

PISO-PS200 快速上手手冊

(Version 3.0)

PISO-PS200 軟體函式庫快速上手
PCI BUS 系列控制卡



ICPDAS CO., LTD.

泓格科技股份有限公司

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目錄

1 PISO-PS200 運動控制卡簡介	6
1.1 簡介	6
1.2 硬體規格	6
1.2.1 主要規格	6
1.2.2 補間功能	6
1.2.3 輸出脈衝	6
1.2.4 編碼器輸入	7
1.2.5 位置計數器	7
FRnet 串列式DI/DO功能	7
1.2.7 自動歸原點	8
1.2.8 伺服馬達輸入訊號 Servo Motor Input Signal	8
1.2.9 極限訊號輸入	8
1.2.10 其它輸入訊號 Other Input Signals	8
1.2.11 緊急停止訊號輸入, Emergency Stop Signal Input	8
1.2.12 一般輸出訊號 General Output Signal	8
1.2.13 整合輸入濾波器Contents of integral type filters	9
1.2.14 軟體極限	9
1.2.15 手搖輪功能	9
1.2.16 同步作動	9
1.3 環境參數Environment	9
1.4 採購資訊Ordering Information	10
2 硬體配線	11
2.1 PISO-PS200 檢查包裝及安裝.....	11
2.1.1 檢查包裝.....	11
2.1.2 安裝	11
2.1.3 SW1 設定.....	12
2.1.4 SW2 設定.....	12

2.2 DN-8237 端子板	13
2.2.1 尺寸圖.....	13
2.2.2 腳位定義.....	14
2.2.3 功能選擇(跳線設定).....	18
2.3 I/O 輸出入介面	20
2.3.1 脈波輸出介面及模式.....	20
2.3.2 極限開關接線(Connection for Limit switch Signal).....	21
2.3.3 一般DI輸入接線(nINPOS, nALARM).....	22
2.3.4 Encoder輸入接線(Encoder Signals).....	22
2.3.5 緊急停止輸入接線(emergency stop signal).....	23
2.3.6 手搖輪信號輸入接線(EXP+, EXP-).....	23
2.3.7 數位輸出信號輸出接線(OUT0、OUT1).....	24
2.4 接線範例	25
3 PISO-PS200 軟體函式軟體開發程序	26
3.1 軟體開發測試程序概觀	26
3.2 安全IO規劃(會使Motion不動作原因)	27
3.2.1 緊急開關 (EMG) 輸入.....	27
3.2.2 設定伺服馬達異常ALARM輸入參數.....	27
3.2.3 設定各軸前後硬體極限 (±EL).....	27
3.2.4 設定各軸前後軟體極限 (±SEL).....	27
3.3 檢查是否有錯誤(GET_ERROR)	27
3.4 Motion 基本設定	27
3.5 Motion 動作測試(手搖輪輸入)(如需要)	28
3.6 軸歸零	28
3.6.1 歸原點設定.....	29
3.6.2 執行歸原點設定.....	29
3.7 Motion 基本運作	29

3.7.1 一般運動控制速度曲線分類.....	29
3.7.2 單軸Motion 基本動作	31
3.7.3 多軸補間Motion 基本動作	31
4 PISO-PS200 PCEZGO(BY BASIC FUNCTION).....	32
4.1 初始化設定對話盒(Configuration Dialog).....	33
4.2 一般運動命令與進階運動命令 (Basic Operation Dialog)	36
4.3 補間運動對話盒 (Interpolation Dialog)	38
4.4 FRnet DI/DO對話盒 (FRnet DI/DO Demo).....	40
附錄A PISO-PS200 驅動程式安裝	41
附錄B PISO-PS200 其它TERMINAL BOARDS	45
APPENDIX-B OTHERS TERMINAL BOARDS.....	45
B.1 DN-8237-DB Daughter Board	45
B.1.1 Board Layout for DN-8237-DB	45
B.1.2 Signal Connections for DN-8237-DB	46
B.1.3 Jumper and Switch Settings	51
B.2 DN-8237-MB Daughter Board.....	54
B.2.1 Board Layout for DN-8237-MB	54
B.2.2 Signal Connections for DN-8237-MB	55
B.2.3 Jumper and Switch Settings	60
B.3 DN-8237-PB Daughter Board.....	62
B.3.1 Board Layout for DN-8237-PB	62
B.3.2 Signal Connections for DN-8237-PB	63
B.3.3 Jumper and Switch Settings	68
B.4 DN-8237-YB Daughter Board	70
B.4.1 Board Layout for DN-8237-YB	70
B.4.2 Signal Connections for DN-8237-YB	71
B.4.3 Jumper and Switch Settings	76

1 PISO-PS200 運動控制卡簡介

1.1 簡介

PS200 是一張支援 2 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 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 PS200 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 PS200 卡（一個系統中最多可控制 16 張 PS200 軸卡），以多軸 (2、4....)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 | MCX312 |
| ■ 控制軸數 | 2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 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 $954 \sim 62.5 \times 10^6 \text{ PPS/S}^2$
 $477 \times 10^3 \sim 31.25 \times 10^9 \text{ PPS/S}^2$
- 加減速範圍 $125 \sim 1 \times 10^6 \text{ PPS/S}$
 $62.5 \times 10^3 \sim 500 \times 10^6 \text{ PPS/S}$
- 速度精度 1 PPS 到 500PPS(依最高速而定)
- 脈衝輸出數 0 ~ 268,435,455 / unlimited
- 速度曲線型態:
 - ◆ 定速
 - ◆ 對稱與非對稱T-profile加減速
 - ◆ 對稱與非對稱S-Curve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 $-2,147,483,648 \sim +2,147,483,647$
- 實際位置(編碼器輸入)計數器範圍 $-2,147,483,648 \sim +2,147,483,647$
- 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

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

- 支援中斷和除頻功能
- 重置(Reset)功能

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。

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nOUT0可作為泛用的DO信號
- 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)
- 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

- 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-PS200 2軸PCI運動控制卡
- DN-8237 PISO-PS200 端子板
- CA-3710D 37-pin D-Sub 接頭線，長度:1 m

2 硬體配線

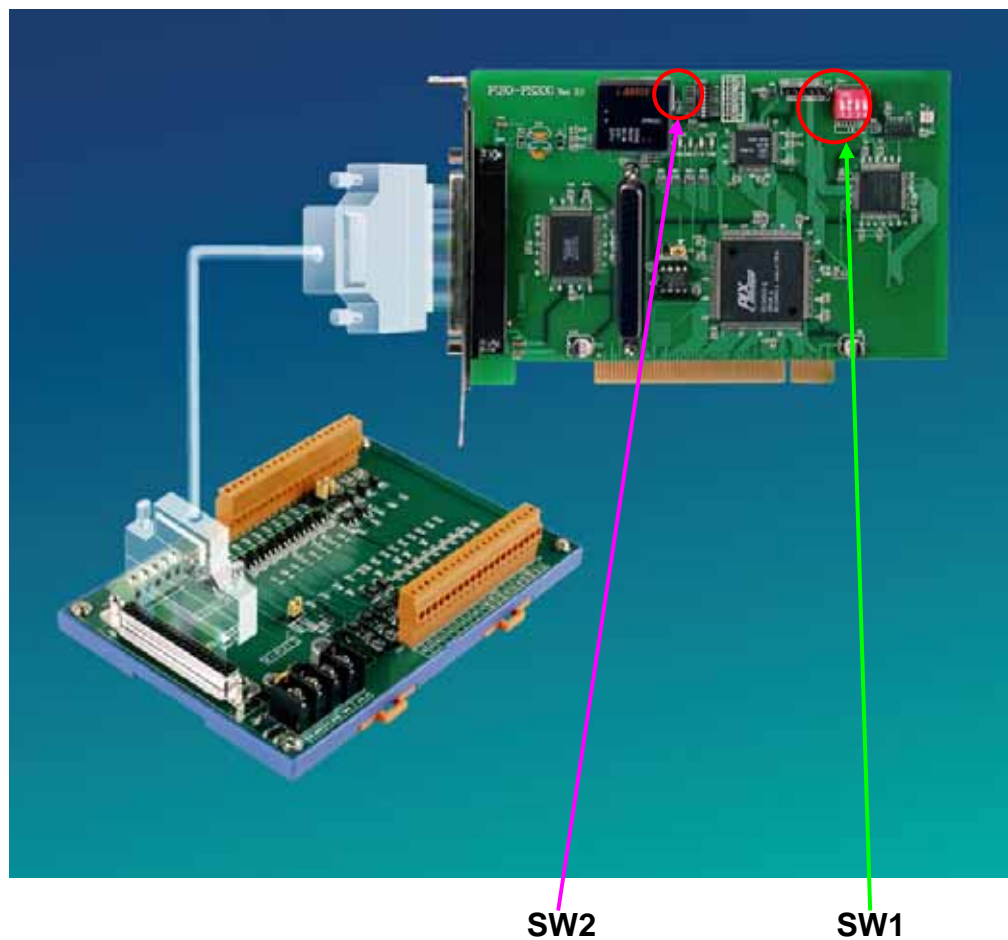
2.1 PISO-PS200 檢查包裝及安裝

2.1.1 檢查包裝

- PISO-PS200 PCI 4軸運動控制卡
- DN-8237 PISO-PS200 配線端子板
- CA-3702 37-pin D-Sub 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-3702 連接到 DN-8237 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				

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-8237 端子板

2.2.1 尺寸圖

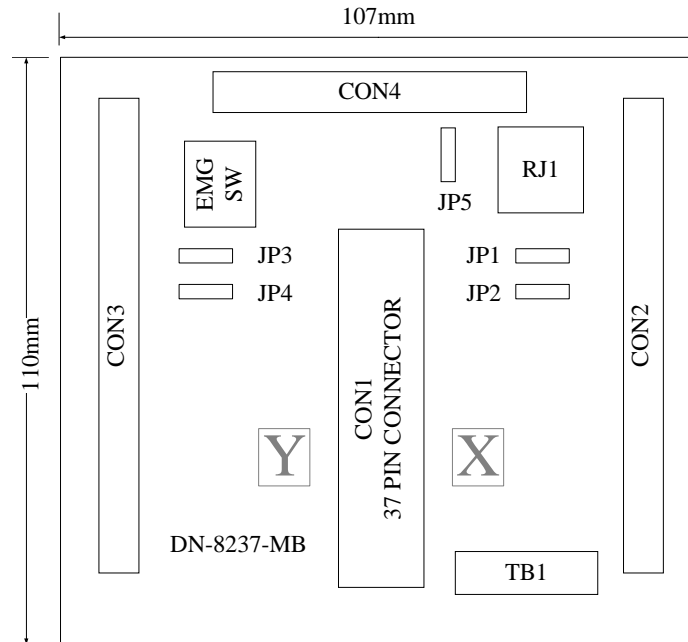


Fig. 2-1 DN-8237-GB位置圖

2.2.2 腳位定義

■ CON1 : PISO-PS200 卡與 DN-8237 連接接頭

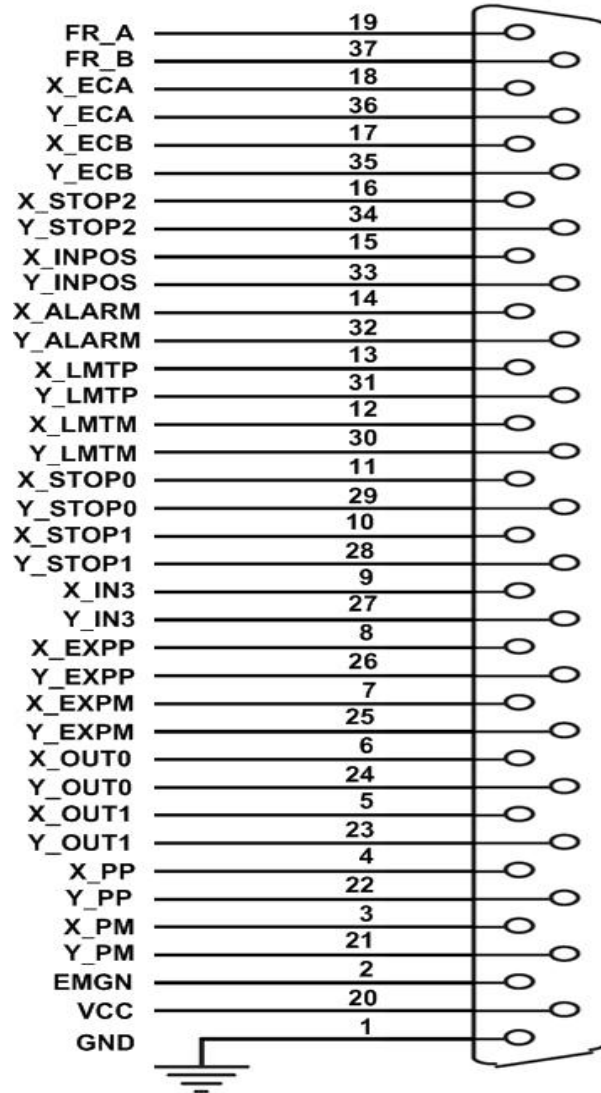


Fig. 2-2 DN-8237 CON1 連接線腳位圖

Table 2.2 DN-8237 CON1 連接線腳位說明

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

- CON2、CON3：各軸（X、Y）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】

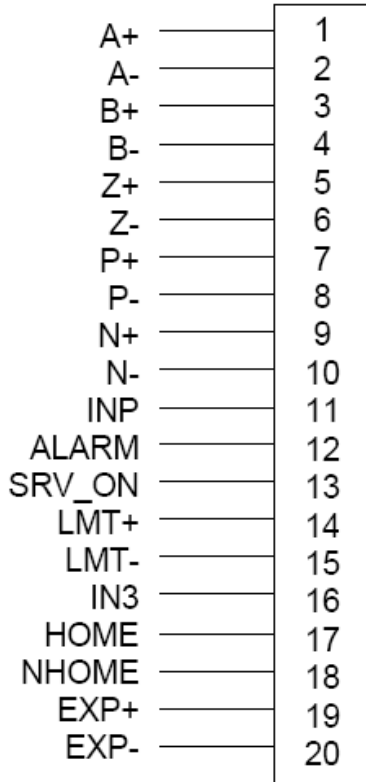


Fig. 3-3 Pin definition for CON2 & CON3

Table 3-3 CON2 ~ CON3 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	Limit Switch Input Signal (+)
LMT-	15	Limit Switch Input Signal (-)
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 (-)

- **CON4**：其他特殊接點：FRnet 接點，各軸 (X、Y) 之伺服驅器 EMG 控制接點，各軸 (X、Y) DCC 接點及手搖輪輸入接點

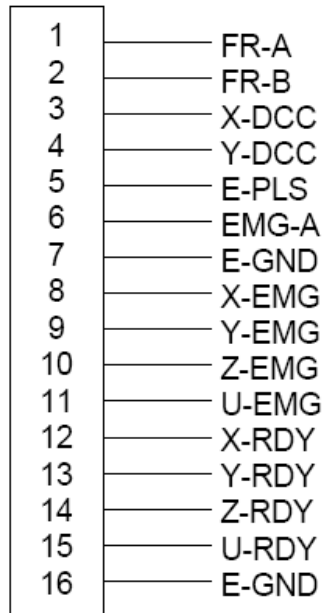


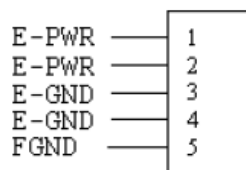
Table 3-4 CON4 Signal Connection

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
X-EMG	EMG input signal for X axis
Y-EMG	EMG input signal for Y axis
Z-EMG	EMG input signal for Z axis
U-EMG	EMG input signal for U axis
X-RDY	Ready input signal for X axis
Y-RDY	Ready input signal for Y axis
Z-RDY	Ready input signal for Z axis
U-RDY	Ready input signal for U axis

