

# 東達變頻器

Tek Drive

TDS-F8

簡易說明書

Brief Instruction Manual

小型標準變頻器/ Compact Standard AC Drive

110V Class 單相 Single phase 0.5~ 1HP

220V Class 單/ 三相 Single/ Three phase 0.5~ 2HP

440V Class 三相 Three phase 1~ 2HP



# TDS-F8

## 簡易說明書 / Brief Instruction Manual



\*本手冊內容若如有更改，恕不另行通知。

\*The content of this manual may be revised without prior notice.

東達科技股份有限公司 TEK-DRIVE CO., LTD.

TEL: (02)2275-6859      FAX: (02)2275-6867

Email: [service@tekdrive.com.tw](mailto:service@tekdrive.com.tw)

<http://www.tekdrive.com.tw>

202210

# 注 意 事 項/ Safety Instructions

首先非常感謝您採用東達無感測向量型高機能變頻器 TEK-DRIVE/ TDS-F8 系列 (以下簡稱 TDS-F8)。TDS-F8 係採用最新之高品質半導體功率元件並融會電機電子控制技術，製造而成之驅動器。

此變頻器簡易說明書提供 TDS-F8 變頻器的相關資訊。在使用 F8 之前，請您仔細詳讀本說明書以確保在安裝、使用上與保養的正確性。此外，請妥善將其交給最終使用者，並放置在明顯的地點以便隨時查閱。下列事項請務必遵守，如有任何疑慮請上東達公司網頁 [www.tekdrive.com.tw](http://www.tekdrive.com.tw)，搜尋 **TDS-F8 使用說明書**以便獲得更詳細的說明。

Thank you for using **TDS-F8** Compact Standard Inverter (drive, VFD) developed by **TEK-DRIVE Co., Ltd.**, featuring High-Performance and ultra-low noise.

In the course of using, in case of any problems not covered by this Manual, please contact local agents or engineering technical personnel from our company. Our professional staff is glad to serve you. Please continue to use this product.

Read this instruction manual first before using the F8, the following additional information is as an aid to avoid problem or injury in this manual, NOTES FOR SAFE OPERATION are classified as “DANGER” or “CAUTION”. Always read these before continuing.

## ■ 禁止及注意警告事項/ DANGER, WARNNING and ATTENTION



- 實施配線工作之前，確認已關閉電源。
- 輸入電源切離後，請勿隨即觸摸電路或更換零件，因此時驅動器內部仍有高壓非常危險，需待變頻器之顯示燈熄滅。
- 變頻器的輸出端子 U、V 及 W，絕不可接錯接到 AC 電源側。
- 絶不可以觸摸或自行改裝內部之零件及線路。



- *Disconnect AC input power before connecting any wiring to the AC motor drive.*
- *After switch off the mains supply, dangerous voltage can still be present in the VFD. When opening the VFD for installing and/or commissioning activities wait at least 5 minutes to allow the buffer capacitor to discharge.*
- *Never connect the AC motor drive output terminals U/T1, V/T2 and W/T3 directly to the AC mains circuit power supply.*
- *Never touch and/ or modify the internal wiring or components.*



警告

- 若變頻器安裝於控制盤內時，務必加裝散熱風扇，使變頻器周溫低於 45°C。
- 在未將馬達連接線從變頻器的輸出端子 U、V 及 W 分離前，不可對馬達線執行高阻抗絕緣測試。
- 不可對變頻器內部零組件作耐壓測試。



WARNING

- A VFD or VFDs installed in an enclosure, be sure the installation location for cooling effect, and use an external cooling fan or air condition in a suitable location to maintain the internal temperature of enclosure as 45 °C Max..
- Do not carry out voltage tests (Megger) on the motor, before all the motor cables have been disconnected from the VFD.
- Do not carry out Megger on the internal wiring or components.



注意

- 在安裝、運轉、保養、點檢前，請詳閱本說明書，需符合資格之專業人員方可進行裝配線工作。
- 變頻器之機型是否為您所訂購之機型。
- 運送中如有造成損傷，請勿接線送電。
- 使用中如有出現任何手冊中無記載的問題，請聯絡你的購買商或是東達技術人員。



ATTENTION

- Installation, commissioning, demounting, taking measurements, etc., of or on the VFD may only be carried out by personnel technically qualified for the task. And read this instruction manual first before using the VFD.
- Verify that the part numbers on the drive nameplate match the numbers on your purchase order or packing slip.
- Check the unit for physical damage which may have occurred during shipping. If any part of the drive is missing or damaged, do "Not" connect the VFD to AC power.
- In the course of using, in case of any problems not covered by this Manual, please contact local agents or engineering technical personnel from our company.

# 目 錄/ Content (See Page 5)

<b>1. TDS-F8 使用說明</b>	
1-1 收貨檢查-----	6
1-2 安裝方向與空間-----	7
1-3 安裝環境注意事項-----	7
1-4 儲存注意事項-----	7
1-5 TDS-F8 標準規格-----	8
1-6 外型尺寸-----	10
1-7 基本配線-----	11
1-8 端子配置與說明-----	12
<b>2. 變頻器周邊設備注意事項</b>	
2-1 周邊設備配線注意事項-----	14
2-2 主回路配線用器具及注意事項-----	15
2-3 系統配置圖例-----	16
<b>3. 變頻器的操作說明</b>	
3-1 操作器顯示部與 LED 指示燈-----	17
3-2 按鍵機能與顯示項目說明-----	18
3-3 操作器操作、顯示模式說明-----	20
<b>4. 變頻器參數列表</b>	
參數一覽表-----	22
0-用戶參數-----	22
1-基本參數-----	22
2-操縱方式參數-----	23
3-數位、類比輸出端子功能參數-----	24
4-數位、類比輸入端子功能參數-----	25
5-多段數以及自動程序運轉參數-----	25
6-保護參數-----	27
7-電機參數-----	27
8-特殊參數-----	27
9-通訊參數-----	28
U-監控參數-----	29

<b>5. 故障顯示及排除</b>	
5-1 異常故障發生原因及排除方法-----	31
5-2 警告顯示及排除方法-----	32
<b>6. 附錄</b>	
6-1 外加剎車電阻選用表-----	34
6-2 交流輸入電抗器選用表-----	34
6-3 輸入雜訊濾波器選用表-----	34
6-4 RFI 零相濾波器-----	35
6-5 數位操作器安裝尺寸-----	36

# Content

## 1. TDS-F8 Introduction

1-1 Preliminary Inspection-----	39
1-2 Mounting & Installation-----	40
1-3 Installing Location Condition Free-----	40
1-4 Storage Condition-----	40
1-5 TDS-F8 General Specification-----	41
1-6 Frame Size & Dimension-----	43
1-7 Wiring & Connection-----	44
1-8 Terminal Configuration and Description-----	45

## 2. Precautions for F8 Peripheral Equipment

2-1 Precautions for Wiring of Peripheral Equipment-----	47
2-2 Main Circuit Wiring, Peripheral Equipment and Note-----	49
2-3 Connecting Peripheral Equipment-----	50

## 3. Operating via the Operator (Keypad)

3-1 LED Indicators, Display and Function Keys-----	52
3-2 Function Key Instruction-----	53
3-3 Menu Structure for Operators-----	55

## 4. Parameter List & Introduction

Parameter List-----	57
0- User Parameters-----	57
1- Basic Parameters-----	57
2- Operating Method Parameters (RUN Command and Frequency Reference Source) -----	58
3- Digital & Analog Output Terminal Parameters-----	59
4- Digital & Analog Input Terminal Parameters-----	59
5- Multi-preset Reference & Auto Operation Parameters-----	60
6- Protection Parameters-----	61
7- Motor Data Parameters-----	62
8- Special Parameters-----	62
9- RS-485 Modbus Communication Parameters-----	63
U- Monitoring Parameters-----	63

## 5. Warning/ Fault Condition, the possible Cause and Remedies

5-1 Fault Condition (Message Lits), the possible Causes and Remedial Actions-----	65
5-2 Warning Condition (Message Flashes), the possible Causes and Remedial Actions-----	66

## 6. Appendix

6-1 Dynamic Braking Resister-----	68
6-2 Input AC Reactor-----	68
6-3 Input Noise Filter-----	68
6-4 RFI Noise Filter (Zero-Phase Core)-----	68
6-5 Mounting Dimension of External Remote Operator-----	70
6-6 Abbreviation Index-----	72

# 1. TDS-F8 使用說明

## 1-1 收貨檢查

每部變頻器在出廠前，均經過嚴格的品管，客戶變頻器拆箱後，請執行下列檢查步驟：

- 檢查變頻器銘板上機種型號是否與外箱登錄相符。(請參閱銘板標示)
- 檢查變頻器是否有因運輸過程中造成損傷。

### ■ 變頻器銘板標示：

型號 →	MODEL	<b>TDS-F8-L0P4E3</b>
輸入電源規格 →	INPUT	AC 3PH 200~230V 50/60 Hz
輸出規格 →	OUTPUT	AC 3PH 0~230V 0~400 Hz 1.4 kVA, 3.2A
重量 →	MASS	1.2Kg
序號 →	SER. NO.	F8xxxxxxxx
TEK-DRIVE CO., LTD.		MADE IN TAIWAN

### ■ 變頻器型號說明

位置號碼：	1	2	3	4	5	6
<b>TDS - F8 - L 0P4 E 3</b>						

位置號碼	名 稱	說 明
1	產品名稱	TDS: 變頻器產品
2	系列別	F8 系列
3	輸入電壓等級	N: 110V L: 220V H: 440V
4	最大輸出容量 (KW)	0P4: 0.4KW 0P7: 0.75KW 1P5: 1.5KW

位置號碼	名 稱	說 明
5	機種型式	E: 標準 S: 客製化恆壓專用機
6	輸入電源規格	空白: 單相入力 3: 三相入力

## 1-2 安裝方向與空間

為確保 TDS-F8 變頻器之散熱，請依下圖 1-1 之安裝空間設置：

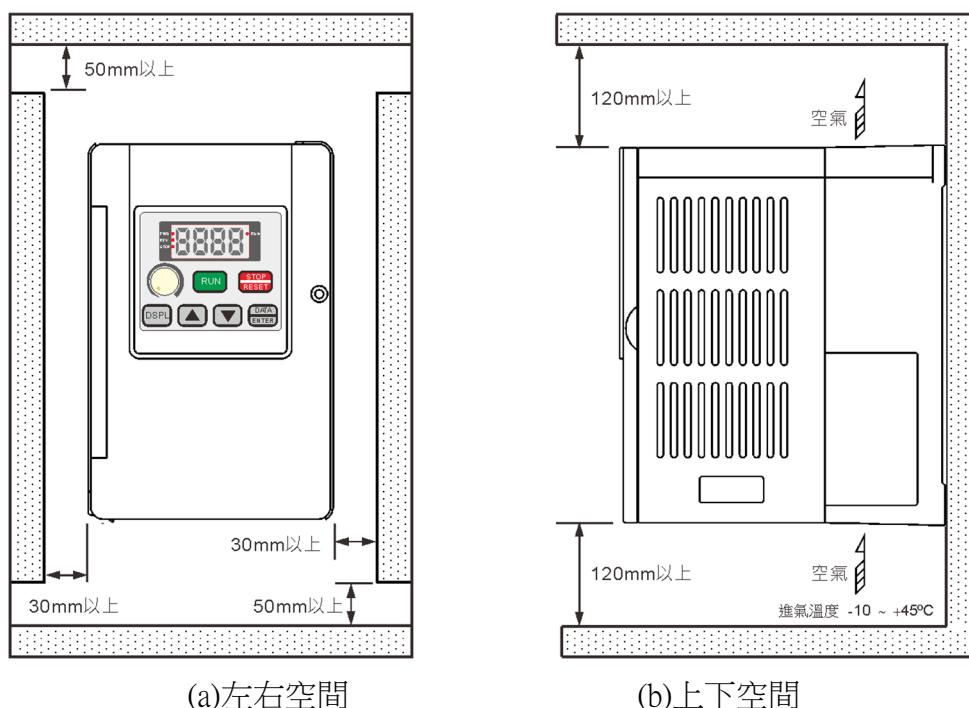


圖 1-1 TDS-F8 安裝空間圖

## 1-3 安裝環境注意事項

安裝環境對變頻器的功能發揮及其使用壽命會有直接的影響，因此安裝 TDS-F8 變頻器，必需考慮下列因素：

- 周圍溫度： $-10^{\circ}\text{C} \sim +45^{\circ}\text{C}$
- 防止雨水、濕氣或直接日曬。
- 防止腐蝕性液體或氣體、塵埃及金屬細屑。
- 防止振動或電磁干擾之場所。
- 若多台變頻器同時安裝於同一控制盤內時，請加散熱風扇，使變頻器周溫低於  $45^{\circ}\text{C}$ 。

## 1-4 儲存注意事項

- 必須置放無塵垢、乾燥之位置
- 儲存位置的環境溫度必須介於  $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$  以內。
- 儲存位置的相對濕度必須在 90%RH 以下，且無結露狀態。
- 避免儲存於含有腐蝕性氣體、液體之環境中。
- 最適當的包裝並存放在架子或台面上。

## 1-5 TDS-F8 標準規格

### ■ F8-標準型規格

輸入電壓等級		單相 110V		單/ 三相 220V			三相 440V						
機種型式 F8-****E(3)		N0P4	N0P7	L0P4	L0P7	L1P5	H0P7	H1P5					
最大適用馬達	HP	0.5	1	0.5	1	2	1	2					
	KW	0.4	0.75	0.4	0.75	1.5	0.75	1.5					
輸出	額定輸出容量(kVA)	1.4	2	1.4	2	3	2.1	2.7					
	額定輸出電流(A)	3.2	4.8	3.2	4.8	7.1	2.6	4					
	最大輸出電壓(V)	三相 200 ~ 230V				三相 380 ~ 460V							
	最高輸出頻率(Hz)	可由參數設定 (最高可達 400Hz)											
電源	額定電壓・頻率	100V ~ 115V , 50/ 60Hz		單/ 三相 200V ~ 230V , 50/ 60Hz		三相 380V ~ 460V , 50/ 60Hz							
	容許電壓變動	-15% ~ +10%											
	容許頻率變動	$\pm 5\%$											
控制特性	操作方式	LED 操作器											
	控制方式	正弦波 PWM 方式											
	頻率控制範圍	0.1Hz ~ 400Hz											
	頻率精度(溫度變動)	數位指令 : $\pm 0.01\%$ (-10 ~ +40°C) , 類比指令 : $\pm 1\%$ (25°C ±10°C)											
	頻率設定解析度	數位指令 : 0.1Hz , 類比指令 : 0.06Hz/ 60Hz											
	輸出頻率解析度	0.01Hz											
	頻率設定信號	DC 0 ~ +10V / 4 ~ 20mA											
	加速、減速時間	0.0~999.9 秒 (加速及減速時間可分別設定)											
	電壓、頻率特性	可由參數任意設定 V/f 曲線											
	主要控制機能	自動轉矩補償、滑差補償、瞬間停電再啟動、PID 控制、簡易程序運轉機能											
保護機能	其他機能	Up/Down 操作、通電時間及運轉時間累積記錄、四組故障履歷及最近一次故障時之狀態記錄、RS-485 通訊格式、脈波倍數輸出、1組類比輸出接點等等。											
	失速防止	加速中、定速中動作電流可分別設定，減速中可設定有／無失速防止											
	瞬時過電流(OC)	變頻器額定電流的 200%以上動作											
	變頻器過載保護(OL2)	變頻器額定電流的 150% 1 分鐘動作											
	馬達過載保護(OL1)	電子式過載曲線保護											
	過電壓(OV)	110/ 220V 級主回路直流電壓超過 410V 以上時動作 400V 級主回路直流電壓超過 820V 以上時動作											
	低電壓(UV)	110/ 220V 級主回路直流電壓低過 190V 以下時動作 400V 級主回路直流電壓低過 380V 以下時動作											
	瞬時停電自動再起動	斷電 15ms 以上											
	過熱保護(OH)	利用溫度檢出器保護											
	保護構造 (塑膠外殼)	IP00 , IP20 (選購)											

機種型式 F8-****E(3)	N0P4	N0P7	L0P4	L0P7	L1P5	H0P7	H1P5					
冷卻方式	自然冷卻			強制	自然	強制風冷						
重量 (kg)	1.2											
環境規格	使用場所	室內(無腐蝕性氣體塵埃等之場所)										
	周圍溫度	-10 ~ +45°C (不結凍狀態)										
	保存溫度	-20 ~ +60°C										
	濕度	90%RH 以下(不結露狀況)										
	標高、振動	海拔 1000 米以下，5.9m/s <sup>2</sup> (0.6G)以下 (JISC0911 基準)										
通訊機能	Modbus RS-485 標準內建											
雜訊干擾(EMI)抑制力	附加雜訊濾波器可符合 EN50081-2(1994)											
雜訊免疫力(EMC)	符合 PrEN50082-2											

## 1-6 外型尺寸

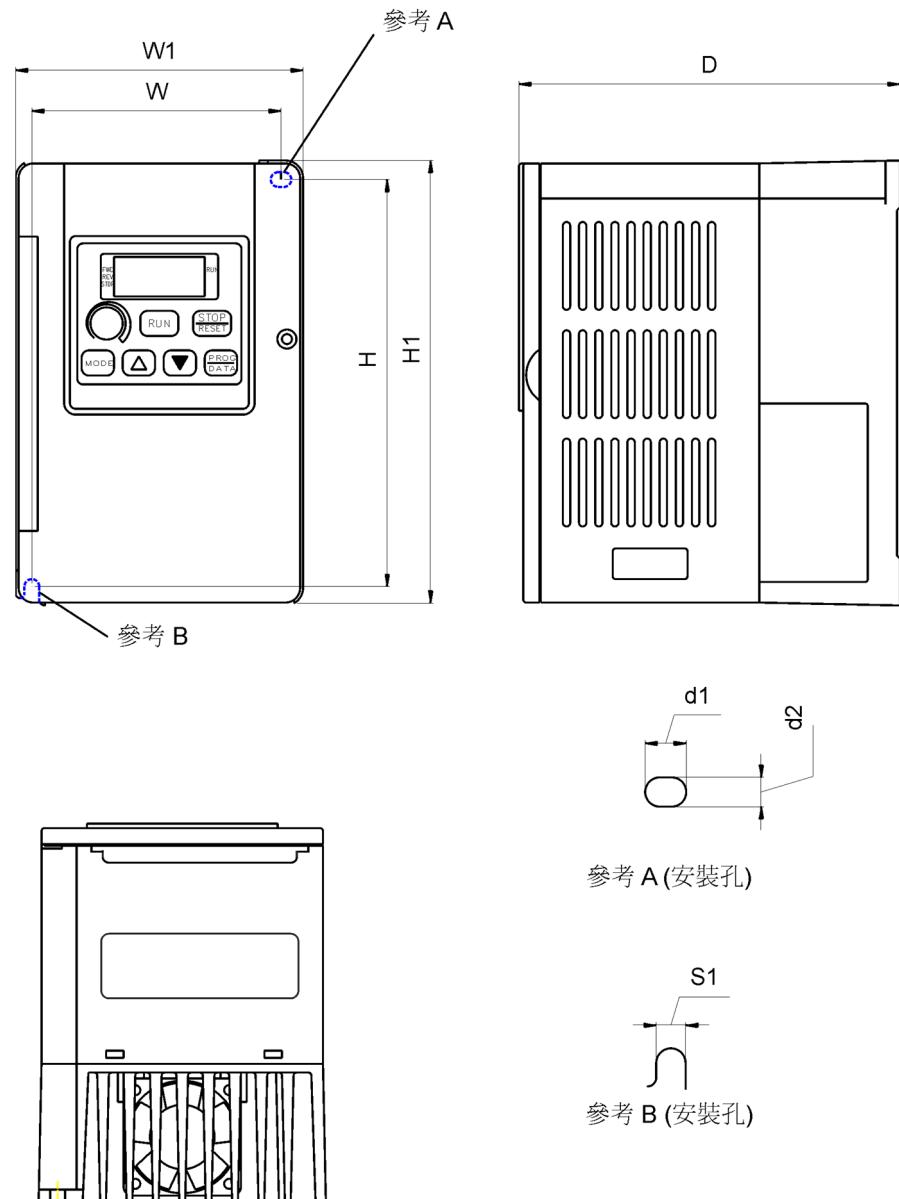


圖 1-2 TDS-F8 尺寸圖

入力電壓	適用馬達容量 KW/ HP	安裝尺寸 (mm)			外型尺寸 (mm)			概略重 量(kg)
		W	H	H2	W1	H1	D	
1Ø 110V	0.4KW/ 0.5HP							
	0.75KW/ 1HP							
1Ø/ 3 Ø 220V	0.4KW/ 0.5HP	85	138	130	98	151	130	1.2
	0.75KW/ 1HP							
	1.5KW/ 2HP							
3 Ø 440V	0.75KW/ 1HP							
	1.5KW/ 2HP							

## 1-7 基本配線

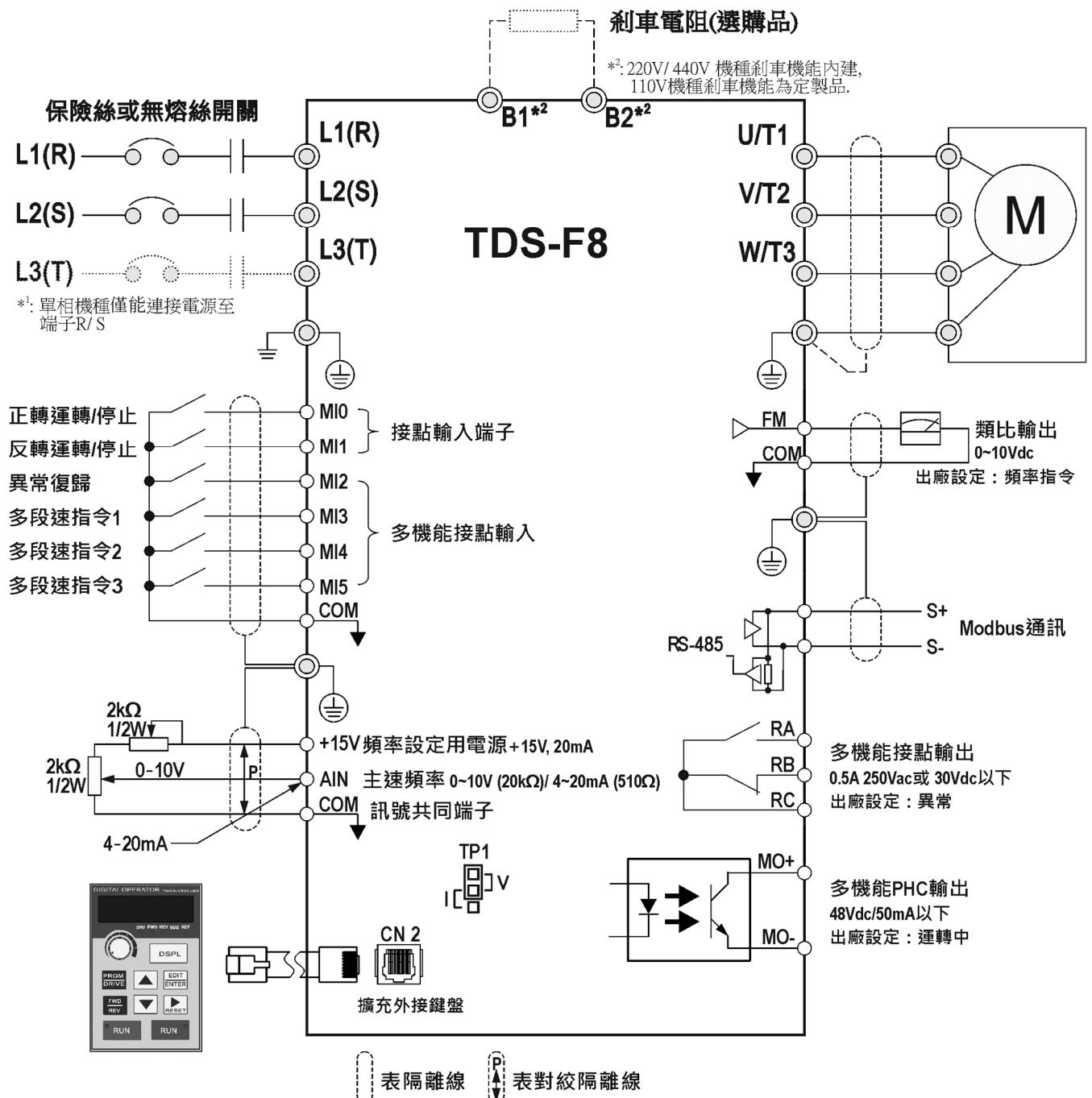


圖 1-3 變頻器標準配線圖

( ◎表示主回路端子，○表示控制端子 )

