHL (Input phase loss)              | ○    ○                                  |
|       |  | 16: oH1 (IGBT over-heat)                | ○    ○                                  |
|       |  | 17: oH2 (Capacitance over-heat)         | ○    ○                                  |
|       |  | 18: ot1 (circuit error)                 |   |
|       |  | 19: ot2 (circuit error)                 |   |
|       |  | 20: oL (150% 1Min, AFE2000 over-load)   | ○    ○                                  |
|       |  | 30: cF1 (Memory write-in error)         |   |
|       |  | 31: cF2 (Memory read error)             |   |
|       |  | 32: cd0 Isum current detection error    |   |
|       |  | 33: cd1 U-phase current detection error |   |
|       |  | 34: cd2 V-phase current detection error |   |
|       |  | 35: cd3 W-phase current detection error |   |
|       |  | 36: Hd0 oc current detection error      |   |
|       |  | 37: Hd1 oc current detection error      |   |
|       |  | 38: Hd2 ov current detection error      |   |
|       |  | 47: S1 Enable Error                     |   |
|       |  | 48: BST Voltage boosting error          |   |
|       |  | 49: EF1                                 | ○    ○                                  |
|       |  | 52: Pcode Code error                    | ○    ○                                  |
|       |  | 54: cE1 communication error (warn)      | ○    ○                                  |
|       |  | 55: cE2 communication error (warn)      | ○    ○                                  |
|       |  | 56: cE3 communication error (warn)      | ○    ○                                  |
|       |  | 57: cE4 communication error (warn)      | ○    ○                                  |
|       |  | 58: cE10 communication Time Out(warn)   | ○    ○                                  |
|       |  | 59: cP10 PU Board Time out(warn)        | ○    ○                                  |
|       |  | 65: PCE phase connection error          |   |
|       |  | 66: PLE Phase lock error                | ○    ○                                  |
|       |  | 67: LDC control voltage is too low      | ○    ○                                  |
|       |  | 68: RIP DC Bus ripple is too large      | ○    ○                                  |
| 00-26 | Electricity cost (Low Word)  | Read only                               | Read only                               |
| 00-27 | Electricity cost (High Word)   | Read only                               | Read only                               |
| 00-28 | Input AC voltage   | 0~6553.5                                | Read only                               |

01 Basic Parameter

| Parameter | Explanation                                    | Settings   | Factory Setting  |
|-----------|--|--|--|
| 01-00     | Parameter Reset                                | 0: No function<br>1: Read only, write is disable<br>8: Keypad lock<br>10: All parameters are reset to the factory settings                             | 0  |
| 01-01     | Start-up Display Screen Selection              | 0: Mains Input Frequency<br>1: DC BUS voltage<br>2: Output current   | 0  |
| 01-02     | Insert Password to cancel Parameter Protection | 1~9998, 10000~65535<br>0~2:    number of times of wrong password   | 0  |
| 01-03     | Set Password for Parameter Protection          | 1~9998, 10000~65535<br>0: No password set or successful input in Pr.00-07<br>1: Password has been set, parameter is locked                             | 0  |
| 01-04     | Source of the Operation Command                | 1: External terminal<br>2: RS-485 serial communication or digital keypad (KPV L-CC01)  | 2  |
| 01-05     | Control Mode Selection                         | 0: AFE mode<br>1: Regenerate mode  | 0  |
| 01-06     | Accel. Time Setting                            | 0.00~600.00 sec  | 2  |
| 01-07     | Decel. Time Setting                            | 0.00~600.00sec   | 2  |
| 01-08     | DC BUS Voltage Command                         | 220V : 300~370V<br>440V :    600~740V  | 340<br>680   |
| 01-09     | DC BUS Gain Ratio of P                         | 0~100%   | 100  |
| 01-10     | DC BUS Gain Ratio of I                         | 0~100%   | 100  |
| 01-11     | DC BUS Bandwidth control                       | 0~75<br>230V, 7.5kW<br>460V, 7.5kW<br>460V, 15kW<br><br>230V, 15kW<br>230V, 22kW<br>460V, 22kW<br>230V, 37kW<br>460V, 37kW<br>460V, 45kW<br>460V, 75kW | 18<br>18<br>18<br><br>22<br>22<br>22<br>22<br>22<br>22<br>22   |
| 01-12     | Inductance Value of Reactor                    | 0(230V, 7.5kW): 2.10<br>1(460V, 7.5kW): 7.32<br>2(230V, 15kW): 1.32<br>3(460V, 15kW): 5.28   | 4(230V, 22kW): 0.88<br>5(460V, 22kW): 3.52<br>6(230V, 37kW): 0.50<br>7(460V,37kW): 1.96<br>9(460V,45kW): 1.76<br>11(460V,75kW): 1.02 |