Fig. 3-4 Pin definition for CON4

- **TB1**:外部電源接點

Table 3-4 TB1 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 TB1

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ RJ1: FRNet 的 RJ45 接口

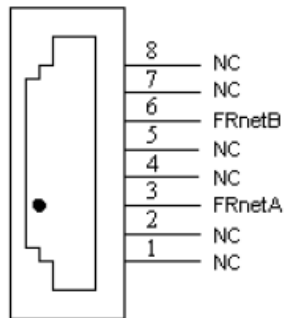


Table 3-5 RJ1

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

Fig. 3-5 Pin definition for RJ1

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

2.2.3 功能選擇(跳線設定)

■ JP5

Jumper 5 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

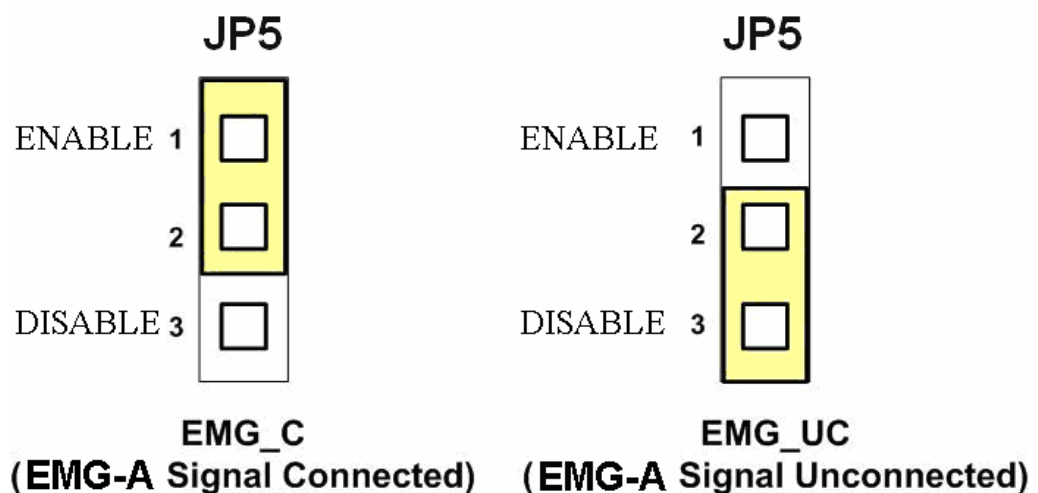


Fig. 2-6 Jumper 5 setting

■ SW 1

伺服馬達的驅動器端的 EMG 點設定，當設定為 ON 代表為直接到 GND (預設值為 ON)，反之則為讓使用者可以從 CON4 來連接到 GND 當成一個安全接點。

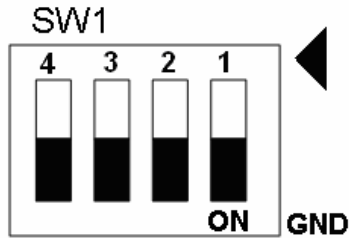


Fig. 2-7 SW1 setting for normally GND (Default setting)

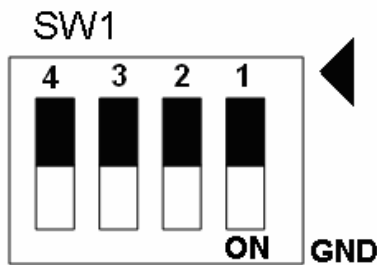


Fig. 2-8 SW1 setting for user controlled signals.

■ JP 1/2 & JP 3/4

Jumper 1、2 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(JP3/4)

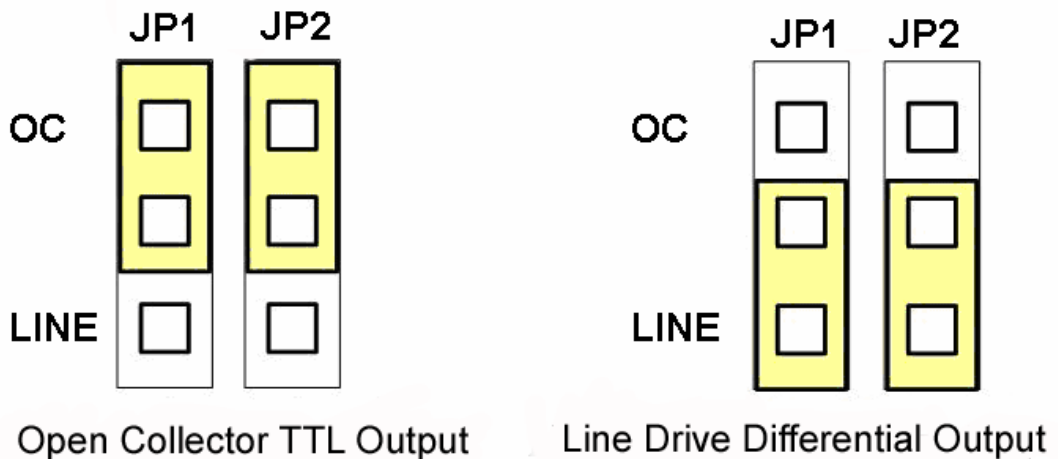


Fig. 2-9 Jumper 1, 2 setting

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

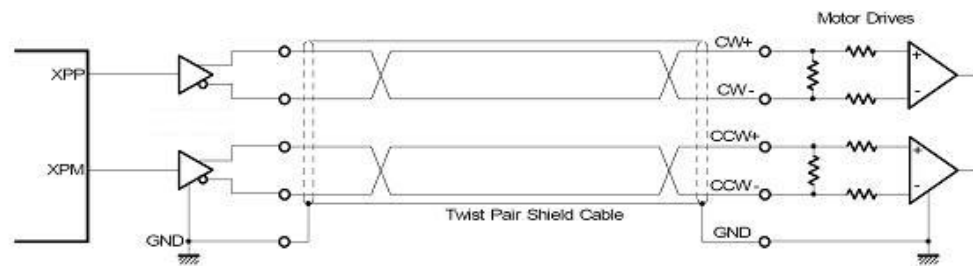


Fig. 2.10 差動脈波輸出接線

◆ 開集極輸出

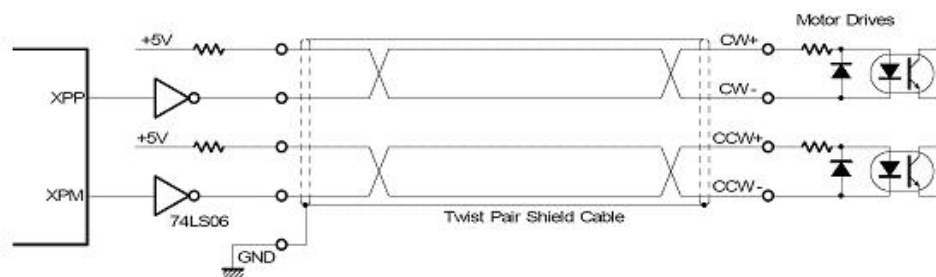


Fig. 2.11 開集極輸出

◆ 脈波信號接線範例

PS200 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。

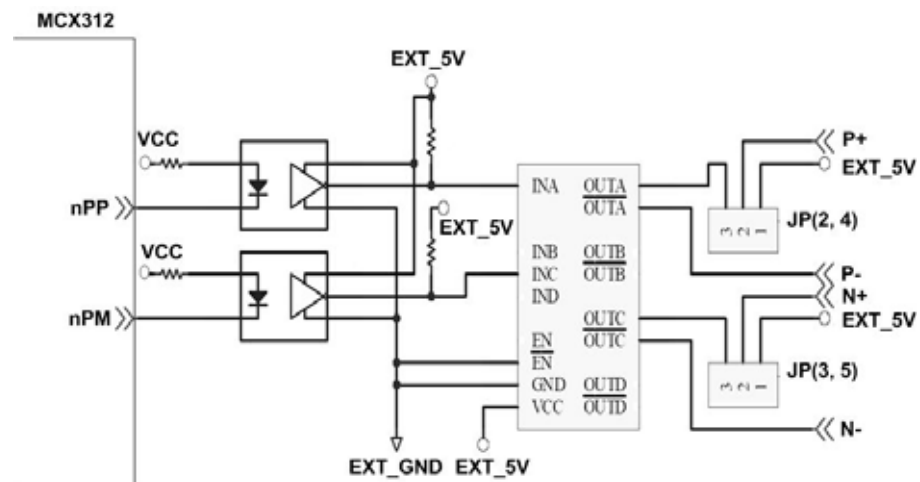
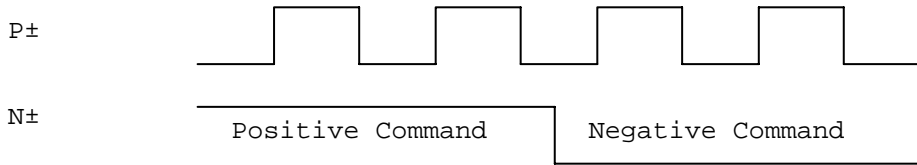


Fig. 2.12 脈波信號接線範例

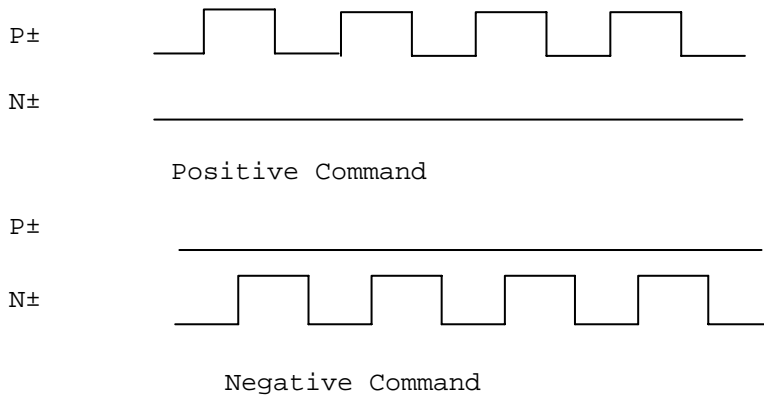
◆ 單一 Pulse 輸出模式 (Pulse/Direction) :

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。

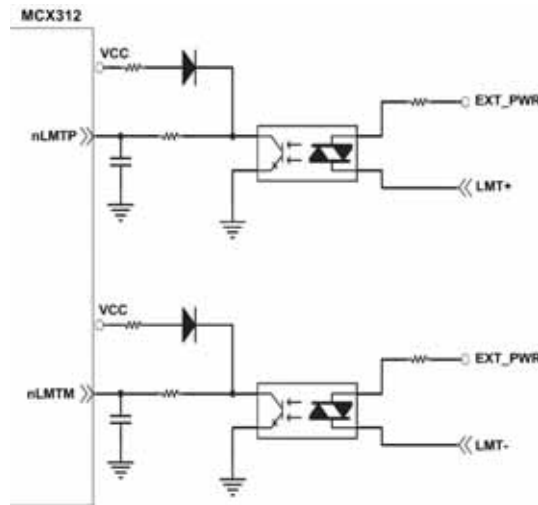


Fig. 2.13 極限開關接線範例

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 PS200 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。