## 1-8 端子配置與說明

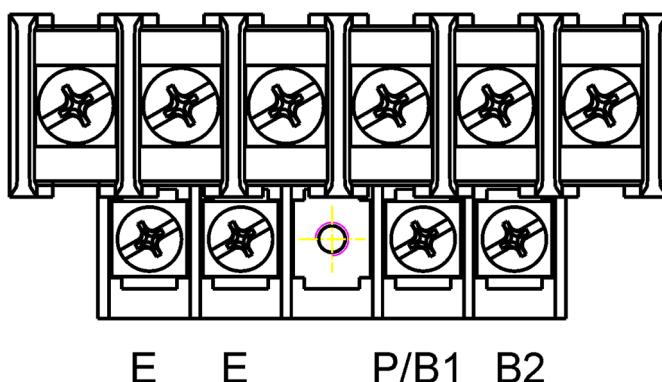
### ■ 主迴路端子說明

端子記號	端子內容說明
R/L1	
S/L2	主回路輸入電源 (單相輸入，只接 R - S)
T/L3	
P/B1	P/B1 - B2 : 外接剎車電阻 (恆壓專用機無、110V 機種為訂製)
B2	
U/T1	
V/T2	變頻器輸出，連接三相馬達
W/T3	
E	接地端子 (第三種接地)

### ■ 主迴路端子配置

220V 0.5~2HP / 440V 1~2HP 三相機種

R/L1 S/L2 T/L3 U/T1 V/T2 W/T3



110V 0.5~1HP / 220V 0.5~2HP 單相機種

R/L1 S/L2 U/T1 V/T2 W/T3



## ■ 控制迴路端子說明

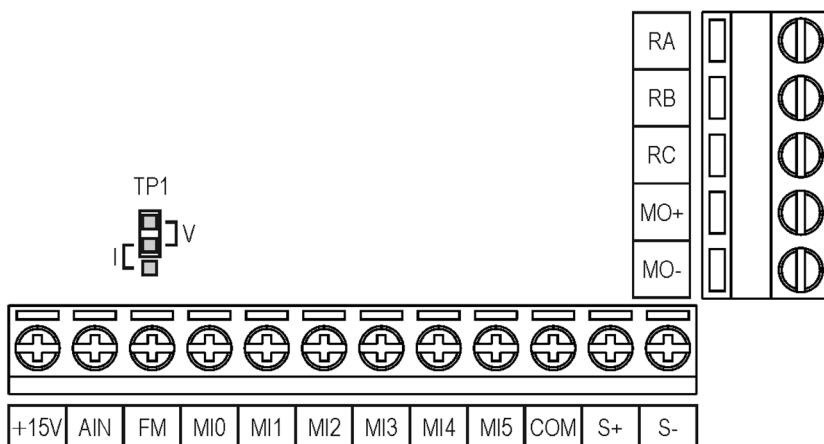


圖 1-4 控制端子配置圖

端子代號	端子功能說明		電氣規格
MI0	正轉運轉—停止命令		
MI1	逆轉運轉—停止命令		
MI2	多機能輸入端子：		每一個輸入端子 最大 Sink 電流為 6mA
MI3	三線式操作，Local／Remote 控制，異常復歸，多段速切換，加減速切換，加減速禁止，外部遮斷，過熱預告，PID		
MI4	控制，速度尋找，UP/DOWN 機能，外部異常，Timer 機能等		
MI5			
COM	訊號共同點		
+15V	速度設定用電源		+15V/ 20mA max.
AIN	電壓/ 電流主速指令(0~10V/ 4~20mA)		0~10V/ 4~20mA
FM*	多機能類比輸出端子： 頻率指令，輸出頻率，輸出電流，輸出電壓，直流電壓，PID 控制量，外部類比指令輸入 AIN 量		0~10V
RA	電驛 A 接點	輸出指示：	250VAC/ 30VDC, 0.5A 以下
RB	電驛 B 接點	運轉中，零速，頻率一致，任意頻率一致，輸出頻率，準備完成，低電壓檢出，輸出遮斷，運轉及頻率指令，過轉矩檢出，頻率指令喪失，異常，低電壓，過熱，馬達過負載、變頻器過負載輸出，重試中，通訊異常，計時機能輸出。	
RC	電驛共同接點		
MO+	開集極晶體輸出		48Vdc max. 50mA max.
MO-			
S+ & S-	Modbus RS-485 通訊埠、規格		
TP1	AIN 輸入訊號選擇插孔，1-2 (位置-上)：0~10V 2-3 (位置-下)：4~20mA		



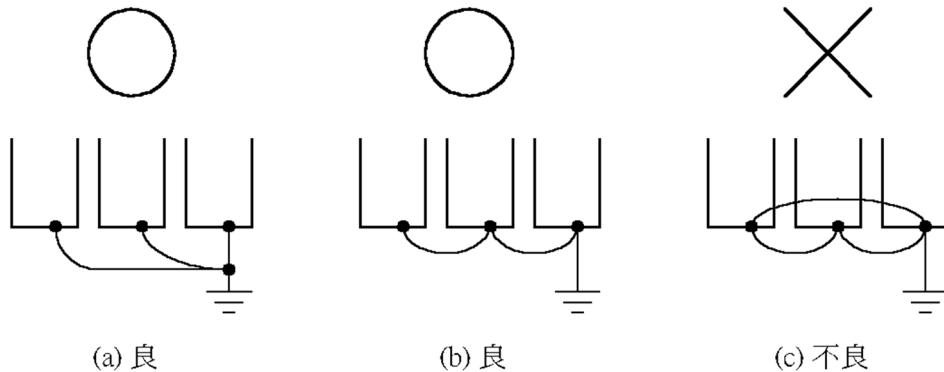
注意

- 控制回路端子 AIN 輸入訊號選擇，請依 TP1 及參數(4-03)設定使用。
- 端子(+15V)輸出電流最大容量為 20mA。
- 多機能類比輸出 FM 為接電錶專用之類比輸出，請勿用作回授控制等之類比輸出信號。

## 2. 變頻器周邊設備注意事項

### 2-1 周邊設備配線注意事項

- 1、配線時，請根據手冊中的注意事項以及請依照電工法規定施行配線，以策安全。
- 2、確定電源電壓及可供應之最大電流。
- 3、變頻器出力側端子 U, V, W 絶不可接至 AC 電源側。
- 4、主回路端子的螺絲請確實鎖緊，以防止因震動鬆脫產生火花。
- 5、交流輸入電源與主回路端子(三相 R/S/T，單相 R/S)之間的連線一定要接一個無熔絲開關。最好能另串接一電磁接觸器 (MC) 以在變頻器保護功能動作時可同時切斷電源。(電磁接觸器的線圈兩端需加裝 R-C 突波吸收器)。
- 6、輸入電源 R, S, T 並無相序分別，可任意連接使用。
- 7、主回路配線與控制回路的配線必需分離，以防止發生誤動作。如必需交錯，請作成 90 度的交叉。
- 8、接地端子 E 以第三種接地方式接地( 接地阻抗  $100\Omega$  以下 )。
- 9、變頻器接地線不可與電鋸機、大馬力馬達等大電流負載共同接地，而必須分別接地。
- 10、接地配線必需愈短愈好。
- 11、數台變頻器共同接地時，勿形成一接地回路，請參考下圖



- 12、控制線請儘量使用隔離線。
- 13、電源配線請使用隔離線或金屬線管，並將隔離層或線管兩端接地。
- 14、若變頻器出力側端子 U/V/W 有必要加裝雜訊濾波器時，必需使用變頻器專用輸出濾波器，不可加裝進相電容器。
- 15、如果變頻器的安裝場所對干擾相當敏感，則請加裝 RFI 濾波器，加裝位置離變頻器越近越好。PWM 的載波頻率越低，干擾也越少。
- 16、變頻器若有加裝漏電斷路器以作為漏電故障保護時，為防止漏電斷路器誤動作，請選擇感度電流在  $200mA$  以上，動作時間為 0.1 秒以上者。
- 17、輸入電源切離後，變頻器面板上 LED 燈未熄滅前，表示電容器尚未放電完畢，請勿觸摸電路或更換零組件。
- 18、由於半導體零組件易受高電壓破壞，所以不可對變頻器內部的零組件進行耐壓測試。
- 19、變頻器控制基板的 CMOS IC 易受靜電影響及破壞，請勿觸摸控制基板。

- 20、參數(1-02)出廠設定:當設為 3、5、7(二線式端子)或 4、6、8(三線式端子)時，除(1-01)外，所有參數設定值均會復歸為出廠初始設定值。若 TDS-F8 原先操作在三線式端子(即參數(1-02)=4、6、8)，改為二線式操作(即參數(1-02)=3、5、7)時，馬達可能會馬上以反方向運轉，所以要先確認端子 1 及 2 均為“開路”的狀態，以免造成機器或人員之損傷。
- 21、配線時，請選用適當的電線線徑，當主回路配線很長時，要考慮電壓降不可大於額定電壓之 2%。相間電壓降  $\Delta V = \sqrt{3} \times \text{電線電阻 } (\Omega/\text{km}) \times \text{配線距離(m)} \times \text{流過電流(A)} \times 10^{-3}$ 。
- 22、當變頻器與馬達間配線很長時，請適度調降載波頻率(參數 2-06)。

## 2-2 主回路配線用器具及注意事項

交流電源與變頻器的電源輸入端 R/L1、S/L2 間，必須要裝無熔絲斷路器(NFB)，而電磁接觸器(MCB)則視需要決定是否安裝。若加裝漏電斷路器以作漏電故障保護時，為防止漏電斷路器誤動作，選擇其感度電流為 200mA 以上，動作時間為 0.1 秒以上者。

表 2-1：主回路配線用器具

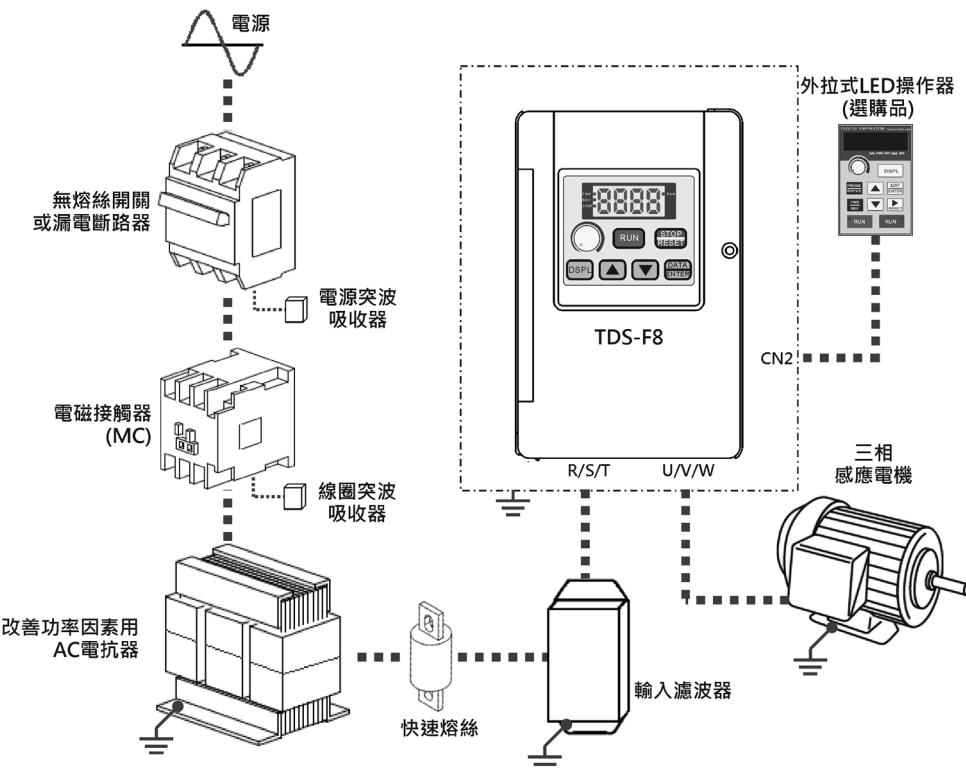
型號 F8-****E(3)	額定電流 (A)	電纜線( $\text{mm}^2$ )			無熔絲 開關*3	電磁接 觸器*3 CN-11
		主回路*1	接地線	控制線*2		
N0P4	3.2	2~5.5	2~5.5	0.5~2	TO-50E 15A	CN-11
N0P7	4.8				TO-50E 20A	
L0P4	3.2				TO-50E 15A	
L0P7	4.8		3.5~5.5	0.5~2	TO-50E 20A	
L1P5	7.1				TO-50EC 15A	
H0P7	2.9		2~5.5	0.5~2		
H1P5	4					

\*1：主回路含包 R(L1)、S(L2)、T(L3)、U(T1)、V(T2)、W(T3)、P/B1、B2

\*2：控制線為控制基板上之接線。

\*3：表中之無熔絲開關及電磁接觸器型式為東元(TECO)產品編號，亦可使用相同額定之其它廠牌。為降低雜訊干擾，請記得務必在電磁接觸器之線圈兩端加裝 R-C 突波吸收器 (0.1uf/1000VDC，10Ω/5W)

## 2-3 系統配置圖例



### ■ 無熔絲開關 (NFB) 及漏電斷路器

- 請根據變頻器之額定，選用適當額定電流之 NFB。
- 請勿使用 NFB 作為變頻器之運轉／停止控制。
- 若加裝漏電斷路器以作為漏電故障保護時，請選用感度電流 200mA 以上/ 動作時間 0.1 秒以上，以防止高頻誤動作。

### ■ 電磁接觸器(MC)

- 一般使用時，可以不加電磁接觸器，但要作外部順序控制或停電後自動再起動等功能時，需加裝電磁接觸器。
- 請儘量避免使用電磁接觸器作變頻器之運轉／停止控制。

### ■ AC 電抗器

- 若欲作進一步改善功因或抑制外來電源突波時，可外加 AC 電抗器。

### ■ 輸入側雜訊濾波器

- TDS-F8 搭配專用濾波器，方可符合 EN55011A 級規範
- 輸入側雜訊濾波器之選用，請參照本使用說明書附錄選用表

### ■ 變頻器

- 輸入側 R, S, (T) 無相序區分，可任意變換，且接地端子 請確實作好接地處理。

### ■ 輸出側雜訊濾波器

- 變頻器輸出側加裝專用雜訊濾波器時，可降低輻射干擾及感應雜訊。
- 請自行選購輸出側雜訊濾波器，或參照附錄之零相雜訊濾波器之使用說明

### ■ 三相感應馬達

- 若一台變頻器驅動多台馬達時，變頻器之額定電流必需大於馬達同時運轉時之總電流。
- 馬達與變頻器必需分別接地

### 3. 變頻器的操作說明

#### 3-1 操作器顯示部與 LED 指示燈

數位操作器有「DRIVE」及「PRGM」兩種操作模式，只有在變頻器停止時，才可以按 DSPL 鍵來切換 DRIVE 模式及 PRGM 模式。在 DRIVE 模式下，變頻器才可做運轉操作，只有在 PRGM 模式下，才可更改變頻器控制及系統參數內容。

TDS-F8 數位操作器有兩種：

1. 一體式數位操作器：位於變頻器中央位置，可分為按鍵區和顯示區兩部分。按鍵區：為使用者控制變頻器操作介面；顯示區：提供顯示運轉狀態與參數設定規劃模式；請參考下方圖 3-1
2. 外接式數位操作器(TMCA-V8 LED)：提供數位操作器外拉功能，其為另購配件。當使用外接式數位操作器時，變頻器操作控制權自動移轉至外接式數位操作器，而一體式數位操作器只能監視變頻器運轉狀態，無法設定參數及運轉操作。

LED 數位操作器之顯示及按鍵機能如下：

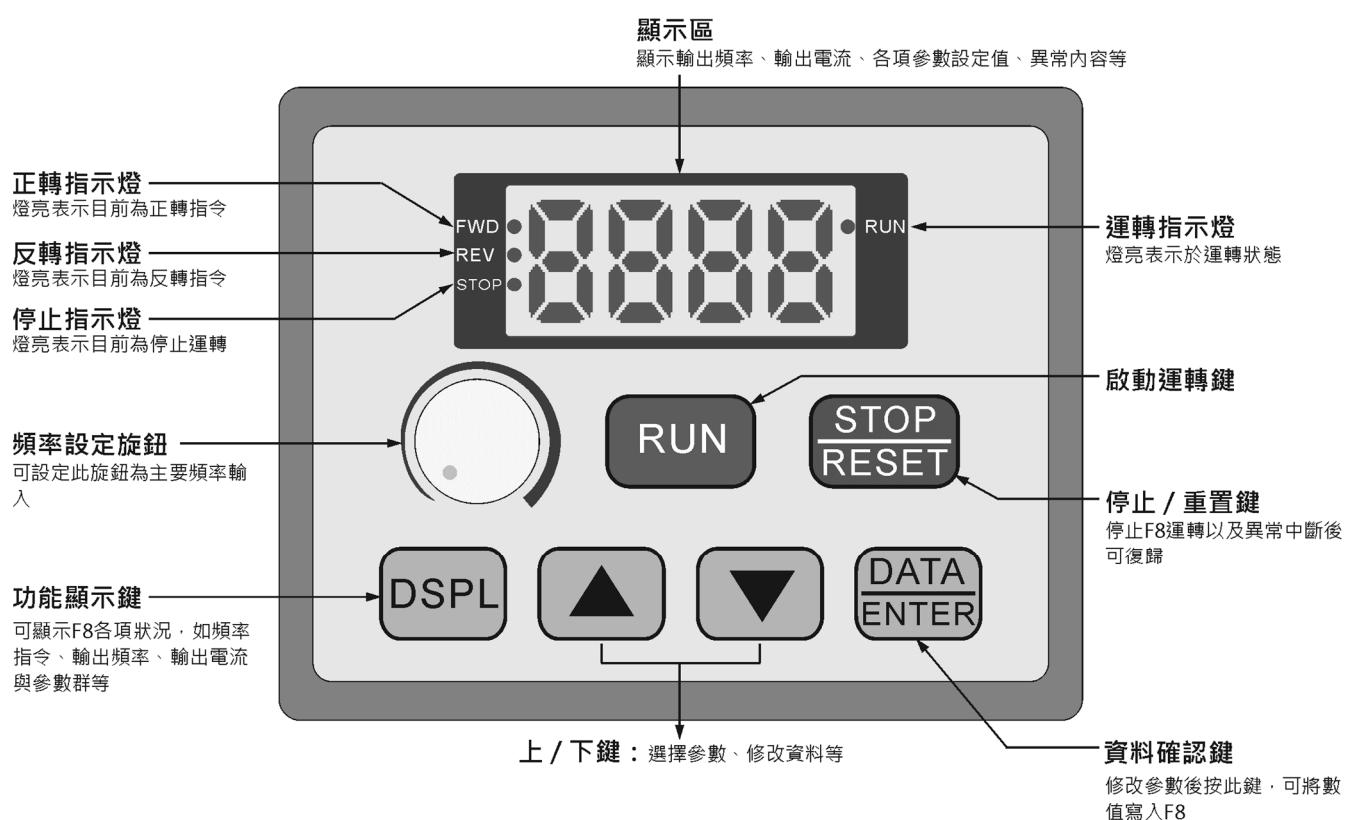
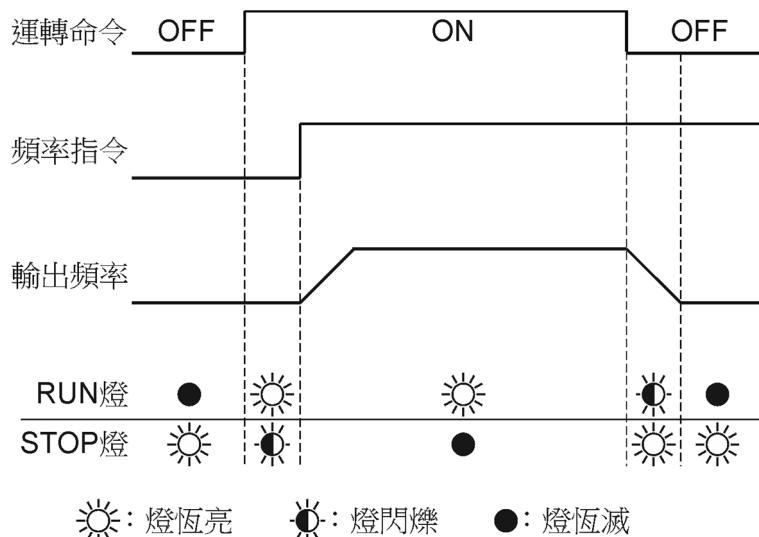


圖 3-1 一體式數位操作器

### 3-2 按鍵機能與顯示項目說明

操作鍵	文章中使用名稱	機能說明
	功能、顯示鍵	用於循環變換顯示變頻器各項狀態資訊，如頻率指令、輸出頻率、輸出電流及參數群。
	UP 鍵 (+鍵)	參數、數值設定變更時用。(遞增)
	DOWN 鍵 (-鍵)	參數、數值設定變更時用。(遞減)
	資料確認鍵 (編輯/輸入鍵)	選取參數群組或某一參數名稱(EDIT 機能)、參數設定值(EDIT 機能)及參數設定完成時(ENTER 機能)，按此鍵
	RUN 鍵 (運轉鍵)	以數位操作器運轉時，在驅動(DRIVE)模式下按此鍵，變頻器開始運轉，同時 RUN LED 燈亮*。
	STOP/ 故障 RESET 鍵	以數位操作器運轉時，在驅動(DRIVE)模式下按此鍵，變頻器停止，同時 STOP LED 燈亮。 以外部控制(參數 2-01 設定為 1 或 2)運轉時，可利用參數 2-04 設定此鍵有效或無效。 變頻器異常中斷時，按此鍵後可復歸

