DN-8368MB
User Manual
(Version 1.0)
For Mitsubishi J2 series Servo Driver

ICP DAS CO., LTD.

泓格科技股份有限公司

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目錄

1 English version

The DN-8368MB is a terminal board connecting between Mitsubishi J2S series servo driver (with pulse train input amplifier) and ICP DAS PISO-PS600, PISO-VS600 or PMDK motion controller card. Please do not use it to connect any other servo driver or cards. Moreover, it also includes 3-axis I/O signals. We expect to reduce the wiring between Mitsubishi J2S series servo driver and the motion controller card. This manual describes signals and operation instructions of DN-8368MB; the content is divided into 5 parts. 1. Board layout, 2. I/O Signal connectors, 3. Signal connectors for Mitsubishi J2S series servo amplifier, 4. Jumper and switch setting, 5. LED function describes, etc.

1.1 Board Layout for DN-8368MB

Dimension and Placement

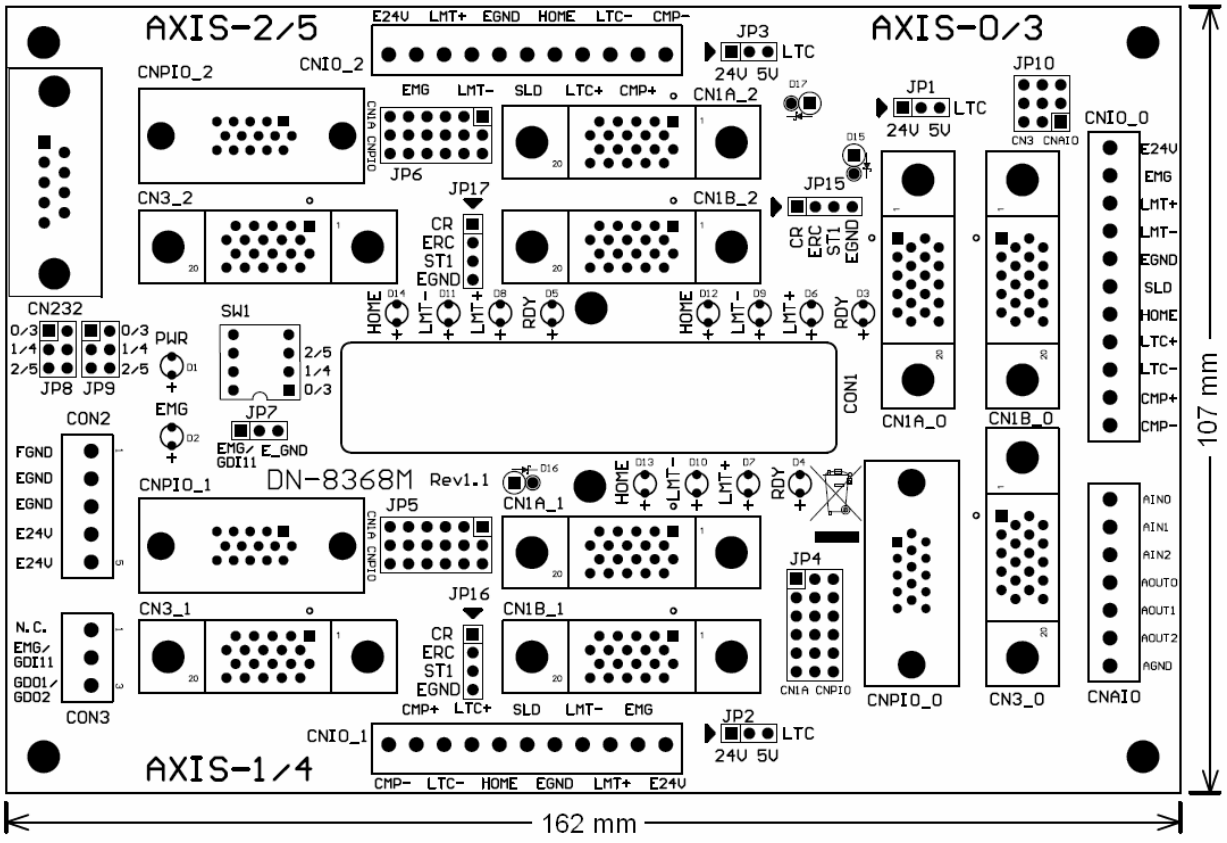

Fig. 1-1 Board layout for the DN-8368MB

1.2 I/O Signal connector

Assuring reliable connections is one of the most important tasks when sending or receiving data from your application systems. This chapter will introduce I/O connector (for general purposes) on DN-8368MB and machine platform specific I/O connector. Users can find various signal usage and meanings in this section.

■ CON1

The I/O connector on DN-8368MB is a 68-pin SCSI II connector that enables you to connect to the sensors and motor drivers to the motion card. Please note: there are two groups of connectors (CN1A/ CN1B) on the main card; therefore, the same signal may have a different name on each sub board. Please refer to Table 1-1, Table 1-2for your reference.

