

# PISO-PS400 快速上手手冊

(Version 3.1)

PISO-PS400 軟體函式庫快速上手  
PCI BUS 系列控制卡



**ICP DAS CO., LTD.**

泓格科技股份有限公司

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# 1 PISO-PS400 運動控制卡簡介

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## 1.1 簡介

PS400 是一張支援 4 軸 步進/伺服 馬達運動控制卡，輸出 Pulse 可高達 4M PPS，適合一般運動控制的應用。函式庫本身提供非常多的功能讓客戶使用，例如 2/3 軸直線補間、2 軸圓(弧)補間、T-profile/S-curve 加減速曲線、多樣組合的同步控制、可規劃的自動歸原點等等，而 PS400 在執行上述功能時，並不需耗用 PC 系統資源，CPU 可同時監控其他執行狀態，由於只耗用少量系統資源，因此可以在 PC 插上多張 PS400 卡（一個系統中最多可控制 16 張 PS400 軸卡），以多軸(4、8....)運動控制於同一 PC 上。泓格亦提供相當多的範例程式及巨集功能，縮短程式設計的時間，以符合低成本高效能的運動控制系統設計平台。

## 1.2 硬體規格

### 1.2.1 主要規格

- |            |                    |
|------------|--------------------|
| ■ 控制晶片     | MCX314As           |
| ■ 控制軸數     | 4 軸,脈波式輸出(步進或伺服馬達) |
| ■ 最大輸出脈波速度 | 4 M PPS            |

### 1.2.2 補間功能

#### 2-軸 / 3-軸 直線補間

- |           |                                 |
|-----------|---------------------------------|
| ■ 每一軸補間區間 | -2,147,483,646 ~ +2,147,483,646 |
| ■ 補間向量速度  | 1 PPS ~ 4 M PPS                 |
| ■ 補間精度    | ± 0.5 LSB                       |

#### 圓弧補間

- |           |                                 |
|-----------|---------------------------------|
| ■ 每一軸補間區間 | -2,147,483,646 ~ +2,147,483,646 |
| ■ 補間向量速度  | 1 PPS ~ 4 M PPS                 |

#### 相關補間功能

- 可以選擇任意軸補間
- 固定向量速度
- 可連續補間

### 1.2.3 輸出脈衝

- 脈衝輸出速度範圍 1 PPS ~ 4 MPPS
- 脈衝輸出精度  $\pm 0.1\%$
- S-曲線衝量(Jerk) 範圍 954 ~  $62.5 \times 10^6$  PPS/S<sup>2</sup>  
477 x 10<sup>3</sup> ~ 31.25 x 10<sup>9</sup> PPS/S<sup>2</sup>
- 加減速範圍 125 ~ 1 x 10<sup>6</sup> PPS/S  
62.5x10<sup>3</sup> ~ 500 x 10<sup>6</sup> PPS/S
- 速度精度 1 PPS 到 500PPS(依最高速而定)
- 脈衝輸出數 0 ~ 4,294,967,295 / unlimited
- 速度曲線型態:
  - ◆ 定速
  - ◆ 對稱與非對稱T-profile型加減速
  - ◆ 對稱與非對稱S型加減速
- 減速度模式
  - ◆ 自動(對稱線性加減速) Auto
  - ◆ 自訂
- 於驅動中途可以動態改變速度及脈波數
- 定數脈波輸出可以用 T-profile/S-curve加減速
- 可選脈波輸出為CW/CCW 或 PULSE/DIR 方式
- 可以選擇邏輯準位 ( Rising Edge/ Falling Edge )

### 1.2.4 編碼器輸入

- 可選擇 A/B 相脈衝輸入或 Up/Down (CW/CCW) 脈衝輸入
- 可選擇 1、2 及 4 除頻 (A/B 相脈衝輸入)

### 1.2.5 位置計數器

- 指令位置計數器範圍 -2,147,483,648 ~ +2,147,483,647
- 實際位置(編碼器輸入)計數器範圍 -2,147,483,648 ~ +2,147,483,647
- 提供可設定為環狀計數器的特殊功能(圓位置)
- 編碼器輸入可設定反方向
- 實際位置可利用DI(IN3)輸入清除為零
- 位置計數器可以經由軟體函式讀取及設定



## 1.2.6 FRnet 串列式 DI/DO 功能

- 可串接遠端DI/DO模組（最多可接128DI及128DO）
- 可讀取遠端DI狀態
- 可控制遠端DO狀態

## 1.2.7 自動歸原點

- 自動歸原點步驟
  - ◆ 步驟 1 (高速找 "近原點" 感測器)
  - ◆ 步驟 2 (低速找 "原點" 感測器)
  - ◆ 步驟 3 (低速找伺服馬達Z相感測器)
  - ◆ 步驟 4 (高速到補正值位置)

雖然自動歸原點只須四個步驟，但是使用者可藉由軟體函式的內容加以變化而形成 10 種以上的歸原點模式，因為每一步驟都可設定要不要執行及其找尋方向

## 1.2.8 伺服馬達輸入訊號 Servo Motor Input Signal

- 警告 (Alarm)
- 可選擇伺服到位(In Position Check)
- 可以選擇 有效/無效 及 邏輯準位

## 1.2.9 極限訊號輸入

- 各軸 2 個極限訊號輸入+ 極限 (+EL), - 極限 (-EL)
- 可以選擇 邏輯準位 及 碰觸極限後的停止模式為：減速停或急停

## 1.2.10 其它輸入訊號 Other Input Signals

- 各軸 In3 可以用來做其他用途，如同步控制中之輸入事件

## 1.2.11 緊急停止訊號輸入, Emergency Stop Signal Input

- 每一模組提供一個緊急停止信號輸入

## 1.2.12 一般輸出訊號 General Output Signal

- 各軸 nOUT1 作為控制Servo On/Off 信號

## 1.2.13 整合輸入濾波器 Contents of integral type filters

- 對模組中一般DI輸入信號可以設定雜訊數位濾波(時間參數)功能

## 1.2.14 軟體極限

- 各軸可支援 2 個軟體極限 + 極限 (+SEL) , - 極限 (-SEL)  
可設定範圍(-2,147,483,646 ~ +2,147,483,646)

## 1.2.15 手搖輪功能

- A/B相手搖輪功能(Manual pulsar Mode)
- CW/CCW訊號輸入(定量模式)，指定步數輸出(Fixed Pulse Driving Mode)
- 準位訊號輸入(連續模式)，指定驅動速度(Continuous Pulse Driving Mode)
- 關閉手搖輪功能(Disable Mode)

## 1.2.16 同步作動

- 引發作動時機
  - ◆ 位置計數器值  $\geq$  COMP+ 時
  - ◆ 位置計數器值  $<$  COMP+ 時
  - ◆ 位置計數器值  $<$  COMP- 時
  - ◆ 位置計數器值  $\geq$  COMP- 時
  - ◆ 軸驅動啟動時
  - ◆ 軸驅動停止時
  - ◆ IN3 輸入電位上升時
  - ◆ IN3 輸入電位下降時
  - ◆ 讀取邏輯位置時
  - ◆ Activation command
- 同步處理動作
  - ◆ 啟動 +/- 固定脈波輸出
  - ◆ 啟動 +/- 連續脈波輸出
  - ◆ 驅動減速停止
  - ◆ 驅動立即停止
  - ◆ 儲存目前位置計數器值(指令位置或編碼器位置)
  - ◆ 設定目前位置計數器值(指令位置或編碼器位置)
  - ◆ 設定輸出步數
  - ◆ 設定輸出頻率

- ◆ 產生中斷信號

任一軸的動作可藉由上述之內容設定，而可指定任意其他軸來觸發

- 中斷信號處理 (不包含補間功能)

- 引發中斷的原因:

- ◆ 在加減速驅動模式中加速結束及減速開始時軸驅動停止時
- ◆ 位置計數器值  $\geq$  COMP- 時
- ◆ 位置計數器值  $<$  COMP- 時
- ◆ 位置計數器值  $\geq$  COMP+ 時
- ◆ 位置計數器值  $<$  COMP+ 時
- ◆ 這些中斷都可以啟動及關閉功能

### 1.3 環境參數 Environment

- 工作溫度 -20 ~ + 75°C
- 儲存溫度 -30 ~ +85°C
- 工作濕度 10 ~ 85%，非結露non-condensing
- 儲存濕度 5 ~ 90%，非結露non-condensing
- I/O 信號隔離 2500Vrms
- 外部供給電壓 24V DC (接線子板)

### 1.4 採購資訊 Ordering Information

- PISO-PS400 4 軸 PCI 運動控制卡
- DN-8468 PISO-PS400 端子板
- CA-SCSI15 68-pin SCSI-II 接頭線，長度:1.5 m

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## 2 硬體配線

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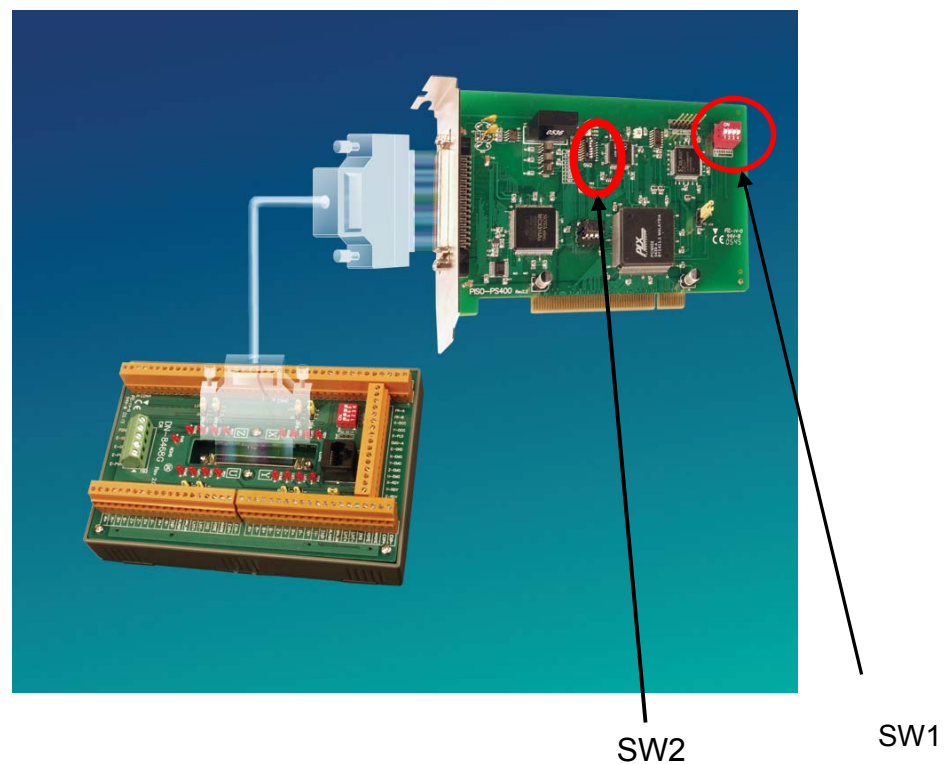
### 2.1 PISO-400 檢查包裝及安裝

#### 2.1.1 檢查包裝

- PISO-PS400                    PCI 4軸運動控制卡
- DN-8468                        PISO-PS400 配線端子板
- CA-SCSI15                    68-pin SCSI-II 接頭線，長度:1.5 m

#### 2.1.2 安裝

請先將電腦電源關閉，並選用空的 PCI 插槽插入板卡，並用螺絲鎖緊固定，並用 CA-SCSI15 聯接到 DN-8468 配線端子板，如下圖：



### 2.1.3 SW1 設定

SW1(1~4)為設定硬體卡號的調整鈕(也就所謂的卡ID, card ID位置請參考2.1.2標示), 使用者可以利用此調整鈕來設卡的ID(出廠預設為1~4皆為OFF, 卡ID=0), 如有其他卡時, 請調成不同卡號, 程式設計時, 會以此硬體卡號來辨識及下控制指令; 設定卡號的範圍為:0~15, 所以一個控制系統最多能插入16張卡;。

SW1	1	2	3	4
ON				
OFF				

← 預設值

### 2.1.4 SW2 設定

SW2(1~8)為FRnet的設定內容(詳細的SW2位置請參照2.1.2標示), 其中5為設定FRnet的傳輸速率(出廠預設值為ON:代表傳輸速率為250k, 若改為OFF, 則為傳輸速率為1M), 目前此SW2也僅開放給使用者可以設定傳輸率, 因此請勿任意更動其他SW2的內容, 而使用者在設定為1M的傳輸速率時, 後端的Slave模組, 必須是支援1M的模組, 這樣才可以運作。

SW2	1	2	3	4	5	6	7	8
ON								
OFF								

## 2.2 DN-8468 端子板

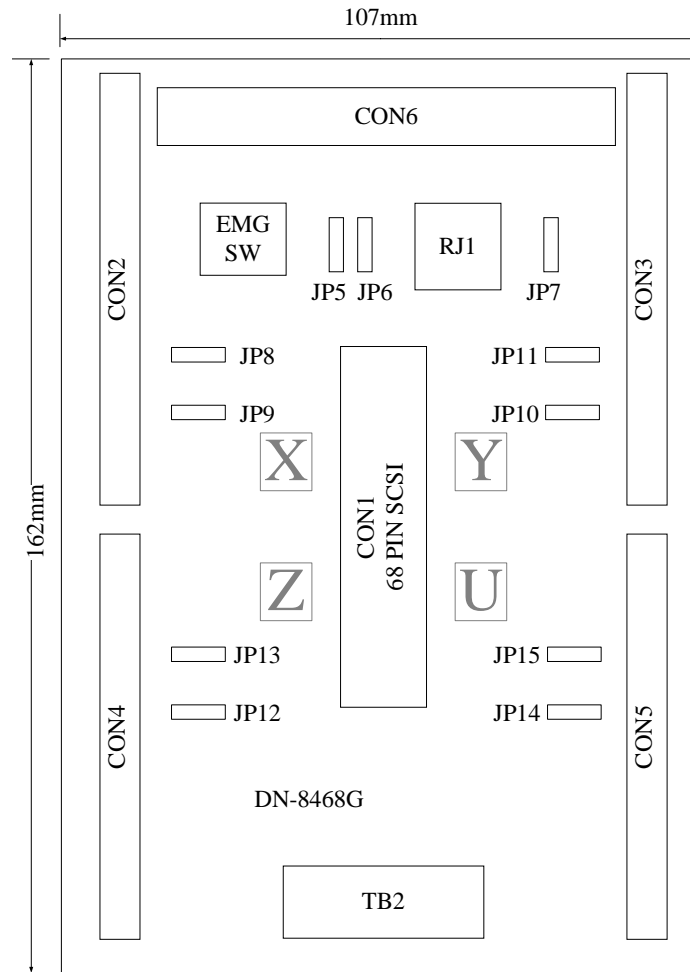


Fig. 2.0 DN-8468 位置圖

## 2.2.1 腳位定義

### ■ CON1 : PISO-PS400 卡與 DN-8468 連接接頭

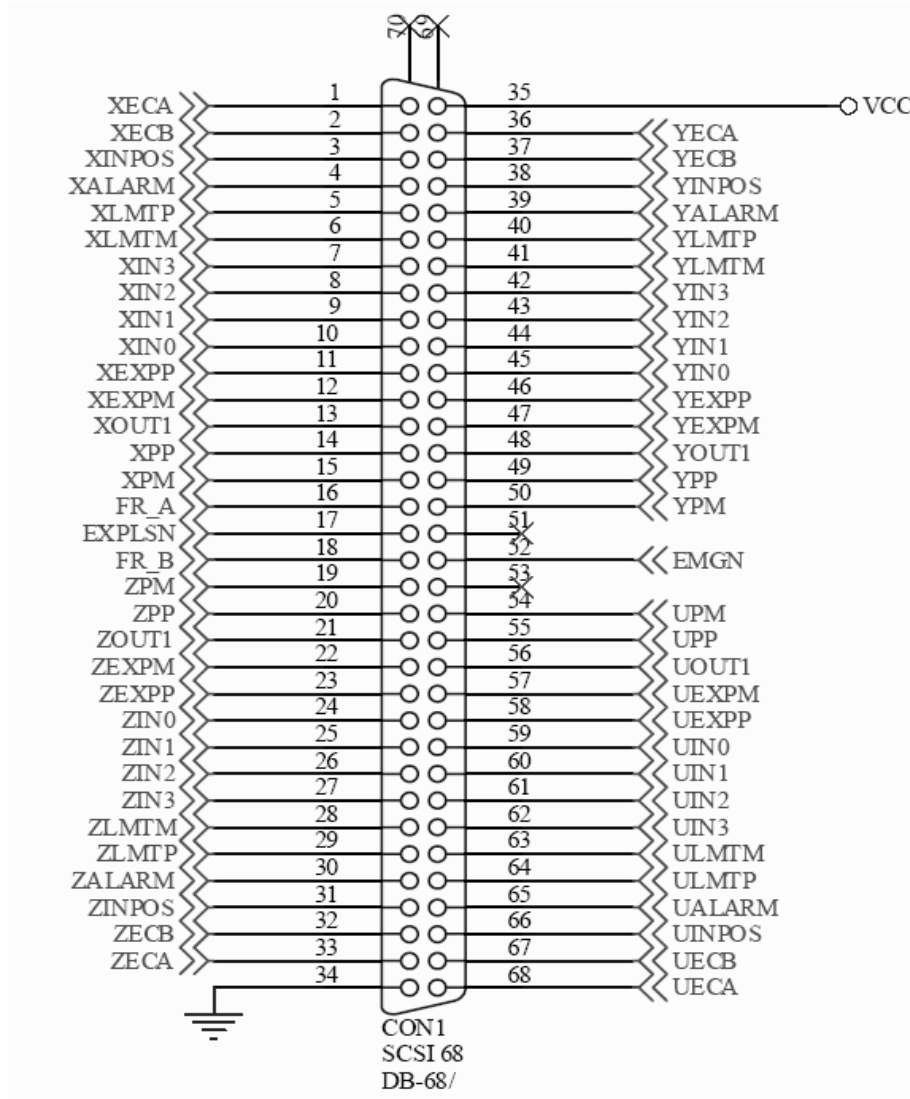


Fig. 2.1 DN-8468 CON1 連接線腳位圖



Table 2.1 DN-8468 CON1 連接線腳位說明 1

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTM	5	Limit switch input signal (+) for X axis
YLMTM	40	Limit switch input signal (+) for Y axis
ZLMTM	29	Limit switch input signal (+) for Z axis
ULMTM	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 2.2 DN-8468 CON1 連接線腳位說明 2

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
FR_A	16	FRnet A
NC	51	Reserved
FR_B	18	FRnet B
NC	53	Reserved
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
GND	34	Ground
VCC	35	Module power (+5V)

- CON2~5 各軸 (X、Y、Z、U) 之控制接點【Pulse 輸出 (±P/±N)；Encoder 輸入 (A±/B±/Z±)】及 I/O 信號接點【INP、ALARM、Home (ORG)、Limit、EXP、IN3 等】

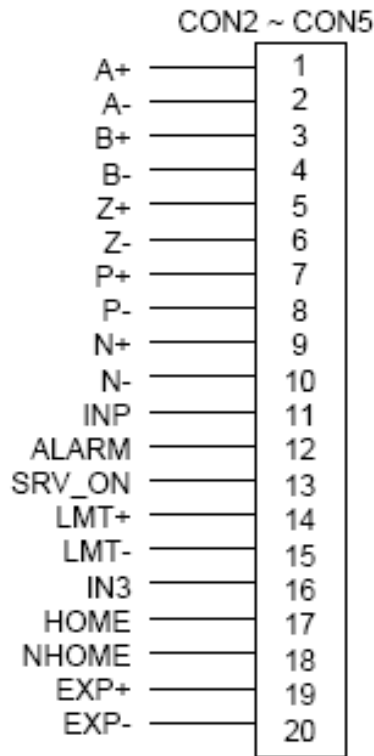


Fig. 2.2 Pin definition for CON2 ~ CON5

Table 2.3 CON2 ~ CON5 Signal Connection

Name	Number	Description
A+	1	Encoder A-Phase (+)
A-	2	Encoder A-Phase (-)
B+	3	Encoder B-Phase (+)
B-	4	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	6	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	9	Negative Direction Pulse Output(+)
N-	10	Negative Direction Pulse Output(-)
INP	11	Servo In Position
ALARM	12	Servo Alarm
SRV_ON	13	Servo On
LMT+	14	END Limit Signal (EL+)
LMT-	15	END Limit Signal (EL-)
IN3	16	Input Signal (IN3)
HOME	17	Home Sensor Input Signal
NHOME	18	Near Home Sensor Input Signal
EXP+	19	EXT Positive Direction Pulse (+)
EXP-	20	EXT Negative Direction Pulse (-)

- **CON6 FRnet 接點**：為串列分散式 I/O 控制點，其最大傳輸速率為 1M Hz，且為主動式之固定時間更新 I/O 點資料，每一週期時間為：0.76 Ms；最多可串接 128DI 及 128DO。

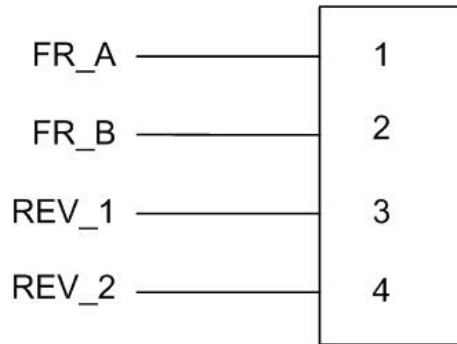


Fig. 2.3 CON6 腳位定義

Table 2.4 CON6

Pin name	Description
FR_A	FRnet A
FR_B	FRnet B
REV_1	Reserved
REV_2	Reserved

如運動控制內建 FR\_Net 分散式 DIO 控制器，可以外接高速 FR\_Net 模組，128 DI/128 DO 接線端子。

- **TB2 參考下列腳位圖**

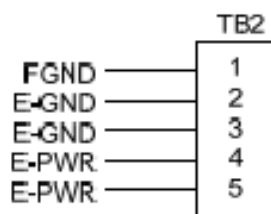


Fig. 2.4 Pin definition for TB2

Table 2.5 TB2 Signal Connection

Name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E\_PWR and E\_GND. Serious damage to your motion card and motion controller might be happen