#### ■ RUN 及 STOP 指示燈



\* : RUN , STOP 燈對應於運轉情形可分「燈亮」、「閃爍」、「燈滅」三種

## ■ 顯示項目說明

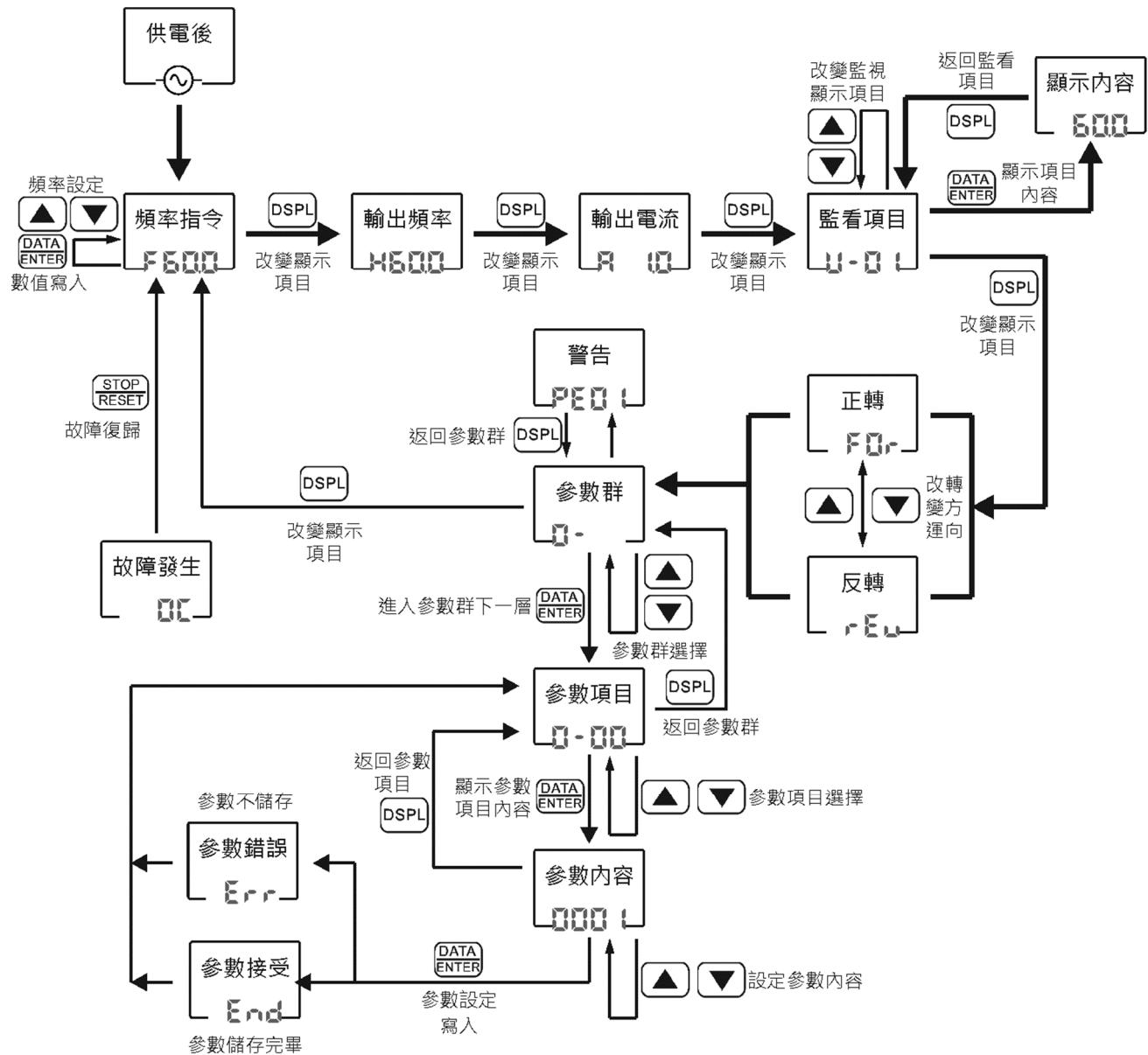
操作器顯示項目	機能說明
	顯示變頻器目前的設定頻率。
	顯示變頻器實際輸出到馬達的頻率。
	顯示變頻器輸出側 U、V 及 W 的輸出電流
	顯示監視項目。
	顯示正轉運行命令。
	顯示逆轉運行命令。
	顯示參數群名稱
	顯示參數群下各項參數項目。
	顯示參數項目之內容值。
	若由顯示區讀到 End 的訊息(如左圖所示)大約一秒鐘，表示資料已被接受並自動存入內部記憶體。
	若設定的資料不被接受或數值超出時即會顯示。

其餘警告及故障顯示項目，請參考第五章故障顯示及排除。

### 3-3 操作器操作、顯示模式說明

#### ■ 一體式操作器

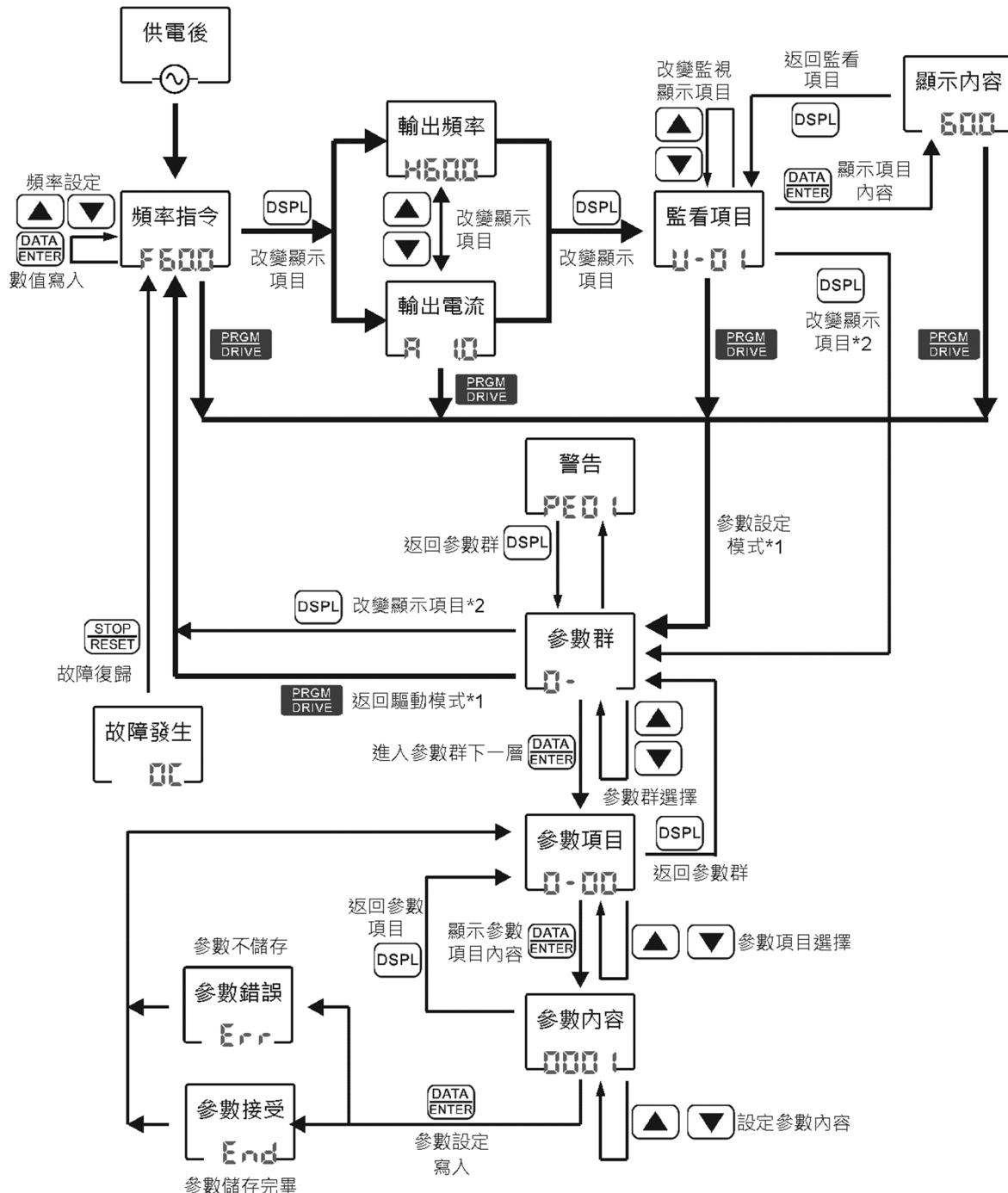
TDS-F8 變頻器內含一體式的數位操作器外，其操作方式分別說明如下：



(A) 一體式操作器操作顯示模式

## ■ 外接式數位操作器

TDS-F8 變頻器除了內含一體式數位操作器外，當使用者需延長外接式數位操作器時，可使用代號 TMCA-V8 LED 或 TMCA-V803 LED 數位操作器，以 V803 LED 為例，其操作方式分別說明如下：



#### (B) 外接式數位操作器顯示模式

\*1：電源投入後，即進入驅動(DRIVE)模式(操作器DRV燈亮)，在變頻器停止的狀態下按  
鍵，即進入參數編輯(PRGM)模式(操作器DRV燈熄滅)，才可設定參數；需再按  
鍵才能回復為(DRIVE)模式，變頻器方可執行運轉。

\*2：在 DRV 的模式下進入參數群時，只能監看、顯示參數，無法改變參數的設定值；此時如需設定參數則請先停止變頻器再按 **PRGM DRIVE** 鍵，即進入參數編輯 (PRGM) 模式。

## 4. 變頻器參數列表

TDS-F8依參數的屬性區分為11個參數群，使用者可根據參數群中相關的參數，完成運轉前的設定，11個參數群如下所示：

0 : 用戶參數	6 : 保護參數
1 : 基本參數	7 : 電機參數
2 : 操作方式參數	8 : 特殊參數
3 : 數位、類比輸出端子功能參數	9 : 通訊參數
4 : 數位、類比輸入端子功能參數	U : 監視參數(只可監看不可設定)
5 : 多段速以及自動程序運轉參數	

本說明書為簡易說明書，僅對參數做重點式的列表說明，如需更詳細的參數說明，請上東達官網 <https://www.tekdrive.com.tw/>，下載**TDS-F8使用說明書**，即有完整的參數說明與解釋

### 參數一覽表

表格內\*1 表示隨機種而定，\*2 表示440V級為220V級的2倍，\*3 為外接鍵盤，(☆)為運轉中可設定

#### 0- 用戶參數

參數代號	參數功能	設定範圍	出廠值	設定值
0-01	數位操作器顯示單位	0 ~ 1999	0	
0-02	電源投入後顯示內容： 0- 頻率指令                  2-輸出電流 1-輸出頻率	0 ~ 2	0 (☆)	

#### 1- 基本參數

參數代號	參數功能	設定範圍	出廠值	設定值
1-01	變頻器容量設定 (容量選擇對應：)	01~03, 21~22	*1	
1-02	出廠設定選擇 (操作狀態及初始化設定：00 ~ 14)： 00- 參數均可設定可監看 01- 限定某些特定參數可設定及監看，其餘參數只可監看不可設定。 02- 保留 03- 2 線式初始化 · 220/440V, 60Hz 電源 04- 3 線式初始化 · 220/440V, 60Hz 電源 05- 2 線式初始化 · 200/415V, 60Hz 電源 06- 3 線式初始化 · 200/415V, 60Hz 電源 07- 2 線式初始化 · 220/380V, 50Hz 電源 08- 3 線式初始化 · 220/380V, 50Hz 電源 09- 10- 保留                      12. 14- 保留 11- 異常履歷清除		0	

1-03	最大輸出頻率 (Hz)	50.0 ~ 400.0	60.0	
1-04	最大電壓 (V)	0.1 ~ 255.0	220.0(*2)	
1-05	最大電壓之頻率 (Hz)	0.1 ~ 400.0	60.0	
1-06	中間頻率 (Hz)	0.1 ~ 400.0	1.5	
1-07	中間頻率之電壓 (V)	0.1 ~ 255.0	7.9	
1-08	最低輸出頻率 (Hz)	0.1 ~ 400.0	1.5	
1-09	最低輸出頻率之電壓 (V)	0.1 ~ 255.0	7.9	
1-10	頻率指令上限	0 ~ 109%	100%	
1-11	頻率指令下限	0 ~ 109%	0%	
1-12	加速時間1	0.0 ~ 999.9s	10.0s(☆)	
1-13	減速時間1	0.0 ~ 999.9s	10.0s(☆)	
1-14	加速時間2	0.0 ~ 999.9s	10.0s(☆)	
1-15	減速時間2	0.0 ~ 999.9s	10.0s(☆)	
1-16	寸動頻率指令	0.0 ~ 400.0Hz	6.0Hz(☆)	
1-17	加速開始之 S 曲線時間	0.0 ~ 1.0s	0.0s	
1-18	加速結束之S曲線時間	0.0 ~ 1.0s	0.0s	
1-19	減速開始之S曲線時間	0.0 ~ 1.0s	0.0s	
1-20	減速結束之S曲線時間	0.0 ~ 1.0s	0.0s	

## 2- 操作方式參數 (運轉命令與頻率指令)

參數代號	參數功能	設定範圍	出廠值	設定值
2-01	運轉指令來源選擇： 0-數位操作器 1-控制回路端子	2- RS-485 通訊	0	
2-02	頻率指令來源選擇： 0-數位操作器 1-控制回路端子 AIN	2- RS-485 通訊 3-面板上 VR	0	
2-03	停止方法選擇： 0-減速停止 1-自由運轉停止	1-自由運轉停止	0	
2-04	操作器STOP鍵機能選擇： 0- STOP鍵有效 1- STOP 鍵無效	1- STOP 鍵無效	0	
2-05	禁止逆轉設定： 0-可逆轉 1-禁止逆轉(逆轉信號無效)	1-禁止逆轉(逆轉信號無效)	0	
2-06	載波頻率設定 (設定值 × 2.5k)	1 ~ 6	4	
2-07	外部UP/DOWN頻率指令於停止運轉後有無記憶功能： 0-無 1-有		1	

2-08	操作器輸出頻率 UP/DOWN 功能： 0- UP/DOWN 改變頻率後，必須按  鍵 1- UP/DOWN直接改變頻率，不須按  鍵	0	
------	---	---	--

### 3- 數位、類比輸出端子功能參數

參數代號	參數功能	設定範圍	出廠值	設定值
3-01	多機能類比輸出 FM 機能選擇  00-頻率指令 01-輸出頻率 02-輸出電流 03-輸出電壓 04-直流電壓. 05-輸出功率	06-類比指令 AIN 08-操作器旋鈕 09-PID 輸入 10-PID 輸出 1 11-PID 輸出 2 07 / 12-保留	0	
3-02	多機能類比輸出增益	1 ~ 255%	100%( $\star$ )	
3-03	加速時，任意頻率檢出準位	0.0 ~ 400.0Hz	0.0Hz	
3-04	減速時，任意頻率檢出準位	0.0 ~ 400.0Hz	0.0Hz	
3-05	頻率一致時的檢出幅度	0.1 ~ 25.5Hz	2.0Hz	
3-06	多機能端子 (RA-RB-RC) 機能選擇  00-運轉中 01-零速 02-頻率一致 03-任意頻率一致 04-輸出頻率檢出 1 05-輸出頻率檢出 2 06-變頻器運轉準備完成 07-Uv1 08-B.B. 遮斷中 A 接點	20-異常再起動中 21-OL1 22-OH 23-OL2 24-RS-485 通訊異常 25-RS-485 擴充輸出接點 26-於程序運轉第 1 段 27-於程序運轉第 2 段 28-於程序運轉第 3 段	10	
3-07	多機能端子 MO 機能選擇  09-B.B. 遮斷中 B 接點 10-異常 11-過轉矩檢出 A 接點 12-運轉命令由鍵盤控制 13-頻率指令由鍵盤控制 14-逆轉檢出 15-頻率指令喪失中 16-過轉矩檢出 B 接點 17-脈波信號輸出 (僅 MO) 18-計時輸出機能 19-Uv 預警 (DC Bus<230V) 37 ~ 38 保留	29-於程序運轉第 4 段 30-於程序運轉第 5 段 31-於程序運轉第 6 段 32-於程序運轉第 7 段 33-於程序運轉第 8 段 34-計數器超過設定值 A 接點 35-計數器超過設定值 B 接點 36-PID 異常	0	
3-08	脈波輸出倍數選擇	01 ~ 16	1	

#### 4- 數位、類比輸入端子功能參數

參數代號	參數功能	設定範圍	出廠值	設定值
4-01	類比頻率指令AIN增益 (%)	0.0 ~ 1000 (1000.0 <sup>*3</sup> )	100.0(☆)	
4-02	類比頻率指令AIN偏壓 (%)	-99.9 ~ 100.0	0.0(☆)	
4-03	類比輸入頻率指令來源選擇： 0-電壓訊號 0 ~ 10V      1-電流訊號 4 ~ 20mA		0	
4-04	類比主速頻率指令輸入特性選擇： 0-0 ~ 100%(正特性)      2- -100% ~ +100%(正逆特性) 1-100 ~ 0%(逆特性)		0	
4-05	端子 MI2 機能選擇	端子 MI2/ MI3/ MI4/ MI5 機能選擇 設定值需符合 MI2 < MI3 < MI4 < MI5 規則	3	
4-06	端子 MI3 機能選擇	00-3 線式控制的正逆轉      14-PID 控制無效 01-由鍵盤控制      15-PID 積分值復歸	4	
4-07	端子 MI4 機能選擇	02-由外部端子控制      16-變頻器過熱預告輸入 03-異常復歸      17-外部異常 A 接點輸入	5	
4-08	端子 MI5 機能選擇	04 多段速指令 1      18-外部異常 B 接點輸入 05 多段速指令 2      19/ 20 保留 06 多段速指令 3      21-由最高頻率速度尋找 07-寸動頻率指令      22-由設定頻率速度尋找 08-加減速時間 1/2 切換      23-TIMER 機能輸入 09-禁止加減速      24-頻率 UP/ DN 機能(僅 4- 10-B.B.遮斷 A 接點輸入      08 · MI4-UP/ MI5-DN) 11-B.B.遮斷 B 接點輸入      25-計數器清除 12-寸動正轉運轉 FJOG      26-計數器輸入 13-寸動逆轉運轉 RJOG      27 ~ 31 保留	6	
4-09	控制回路端子掃描次數： 0- 掃描1次(5ms) 1- 掃描2次(10ms)		1	
4-10	類比輸入濾波量	1 ~ 80	10	
4-11	計數器設定值	0 ~ 9999	0	

#### 5- 多段速以及自動程序運轉參數

參數代號	參數功能	設定範圍	出廠值	設定值
5-01	頻率指令 1	0.0 ~ 400.0Hz	0.0Hz(☆)	
5-02	頻率指令 2	0.0 ~ 400.0Hz	0.0Hz(☆)	
5-03	頻率指令 3	0.0 ~ 400.0Hz	0.0Hz(☆)	

5-04	頻率指令 4	0.0 ~ 400.0Hz	0.0Hz(☆)	
5-05	頻率指令 5	0.0 ~ 400.0Hz	0.0Hz(☆)	
5-06	頻率指令 6	0.0 ~ 400.0Hz	0.0Hz(☆)	
5-07	頻率指令 7	0.0 ~ 400.0Hz	0.0Hz(☆)	
5-08	頻率指令 8	0.0 ~ 400.0Hz	0.0Hz(☆)	
5-09	自動程序運轉模式選擇： 0-自動程序運轉模式機能無效 1-執行單一週期之自動程序運轉模式，停止後會由停止前的速度起，繼續運轉 2-連續循環週期之自動程序運轉模式，停止後會由停止前的速度起，繼續運轉 3-單一週期結束後，以最後運轉速度運轉，停止後會由停止前的速度開始運轉 4-執行單一週期之自動程序運轉模式，停止後會由第一段速度起，繼續運轉 5-連續循環週期之自動程序運轉模式，停止後會由第一段速度起，繼續運轉 6-單一週期結束後，以最後運轉速度運轉，停止後會由第一段速度開始運轉	0		
5-10	運轉模式選擇 1	0- 停止 1- 正轉 2- 反轉	0	
5-11	運轉模式選擇 2		0	
5-12	運轉模式選擇 3		0	
5-13	運轉模式選擇 4		0	
5-14	運轉模式選擇 5		0	
5-15	運轉模式選擇 6		0	
5-16	運轉模式選擇 7		0	
5-17	運轉模式選擇 8		0	
5-18	運轉模式時間 1	0.0 ~ 6000 (6000.0 <sup>*3</sup> ) (Sec.)	0.0(☆)	
5-19	運轉模式時間 2		0.0(☆)	
5-20	運轉模式時間 3		0.0(☆)	
5-21	運轉模式時間 4		0.0(☆)	
5-22	運轉模式時間 5		0.0(☆)	
5-23	運轉模式時間 6		0.0(☆)	
5-24	運轉模式時間 7		0.0(☆)	
5-25	運轉模式時間 8		0.0(☆)	

## 6- 保護參數

參數代號	參數功能	設定範圍	出廠值	設定值
6-01	加速中失速防止機能選擇	0- 無效 1- 有效	1	
6-02	減速中失速防止機能選擇		1	
6-03	運轉中失速防止機能選擇		1	
6-04	加速中，失速防止動作準位	30 ~ 150%	140	
6-05	運轉中，失速防止動作準位		130	
6-06	過轉矩檢出準位 (%)	30 ~ 150	130	
6-07	過轉矩檢出時間 (Sec.)	0.0 ~ 25.5	0.1	
6-08	過轉矩檢出選擇： 0- 過轉矩檢出無效 1- 頻率一致時方檢出，然後繼續運轉 2- 頻率一致時方檢出，然後停止 3- 運轉中檢出，然後繼續運轉 4- 運轉中檢出，然後停止運轉		0	
6-09	馬達過載保護選擇： 0- 電子式馬達過載保護無效 1- 標準馬達冷機起動過載保護 2- 標準馬達熱機起動過載保護 3- 專用馬達冷機起動過載保護 4- 專用馬達熱機起動過載保護		1	
6-10	低電壓檢出準位 (Vdc)	150 ~ 210	190	

## 7- 電機參數

參數代號	參數功能	設定範圍	出廠值	設定值
7-01	馬達額定電流 (*. *A)	*.*A	*1	
7-02	馬達無載電流 (%)	0 ~ 99	30	
7-03	馬達額定滑差 (%)	0 ~ 9.9	0.0	
7-04	自動轉矩補償增益	0.0 ~ 2.0	0.0	

## 8- 特殊參數

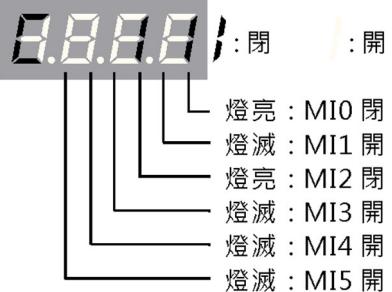
參數代號	參數功能	設定範圍	出廠值	設定值
8-01	直流煞車開始頻率 (Hz)	0.1 ~ 10.0Hz	1.5Hz	
8-02	直流煞車電流準位 (%)	0 ~ 80	40	
8-03	停止時直流煞車時間 (Sec.)	0.0 ~ 25.5	0.5	
8-04	起動時直流煞車時間 (Sec.)	0.0 ~ 25.5	0.0	

8-05	瞬停再起動運轉選擇： 0-無效 1-有效	0	
8-06	速度尋找電流準位 (%)	0 ~ 150	100
8-07	速度尋找減速時間 (Sec.)	0.1 ~ 25.5	5.0
8-08	最小遮斷時間 (Sec.)	0.5 ~ 5.0	0.5
8-09	頻率跳躍1 (Hz)	0.0 ~ 400.0	0.0
8-10	頻率跳躍2 (Hz)	0.0 ~ 400.0	0.0
8-11	頻率跳躍3 (Hz)	0.0 ~ 400.0	0.0
8-12	頻率跳躍範圍 (Hz)	0.0 ~ 25.5	1.0
8-13	異常再起動次數	0 ~ 10	0
8-14	計時機能ON延遲時間 (Sec.)	0.0 ~ 999.9	0.0(☆)
8-15	計時機能OFF延遲時間 (Sec.)	0.0 ~ 999.9	0.0(☆)
8-16	PID機能選擇： 0-無效 1-有效	0	
8-17	PID檢出值增益	1 ~ 1000	100(☆)
8-18	PID比例增益(P)	1 ~ 1000	100(☆)
8-19	PID積分時間(I) (Sec.)	0.0 ~ 100.0	1.0(☆)
8-20	PID微分時間(D) (ms)	0 ~ 1000	0(☆)
8-21	PID輸出偏差量 (%)	0 ~ 109	0(☆)
8-22	PID積分上限值 (%)	0 ~ 109	100
8-23	PID一次延遲時間 (Sec.)	0.0 ~ 2.5	0.0
8-24	PID異常準位 (%)	0 ~ 100	100%

## 9- 通訊參數

參數代號	參數功能	設定範圍	出廠值	設定值
9-01	RS-485通訊位址	01 ~ 255	1	
9-02	RS-485 傳輸速率設定 bps (位元/秒)： 0-1200            2-4800            4-19200 1-2400            3-9600            5-38400		3	
9-03	RS-485 傳輸同位元設定： (當 9-03 為 0，停止位元需=2) 0-無同位元      1-偶同位元      2-奇同位元		0	
9-04	RS-485 傳輸異常停止方式： 0-減速停止 (1-13)      2-減速停止 (1-15) 1-自由運轉停止          3-繼續運轉		0	
9-05	通訊異常檢出時間 (Sec.)	0.0 ~ 25.5	1.0	