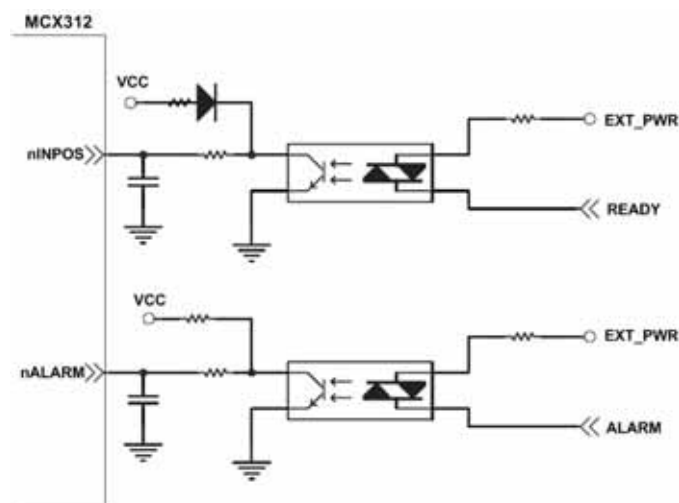


Fig. 2.14 一般 DI 輸入接線範例

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-，經過高速光偶合 IC 就直接連到運動控制晶片。

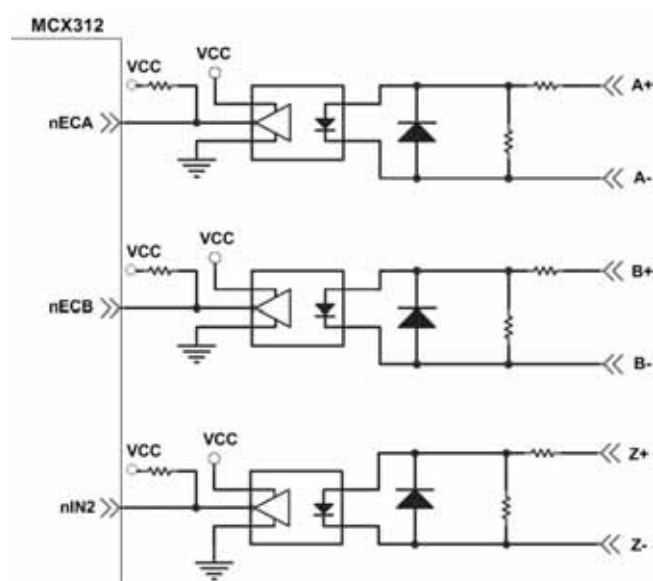


Fig. 2.15 Encoder 接線範例

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。

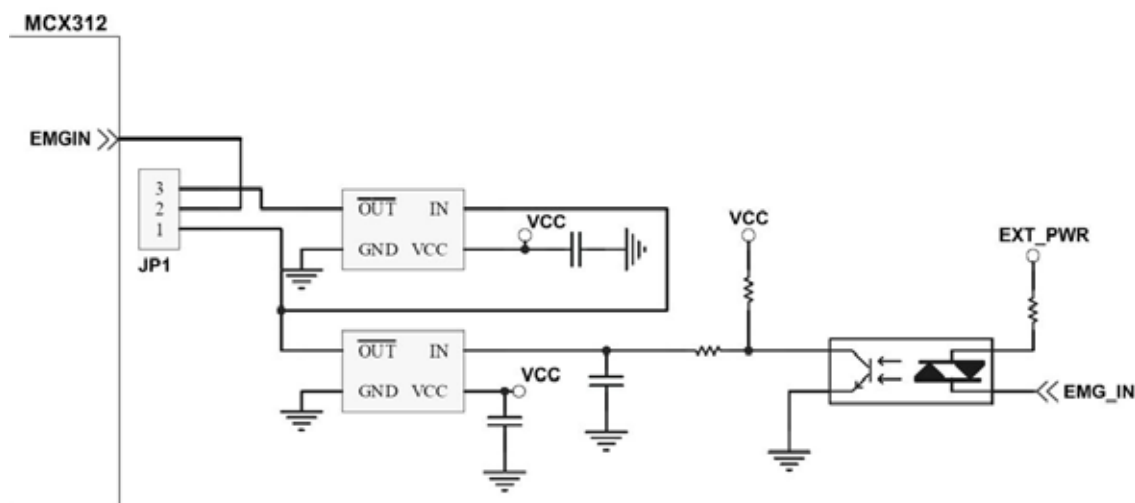


Fig. 2.16 緊急停止輸入接線範例

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。

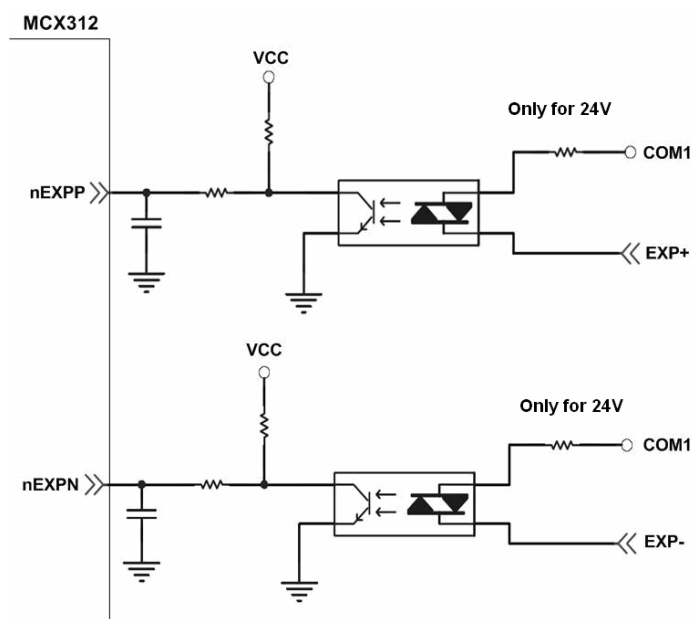


Fig. 2.17 外部信號 +/- 輸入接線範例

2.3.7 數位輸出信號輸出接線(OUT0、OUT1)

下圖是 OUT0：汎用數位輸出訊號和 OUT1：Servo On/Off 信號輸出接線範例。

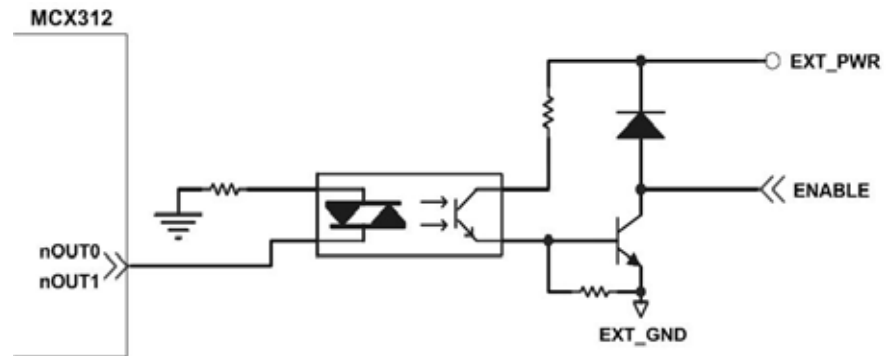


Fig. 2.18 Servo On/Off 信號輸出接線

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-8237 的接線腳位圖

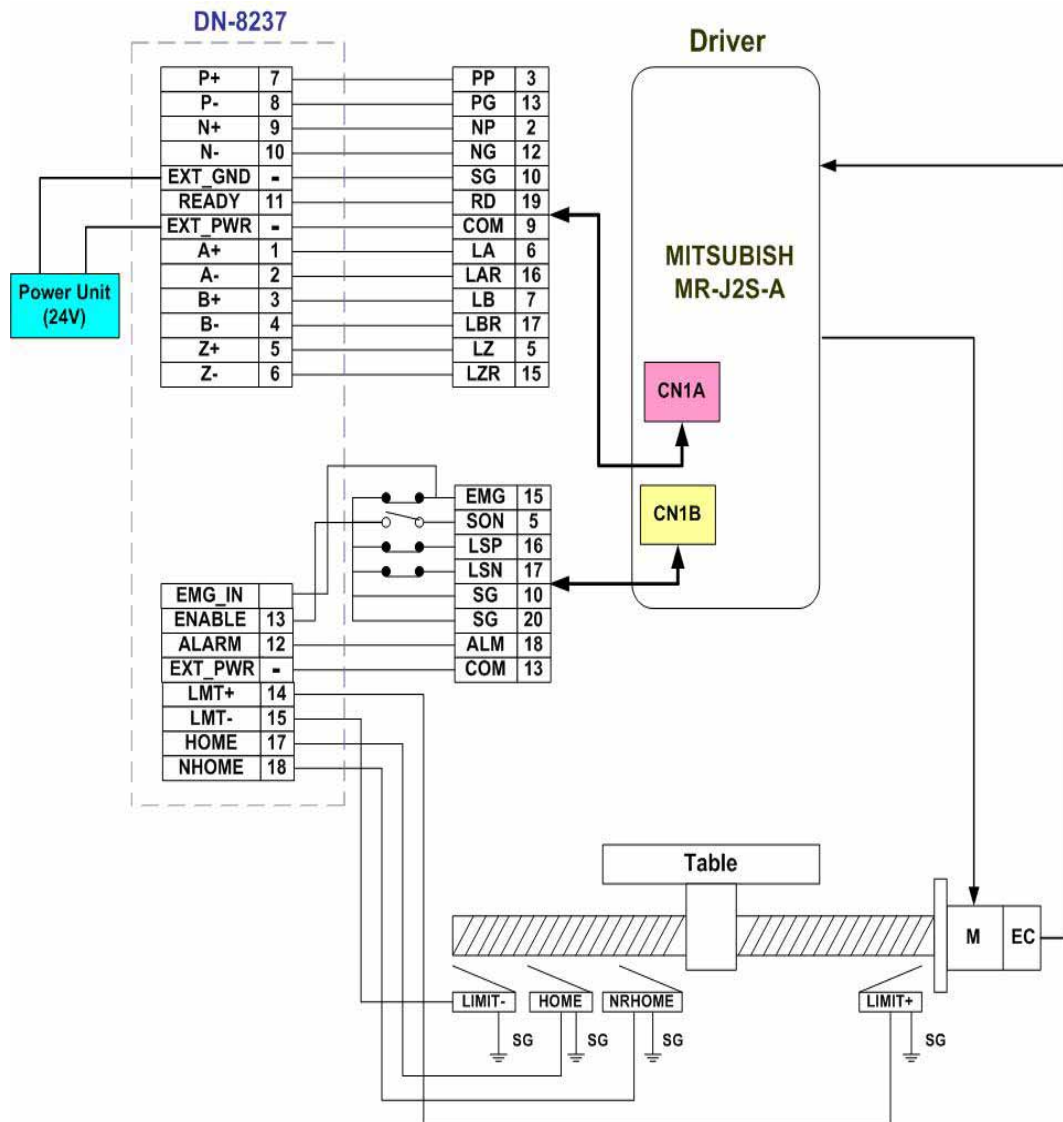
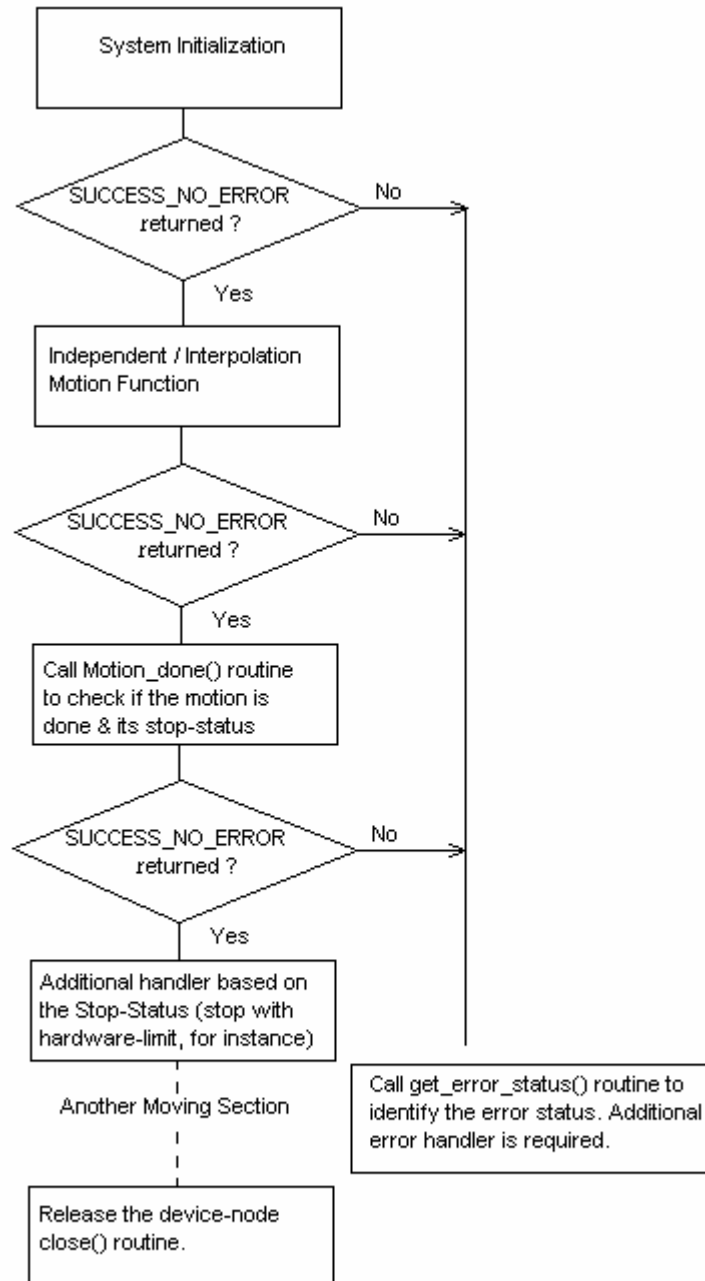


Fig. 2.19 MR-J2S AC 伺服馬達，連接到 DN-8237 的接線腳位圖

3 PISO-PS200 軟體函式軟體開發程序

3.1 軟體開發測試程序概觀



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(N.C.)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“PS200軟體函式手冊 V3.0” pdf 2.3.2 ps200_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PS200MF會自動停止，您可以選擇使用適當觸發邏輯。詳情請參考“PS200軟體函式手冊 V3.0” pdf 2.2.5 ps200_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PS200會自動停止，您可以選擇使用與否，與設定位置。詳情請參考“PS200軟體函式手冊 V3.0” pdf 2.8 ps200_set_softlimit ()功能

3.3 檢查是否有錯誤(GET_ERROR)

檢查是否有錯誤，如有再ps200_get_error_status() 取得 ERROR_CODE並查相關原因，相關處理檢查，及正確設定詳情請參考“PS200軟體函式手冊 V3.0”pdf 9.9

也可以利用“PS200軟體函式手冊 V3.0”pdf 9.9 ps200_get_error_status()讀取目前Error_status狀態確定是否產生。

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...

ps200_set_pls_cfg() (詳情請參考 PS200軟體函式手冊 2.5)

2 設定各軸的最高速度限制

ps200_set_MaxSpeed()(詳情請參考 PS200軟體函式手冊 2.6)

3 設定編碼器輸入參數(如需要)

ps200_set_enc_cfg()(詳情請參考 PS200軟體函式手冊 2.9)

4 設定數位輸入雜訊濾波功能(如需要)

ps200_set_filter ()(詳情請參考 PS200軟體函式手冊 2.13)

5 指定軸為圓形運動軸(環狀計數器)(如需要)

ps200_set_vring ()(詳情請參考 PS200軟體函式手冊 2.14)

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。

ps200_set_mpg ()(詳情請參考 PS200軟體函式手冊 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。

ps200_set_mpg ()(詳情請參考 PS200軟體函式手冊 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。

ps200_set_mpg ()(詳情請參考 PS200軟體函式手冊 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。

ps200_set_mpg ()(詳情請參考 PS200軟體函式手冊 7.2)

3.6 軸歸零

PS200 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 歸原點設定

- 1 設定軸近原點輸入觸發邏輯(如需要)

`ps200_set_home_cfg ()` (詳情請參考 PS200軟體函式手冊3.1)

- 2 設定/執行歸零運動

`ps200_home_start ()`(詳情請參考 PS200軟體函式手冊 3.2)

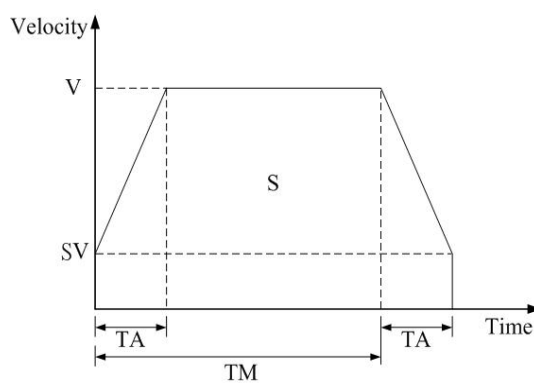
3.6.2 執行歸原點設定

- 1 等待完成歸零動作

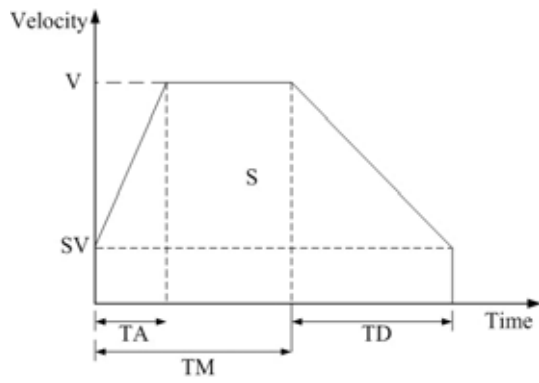
`ps200_motion_done ()`(詳情請參考 PS200 軟體函式手冊 9.1)