■ RJ1 FRnet 接點,參考下列腳位圖

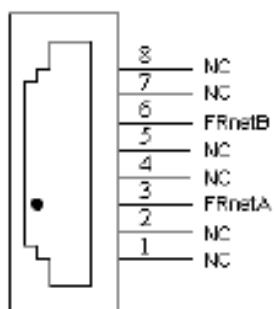


Fig. 2.5 Pin definition for RJ1

Table 2.6 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

► **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## 2.2.2 功能選擇(跳線設定)

### ■ JP7

Jumper 7 控制緊急停止輸入由外部提供或直接與GND點連接，1-2pin 短路須經由外部腳位接GND，2-3pin 短路為內部電路直接接GND

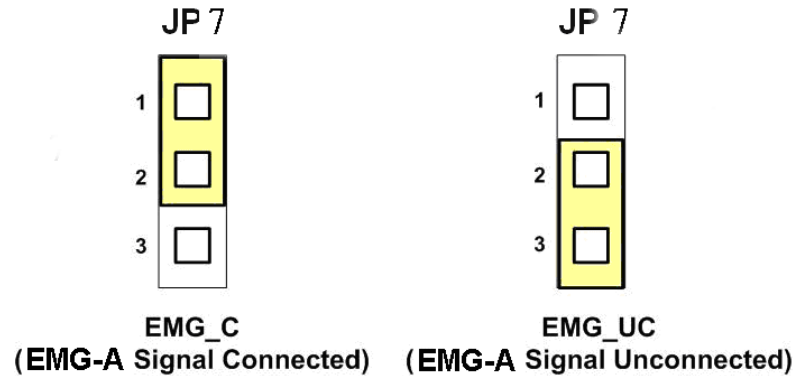


Fig. 2.5 Jumper 7 設定

### ■ JP8/9, JP10/11, JP12/13, JP14/15

Jumper 8、9 控制X軸(CON1) XPP、XPM訊號模式，2-3pin 短路為差動輸出 (Differential)；1-2pin 短路為開集極輸出(Open Collector)，同理其他各軸設定Y(JP10/11)、Z(JP12/13)、U(JP14/15)亦相同，如下圖範例

**注意：** 開集極輸出(Open Collector)，P+ (N+)和 EXT\_5V 短路，可供外部使用 (參考 Fig 2.10)。

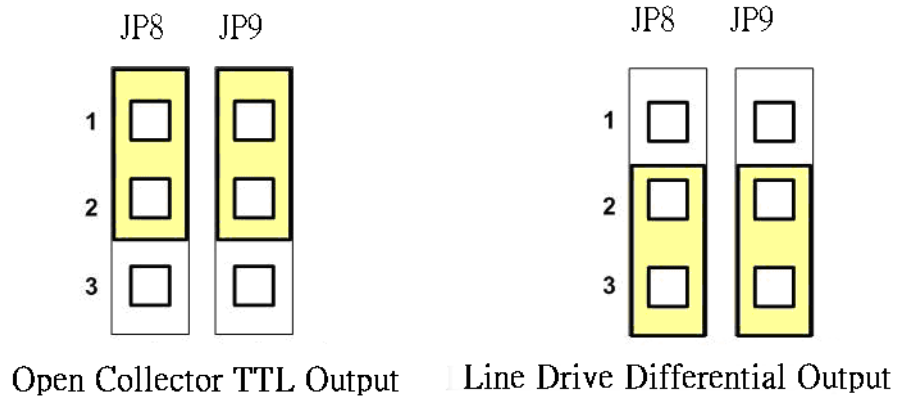


Fig. 2.6 Jumper 8, 9 設定

## ■ EMG SW

EMG SW 是將伺服馬達所上提供給EMG Stop訊號引出供給客戶配接使用，並非軸卡上之功能，客戶可以撥動EMG SW來選擇將此訊號配接於自行設計的安全開關連接使用或選擇不使用，若選擇不使用則是將此訊號直接短路到端子台的GND，若選擇使用則客戶可以將CON6上的EMG當成配接點來結合使用，請參考下圖：

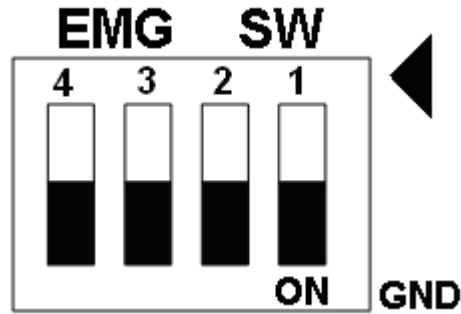


Fig. 2.7 EMG SW 設定為直接內部接 GND (預設值)

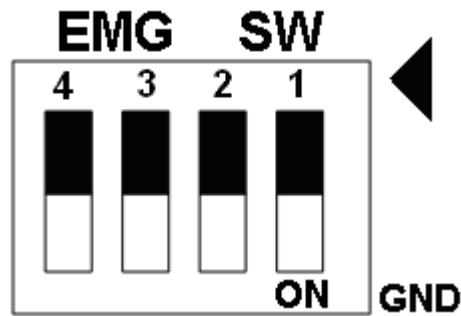


Fig. 2.8 EMG SW 設定為使用者自行配接點.

## 2.3 I/O 輸出入介面

### 2.3.1 脈波輸出介面及模式

脈波輸出介面有分差動式 (Differential-Type) 及開集極式 (Open-Collector) 兩種；而輸出模式也分為兩大類 (Pulse/Direction 及 CW/CCW)，我們將對上述內容做個別說明：

#### ◆ 差動脈波輸出接線

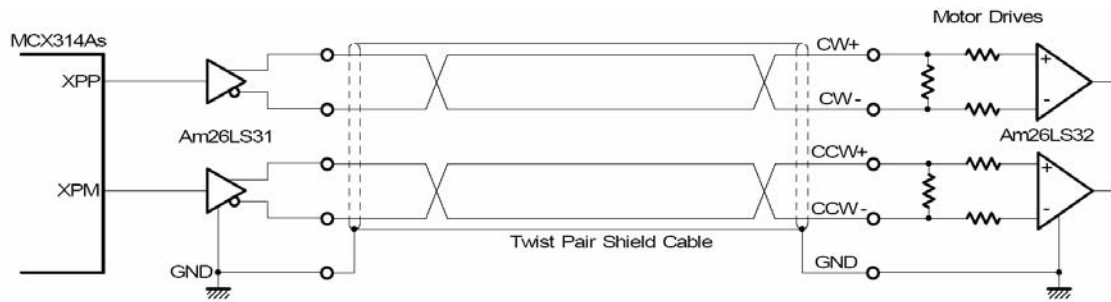


Fig. 2.8 差動脈波輸出接線

#### ◆ 開集極輸出

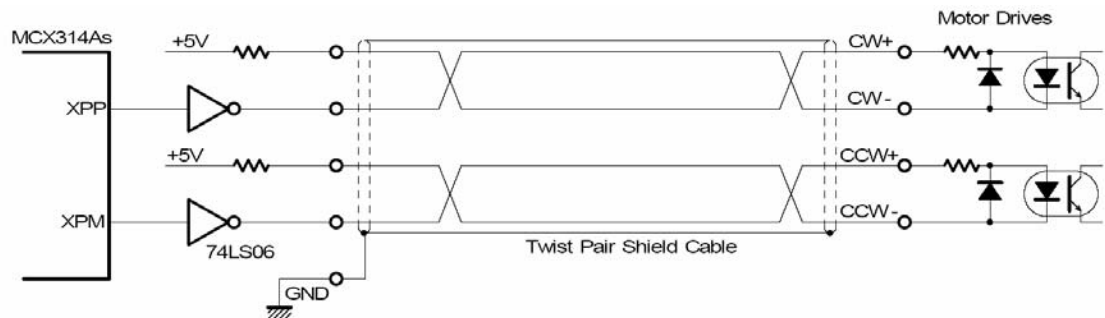


Fig. 2.9 開集極輸出

#### ◆ 脈波信號接線範例

PS400 脈波輸出命令，可以使用 CW/CCW 模式或用 PULSE/DIR 模式。利用 JP2 至 JP9 去選擇各軸為差動或開集極的接法。

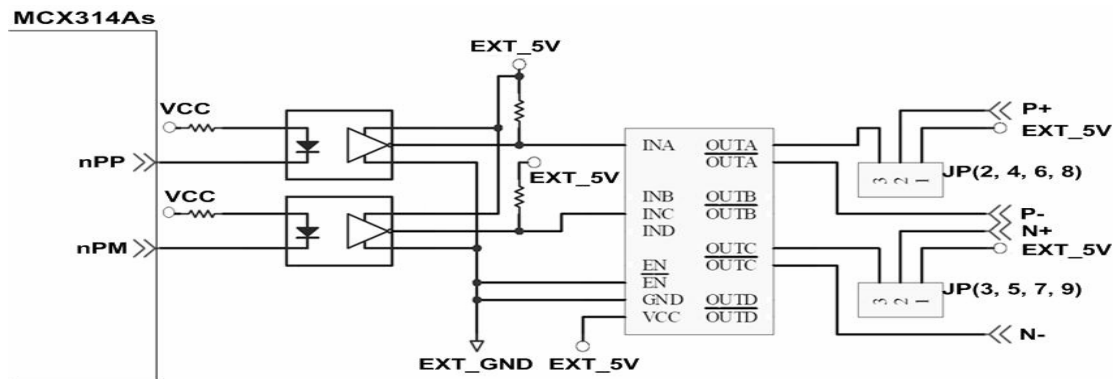
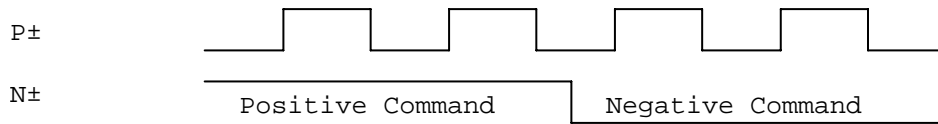


Fig. 2.10 脈波信號接線範例



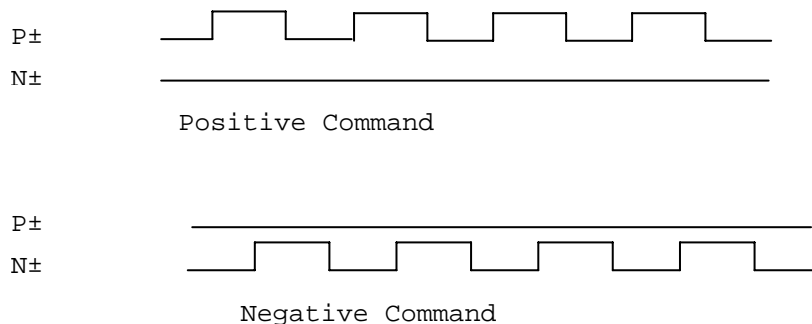
◆ 單一 Pulse 輸出模式 (Pulse/Direction) :

此模式脈衝輸出的特色為 Pulse 輸出點固定，皆由 Pulse 點輸出，而決定旋轉方向的部份是由 Direction 之電位來決定。請參考下圖：



◆ 雙 Pulse 輸出模式 (CW/CCW) :

此模式的脈衝輸出的特色為 Pulse 輸出點有兩點，而此兩點的輸出同時也決定了旋轉方向，請參考下圖：



### 2.3.2 極限開關接線(Connection for Limit switch Signal)

使用極限開關去防止機械過動作，設計者能透過本手冊的函式庫，去設定硬體極限開關的動作為 A 接點 (Normal open) 或 B 接點 (Normal close)。下面圖例，極限開關信號的接續迴路是為了要隔離雜訊源。

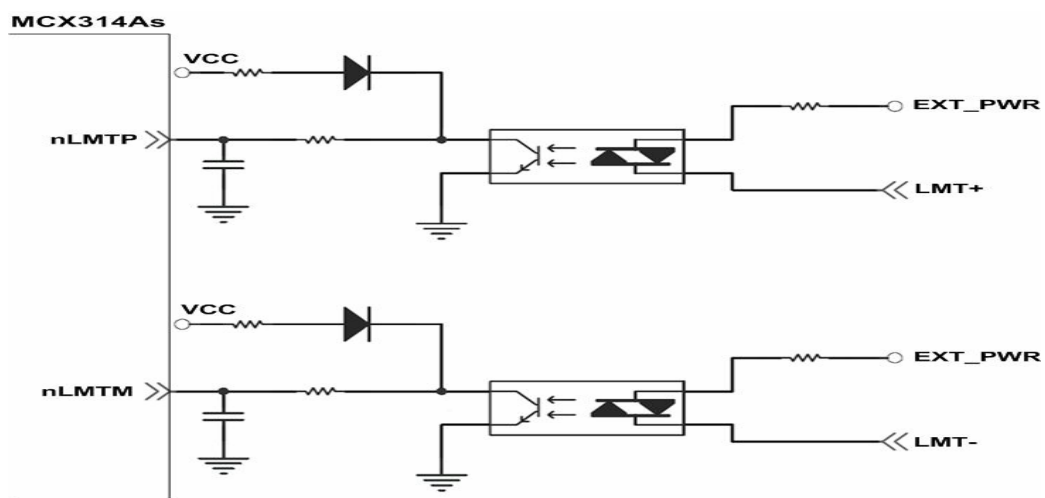


Fig. 2.11 極限開關接線範例

### 2.3.3 一般 DI 輸入接線(nINPOS,nALARM)

INPOS 輸入信號，是伺服驅動器 In-Position 的檢查信號。設計者能透過本手冊的函式庫去 enable/disable 這個信號。

ALARM 輸入信號，是伺服驅動器警報輸出信號，當 PS400 收到這個信號可以停止輸出脈波。設計者能透過本手冊的函式庫去 enable/disable 這個信號。

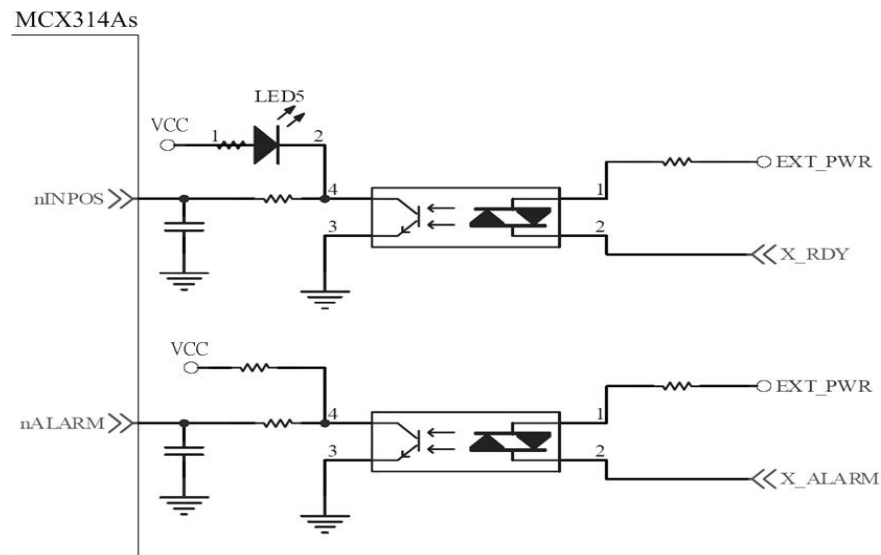


Fig. 2.12 一般 DI 輸入接線範例

### 2.3.4 Encoder 輸入接線(Encoder Signals)

下圖是一個 Encoder 輸入接線範例，是用差動輸入信號接法。要接 Encoder 輸入時，A 相請連接 A+、A-，B 相請連接 B+、B-，經過高速光耦合 IC 就直接連到運動控制晶片。

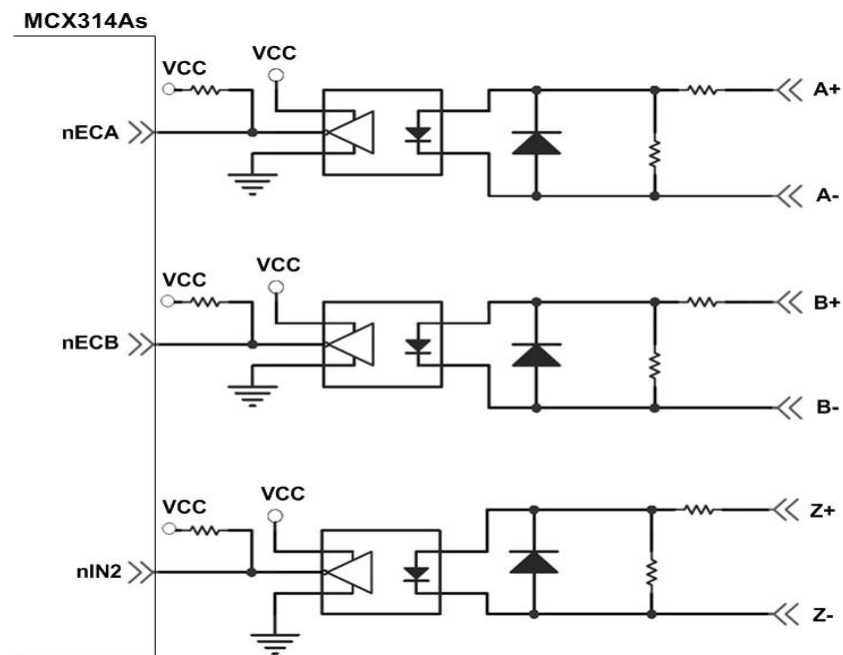


Fig. 2.13 Encoder 接線範例

## 2.3.5 緊急停止輸入接線(emergency stop signal)

下圖是一個緊急停止輸入接線範例，當緊急停止輸入被按下時，所有軸會立即停止輸出，錯誤旗標將設為 1，這信號經過高速光耦合 IC 就直接連到運動控制晶片。

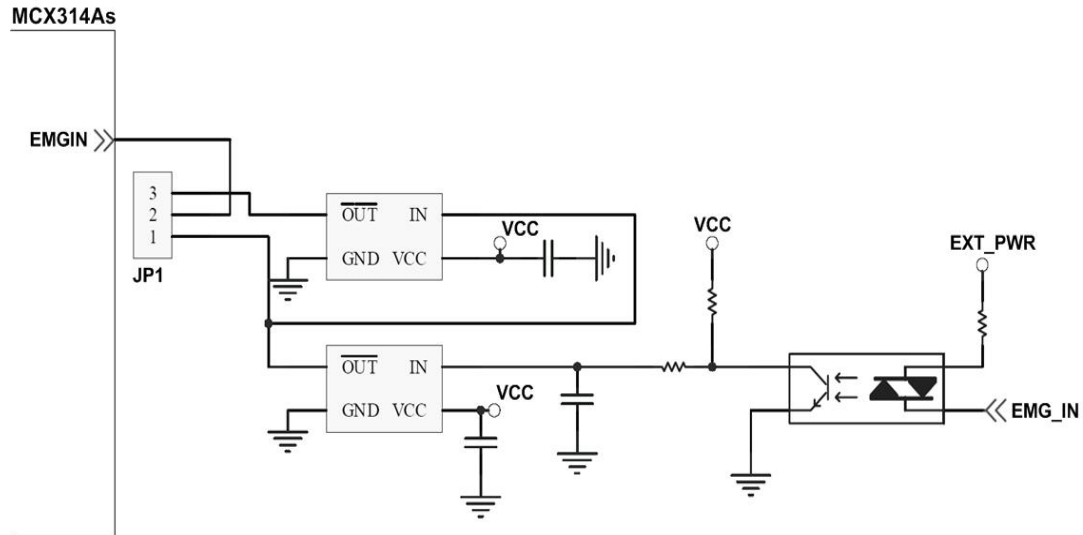


Fig. 2.15 緊急停止輸入接線範例

## 2.3.6 手搖輪信號輸入接線(EXP+,EXP-)

本信號用於手搖輪輸入驅動，下圖是外部信號 +/- 輸入接線範例，這輸入功能可用 5.1 章節中的固定脈波 (CW/CCW) 驅動、連續脈波 (CW/CCW) 驅動、手輪脈波驅動 (A/B phase) 三個功能可以應用。