## U- 監視參數

參數代號	參數功能名稱	單位	
U-01	頻率指令	0.1Hz	顯示頻率指令，顯示單位可由0-01設定
U-02	輸出頻率	0.1Hz	顯示輸出頻率，顯示單位由0-01設定
U-03	輸出電流	0.1A	顯示變頻器輸出電流
U-04	輸出電壓	1V	顯示變頻器輸出電壓
U-05	主回路直流電壓	1V	顯示變頻器內部的主回路直流電壓
U-06	輸出功率	1W	顯示變頻器輸出功率
U-07	輸入端子狀態		
U-08	輸出端子狀態		
U-09	運轉累積時間	1Hr	變頻器有電壓輸出之時間累積。累積時間範圍0~65535 Hr (小時)。超過65535 Hr後，重新由0開始累積。
U-10	送電累積時間	1Hr	變頻器輸入側電源投入到電源OFF的時間累積。累積時間範圍0~65535 Hr。超過65535 Hr後，重新由0開始累積。
U-11	外部類比指令AIN	0.1%	用以監看外部類比指令AIN端子之類比指令電壓。
U-12	面板上VR	0.1%	用以監看外部類比指令AIN端子之類比指令電壓。
U-13	FM 類比輸出	0.1%	用以監看類比輸出端子FM之電壓(0 ~ 10V) · 10V/100%
U-14	計數器累進值	-	用以監看計數器累進值
U-15	自動程序運轉段速數		自動程序運轉模式時，用以監看現在運轉段速數
U-16	PID控制輸入量	0.1%	參照 F8 使用說明書的「PID 控制架構圖」，可利用 U-16, 17, 18 來監看。100% = 最高輸出頻率
U-17	PID控制輸出量	0.1%	
U-18	PID控制輸出量	0.1%	

U-19	異常發生時的頻率指令	0.1Hz	顯示的內容，用以記錄最近一次異常發生時之變頻器運轉狀況，表示狀態同上。
U-20	異常發生時的輸出頻率	0.1Hz	
U-21	異常發生時的輸出電流	0.1A	
U-22	異常發生時的輸出電壓	1V	
U-23	異常發生時的直流電壓	1V	
U-24	異常發生時的運轉累積時間	1Hr	
U-25	異常發生時的輸入端子狀態	-	
U-26	異常發生時的輸出端子狀態	-	
U-27	異常履歷 1	-	最近一次發生的異常內容
U-28	異常履歷 2	-	前一次發生的異常內容
U-29	異常履歷 3	-	前二次發生的異常內容
U-30	異常履歷 4	-	前三次發生的異常內容
U-31	EPROM軟體編號	-	出廠軟體編號，廠商用以追查軟體版本。
U-32	廠商變頻器型號	-	顯示Ed5F為東達科技用以標示變頻器之型號。
U-33			保留

## 5. 故障顯示及排除

變頻器具有警告及保護功能。一旦警告機能動作時，數位操作器上會顯示警告內容，此時異常接點輸出端子並不動作。當異常故障發生時，保護功能動作，變頻器停止輸出，馬達自由運轉停止，數位操作器會顯示異常原因，同時異常接點輸出端子動作。

### 5-1 異常故障發生原因及排除方法

異常故障顯示內容	故障現象說明	異常發生原因	排除方法
<b>Uu1</b> 直流電壓過低	運轉中，主回路直流電壓太低	1. 電源系統容量不足，電壓壓降太大 2. 電源側電磁接觸器不良	1. 檢查輸入電源電壓是否正常 2. 檢查電源容量是否太小
<b>oL</b> 過電流	變頻器輸出電流大於變頻器額定電流2倍	1. 變頻器輸出端短路或接地 2. 馬達容量遠大於變頻器容量 3. 變頻器與馬達間接線鬆動 4. 加速時間太短	1. 檢查輸出端配線是否正確 2. 檢查馬達與變頻器容量是否匹配 3. 加長加速時間
<b>oU</b> 過電壓	主回路直流電壓太高	1. 減速時間太短 2. 電源輸入電壓太高或有突波	1. 確認輸入電源電壓是否正常 2. 延長減速時間 3. 加裝剎車電阻器
<b>oH</b> 過熱	變頻器內部過熱	1. 周圍環境通風不良，溫度過高 2. 冷卻風扇故障，過濾網堵塞 3. 散熱片損壞，風導有異物堵塞	檢查周圍溫度，風扇，濾網，散熱片及風導是否正常
<b>oL1</b> 馬達過負載	內部電子式熱動電驛檢出馬達過負載。	1. 馬達額定電流(7-01)設定不良 2. 馬達長時間過負載運轉 3. V/F曲線選擇不當，馬達過激磁或欠激磁	1. 正確設定馬達額定電流(7-01) 2. 減輕馬達負載或增大馬達容量 3. 依馬達銘板與負載，設定適當的V/F曲線
<b>oL2</b> 變頻器過負載	變頻器過負載檢出(變頻器額定電流150%1分鐘)。	1. 變頻器長時間過負載運轉 2. V/F曲線選擇不當，馬達過激磁或欠激磁	1. 增大變頻器容量 2. 減輕馬達負載 3. 依馬達銘板與負載，設定適當的V/F曲線
<b>oL3</b> 過轉矩	機械負載過轉矩檢出(輸出電流 $\geq 6-06$ )，且變頻器停止運轉	機械負載異常	1. 檢查負載機械動作是否正常 2. 設定適當的過負載檢出準位(6-06)
<b>EF2</b> 外部異常 2	外部異常信號由端子 MI2 輸入	外部異常信號輸入	排除由外部端子輸入的異常信號源
<b>EF3</b> 外部異常 3	外部異常信號由端子 MI3 輸入		
<b>EF4</b> 外部異常 4	外部異常信號由端子 MI4 輸入		
<b>EF5</b> 外部異常 5	外部異常信號由端子 MI5 輸入		
<b>PFO3</b> EEPROM 故障	EEPROM 故障	控制基板之 EEPROM 故障	執行 EEPROM 復歸(1-02)，若故障無法排除時，更換控制基板

異常故障顯示內容	故障現象說明	異常發生原因	排除方法
<b>EF</b> 地短路	變頻器輸出端接地且接地電流高於變頻器額定電流的50%以上	1. 馬達絕緣不良 2. 輸出端接線不良	1. 檢查馬達繞線阻抗是否匹配，是否漏電 2. 檢查輸出端配線
<b>Err</b> RS-485 通訊故障	RS-485 通訊異常檢出，且設定為停止運轉方式	1. RS-485 通訊參數設定不當 2. RS-485 接線不當 3. RS-485 傳輸格式錯誤 4. 雜訊干擾	1. 檢查 RS-485 通訊參數設定 2. 檢查 RS-485 接線 3. 參考 RS-485 通訊格式 4. 加強雜訊干擾防治
<b>P IDE</b> PID 故障	PID 回授異常檢出	PID 指令或回授量異常，符合下方公式，且時間超過 60 秒 回授值 < 目標值 * (1-(08-24))	1. 檢查 PID 指令或回授量是否正常 2. 調整檢出準位 08-24

## 5-2 警告顯示及排除方法

警告顯示	警告現象說明	發生原因	排除方法
<b>U</b> (閃爍) 直流電壓過低	變頻器停止中，主回路直流電壓太低	1. 輸入電源電壓太低 2. 輸入電源接線不良 3. 電源接觸器不良	1. 檢查主回路直流電壓是否太低或是有突波 2. 輸入電源接線是否正確
<b>Q</b> (閃爍) 過電壓	變頻器停止中，主回路直流電壓太高	1. 輸入電源電壓太高 2. 輸入電源接線不良	1. 檢查主回路直流電壓是否太高 2. 輸入電源接線是否正確
<b>OH</b> (閃爍) 過熱預警	外部端子的過熱預警信號輸入	多機能外部輸入端子設過熱預警機能且過熱預警信號輸入	檢查過熱預告輸入信號
<b>OL</b> (閃爍) 過轉矩	機械負載過轉矩檢出 (輸出電流 $\geq 6-06$ )，且設定為過轉矩檢出後繼續運轉時	1. 機械動作異常 2. 過負載檢出準位(6-06)設定不良	1. 檢查負載機械動作是否正 2. 設定適當的過負載檢出準位(6-06)
<b>Err</b> (閃爍) RS-485 通訊警告	RS-485 通訊異常檢出，且設定為繼續運轉方式	1. RS-485 通訊參數設定不當 2. RS-485 接線不當 3. RS-485 傳輸格式錯誤 4. 雜訊干擾	1. 檢查 RS-485 通訊參數設定 2. 檢查 RS-485 接線 3. 參考 RS-485 通訊格式 4. 加強雜訊干擾防治
<b>OPFD</b> 操作器 通訊故障	外接數位操作器資料傳送錯誤	1. 電源投入 5 秒後外接數位操作器與變頻器主機無法傳送資料 2. 電源投入後，外接數位操作器與變頻器主機可傳送資料，但發生 2 秒以上的傳送異常	1. 外接數位操作器之連接器再插入 2. 更換控制基板
<b>bb</b> (閃爍) 遮斷中	外部遮斷輸入信號作動，變頻器中斷輸出，馬達自由運轉停止，解除遮斷信號後，變頻器執行速度尋找功能	輸入端子接收到外部的遮斷信號，變頻器中斷輸出中	清除遮斷信號後， <b>bb</b> 立即消失

警告顯示	警告現象說明	發生原因	排除方法
<b>EF1</b> (閃爍) 指令輸入 不正確	正/反轉指令同時投 入時間超過 500ms。 (變頻器依 2-03 所設 定的方式停止)	運轉程序設計不當	1. 檢查系統回路配線 2. 檢查運轉程序設計
<b>PE01</b> 參數輸入 不正確	參數設定範圍不良	1. 變頻器容量設定(1-01)不當 2. 參數設定超過設定範圍	1. 注意 220V/440V 級的不同，設 定適合的 KVA 數 2. 重新執行參數復歸( 1-02 )
<b>PE02</b> 參數輸入 不正確	多機能輸入端子設 定不良 (4-05~4-08)	1. 4-05~4-08 的設定值，不滿足 4- 05<4-06<4-07<4-08 條件 2. 同時有兩個多機能輸入端子設 定為兩個速度尋找指令	1. 調整參數 4-05~4-08 的設定值， 依 4-05 < 4-06 < 4-07 < 4-08 順序 設定 2. 只設定 1 個速度尋找指令輸入端 子
<b>PE03</b> 參數輸入 不正確	自動程序運轉設定 不正確	5-09 設定自動程序運轉有效(> 0)，但 5-10~5-17 均設為停止(= 0)	調整參數 5-09 或 5-10~5-17 之設 定值
<b>PE04</b> 參數輸入 不正確	V/F 曲線參數設 定不良(1-03~1-09)	1-03~1-09 設定值，不滿足 $1-03 \geq 1-05 > 1-06 \geq 1-08$ 及 $1-04 \geq 1-07 > 1-09$ 條件	調整參數 1-03~1-09 之設定值
<b>PE05</b> 參數輸入 不正確	頻率指令上、下限 值設定不正確	頻率指令上、下限值設定值，不 滿足 $1-11 < 1-10$ 條件	調整參數 1-10 & 1-11 設定值
<b>PE06</b> 參數輸入 不正確	跳躍頻率設定不良	8-09~8-11 跳躍頻率設定值，不滿 足 $8-09 \geq 8-10 \geq 8-11$ 條件	調整參數 8-09~8-11 設定值

## 6.附錄

### 6-1 外加剎車電阻選用表

輸入電壓 等級	最大適用馬達		外加剎車電阻等效規格		概略剎車轉矩 ( 10% ED)
	KW	HP	W	Ω	
220	0.4	1/2	70	200	160% ↑
	0.75	1	260	100	160% ↑
	1.5	2	260	70	162%
440	0.75	1	70	750	126%
	1.5	2	260	400	119%

### 6-2 交流輸入電抗器選用表

輸入電壓		最大適用馬達		額定電流值 A	電感值 mH
等級	相數	KW	HP		
220	3Ø	0.4	1/2	2.5	4.2
	3Ø	0.75	1	5	2.1
	3Ø	1.5	2	10	1.1
440	3Ø	0.75	1	2.5	8.4
	3Ø	1.5	2	5	4.2

### 6-3 輸入雜訊濾波器選用表

輸入電壓		最大適用馬達		標準型濾波器		
等級	相數	KW	HP	編號	使用個數	額定電流值 A
220	3Ø	0.4	1/2	TDSNF 32006	1	6
	3Ø	0.75	1	TDSNF 32006	1	6
	3Ø	1.5	2	TDSNF 32012	1	12
440	3Ø	0.75	1	TDSNF 34006	1	6
	3Ø	1.5	2	TDSNF 34006	1	6

## 6-4 RFI 零相濾波器

請參考下表，東達科技提供三種不同的 RFI 零相濾波器，請自行根據應用的差異來選擇適合的濾波器。

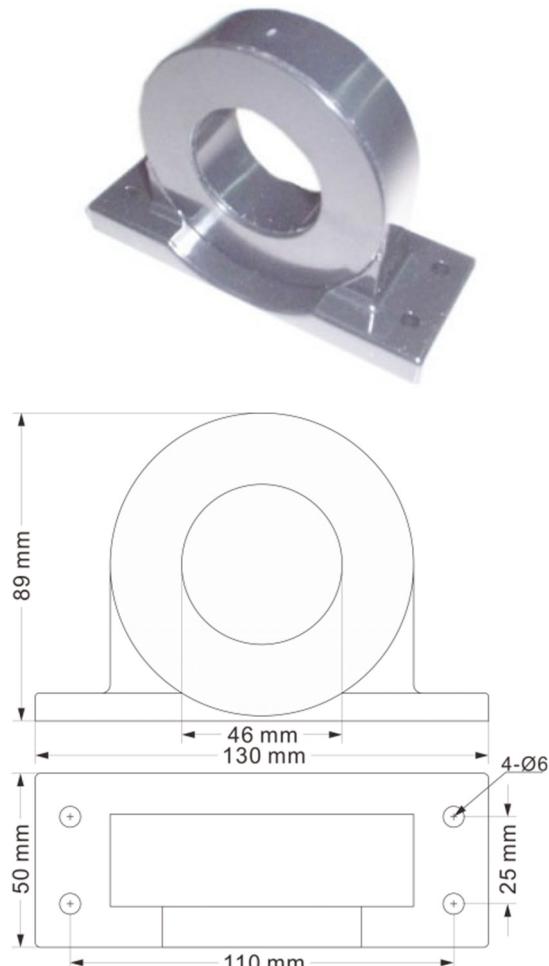


圖 6-1 FC-ZF-46 (含固定座)



型號	外型尺寸 (mm)		
	D	d	H
FC-80D*50d*20H	80	50	20
FC-63D*38d*12H	63	38	12

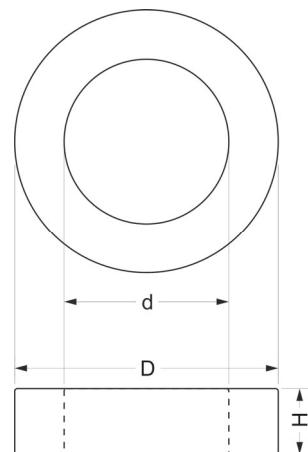
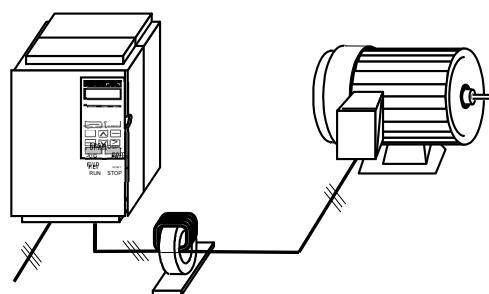
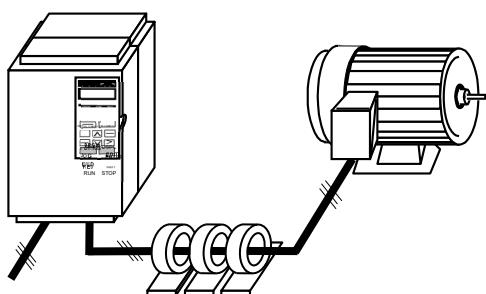


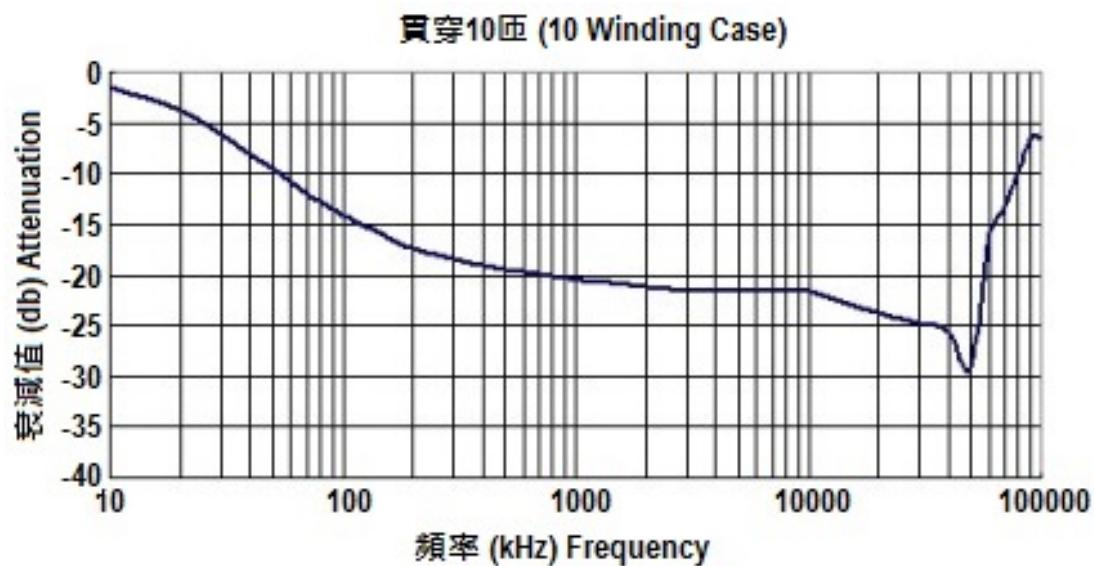
圖 6-2 零相濾波器環

### ❖ 安裝例



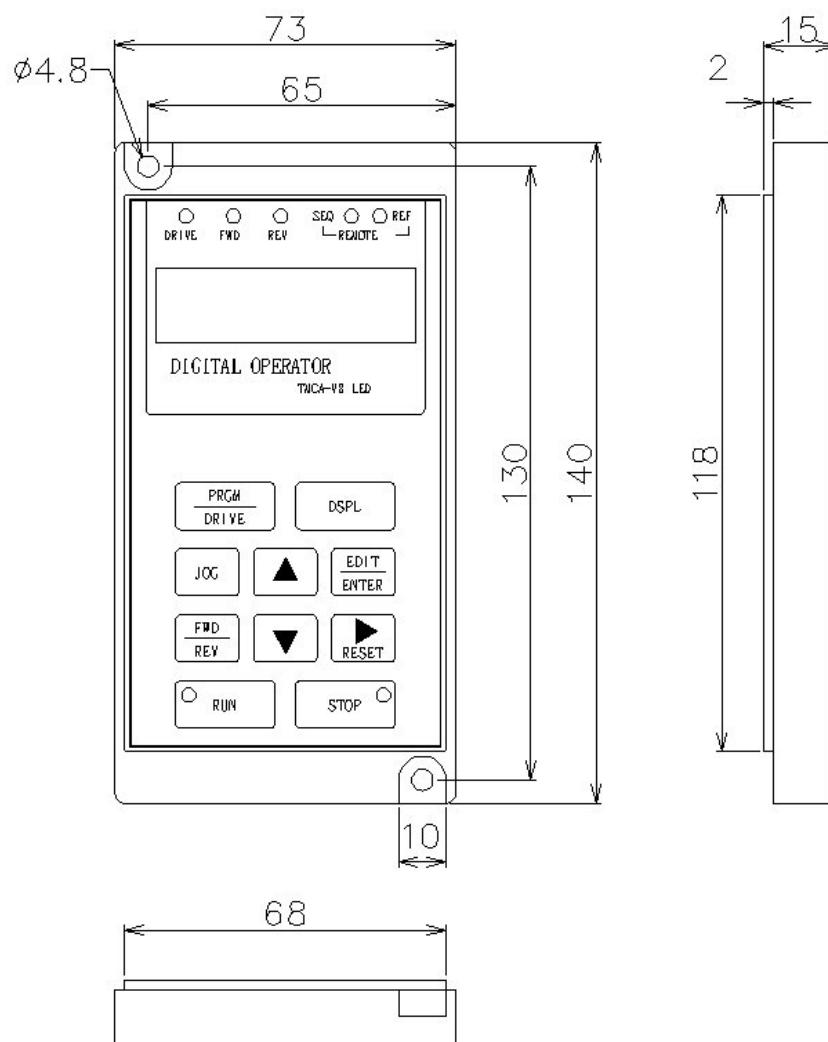
安裝零相濾波器時，不管是安裝在變頻器的輸入側或輸出側，三條線 (R,S,T 或 U,V,W) 均需貫穿同一個零相濾波器，依同方向捲繞才有效果，而安裝位置要儘量靠近變頻器一側。

❖ 衰減特性



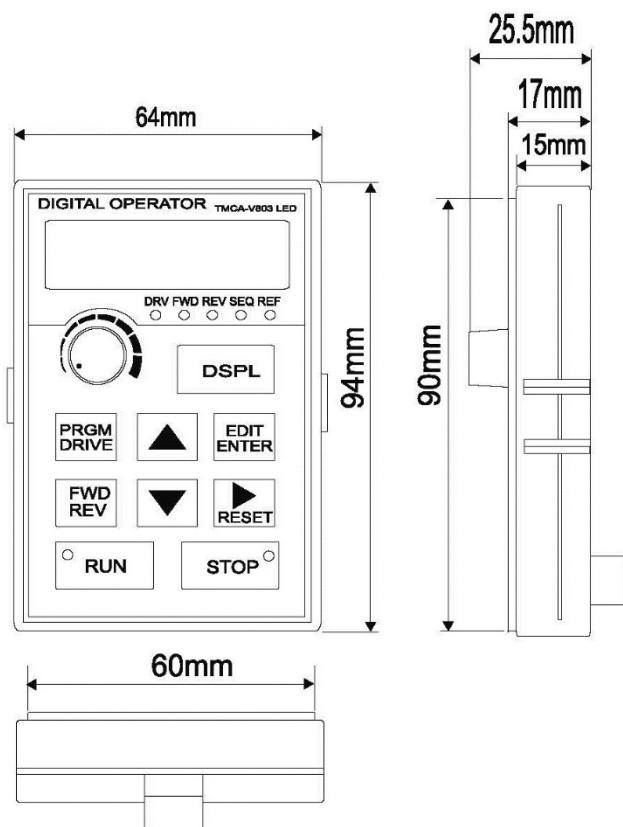
## 6-5 數位操作器安裝尺寸

### ■ TMCA-V8 LED

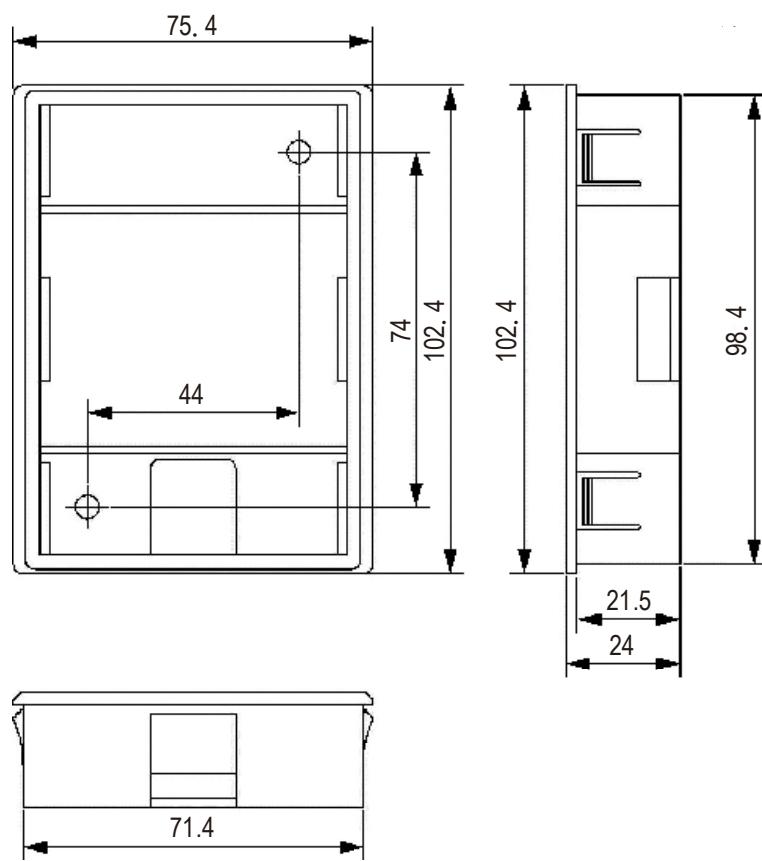


## ■ TMCA-V803 LED 操作器與外拉固定框尺寸

### ❖ TMCA-V803 LED



### ❖ 外拉固定框



# 1. TDS-F8 Introduction

## 1-1 Preliminary Inspection

### ■ Receiving

After unpacking the TDS-F8:

- Verify that the part/ type code numbers on the drive nameplate match the numbers on your purchase order or packing slip.
- Check the unit for physical damage which may have occurred during shipping. If any part of the drive is missing or damaged, notify the carrier and your **TEK-DRIVE** Representative immediately.
- Verify that the instruction manual is included.