3.7 Motion 基本運作

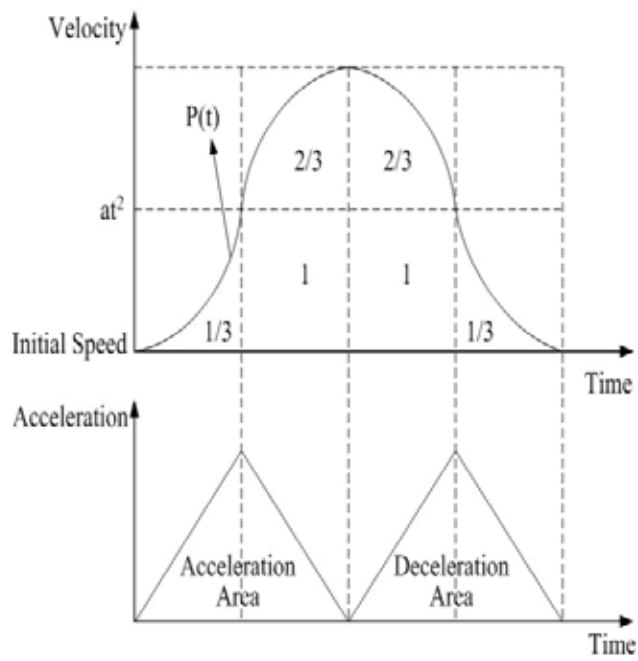
3.7.1 一般運動控制速度曲線分類



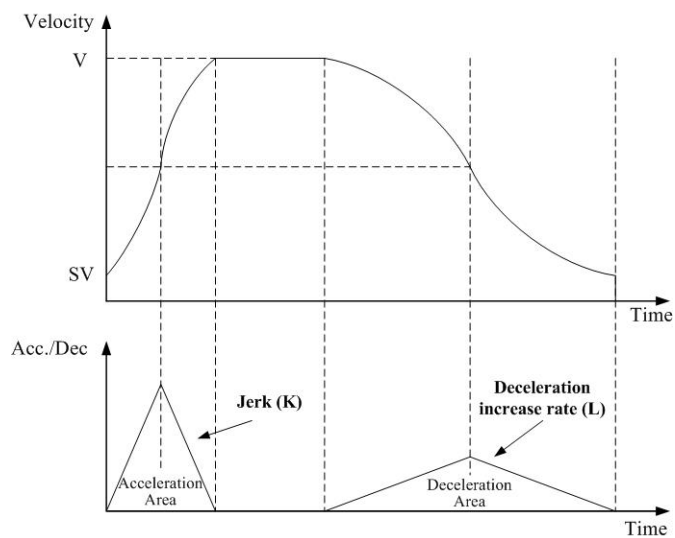
- 1 對稱 T 型運動控制速度曲線(如 SV 大於等於 V,將執行定速驅動)



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) → ps200_const_move()

對稱 T 曲線 (SV、V、A、AO) → ps200_t_move()

對稱 S 曲線 (SV、V、K、AO) → ps200_s_move()

非對稱 T 曲線 (SV、V、A、D、AO) → ps200_t_move()

非對稱 S 曲線 (SV、V、K、L、AO) → ps200_s_move()

(詳情請參考 PS200 軟體函式庫手冊 4.4~4.7)

- 2 連續脈波輸出: 執行單軸連續脈波輸出。

相關函式: ps200_velocity_move()

(詳情請參考 PS200 軟體函式庫手冊 4.1)

- 3 等待完成軸運動: 等待軸完成停止。

相關函式: ps200_motion_done()

(詳情請參考 PS200 軟體函式庫手冊 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: ps200_t_line2_move()

ps200_s_line2_move()

(詳情請參考 PS200 軟體函式庫手冊 5.1)

- 2 二軸圓弧補間: 執行二軸圓弧補間。

相關函式: ps200_t_arc2_move()

(詳情請參考 PS200 軟體函式庫手冊 5.1)

4 PISO-PS200 PCEzGo(by Basic Function)

PISO-PS200 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)、信號濾波器(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。

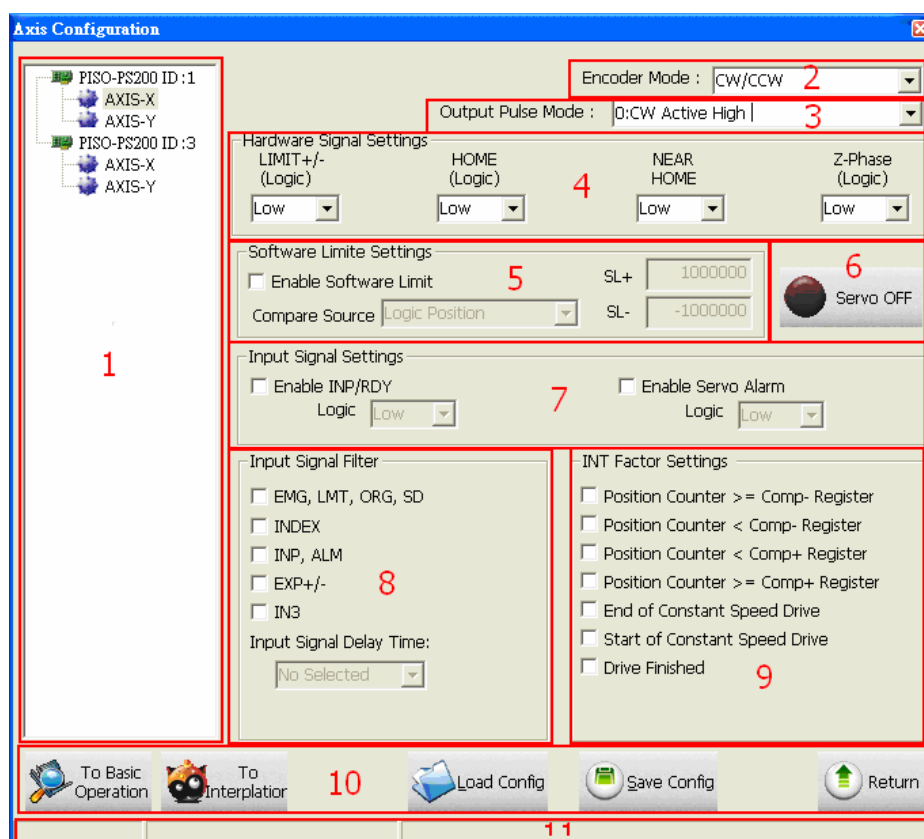
3、補間運動命令 (Interpolation)：請參閱 4.3 節

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. 版卡配置(Card Configuration)：

- 配合各版卡設定指定運動軸。

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：ps200_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：ps200_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(Hi/Low)。
- 相關函數指令：ps200_set_limit()、ps200_set_home_cfg()。

5. 軟體極線設定(Software Signals Settings) :

- 說明請參考 3.2.4 節。
- 相關函數指令：ps200_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：ps200_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：ps200_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：ps200_set_filter()。

9. 中斷向量設定(INT Factor Settings) :

- PISO-PS200 運動控制卡提供 10 種中斷事件的設定。包括起始脈波輸出(Pulse-Up)、位置計數器大於等於負方向比較計數器(Position Counter >= Comp- Counter)、位置計數器小於負方向比較計數器(Position Counter < Comp- Counter)、位置計數器大於等於正方向比較計數器(Position Counter >= Comp+ Counter)、位置計數器小於正方向比較計數器(Position Counter < Comp+ Counter)、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)、原點返回結束(Home Termination)，以及同步運動(Synchronous Action)的中斷事件。使用者可利用

多執行緒的觀念,自行撰寫中斷服務常式(ISR)執行緒中,配合呼叫中斷函數指令即可簡單達到中斷功能。

- 相關函數指令： `ps200_set_int_factor()`、`ps200_int_event_config()`。

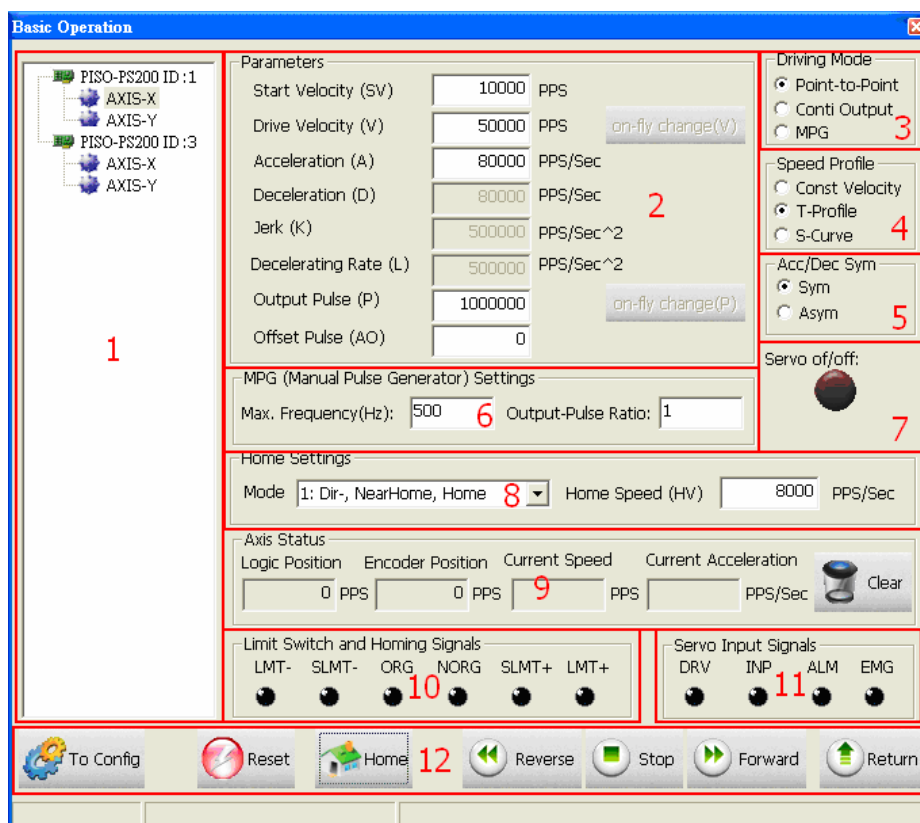
10. 按鈕功能

- `ToBasicOperation`：切換到 Basic Operation Dialog。
- `ToInterpolation`：切換到 Interpolation Dialog。
- `LoadConfig`：載入特定的 ini 檔案。
- `SaveConfig`：儲存相關硬體訊號設定至 ini 檔案。
- `Return`：返回起始畫面。

11. 狀態顯示

- 顯示錯誤軸的狀態。

4.2 一般運動命令與進階運動命令 (Basic Operation Dialog)



群組定義&使用說明

1. 版卡配置(Card Configuration)：

- 配合各版卡設定指定運動軸。

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)

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

4. 速度模式設定 (Speed Profile)

- 可選擇常速運動模式(Const Velocity)、T 曲線模式(T-Profile)、S 曲線模式(S-Profile)。

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：`ps200_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、實際位置計數器、位置誤差、即時速度等資訊。
- 相關函數指令：`ps200_get_cmdcounter()`、`ps200_get_position()`、`ps200_get_speed()`、`ps200_get_acc()`。

10. 原點與極限點狀態 (Limit Switch and Homing Signals)

- 顯示原點與極限點狀態。
- 相關函數指令：`ps200_get_int_status()`。

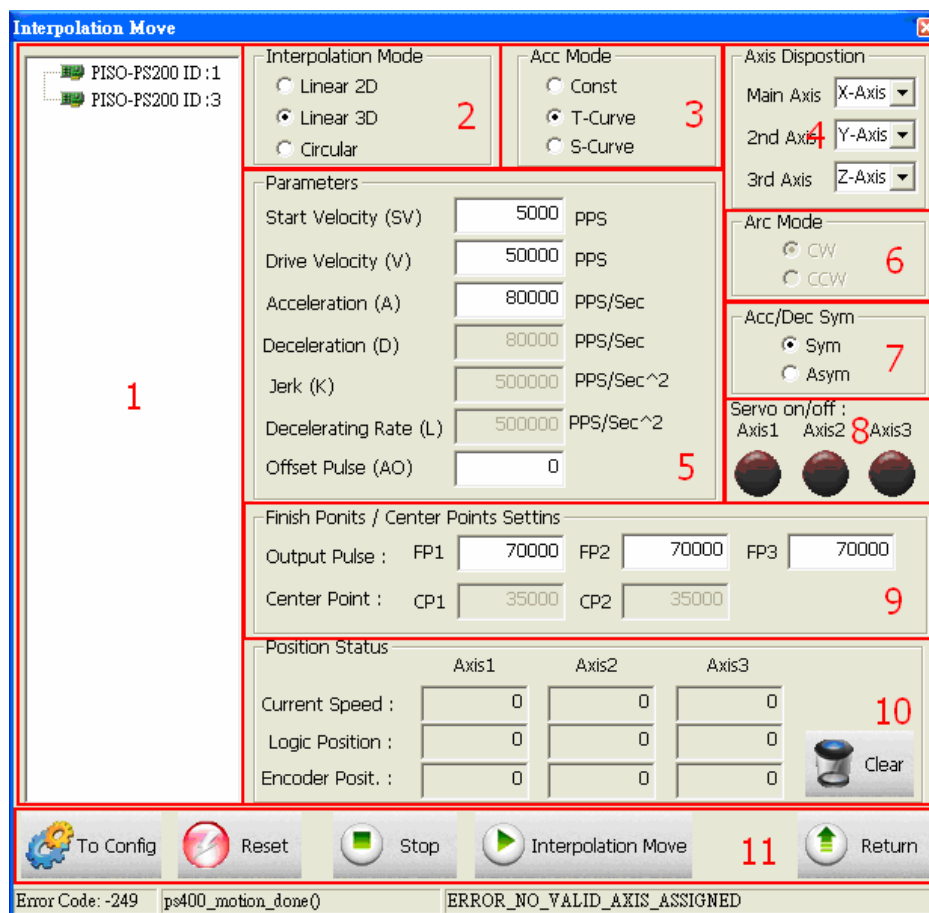
11. 伺服輸入信號狀態顯示 (Servo Input Signal)

- 顯示伺服輸入信號狀態顯示。

12. 按鈕功能

- ToConfig：切換到 Axis Configuration Dialog。
- Reset：回復至版卡的初始狀態。
- Home：啟動原點返回。相關函數指令：`ps200_home_start()`。
- Reverse：啟動負方向運動。
- Stop：停止運動。相關函數指令：`ps200_stop_move()`。
- 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. 版卡配置(Card Configuration)：

- 配合各版卡設定指定版卡。

2. 補間模式設定 (Interpolation Mode)

- PISO-PS200 PCEzGo 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：ps200_t_line2_move()、ps200_s_line2_move()、ps200_t_line3_move()、ps200_s_line3_move()、ps200_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(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。

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)