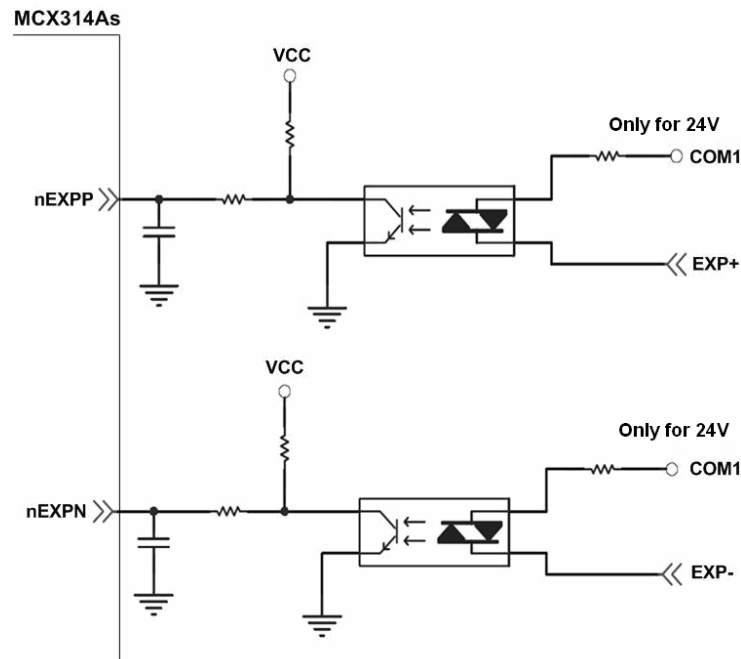


Fig. 2.16 外部信號 +/- 輸入接線範例

## 2.3.7 Servo On/Off 信號輸出接線(ENABLE)

下圖是 Servo On/Off 信號輸出接線範例，這輸出功能用於使每軸伺服馬達伺服啟動/關閉。

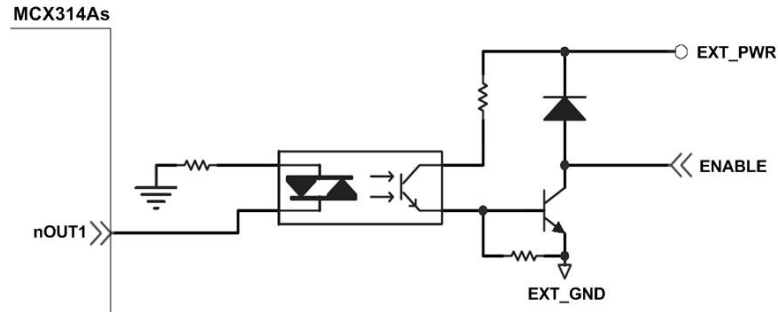


Fig. 2.17 Servo On/Off 信號輸出接線

## 2.4 接線範例

我們實際示範接 MITSUBISHI MR-J2S AC 伺服馬達，連接到 DN-8468 的接線腳位圖

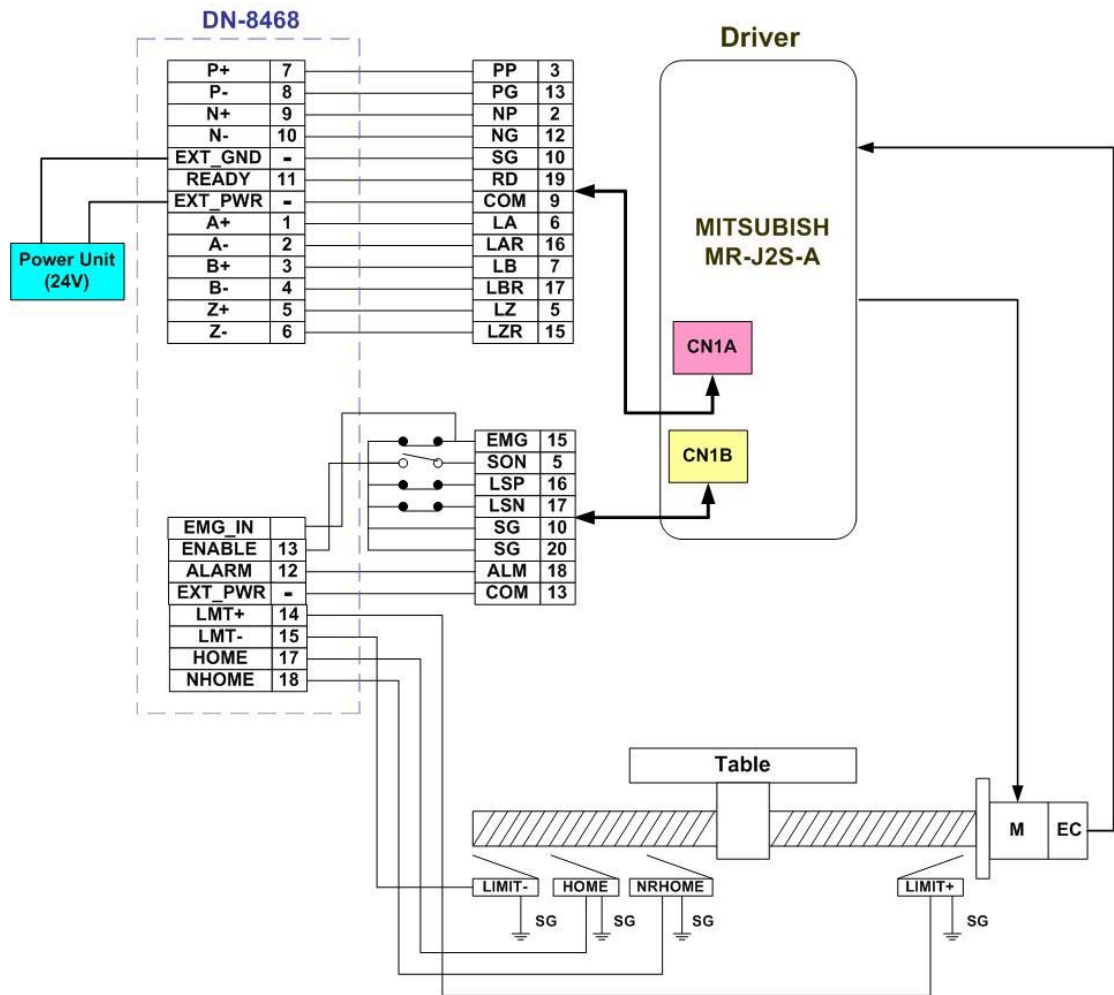
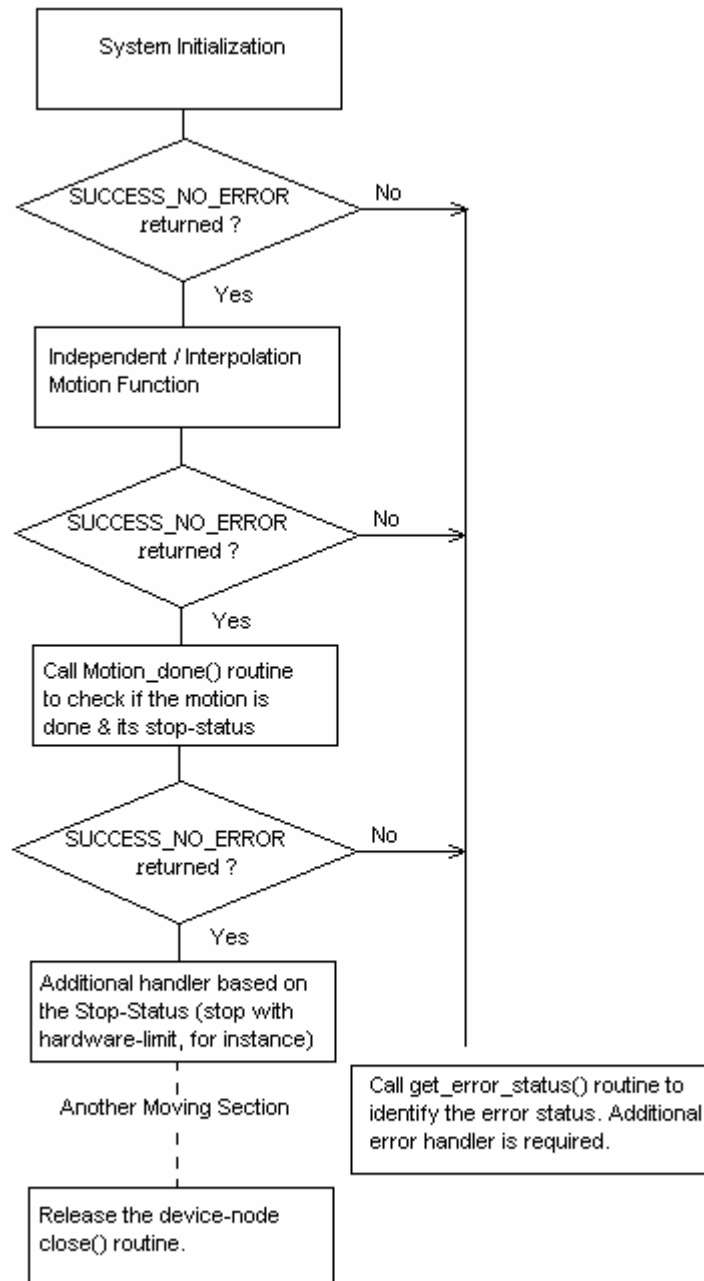


Fig. 2.18 MR-J2S AC 伺服馬達，連接到 DN-8468 的接線腳位圖

## 3 PISO-400 軟體函式軟體開發程序

### 3.1 軟體程式開發流程圖概觀



在安裝完成後，可以在 Samples/ 子目錄下找到 VC6, VB6 和 BCB6 的範例程式。請開啟個別的專案檔，並參考相關的範例程式。

## 3.2 安全 IO 規劃(會使 Motion 不動作原因)

### 3.2.1 緊急開關 (EMG) 輸入

緊急開關，是為因應緊急狀況，讓使用者在緊急時可以立即使Motion 動作停止，以保護人機安全。

如果您不用緊急開關，在 2.2.2 的JP1接為2-3pin。

如果您要使用緊急開關，在 2.2.2 的JP1接為1-2pin，EMG\_IN 請連到常閉型(Normal Close)開關，並將開關安裝到適當位置。

### 3.2.2 設定伺服馬達異常 ALARM 輸入參數

是為因應伺服馬達ALARM發生時輸入，讓使用者可以判斷及處理，您可以選擇使用與否，與適當觸發邏輯。詳情請參考“PS400軟體函式手冊 V3.0”，section 2.3.2

ps400\_set\_alarm()

### 3.2.3 設定各軸前後硬體極限 ( $\pm$ EL)

在一般機構設計時，為保護機構安全，會在機構的安全行程內設置前後硬體極限開關，讓使用者可以避免超出行程，如碰觸到前後硬體極限開關 PISO-PS400會自動停止，您可以選擇使用適當觸發邏輯。詳情請參考“PS400軟體函式手冊 V3.0”，section 2.2.5

ps400\_set\_limit () 功能

### 3.2.4 設定各軸前後軟體極限 ( $\pm$ SEL)

在一般機構設計時，為保護機構安全，會在機構的安全行程內設置前後硬體極限開關外，可以再加軟體極限，讓使用者可以提早避免超出行程，或免用硬體極限，如碰觸到前後軟體極限PS400會自動停止，您可以選擇使用與否，與設定位置。詳情請參考“PS400軟體函式手冊 V3.0”，section 2.3.4 ps400\_set\_softlimit () 功能

## 3.3 檢查是否有錯誤(GET\_ERROR)

每一個函式都會檢查所輸入的參數並回報是否有錯誤；而對於前一個函式執行時所遭遇的錯誤(例如碰撞到軟、硬體極限)，則會回應錯誤碼(-301~-315)，需要再使用 ps400\_get\_error\_status 取得相關原因。相關處理檢查，及正確設定詳情請參考“PS400軟體函式手冊 V3.0”，section 9.9 ps400\_get\_error\_status ()。

### 3.4 Motion 基本設定

Motion 基本設定主要是針對一般必要性設定分別如下:

- 1 軸輸出PULSE模式設定，Pulse/Dir、CW/CCW...

ps400\_set\_pls\_cfg () (詳情請參考 PS400軟體函式手冊, section 2.2.3)

- 2 設定各軸的速度、加速度的範圍與精確度

ps400\_set\_range()(詳情請參考 PS400軟體函式手冊, section 2.2.1)

- 3 設定編碼器輸入參數

ps400\_set\_enc\_cfg()(詳情請參考 PS400軟體函式手冊, section 2.2.4)

- 4 設定數位輸入雜訊濾波功能(如需要)

ps400\_set\_filter ()(詳情請參考 PS400軟體函式手冊, section 2.3.3)

- 5 指定軸為圓形運動軸(環狀計數器)(如需要)

ps400\_set\_vring ()(詳情請參考 PS400軟體函式手冊, section 7.1)

### 3.5 Motion 動作測試(手搖輪輸入)(如需要)

實際測試時可用手動驅動功能，做一些基本前後移動動作，確認DI信號是否正常，正負方向是否正確，以便做進一步線路及參數調整，主要有下列三種方法可以選其一運用:

- 1 手輪脈波驅動: 用A/B相手輪(手動脈波產生器，如附圖)做為前後之控制。

ps400\_set\_mpg()(詳情請參考 PS400軟體函式手冊, section 7.2)



- 2 固定脈波驅動: 利用兩按鈕開關，可設定每按一下走幾步(Pulse)，一按鈕控制Motion前進，另一按鈕控制後退。

ps400\_set\_mpg()(詳情請參考 PS400軟體函式手冊, section 7.2)

- 3 連續脈波驅動: 利用兩按鈕開關，可設定Pulse輸出速度(Hz)按下輸出，放開即停止，一按鈕控制Motion前進，另一按鈕控制後退。

ps400\_set\_mpg()(詳情請參考 PS400軟體函式手冊, section 7.2)

- 4 外部輸入關閉: 使用完上述三項功能，必須用此指令，將它關閉。

ps400\_set\_mpg ()(詳情請參考 PS400軟體函式手冊, section 7.2)

## 3.6 軸歸零

PS400 提供自動歸零功能，只要經適當設定後，即可下指令自動執行，主要步驟如下：

- 以高速尋找近原點開關
- 以低速尋找原點開關
- 以低速尋找伺服馬達 Z 相信號
- 以高速運動到補正值(Offset)位置(程式原點)

設定時，其中步驟可以選擇不執行，以符合客戶實際需求動作，執行時完全自動執行，節省 CPU 資源，及程式設計。雖然自動歸原點只須四個步驟，但是使用者可藉由軟體函式的內容加以變化而形成 10 種以上的歸原點模式，因為每一步驟都可設定要不要執行及其找尋方向

### 3.6.1 歸零設定

- 1 設定軸近原點及原點的輸入觸發邏輯

`ps400_set_home_cfg ()` (詳情請參考 PS400 軟體函式手冊, section 3.1)

- 2 設定歸零模式

`ps400_set_home_cfg ()` (詳情請參考 PS400 軟體函式手冊, section 3.1)

### 3.6.2 執行歸零設定

- 1 啟動軸歸零，包含設定歸零速度值及設定開始啟動速度

`ps400_home_start ()`(詳情請參考 PS400 軟體函式手冊, section 3.2)

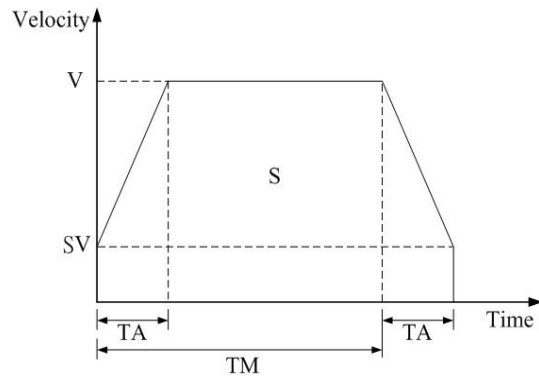
- 2 等待完成歸零動作

`ps400_motion_done ()`(詳情請參考 PS400 軟體函式手冊, section 9.1)

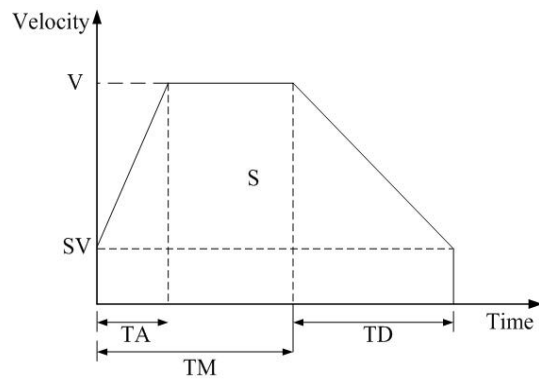


## 3.7 Motion 基本運作

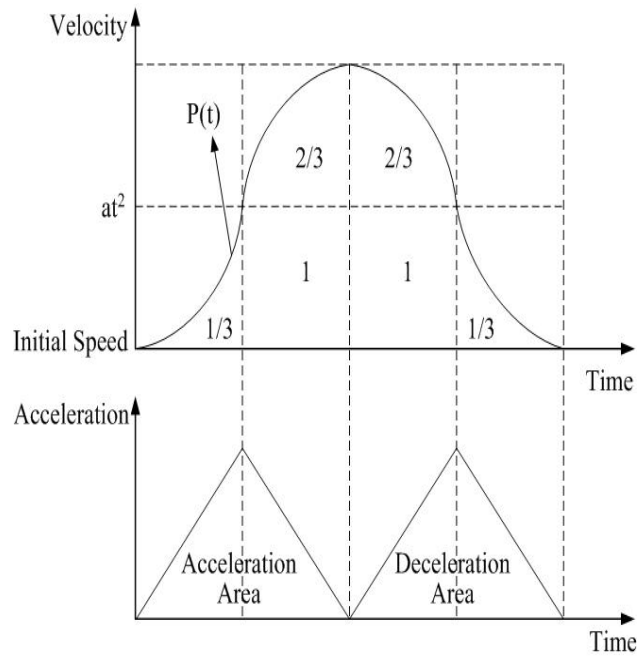
### 3.7.1 一般運動控制速度曲線分類



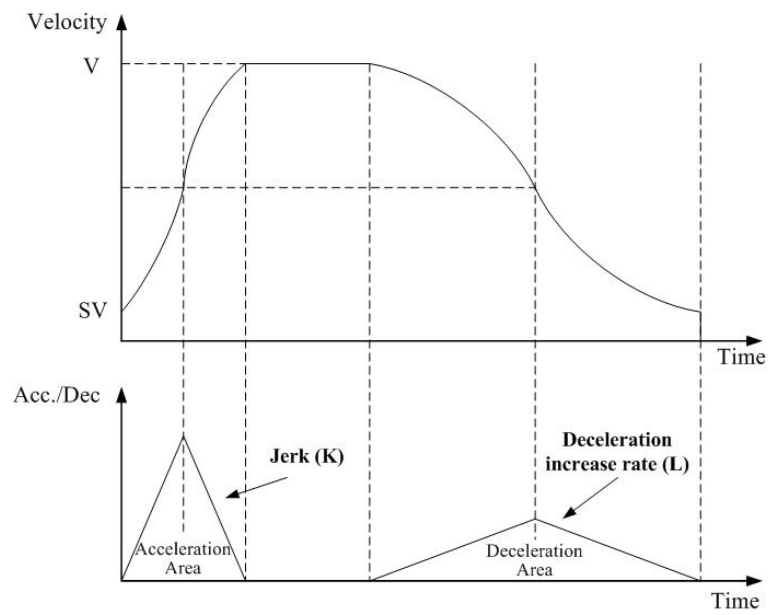
1 對稱 T 型運動控制速度曲線(如 SV 大於等於 V,將執行定速驅動)



2 非對稱 T 型運動控制速度曲線



3 對稱 S 型運動控制速度曲線



4 非對稱 S 型運動控制速度曲線

### 3.7.2 單軸 Motion 基本動作

- 1 固定脈波數輸出: 執行單軸固定步數輸出, 有五種速度模式可選擇使用以下相關函式。
  - 等速度曲線(V) → ps400\_const\_move()
  - 對稱 T 曲線 (SV、V、A、AO) → ps400\_t\_move()
  - 對稱 S 曲線 (SV、V、K、AO) → ps400\_s\_move()
  - 非對稱 T 曲線 (SV、V、A、D、AO) → → ps400\_t\_move()
  - 非對稱 S 曲線 (SV、V、K、L、AO) → ps400\_s\_move()(詳情請參考 PS400 軟體函式庫手冊, section 4.2~4.7)
- 2 連續脈波輸出: 執行單軸連續脈波輸出。
  - 相關函式: ps400\_velocity\_move()(詳情請參考 PS400 軟體函式庫手冊, section 4.1)
- 3 等待完成軸運動: 等待軸完成停止。
  - 相關函式: ps400\_motion\_done()(詳情請參考 PS400 軟體函式庫手冊, section 9.1)

### 3.7.3 多軸補間 Motion 基本動作

- 1 二軸直線補間: 執行二軸直線補間。
  - 相關函式: ps400\_t\_line2\_move()、ps400\_s\_line2\_move()。(詳情請參考 PS400 軟體函式庫手冊, section 5.1.1/5.1.2)
- 2 三軸直線補間: 執行三軸直線補間。
  - 相關函式: ps400\_t\_line3\_move()、ps400\_s\_line3\_move()。(詳情請參考 PS400 軟體函式庫手冊, section 5.1.3/5.1.4)
- 3 二軸圓弧補間: 執行二軸圓弧補間。
  - 相關函式: ps400\_t\_arc2\_move ()。(詳情請參考 PS400 軟體函式庫手冊, section 5.1.5)
- 4 多軸補間可採用的加速模式: 定速(constant speed)、T 型曲線加減速和 S 型曲線加減速。
- 5 同一時間只能使用一組補間軸。

### 3.7.4 多軸連續補間 Motion 動作

- 1 多軸連續補間只提供向量定速(Constant Vector Speed)，相關的補間軸必須先設定，且在連續補間過程內不能改變。  
相關函式：ps400\_conti\_interp\_begin()。  
(詳情請參考 PS400 軟體函式庫手冊, section 5.2.1)
- 2 連續補間必須在補間運動停止前準備好下一段補間運作，可以透過 ps400\_conti\_interp\_next\_ready() 確定是否可設定下一段補間運動。  
(詳情請參考 PS400 軟體函式庫手冊, section 5.2.2)
- 3 在連續補間期間可使用直線與圓弧補間。  
相關函式：ps400\_conti\_line2\_move()、ps400\_conti\_line3\_move()、ps400\_conti\_arc2\_move()。  
(詳情請參考 PS400 軟體函式庫手冊, section 5.2.3 / 5.2.4)
- 4 結束連續補間必須呼叫 ps400\_conti\_interp\_end()。  
(詳情請參考 PS400 軟體函式庫手冊, section 5.2.5)

### 3.8 Motion 同步運動

提供使用者可以設定2軸(含)以上同步運動條件因子

相關函式: ps400\_set\_synch()