### ■ Nameplate Information:

Model & Type Code	→	MODEL	<b>TDS-F8-L0P4E3</b>	
Input Specification	→	INPUT	AC 3PH 200~230V 50/60 Hz	
Output Specification	→	OUTPUT	AC 3PH 0~230V 0~400 Hz 1.4 kVA, 3.2A	
Net Weight	→	MASS	1.2Kg	
Series Number	→	SER. NO.	F8xxxxxxxx	
<b>TEK-DRIVE CO., LTD.</b>			MADE IN TAIWAN	

### ■ Type Code Number

<b>TDS - F8 - L 0P4 E 3</b>					
Position Number :		1	2	3	4 5 6

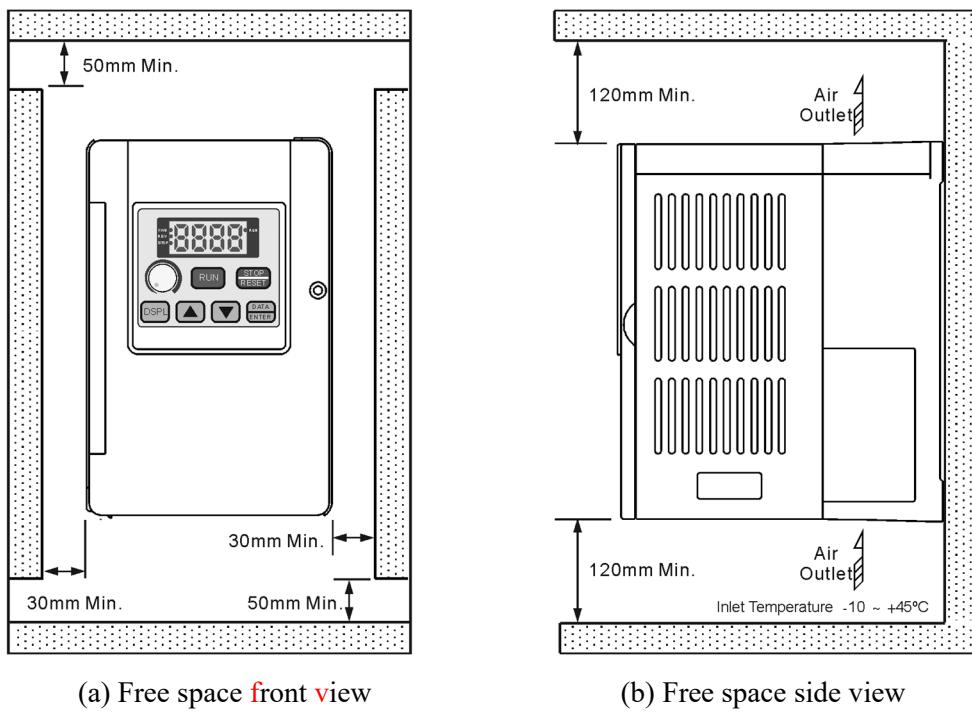
Position No.	Configuration	Description
1	Brand Name	TDS: TEK-DRIVE
2	Model	F8 Series
3	Input Voltage Class	N: 110V L: 220V H: 440V
4	Power Rating (KW)	0P4: 0.4KW 0P7: 0.75KW 1P5: 1.5KW

Position No.	Configuration	Description
5	Type	E: Standard S: Customized CPS type
6	Input Power System	Blank: 1Ø power input 3: 3Ø power input

## 1-2 Mounting & Installation

To enhance the operation reliability and life time of F8, the F8 should be installed in an environment for temperature increase free, such as in an enclosure or box.

**Fig. 1.1** shows the minimum free space required around the F8 to guarantee adequate cooling.



**Fig. 1.1 Free space for installation**

## 1-3 Installing Location Condition Free

The F8 must be installed in a location free for:

- Floating dust/ cotton dust/ metal power or any material into the F8.
- Rain/ moisture or wet environment, direct sunlight (not for use outdoor).
- Corrosive, combustible gases or liquid. oil spray, splashes or salty spray.
- Physical shock or vibration, magnetic noise or radioactive substances.

F8 drive is suitable for operation in temperature range as  $-10^{\circ}\text{C} \sim +45^{\circ}\text{C}$ , if F8s installed in an enclosure, be sure the installation location for cooling effect, and use an external cooling fan or air condition in a suitable location to maintain the internal temperature of enclosure as  $45^{\circ}\text{C}$  maximum.

## 1-4 Storage Condition

If the drive will be stored after receiving, place it in its original packaging and store according to following table.

Nominal Ambient Temperature	$-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$
Relative Humidity	0 to 90% RH, Non-Condensing
Atmospheric Pressure	86 ~ 106kPa
Storage Site	Indoor, Location Free as Installing, store on a Shelf or Countertop

## 1-5 TDS-F8 General Specification

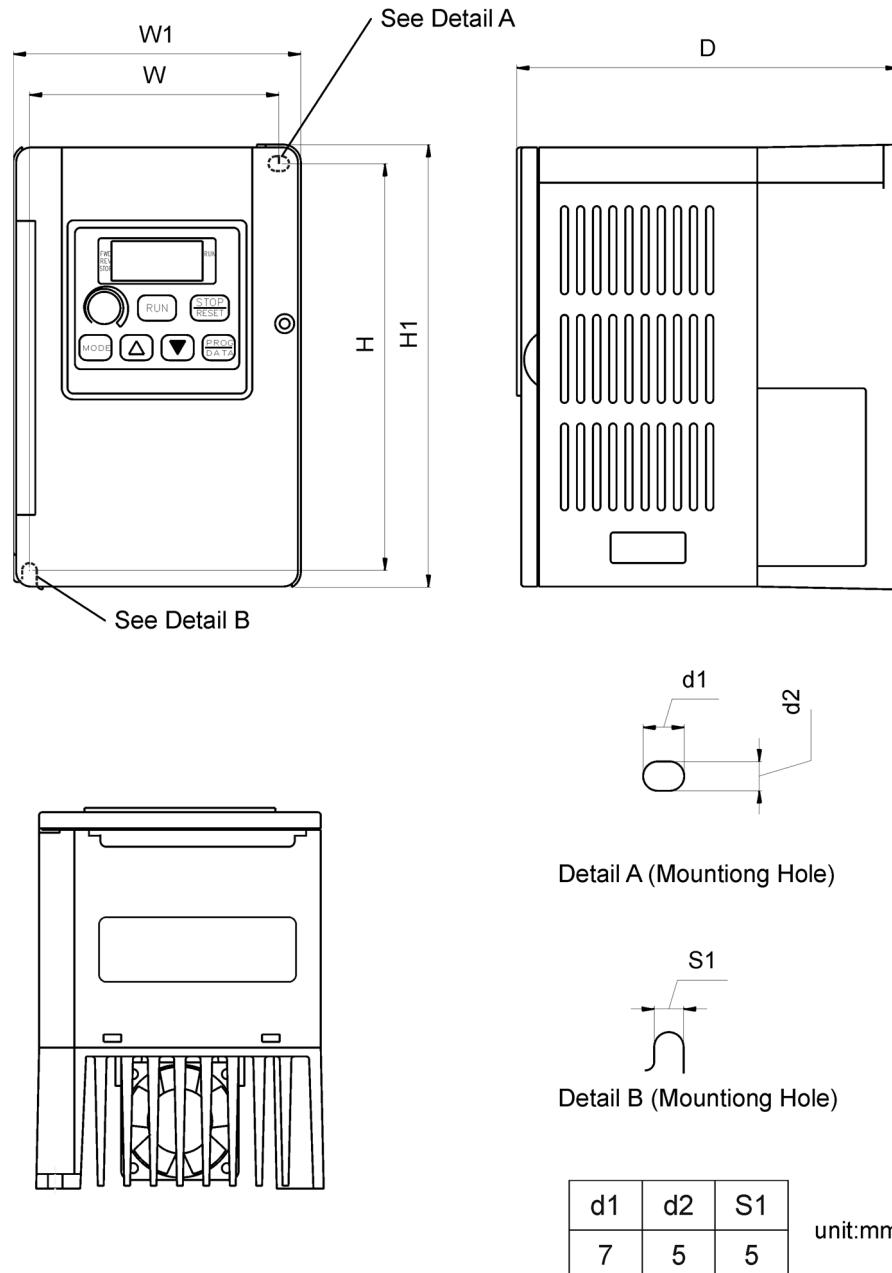
### ■ F8 Specification

Voltage in Class		1Ø 110V		1 / 3Ø 220V			3Ø 440V						
Type F8-****E(3)		N0P4	N0P7	L0P4	L0P7	L1P5	H0P7	H1P5					
Applicable Motor	HP	0.5	1	0.5	1	2	1	2					
	KW	0.4	0.75	0.4	0.75	1.5	0.75	1.5					
Rated Output	Output Rating (kVA)	1.4	2	1.4	2	3	2.1	2.7					
	Output Current (A)	3.2	4.8	3.2	4.8	7.1	2.6	4					
Power supply	Max. Output Voltage	3Ø 200 ~ 230V				3Ø 380 ~ 460V							
	Output Frequency	Up to 400Hz (Available by Programming)											
Control Characteristic	Voltage, Frequency	1Ø 100V~ 115V , 50/ 60Hz		1 / 3Ø 200V~ 230V , 50/ 60Hz		3Ø 380V~ 460V , 50/ 60Hz							
	Allowable Voltage/ Frequency Fluctuation	Voltage : -15% ~ +10%, Frequency: ±5%											
	Operating Method	LED Operator											
	Control Method	V/F Control, Sine Wave PWM											
	Frequency Control Range	0.1Hz ~ 400Hz											
	Frequency Accuracy (Temperature Characteristic)	Digital Reference: ±0.01% (-10°C ~ +40°C), Analog Reference: ±0.1% (25°C ± 10°C)											
	Frequency Setting Resolution	Digital Reference: 0.01Hz, Analog Reference: 0.06Hz/ 60Hz (10 bits)											
	Output Frequency Resolution	0.01Hz (Calculation)											
	Frequency Setting Signal	DC 0 ~ +10V / 4 ~ 20mA											
	Acceleration/ Deceleration Time	0.0~999.9 Seconds (4 Selectable Combinations of Independent Acceleration and Deceleration Settings)											
Protective Function	V/ F Characteristic	Programable V/F Curve											
	Major Control Function	Auto Torque Compensation, Slip Compensation, Momentary Power Loss Ridethru, PID control, Simple Auto Process Operation.											
	Other Functions	Up/Down operation, Elapsed Time @ Power-on & Operating, 4set Fault Records & 1 set Fault Trace of Most Recent Fault, Modbus RS-485, 1set Pulse Output, 1 set Analog Output.											
	Stall Prevention	Stall Prevention during Acceleration, Running, Deceleration											
	Instantaneous Overcurrent Protection (OC)	Stops at approx. 200% of Rated Output Current											
	Overload Capacity (OL2)	150% Rated Current for 1 minute											
	Motor Protection (OL1)	Protection by Electric Thermal Overload Relay Function											
	Overvoltage Protection (OV)	Stops when Main Circuit DC Bus Voltage is approx. 400V for 110V/ 220V Class, approx. 800V for 400V Class											
Protective Function	Undervoltage Protection (UV)	Stops when Main Circuit DC Bus Voltage is approx. 190V for 110V/ 220V Class, approx. 380V for 400V Class											
	Momentary Power Loss Ridethru	Stops for 15ms or more.											
	Cooling Fin Overheating (OH)	Protection by Thermistor											

Type F8-****E(3)	N0P4	N0P7	L0P4	L0P7	L1P5	H0P7	H1P5	/				
Protective Class	IP00, IP20 (Optional)											
Cooling Method	Natural Cooling			Fan Cooling	Natural Cooling	Fan Cooling						
Approximate Weight (kg)	1.2											
Environmental Conditions	Application Site	Indoor (No Corrosive Gas, Dust, etc.)										
	Nominal Ambient Operating Temperature	-10 ~ +45°C (Non-Frozen)										
	Storage Temperature	-20 ~ +60°C										
	Relative Operating Humidity	0 to 90% RH, Non-Condensing										
	Altitude	1000 m max.										
	Vibration	5.9m/S <sup>2</sup> (0.6G) max. (JISC0911 Standard)										
Communication	Modbus RS-485 built-in											
EMI	Meet the EN50081-2(1994) with extended Noise Filter											
EMC	Meet the PrEN50082-2											

**\*: Some of words in this manual will use the abbreviation, for the abbreviation please read “6-6 Abbreviation Index”.**

## 1-6 Frame Size & Dimension



*Fig. 1.2 TDS-F8 Dimension*

Power Supply	Applicable Motor KW/ HP	Mounting Size (mm)			Appearance Size (mm)			Approx. Weight (kg)
		W	H	H2	W1	H1	D	
Single-Phase 110V	0.4KW/ 0.5HP	85	138	130	98	151	130	1.2
	0.75KW/ 1HP							
Single-Phase/ 3-Phases 220V	0.4KW/ 0.5HP	85	138	130	98	151	130	1.2
	0.75KW/ 1HP							
	1.5KW/ 2HP							
3-Phases 440V	0.75KW/ 1HP							
	1.5KW/ 2HP							

## 1-7 Wiring & Connection

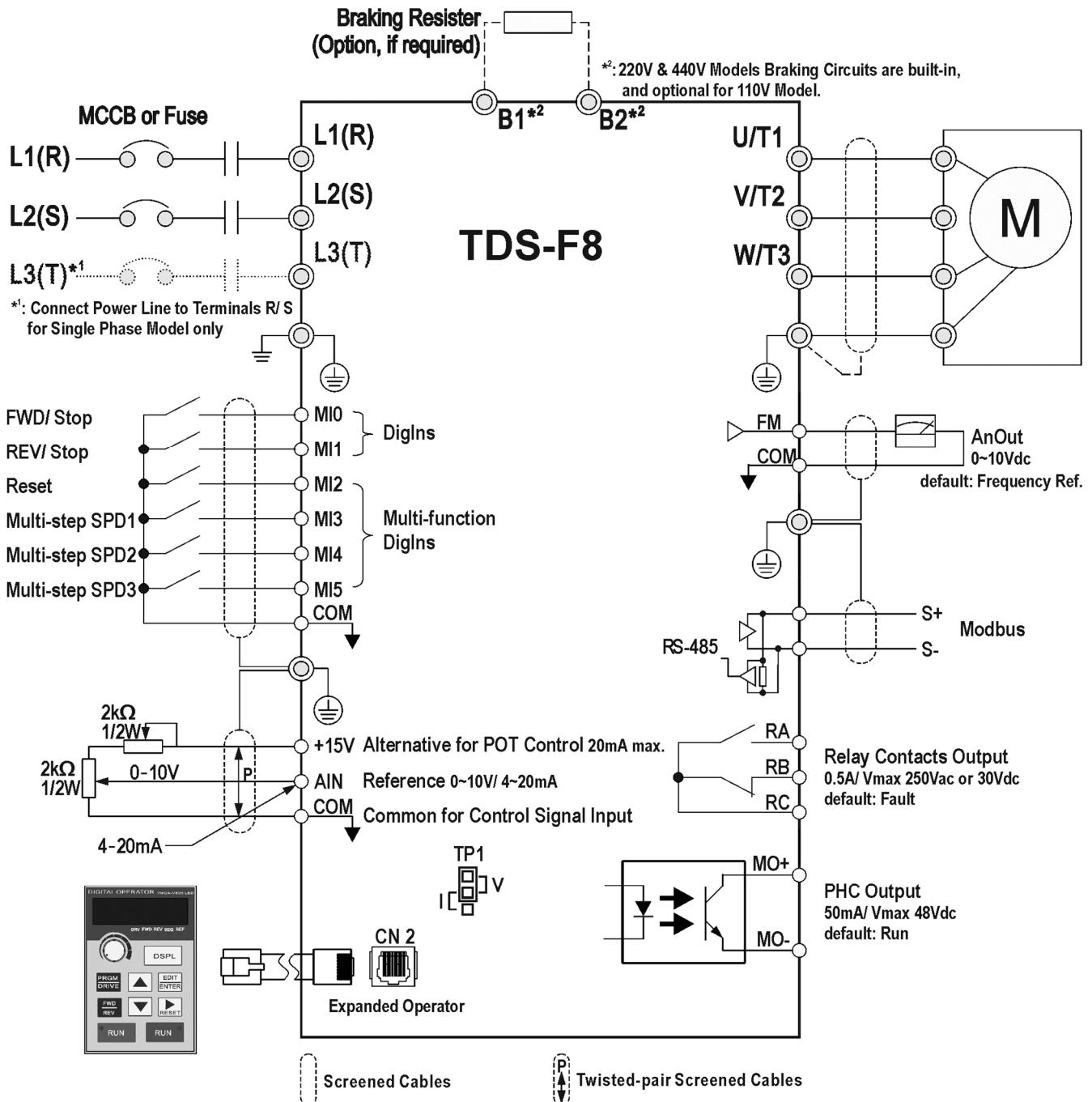


Fig. 1.3 F8 Standard Connection Diagram

( ○Mains Circuit Terminals, ○Control Circuit Terminals )

## 1-8 Terminal Configuration and Description

### ■ Main Circuit Terminals Description

Symbol	Terminal Description
R/L1	Main Power Input (R/L1 – S/L2 for Single-Phase Input)
S/L2	
T/L3	
P/B1	For extended Braking Resister connection. (P/B1 – B2 for Standard Type F8 Only, 220V & 440V models built-in, 110V model is optional by order)
B2	
U/T1	Motor Output, 3- Phases
V/T2	
W/T3	
E	Grounding/ Earth

### ■ Main Circuit Terminals Configuration

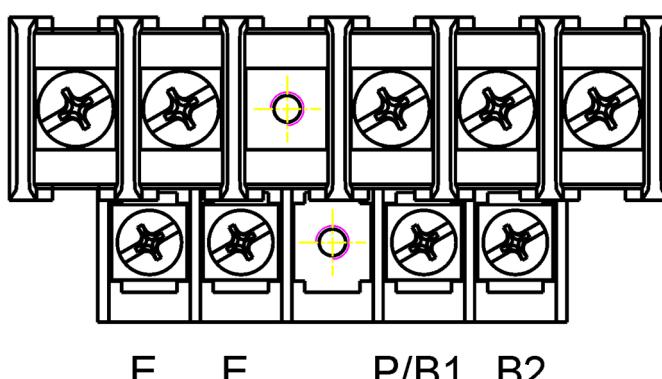
220V 0.5~2HP/ 440V 1~2HP 3-Phases Power in Models

R/L1 S/L2 T/L3 U/T1 V/T2 W/T3

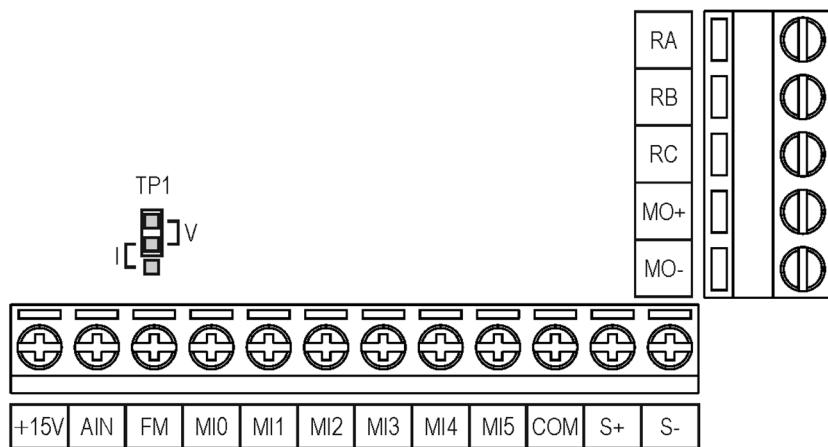


110V 0.5~1HP/ 220V 0.5~2HP Single-Phase Power in Models

R/L1 S/L2                  U/T1 V/T2 W/T3



## ■ Control Circuit Terminals Description



**Fig. 1.4 Control Circuit Terminals Configuration**

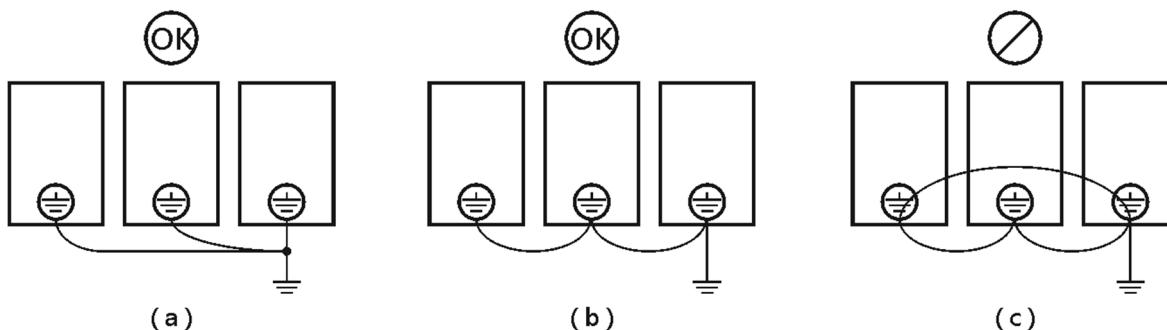
Terminal	Description		Signal Level
MI0	Forward Run/ Stop (2-wire configuration)		
MI1	Reverse Run/ Stop (2-wire configuration)		
MI2	Fault Reset Input		
MI3	Multi-Step Reference 1	Multi-function Sequence Inputs (DIns) (04-05 to 04-08)	Photo-coupler Insulated SINK Signal Input, 6mA/ each
MI4	Multi-Step Reference 2		
MI5	Multi-Step Reference 3		
COM	Sequence Control Input and Analog I/O Common Terminal		
+15V	Analog Reference +15V power supply		+15V/ 20mA max.
AIN*	Frequency Reference Voltage/ Current (0-10V/ 4-20mA)		0-10V/ 4-20mA
FM*	Frequency Reference	Multi-function Analog Monitor	0~10V
RA	Fault Contact Output (N.O./ N.C. Contact)	Multi-function Digital Output (3-06 and 3-07)	Contact Capacity 250VAC/ 30VDC, 0.5A or less
RB			
RC			
MO+	During Running (Open Collector output)		Open Collector Capacity 48Vdc, 50mA or less
MO-			
S+ & S-	Modbus RS-485 Communication		
TP1	Jumper for AIN Signal Level 1-2 (Up-position): 0-10V 2-3 (Down-position): 4-20mA		

- ATTENTION** 
- Please set the TP1 Jumper Position and Function 4-03 to make the correct Signal Level for Terminal AIN.
  - The Multi-function Analog Monitor FM is dedicated to the meter, please do not use it as an Analog Reference Signal such as Feedback control.