Table 1-1 CN1A（be close the PCB）

No.	Name	I/O	Function Axis	No.	Name	I/O	Function Axis
1	AOUT0	O	Analog Output	35	AIN0	I	Analog Input
2	AOUT1	O	Analog Output	36	AIN1	I	Analog Input
3	AOUT2	O	Analog Output	37	AIN2	I	Analog Input
4	AGND	-	Analog Ground	38	AGND	-	Analog Ground
5	DGND	-	Digital Ground	39	ERC0	O	Error Counter Clear
6	LTC0	I	Position Latch	40	SVON0	O	Servo On
7	EA0	I	Encoder A-Phase	41	RDY0	I	Servo Ready
8	EB0	I	Encoder B-Phase	42	INP0	I	Servo In-Position
9	EZ0	I	Encoder Z-Phase	43	ALM0	I	Servo Alarm
10	CW0	O	Clockwise pulse	44	SLD0	I	Slow Down
11	CCW0	O	Counter-Clockwise pulse	45	ORG0	I	Origin Signal
12	CMP0	O	Compare Trigger	46	MEL0	I	Minus End Limit
13	EMG	I	Emergency Stop	47	PEL0	I	Positive End Limit
14	ALMRST0	O	Servo Alarm Reset	48	DGND	-	Digital Ground
15	DGND	-	Digital Ground	49	ERC1	O	Error Counter Clear
16	LTC1	I	Position Latch	50	SVON1	O	Servo On
17	EA1	I	Encoder A-Phase	51	RDY1	I	Servo Ready
18	EB1	I	Encoder B-Phase	52	INP1	I	Servo In-Position
19	EZ1	I	Encoder Z-Phase	53	ALM1	I	Servo Alarm
20	CW1	O	Clockwise pulse	54	SLD1	I	Slow Down
21	CCW1	O	Counter-Clockwise pulse	55	ORG1	I	Origin Signal
22	CMP1	O	Compare Trigger	56	MEL1	I	Minus End Limit
23	GDO1	O	Generic Digital Output	57	PEL1	I	Positive End Limit
24	ALMRST1	O	Servo Alarm Reset	58	DGND	-	Digital Ground
25	DGND	-	Digital Ground	59	ERC2	O	Error Counter Clear
26	LTC2	I	Position Latch	60	SVON2	O	Servo On
27	EA2	I	Encoder A-Phase	61	RDY2	I	Servo Ready
28	EB2	I	Encoder B-Phase	62	INP2	I	Servo In-Position
29	EZ2	I	Encoder Z-Phase	63	ALM2	I	Servo Alarm
30	CW2	O	Clockwise pulse	64	SLD2	I	Slow Down
31	CCW2	O	Counter-Clockwise pulse	65	ORG2	I	Origin Signal
32	CMP2	O	Compare Trigger	66	MEL2	I	Minus End Limit
33	DGND	-	Digital Ground	67	PEL2	I	Positive End Limit
34	ALMRST2	O	Servo Alarm Reset	68	VCC	-	5V Digital Power from Bus

Table 1-2 CN1B (be distances from PCB）

No.	Name	I/O	Function Axis	No.	Name	I/O	Function Axis
1	AOUT3	O	Analog Output	35	AIN3	I	Analog Input
2	AOUT4	O	Analog Output	36	AIN4	I	Analog Input
3	AOUT5	O	Analog Output	37	AIN5	I	Analog Input
4	AGND	-	Analog Ground	38	AGND	-	Analog Ground
5	DGND	-	Digital Ground	39	ERC3	O	Error Counter Clear
6	LTC3	I	Position Latch	40	SVON3	O	Servo On
7	EA3	I	Encoder A-Phase	41	RDY3	I	Servo Ready
8	EB3	I	Encoder B-Phase	42	INP3	I	Servo In-Position
9	EZ3	I	Encoder Z-Phase	43	ALM3	I	Servo Alarm
10	CW3	O	Clockwise pulse	44	SLD3	I	Slow Down
11	CCW3	O	Counter-Clockwise pulse	45	ORG3	I	Origin Signal
12	CMP3	O	Compare Trigger	46	MEL3	I	Minus End Limit
13	GDI11	I	Generic Digital Input	47	PEL3	I	Positive End Limit
14	ALMRST3	O	Servo Alarm Reset	48	DGND	-	Digital Ground
15	DGND	-	Digital Ground	49	ERC4	O	Error Counter Clear
16	LTC4	I	Position Latch	50	SVON4	O	Servo On
17	EA4	I	Encoder A-Phase	51	RDY4	I	Servo Ready
18	EB4	I	Encoder B-Phase	52	INP4	I	Servo In-Position
19	EZ4	I	Encoder Z-Phase	53	ALM4	I	Servo Alarm
20	CW4	O	Clockwise pulse	54	SLD4	I	Slow Down
21	CCW4	O	Counter-Clockwise pulse	55	ORG4	I	Origin Signal
22	CMP4	O	Compare Trigger	56	MEL4	I	Minus End Limit
23	GDO2	O	Generic Digital Output	57	PEL4	I	Positive End Limit
24	ALMRST4	O	Servo Alarm Reset	58	DGND	-	Digital Ground
25	DGND	-	Digital Ground	59	ERC5	O	Error Counter Clear
26	LTC5	I	Position Latch	60	SVON5	O	Servo On
27	EA5	I	Encoder A-Phase	61	RDY5	I	Servo Ready
28	EB5	I	Encoder B-Phase	62	INP5	I	Servo In-Position
29	EZ5	I	Encoder Z-Phase	63	ALM5	I	Servo Alarm
30	CW5	O	Clockwise pulse	64	SLD5	I	Slow Down
31	CCW5	O	Counter-Clockwise pulse	65	ORG5	I	Origin Signal
32	CMP5	O	Compare Trigger	66	MEL5	I	Minus End Limit
33	DGND	-	Digital Ground	67	PEL5	I	Positive End Limit
34	ALMRST5	O	Servo Alarm Reset	68	VCC	-	5V Digital Power from Bus

■ CON2

The connectors CON2 are a 5-pin connector for external Power supply (24V input). Table 1-3 shows its I/O connector signal description.

Table 1-3

Pin NO	Pin Define	Function description
1	FGND	Frame ground of DN-8368MB
2	EGND	Ground of the external power
3	EGND	Ground of the external power
4	E24V	External power supply of +24V DC
5	E24V	External power supply of +24V DC

■ CON3

The connector CON3 is a 3-pin connector for connecting general purpose I/O. There are one digital input and one digital output signal, when the connectors connect to the CN1A of main card (the one closer to the PCB board), the input signal is defined as emergency stop. When the connectors connect to the CN1B of main card, the input signal is defined as general purpose input signal. Table 1-4 shows its I/O connector signal description:

Table 1-4

Pin NO	Pin Define	Function description
1	N.C	No Connection
2	EMG/GDI11	Emergency stop signal(or General purpose input signal)
3	GDO1/GDO2	General purpose output signal

■ CNAIO (only for PSIO-VS600 and PMDK)

This connector is for analog output and input, there are three analog inputs, 3 analog outputs and one analog ground. The user can utilize this to control the analog signal of PISO-VS600 and PMDK, the detail pin-definition is as below (Table 1-5):