(詳情請參考 PS400軟體函式庫手冊, section 7.6)

當設定的同步處理動作為「啟動固定脈波輸出」時，則可以透過下列函式設定運作的相關參數。

相關函式: ps400\_synch\_t\_move\_cfg(),ps400\_synch\_s\_move\_cfg()

(詳情請參考 PS400軟體函式庫手冊, section 7.7 / 7.8)

# 4 PISO-PS400 PCEzGo(by Basic Function)

PISO-PS400 PCEzGo 以此主畫面為起始點，依功能分類主要可分為 4 種功能項目：



## 1、初始化設定 (Configuration)：請參閱 4.1 節

關於初始化設定對話盒(Configuration Dialog)設定上可分為硬體訊號(Hardware Signals)、軟體極限訊號(Software Limit)、伺服訊號(Servo Input & Enable Signals)、信號慮波器(Input Signal Filter)，和中斷訊號 (Interrupt Factor) 等設定。詳細說明請參考各節說明。

## 2、基本運動命令(Basic Operation)：請參閱 4.2 節

關於基本運動命令對話盒(Basic Operation Dialog)動作上可分為等速、梯形加減速、S 曲線加減速，原點返回與外部訊號吋動模式。詳細說明請參考各節說明。

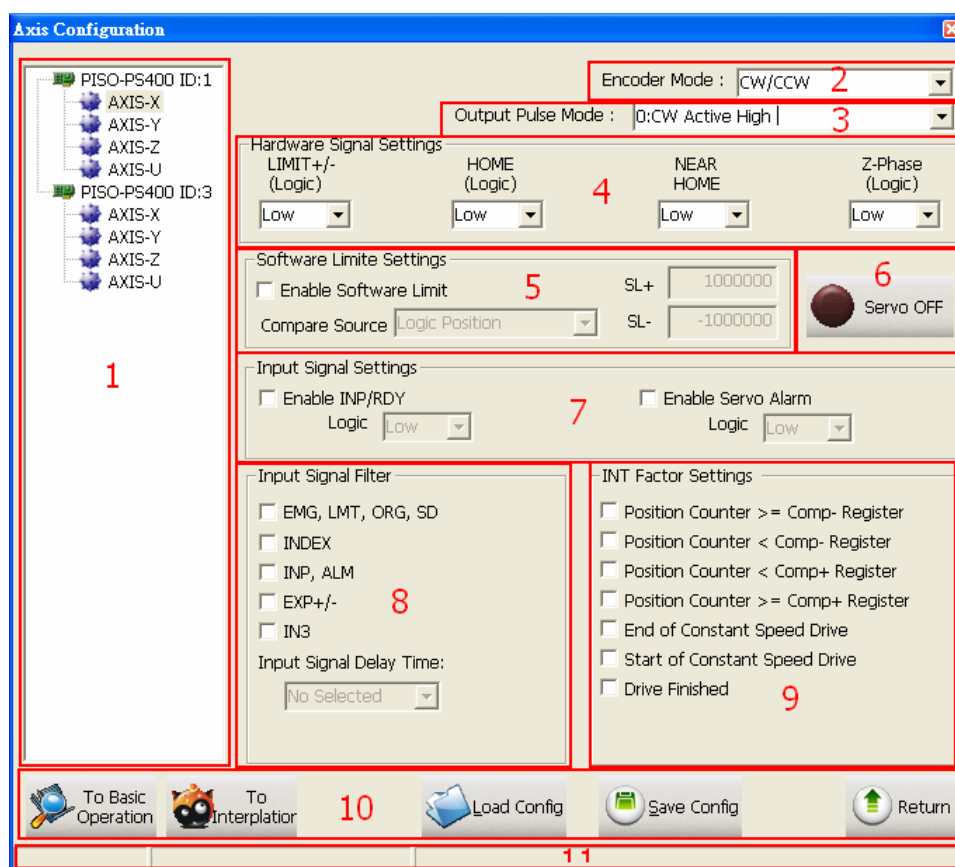
## 3、補間運動命令 (Interpolation)：請參閱 4.3 節

關於補間命令對話盒(Interpolation Dialog) 動作上可分為直線及圓弧補間運動。詳細說明請參考各節說明。

## 4、FRnet DI/DO (FRnet DI/DO)：請參閱 4.4 節

關於 FRnet DI/DO 對話盒，為遠端 FRnet 模組的資料傳輸測試，FRnet 不需 CPU 處理通訊且以固定的時間掃描動態資料，配合運動控制。詳細說明請參考各節說明。

## 4.1 初始化設定對話盒(Configuration Dialog)



### 群組定義&使用說明

#### 1. 指定所要設定的軸：

- 以樹狀結構顯示目前在系統上可使用的 PISO-PS400，用以指定位於特定板卡上所設定的軸。

#### 2. 編碼器輸入模式(Encoder Mode)：

- 可分為 4 種模式：1/1 AB Phase、1/2 AB Phase、1/4 AB Phase、CW/CCW。
- 相關函數指令：ps400\_set\_enc\_cfg()。

#### 3. 脈波輸出模式(Output Pulse Mode)：

- 可分為 6 種模式：0, 1 為 CW/CCW 雙脈波模式；2~5 為 PULSE/DIR 單脈波模式。
- 相關函數指令：ps400\_set\_pls\_cfg()。

#### 4. 硬體訊號設定(Hardware Signals Settings)：

- 可分為正負極限(LIMIT+/-)、原點訊號(HOME)、接近原點訊號(NEAR HOME)、馬達編碼器 Z 相訊號(INDEX)。以上每個硬體訊號可四軸個別獨立設定其邏輯位準(High/Low)。

- 相關函數指令：ps400\_set\_limit()、ps400\_set\_home\_cfg()。

#### 5. 軟體極限設定(Software Signals Settings)：

- 說明請參考 3.2.4 節。
- 相關函數指令：ps400\_set\_softlimit()。

#### 6. 伺服開關訊號(Servo On/Off)：

- 在所選取的軸上(Card Configuration)啟動或停止伺服馬達。
- 相關函數指令：ps400\_servo\_on()。

#### 7. 伺服輸入訊號(Servo Input Signal)：

- 伺服警告訊號可致能或除能，可選擇邏輯位準。
- 相關函數指令：ps400\_set\_alarm()。

#### 8. 輸入信號之數位濾波器(Input Signals Filter Settings)：

- 設定輸入濾波延遲時間參數如下表所示：

代號	可移除最大雜訊寬(width)	輸入延遲時間
0	1.75μSEC	2μSEC
1	224μSEC	256μSEC
2	448μSEC	512μSEC
3	896μSEC	1.024 mSEC
4	1.792 mSEC	2.048 mSEC
5	3.584 mSEC	4.096 mSEC
6	7.168 mSEC	8.192 mSEC
7	14.336 mSEC	16.384 mSEC

- 設定數位濾波訊號：  
FE0為緊急停止訊號(EMGN)、左右極限(LMT)、原點訊號(IN1)，以及靠近原點訊號(IN0)。  
FE1為編碼器Z相訊號(IN2)。  
FE2為馬達完成訊號(RDY)和馬達警告訊號(ALM)。  
FE3為外部輸入正負方向訊號(EXP+/EXP-)。FE4為IN3訊號。
- 相關函數指令：ps400\_set\_filter()。

#### 9. 中斷向量設定(INT Factor Settings)：

- PISO-PS400 運動控制卡提供多種中斷事件的設定。包括有位置計數器大於等於負方向比較計數器(Position Counter >= Comp-)、位置計數器小於負方向比較計數器(Position Counter < Comp-)、位置計數器大於等於正方向比較計數器(Position Counter >= Comp+)、位置計數器小於正方向比較計數器(Position Counter < Comp+)、等速段的終

點(End of Constant Speed Drive)、等速段的起點(Start of Constant Speed Drive)、驅動結束(Drive Finished)。使用者可利用 Windows 系統函式，WaitForSingleObject，等待個別軸的事件(Event)。請參閱 VC6 的範例程式(INT\_EVENT)。

- 相關函數指令： ps400\_set\_int\_factor()、ps400\_int\_event\_config()。

## 10. 按鈕功能

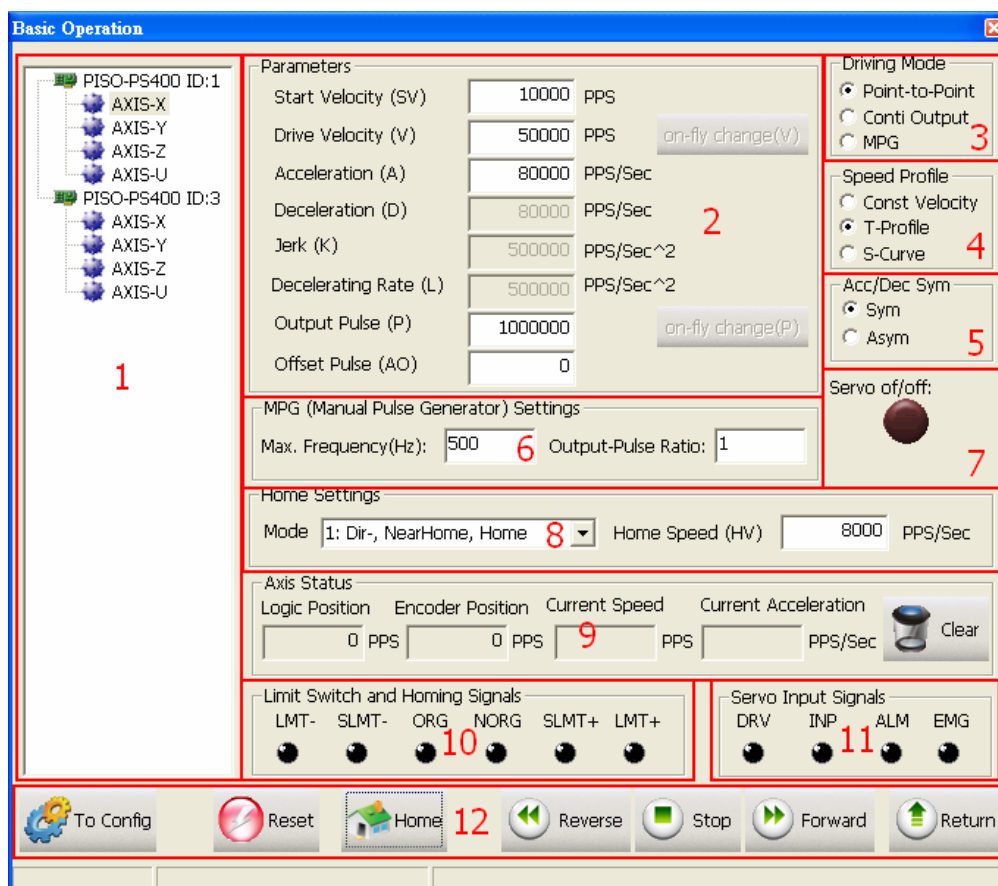
- To BasicOperation：切換到 Basic Operation Dialog。
- To Interpolation：切換到 Interpolation Dialog。
- LoadConfig：載入預先儲存的設定檔。
- SaveConfig：儲存相關硬體訊號設定儲存至設定檔。
- Return：返回起始畫面。

## 11. 狀態顯示

- 顯示錯誤軸的狀態。



## 4.2 基本運動命令 (Basic Operation Dialog)



### 群組定義&使用說明

#### 1. 指定所操作的軸：

- 以樹狀結構顯示目前在系統上可使用的 PISO-PS400，用以指定位於特定板卡上所要操作的軸。

#### 2. 運動參數設定(Parameter)

- 可設置初始速度(SV)、驅動速度(V)、加速度(A)、減速度(D)、加速率(Jerk)、減速率(L)、輸出 PULSE(P)、位移 PULSE(AO)的值。

#### 3. 驅動模式設定 (Driving Mode)

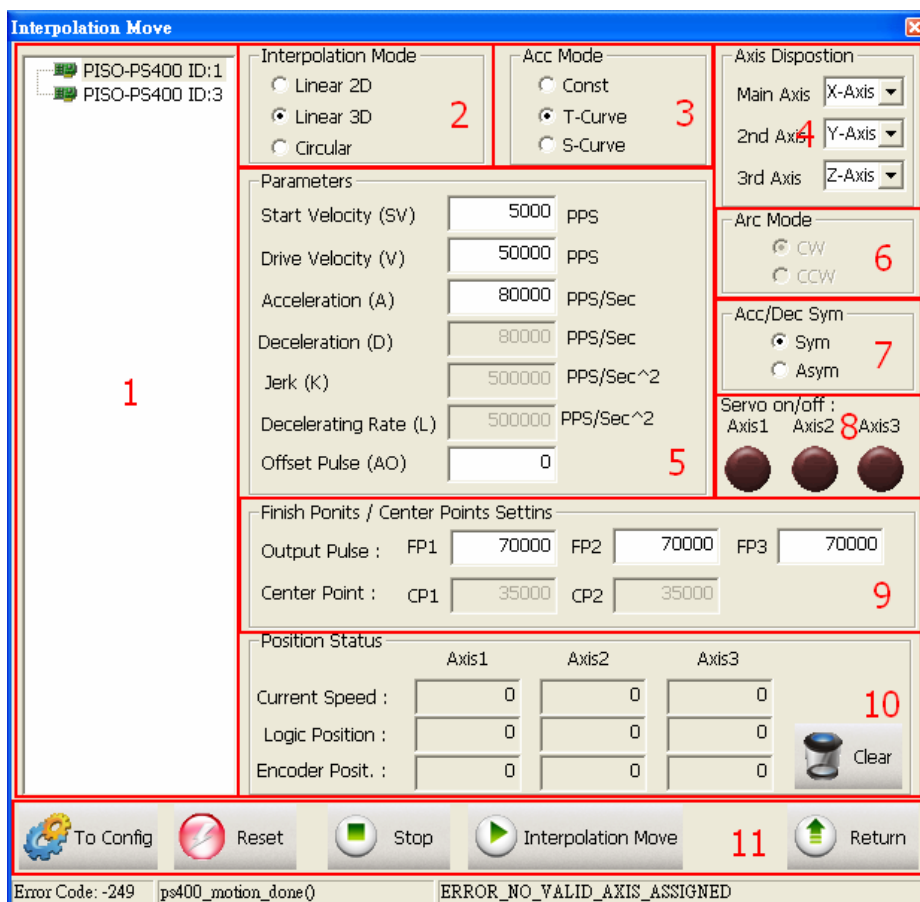
- 可選擇點對點定量模式(point-to-point)、連續模式(conti-output)、手搖輪模式(MPG)。

#### 4. 加速模式設定 (Speed Profile)

- 可選擇定速度運動模式(Const Velocity)、T 曲線模式(T-Profile)、S 曲線模式(S-Curve)。

5. 加減速曲線對稱設定 (Acc/Dec Sym)
  - 可選擇對稱模式(Sym)、非對稱模式(Asym)
6. 手搖輪設定 (MPG Setting)
  - 設定手搖輪最大頻率與輸出倍率。
7. 伺服啟動狀態 (Servo On/Off)
  - 顯示設定軸的伺服馬達啟動狀態。
8. 原點返回設定 (Home Setting)
  - 設定返回原點的運動模式與速度。
  - 相關函數指令： `ps400_set_home_cfg()`。
9. 運動軸狀態顯示 (Axis Status)
  - 其中位置與速度計數器子頁提供顯示各軸之邏輯位置計數器、編碼器位置計數器、即時速度、即時加速度等資訊。
  - 相關函數指令： `ps400_get_cmdcounter()`、`ps400_get_position()`、`ps400_get_speed()`、`ps400_get_acc()`。
10. 原點與極限點狀態 (Limit Switch and Homing Signals)
  - 顯示原點、近原點、軟體極限點與極限點狀態。
  - 相關函數指令： `ps400_get_int_status()`。
11. 伺服輸入信號狀態顯示 (Servo Input Signals)
  - 顯示伺服輸入信號狀態顯示。
12. 按鈕功能
  - To Config：切換到 Axis Configurature Dialog。
  - Reset：回復至板卡的初始狀態。
  - Home：啟動原點返回。
  - Reverse：啟動負方向運動。
  - Stop：停止運動。
  - Forward：啟動正方向運動。
  - Return：返回起始畫面。

## 4.3 補間運動對話盒 (Interpolation Dialog)



### 群組定義&使用說明

1. 指定所操作的板卡：
  - 以樹狀結構顯示目前在系統上可使用的 PISO-PS400，用以指定所要操作的板卡。
2. 補間模式設定 (Interpolation Mode)
  - 提供基本的 2 種補間模式：直線補間(Linear)與圓弧補間(Circular)。
  - 相關函數：ps400\_t\_line2\_move()、ps400\_s\_line2\_move()、ps400\_t\_line3\_move()、ps400\_s\_line3\_move()、ps400\_t\_arc2\_move()。
3. 加速模式設定 (Acc Mode)
  - 補間運動可選擇 3 種加速模式：等速(Const)、梯形加減速(T-Curve)、S-Curve 加減速(S-Curve)。
4. 補間軸配置 (Axis)
  - 設定補間軸。

## 5. 補間運動參數設定(Parameters)

- 可設置初始速度(SV)、驅動速度(V)、加速度(A)、減速度(D)、加速率(Jerk)、減速率(L)、輸出 PULSE(P)、位移 PULSE(AO)的值。

## 6. 圓弧補間方向設定 (Arc Mode)

- 圓弧補間方向可分為順時針方向(CW)與逆時針方向(CCW)。

## 7. 加減速曲線對稱設定 (Acc/Dec Sym)

- 可選擇對稱模式(Sym)、非對稱模式(Asym)

## 8. 伺服啟動狀態 (Servo On/Off)

- 顯示設定軸的伺服馬達啟動狀態。

## 9. 圓弧補間參數設定(Finish Points/Center Points Setting)

- 設定補間的結束點與圓弧補間的原點。

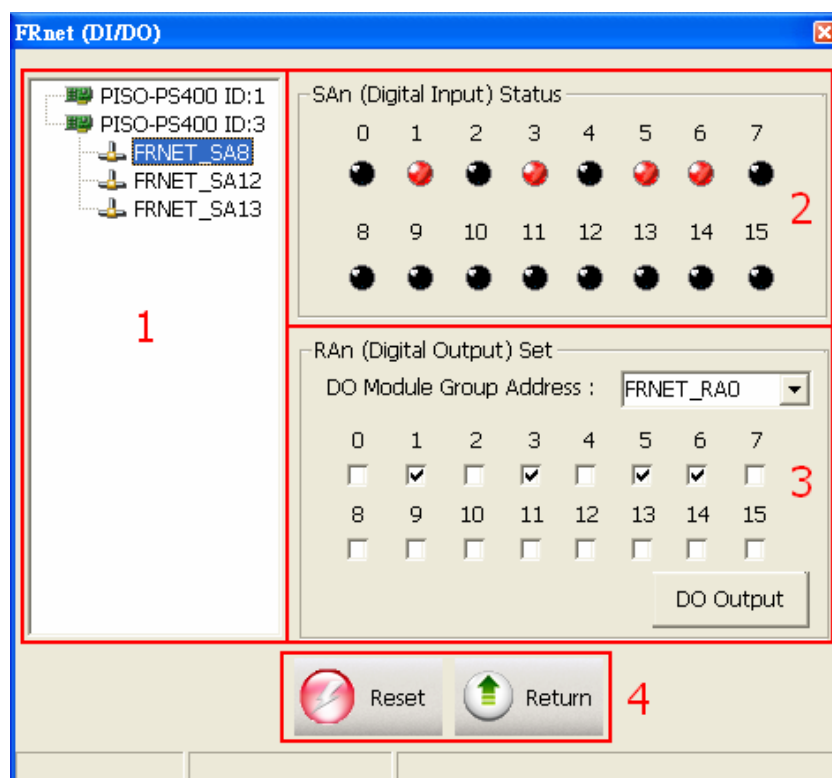
## 10. 運動軸狀態顯示 (Axis Status)

- 其中位置與速度計數器子頁提供顯示各軸之邏輯位置計數器、編碼器位置計數器、即時速度等資訊。
- 相關函數指令：`ps400_get_cmdcounter()`、`ps400_get_position()`、`ps400_get_speed()`。

## 11. 按鈕功能

- To Config：切換到 Axis Configurature Dialog。
- Reset：回復至版卡的初始狀態。
- Stop：停止運動。
- Interpolation Move：啟動補間運動。
- Return：返回起始畫面。

## 4.4 FRnet DI/DO 對話盒 (FRnet DI/DO Demo)



### 群組定義&使用說明

#### 1. 指定所操作的板卡及 FRnet DI 模組：

- 以樹狀結構顯示目前在系統上可使用的 PISO-PS400，並掃描所有的 FRnet DI 模組。用以指定位板卡及所要操作的 FRNet DI 模組。

#### 2. SAn 數位輸入端 (SAn (Digital Input) Status)

- 動態顯示所指定的 FRnet DI 模組的輸入狀態。
- 相關函數指令：ps400\_get\_FRnet\_DI()。

#### 3. RAn 數位輸出端 (RAn (Digital Output) Set)

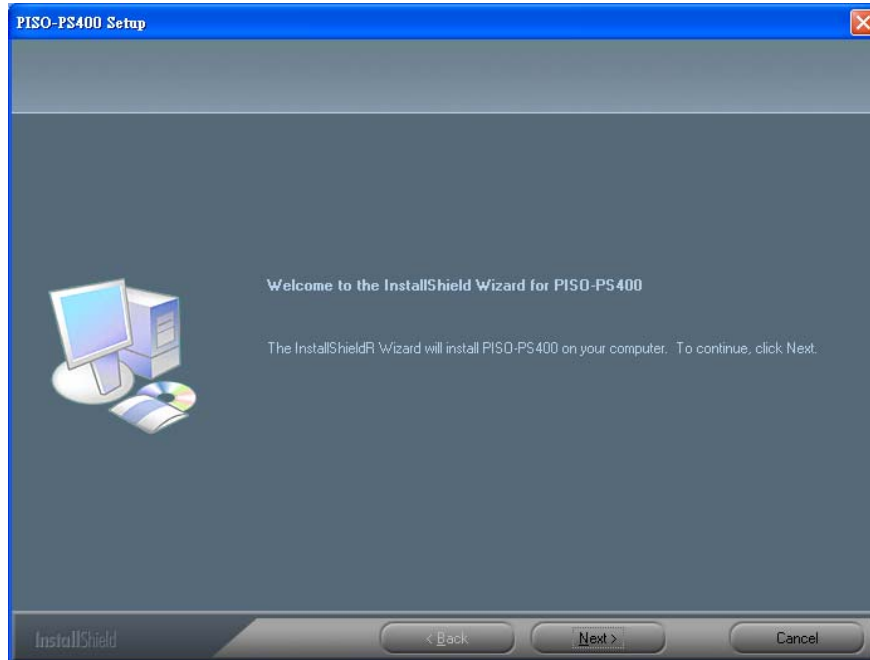
- 選擇 FRnet DO 模組的群組地址(Do Module Group Address)。
- 相關函數指令：ps400\_set\_FRnet\_DO()。