02 Digital Input/Output Parameters

| Parameter | Explanation                                      | Settings  | Factory Setting |
|-----------|--|---|-----------------|
| 02-00     | Multi-Function Input Command 1 (MI1)             | 0: Disable  | 1               |
| 02-01     | Multi-Function Input Command 2 (MI2)             | 1: RUN  | 2               |
| 02-02     | Multi-Function Input Command 3 (MI3)             | 2: STOP   | 3               |
| 02-03     | Multi-Function Input Command 4 (MI4)             | 3: EF1  | 4               |
| 02-04     | Multi-Function Input Command 5 (MI5)             | 4: RESET  | 0               |
| 02-05     | Multi-Function Input Command 6 (MI6)             | 5: MASTER/SLAVE (will be available soon)                                      | 0               |
| 02-06     | Multi-Function Input Command 7 (MI7)             | 6: ENABLE   | 0               |
| 02-07     | Multi-Function Input Command 8 (MI8)             | 7: EF2<br>8: EF3<br>9: oH3  | 0               |
| 02-08     | Digital Input Response Time                      | 0.001~ 30.000 sec   | 0.005           |
| 02-09     | Digital Input Operation Direction                | 0 ~ 65535   | 0               |
| 02-10     | Multi-Function Output 1 RA1, RB1, RC1 ( Relay1 ) | 0: Disable<br>1: Operation indication   | 2               |
| 02-11     | Multi-Function Output 2 RA2, RB2, RC2 ( Relay2 ) | 2: DCBUS command attained<br>3: (Phase lock complete) Ready                   | 3               |
| 02-12     | Multi-Function Output 3 (MO1)                    | 4: Fault Indication<br>5: Overheat warning (03-05&03-06)<br>6: Output warning | 0               |
| 02-13     | Multi-Function Output 4 (MO2)                    | 7: Drive / Regenerate<br>8: Fault Reset                                       | 0               |
| 02-14     | Multi-Function Output Direction                  | 0~65535   | 0               |

03 Special Protection Parameters

| Parameter | Explanation  | Settings   | Factory Setting |
|-----------|--|--|-----------------|
| 03-00     | Low Voltage Level                                    | 230V model: 160.0~220.0Vdc<br>460V model: 320.0~440.0Vdc | 180<br>360      |
| 03-01     | Current Limit of the Drive Operating Direction       | 0~250%   | 150             |
| 03-02     | Current Limit of the Power Regeneration    Direction | 0~250%   | 150             |
| 03-03     | Level Deviation of Phase Lock Frequency              | 0.00~10.00Hz   | 4.00            |
| 03-04     | Time Deviation of Phase Lock Frequency               | 0~1000ms   | 150             |
| 03-05     | IGBT Temperature Warning                             | 0.0~110.0 ℃  | 100.0           |
| 03-06     | Ambient Temperature Warning                          | 0.0~110.0 ℃  | 60.0            |
| 03-07     | Number of Restarts After Fault                       | 0~10   | 0               |
| 03-08     | The Duration Before Setting Returns                  | 1~600s   | 600             |

|       |  |  |     |
|-------|--|--|-----|
|       | to the Setting in "Number of Restarts After Fault" |  |     |
| 03-09 | Fan Cooling Control (only ON/OFF for Frame B)      | 0: Fan is ON<br>1: Fan stop rotation after the drive stops for 1 min<br>2: Fan stop rotation when the drive stops<br>3: Fan operation depends on the ambient temperature<br>4: Fan is always off | 2   |
| 03-10 | Voltage Boosting Error (Level Setting)             | 0.0V ~15.0V  | 5.0 |
| 03-11 | Voltage Boosting Error (Time Setting)              | 200ms~1000ms   | 200 |
| 03-12 | Delete Work  | 1: Delete (when deleting is completed, Pr.03-12 reset to 1)  | 0   |
| 03-13 | Electricity price per degree                       | 0~6553.5   | 3.0 |