## 2. Precautions for F8 Peripheral Equipment

### 2-1 Precautions for Wiring of Peripheral Equipment

- 21、Please follow the Safety Instruction and National/ Local Electrical Standard when make the wiring for F8.
- 22、Make sure the Mains Power must be able to carry the F8's Load Current and Voltage.
- 23、Never connect the F8 output terminals U/T1, V/T2 and W/T3 directly to the AC Mains Power.
- 24、Tighten the screws on the main circuit and control circuit terminals.
- 25、Be sure to connect MCCBs or fuses between the AC Mains Power and F8 input terminals R, S & (T) for wiring protection.
- 26、An electromagnetic contactor (MC) can be installed on the supply side if needed, the MC can shut off the drive when a fault occurs in any external equipment or F8 failure terminal is triggered. (Always use a R-C surge suppressor across the coil of MC if MC is installed.)
- 27、Input Mains supply phases can be connected to any input side terminal regardless of the order of L1, L2 and L3 on the terminal block.
- 28、Separate control circuit wiring from main circuit wiring (terminals R/L1, S/L2, T/L3, P/B1, B2, U/T1, V/T2, W/T3) and other high-power lines. Improper wiring practices could result in drive malfunction due to electrical interference.
- 29、Ground Resistance: 220V class: 100Ω or less, 460V class: 10Ω or less.
- 30、Never ground the VFD in common with welding machines, motors, or other high-current electrical equipment. Run all ground wiring in a separate conduit.
- 31、Use ground wiring as National/Local standard, and keep the length as short as possible.
- 32、When using several VFD units side by side, ground the units as shown in following Figure, (a) or (b). Do not loop the wires as shown in (c).



- 33、Use the screened or twisted-pair cables for control circuits to prevent VFD malfunction.
- 34、Use a shield/ screened cable and grounding the shield both sides, or the cable can be routed through a grounded metal pipe to prevent inductive noise.
- 35、If install a noise filter on the output side of VFD is needed, *TEK-DRIVE* recommend using the Inverter dedicated output noise filter, and do not connect phase-advancing capacitors or LC/RC noise filters to the output circuits. Failure to comply could result VFD in damage.
- 36、If the place where the VFD is installed is quite sensitive to noise interference, please use an RFI filter. The installation location should be as close to the VFD as possible. Lower the carrier frequency of PWM wave then less the interference.
- 37、Where a residual current device (RCD) is used for protection in case of direct or indirect contact, only a Type B RCD is allowed on the supply side of this product. Use a RCD of 200 mA/ 0.1s minimum
- 38、Always switch off the mains power and wait Indicator of operated lights off to allow the buffer capacitor to discharge, before make the wiring or switch the Jumper.

- 39、The semiconductor components are susceptible to high voltage, it is not allowed to carry out voltage tests (Megger) on the internal components of VFD.
- 40、Observe proper electrostatic discharge procedures (ESD) when handling the drive and circuit boards. Failure to comply may result in ESD damage to the drive circuitry.
- 41、All parameters value (except parameter 1-01) will be set back to their original value when parameter (1-02) Initialize parameter value is set to 3、5、7 (2-wire Initialization) or 4、6、8 (3-wire Initialization). If VFD was originally operated on 3-wire terminals control (parameter (1-02)= 4, 6, 8) and hard wires connected already, when it is changed to 2-wire operation (parameter (1-02)= 3, 5, 7), the motor may run in the opposite direction immediately. So make sure that terminals 1 and 2 are both "open" to avoid damage to the machine or injury to personnel.
- 42、Consider the amount of voltage drop when selecting wire gauges. Increase the wire gauge when the voltage drop is greater than 2% of motor rated voltage. Ensure the wire gauge is suitable for the terminal block. Use the following formula to calculate the amount of voltage drop.

$$\text{Line drop voltage (V)} = \sqrt{3} \times \text{wire resistance } (\Omega/\text{km}) \times \text{wire length (m)} \times \text{current (A)} \times 10^{-3}$$

- 43、If the wiring distance between VFD and motor is excessively long, please reduce the VFD carrier frequency (parameter 2-06) or/ and use output coils (AC reactor).

## 2-2 Main Circuit Wiring, Peripheral Equipment and Note

Be sure to connect MCCB or fuses between the AC main circuit power supply and VFD input terminals R/L1, S/L2 (& T/L3) to protect the input wiring, whether a MC needs to be installed depends on the situation.

Where a residual current device (RCD) is used for protection in case of direct or indirect contact, only a Type B RCD is allowed on the supply side of this product. Use a RCD of 200 mA/ 0.1s minimum.

**Table 2.1 Mains Circuit Wiring and Peripheral Equipment**

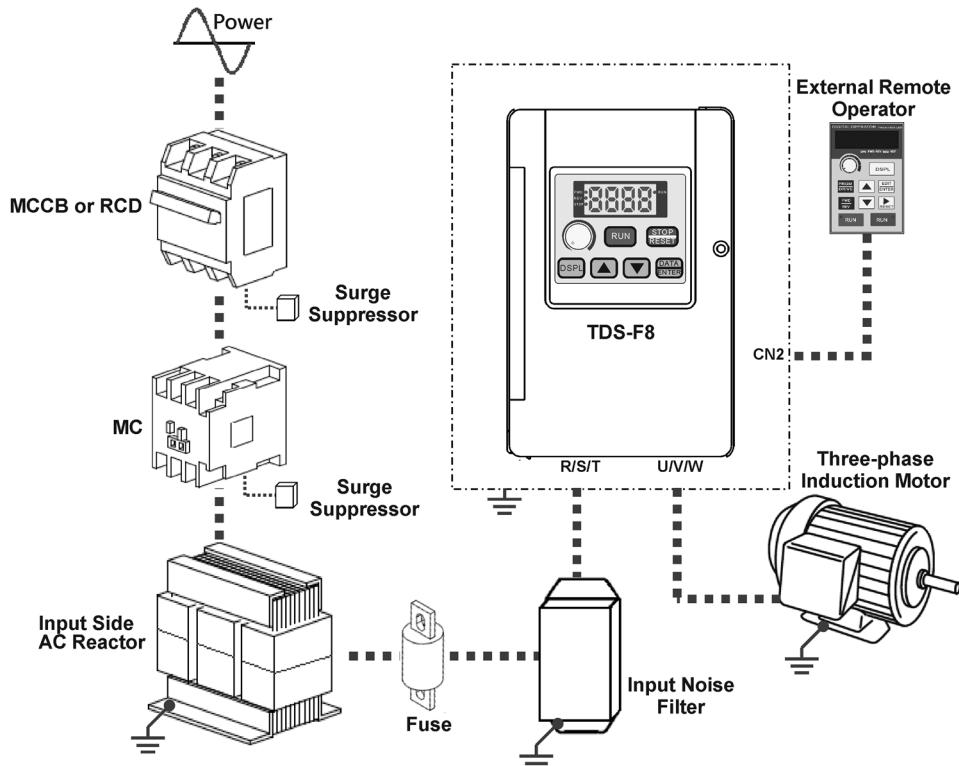
Type F8-****E(3)	Rating (A)	Wire/ Cable (mm <sup>2</sup> )			MCCB*3	MC*3	
		Mains*1	Grounding	Control*2			
N0P4	3.2	2~ 5.5	2~ 5.5	0.5~ 2	TO-50E 15A	CN-11	
N0P7	4.8				TO-50E 20A		
L0P4	3.2				TO-50E 15A		
L0P7	4.8		3.5~ 5.5		TO-50E 20A		
L1P5	7.1				TO-50EC 15A		
H0P7	2.9		2~ 5.5				
H1P5	4						

\*1 : Mains circuit include R(L1)、S(L2)、T(L3)、U(T1)、V(T2)、W(T3)、P/B1、B2.

\*2 : Control wiring is the control signal wire on control board.

\*3 : The types of MCCBs and MCs in the table are TECO product numbers, of course other brands with the same rating can be used also. In order to reduce noise interference, please remember to install R-C surge suppressors (0.1uf/1000VDC , 10Ω/5W) at both ends of the coil of MC.

## 2-3 Connecting Peripheral Equipment



### ■ Molded Case Circuit Breaker (MCCB) and Residual current device (RCD)

- The capacity of MCCB must be larger than 1.5 to 2 times of VFD rated current. For MCCB's time characteristics, make sure to consider the VFD overload protection.
- Do not use MCCB to Run/ Stop VFD by ON-OFF the power supply.
- Where a residual current device (RCD) is used for protection in case of direct or indirect contact, only a Type B RCD is allowed on the supply side of this product. Use a RCD of 200 mA/ 0.1s minimum to prevent RCD malfunctions by high-frequency leakage current.

### ■ Electromagnetic Contactor (MC)

- In application where when the VFD protection function is activated or the emergency stop is executed, the main circuit power supply is shut OFF by the sequence controller, an MC can be used instead of an MCCB. However, when an MC is switched OFF on the primary side, regenerating brake would not activate and the motor coasts to stop.
- TEK-DRIVE recommend do not operate/ stopped VFD by ON/ OFF the MC on the primary side, switching the MC frequently may cause the VFD to malfunction.

### ■ AC Reactor (AC Coil)

- When connecting an VFD to a large capacity power supply transformer (600kVA or more), or when mains power system is switching a phase-advancing capacitor, excessive peak current may flow through the input power supply circuit, which may damage the converter section of VFD. In such cases, install an AC reactor (optional) on the input side.
- Installation of a reactor is effective for improvement of power factor on the power supply side.

### ■ Input Noise Filter

- In order to confirm to EMC Standard EN55011A, please installs a TDS-F8 dedicated filter.
- Please refer to the Chap. 6 Appendix of this manual to select a correct input noise filter.

### ■ Inverter (F8)

- Input mains supply phases can be connected to any input side terminal regardless of the order of L1, L2 and L3 on the terminal block. Make the correct grounding connection to Ground Terminal  $\ominus$ .

### ■ Output Noise Filter

- Install a noise filter on the VFD's output side to reduce the radio noise & inductive noise.
- Please buy an output side noise filter by yourself, or you can refer to the description of *Chap.6-4 RFI Noise Filter*.

## ■ 3 Phases Induction Motor

- If a single inverter drives multiple motors, the rated current of the inverter must be greater than the total current of motors which are running at the same time.
- The motor and VFD must be grounded separately.

### 3. Operating via the Operator (Keypad)

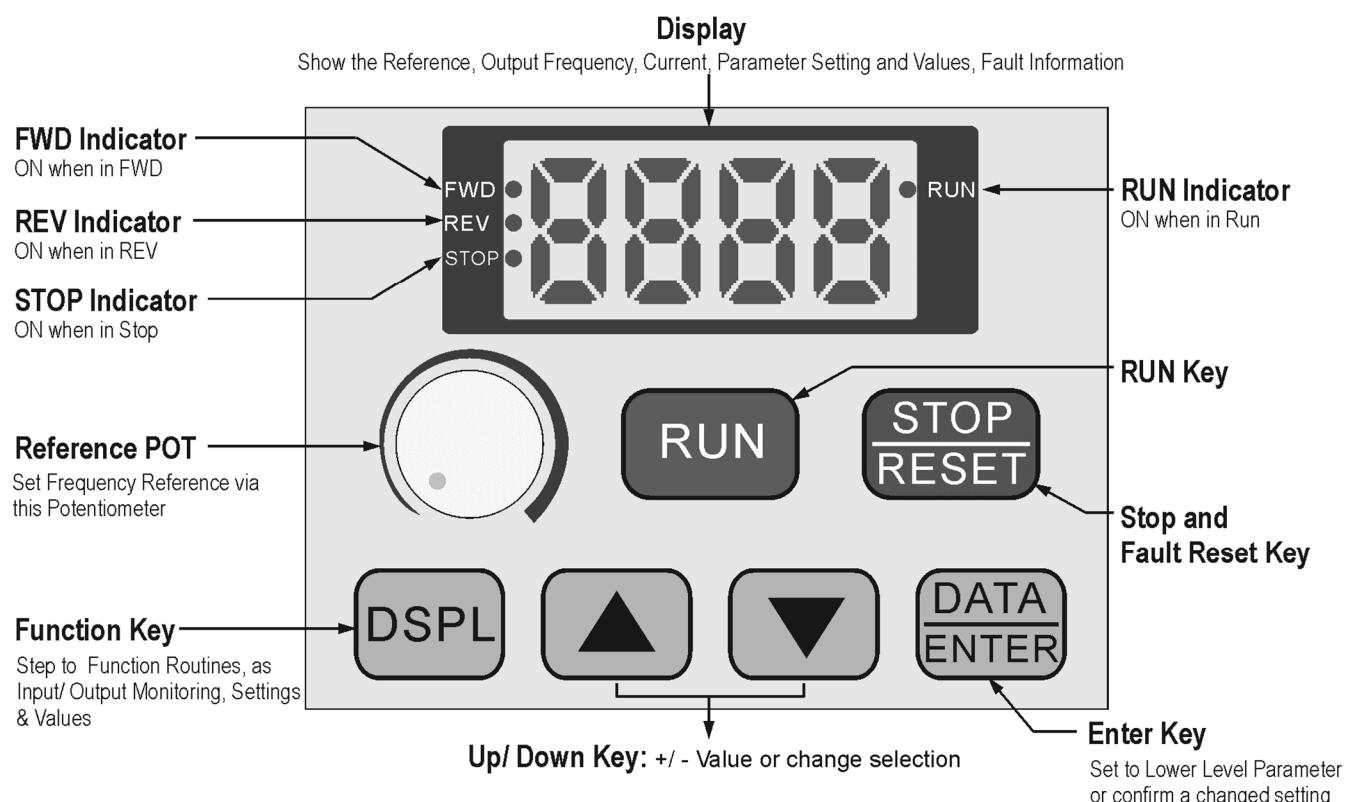
#### 3-1 LED Indicators, Display and Function Keys

The F8 has two operating mode, “DRIVE” and “PRGM” (PROGRAM). User can press the **DSPL** key to switch mode between DRIVE and PRGM when F8 is at stopped status only. In the DRIVE mode, the F8 can be operated and run. Only in the PRGM mode, user can change the control and system parameters of F8.

TDS-F8 has two types of digital operator:

1. **Local Operator (LOP):** located in the center of F8, it consists the LED indicators, display area and function keys. Please see following *Figure 3.1*.
2. **External Remote Operator (ROP):** It provides the remote function of the digital operator, which is an optional accessory. When using an ROP, the control priority of F8 will be transferred to the ROP automatically. At this time the LOP can only be monitored the operating status of F8, and can neither set parameters nor control the operating.

#### ■ Outline of LOP



*Fig. 3.1 Local Operator*

### 3-2 Function Key Instruction

FUN. Key	Title	Function Description
	Function/ Display Key	Used to display various status information cyclically of F8, such as frequency command, output frequency, output current and parameter group.
	UP Key (+ Key)	Increment key for function, parameter or set value.
	DOWN Key (- Key)	Decrement key for function, parameter or set value.
	Data Enter Key (Edit/ Write)	Selects mode, group, function or parameter. Displays each parameter's set value. By depressing this key (after changing a parameter setting), the set value is entered.
	RUN Key (Run Command)	When F8 is under drive mode and the Run command is by operator, the RUN LED illuminates after depressing RUN key then F8 will start to run.
	STOP/ Fault Reset Key	When F8 is under drive mode and during in run, the STOP LED illuminates after depressing STOP key then F8 will stop output. The function of STOP key can be disabled/ enabled by setting of Parameter 2-04 if F8 Run command is by remote (2-01≠0). Reset F8 at fault by depress the RESET key.

#### ■ RUN and STOP Indicators

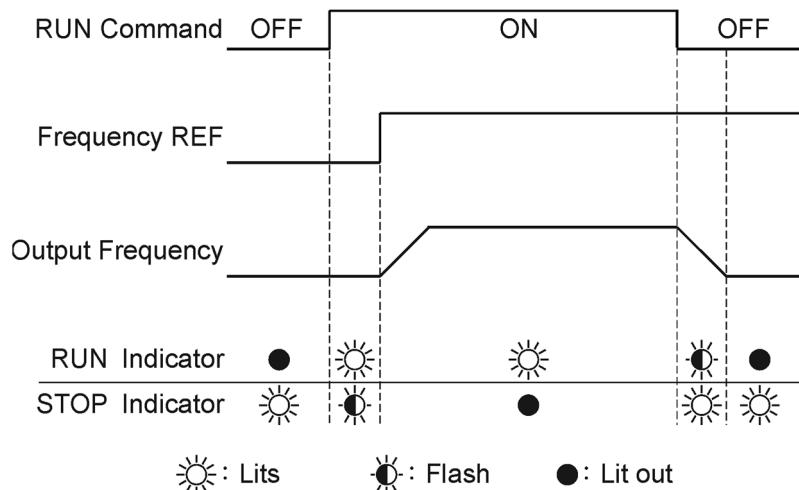


Fig. 3.2 RUN/STOP LED and Drive Operation

\*: RUN, STOP indicator consists three types status lit, flashing, and lit out, which are corresponding to the operating conditions of F8.

## ■ Display Section Description

Displayed	Meaning & Description
	Display frequency reference set value.
	Display output frequency value.
	Display output current value.
	Monitoring item.
	Motor is rotating in FWD command.
	Motor is rotating in REV command.
	Parameter group “0”
	Parameter number “2” of group 0.
	Value of this parameter.
	If the display show “End” for 1 second almost, it means the data is written in internal memory already.
	The set value is rejected or exceeding the limit value.

Refer to **Chapter 5 Diagnostics** for more Alarm/ Fault condition.

### 3-3 Menu Structure for Operators

#### ■ Local Operator (LOP)

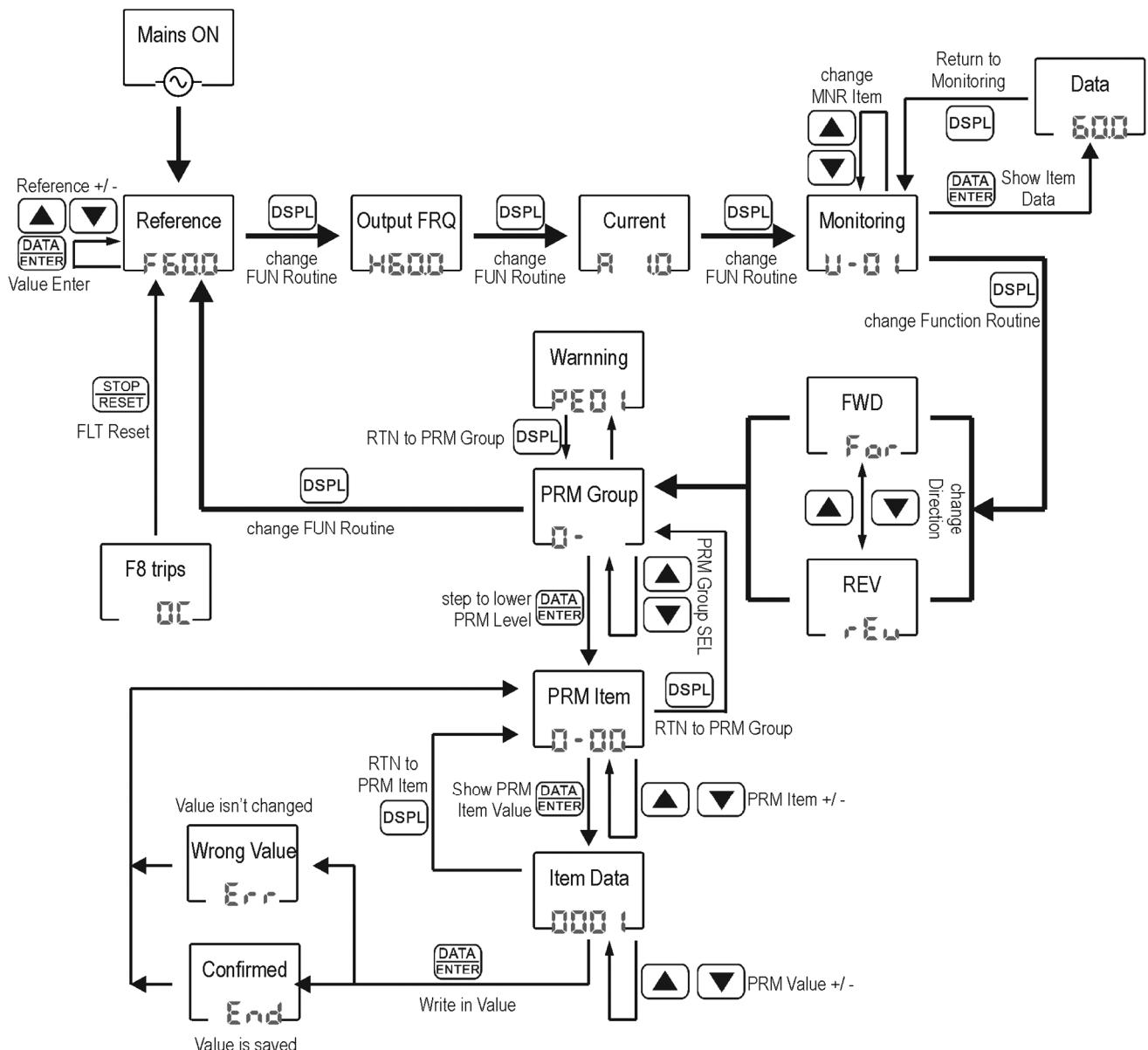
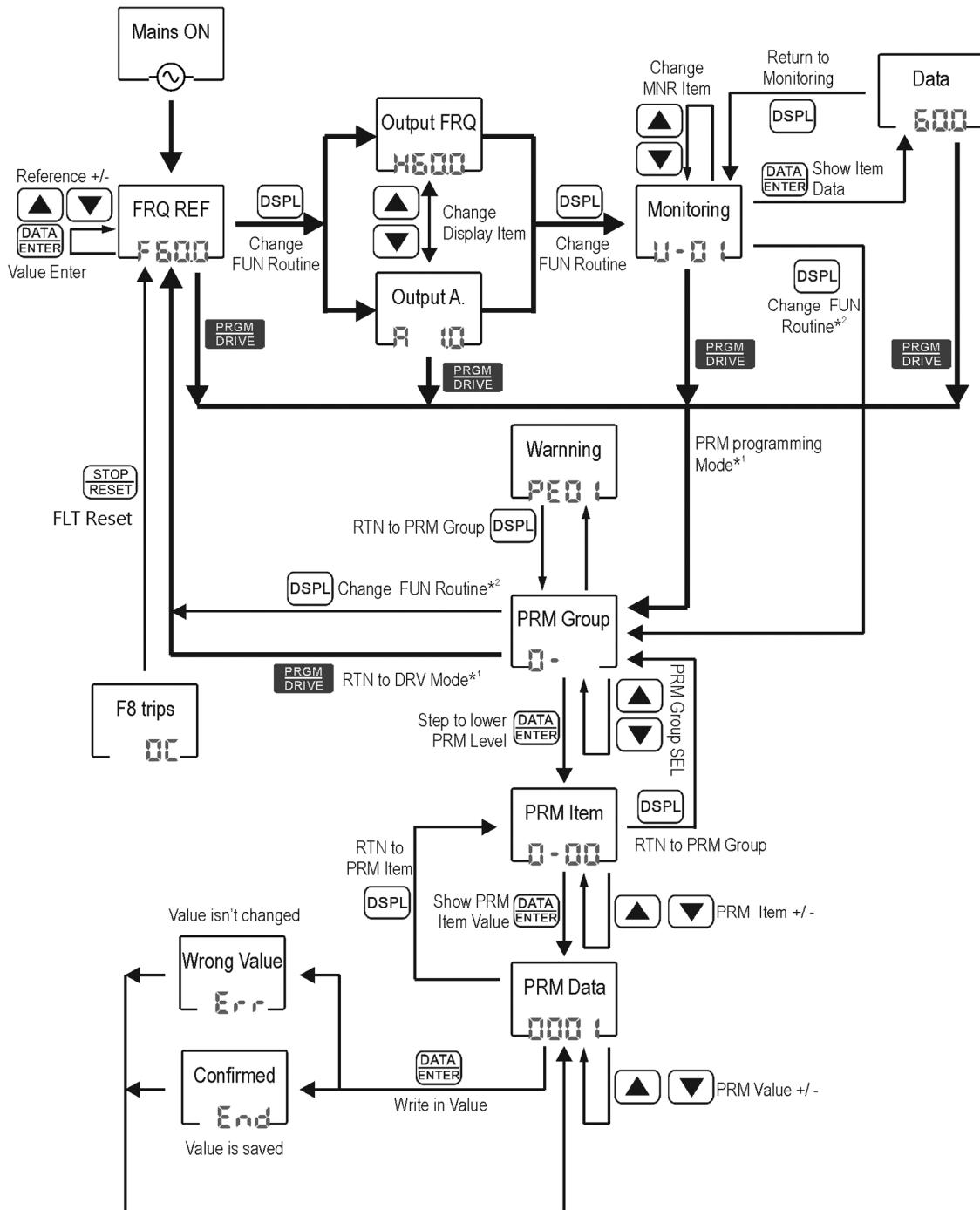


Fig. 3.3 LOP Screen Structure

## ■ External Remote Operator (ROP)

In addition to the LOP in the TDS-F8, user needs to extend the operator for remote controlling at some application, they can use the code TMCA-V8 LED or TMCA-V803 LED digital operator. Takes V803 LED as an example, the operating methods are described as follows.