Table 1-5

Pin NO	Pin Define	Function description
1	AGND	Analog ground
2	AOUT2	Analog output
3	AOUT1	Analog output
4	AOUT0	Analog output
5	AIN2	Analog input
6	AIN1	Analog input
7	AIN0	Analog input

■ CNIO_0 ~ CNIO_2

This connector is used for transmitting general machine signal from each axis, such as, Emergency stop, positive end-limit /negative end-limit, Original (HOME), slow down signals, Latch and Compare signals etc to the main card. The detail pin-definition is as below (Table 1-6):

Table 1-6

Pin NO	Pin Define	Function description
1	CMP-	Ground for Compare trigger output
2	CMP+	High Speed Compare trigger output
3	LTC-	Ground for Position Latch input
4	LTC+	High Speed Position Latch input
5	HOME	Origin signal (ORG) input
6	SLD	Slow-Down signal input
7	EGND	External Power Ground
8	LMT-	Negative End Limit signal (MEL) input
9	LMT+	Positive End Limit signal (PEL) input
10	EMG	Emergency stop signal to servo motor driver, direct connect to pin 15 of CN1B
11	E24V	External power, direct connect to pin 4 and pin 5 of CON2

■ CN232

This connector is used for communication between Mitsubishi and computer. Because the servo amplifier of Mitsubishi has a RS-232 serial communication function that can be used to perform servo operation, parameter modification, monitor function, etc. User can set up JP8 and JP9, select the desired axis. The detail pin-definition is as below (Table 1-7)

Table 1-7

Pin NO	Pin Define	Function description
1	N.C	No Connection
2	TXD	Transmitted data output to RS232 of Personal Computer
3	RXD	Received data input from RS232 of Personal Computer
4	N.C	No Connection
5	AGND	Analog Ground
6	N.C	No Connection
7	N.C	No Connection
8	N.C	No Connection
9	N.C	No Connection

■ CNPIO_0 ~ CNPIO_2

This connector usually is used in two ways: first, it can be connected in order to receive external encoder of the linear scale; users can determine to receive encoder source from external linear scale or servo motor by setting JP4 ~ JP6. Another application of CNPIO_0 ~ CNPIO_2 is under the circumstance when not using all Mitsubishi servo motor; stepper or servo motor from manufacturers other than Mitsubishi can be connected together through this connector. The detail pin-definition is as below (Table 1-8):

Table 1-8

Pin NO	Pin Define	Function description
1	CW+	Positive Direction Pulse(+)
2	CCW+	Negative Direction Pulse(+)
3	EGND	External Power Ground
4	A-	Encoder A-phase(-)
5	B-	Encoder B-phase(-)
6	EXT_5V	+5V Power output for external devices
7	CW-	Positive Direction Pulse(-)
8	CCW-	Negative Direction Pulse(-)
9	A+	Encoder A-phase(+)
10	B+	Encoder B-phase(+)
11	Z+	Encoder Z-phase(+)
12	Z-	Encoder Z-phase(-)
13	N.C	No Connection
14	N.C	No connection
15	E24V	External Power, direct connect to pin 4 and pin 5 of CON2

1.3 I/O connector for servo motor of Mitsubishi

This chapter describes the signals on terminal board DN-8368MB, which is used to connect the main card with Mitsubishi servo motor. The DN-8368MB supports PISO-PS600 (position control mode), PISO-VS600 (Position/Speed control mode) and PMDK (Professional Motion development Kit, with AI/AO).The Mitsubishi servo motor has various control modes, and different modes may have some common signal or require special setting before operation. Detail explanations for signal pins of CN1A, CN1B, and CN3 on Mitsubishi servo driver will be listed in this section.

■ CN1A_0 ~ CN1A_2

There are 20 pins on CN1A. For these pins are pin-to-pin from motion card to Mitsubishi Server driver, the User can just buy cable and connector to connect them directly. Please note, not all pins are used by ICP DAS's motion control card. And some of pins may have different function according to different control mode of the servo driver. Table 1-9list the detail definition of pins:

Table 1-9

I/O Signals in Servo Drive				Signals in DN-8368MB
Pin No.	I/O	Position control mode	Speed control mode	
1				
2	I	NP		CCW+
3	I	PP		CW+
4				
5	O	LZ	LZ	Z+
6	O	LA	LA	A+
7	O	LB	LB	B+
8	I	CR*	SP1*	Pin 1 of JP15~JP17
9				
10	PWR	SG	SG	EGND
11				
12	I	NG		CCW-
13	I	PG		CW
14				
15	O	LZR	LZR	Z-
16	O	LAR	LAR	A-
17	O	LBR	LBR	B-
18	O	INP	SA	INP
19	O	RD	RD	RDY
20	PWR	SG	SG	EGND

Note: For any pin-define whose symbol is preceded by "*" indicates that by setting Mitsubishi driver parameters (from 43 to 48), it can be set as a different pin-define.

■ CN1B_0 ~ CN1B_2

There are 20 pins on CN1B. Since these pins are pin-to-pin from motion card to Mitsubishi Server driver, the User can just buy cable and connector to connect them directly. Please note, not all pins are used by ICP DAS's motion control card. And some of pins may have different function according to different control mode of servo driver. The detail definitions of pins are as follow:

Table 1-10

I/O Signals in Servo Drive				Signals in DN-8368MB
Pin No.	I/O	Position control mode	Speed control mode	
1	PWR	LG	LG	AGND
2	I	N.C.	VC	AOUT
3				
4				
5	I	SON*	SON*	SRV_ON
6				
7				
8	I	PC*	ST1*	Pin 3 of JP15~JP17
9				
10	PWR	SG	SG	EGND
11				
12				
13	PWR	COM	COM	E24V
14	I	Reset*	Reset*	ALM_RST
15	I	EMG	EMG	SW1 and Pin 10 of CNIO
16	I	LSP	LSP	EGND
17	I	LSN	LSN	EGND
18	O	ALM	ALM	ALARM
19				
20	PWR	SG	SG	EGND

Note: For any pin-define whose symbol is preceded by "*" indicates that by setting Mitsubishi driver parameters (from 43 to 48), it can be set as a different pin-define.