- 設定圓弧補間結束點與原點。

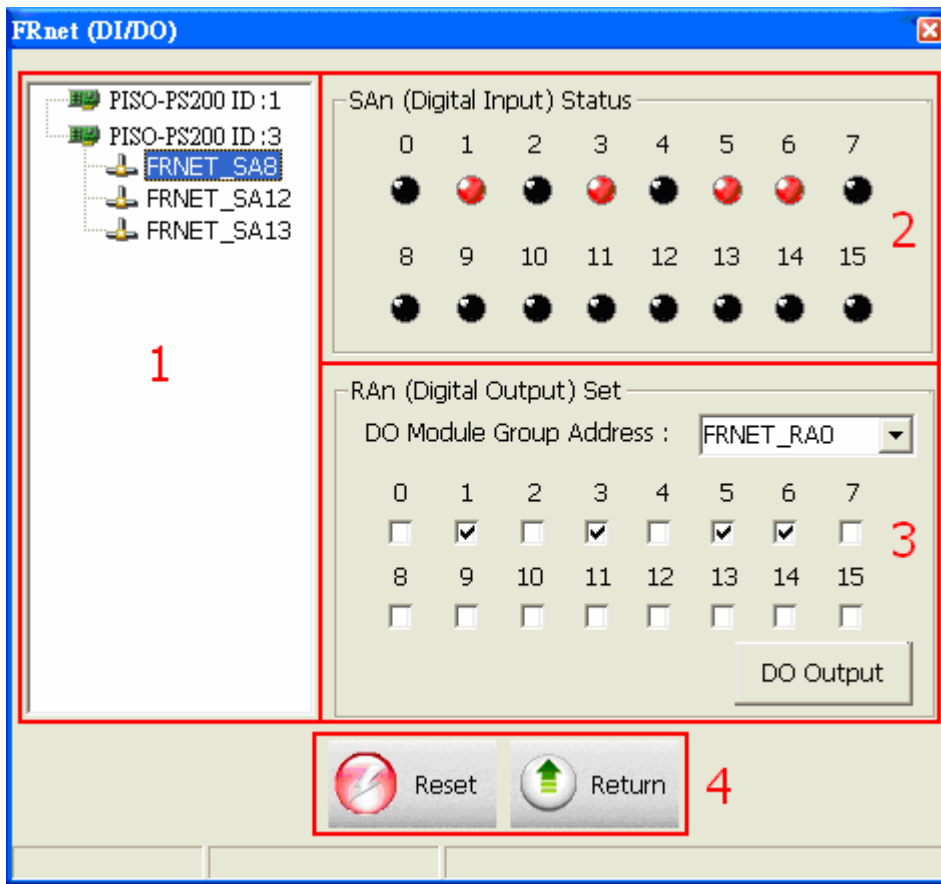
10. 運動軸狀態顯示 (Axis Status)

- 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、實際位置計數器、位置誤差、即時速度等資訊。
- 相關函數指令：`ps200_get_cmdcounter()`、`ps200_get_position()`、`ps200_get_speed()`。

11. 按鈕功能

- ToConfig：切換到 Axis Configuration Dialog。
- Reset：回復至版卡的初始狀態。
- Stop：停止運動。
- Interpolation Move：執行補間運動。
- 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. 版卡配置(Card Configuration)：

- 配合各版卡設定指定版卡。

2. SAn 數位輸出端 (San, (Digital Output) Set)

- PISO-PS200 提供 FRnet 通訊功能：數位輸出端共有 128 點(16×8)可供使用。
- 相關函數指令：ps200_set_FRnet_DO()。
-

3. RAn 數位輸入端 (Ran, (Digital Input) Set)

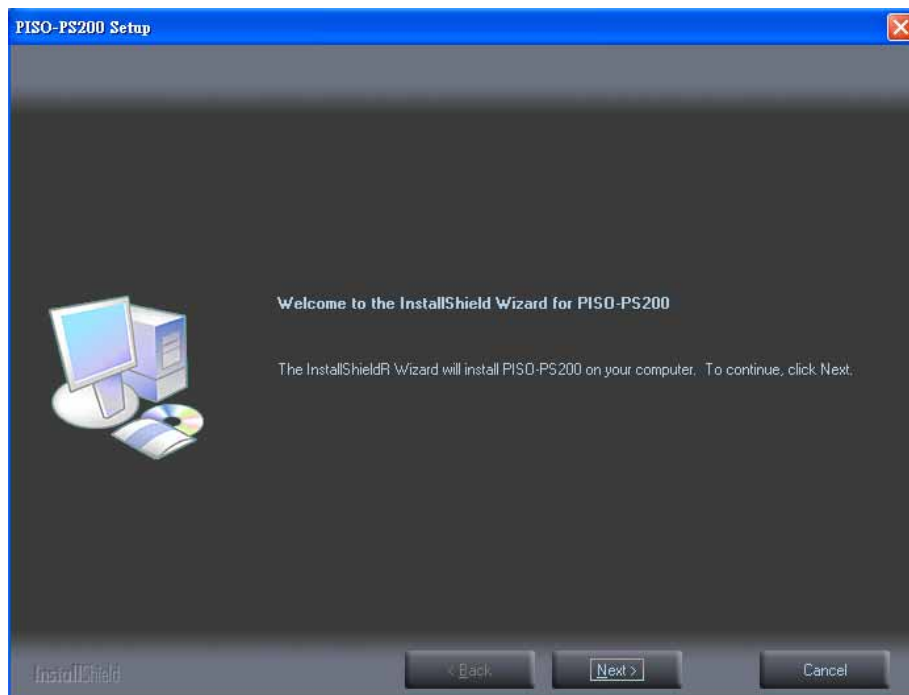
- 選擇數位輸出輸入群組等功能(Do Module Group Address)。
- PISO-PS200 提供 FRnet 通訊功能：數位輸入端共有 128 點(16×8)可供使用。
- 相關函數指令：ps200_get_FRnet_DI()。

4. 按鈕功能

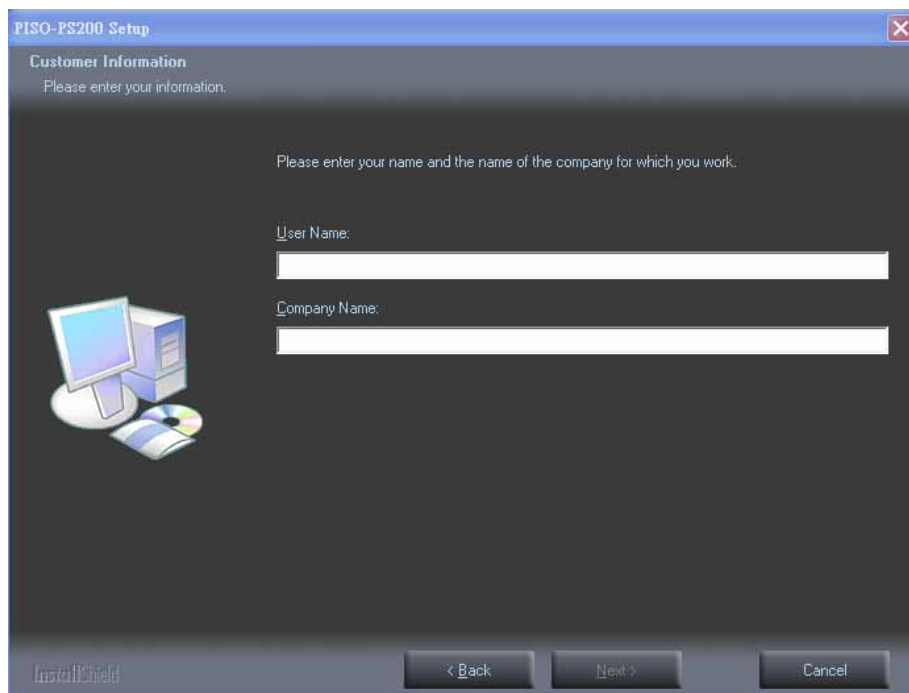
- Reset：回復至版卡的初始狀態。
- Return：返回起始畫面。

附錄 A PISO-PS200 驅動程式安裝

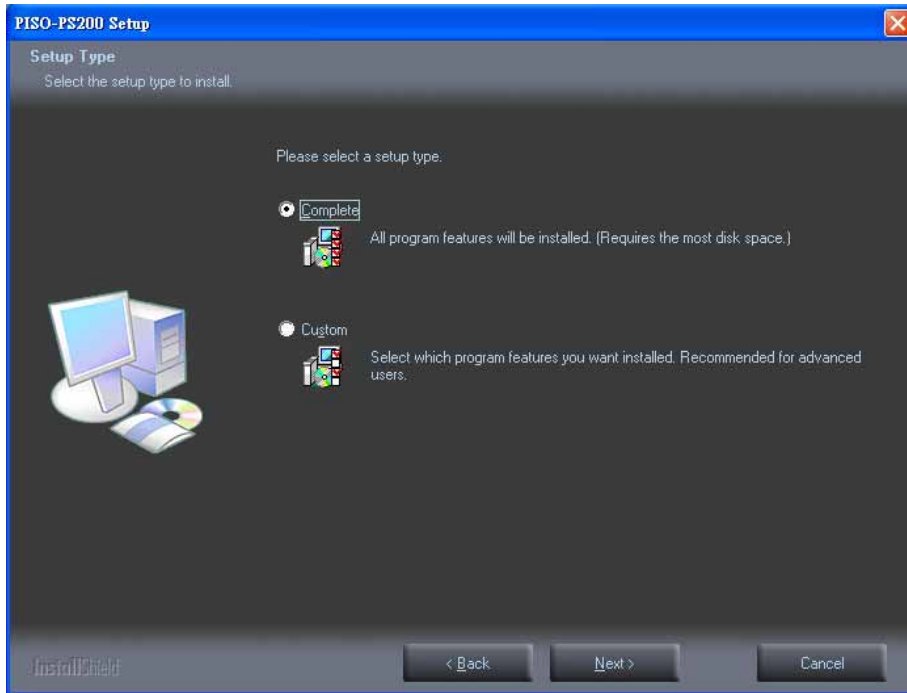
請從 CD //PISO-PS200/Setup_2K_XP/ 中執行: setup.exe ,按"NEXT"



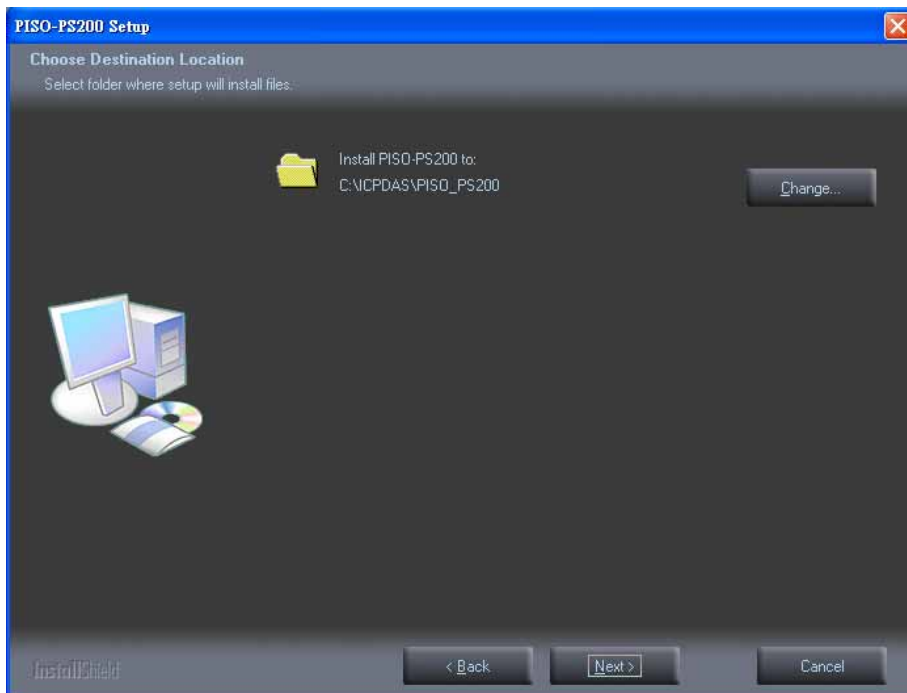
輸入使用者名稱及公司名稱,按"NEXT"



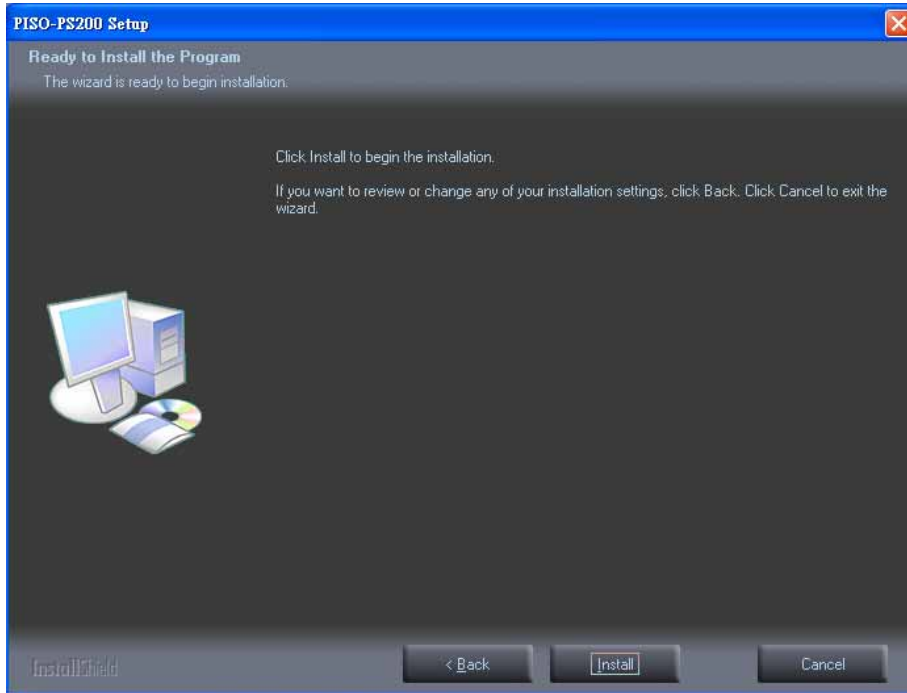
選擇”完整”或”自訂”安裝,按”NEXT”



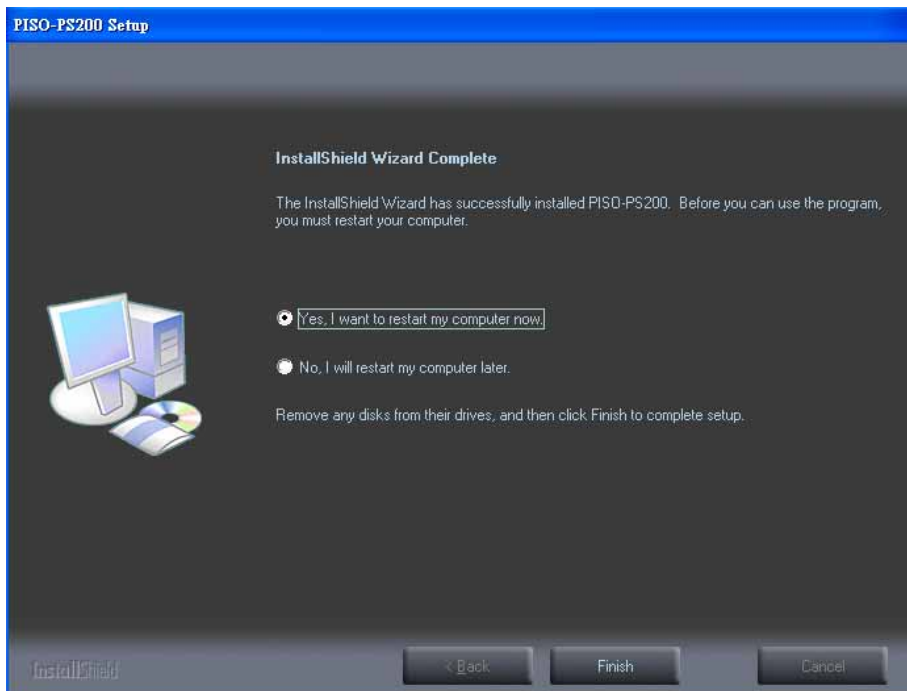
指定安裝路徑後,按”NEXT”



按”Install” 開始安裝



安裝完成後請按”Finish”重新開機即可



After installation, the folder/files are distributed as follows:

(Typically, the installed directory is, C:\ICPDAS\PISO_PS200)

\$Installed_Directory	\Include	Header Files
	\LIB	Library Files
	\Manuals	All manuals
	\Utility	PCEzGo.exe
	\Driver	Win2K WinXP drivers and information file
	\Samples	VC6 VB6 BCB6 Samples for VC 6.0, VB 6.0, BCB 6.0.