**Fig. 3.4 External Remote Operator (ROP) Screen Structure**

\*1: The F8 operates in DRIVE Mode when it is first powered up (DRV indicator Lit). When the F8 is stopped, depress the **PRGM DRIVE** key to enter the parameter programming (PRGM) mode (DRV indicator Lit out), and then the parameters can be set. Depress the **PRGM DRIVE** key again is required to return to the DRIVE mode, and the F8 can run.

\*2: If entering the parameter group when F8 is in the DRV mode, it can be monitored and display the parameter values only, the value cannot be changed. At this time, if you need to set the parameter value, please stop the F8 first then depress the **PRGM DRIVE** key to switch F8 to the PRGM mode.

## 4. Parameter List & Introduction

F8's parameters are divided into 11 parameter groups according to the applied attributes of these parameters. User can complete the setting before operate F8 according to the relevant parameters in the parameter groups. The 11 parameter groups are as follows.

- |  |                          |
|--|--------------------------|
| 0: User Parameters                                 | 6: Protection Parameters |
| 1: Basic Parameters                                | 7: Motor Data            |
| 2: Operating Method                                | 8: Special Parameters    |
| 3: Digital & Analog Output Terminal                | 9: Modbus Communication  |
| 4: Digital & Analog Input Terminal                 | U: Monitoring            |
| 5: Multi-preset Reference & Auto Process Operation |                          |

This manual is a brief manual, just only make a simple list and description for the parameters. If you need more detailed parameter description, please go to the TEK-DRIVE official website: <https://www.tekdrive.com.tw/>, to download the TDS-F8 Instruction Manual, there are complete parameter descriptions and explanations in it.

### Parameter List

- Sometimes, there is a mark as following in the table,  
\*1 means the value will be different as different F8 type.  
\*2 means the value of 440V Class is twice of 220V Class.  
\*3 means only for External remote operator.  
★ means this parameter can be set while F8 is running.

#### 0- User Parameters

No.	Parameter Name & Description	Setting Range	Default	User set
0-01	Unit displayed of Operator	0~ 1999	0	
0-02	Monitor Selection after Powered Up. 0-Frequency Reference      2-Output Current 1-Output Frequency	0~ 2	0 (★)	

#### 1- Basic Parameters

No.	Parameter Name & Description	Setting Range	Default	User set
1-01	F8 Power Rating	01~03, 21~22	*1	
1-02	Initialize Parameter (00~ 14): 00- All Parameters can be set & monitor 01- Parameters 0-01, 0-02, 1-02, 1-16, 5-01~5-08 can be set, the others can be monitor only. 03- 2 wires Initialization, 220/440V, 60Hz 04- 3 wires Initialization, 220/440V, 60Hz 05- 2 wires Initialization, 200/415V, 60Hz 06- 3 wires Initialization, 200/415V, 60Hz 07- 2 wires Initialization, 220/380V, 50Hz 08- 3 wires Initialization, 220/380V, 50Hz 11- Clear All Fault Logs 02, 09~10,12~14- Reserved		0	
1-03	Maximum Output Frequency (Hz)	50.0~ 400.0	60.0	
1-04	Maximum Voltage (V)	0.1~ 255.0	220.0(* <sup>2</sup> )	
1-05	Frequency of Maximum Voltage (Hz)	0.1~ 400.0	60.0	

1-06	Middle Frequency (Hz)	0.1~ 400.0	1.5	
1-07	Voltage at Middle Frequency (V)	0.1~ 255.0	14.8(* <sup>2</sup> )	
1-08	Minimum Output Frequency (Hz)	0.1~ 400.0	1.5	
1-09	Voltage at Minimum Output Frequency (V)	0.1~ 255.0	7.9(* <sup>2</sup> )	
1-10	Frequency Reference Upper Limit	0~ 109%	100%*	
1-11	Frequency Reference Lower Limit	0~ 109%	0%*	
1-12	Accelerating Time 1	0.0~ 999.9s	10.0s(☆)	
1-13	Decelerating Time 1	0.0~ 999.9s	10.0s(☆)	
1-14	Accelerating Time 2	0.0~ 999.9s	10.0s(☆)	
1-15	Decelerating Time 2	0.0~ 999.9s	10.0s(☆)	
1-16	JOG Frequency Reference	0.0~ 400.0Hz	6.0Hz(☆)	
1-17	S-curve Time at the Starting of Acceleration	0.0~ 1.0s	0.0s	
1-18	S-curve Time at the Ending of Acceleration	0.0~ 1.0s	0.0s	
1-19	S-curve Time at the Starting of Deceleration	0.0~ 1.0s	0.0s	
1-20	S-curve Time at the Ending of Deceleration	0.0~ 1.0s	0.0s	

\*: The setting value of 1-10 must  $\geq$  1-11.

## 2- Operating Method Parameters (RUN Command and Frequency Reference Source)

No.	Parameter Name & Description	Setting Range	Default	User set
2-01	Run Command Source Selection: 0- Operator                            2- RS-485 Modbus 1- Control Terminals		0	
2-02	Frequency Reference Source Selection: 0- Operator                            2- RS-485 Modbus 1- Control Terminal- AIN            3-Reference POT of Operator		0	
2-03	Stopping Method Selection: 0- Decelerating to Stop (Ramp)    1-Coast to Stop (Free Run)		0	
2-04	Function of STOP key at OP Selection (when 02-01≠0) : 0- STOP Key is enabled              1- STOP Key is disabled		0	
2-05	Reverse Command or/ and Reference prohibits: 0- REV is effectual                    1- REV is invalid		0	
2-06	Carrier Frequency (= Set Value $\times$ 2.5kHz)	1~ 6	4	
2-07	FRQ REF Hold Selection of MOP Control by Multi-function DIs (Parameter 4-08= 24) when F8 stops. 0- FRQ REF Hold during MOP operation is not retained. If a stop command is given the FRQ REF will reset to 0Hz. The F8 start to run from FRQ REF Lower Limit (1-11) if Run Command is given next time. 1- FRQ REF Hold during MOP operation is retained. If a stop command is given the FRQ REF resumes at the Held FRQ REF when Run command is restored.		1	
2-08	Selects whether the  key is used when the FRQ REF is set by the OP. The OP can simulate a MOP by setting this PRMs. 0- The OP MOP mode is disabled. The F8 accepts the FRQ REF when the  Key is depressed. 1- The OP MOP mode is enabled. The F8 accepts the FRQ REF as soon as changes are made with the  &  Keys, without the  Key being depressed.		0	

### 3- Digital & Analog Output Terminal Parameters

No.	Parameter Name & Description		Setting Range	Default	User set
3-01	Terminal FM Analog Output Selection	00- Frequency Reference 01- Output Frequency 02- Output A. 03- Output V. 04- DC Bus V. 05- Output Power	06- Terminal AIN 08- OP-POT 09- PID Input 10- PID Output 1 11- PID Output 2 07 & 12- Reserved	0	
3-02	Terminal FM Analog Output % Gain		1~ 255%	100%( $\star$ )	
3-03	Desired Frequency Agree during ACC		0.0~ 400.0Hz	0.0Hz	
3-04	Desired Frequency Agree during DEC		0.0~ 400.0Hz	0.0Hz	
3-05	Frequency Agree Width		0.1~ 25.5Hz	2.0Hz	
3-06	Multi-FUN Output (Terminals RA-RB-RC) Selection	00- During Run 01- Zero Speed 02- FRQ Agree 03- Desired FRQ Agree 04- FOUT Detection 1 05- FOUT Detection 2 06- VFD Ready 07- Uv1 08- During B.B. (N.O.) 09- During B.B. (N.C.) 10- Fault	20- During Restart 21- OL1 22- OH 23- OL2 24- RS-485 MOD ERR 25- RS-485 MOD Control 26- During APO 1 27- During APO 2 28- During APO 3 29- During APO 4 30- During APO 5	10	
3-07	Multi-FUN Output (TMN MO) Selection	11- Over TRQ DET (N.O.) 12- Run CMD by OP 13- FRQ REF by OP 14- During REV operation 15- FRQ REF loss 16- Over TRQ DET (N.C.) 17- Pulse Output (MO only) 18- Timer Output 19- Uv pre-alarm (DBV<230V)	31- During APO 6 32- During APO 7 33- During APO 8 34- CTC achieves (N.O.) 35- CTC achieves (N.C.) 36- PID Error 37~ 38- Reserved	0	
3-08	Pulse Output Multiple	01~ 16		1	

### 4- Digital & Analog Input Terminal Parameters

No.	Parameter Name & Description	Setting Range	Default	User set
4-01	Terminal AIN Analog REF % Gain	0.0~ 1000 (1000.0 $^{*3}$ )	100.0( $\star$ )	
4-02	Terminal AIN Analog REF % $\pm$ Bias	-99.9~ 100.0	0.0( $\star$ )	
4-03	Terminal AIN Analog REF Signal Selection 0- 0~ 10V                          1- 4~ 20mA		0	
4-04	Frequency Reference Analog Input Characteristic: 0- 0~ 100% (Normal/ FWD) 1- 100~ 0% (REV)	2- -100~ +100 (FWD+ REV)	0	

4-05	Multi-function Input MI2 Selection	00- REV of 3 wires CTL 01- Run Command by OP 02- Run Command by TMN 03- Fault Reset 04- Multi-step SPD 1 05- Multi-step SPD 2 06- Multi-step SPD 3 07- JOG Frequency REF 08- ACC/ DEC Time1/ 2 switching 09- ACC/ DEC disable 10- B.B. Input (N.O.) 11- B.B. Input (N.C.) 12- FWD JOG (FJOG) Run 13- REV JOG (RJOG) Run *: The setting value of Multi-function Digital Inputs must meet the rule of MI2< MI3< MI4< MI5.	14- PID disable 15- PID (I) Reset 16- OH pre-alarm 17- External Fault (N.O.) 18- External Fault (N.C.) 19 & 20- Reserved 21- SPD Search from 1-03 22- SPD Search from FRQ REF 23- TIMER Function Input 24- MOP UP/ DN ( only for 4-08 · then MI4-UP/ MI5-DN) 25- Count present value clear 26- Counter Input 27~ 31- Reserved	3	
4-06	Multi-function Input MI3 Selection			4	
4-07	Multi-function Input MI4 Selection			5	
4-08	Multi-function Input MI5 Selection			6	
4-09	Control Terminal Signal Scan Time 0- Scan 1 Time (5ms)	1- Scan 2 Times (10ms)		1	
4-10	Analog Input Filter Constant	1~ 80		10	
4-11	Counter Target Value	0~ 9999		0	

## 5- Multi-preset Reference & Auto Process Operation Parameters

No.	Parameter Name & Description	Setting Range	Default	User set
5-01	Preset Reference 1	0.0~ 400.0Hz	0.0Hz(☆)	
5-02	Preset Reference 2	0.0~ 400.0Hz	0.0Hz(☆)	
5-03	Preset Reference 3	0.0~ 400.0Hz	0.0Hz(☆)	
5-04	Preset Reference 4	0.0~ 400.0Hz	0.0Hz(☆)	
5-05	Preset Reference 5	0.0~ 400.0Hz	0.0Hz(☆)	
5-06	Preset Reference 6	0.0~ 400.0Hz	0.0Hz(☆)	
5-07	Preset Reference 7	0.0~ 400.0Hz	0.0Hz(☆)	
5-08	Preset Reference 8	0.0~ 400.0Hz	0.0Hz(☆)	
5-09	Auto Process Operation Mode Selection: 0- Auto Process is disabled. 1- Executes 1 Cycle operation then stop. 2- Continuously Executes Cycles Operation. 3- Executes 1 Cycle operation then Keep running at last Preset REF. 4- Executes 1 Cycle operation then stop. 5- Continuously Executes Cycles Operation. 6- Executes 1 Cycle operation then Keep running at last Preset REF.  *5-09= 1~ 3, if the run command is given again after F8 stopped, the F8 will start to run from the Frequency Reference before last stop.  5-09= 4~ 6, if the run command is given again after F8 stopped, the F8 will start to run from the Preset Reference 1.		0	
5-10	Process Operating Mode Selection 1	0- STOP 1- FWD 2- REV	0	
5-11	Process Operating Mode Selection 2		0	
5-12	Process Operating Mode Selection 3		0	

5-13	Process Operating Mode Selection 4		0	
5-14	Process Operating Mode Selection 5		0	
5-15	Process Operating Mode Selection 6		0	
5-16	Process Operating Mode Selection 7		0	
5-17	Process Operating Mode Selection 8		0	
5-18	Process Operating Time 1	0.0~ 6000 (6000.0 * <sup>3</sup> ) (Sec.)	0.0(☆)	
5-19	Process Operating Time 2		0.0(☆)	
5-20	Process Operating Time 3		0.0(☆)	
5-21	Process Operating Time 4		0.0(☆)	
5-22	Process Operating Time 5		0.0(☆)	
5-23	Process Operating Time 6		0.0(☆)	
5-24	Process Operating Time 7		0.0(☆)	
5-25	Process Operating Time 8		0.0(☆)	

## 6- Protection Parameters

No.	Parameter Name & Description	Setting Range	Default	User set
6-01	Stall Prevention Limit During Acceleration	0- Disable 1- Enable	1	
6-02	Stall Prevention Selection During Deceleration		1	
6-03	Stall Prevention Selection During Running		1	
6-04	Stall Prevention Level During Acceleration	30~ 150%	140	
6-05	Stall Prevention Level During Running		130	
6-06	Overtorque Detection Level (%)	30~ 150	130	
6-07	Detection Delay Time (Sec.)	0.0~ 25.5	0.1	
6-08	Overtorque Detection Selection: 0- Overtorque Detection is disabled. 1- Overtorque Detection is enabled whenever at the Frequency Agree, continue running after detected. 2- Overtorque Detection is enabled whenever at the Frequency Agree, F8 stops after detected. 3- Overtorque Detection is enabled always when F8 is during Run, continue running after detected. 4- Overtorque Detection is enabled always when F8 is during Run, F8 stops after detected.		0	
6-09	Motor Overload Protection (OL1): 0- Motor Overload Detection is disabled. 1- Standard Type Motor with Cold Start Curve Protection. 2- Standard Type Motor with Hot Start Curve Protection. 3- Inverter Duty Motor with Cold Start Curve Protection. 4- Inverter Duty Motor with Hot Start Curve Protection.		1	
6-10	Undervoltage Detection Level (Vdc)	150~ 210	190* <sup>2</sup>	

## 7- Motor Data Parameters

No.	Parameter Name & Description	Setting Range	Default	User set
7-01	Motor Rated Current (*.A)	*.*A	*1	
7-02	Motor No-load Current (%)	0~99	30	
7-03	Motor Rated Slip (%)	0~9.9	0.0	
7-04	Auto Torque Compensation Gain	0.0~2.0	0.0	

## 8- Special Parameters

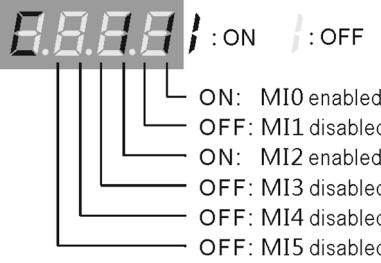
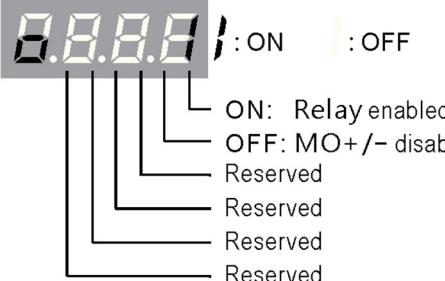
No.	Parameter Name & Description	Setting Range	Default	User set
8-01	DC Braking Frequency (Hz)	0.1~10.0Hz	1.5Hz	
8-02	DC Braking Current Level (%)	0~80	40	
8-03	DC Braking Time at Stop (Sec.)	0.0~25.5	0.5	
8-04	DC Braking Time at Start (Sec.)	0.0~25.5	0.0	
8-05	Momentary Power Loss Ride through Selection 0- Disabled 1- Enabled		0	
8-06	Speed Search Detection Current Level (%)	0~150	100	
8-07	Speed Search Deceleration Time (Sec.)	0.1~25.5	5.0	
8-08	Minimum Baseblock Time (Sec.)	0.5~5.0	0.5	
8-09	Jump Frequency1 (Hz)	0.0~400.0*	0.0	
8-10	Jump Frequency2 (Hz)	0.0~400.0*	0.0	
8-11	Jump Frequency3 (Hz)	0.0~400.0*	0.0	
8-12	Jump Frequency Width (Hz)	0.0~25.5	1.0	
8-13	Number of Automatic Restart Attempts	0~10	0	
8-14	ON Delay Time of Timer Function (Sec.)	0.0~999.9	0.0(☆)	
8-15	OFF Delay Time of Timer Function (Sec.)	0.0~999.9	0.0(☆)	
8-16	PID Control Selection: 0- PID Control is Disabled 1- PID Control is Enabled		0	
8-17	PID Feedback Gain	1~1000	100(☆)	
8-18	PID Control Proportional Gain (P)	1~1000	100(☆)	
8-19	PID Control Integral Time (I) (Sec.)	0.0~100.0	1.0(☆)	
8-20	PID Control Derivative Time (D) (ms)	0~1000	0(☆)	
8-21	PID Output Deviation (%)	0~109	0(☆)	
8-22	PID Control Integral Upper Limit (%)	0~109	100	
8-23	PID Control Output Primary Delay Time (Sec.)	0.0~2.5	0.0	
8-24	PID Error Level (%)	0~100	100%	

\*: The setting value must meet the rule for 8-9 ≥ 8-10 ≥ 8-11.

## 9- RS-485 Modbus Communication Parameters

No.	Parameter Name & Description	Setting Range	Default	User set
9-01	Station Address (ID#)	01~255	1	
9-02	Modbus Communication Baud Rate (bps): 0-1200                  2-4800 1-2400                  3-9600                  4-19200 5-38400		3	
9-03	Modbus Communication Parity Selection: bit must be “2”) 0*- No Parity            1- Even Parity            2- Odd Parity *: If 9-03= 0, then the Stop Bit of Protocol must be “2”		0	
9-04	Stopping Method After Communication Error: 0- Decelerating to stop (1-13)            2- Decelerating to stop (1-15) 1- Coast to stop                  3- Keep Running		0	
9-05	Modbus Time Out Detection Time (Sec.)	0.0~25.5	1.0	

## U- Monitoring Parameters

No.	Parameter Name	Unit	Description	
U-01	Frequency Reference	0.1Hz	Shows Frequency Reference	The Unit differs depending on 0-01 setting.
U-02	Output Frequency	0.1Hz	Shows Output Frequency	
U-03	Output Current	0.1A	Shows Output Current	
U-04	Output Voltage	1V	Shows Output Voltage Reference	
U-05	DC Bus Voltage	1V	Shows DC Bus Voltage	
U-06	Output Power	1W	Shows calculated Output Power	
U-07	Input Terminals Status (DIns)		 ON: MIO enabled OFF: MI1 disabled ON: MI2 enabled OFF: MI3 disabled ON: MI4 enabled OFF: MI5 disabled	
U-08	Output Terminals Status (RY & PHC)		 ON: Relay enabled OFF: MO+/- disabled Reserved Reserved Reserved Reserved	
U-09	Accumulated Operation Time	1Hr	Shows the cumulative operation time of F8. The operation time should start as soon as while the Run command is given and F8 outputs the Voltage. The maximum number displayed is 65535, after which the value is reset to 0.	
U-10	Power ON Elapsed Time	1Hr	Shows the elapsed time of F8. The elapsed time should start as soon as the power is switched on. The maximum number displayed is 65535, after which the value is reset to 0.	
U-11	Terminal AIN	0.1%	Shows input value of terminal AIN	

U-12	OP POT	0.1%	Shows Potentiometer of Operator value.
U-13	Terminal FM Output	0.1%	Shows output voltage reference of Terminal FM. 0~10V, 10V/100%
U-14	Counter Present Value	-	Shows the present accumulated value of Counter
U-15	Process Operating STEP		Shows the current STEP number while F8 is running in process operation.
U-16	PID Input Value	0.1%	Please refer to page 62 <b>Fig. 4-24 Block Diagram</b> ...of <b>F8 Instruction Manual</b> , use the U-16, 17, 18 to monitor PID status. 100% = 1-03 set value.
U-17	PID Output Value 1	0.1%	
U-18	PID Output Value 2	0.1%	
U-19	Frequency Reference at Fault	0.1Hz	Fault Trace to record the VFD operating status of most recent fault if a Fault appeared.
U-20	Output Frequency at Fault	0.1Hz	
U-21	Output Current at Fault	0.1A	
U-22	Output Voltage at Fault	1V	
U-23	DC Bus Voltage Output at Fault	1V	
U-24	Accumulated Operation Time at Fault	1Hr	
U-25	DIns Status at Fault	-	
U-26	RY & PHC Status at Fault	-	
U-27	Fault Record 1	-	Most Recent Fault Record
U-28	Fault Record 2	-	2 <sup>nd</sup> Most Recent Fault Record
U-29	Fault Record 3	-	3 <sup>rd</sup> Most Recent Fault Record
U-30	Fault Record 4	-	4 <sup>th</sup> Most Recent Fault Record
U-31	EPROM Code	-	F8 firmware version
U-32	TEK-DRIVE VFD Model	-	TdSF means TDS-F8 model VFD
U-33	Reserved		

## 5. Warning/ Fault Condition, the possible Causes and Remedies

F8 has built-in the warning and fault protective functions. When the F8 detects a fault, the fault message is displayed on the operator and activates a fault signal output, after which the motor coasts to a stop.

Unlike faults, warning do not activate fault contact outputs. When the F8 detects a warning, the warning message is flashed on the operator only. After the cause of the warning is corrected, the F8 returns to its former operation status automatically.

There are some tables later on in this section must be seen as a basic aid to find the cause of a F8 failure and to how to solve any problems that arise.