■ CN3_0 ~ CN3_2

The 3 pins on CN3 of Mitsubishi servo driver work as COM port, allowing the user to read and set configuration from/to servo motor via special software from Mitsubishi. For making things easier, the COM port pins are directed to the CN232 connector of terminal board. By switching JP8~JP9, the users can select which servo motor among these 3 to communicate with. The pins are dentally explained as below:

Table 1-11

I/O Signals in Servo Drive				Signals in DN-8368MB
Pin No.	I/O	Position control mode	Speed control mode	
1	PWR	LG	LG	AGND
2	O	TXD	TXD	Pin 2 of CN232 (selected by JP8)
3				
4				
5				
6				
7				
8				
9				
10				
11				
12	I	RXD	RXD	Pin 3 of CN232 (selected by JP9)
13	PWR	LG	LG	AGND
14	O	MO2	MO2	AIN
15				
16				
17				
18				
19				
20				

Note1: At speed-control mode, MO2 can be used as feedback signal of PISO-VS600, therefore parameter 17 of Mitsubishi driver must be set to 0000 when user use the PISO-VS600 motion card , so that the Servo-motor speed will be output by MO2 (will be connected directly to PISO-VS600analog input).

■ Control mode setting

DN-8368MB could be used with both PISO-PS600 (position control mode) and PISO-VS600 (Speed control mode), please note that the settings in these two modes are different. The following section describes how to set up parameters for Mitsubishi motor and some notes:

- **Position Control mode:**
  1. The parameter 0 (STY) of J2S servo-driver of Mitsubishi must be set to 0000
  (Position control mode).
  2. Please switch the 4-pin jumper (JP15-JP17) to position1-2, so that the CR signal of J2S servo-driver will be controlled by the ERC signal of PISO-PS600 (or PISO-VS600).

- **Speed control mode:**
  1. The parameter 0 (STY) of J2S servo-driver of Mitsubishi must be set to 0002
  (Speed control mode).
  2. Please switch the 4-pin jumper (JP15-JP17) to position 2-3, so that the ST1 signal of J2S servo-driver will be controlled by the ERC signal of PISO-VS600. Or please switch the jumper to position 3-4, that is: the ST1 signal of J2S servo-driver is connected to GND (Disable the ERC function of PISO-VS600).
  3. The parameter 17 (MOD) of J2S servo-driver of Mitsubishi must be set to 0000, so that the output of Servo motor speed will be transmitted via MO2 (It will be directly connected to a PISO-VS 600 analog input.)
  4. The parameter 25 (VCM) of J2S servo-driver of Mitsubishi should be set as an appropriate value (the Rotational speed of the motor when Voltage Command is 10V).
  5. The parameter 29 (VCD) of J2S servo-driver of Mitsubishi should be set as an appropriate value, so that the motor will be absolute stop when Voltage Command is 0V.

Note: When the J2S servo-driver of Mitsubishi is set as speed control mode, I the ST1 signal of J2S servo-driver (CW) (or the ST2 signal of J2S servo-driver (CWW)) must be connected to GND to start the servo motor. The motor speed is depend by the status of SP1~SP3 of J2S servo-driver. If all settings of J2S servo-driver from SP1 to SP3 is turned off, the motor speed will be depend by Voltage command (VC).

1.4 Jumper and Switch Settings

■ SW1 (EMG SW)

The emergency stop signal for each servo amplifier can be selected from SW1. The number 1, 2, 3 on SW1 are denoted as axis 0/3, 1/4, 2/5, respectively. Fig. 1-2 is the default setting for connecting the EMG signals to Pin#2 of JP7 (The default setting is wired to EGND). The EMG signals from CN1B_0 ~ CN1B_2 will not take effect. If the switch is disconnected as shown in Fig. 1-3, the emergency stop signals can be controlled from EMG signals on CNIO_0 ~ CNIO_3.

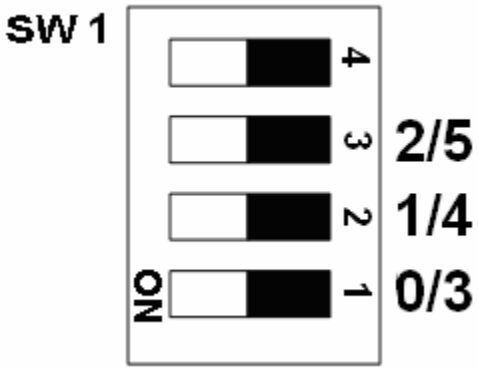

Fig. 1-2 EMG SW setting for normal GND (Default setting)

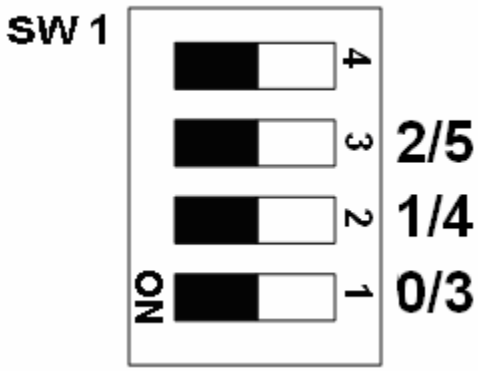

Fig. 1-3 EMG SW setting for user controlled signals.

■ JP1 ~ JP3

Jumper 1~3(Fig 1-4) controls the input voltage of LTC for 24V (Jumper position is in 1~2) or 5V (Jumper position is in 2~3). The default setting is 5V.

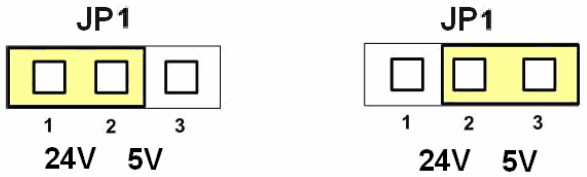

Fig. 1-4 Jumper 1~ Jumper 3 setting

■ JP4 ~ JP6

The encoder signals can be chosen from servo driver encoder or external encoder. Fig. 1-5 shows that the encoder signals are selected from servo driver encoder (default setting). Fig. 1-6 shows that the encoder signals are selected from external encoder.