04 Communication Parameters

| Parameter | Explanation                                 | Settings  | Factory Setting |
|-----------|---|---|-----------------|
| 04-00     | Communication Address                       | 1~254   | 1               |
| 04-01     | Transmission Speed (Keypad)                 | 4.8 ~ 115.2Kbps   | 19.2            |
| 04-02     | Transmission Fault Treatment (Keypad)       | 0: Warn and continue operation<br>1: Warn and ramp to stop<br>2: Reserved<br>3: Not displayed and ignore the fault  | 3               |
| 04-03     | Time-out Detection (Keypad)                 | 0.0 ~ 100.0 sec   | 0               |
| 04-04     | Communication Protocol (Keypad)             | 0: 7N1 (ASCII)<br>1: 7N2 (ASCII)<br>2: 7E1 (ASCII)<br>3: 7O1 (ASCII)<br>4: 7E2 (ASCII)<br>5: 7O2 (ASCII)<br>6: 8N1 (ASCII)<br>7: 8N2 (ASCII)<br>8: 8E1 (ASCII)<br>9: 8O1 (ASCII)<br>10: 8E2 (ASCII)<br>11: 8O2 (ASCII)<br>12: 8N1 (RTU)<br>13: 8N2 (RTU)<br>14: 8E1 (RTU)<br>15: 8O1 (RTU)<br>16: 8E2 (RTU)<br>17: 8O2 (RTU)                              | 13              |
| 04-05     | Response Delay Time                         | 0.0~200.0ms   | 2               |
| 04-06     | COM2Transmission Speed (Keypad)             | 4.8 ~ 115.2Kbps   | 19.2            |
| 04-07     | COM2 Transmission Fault Treatment (Keypad)  | 0: Warn and continue operation<br>1: Warn and ramp to stop<br>2: Warn and coast to stop<br>3: No warning and continue operation   | 3               |
| 04-08     | COM2 Time-out Detection (Keypad)            | 0.0 ~ 100.0 sec   | 0.0             |
| 04-09     | COM2 Communication Protocol (Keypad)        | 0: 7N1 (ASCII)<br>1: 7N2 (ASCII)<br>2: 7E1 (ASCII)<br>3: 7O1 (ASCII)<br>4: 7E2 (ASCII)<br>5: 7O2 (ASCII)<br>6: 8N1 (ASCII)<br>7: 8N2 (ASCII)<br>8: 8E1 (ASCII)<br>9: 8O1 (ASCII)<br>10: 8E2 (ASCII)<br>11: 8O2 (ASCII)<br>12: 8N1 (RTU)<br>13: 8N2 (RTU)<br>14: 8E1 (RTU)<br>15: 8O1 (RTU)<br>16: 8E2 (RTU)<br>17: 8O2 (RTU)                              | 13              |
| 04-10     | Identifications for Communication Card      | 0: No communication card<br>1: DeviceNet Slave<br>2: Profibus-DP Slave<br>3: CANopen Slave/Master<br>4: Modbus-TCP Slave<br>5: EtherNet/IP Slave<br>6~8: Reserved   | 0               |
| 04-11     | CANopen Baud Rate                           | 0: 1M<br>1: 500k<br>2: 250k<br>3: 125k<br>4: 100k (Delta only)<br>5: 50k  | 0               |
| 04-12     | CANopen Slave Address                       | 0: Disable<br>1~127   | 0               |
| 04-13     | CANopen Communication Status                | 0: Node Reset State<br>1: Com Reset State<br>2: Boot up State<br>3: Pre Operation State<br>4: Operation State<br>5: Stop State  | 0               |
| 04-14     | CANopen Warning Record                      | bit 0: CANopen Guarding Time out<br>bit 1: CANopen Heartbeat Time out<br>bit 2: CANopen SYNC Time out<br>bit 3: CANopen SDO Time out<br>bit 4: CANopen SDO buffer overflow<br>bit 5: Can Bus Off<br>bit 6: Error protocol of CANopen  | 0               |
| 04-15     | Firmware Version of Communication Card      | Read only   | ##              |
| 04-16     | Product Code                                | Read only   | ##              |
| 04-17     | Error Code                                  | Read only   | ##              |
| 04-18     | The Address of Communication Card           | DeviceNet:    0-63<br>Profibus-DP:    1-125   | 1               |
| 04-19     | Setting of DeviceNet Speed                  | Standard DeviceNet:<br>0: 100Kbps<br>1: 125Kbps<br>2: 250Kbps<br>3: 1Mbps (Delta only)<br><br>Non standard DeviceNet:    (Delta only)<br>0: 10Kbps<br>1: 20Kbps<br>2: 50Kbps<br>3: 100Kbps<br>4: 125Kbps<br>5: 250Kbps<br>6: 500Kbps<br>7: 800Kbps<br>8: 1Mbps  | 2               |
| 04-20     | Additional Setting of DeviceNet Speed       | 0: Disable<br>In this mode, baud rate can only be 0,1,2,3 as a standard DeviceNet setting.<br>1: Enable<br>In this mode, the baud rate of DeviceNet can be same as CANopen (0-8).   | 0               |
| 04-21     | IP Configuration of Communication Card      | 0: Static IP<br>1: Dynamic IP (DHCP)  | 0               |
| 04-22     | Communication Card IP Address 1             | 0~255   | 0               |
| 04-23     | Communication Card IP Address 2             | 0~255   | 0               |
| 04-24     | Communication Card IP Address 3             | 0~255   | 0               |
| 04-25     | Communication Card IP Address 4             | 0~255   | 0               |
| 04-26     | Communication Card Address Mask 1           | 0~255   | 0               |
| 04-27     | Communication Card Address Mask 2           | 0~255   | 0               |
| 04-28     | Communication Card Address Mask 3           | 0~255   | 0               |
| 04-29     | Communication Card Address Mask 4           | 0~255   | 0               |
| 04-30     | Getway Address 1 of the Communication Card  | 0~255   | 0               |
| 04-31     | Getway Address 2 of the Communication Card  | 0~255   | 0               |
| 04-32     | Getway Address 3 of the Communication Card  | 0~255   | 0               |
| 04-33     | Getway Address 4 of the Communication Card  | 0~255   | 0               |
| 04-34     | Password for Communication Card (Low word)  | 0~255   | 0               |
| 04-35     | Password for Communication Card (High word) | 0~255   | 0               |
| 04-36     | Reset Communication Card                    | 0: No function<br>1: Reset (Returns to factory setting.)  | 0               |
| 04-37     | Additional Setting for Communication Card   | Bit0: Enable IP filter<br>Bit1: Enable to write internet parameters (1bit).<br>Bit 1: Enable to write internet parameters (1bit). This bit will change to disable when it finishes saving the internet parameter updates.<br>Bit 2: Enable login password (1bit). This bit will change to disable when it finishes saving the internet parameter updates. | 0               |
| 04-38     | Communication Card Status                   | Bit 0: password enable<br>When the communication card is set with password, this bit is enabled.<br>When the password is cleared, this bit is disabled.   | 0               |

## AFE2000 Serisi Kurulum Dökümanı

### AFE-Active Front End (IGBT'li Regeneratif Modül)

- Lütfen ürünü kullanmadan önce bu bilgi dökümanını tamamen okuyunuz ve daha sonra gerektiğinde tekrar referans olarak kullanabilmek için saklayınız.
- Ürünün ve operatörün güvenliğini garanti altına almak için, ürünün kurulumu, çalışması ve parametre ayarları konuya hakim yetkili kişiler tarafından yapılmalıdır. Ürünü kullanırken özellikle WARNING, DANGER ve CAUTION notlarına dikkat ediniz. Ürüne ilgili sorularınız için lütfen teknik servisimizle bağlantıya geçiniz.