#### 4. 按鈕功能

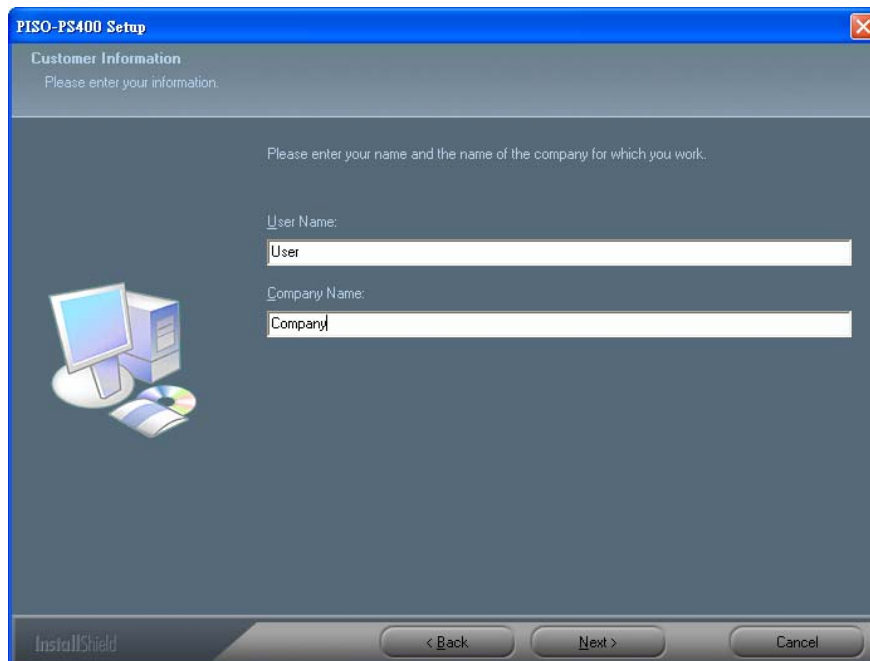
- Reset：回復至版卡的初始狀態。
- Return：返回起始畫面。

## 附錄 A1 PISO-PS400 驅動程式安裝

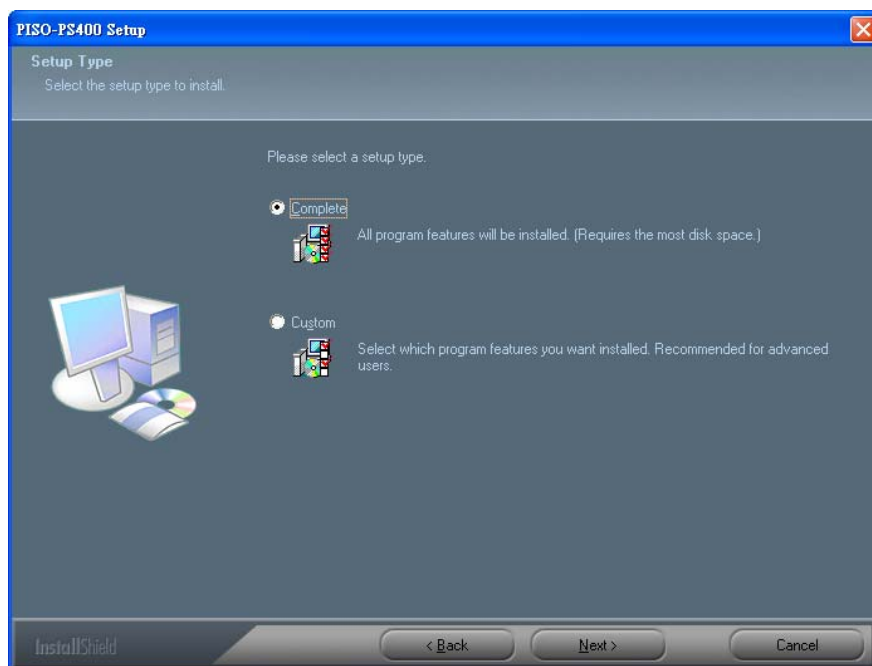
請從安裝光碟中的 /PC\_BASE/PCI/PISO\_PS400/Win2K\_XP 目錄執行 setup.exe，按”NEXT”



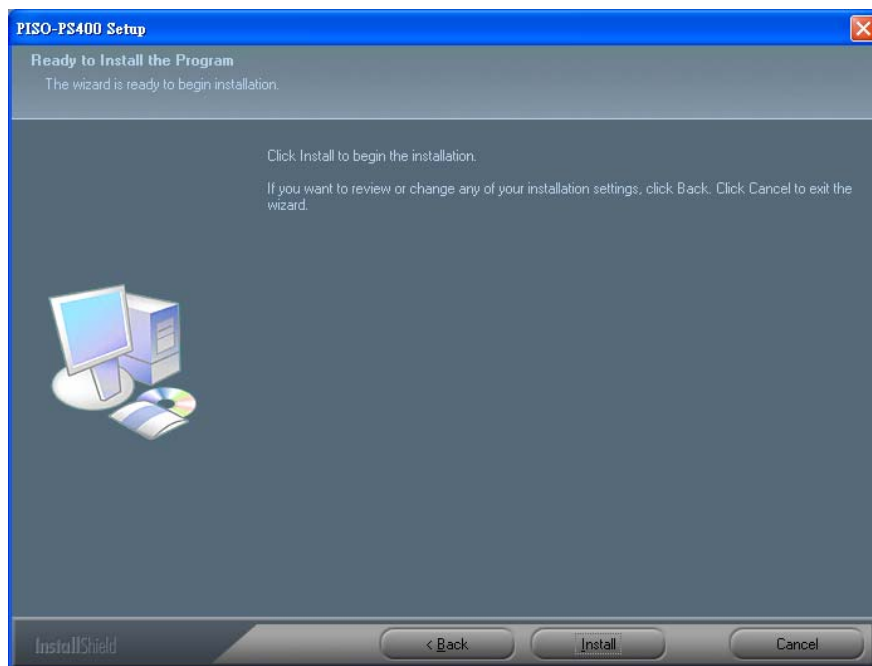
輸入使用者名稱及公司名稱，按”NEXT”



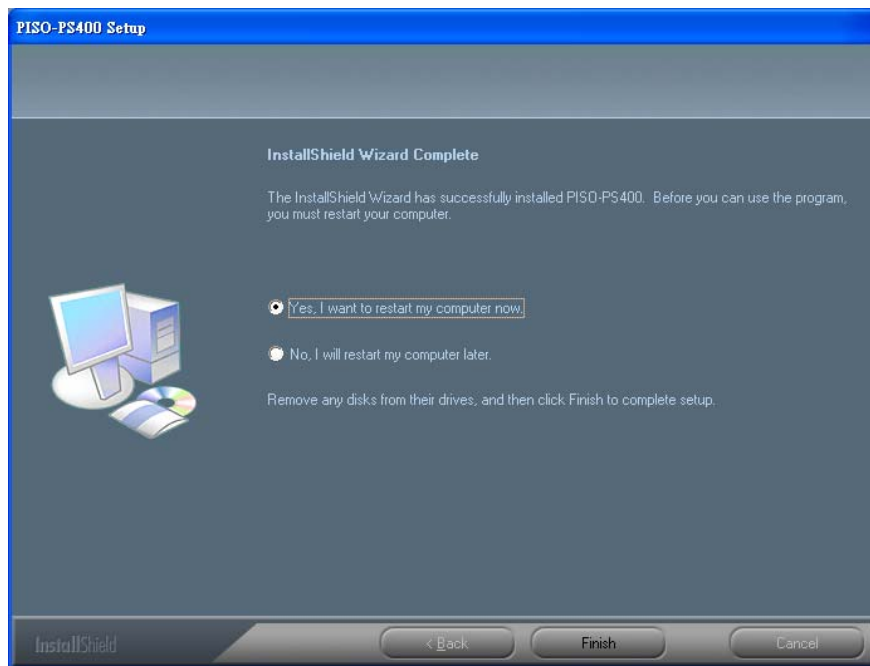
選擇完整安裝 (Complete) 後，按”NEXT”



按”Install” 開始安裝



安裝完成後請按”Finish”重新開機即可



安裝完成後，下列的目錄\檔案會出現在所選的安裝路徑 (\$Installed\_Directory):  
(預設的安裝路徑是 C:\ICPDAS\PISO\_PS400)

\$Installed_Directory	\Include		程式開發所須要標頭檔
	\LIB		程式開發所須要程式庫
	\Manuals		相關的說明手冊
	\Utility		PCEzGo.exe
	\Driver	\Win2K	驅動程式與註冊資訊檔
		\WinXP	
	\Labview VI	\Ver 8.x	ADVANCED MOTION CONFIGURATIONS Labview 8.x 所使用的 VI
			AUTOMATIC HOME SERCH
			\FRNET IO EXTENSION
			\INDEPENDENT MOVING FUNCTIONS
			\INTERPOLATION MOVING FUNCTIONS
			\MISCELLANEOUS FUNCTIONS
			\OTHER MOTION FUNCTIONS
			\STATUS
			\SYSTEM INITIALIZATION
	\Samples	\VC6	相對於 VC 6.0、VB 6.0、
		\VB6	BCB 6.0 和 Labview 8.x 的
		\BCB6	範例程式
		\Labview 8.x	



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## 附錄 A2 PISO-PS400 For RTX

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### RTX Library for PISO-PS400:

The RTX library for PISO-PS400 is provided as RTSS DLL. RTSS is an RTSS process that exports functions for use by other RTSS processes. An RTSS DLL is the analog of an implicitly loaded Win32 DLL. That means, RTSS DLL accurately mirrors the automatic resolution of reference to exported functions for implicitly loaded Win32 DLL.

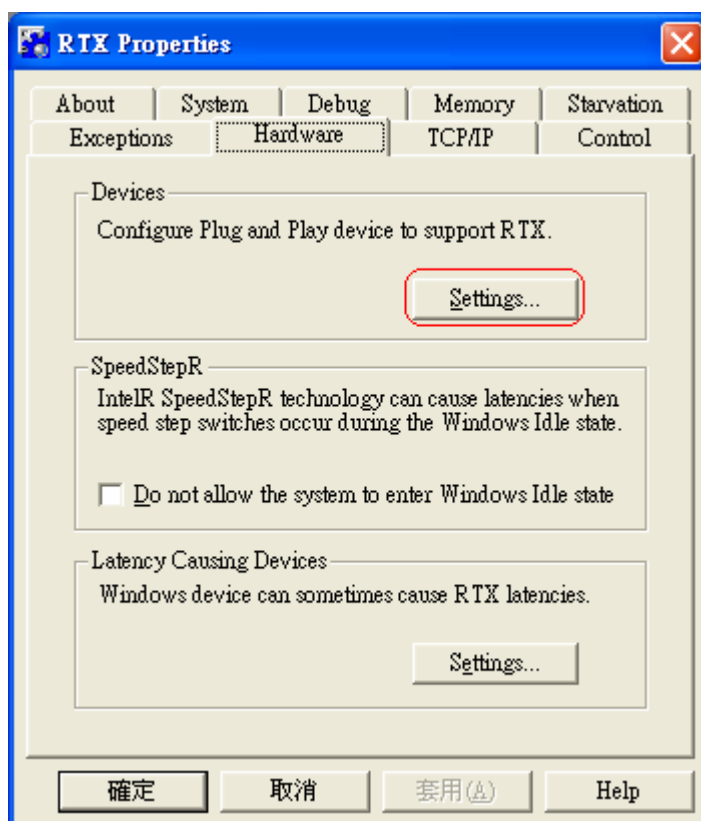
The primary difference between RTSS DLL and implicitly loaded Win32 DLL is:

- RTSS DLL must be explicitly loaded and unloaded in developer's system

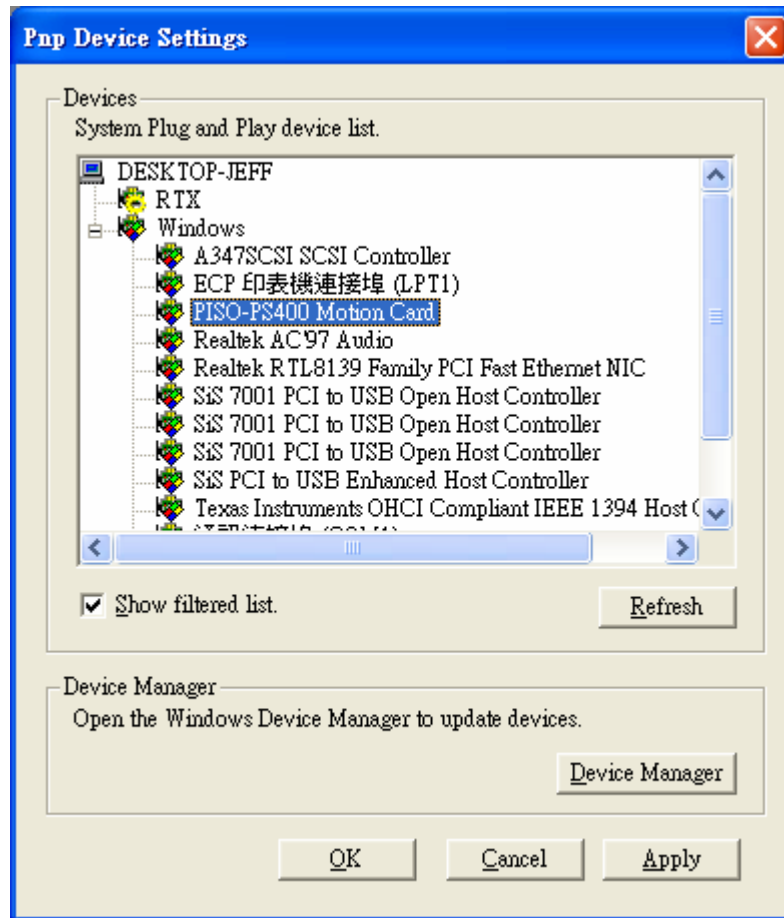
### How to setup PISO-PS400 in RTX:

In RTX, PISO-PS400 use the RTX Plug&Play driver, `rtxnp.sys`, to communicate with RTX. The following steps help to add the hardware-information into ***rtxnp.inf***:

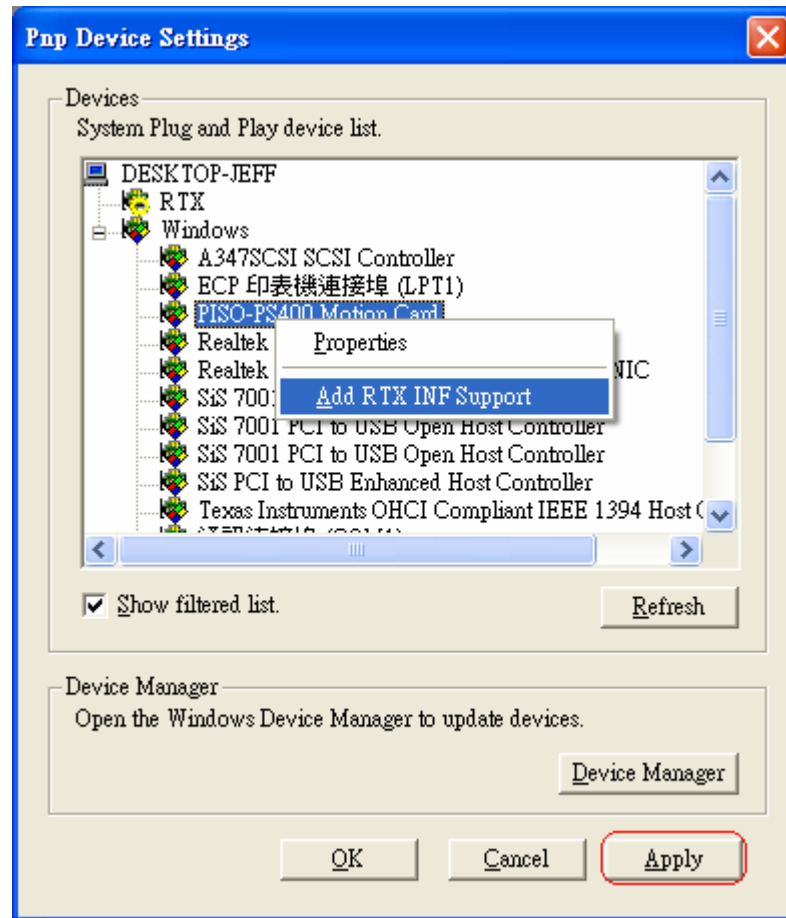
1. Make sure the official WDM driver of PISO-PS400 is installed.
2. Execute ***RTX Properties***, switch to ***Hardware*** tag and click the ***Settings*** in Device section.



3. In Pnp Device Settings, click the target device, ***PISO-PS400 Motion Card***.



- Right-Click the selected device, and choose the **Add RTX INF Support** in popup menu. And then click the **Apply** button to add the hardware-information.



Another INF file, *rtxnp.inf*, now has the hardware-information of PISO-PS400. The *rtxnp.sys* can be updated with the changed *rtxnp.inf*.

For the detailed information, please refer to the “Hardware Settings” of online help, RTXRuntimeDocumentation.chm.

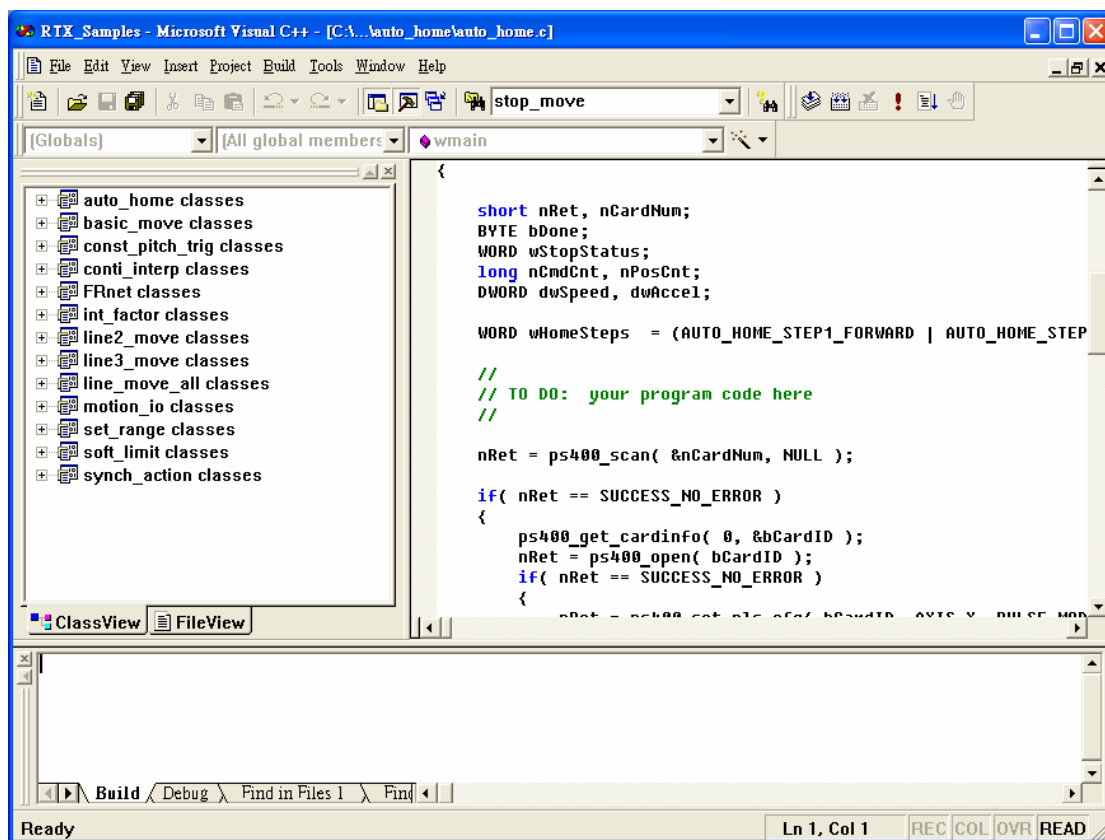
**Caveat:**

Please remove the Window WDM and control PISO-PS400 with RTSS DLL only. **DO NOT** access PISO-PS400 through both Win32 DLL and RTSS DLL.

## Folder in RTX software package:

Four directories are included in PISO-PS400 software package

- rtss\_dll\ : This folder contains the PISO-PS400 RTSS DLL, ps400\_rtx.rtss
- include\ : This folder contains the header file, ps400\_rtx.h.
- lib\ : This folder contains the LIB file, ps400\_rtx.lib.
  - samples\ : This folder contains the samples to demonstrate the most functions in ps400\_rtx.rtss. These samples are combined into single workspace, RTX\_Samples.dsw.