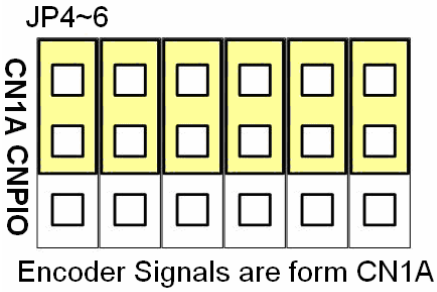

Fig. 1-5 Primary encoder signals setting

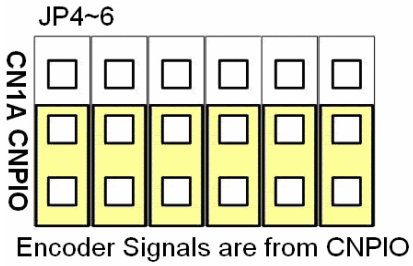

Fig. 1-6 External encoder signals setting

■ **JP7**

This Jumper is used for setting each axis EMG signal when the SW1 is set to ON, it connects to EGND directly or connects to EMG/GDI11 by user wiring. The detail content is as below (Fig. 1-7 or Fig. 1-8):

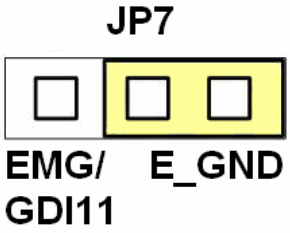

Fig 1-7 The EMG signal is connected to E_GND, directly. (Default setting)

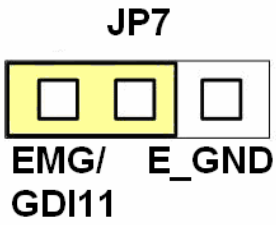

Fig 1-8 the EMG signal is used by EMG/DI11

■ **JP8 ~ JP9**

This jumper (JP8 ~ JP9) is used for choosing the RS232 of the computer connect with any axis of DN-8368MB of J2S servo-driver. And they (JP8 and JP9) must be set at the same time. The detail content is as below (Fig. 1-9):

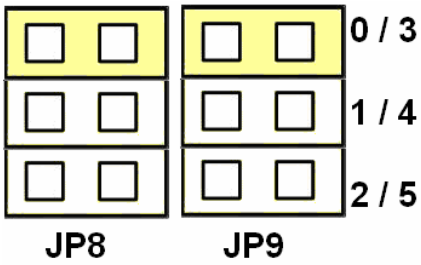

Fig 1-9 with what axis link set up RS232 (Default setting is for 0/3-axis)

■ JP10

User can choose the analog input source from the connector of CNAIO (from pin5 to pin7) of card (or the MO2 of CN3 of J2s servo-driver via the jumper 10 (JP10). The detail content is as below:

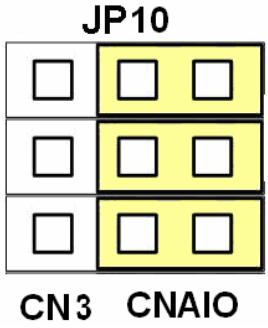

Fig 1-10 the analog input of card is connected to the connecter of CNAIO (Pin5 ~ Pin7) (default setting)

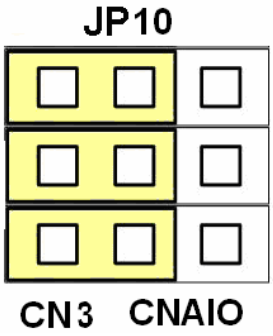

Fig 1-11 the analog input of card is connected to the MO2 signal of J2S servo-driver

■ JP15 ~ JP17

This Jumper (JP15~JP17) can be used for choosing the ERC signal of card use way with position control or speed control. Please refer to the section (Control Mode Setting), before.

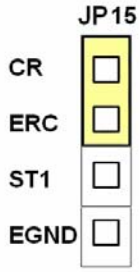

Fig 1-12 The ERC signal of main card controls the J2S's CR signal. (Default setting)

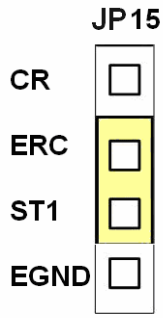

Fig 1-13 The ERC signal of main card controls the J2S's signal.

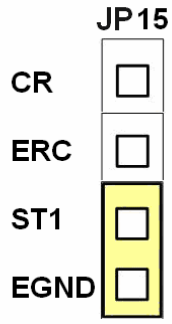

Fig 1-14 The ST1 signal of J2S connects to EGND, directly.

1.5 LED Description

LED is used for indicating a specific or emergent DI state, there are two types of LED indicator on the daughter board, one is for showing machine I/O state (Home, LMT-, LMT+, RDY, etc.), the other is for showing Power and EMG state. The detail descriptions are as follows:

- **HOME: It shows the original signal of motion control on the machine. The LED will be turned on when the motion control is moved to the original signal.**

- **LMT -: It shows the minus end-limit signal of motion control on the machine. The minus end-limit signal of motion axis is to decide the end point of minus moving. If this signal is on, the LED will be turned on. (This is the case when "Normal Open" mode is set, for "Normal Close" mode, the LED is turned off when signal is on.)**

- **LMT +: It shows the plus end-limit signal of motion control on the machine. The plus end-limit signal of motion axis is to decide the end point of plus moving. If this signal is on, the LED will be turned on. (This is the case when "Normal Open" mode is set, for "Normal Close" mode, the LED is turned off when signal is on.)**

- **RDY: It point out whether the servo motor is in the state ready for operation. The LED will be turned on when the motor is ready**

- **Power: It shows the power state of DN-8368GB. The LED will be turned on when the power is inputted.**

- **EMG: It shows the state of EMG signal. The LED will be turned on when the EMG signal is triggered**