#### GÜVENLİK İÇİN LÜTFEN İLK ÖNCE AŞAĞIDAKİ BİLGİLERİ OKUYUNUZ.

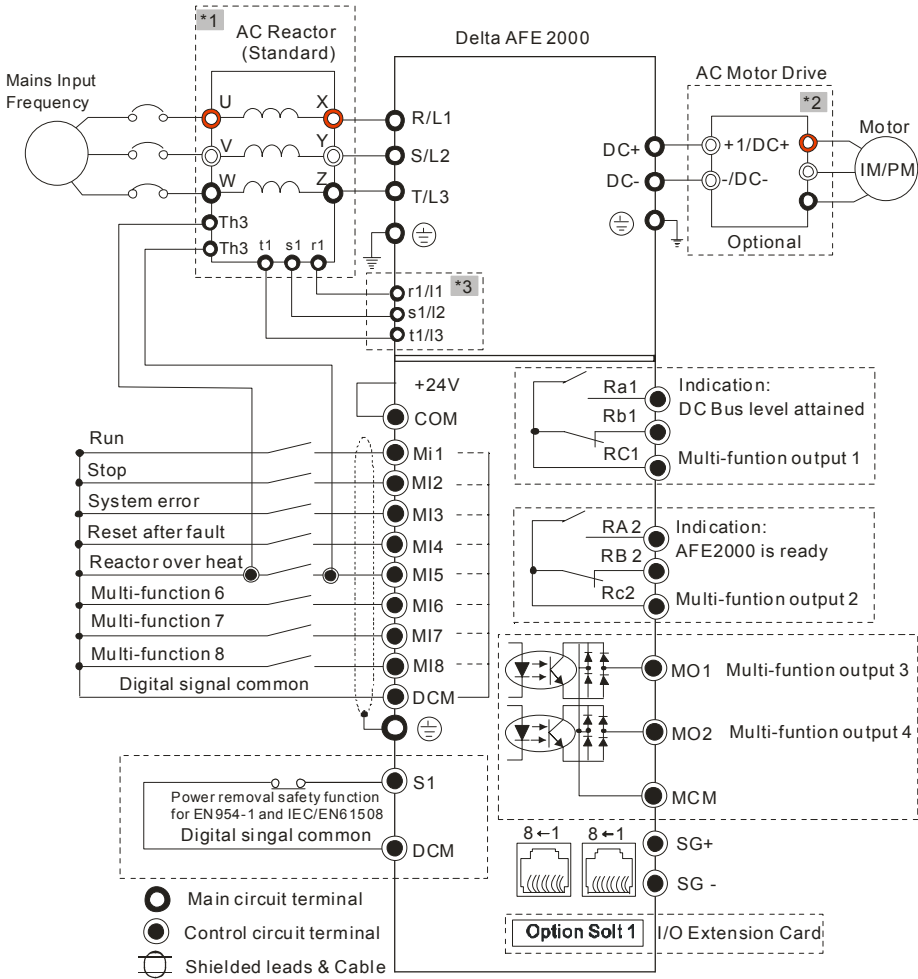


#### NOTE

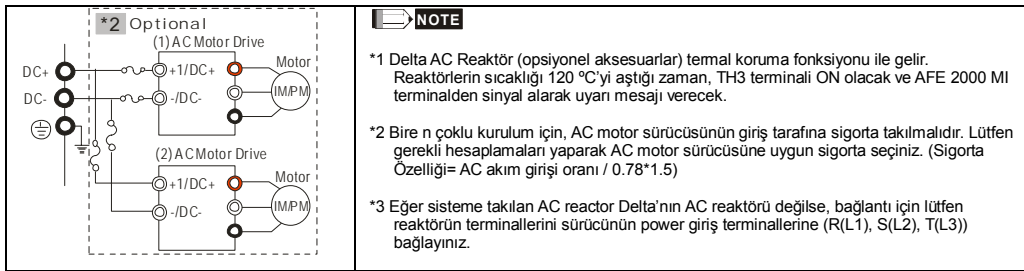
- Bu bilgi dökümanındaki şekiller referans içindir.
- Bu bilgi dökümanının içeriği hiç bir bildirimle gerek duymadan değiştirilebilir. Dökümanın en güncel halini elde etmek için teknik servisimizle bağlantıya geçebilirsiniz veya internet adresinden indirebilirsiniz. <http://www.delta.com.tw/industrialautomation/>.

#### Bağlantı Diyagramı

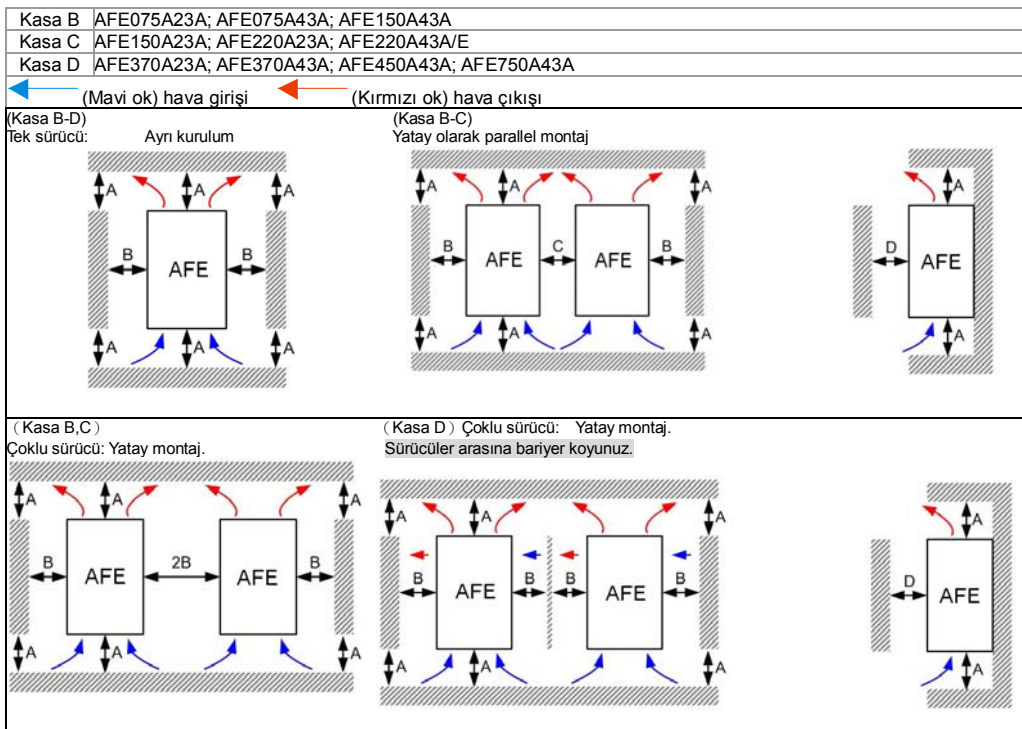
Bire-Bir Kurulum (AFE2000\*1 + AC motor sürücüsü\*1)