附錄 B PISO-PS200 其它 Terminal Boards

APPENDIX-B Others Terminal Boards

B.1 DN-8237-DB Daughter Board

The DN-8237DB is the daughter board for Delta ASDA-A Series Amplifier. It has 2-axis I/O signals.

B.1.1 Board Layout for DN-8237-DB

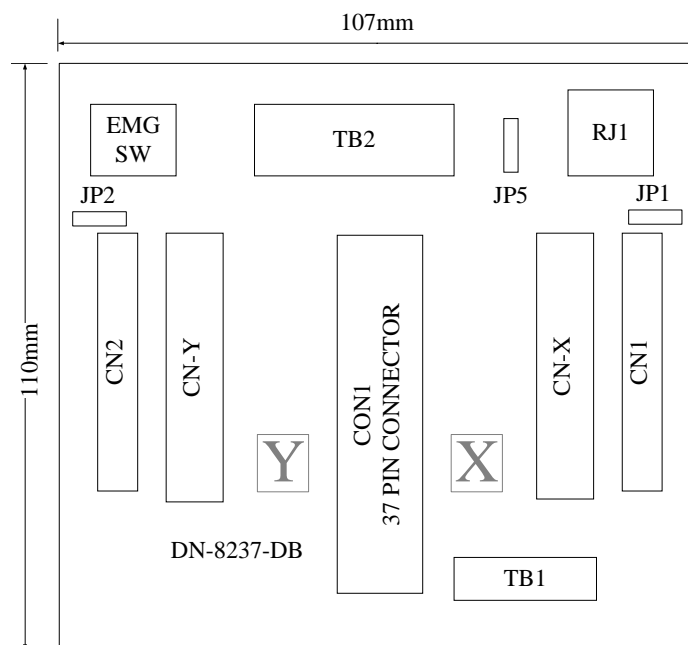


Fig. 1-1 Board layout for the DN-8237-DB

B.1.2 Signal Connections for DN-8237-DB

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-8237-DB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 1-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-DB (or on the motion card), and refer to Table 1-2 for description of each motion I/O signal.

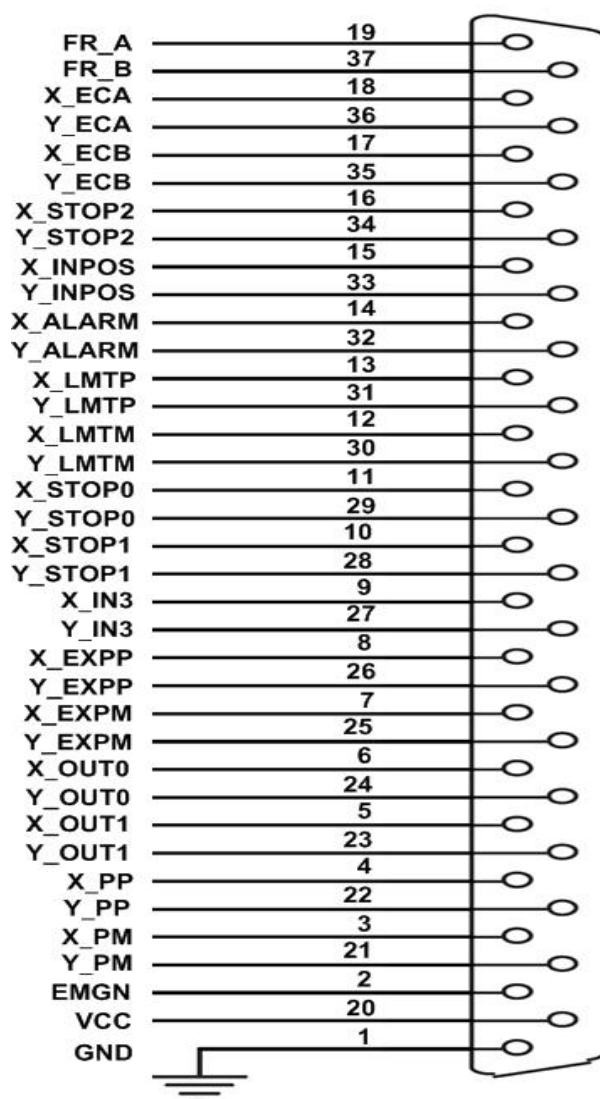


Fig. 1-2 I/O connector pin assignment for the CON1

Table 1-2 DN-8237-DB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ 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-8237-DB, and the Table 1-3 shows its I/O connector signal description.

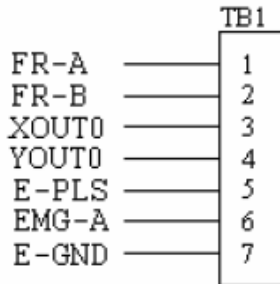


Fig. 1-3 Pin definition for TB1

Table 1-3 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
XOUT0	General Output 0 for X axis
YOUT0	General Output 0 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-8237-DB, and the Table 1-4 shows its I/O connector signal description.

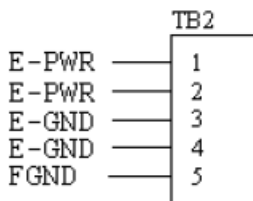


Fig. 1-4 Pin definition for TB2

Table 1-4 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 (CN1 connector for each AXIS in Driver)**

The connectors CN-X and CN-Y are 50-pin connectors that enable you to connect to the CN1 connector of Delta ASDA-A series motor drivers. Fig.1-5 shows the pin assignment for the 50-pin connector on the DN-8237-DB, and the Table 1-5 shows its I/O connector signal description.

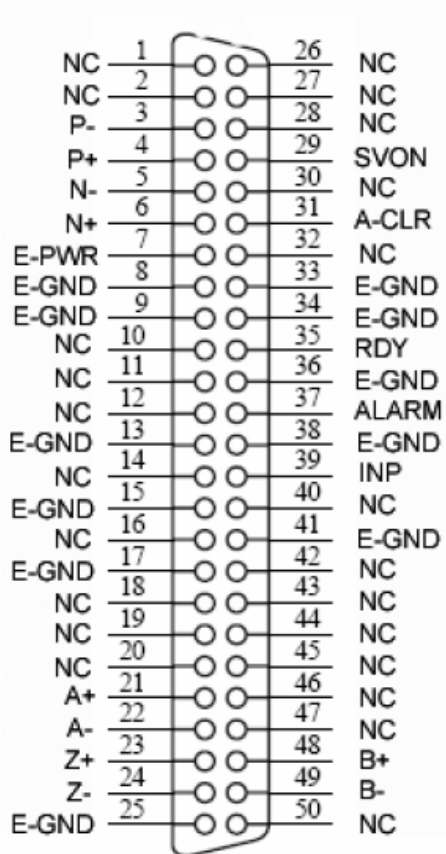


Fig. 1-5 Pin definition for CNX and CNY

Table 1-5 CN1 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:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1 & CN2 (The I/O signals of the X and Y AXIS)

The connectors CN1 and CN2 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-6 shows the pin assignment for the 20-pin connector on the DN-8237-DB, and the Table 1-6 shows its I/O connector signal description.

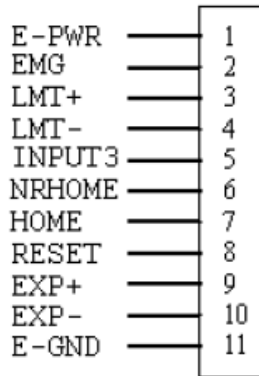


Fig. 1-6 Pin definition for CN1 & CN2

Table 1-6 CN1 & CN2 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

■ 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.1-7 shows the pin assignment for the 8-pin connector on the DN-8237-DB, and the Table 1-7 shows its I/O connector signal description.

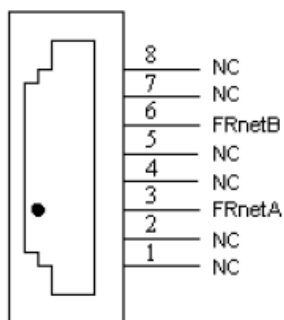


Fig. 1-7 Pin definition for RJ1

Table 1-7 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.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.

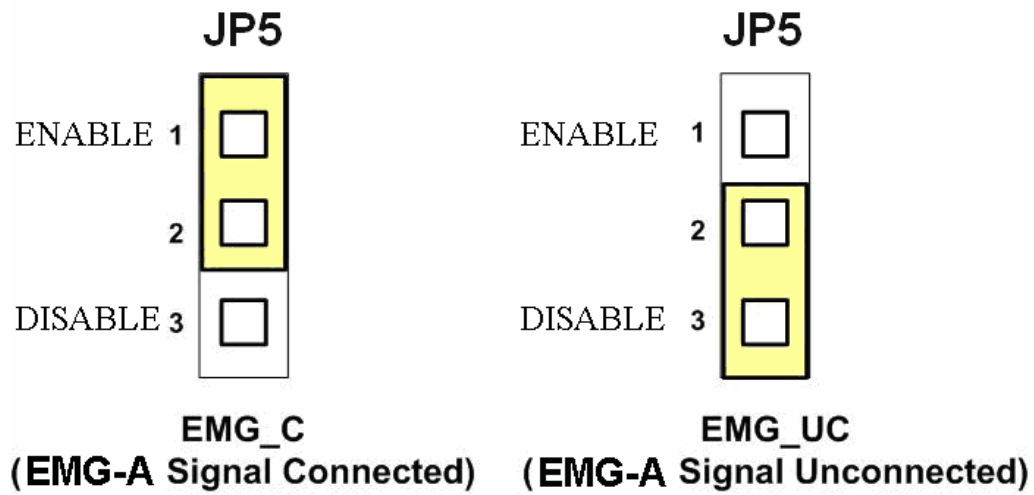


Fig. 1-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. 1-9 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. 1-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

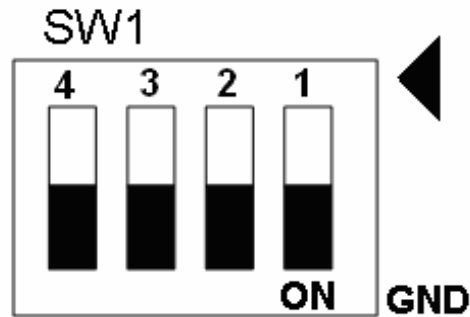


Fig. 1-9 SW1 setting for normally GND (Default setting)



Fig. 1-10 SW1 setting for user controlled signals.

■ JP1 ~ JP2

Jumper 1 ~ Jumper 2 can select the reset function in CN1 and CN2 for each axis. The following diagram is shown the selection condition of the JP1.

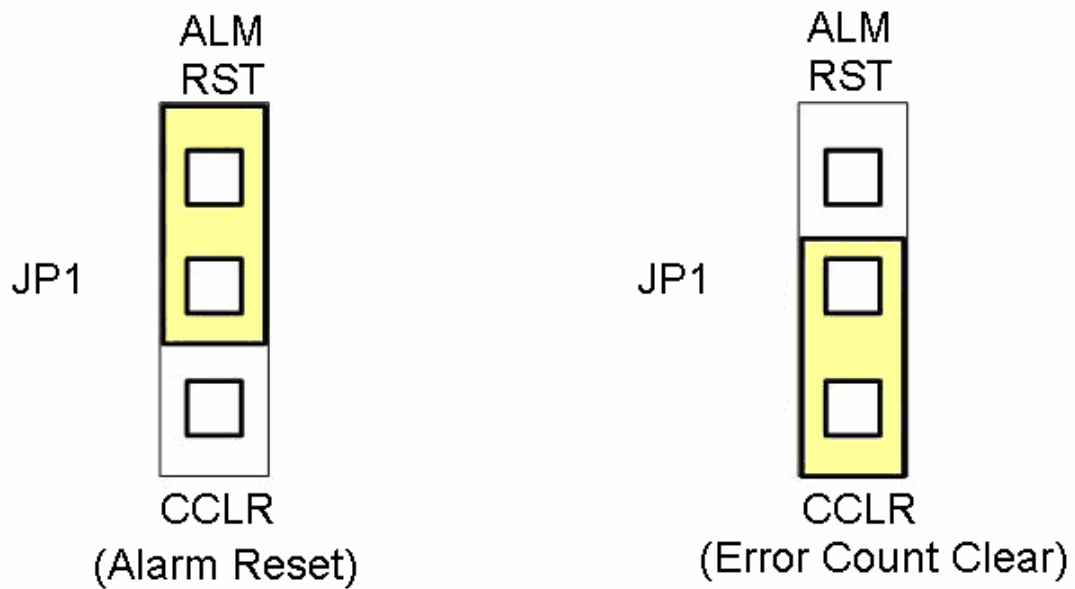


Fig. 1-15 JP 1 and 2 setting

B.2 DN-8237-MB Daughter Board

The DN-8237MB is the daughter board for Mitsubishi J2 Series Amplifier. It has 2-axis I/O signals.

B. 2. 1 Board Layout for DN-8237-MB

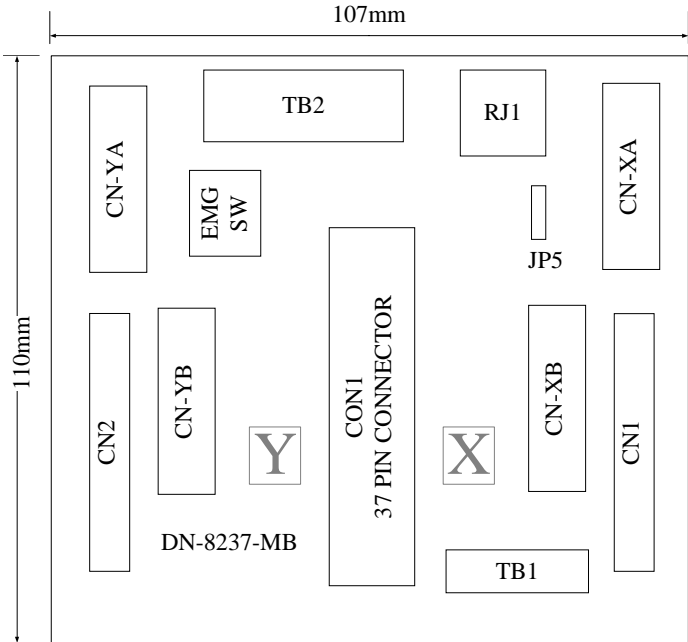


Fig. 3-1 Board layout for the DN-8237-MB

B. 2. 2 Signal Connections for DN-8237-MB

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-8237-MB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 3-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-MB (or on the motion card), and refer to Table 3-2 for description of each motion I/O signal.