2 繁體中文版

DN-8368MB 是泓格科技股份有限公司專為三菱伺服馬達動器J2系列，所設計的三軸專用配接端子台。此產品可搭配泓格科技公司所設計的PISO-PS600， PISO-VS600及PMDK等運動控制產品（本文之後統稱為主卡）。我們期望客戶經由此專用端子板減少控制卡與三菱伺服馬達之間的配線及降低配線的錯誤， 提高客戶的競爭能力。本手冊主要是描述此端子板上的所有訊號及相關使用手說明，內容共分為：1. 端子板配置、2. 訊號連接器、3. 伺服馬達訊號專用連接器、4. Jumper與開關調撥設定、5. LED功能描述等五大部份。

2.1 DN-8368MB配置

尺寸與配置

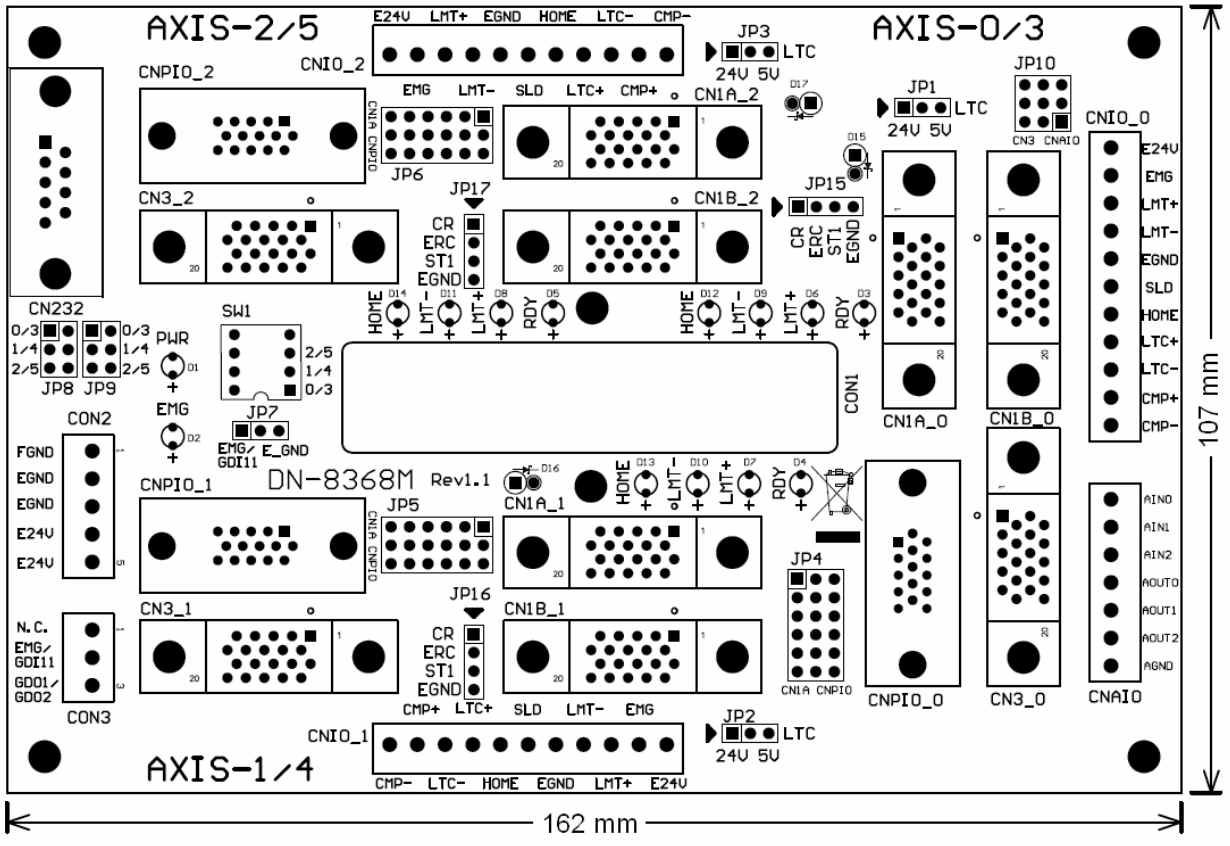

Fig. 2-1 Board layout for the DN-8368MB

2.2訊號連接器

保持信號連接是在保證使用者的應用系統能正確地送出和得到數據過程中最重要的元素。所以本節主要就是介紹端子板上的一般用途之I/O端子接頭、機台使用I/O端子接頭及伺服馬達專用連接器的各訊號配接點意義說明。除了讓使用者可以了解訊號用途及意義外，更可以讓使用者依此再確認訊號配接是否正確。

■ CON1

DN-8368 MB上的I/O 連接器是經由68腳位的SCSI II的連接器端子，讓使用者可以將端子板訊號連接到主控端的主卡。由於主卡上有兩組連接器（CN1A/ CN1B），因此對應到端子板上的訊號名稱時將有有所不同，故我們將相關的訊號表列於下【表2-1、表2-2】；不過因為此連接器僅是將端子台與主卡的控制訊號直接連接起來，而使用者並無法直接控制使用，所以使用者是可以忽略此說明內容！