Bire-N Adet Çoklu Kurulum (AFE2000\*1 + AC motor sürücüsü\* n)



#### Sürücü Kurulumu (Aşağıda şekilde gösterilen çizimler sadece referans içindir)

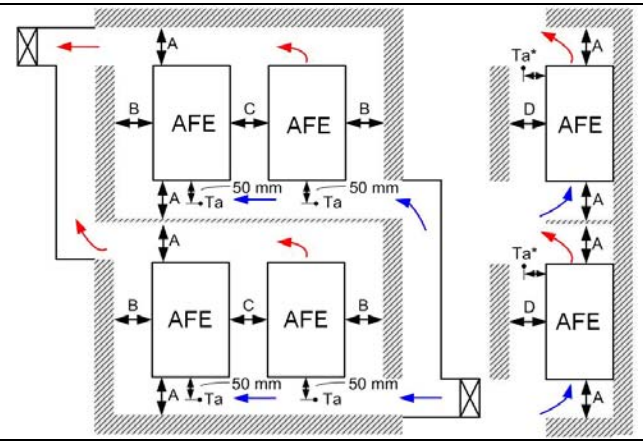
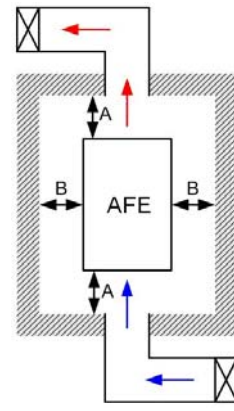


(Kasa B,C)

Çoklu sürücü – dikey paralel montaj.

Sürücüler arasında bariyer konulması tavsiye edilir. Fanın içeriye hava akışı sıcaklığının çalışma sıcaklığından düşük olacak şekilde dengelenmesi için lütfen yeterli kalınlıkta bariyer kullanın.

(Sağdaki şekli inceleyiniz.) Çalışma sıcaklığı fanın içeriye hava akışı tarafından 50 mm uzaklığındaki sıcaklık olarak tanımlanır.



#### Minimum Montaj Boşlukları

| Kasa | A (mm) | B (mm) | C (mm) | D (mm) |
|------|--------|--------|--------|--------|
| B-C  | 60     | 30     | 10     | 0      |
| D    | 100    | 50     | -      | 0      |

#### NOTE

- ✓ Sol şekilde gösterilen montaj boşlukları sürücünün kapalı bir ortama (elektrik kutusu veya pano) kurulumu için değildir. Kapalı bir ortama kurulacağı zaman, şekilde belirtilen minimum montaj boşluklarından başka, çevre sıcaklığını çalışma sıcaklığının altında muhafaza etmek için havalandırma cihazları veya klima kullanılması gerekmektedir.
- ✓ Aşağıdaki tablo bir sürücünün kapalı bir ortama kurulacağı zaman ısı dağılımı ve gerekli olan hava miktarını gösterir. Birden fazla sürücü kurulacaksa, gerekli olan hava miktarı sürücü sayısı ile çarpılır.
- ✓ Havalandırma cihazı dizaynı ve seçimi için lütfen aşağıdaki tabloyu (Soğutma için hava akış oranı) inceleyiniz.
- ✓ Klima dizaynı ve seçimi için lütfen aşağıdaki tabloyu (Güç Dağılımı) inceleyiniz.
- ✓ B-D kasalar için gerekli olan minimum mesafedir. Eğer sürücüler minimum boşluk mesafelerinden daha yakın kurulursa, fan düzgün çalışmayacaktır.