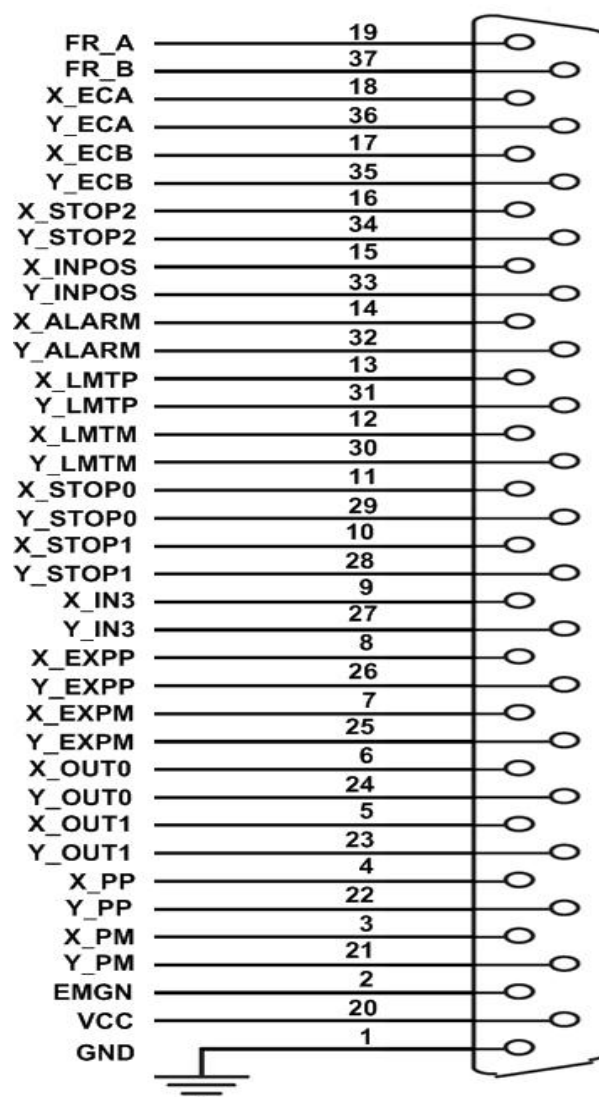


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8237-MB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ 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-8237-MB, and the Table 3-3 shows its I/O connector signal description.

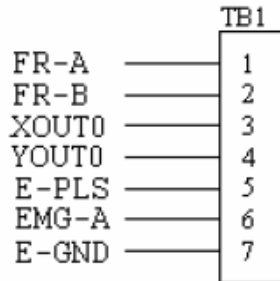


Fig. 3-3 Pin definition for TB1

Table 3-3 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
XOUT0	General Output 0 for X axis
YOUT0	General Output 0 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-8237-MB, and the Table 3-4 shows its I/O connector signal description.

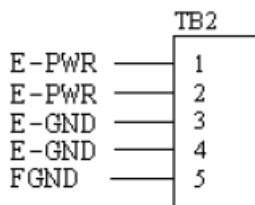


Fig. 3-4 Pin definition for TB2

Table 3-4 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-XA & CN-YA (CNA connector for each AXIS)**

The connectors CN-XA and CN-YA are 20-pin connectors that enable you to connect to the CNA connector of Mitsubishi motor drivers. Fig.3-5 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table 3-5 shows its I/O connector signal description.

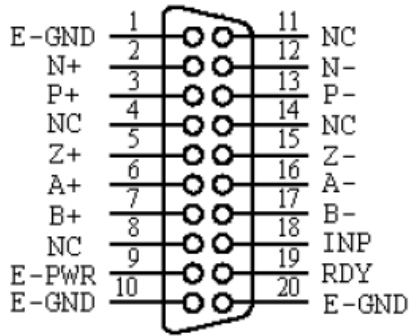


Fig. 3-5 Pin definition for CN-XA and CN-YA

Table 3-5 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

► **Note 1:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ **CN-XB & CN-YB (CNB connector for each AXIS)**

The connectors CN-XB and CN-YB are 20-pin connectors that enable you to connect to the CNB connector of your motor drivers. Fig.3-6 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table 3-6 shows its I/O connector signal description.

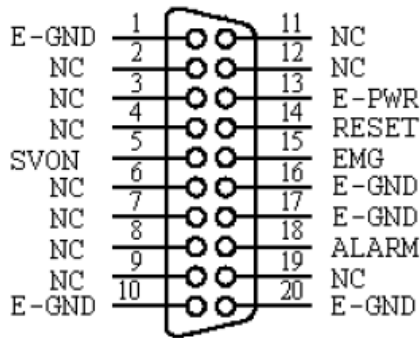


Fig. 3-6 Pin definition for CN-XB and CN-YB

Table 3-6 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

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

■ CN1 & CN2 (The I/O signals of the X and Y AXIS)

The connectors CN1 and CN2 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-8237-MB, and the Table 3-7 shows its I/O connector signal description.

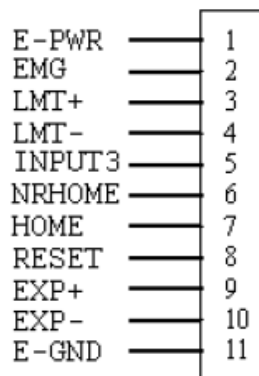


Fig. 3-7 Pin definition for CN1 & CN2

Table 3-7 CN1 & CN2 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

■ 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.3-8 shows the pin assignment for the 8-pin connector on the DN-8237-MB, and the Table 3-8 shows its I/O connector signal description.

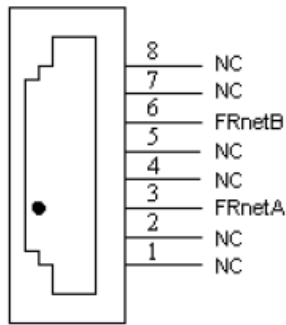


Table 3-8 RJ1

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

Fig. 3-8 Pin definition for RJ1

► **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.

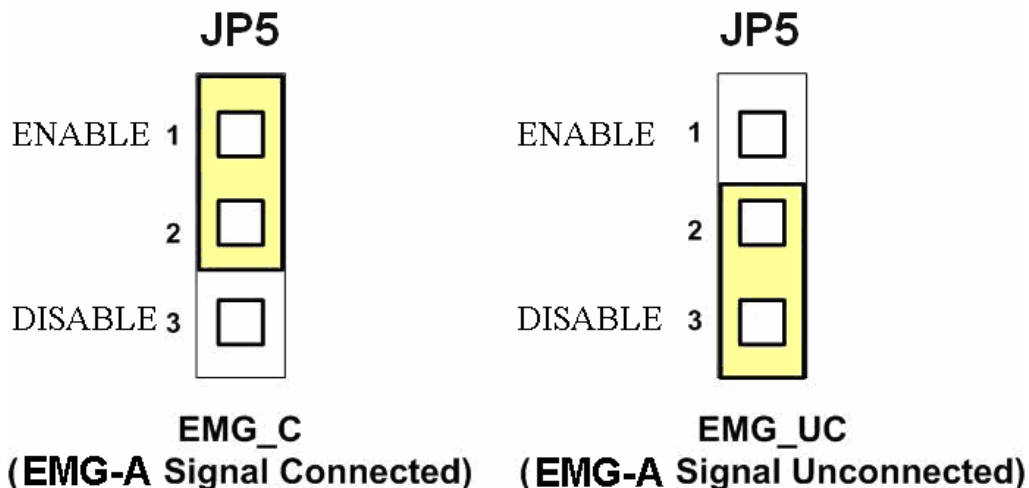


Fig. 3-9 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are

reserved for future work. Fig. 3-10 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. 3-11, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

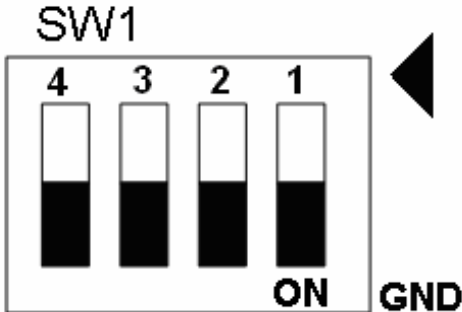


Fig. 3-10 SW1 setting for normally GND (Default setting)

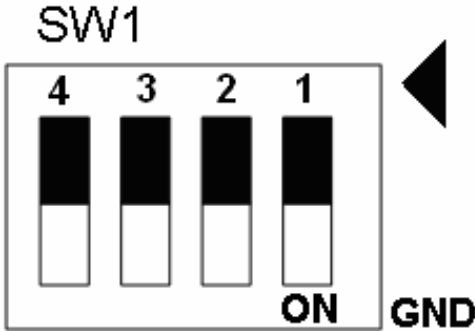


Fig. 3-11 SW1 setting for user controlled signals.

B.3 DN-8237-PB Daughter Board

The DN-8237PB is the daughter board for Panasonic A4 Series Amplifier. It has 2-axis I/O signals.

B. 3. 1 Board Layout for DN-8237-PB

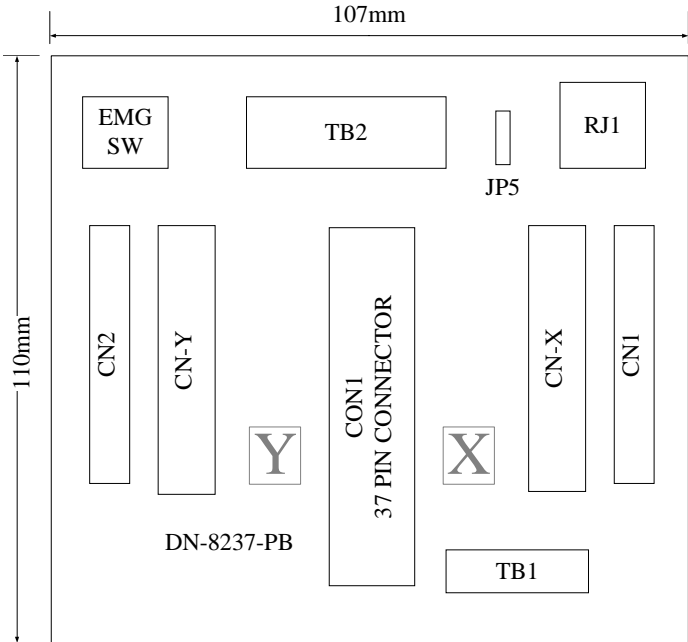


Fig. 3-1 Board layout for the DN-8237-PB

B. 3. 2 Signal Connections for DN-8237-PB

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-8237-PB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 3-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-PB (or on the motion card), and refer to Table 3-2 for description of each motion I/O signal.

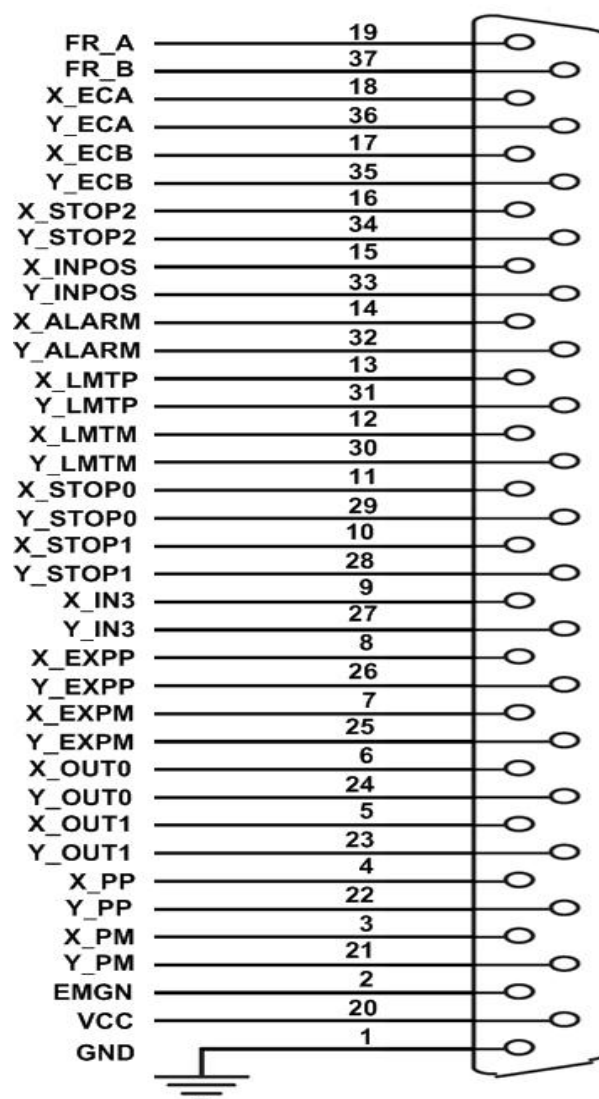


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8237-PB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ 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-8237-PB, and the Table 3-3 shows its I/O connector signal description.

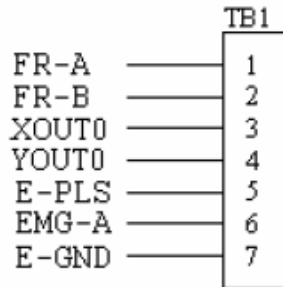


Fig. 3-3 Pin definition for TB1

Table 3-3 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
XOUT0	General Output 0 for X axis
YOUT0	General Output 0 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-8237-PB, and the Table 3-4 shows its I/O connector signal description.

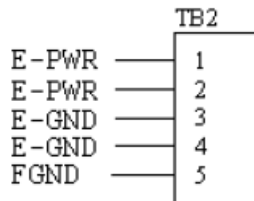


Fig. 3-4 Pin definition for TB2

Table 3-4 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 X5 connector for each Axis in Driver)**

The connectors CN-X and CN-Y 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-8237-PB, and the Table 3-5 shows its I/O connector signal description.

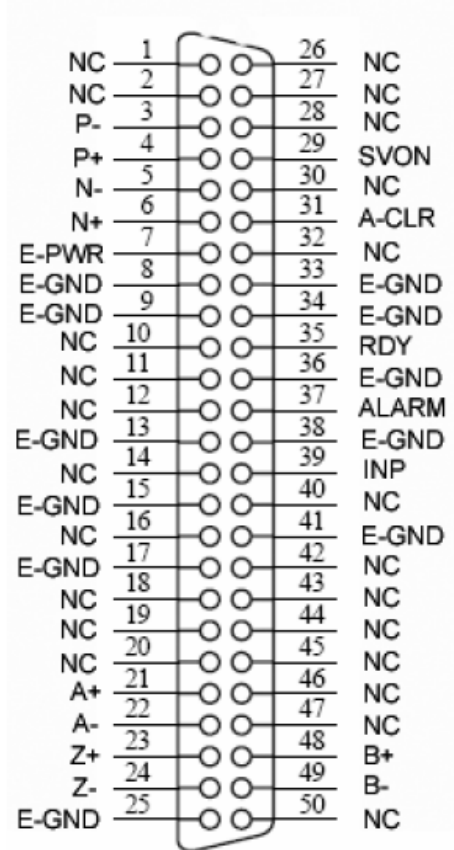


Fig. 3-5 Pin definition for CNX and CNY

Table 3-5 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:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1& CN2 (The I/O signals of the X and Y axis)

The connectors CN1 and CN2 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-6 shows the pin assignment for the 20-pin connector on the DN-8237-PB, and the Table 3-6 shows its I/O connector signal description.