# 附錄 B PISO-PS400 其它 Terminal Boards

## B.1 DN-8468M Daughter Board

The DN-8468M is the daughter board for Mitsubitch J2 Series Amplifier. It has 4-axis I/O signals.

### B.1.1 Board Layout for DN-8468M

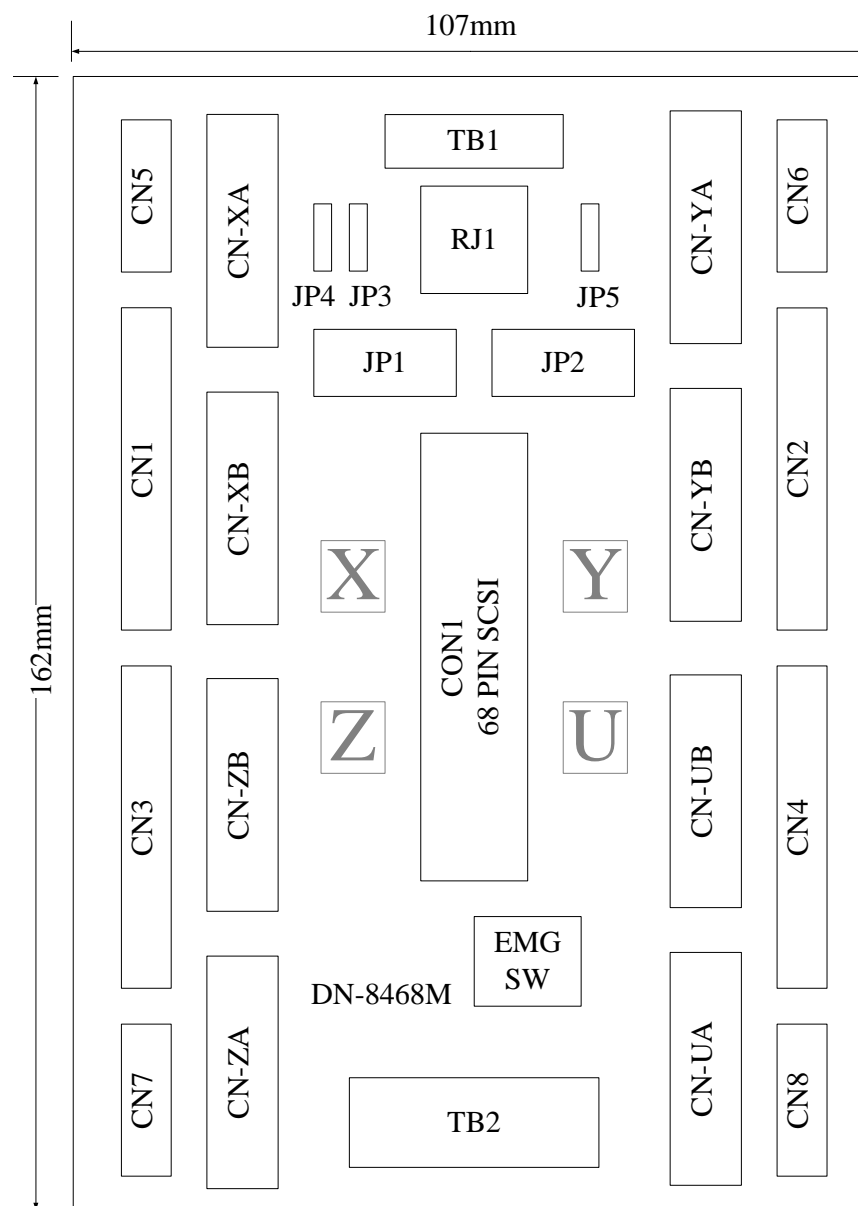


Fig. 1-1 Board layout for the DN-8468M

## B.1.2 Signal Connections for DN-8468M

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

### ■ Pin Assignment for CON1

---

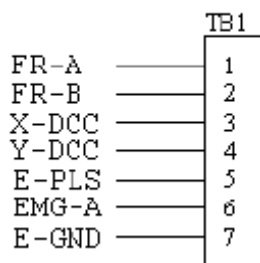
The I/O connector on the DN-8468M is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1( page 15).

### ■ TB1

---

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-3 shows the pin assignment for the 7-pin connector on the DN-8468M, and the Table 1-4 shows its I/O connector signal description.

Table 1-4 TB1 Signal Connection



Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

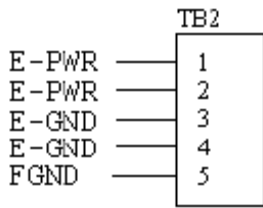
Fig. 1-3 Pin definition for TB1

### ■ TB2

---

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-4 shows the pin assignment for the 5-pin connector on the DN-8468M, and the Table 1-5 shows its I/O connector signal description.

Table 1-5 TB2 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

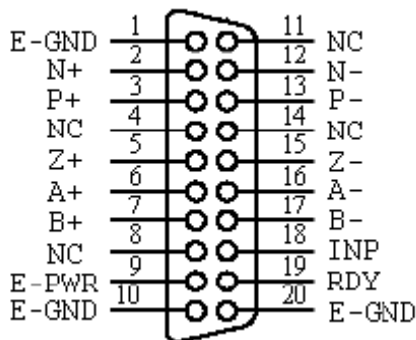
Fig. 1-4 Pin definition for TB2

► **Note:** Don't reverse connect signals with E\_PWR and E\_GND. Serious damage to your motion card and motion controller might be happened.

■ **CN-XA, CN-YA, CN-ZA, CN-UA (CNA connector for each AXIS)**

The connectors CN-XA, CN-YA, CN-ZA, and CN-UA are 20-pin connectors that enable you to connect to the CNA connector of Mitsubishi motor drivers. Fig.1-5 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-6 shows its I/O connector signal description.

Table 1-6 CNA Signal Connection



Name	Number	Description
A+	6	Encoder A-Phase (+)
A-	16	Encoder A-Phase (-)
B+	7	Encoder B-Phase (+)
B-	17	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	15	Encoder Z-Phase (-)
P+	3	Positive Direction Pulse Output(+)
P-	13	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	12	Negative Direction Pulse Output(-)
INP	18	Servo In Position
RDY	19	Servo Ready
E-PWR	9	EXT power +24V
E-GND	1, 10, 20	EXT power ground
NC	4,8,11,14	No connection

Fig. 1-5 Pin definition for CN-XA, CN-YA, CN-ZA, CN-UA

► **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CN-XA and the other is from CN5. In Y axis, one is from CN-YA and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.

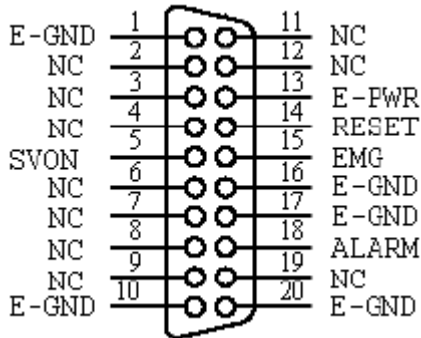
► **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CN-ZA and CN7 at the same time. In U axis, do not connect CN-UA and CN8 at the same time.

► **Note 3:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ **CN-XB, CN-YB, CN-ZB, CN-UB (CNB connector for each AXIS )**

The connectors CN-XB, CN-YB, CN-ZB, and CN-UB are 20-pin connectors that enable you to connect to the CNB connector of your motor drivers. Fig.1-6 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-7 shows its I/O connector signal description.

Table 1-7 CNB Signal Connection



Pin	Pin	Description
SVON	5	Servo On
RESET	14	Servo Reset
EMG	15	Emergent Stop
ALARM	18	Servo Alarm
E-PWR	13	EXT power +24V
E-GND	1, 10, 16, 17, 20	EXT power ground
NC	2, 3, 4, 6, 7, 8, 9, 11, 12, 19	No connection

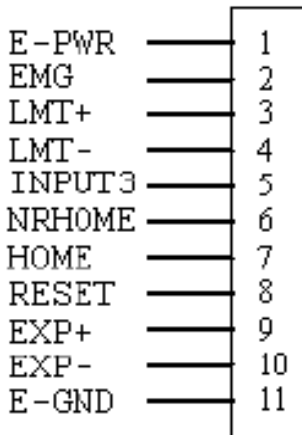
Fig. 1-6 Pin definition for CN-XB, CN-YB  
CN-ZB, CN-UB

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ **CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS )**

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-8 shows its I/O connector signal description.

Table 1-8 CN1~4 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

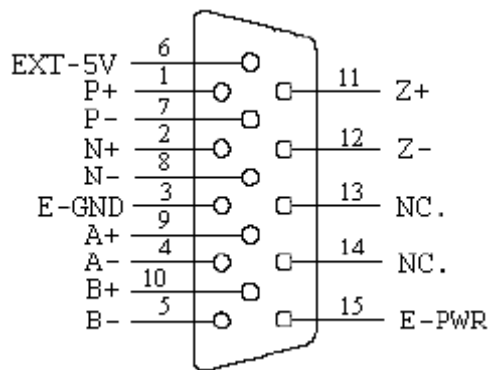
Fig. 1-7 Pin definition for CN1~CN4



## ■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468M, and the Table 1-9 shows its I/O connector signal description.

Table 1-9 CN5~8



Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

Fig. 1-8 Pin definition for CN5~CN8

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## ■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.1-9 shows the pin assignment for the 8-pin connector on the DN-8468M, and the Table 1-10 shows its I/O connector signal description.

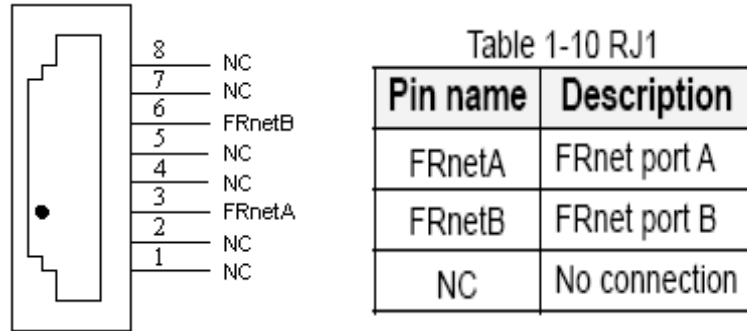


Fig. 1-9 Pin definition for RJ1

► **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## B. 1. 3 Jumper and Switch Settings

### ■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

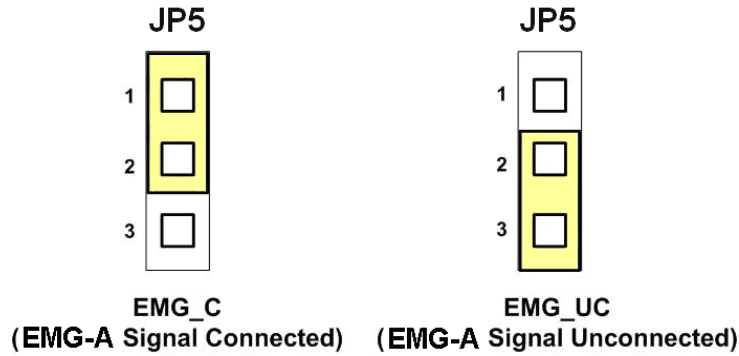


Fig. 1-10 Jumper 5 setting

### ■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

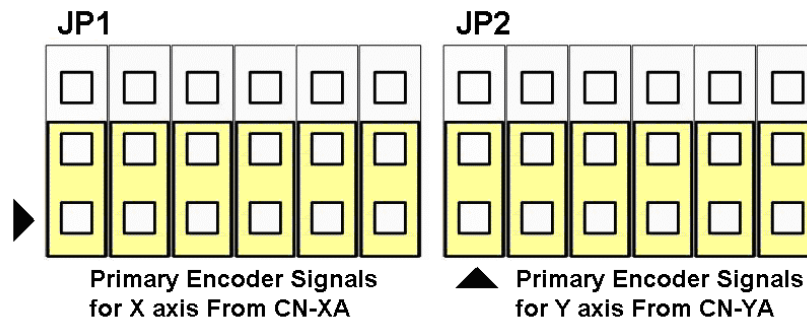


Fig. 1-11 Primary encoder signals setting

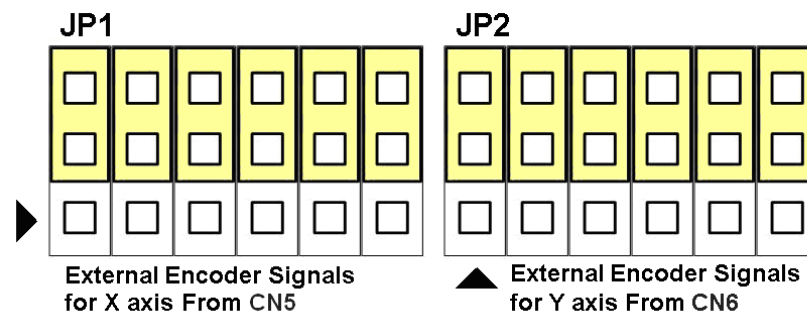


Fig. 1-12 External encoder signals setting

## ■ EMG SW

The emergency stop signal for each servo amplifier can be selected from EMG SW. The number 1, 2, 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.



Fig. 1-13 EMG SW setting for normally GND (Default setting)

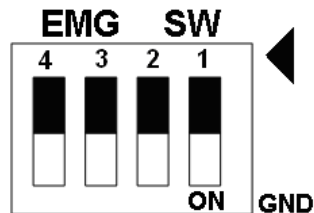


Fig. 1-14 EMG SW setting for user controlled signals.

## B.2 DN-8468P Daughter Board

The DN-8468P is the daughter board for Panasonic A4 Series Amplifier. It has 4-axis I/O signals.

### B. 2. 1 Board Layout for DN-8468P

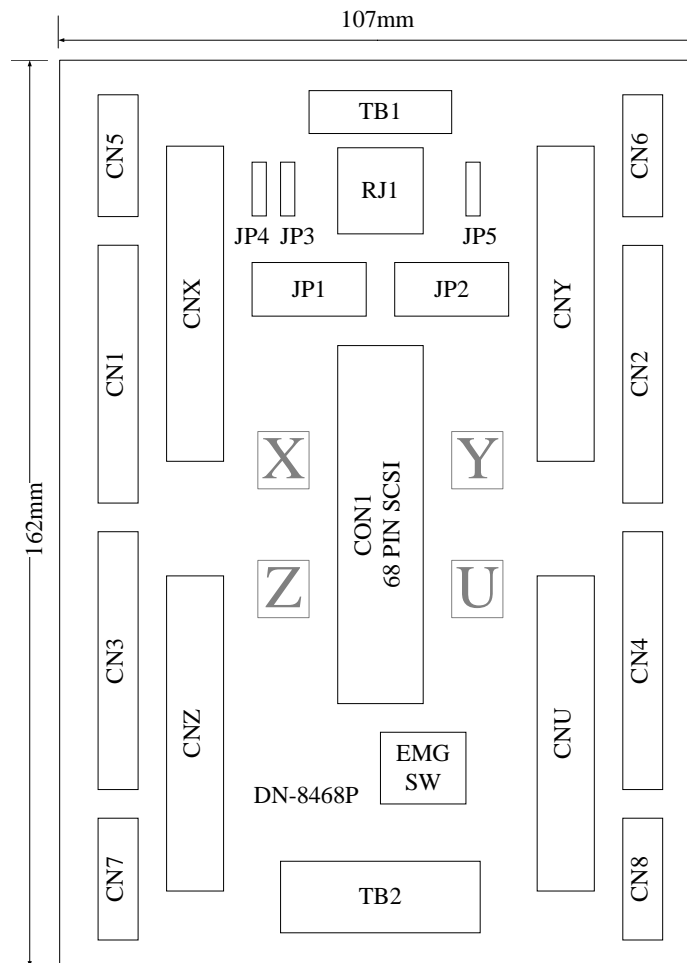


Fig. B2-1 Board layout for the DN-8468P

## B. 2. 2 Signal Connections for DN-8468P

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

### ■ Pin Assignment for CON1

The I/O connector on the DN-8468P is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1( page 15).

### ■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-3 shows the pin assignment for the 7-pin connector on the DN-8468P, and the Table 1-4 shows its I/O connector signal description.

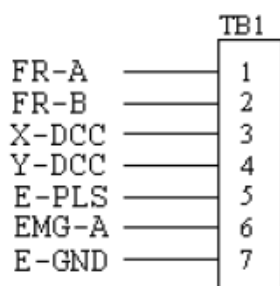


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

### ■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-4 shows the pin assignment for the 5-pin connector on the DN-8468P, and the Table 1-5 shows its I/O connector signal description.

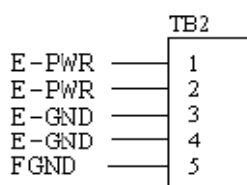


Fig. 1-4 Pin definition for TB2

Table 1-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E-PWR and E-GND. Serious damage to your motion card and motion controller might be happened.

■ **CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)**

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.1-5 shows the pin assignment for the 50-pin connector on the DN-8468P, and the Table 1-6 shows its I/O connector signal description.

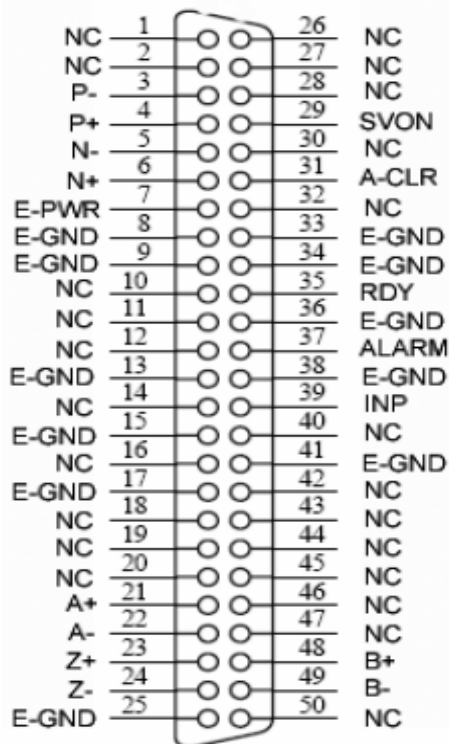


Fig. 1-5 Pin definition for CNX, CNY, CNZ, CNU

Table 1-6 CN X5 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	48	Encoder B-Phase (+)
B-	49	Encoder B-Phase (-)
Z+	23	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	4	Positive Direction Pulse Output(+)
P-	3	Positive Direction Pulse Output(-)
N+	6	Negative Direction Pulse
N-	5	Negative Direction Pulse Output(-)
INP	39	Servo In Position
RDY	35	Servo Ready
SVON	29	Servo On
A-CLR	31	Alarm Clear
ALARM	37	Servo Alarm
E-PWR	7	EXT power +24V
E-GND	8, 9, 13, 15, 17, 25, 33, 34, 36, 38, 41	EXT power ground
NC	1, 2, 10, 11, 12, 14, 16, 18, 19, 20, 26, 27, 28, 30, 32, 40, 42, 43, 44, 45, 46, 47, 50	No connection

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## ■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468P, and the Table 1-8 shows its I/O connector signal description.

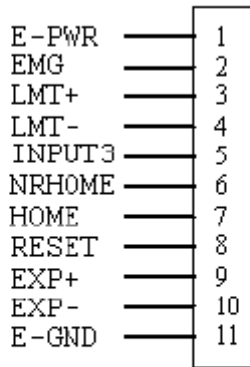


Fig. 1-7 Pin definition for CN1 ~ CN4

Table 1-8 CN1~4 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

## ■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468P, and the Table 1-9 shows its I/O connector signal description.

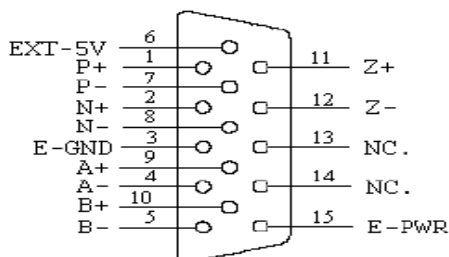


Fig. 1-8 Pin definition for CN5 ~ CN8

Table 1-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection



- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

### ■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.1-9 shows the pin assignment for the 8-pin connector on the DN-8468P, and the Table 1-10 shows its I/O connector signal description.