#### Bağlantı Terminaleri Özellikleri (Lütfen bağlantı diyagramını inceleyiniz.)

| AFE Model | Max. Kablo Ölçüsü              | Min. Kablo Ölçüsü              | Tork (±10%)                         | Not  |
|-----------|--------------------------------|--------------------------------|-------------------------------------|--|
| 075A23A   |                                | 6 AWG (13.3mm <sup>2</sup> )   |                                     | DC+ & DC-: 1kV kablo kullanılmalıdır. UL kurulumlarında 600V, 75°C veya 90°C kablo kullanılmalıdır. Sadece bakır kablolar kullanınız.  |
| 075A43A   |                                | 8 AWG (8.4mm <sup>2</sup> )    |                                     | Terminal r1/1, s1/2, t1/3: Kablo Ölçüsü: 20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ] Tork: 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%)   |
| 150A43A   | 4 AWG (21.2mm <sup>2</sup> )   | 6 AWG (13.3mm <sup>2</sup> )   | M5 35kg-cm (30.4 lb-in.) (3.4335Nm) | Lütfen aşağıda belirtildiği gibi UL standartları ile uyumlu izoleli makaron kullanınız. (600C, YDPU2).   |
| 150A23A   |                                | 1 AWG (42.4mm <sup>2</sup> )   |                                     | DC+ & DC-: 1kV kablo kullanılmalıdır. UL kurulumlarında 600V, 75°C veya 90°C kablo kullanılmalıdır. Sadece bakır kablolar kullanınız.  |
| 220A23A   |                                | 1/0 AWG (53.5mm <sup>2</sup> ) |                                     | Terminal r1/1, s1/2, t1/3: Kablo Ölçüsü: 20AWG [0.5mm <sup>2</sup> ] ~ 14 AWG [2.1mm <sup>2</sup> ] Tork: 12 kg-cm [10.4 lb-in.] (1.18Nm) (±10%)   |
| 220A43A   | 1/0 AWG (53.5mm <sup>2</sup> ) | 4 AWG (21.2mm <sup>2</sup> )   | M8 80kg-cm (69.4 lb-in.) (7.848Nm)  | Ortam sıcaklığı 45°C' yi aştığı zaman, AFE220A23A model için 600V, 90°C kablo kullanınız. Lütfen aşağıda belirtildiği gibi UL standartları ile uyumlu izoleli makaron kullanınız. (600C, YDPU2). |
| 370A23A   |                                | 250MCM (126mm <sup>2</sup> )   |                                     | DC+ & DC-: 1kV kablo kullanılmalıdır. Sadece bakır kablolar kullanınız.  |
| 370A43A   |                                | 1/0 AWG (42.4mm <sup>2</sup> ) |                                     | Terminal r1/1, s1/2, t1/3: Kablo Ölçüsü: 22AWG [0.3mm <sup>2</sup> ] ~ 16 AWG [1.3mm <sup>2</sup> ] Tork: 5 kg-cm [4.3 lb-in.] (0.49 N.m)  |
| 450A43A   | 300MCM (152mm <sup>2</sup> )   | 2/0 AWG (67.4mm <sup>2</sup> ) | M8 200kg-cm (173 lb-in.) (19.62Nm)  | Lütfen aşağıda belirtildiği gibi UL standartları ile uyumlu izoleli makaron kullanınız. (600C, YDPU2).   |
| 750A43A   |                                | 300MCM (152mm <sup>2</sup> )   |                                     |  |



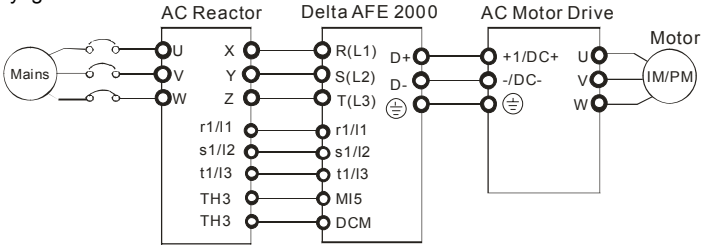
AC Reaktör

Terminal Özellikleri

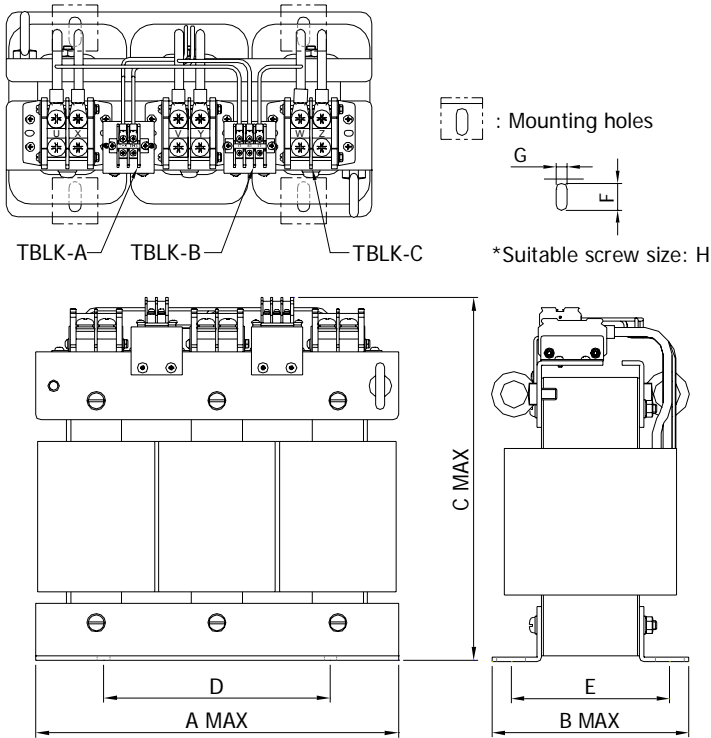
| 230 V<br>Reaktör Model | Kasa | KW  | Uygulanan<br>Model<br>AFE-<br>A23A | Endüktans<br>mH | Akım<br>Kolları<br>Oranı | Tork: kg-cm / lb-in. / Nm ±10% |                |                  | Ağırlık<br>Net(Kg) |
|------------------------|------|-----|------------------------------------|-----------------|--------------------------|--------------------------------|----------------|------------------|--------------------|
|                        |      |     |                                    |                 |                          | Montaj                         | TBLK-A, B      | TBLK-C           |                    |
| AF-RC075A2             | B    | 7.5 | 075                                | 2.1             | 35                       | 40.0 /46.1 /3.92               | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28                 |
| AF-RC150A2             | C    | 15  | 150                                | 1.05            | 70                       | 60.0 /69.2 /5.89               | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 52                 |
| AF-RC220A2             | D    | 22  | 220                                | 0.77            | 95                       | 80.0 /92.2 /7.85               | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62                 |
| AF-RC370A2             | D    | 37  | 370                                | 0.5             | 150                      | 130.0 /149.9 /12.75            | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87                 |