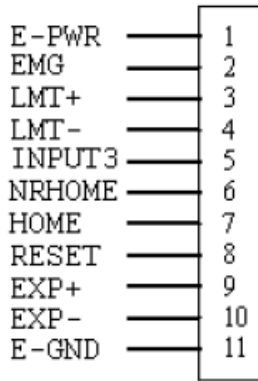


Fig. 3-6 Pin definition for CN1 & CN2

Table 3-6 CN1 & CN2 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

■ 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.3-7 shows the pin assignment for the 8-pin connector on the DN-8237-PB, and the Table 3-7 shows its I/O connector signal description.

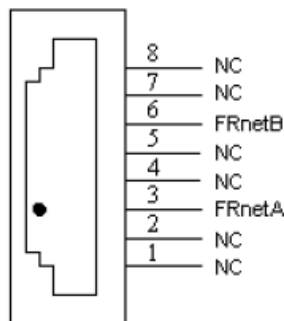


Fig. 3-7 Pin definition for RJ1

Table 3-7 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.

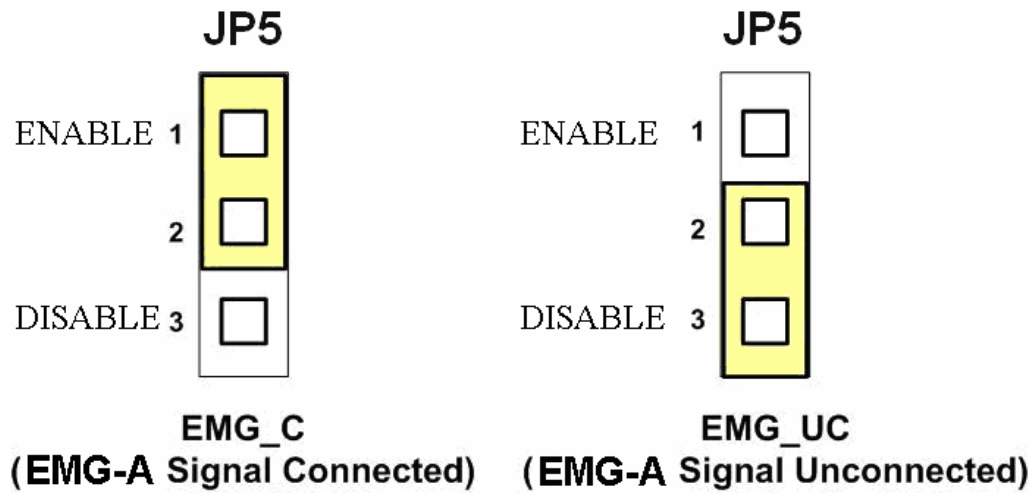


Fig. 3-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. 3-9 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. 3-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

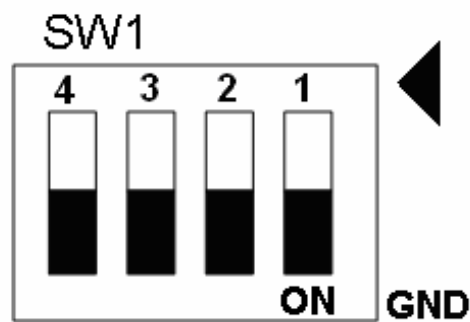


Fig. 3-9 SW1 setting for normally GND (Default setting)

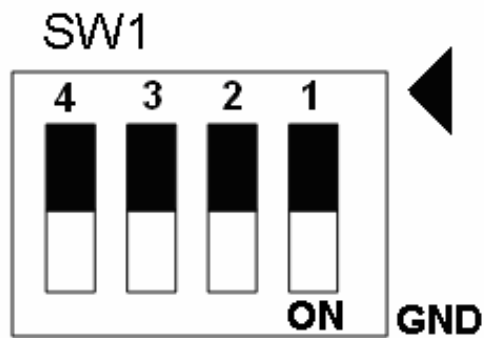


Fig. 3-10 SW1 setting for user

B.4 DN-8237-YB Daughter Board

The DN-8237YB is the daughter board for Yaskawa Series Amplifier. It has 2-axis I/O signals.

B. 4. 1 Board Layout for DN-8237-YB

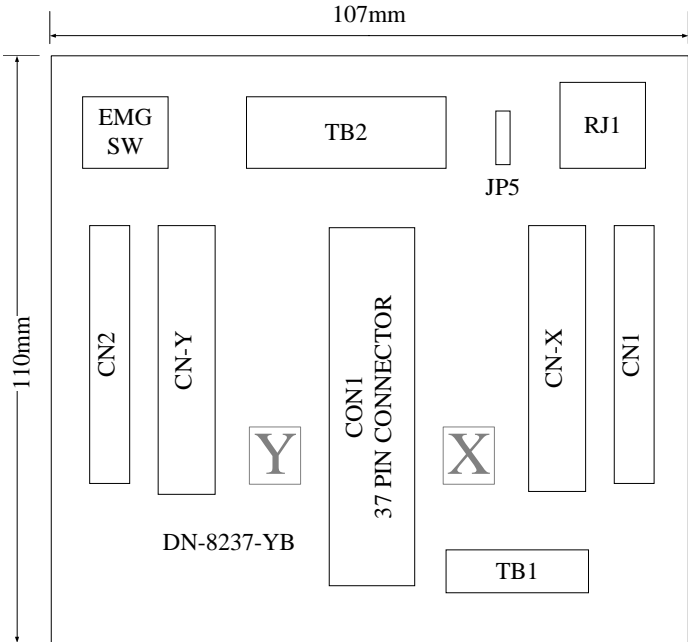


Fig. 1-1 Board layout for the DN-8237-YB

B. 4. 2 Signal Connections for DN-8237-YB

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-8237-YB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 1-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-YB (or on the motion card), and refer to Table 1-2 for description of each motion I/O signal.

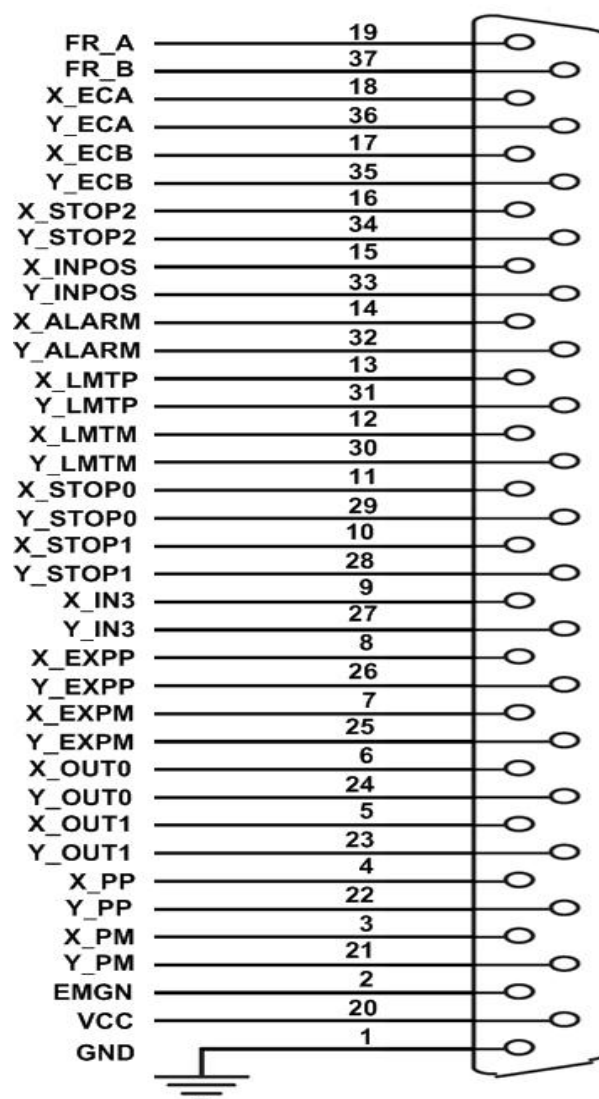


Fig. 1-2 I/O connector pin assignment for the CON1

Table 1-2 DN-8237-YB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ 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-8237-YB, and the Table 1-3 shows its I/O connector signal description.

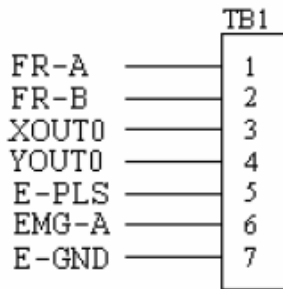


Fig. 1-3 Pin definition for TB1

Table 1-3 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
XOUT0	General Output 0 for X axis
YOUT0	General Output 0 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-8237-YB, and the Table 1-4 shows its I/O connector signal description.

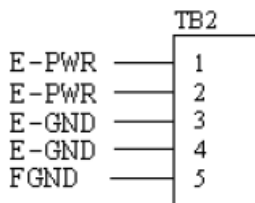


Fig. 1-4 Pin definition for TB2

Table 1-4 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 (CN1 connector for each AXIS in Driver)**

The connectors CN-X and CN-Y are 50-pin connectors that enable you to connect to the CN1 connector of Yaskawa motor drivers. Fig.1-5 shows the pin assignment for the 50-pin connector on the DN-8237-YB, and the Table 1-5 shows its I/O connector signal description.

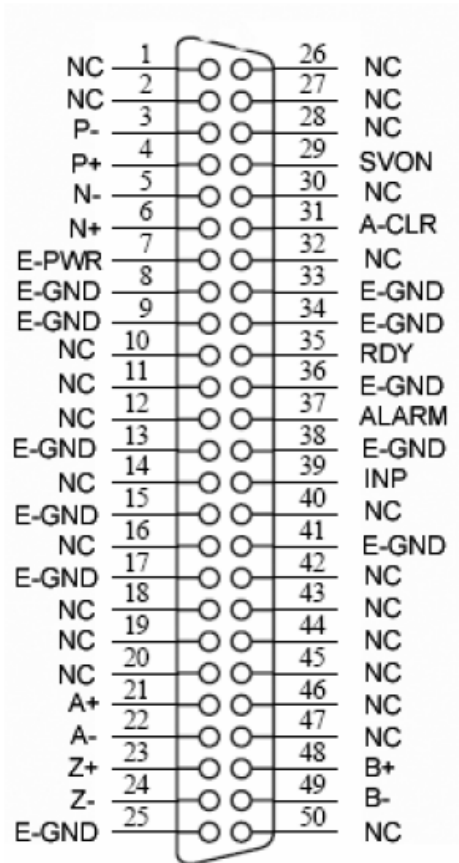


Fig. 1-5 Pin definition for CNX and CNY

Table 1-5 CN1 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:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1 & CN2 (The I/O signals of the X and Y AXIS)

The connectors CN1 and CN2 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-6 shows the pin assignment for the 20-pin connector on the DN-8237-YB, and the Table 1-6 shows its I/O connector signal description.

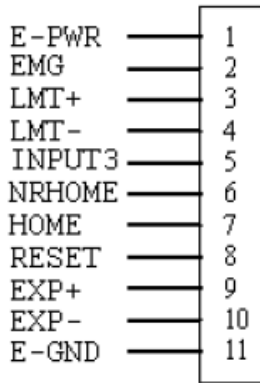


Fig. 1-6 Pin definition for CN1 & CN2

Table 1-6 CN1 & CN2 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

■ 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.1-7 shows the pin assignment for the 8-pin connector on the DN-8237-YB, and the Table 1-7 shows its I/O connector signal description.

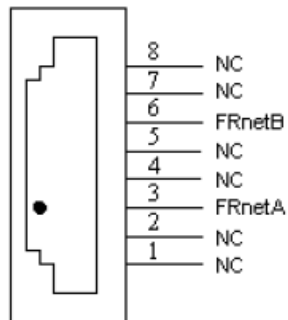


Fig. 1-7 Pin definition for RJ1

Table 1-7 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. 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.

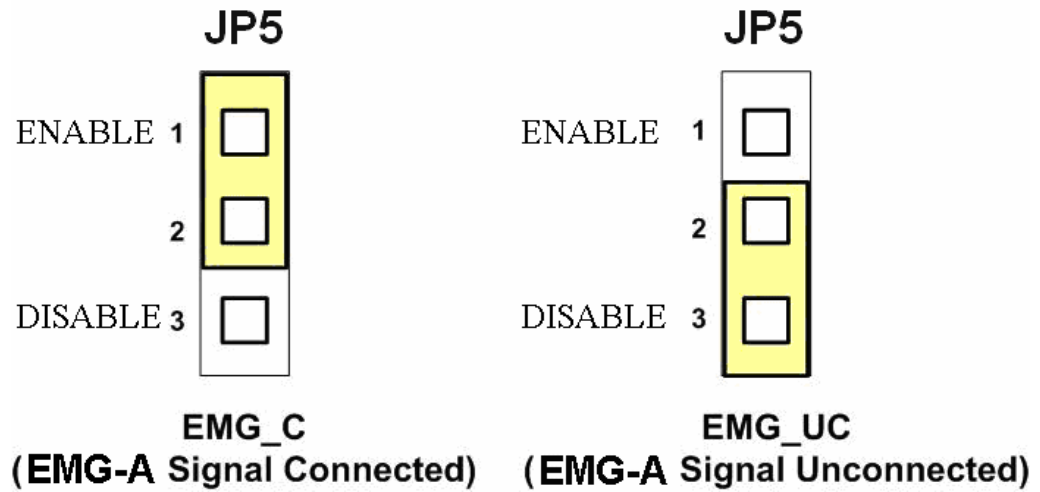


Fig. 1-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. 1-9 is the default setting to connect the EMG signals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. 1-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

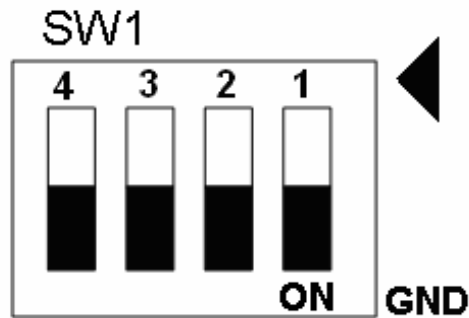


Fig. 1-9 SW1 setting for normally GND (Default setting)

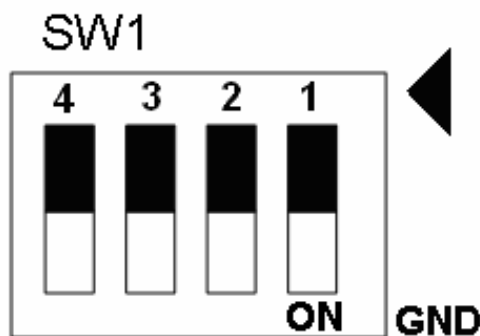


Fig. 1-10 SW1 setting for user controlled signals.