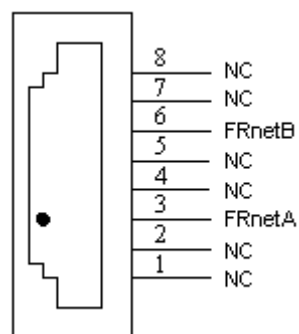


Table 1-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Fig. 1-9 Pin definition for RJ

- ▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## B. 2. 3 Jumper and Switch Settings

### ■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

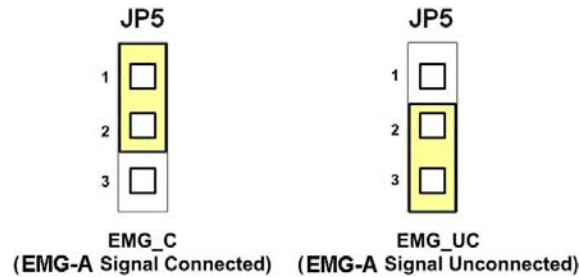


Fig. 1-10 Jumper 5 setting

### ■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

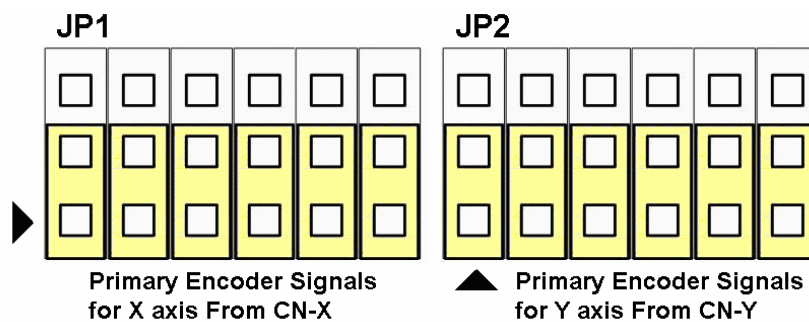


Fig. 1-11 Primary encoder signals setting

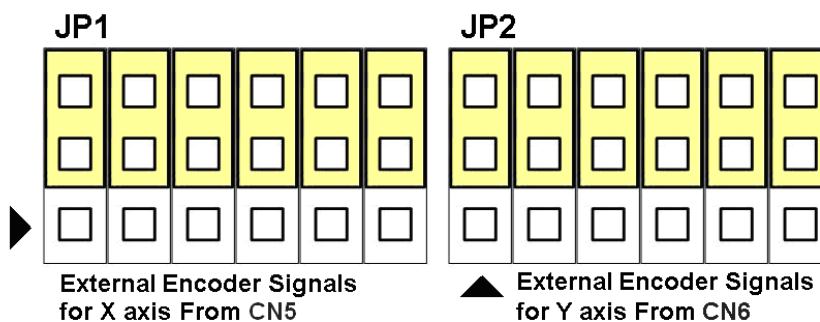


Fig. 1-12 External encoder signals setting

## ■ EMG SW

The emergency stop signal for each servo amplifier can be selected from EMG SW. The number 1, 2, 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

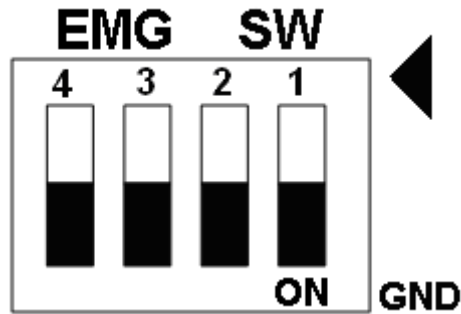


Fig. 1-13 EMG SW setting for normally GND (Default setting)

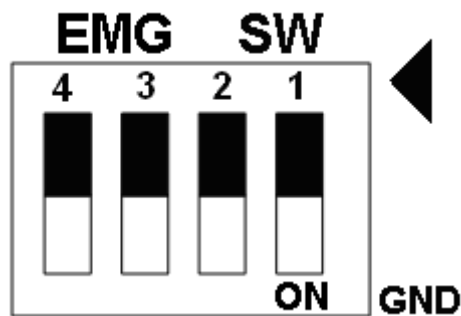


Fig. 1-14 EMG SW setting for user controlled signals.

## B.3 DN-8486Y Daughter Board

The DN-8468Y is the daughter board for Yaskawa Amplifier. It has 4-axis I/O signals.

### B. 3. 1 Board Layout for DN-8468Y

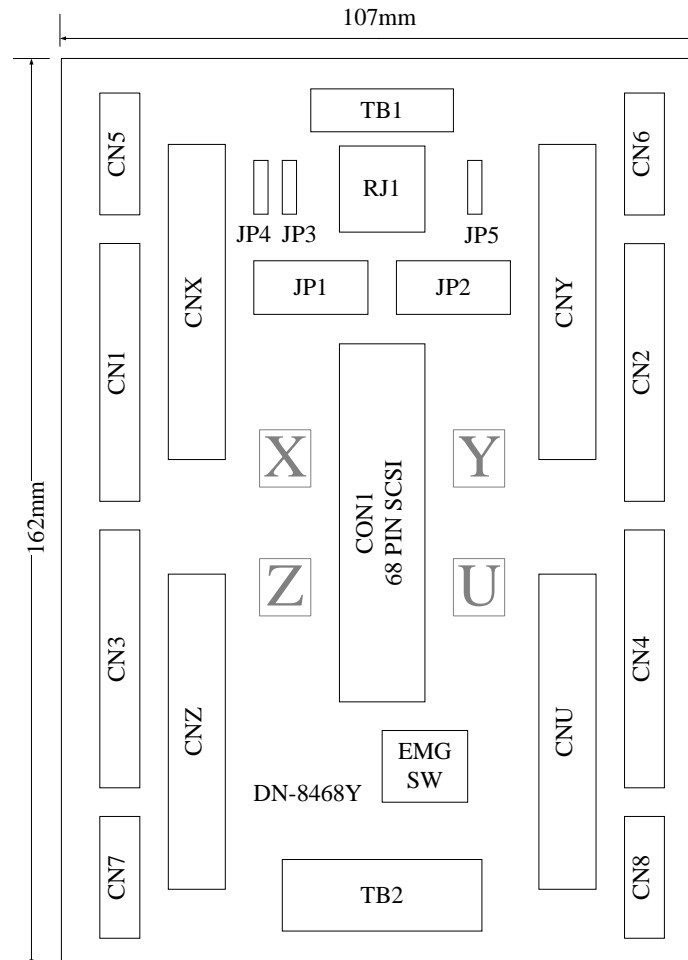


Fig. 3-1 Board layout for the DN-8468Y

## B. 3. 2 Signal Connections for DN-8468Y

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

### ■ Pin Assignment for CON1

The I/O connector on the DN-8468Y is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1( page 15).

### ■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468Y, and the Table 3-4 shows its I/O connector signal description.

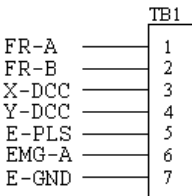


Table 3-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

Fig. 3-3 Pin definition for TB1

### ■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468Y, and the Table 3-5 shows its I/O connector signal description.

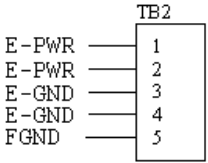


Table 3-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

Fig. 3-4 Pin definition for TB2

► **Note:** Don't reverse connect signals with E-PWR and E-GND. Serious damage to your motion card and motion controller might be happened.

■ **CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)**

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.3-5 shows the pin assignment for the 50-pin connector on the DN-8468Y, and the Table 3-6 shows its I/O connector signal description.

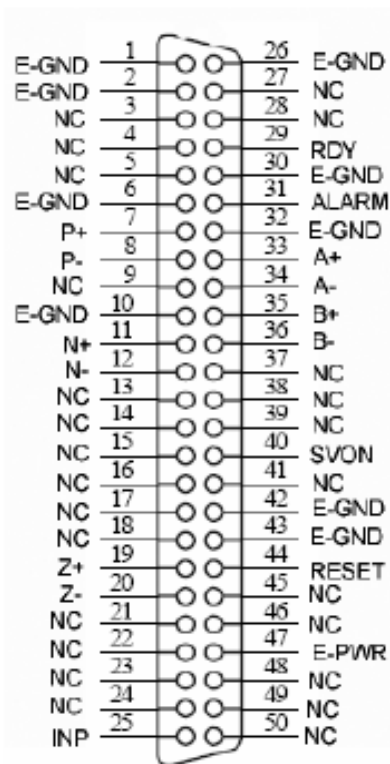


Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 CN1 Signal Connection

Name	Number	Description
A+	33	Encoder A-Phase (+)
A-	34	Encoder A-Phase (-)
B+	35	Encoder B-Phase (+)
B-	36	Encoder B-Phase (-)
Z+	19	Encoder Z-Phase (+)
Z-	20	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	11	Negative Direction Pulse
N-	12	Negative Direction Pulse Output(-)
INP	25	Servo In Position
RDY	29	Servo Ready
SVON	40	Servo On
RESET	44	Parameter Reset
ALARM	31	Servo Alarm
E-PWR	47	EXT power +24V
E-GND	1,2,6,10, 26, 30,32, 42,43	EXT power ground
NC	3,4,5,9, 13,14,15, 18,17,18, 21,22,23, 24,27,28, 37,38,39, 41,45,46, 48,49,50.	No connection

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## ■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 20-pin connector on the DN-8468Y, and the Table 3-8 shows its I/O connector signal description.

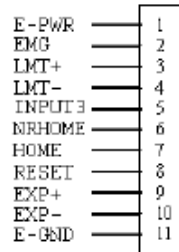


Fig. 3-7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

## ■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468Y, and the Table 3-9 shows its I/O connector signal description.

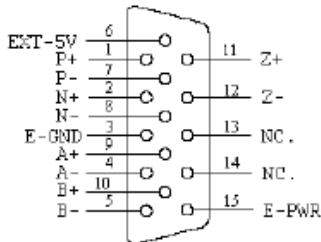


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## ■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468Y, and the Table 3-10 shows its I/O connector signal description.

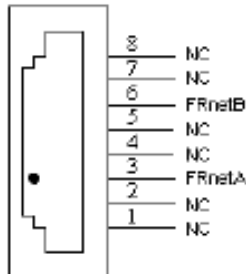


Fig. 3-9 Pin definition for RJ1

Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.



## B. 3. 3 Jumper and Switch Settings

### ■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

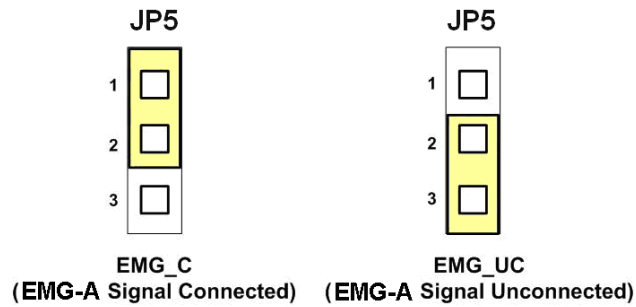


Fig. 3-10 Jumper 5 setting

### ■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

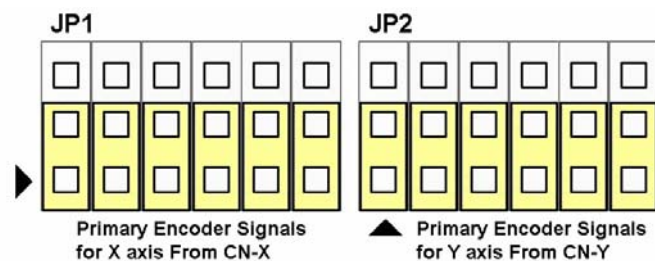


Fig. 3-11 Primary encoder signals setting

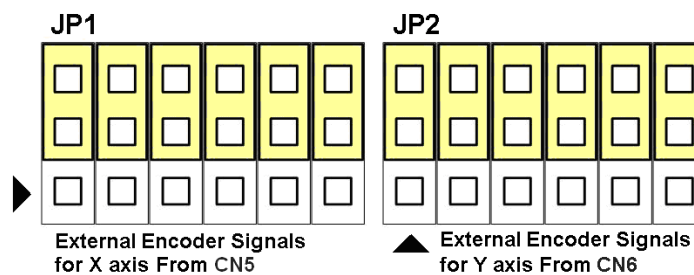


Fig. 3-12 External encoder signals setting

## ■ EMG SW

The emergency stop signal for each servo amplifier can be selected from EMG SW. The number 1, 2, 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

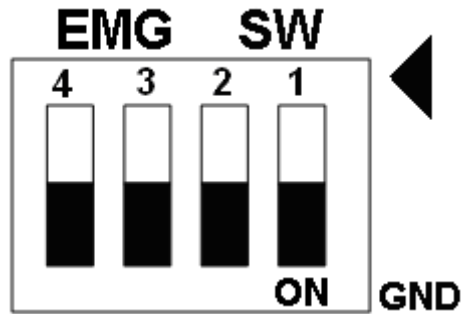


Fig. 3-13 EMG SW setting for normally GND (Default setting)

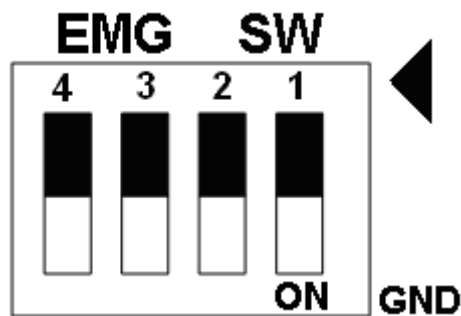


Fig. 3-14 EMG SW setting for user controlled signals.

## B.4 DN-8468D Daughter Board

The DN-8468D is the daughter board for Delta ASDA-A Series Amplifier. It has 4-axis I/O signals.

### B. 4. 1 Board Layout for DN-8468D

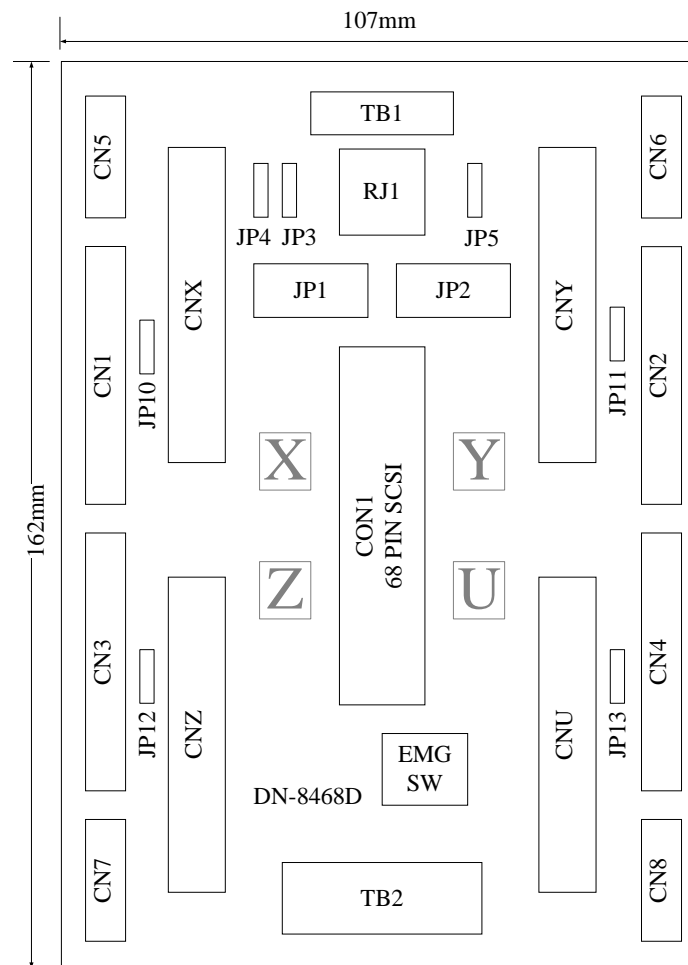


Fig. 3-1 Board layout for the DN-8468D

## B. 4. 2 Signal Connections for DN-8468D

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

### ■ Pin Assignment for CON1

The I/O connector on the DN-8468D is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468D (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

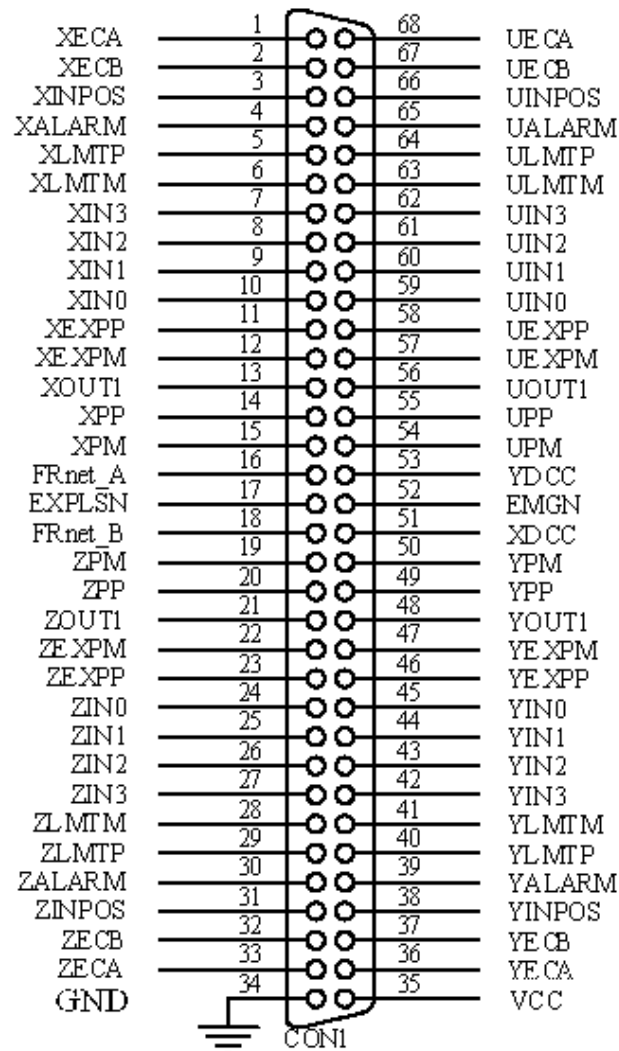


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8468D I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTM	5	Limit switch input signal (+) for X axis
YLMTM	40	Limit switch input signal (+) for Y axis
ZLMTM	29	Limit switch input signal (+) for Z axis
ULMTM	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 3-3 DN-8468D I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

## ■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468D, and the Table 3-4 shows its I/O connector signal description.

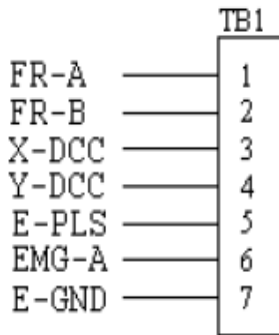


Fig. 3-3 Pin definition for TB1

Table 3-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

## ■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468D, and the Table 3-5 shows its I/O connector signal description.

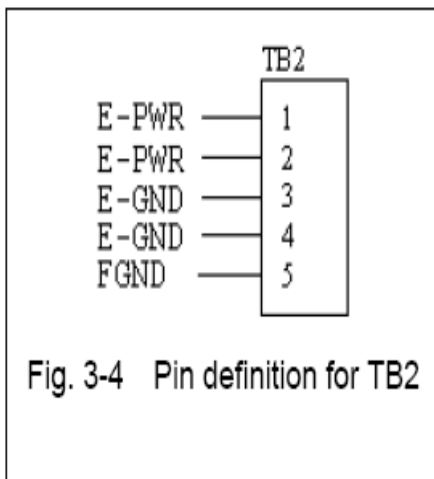


Fig. 3-4 Pin definition for TB2

Table 3-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E-PWR and E-GND. Serious damage to your motion card and motion controller might be happened.

■ **CNX, CNY, CNZ, CNU (CN 1 connector for each AXIS in Driver)**

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN1 connector of Delta ASDA-A series motor drivers. Fig.3-5 shows the pin assignment for the 50-pin connector on the DN-8468D, and the Table 3-6 shows its I/O connector signal description.

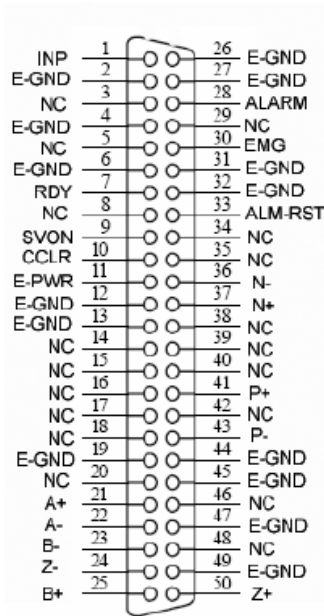


Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 CN 1 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	25	Encoder B-Phase (+)
B-	23	Encoder B-Phase (-)
Z+	50	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	41	Positive Direction Pulse Output(+)
P-	43	Positive Direction Pulse Output(-)
N+	37	Negative Direction Pulse Output(+)
N-	36	Negative Direction Pulse Output(-)
INP	1	Servo In Position
RDY	7	Servo Ready
SVON	9	Servo On
ALM-RST	33	Alarm Reset
CCLR	10	Error Counter Clear
ALARM	28	Servo Alarm
EMG	30	Emergent Stop
E-PWR	11	EXT power +24V
E-GND	2,4,6,12,13,19,26,27,31,32,44,45,47,49	EXT power ground
NC	3,5,8,14,15,16,17,18,20,29,34,35,38,39,40,42,46,48,50	No connection

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.



## ■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 20-pin connector on the DN-8468D, and the Table 3-8 shows its I/O connector signal description.

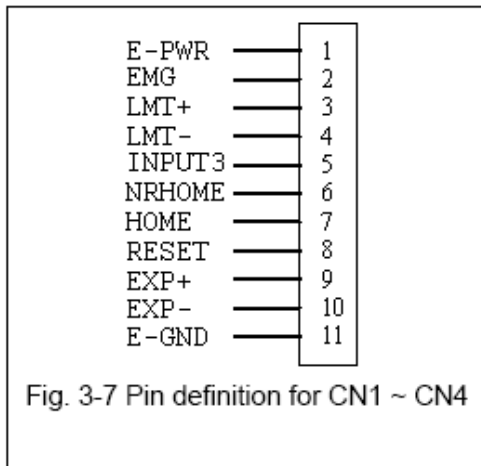


Table 3-8 CN1~4 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

## ■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468D, and the Table 3-9 shows its I/O connector signal description.

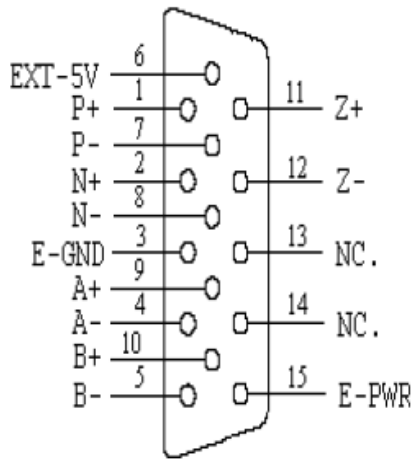


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## ■ RJ1 (The I/O signals of the FRnet)

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The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468D, and the Table 3-10 shows its I/O connector signal description.