| 460 V<br>Reaktör Model | Kasa | KW  | Uygulanan<br>Model<br>AFE-<br>A43A | Endüktans<br>mH | Akım<br>Kolları<br>Oranı | Tork: kg-cm / lb-in. / Nm ±10% |                |                  | Ağırlık<br>Net(Kg) |
|------------------------|------|-----|------------------------------------|-----------------|--------------------------|--------------------------------|----------------|------------------|--------------------|
|                        |      |     |                                    |                 |                          | Montaj                         | TBLK-A, B      | TBLK-C           |                    |
| AF-RC075A4             | B    | 7.5 | 075                                | 7.32            | 20                       | 40.0 /46.1 /3.92               | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 28                 |
| AF-RC150A4             | B    | 15  | 150                                | 4.18            | 35                       | 60.0 /69.2 /5.89               | 3.8 /4.4 /0.37 | 23.0/ 26.5/ 2.25 | 52                 |
| AF-RC220A4             | C    | 22  | 220                                | 2.92            | 50                       | 80.0 /92.2 /7.85               | 3.8 /4.4 /0.37 | 61.4/ 70.8/ 6.02 | 62                 |
| AF-RC370A4             | C    | 37  | 370                                | 1.96            | 75                       | 130.0 /149.9 /12.75            | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 87                 |
| AF-RC450A4             | D    | 45  | 450                                | 1.54            | 95                       | 160.0 /184.5 /15.70            | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 105                |
| AF-RC750A4             | D    | 75  | 750                                | 0.92            | 160                      | 220.0 /253.7 /21.58            | 3.8 /4.4 /0.37 | 76.8/ 88.5/ 7.53 | 137                |

Bağlantı Diyagramı



Kasa Yapısı



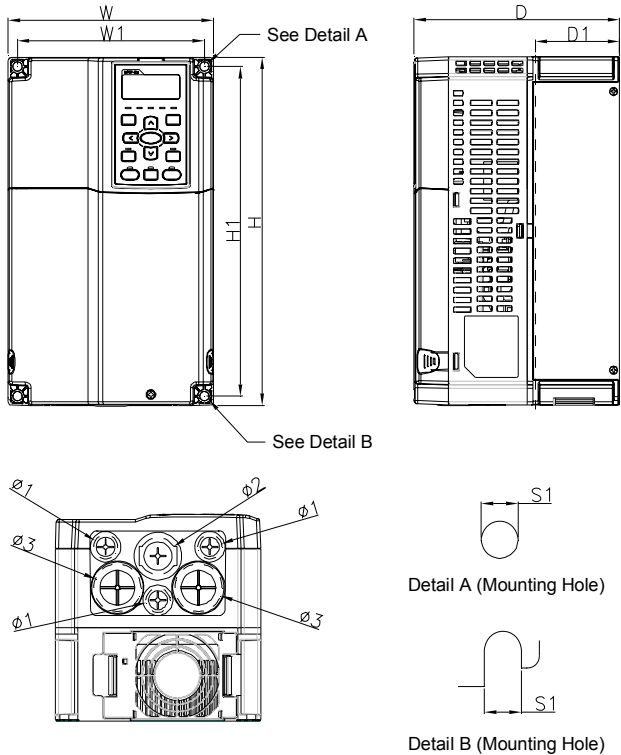
Model Özellikleri

| Model      | A<br>mm [inch] | B<br>mm [inch] | C<br>mm [inch] | D<br>mm [inch] | E<br>mm [inch] | F<br>mm [inch] | G<br>mm [inch] | H<br>Vida |
|------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|
| AF-RC075A2 | 305 [12.01]    | 159 [6.26]     | 280 [11.02]    | 150 [5.91]     | 125 [4.92]     | 22 [0.87]      | 11 [0.43]      | M10       |
| AF-RC150A2 | 355 [13.98]    | 180 [7.09]     | 328 [12.91]    | 200 [7.87]     | 139 [5.47]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC220A2 | 355 [13.98]    | 200 [7.87]     | 328 [12.91]    | 200 [7.87]     | 159 [6.26]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC370A2 | 385 [15.16]    | 210 [8.27]     | 385 [15.16]    | 200 [7.87]     | 168 [6.26]     | 25 [1.02]      | 13 [0.51]      | M12       |
| AF-RC075A4 | 305 [12.01]    | 159 [6.26]     | 280 [11.02]    | 150 [5.91]     | 125 [4.92]     | 22 [0.87]      | 11 [0.43]      | M10       |
| AF-RC150A4 | 355 [13.98]    | 180 [7.09]     | 328 [12.91]    | 200 [7.87]     | 139 [5.47]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC220A4 | 355 [13.98]    | 200 [7.87]     | 328 [12.91]    | 200 [7.87]     | 159 [6.26]     | 26 [1.02]      | 11 [0.43]      | M10       |
| AF-RC370A4 | 385 [15.16]    | 210 [8.27]     | 385 [15.16]    | 200 [7.87]     | 168 [6.26]     | 25 [1.02]      | 13 [0.51]      | M12       |
| AF-RC450A4 | 385 [15.16]    | 230 [9.06]     | 385 [15.16]    | 200 [7.87]     | 188 [7.40]     | 25 [1.02]      | 13 [0.51]      | M12       |
| AF-RC750A4 | 420 [16.54]    | 240 [9.45]     | 440 [17.32]    | 250 [9.84]     | 200 [7.87]     | 25 [1.02]      | 13 [0.51]      | M12       |

Ölçüler (Aşağıdaki şekilde gösterilen çizimler sadece referans içindir.)