CN1A（較靠近PCB板）表2-1

No.	Name	I/O	Function Axis	No.	Name	I/O	Function Axis
1	AOUT0	O	Analog Output	35	AIN0	I	Analog Input
2	AOUT1	O	Analog Output	36	AIN1	I	Analog Input
3	AOUT2	O	Analog Output	37	AIN2	I	Analog Input
4	AGND	-	Analog Ground	38	AGND	-	Analog Ground
5	DGND	-	Digital Ground	39	ERC0	O	Error Counter Clear
6	LTC0	I	Position Latch	40	SVON0	O	Servo On
7	EA0	I	Encoder A-Phase	41	RDY0	I	Servo Ready
8	EB0	I	Encoder B-Phase	42	INP0	I	Servo In-Position
9	EZ0	I	Encoder Z-Phase	43	ALM0	I	Servo Alarm
10	CW0	O	Clockwise pulse	44	SLD0	I	Slow Down
11	CCW0	O	Counter-Clockwise pulse	45	ORG0	I	Origin Signal
12	CMP0	O	Compare Trigger	46	MEL0	I	Minus End Limit
13	EMG	I	Emergency Stop	47	PEL0	I	Positive End Limit
14	ALMRST0	O	Servo Alarm Reset	48	DGND	-	Digital Ground
15	DGND	-	Digital Ground	49	ERC1	O	Error Counter Clear
16	LTC1	I	Position Latch	50	SVON1	O	Servo On
17	EA1	I	Encoder A-Phase	51	RDY1	I	Servo Ready
18	EB1	I	Encoder B-Phase	52	INP1	I	Servo In-Position
19	EZ1	I	Encoder Z-Phase	53	ALM1	I	Servo Alarm
20	CW1	O	Clockwise pulse	54	SLD1	I	Slow Down
21	CCW1	O	Counter-Clockwise pulse	55	ORG1	I	Origin Signal
22	CMP1	O	Compare Trigger	56	MEL1	I	Minus End Limit
23	GDO1	O	Generic Digital Output	57	PEL1	I	Positive End Limit
24	ALMRST1	O	Servo Alarm Reset	58	DGND	-	Digital Ground
25	DGND	-	Digital Ground	59	ERC2	O	Error Counter Clear
26	LTC2	I	Position Latch	60	SVON2	O	Servo On
27	EA2	I	Encoder A-Phase	61	RDY2	I	Servo Ready
28	EB2	I	Encoder B-Phase	62	INP2	I	Servo In-Position
29	EZ2	I	Encoder Z-Phase	63	ALM2	I	Servo Alarm
30	CW2	O	Clockwise pulse	64	SLD2	I	Slow Down
31	CCW2	O	Counter-Clockwise pulse	65	ORG2	I	Origin Signal
32	CMP2	O	Compare Trigger	66	MEL2	I	Minus End Limit
33	DGND	-	Digital Ground	67	PEL2	I	Positive End Limit
34	ALMRST2	O	Servo Alarm Reset	68	VCC	-	5V Digital Power from Bus

CN1B（較遠離PCB板）表2-2

No.	Name	I/O	Function Axis	No.	Name	I/O	Function Axis
1	AOUT3	O	Analog Output	35	AIN3	I	Analog Input
2	AOUT4	O	Analog Output	36	AIN4	I	Analog Input
3	AOUT5	O	Analog Output	37	AIN5	I	Analog Input
4	AGND	-	Analog Ground	38	AGND	-	Analog Ground
5	DGND	-	Digital Ground	39	ERC3	O	Error Counter Clear
6	LTC3	I	Position Latch	40	SVON3	O	Servo On
7	EA3	I	Encoder A-Phase	41	RDY3	I	Servo Ready
8	EB3	I	Encoder B-Phase	42	INP3	I	Servo In-Position
9	EZ3	I	Encoder Z-Phase	43	ALM3	I	Servo Alarm
10	CW3	O	Clockwise pulse	44	SLD3	I	Slow Down
11	CCW3	O	Counter-Clockwise pulse	45	ORG3	I	Origin Signal
12	CMP3	O	Compare Trigger	46	MEL3	I	Minus End Limit
13	GDI11	I	Generic Digital Input	47	PEL3	I	Positive End Limit
14	ALMRST3	O	Servo Alarm Reset	48	DGND	-	Digital Ground
15	DGND	-	Digital Ground	49	ERC4	O	Error Counter Clear
16	LTC4	I	Position Latch	50	SVON4	O	Servo On
17	EA4	I	Encoder A-Phase	51	RDY4	I	Servo Ready
18	EB4	I	Encoder B-Phase	52	INP4	I	Servo In-Position
19	EZ4	I	Encoder Z-Phase	53	ALM4	I	Servo Alarm
20	CW4	O	Clockwise pulse	54	SLD4	I	Slow Down
21	CCW4	O	Counter-Clockwise pulse	55	ORG4	I	Origin Signal
22	CMP4	O	Compare Trigger	56	MEL4	I	Minus End Limit
23	GDO2	O	Generic Digital Output	57	PEL4	I	Positive End Limit
24	ALMRST4	O	Servo Alarm Reset	58	DGND	-	Digital Ground
25	DGND	-	Digital Ground	59	ERC5	O	Error Counter Clear
26	LTC5	I	Position Latch	60	SVON5	O	Servo On
27	EA5	I	Encoder A-Phase	61	RDY5	I	Servo Ready
28	EB5	I	Encoder B-Phase	62	INP5	I	Servo In-Position
29	EZ5	I	Encoder Z-Phase	63	ALM5	I	Servo Alarm
30	CW5	O	Clockwise pulse	64	SLD5	I	Slow Down
31	CCW5	O	Counter-Clockwise pulse	65	ORG5	I	Origin Signal
32	CMP5	O	Compare Trigger	66	MEL5	I	Minus End Limit
33	DGND	-	Digital Ground	67	PEL5	I	Positive End Limit
34	ALMRST5	O	Servo Alarm Reset	68	VCC	-	5V Digital Power from Bus

■ CON2

此控制接點為此端子板的電源入力接點，共有5腳位,詳細腳位描述內容如表2-3：

表2-3

Pin NO	Pin Define	Function description
1	FGND	Frame ground of DN-8368MB
2	EGND	Ground of the external power
3	EGND	Ground of the external power
4	E24V	External power supply of +24V DC
5	E24V	External power supply of +24V DC

■ CON3

一般用途的I/O配接點，DI及DO各1， 其中DI的部份， 當接到主卡的CN1A（較靠近PCB板）時,此訊號為緊急停止（EMG）開關之輸入； 當接到主卡的CN1B（較遠離PCB板）時， 做為一般用途的GDI11使用, 詳細腳位描述內容如表2-4：

表2-4

Pin NO	Pin Define	Function description
1	N.C	No Connection
2	EMG/GDI11	Emergency stop signal(or General purpose input signal)
3	GDO1/GDO2	General purpose output signal

■ CNAIO (only for PSIO-VS600 and PMDK)

此為類比輸出入訊號配接點， 共計有AI x3, AO x3及 analog ground x1，使用者可以利用此來將PISO-VS600 and PMDK的類比控制訊號輸出,詳細腳位描述內容如表2-5：