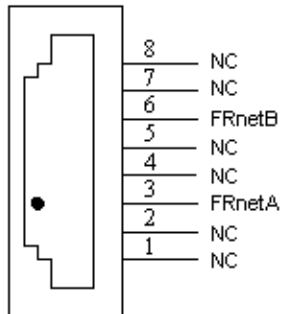


Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Fig. 3-9 Pin definition for RJ1

► **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## B. 4. 3 Jumper and Switch Settings

### ■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

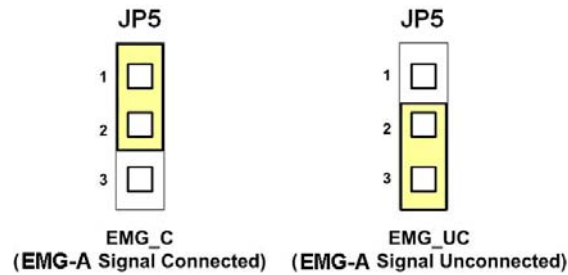


Fig. 3-10 Jumper 5 setting

### ■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

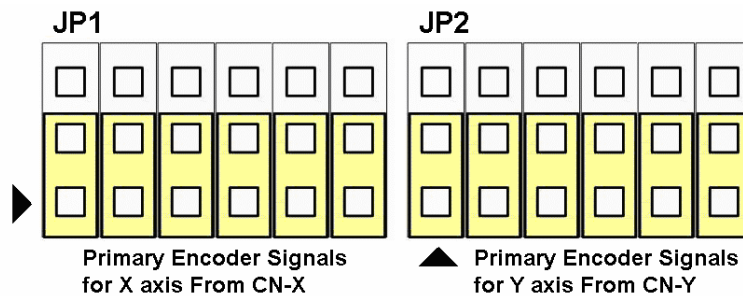


Fig. 3-11 Primary encoder signals setting

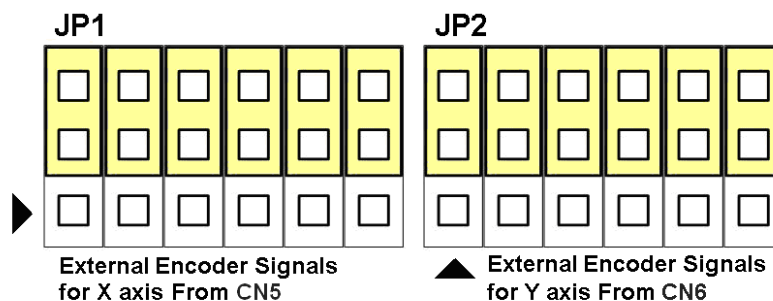


Fig. 3-12 External encoder signals setting

## ■ SW1

The emergency stop signal for each servo amplifier can be selected from SW1. The number 1, 2, 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

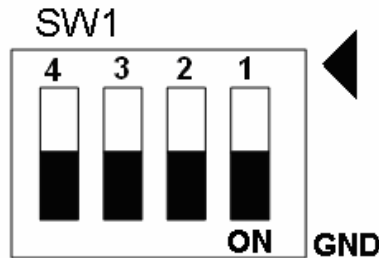


Fig. 3-13 SW1 setting for normally GND (Default setting)



Fig. 3-14 SW1 setting for user controlled signals.

## ■ JP10 ~ JP13

Jumper 10 ~ Jumper 13 can select the reset function in CN1 ~ CN4 for each axis. The following diagram is shown the selection condition of the JP10.

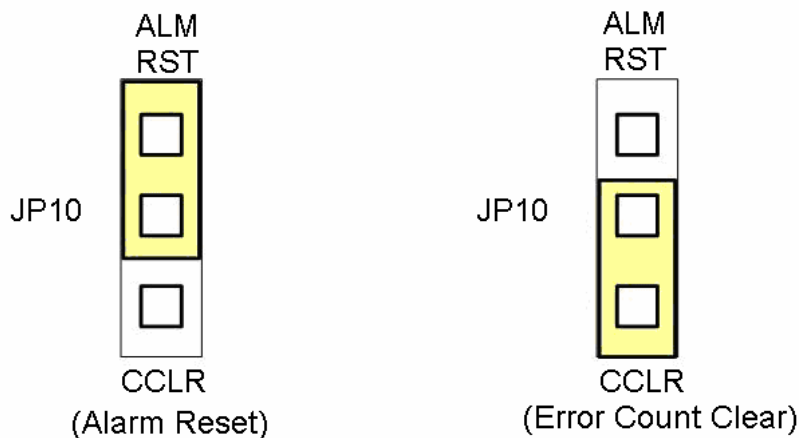


Fig. 3-15 JP 10 ~ 13 setting

## B.5 DN-8468FB Daughter Board

The DN-8468FB is the daughter board for FUJI FALDIC-W Series Amplifier. It has 4-axis I/O signals.

### B.5.1 Board Layout for DN-8468FB

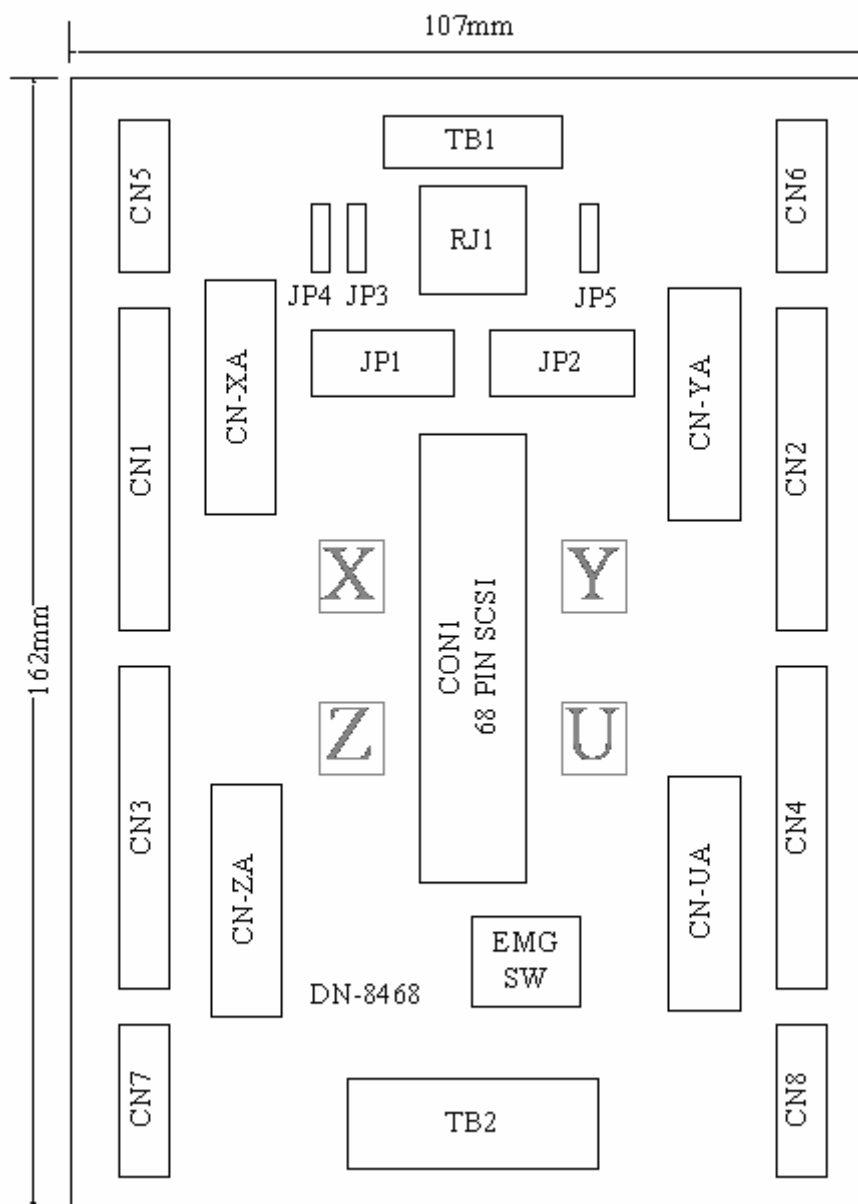


Fig. 3-1 Board layout for the DN-8468FB

## B. 5.2 Signal Connections for DN-8468FB

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

### ■ Pin Assignment for CON1

The I/O connector on the DN-8468FB is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468FB (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

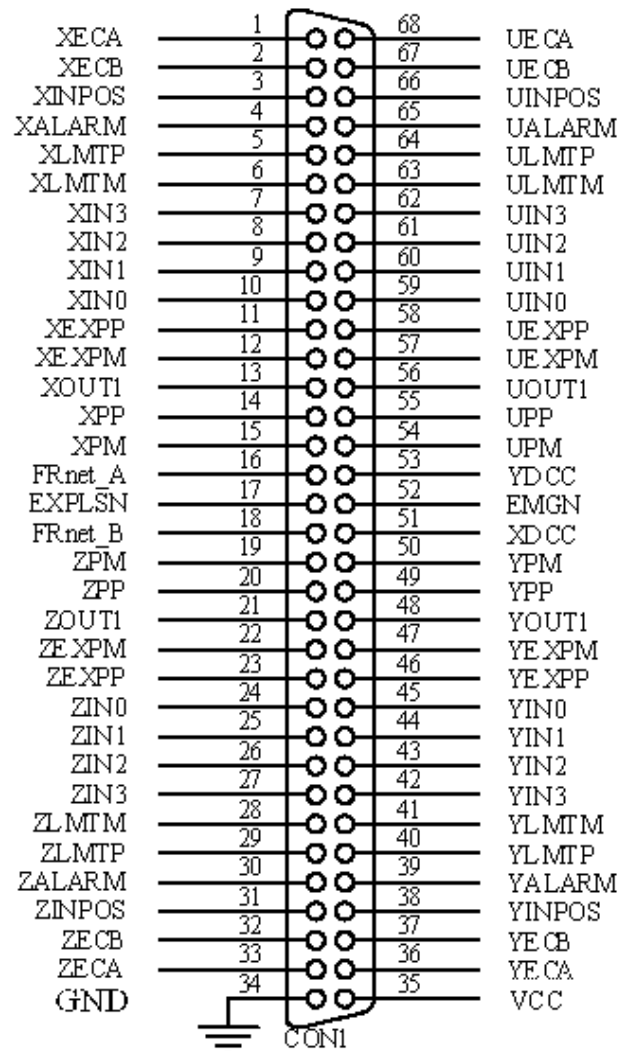


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8468FB I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTM	5	Limit switch input signal (+) for X axis
YLMTM	40	Limit switch input signal (+) for Y axis
ZLMTM	29	Limit switch input signal (+) for Z axis
ULMTM	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 3-3 DN-8468FB I/O connector signal description (part 2)



Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

## ■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468FB, and the Table 3-4 shows its I/O connector signal description.

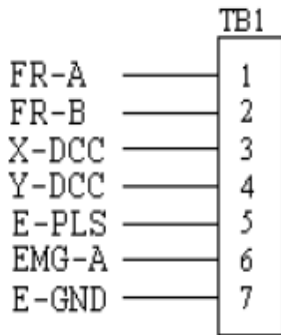


Fig. 3-3 Pin definition for TB1

Table 3-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

## ■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468FB, and the Table 3-5 shows its I/O connector signal description.

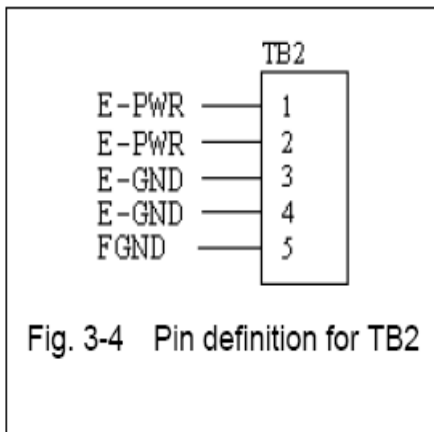


Fig. 3-4 Pin definition for TB2

Table 3-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E-PWR and E-GND. Serious damage to your motion card and motion controller might be happened.

## ■ CN-X, CN-Y, CN-Z, CN-U (CN1 connector for each AXIS in Driver)

The connectors CN-X, CN-Y, CN-Z, and CN-U are 26-pin connectors that enable you to connect to the CN1 connector of FUJI FALDIC-W series motor drivers. Fig.3-5 shows the pin assignment for the 26-pin connector on the DN-8468FB, and the Table 3-6 shows its I/O connector signal description.

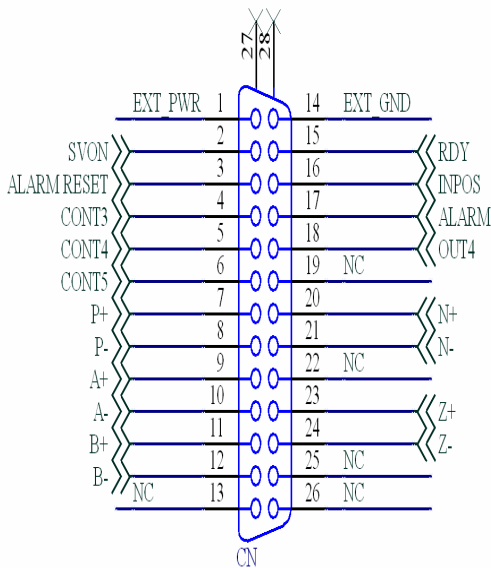


Fig 3-5 Pin definition for CN-X, CN-Y, CN-Z, CN-U

Table 3-6 CN-X ,CN-Y ,CN-Z ,CN-U

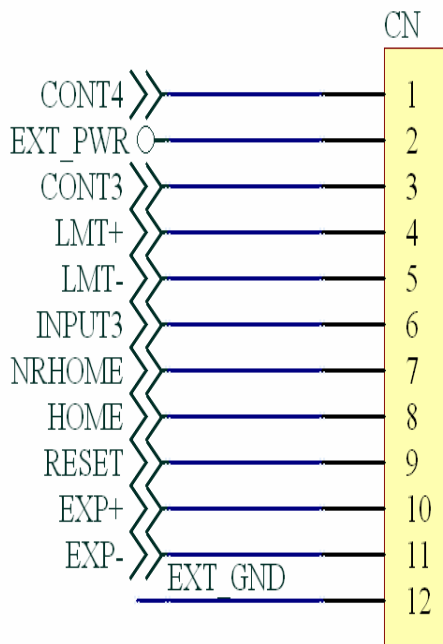
Name	No.	Description
EXT_PWR	1	EXT POWER 24V
SVON	2	CONT1 of Servo Motor (default: SVON)
ALARM RESET	3	CONT2 of Servo Motor (default: ALARM RESET)
CONT3	4	CONT3 of Servo Motor
CONT4	5	CONT4 of Servo Motor
CONT5	6	CONT5 of Servo Motor
P+	7	Positive Direction Pulse (+)
P-	8	Positive Direction Pulse (-)
A+	9	Encoder A-phase (+)
A-	10	Encoder A-phase (-)
B+	11	Encoder B-phase (+)
B-	12	Encoder B-phase (-)
NC	13	No connection
EXT_GND	14	EXT POWER Ground
RDY	15	OUT1 of Servo Motor (default: RDY)
INPOS	16	OUT2 of Servo Motor (default: INPOS)
ALARM	17	OUT3 of Servo Motor (default: ALARM)
OUT4	18	OUT4 of Servo Motor
NC	19	No connection
N+	20	Negative Direction Pulse (+)
N-	21	Negative Direction Pulse (-)
NC	22	No connection
Z+	23	Encoder Z-phase (+)
Z-	24	Encoder Z-phase (-)
NC	25	No connection
NC	26	No connection

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ **CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS )**

The connectors CN1~CN4 are 12-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 12-pin connector on the DN-8468FB, and the Table 3-8 shows its I/O connector signal description.

Table 3-8 CN1~CN4



Name	Number	Description
CONT4	1	CONT4 of Servo Motor
EXT_PWR	2	EXT POWER 24V
CONT3	3	CONT3 of Servo Motor
LMT+	4	Limit switch Input Signal(+)
LMT-	5	Limit switch Input Signal(-)
INPUT3	6	Input Signal (IN3)
NRHOME	7	Near HOME Sensor Input Signal
HOME	8	HOME Sensor Input Signal
RESET	9	RESET Input Signal
EXP+	10	EXT Positive Direction Pulse(+)
EXP-	11	EXT Positive Direction Pulse(-)
EXT_GND	12	EXT POWER Ground

Fig 3-7 Pin definition for CN1~ CN4

## ■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS )

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468FB, and the Table 3-9 shows its I/O connector signal description.

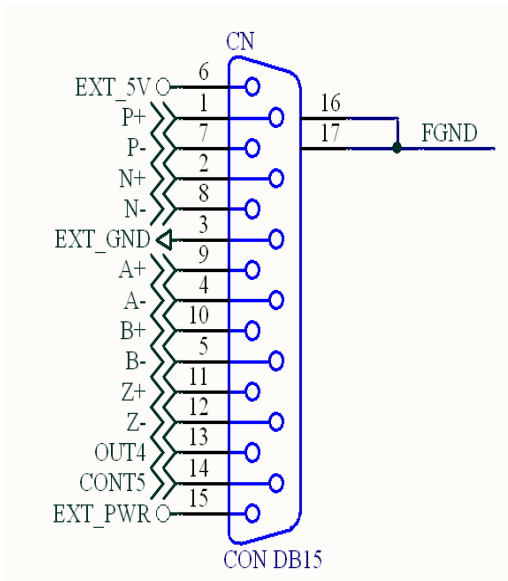


Fig 3-8 Pin definition for CN5~ CN8

Table 3-9 CN5~CN8

Name	Number	Description
P+	1	Positive Direction Pulse(+)
N+	2	Negative Direction Pulse(+)
EXT_GND	3	EXT POWER Ground
A-	4	Encoder A-phase(-)
B-	5	Encoder B-phase(-)
EXT_5V	6	EXT POWER 5V
P-	7	Positive Direction Pulse(-)
N-	8	Negative Direction Pulse(-)
A+	9	Encoder A-phase(+)
B+	10	Encoder B-phase(+)
Z+	11	Encoder Z-phase(+)
Z-	12	Encoder Z-phase(-)
OUT4	13	OUT4 of Servo Motor
CONT5	14	CONT5 of Servo Motor
EXT_PWR	15	EXT POWER 24V

- ▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## ■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468FB, and the Table 3-10 shows its I/O connector signal description.

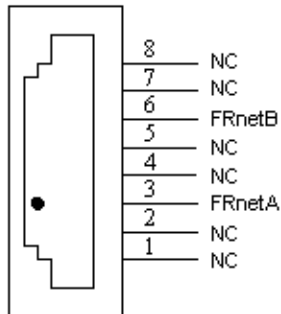


Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Fig. 3-9 Pin definition for RJ1

► **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

## B. 5. 3 Jumper and Switch Settings

### ■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

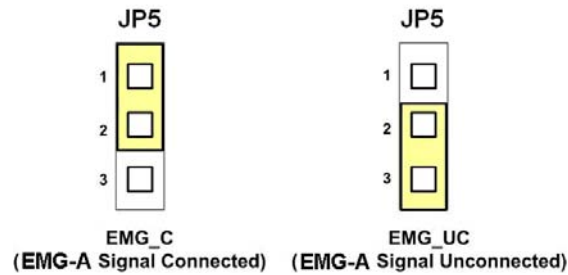


Fig. 3-10 Jumper 5 setting

### ■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

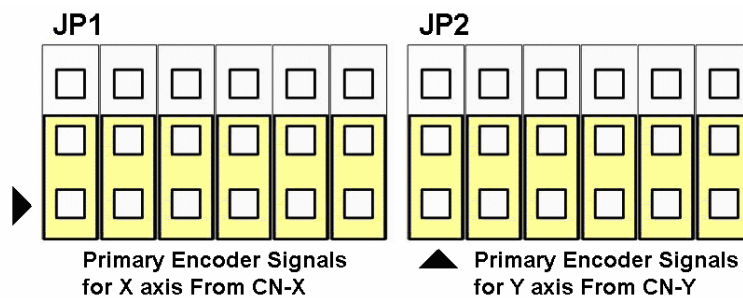


Fig. 3-11 Primary encoder signals setting

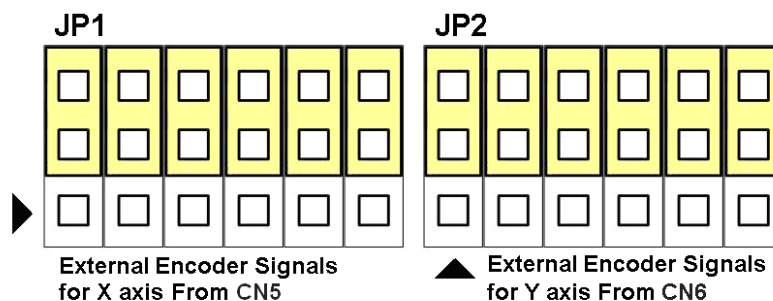


Fig. 3-12 External encoder signals setting

### ■ SW1

The CONT3 for each servo amplifier can be selected from SW1. The number 1, 2, 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the CONT3 signals to GND. The CONT3 signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the CONT3 signals can be controlled from CONT3 signals in CN1 ~ CN4.



Fig. 3-13 SW1 setting for normally GND (Default setting)

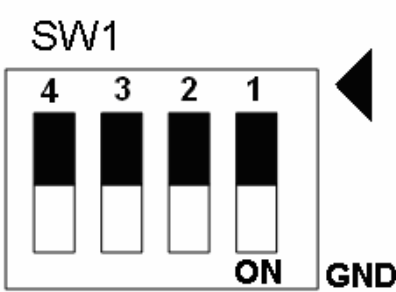


Fig. 3-14 SW1 setting for user controlled signals.