Kasa B

AFE075A23A; AFE075A43A; AFE150A43A

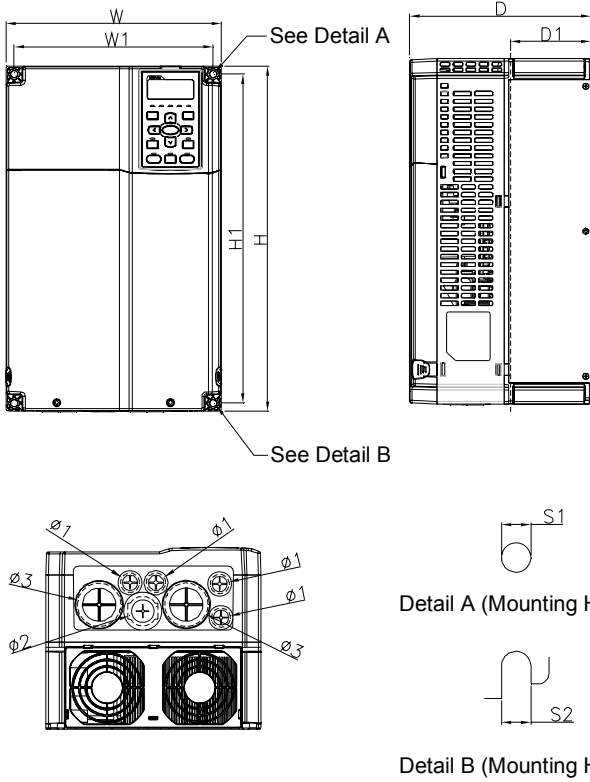


| Kasa | W            | H             | D            | W1           | H1            | D1*         | S1         | Φ1          | Φ2          | Φ3          |
|------|--------------|---------------|--------------|--------------|---------------|-------------|------------|-------------|-------------|-------------|
| B1   | 190.0 [7.48] | 320.0 [12.60] | 190.0 [7.48] | 173.0 [6.81] | 303.0 [11.93] | 77.9 [3.07] | 8.5 [0.33] | 22.2 [0.87] | 34.0 [1.34] | 28.0 [1.10] |

D1\*: Bu ölçüler flanş montaj uygulamaları için referanstır. Birim: mm [inch]

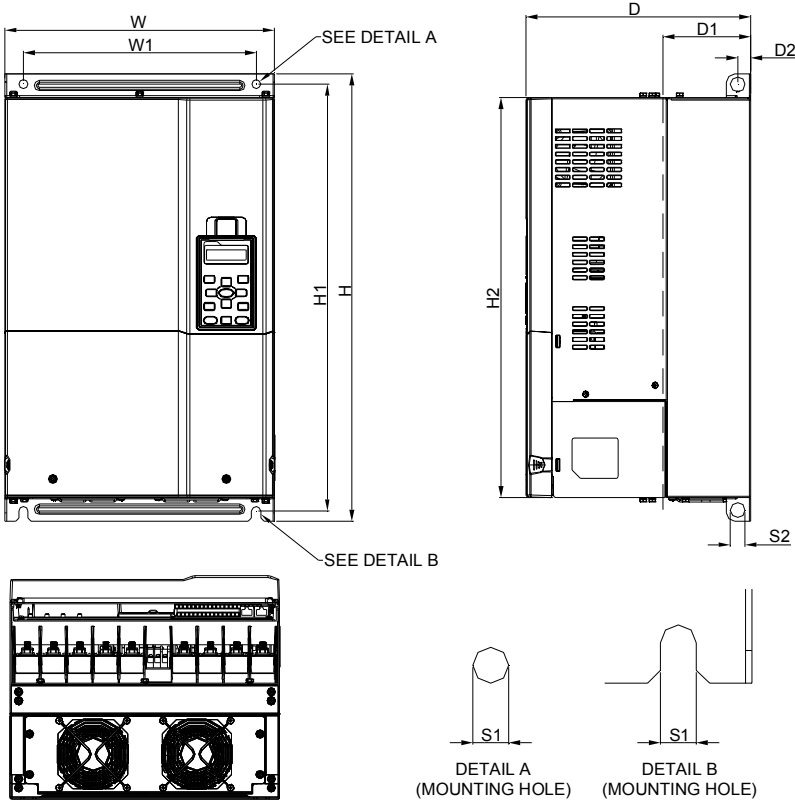
Kasa C

AFE150A23A; AFE220A23A; AFE220A43A



Kasa D

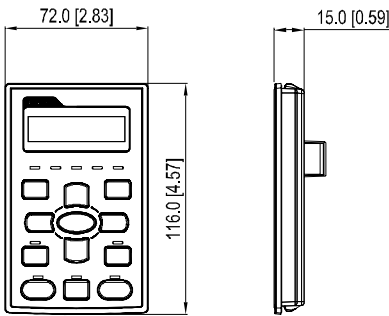
AFE370A23A; AFE370A43A; AFE450A43A; AFE750A43A



| Kasa | W             | H             | D             | W1            | H1            | H2            | D1*          | D2          | S1          | S2          |
|------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|-------------|-------------|-------------|
| D1   | 330.0 [12.99] | 550.0 [21.65] | 275.0 [10.83] | 285.0 [11.22] | 525.0 [20.67] | 492.0 [19.37] | 107.2 [4.22] | 16.0 [0.63] | 11.0 [0.43] | 18.0 [0.71] |

D1\*: Bu ölçüler flanş montaj uygulamaları için referanstır. Birim: mm [inch]

Dijital Keypad KPC-CE01



Çalışma Prosedürü