### 5-1 Fault Condition (Message Lists), the possible Causes and Remedial Actions

Fault Condition	Name and Possible Causes	Remedies
 DC Bus Undervoltage	Too low DC Link voltage exceeded the Undervoltage Detection level during running. - Too low or no supply voltage or phase loss - Mains voltage dip due to starting other major power consuming machines on the same line. - Worse Mains wiring.	- Make sure all mains wires are properly connected and that the terminal screws are tightened. - Check that the mains supply voltage is within the limits of F8. - Try to use other mains supply lines if dip is caused by other machinery. - Use the momentary power loss function.
 Overcurrent	Motor current exceeds the peak F8 Current (Approximately 200% Rated Current): - Too short acceleration time. - Too high motor load. - Excessive load change. - Soft short-circuit between phases or phase to earth - Poor or loose motor cable connections.	- Check on ACC time settings and make it longer if necessary. - Check on motor load. - Check motor coil resistance & Insulation. - Check on bad motor cable connections. - Check on bad earth cable connection. - Check on water or moisture in the motor housing and cable connections.
 DC Bus Overvoltage	Too high DC Link voltage exceeded the Overvoltage Detection level during running. - Power supply voltage is too high. - Too short deceleration time with respect to motor/machine inertia. - Too small brake resistor, or malfunctioning Brake Transistor.	- Check and decease the power supply voltage within F8 specification. - Increase deceleration time. - Check on deceleration time settings and make them longer (if necessary). - Add a suitable size braking resister (if necessary). - Check on size of the brake resister and the related parameter Setting (if used).
 Overheat	The Heatsink Temperature is too High. - Too high ambient temperature. - Heat source nearby or Insufficient cooling. - Blocked or stuffed cooling fan.	- Check on cooling of the F8 cabinet. - Install a cooling unit or remove heat source. - Check on functionality of the built-in cooling fans. The fans must run automatically if the F8 is powered on. - Clean fan or replace a new fan (if necessary).
 Motor Overload	F8 output exceeded the motor overload level. - Load too heavy - Acceleration, deceleration, cycles are too short. - V/F curve setting is incorrect; the voltage is too high or too low. - 07-01 setting value is wrong (too small) - Self-cooled motor at low speed, high load	- Check on mechanical overload on motor or the machinery (bearing, gearbox, chains, belts, etc.) - Reduce the load. - Check on acceleration, deceleration, cycle Time. - Check on V/F curve setting. - Check on 7-01 motor rating current setting - Check on 6-09 and motor cooling system.
 VFD Overload	F8 output exceeded the F8 Overload level. - Load too heavy - Acceleration, deceleration, cycles are too short. - V/F curve setting is incorrect; the voltage is too high or too low. - The F8 Size too small.	- Check on Mechanical Overload on Motor or the Machinery (Bearing, Gearbox, Chains, Belts, etc.) - Reduce the load. - Check on Acceleration, Deceleration, Cycle Time. - Check on V/F Curve setting. - Replace F8 by bigger rating

Fault Condition	Name and Possible Causes	Remedies
<b>OL3</b> Overtorque	There has been F8 output exceeded the F8 Overtorque Protection Detect level. - Larger than 6-06. - And longer than 6-07.	- Check on mechanical overload on motor or the machinery (bearing, gearbox, chains, belts, etc.). - Reduce the load. - Check on acceleration, deceleration, cycle Time. - Check on the setting in 6-06 and 6-07.
<b>EF2</b> EXT Fault 2	An External Fault Signal is activated by Input Terminal MI2 to MI5	- Remove the external signal input from multi-function input terminals.
<b>EF3</b> EXT Fault 3	- 4-05 to 4-08 is set to 17 or 18. - Terminal MI2 to MI5 is enabled during related situation.	- Clear the possible cause of this fault.
<b>EF4</b> EXT Fault 4		
<b>EF5</b> EXT Fault 5		
<b>PF03</b> EEPROM Error	EEPROM Error - F8's PCB control board fault.	- Do the parameter initialization (1-02) again. - F8 needs to repair (if failure still on after Initialization)
<b>GF</b> Ground Fault	F8 output grounding current exceeded 50% of F8 rated current. - Soft short-circuit between phases or phase to earth. - Poor or loose motor cable connections.	- Check motor coil resistance & insulation. - Check on bad motor cable connections. - Check on bad earth cable connection. - Check on water or moisture in the motor housing and cable connections.
<b>CErr</b> RS-485 CMN ERR	RS-485 Modbus Communication Error When power supply was turned on and 9-04 ≠ 3, the response was not possible for 9-05 seconds after received control data correctly. - Modbus Protocol and 9-01~9-05 are not match. - Poor cable wiring. - Noise Interference	- Check the Modbus protocol and 9-01~9-05 value. - Check the communication wiring. - Do the prevention of noise interference.
<b>P IDE</b> PID Error	PID Control Error Detected This fault occurs when: <b>PID Feedback &lt; PID REF * (1-PID Error Level)</b> for 60 seconds. - PID Feedback Loss. - PID Reference is too High. - Poor error detecting level.	- Check PID reference value and PID feedback signal. - Adjust PID error level 8-24

## 5-2 Warning Condition ((Message Flashes), the possible Causes and Remedial Actions

Fault Condition	Name and Possible Causes	Remedies
<b>Uu</b> DC Bus Undervoltage	Too low DC Link voltage exceeded the Undervoltage Detection level during in Ready. - Too low or no supply voltage or phase loss - The pre-charge contact opened. - Worse Mains connection. - See Cause for Uv1.	- See Remedies for fault Uv1 of <b>5-1 Fault Condition</b> ....
<b>oo</b> DC Bus Overvoltage	Too high DC Link voltage exceeded the Overvoltage Detection level during in Ready. - Power supply voltage is too high.	- Check and decrease the power supply voltage within F8 specification.
<b>oh</b> Pre-overheat	An OH Signal is activated by Input Terminal MI2~MI.	- Remove the OH signal input from multi-function input terminals. - Check parameter setting for related terminal. - Clear the possible cause of this warning.

Fault Condition	Name and Possible Causes	Remedies
<b>oL3</b> Overtorque	There has been F8 output exceeded the F8 Overtorque Protection Detect level. - Larger than 6-06. - And longer than 6-07. - And set 6-08= 1 ro3 (keep running after detected).	- See Remedies for fault oL3 of <b>5-1 Fault Condition</b> ....
<b>CErr</b> RS-485 CMN ERR	RS-485 Modbus Communication Error and keep running after Error occurred - Modbus Protocol and 9-01~ 9-05 are not match. - Poor cable wiring. - Noise Interference	- See Remedies for fault CErr of <b>5-1 Fault Condition</b> ....
<b>CPFO1</b> ROP CMN ERR	External Remote Operator Loss - The external digital operator and the control board cannot transmit data 5 seconds later the power is turned on, - After the power is turned on, the external digital operator and the control board can transmit data, but the transmission abnormality occurs for more than 2 seconds	- Re-plug the Operator cable again. - Replace a new ROP. - F8 needs to repair. (if necessary)
<b>bb</b> During Baseblock	An bb Signal is activated by Input Terminal MI2~MI5. - The bb signal is activated, the F8 cuts off the output, and the motor free runs. - After the bb signal is released, the F8 outputs by speed search.	- The bb message disappear after the bb signal was released. - Check parameter setting for related terminal. - Clear the possible cause of this warning.
<b>EF1</b> Run CMD Input ERR	FWD and REV Command are activated at same time over than 500ms. - F8 stops according to 2-03. - The sequence of run command is incorrect.	- Check the control system wiring. - Check the run command sequence for operation.
<b>PED1</b> Parameter Input ERR	Parameter Setting Range is Incorrect. - The power rating 1-01 doesn't match hardware detection. - The parameter setting value is out of valid range.	- Check the 1-01 setting and mind the voltage class. - Do the parameter initialization (1-02) again.
<b>PED2</b> Parameter Input ERR	Parameter Setting of Terminal MI2~ MI5 (4-05~4-08) are Incorrect. - The setting value of 04-05~04-08 doesn't meet the rule of MI2< MI3< MI4< MI5. - 2 terminals of MI2~ MI5 set to speed search ( value 21 & 22) at the same time.	- Check the setting for 4-05~4-08 to meet the rule. - Only set one terminal for speed search function.
<b>PED3</b> Parameter Input ERR	Auto Process setting is Incorrect. - 5-09 is set to "Auto Process Enabled" (> 0), but all the 5-10~ 5-17 (Process Operating Mode Selection) are set to stop (= 0).	- Check the setting for 5-09 and 5-10~ 5-17.
<b>PED4</b> Parameter Input ERR	V/F Curve setting is Incorrect. - The setting of V/F curve 1-03~ 1-09 don't meet the rule of $1-03 \geq 1-05 > 1-06 \geq 1-08$ and $1-04 \geq 1-07 > 1-09$ .	- Check the setting for 1-03~ 1-09 to meet the rule.
<b>PED5</b> Parameter Input ERR	Frequency Upper (1-10) and Lower Limit (1-11) setting are Incorrect - The setting of 1-10 and 1-11 are incorrect. - The setting of 1-10 and 1-11 don't meet the rule of $1-10 \geq 1-11$ .	- Check the setting for 1-10 and 1-11 then meet the rule.
<b>PED6</b> Parameter Input ERR	Jump Frequency setting are Incorrect - Jump Frequency setting 8-09~ 8-11 don't meet the rule of $8-09 \geq 8-10 \geq 8-11$ .	- Check the setting for 8-09~ 8-11 to meet the rule.

## 6. Appendix

### 6-1 Dynamic Braking Resister

Input Voltage Class	Applicable Motor		Equivalent SPECs of Additional BKR		Rough BR Torque (10% ED)
	KW	HP	W	Ω	
220	0.4	1/2	70	200	160%↑
	0.75	1	260	100	160%↑
	1.5	2	260	70	162%
440	0.75	1	70	750	126%
	1.5	2	260	400	119%

### 6-2 Input AC Reactor

Input Voltage		Applicable Motor		Rated Current A	Inductance mH
Class	Phases	KW	HP		
220	3Ø	0.4	1/2	2.5	4.2
	3Ø	0.75	1	5	2.1
	3Ø	1.5	2	10	1.1
440	3Ø	0.75	1	2.5	8.4
	3Ø	1.5	2	5	4.2

### 6-3 Input Noise Filter

Input Voltage		Applicable Motor		Standard Filter		
Class	Phases	KW	HP	Code	QTY	Rated Current A
220	3Ø	0.4	1/2	TDSNF 32006	1	6
	3Ø	0.75	1	TDSNF 32006	1	6
	3Ø	1.5	2	TDSNF 32012	1	12
440	3Ø	0.75	1	TDSNF 34006	1	6
	3Ø	1.5	2	TDSNF 34006	1	6

### 6-4 RFI Noise Filter (Zero-Phase Core)

**TEK-DRIVE** provides three kinds of RFI zero-phase cores, please choose the appropriate filter according to the difference application.



Type Code	Dimension (mm)		
	D	d	H
FC-63D*38d*12H	63	38	12
FC-80D*50d*20H	80	50	20

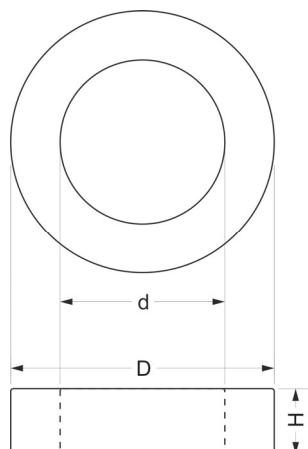
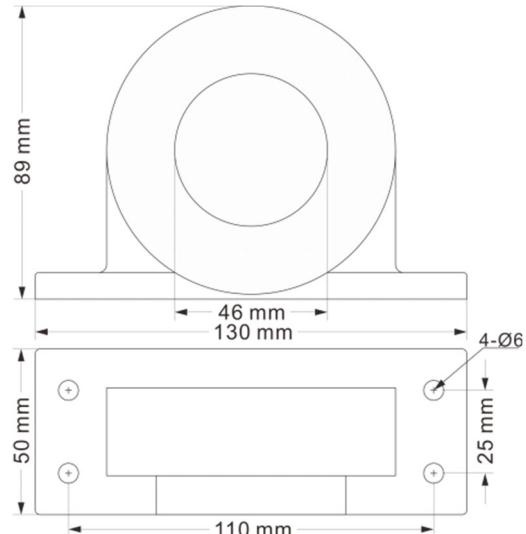
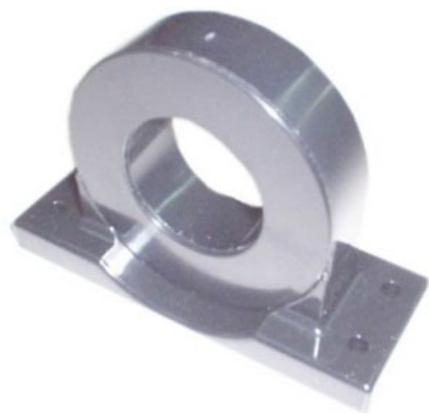
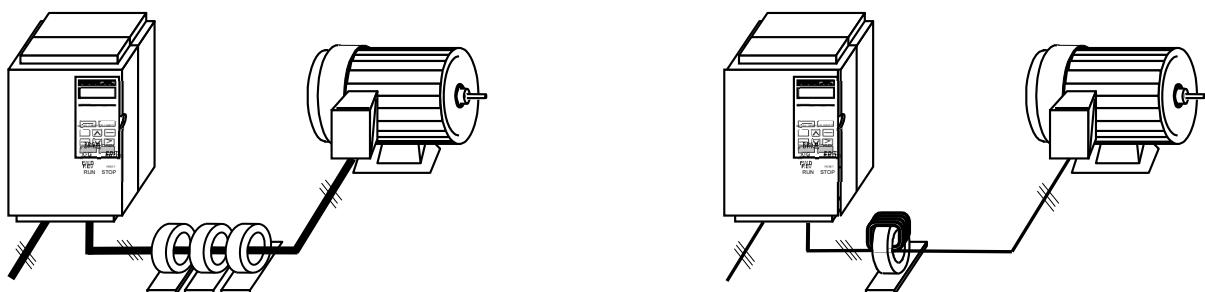


Fig. 6.1 Zero Phase Core



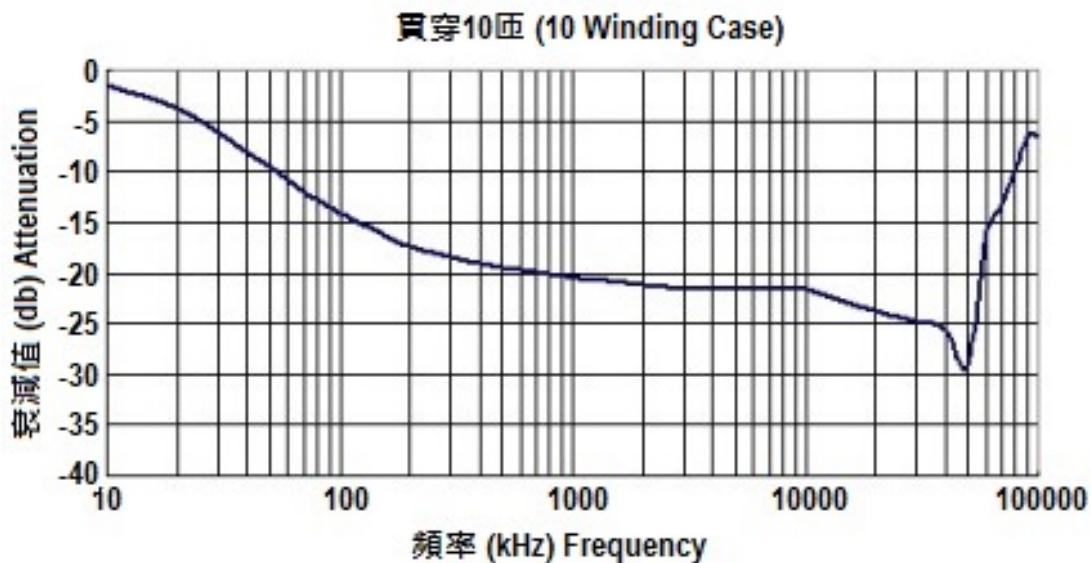
*Fig. 6.2 FC-ZF-46 (mounting base included)*

#### ❖ Installation Example



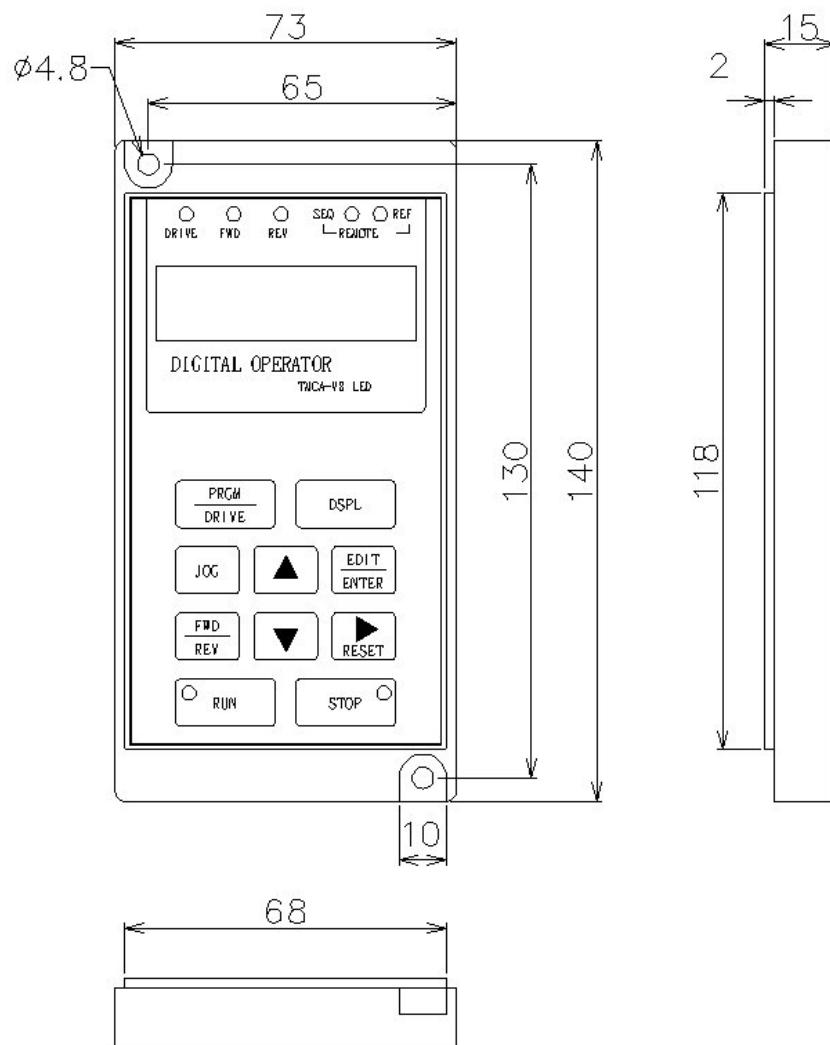
When install the zero-phase core, no matter it is installed on the input or output side of the inverter, the three wires (R, S, T or U, V, W) must run through the same zero-phase core together and be wound in the same direction then it is effective. And the installation location should be as close as possible to the inverter.

#### ❖ Attenuation characteristics



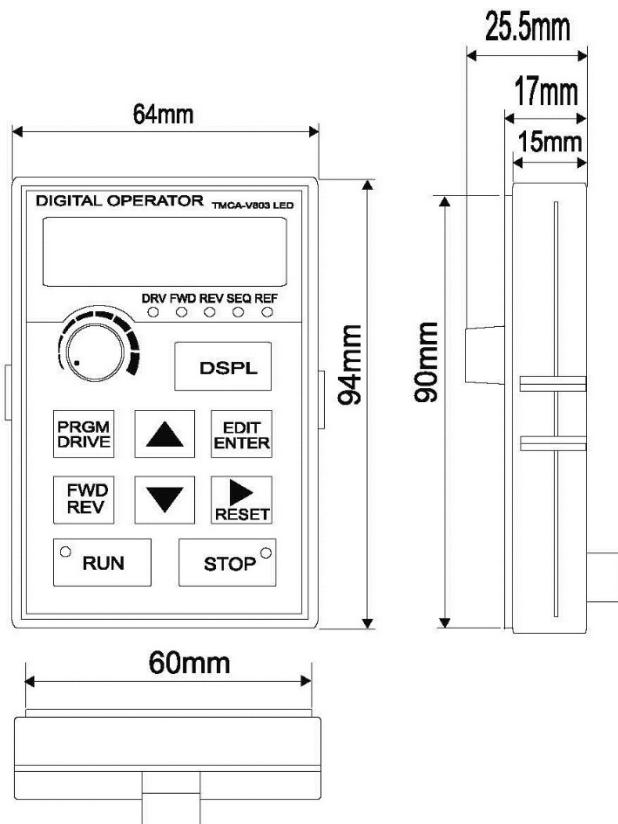
## 6-5 Mounting Dimension of External Remote Operator

### ■ TMCA-V8 LED Dimension

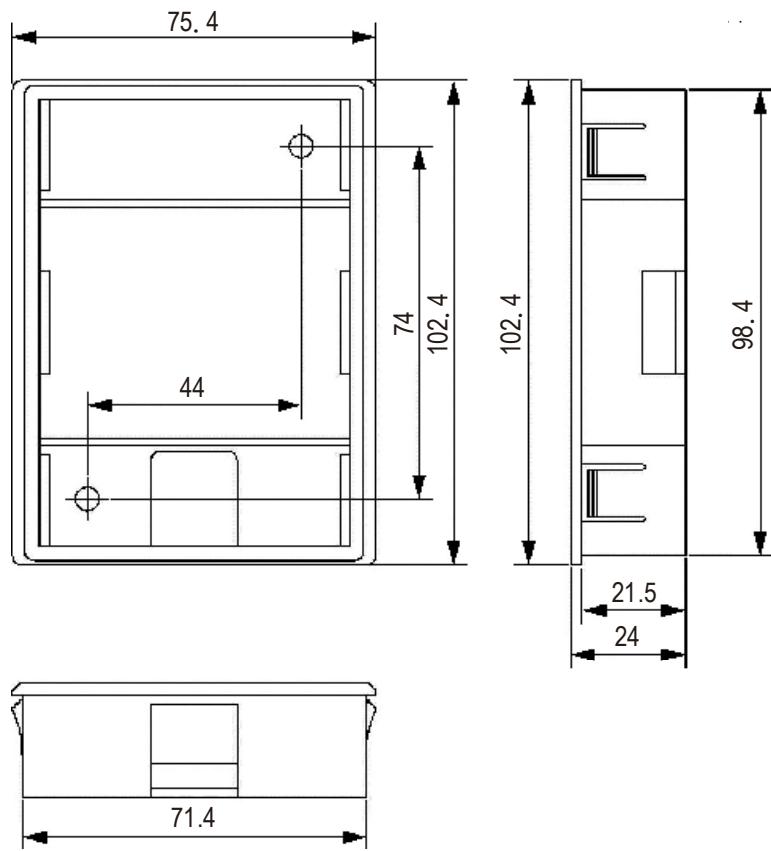


## ■ TMCA-V803 LED Dimension and Mounting Kit

### ❖ TMCA-V803 LED Dimension



### ❖ Mounting Kit



## 6-6 Abbreviation Index

In this manual, there are Abbreviation with Uppercase Words because of limited space in some tables, please refer the following explanation to know what the real meaning of the word.

Alphard	Abbreviation	Meaning
A	ACC	Acceleration, Accelerating, Accelerative
	APO	Auto Process Operation
	AVR	Auto Voltage Regulation
B	B.B.	Base Block
	BKR	Braking Resister
	BRK	Brake, Braking
C	CMD	Command
	CMN	Communication
	CTL	Control, Controlling
	CPS	Constant Pressure System
	CTV	Counter Target Value
D	DBV	DC Bus Voltage
	DEC	Decrease, Deceleration, Decelerating, Decelerative
	DET	Detection
	DRV	Drive
E	ERR	Error
	E.S.	Emergency Stop, Fast Stop
	ESD	Electrostatic Discharge
	EXT	External
F	FBL	Feed Back Loss
	FOUT	Output Frequency
	FRQ	Frequency
	FUN	Function
	FWD	Forward
I	INC	Increase
L	LOP	Local Operator, Operator, Keypad
	LVL	Level
M	MOD	Modbus
	MOP(s)	Motor Operated Potentiometer
	MTR	Motor
	MNR	Monitor
N	N.C.	Normal Close
	N.O.	Normal Open
O	OP	Operator, LOP or ROP
	OPN	Operation, Operating
P	PHC	Photo-coupler
	POT	Potentiometer
	PRM(s)	Parameter(s)
Q	QTY	Quality
R	REF	Reference
	ROP	Remote Operator, Operator, Keypad
	REV	Reverse
	RST	Reset or Mains Terminal Label
	RTN	Return, Back
S	SEL	Select, Selection
	SGN	Signal
	SPD	Speed
	SPEC(s)	Specification(s)
	STP	Stop
T	TMN(s)	Terminal(s)
	TRQ	Torque
V	VFD	Variable Frequency Drive, Inverter, Drive