表2-5

Pin NO	Pin Define	Function description
1	AGND	Analog ground
2	AOUT2	Analog output
3	AOUT1	Analog output
4	AOUT0	Analog output
5	AIN2	Analog input
6	AIN1	Analog input
7	AIN0	Analog input

■ CNIO_0 ~ CNIO_2

此配接口主要是讓使用者可以配接各軸的一般機台I/O訊號， 例如:緊急訊號、 正負極限, 歸零、減速訊號、LTC、 正負CMP等， 透過這些配接點可以讓使用者輕易的將這些機台常用的訊號引入控制卡， 達到控制。 詳細腳位描述內容如表2-6：

表2-6

Pin NO	Pin Define	Function description
1	CMP-	Ground for Compare trigger output
2	CMP+	High Speed Compare trigger output
3	LTC-	Ground for Position Latch input
4	LTC+	High Speed Position Latch input
5	HOME	Origin signal (ORG) input
6	SLD	Slow-Down signal input
7	EGND	External Power Ground
8	LMT-	Negative End Limit signal (MEL) input
9	LMT+	Positive End Limit signal (PEL) input
10	EMG	Emergency stop signal to servo motor driver, direct connect to pin 15 of CN1B
11	E24V	External power, direct connect to pin 4 and pin 5 of CON2

■ CN232

主要提供使用者可以將電腦上的COM Port與三菱伺服馬達驅動器上的CN3中的RS-232 通訊串口連接使用， 再經由設定JP8~JP9來選定接到此端子板上的3軸中欲讀取的伺服馬達驅動器內容；經由此貼心設定可省去客戶常因為須要調機或者設定驅動器之內定值而一直插拔線材；詳細的腳位內容描述如表2-7：

表2-7

Pin NO	Pin Define	Function description
1	N.C	No Connection
2	TXD	Transmitted data output to RS232 of Personal Computer
3	RXD	Received data input from RS232 of Personal Computer
4	N.C	No Connection
5	AGND	Analog Ground
6	N.C	No Connection
7	N.C	No Connection
8	N.C	No Connection
9	N.C	No Connection

■ CNPIO_0 ~ CNPIO_2

此配接口主要有兩大用途， 第一提供使用者可以配接外部光學尺訊號的輸入點， 再搭配Jumper之JP4~JP6的設定選擇Encoder訊號來源是由伺服馬達(CN1A)或者是外部光學尺； 第二為當使用者的應用上， 並非全數為三菱伺服馬達時， 而是有一軸(或兩軸)是步進(或他牌伺服)馬達時，可以經由此配接口來配接結合使用，可以讓使用者做多變化的配接， 詳細的腳位內容描述如表2-8：

表2-8

Pin NO	Pin Define	Function description
1	CW+	Positive Direction Pulse(+)
2	CCW+	Negative Direction Pulse(+)
3	EGND	External Power Ground
4	A-	Encoder A-phase(-)
5	B-	Encoder B-phase(-)
6	EXT_5V	+5V Power output for external devices
7	CW-	Positive Direction Pulse(-)
8	CCW-	Negative Direction Pulse(-)
9	A+	Encoder A-phase(+)
10	B+	Encoder B-phase(+)
11	Z+	Encoder Z-phase(+)
12	Z-	Encoder Z-phase(-)
13	N.C	No Connection
14	N.C	No connection
15	E24V	External Power, direct connect to pin 4 and pin 5 of CON2

2.3伺服馬達專用訊號連接器

本章節主要是說明三菱伺服馬達在DN-8368MB上的端子接點訊號說明， 由於此端子板是可配PISO-PS600 (position control mode)， PISO-VS600 (Position/Speed control mode) 及PMDK (Professional Motion development Kit (支援AI/AO)) 多卡共用端子板； 再加上三菱的伺服馬達又可以經由設定而有不同的控制模式，而這些不同的控制模式中又有些訊號腳位是共用或者是須要經由設定驅動器後始可操作， 所以我們特別將這些三菱伺服驅動器上的CN1A、CN1B、 CN3等的控制腳位的定義特別列出來說明，讓使用者可以經由這的說明而能容易的操控不同模式的馬達模式控制。

■ CN1A_0 ~ CN1A_2

軸卡與三菱伺服驅動器CN1A連接之配腳口,此配接口共有20Pin， 為直接腳位對應引入， 使用者可以直接將購買的三菱線材與端子板的連接頭對接即可。泓格科技股份公司之運動控制卡並未全數引用所有三菱伺服的腳位，我們僅僅使用部份腳位， 且由於各腳位於伺服馬達驅動器的控制模式設定改變時，部份腳位定義也將會依控制模式的改變而有所改變， 詳細定義內容如表2-9：

表2-9

I/O Signals in Servo Drive				Signals in DN-8368MB
Pin No.	I/O	Position control mode	Speed control mode	
1				
2	I	NP		CCW+
3	I	PP		CW+
4				
5	O	LZ	LZ	Z+
6	O	LA	LA	A+
7	O	LB	LB	B+
8	I	CR*	SP1*	Pin 1 of JP15~JP17
9				
10	PWR	SG	SG	EGND
11				
12	I	NG		CCW-
13	I	PG		CW
14				
15	O	LZR	LZR	Z-
16	O	LAR	LAR	A-
17	O	LBR	LBR	B-
18	O	INP	SA	INP
19	O	RD	RD	RDY
20	PWR	SG	SG	EGND

註：有打*號的腳位是代表該訊號可以經由三菱伺服馬達驅動器(J2S) 的Para.43~48的設定來改變腳位定義名稱。

■ CN1B_0 ~ CN1B_2

軸卡與三菱伺服驅動器CN1B連接之配腳口,此配接口共有20Pin， 為直接腳位對應引入， 使用者可以直接將購買的三菱線材與端子板的連接頭對接即可。 泓格之運動控制卡並未全數引用所有三菱伺服的腳位， 我們僅僅使用部份腳位， 且由於各腳位於伺服馬達驅動器的控制模式設定改變時，部份腳位定義也將會依控制模式的改變而有所改變， 詳細定義內容如表2-10：

表2-10

I/O Signals in Servo Drive				Signals in DN-8368MB
Pin No.	I/O	Position control mode	Speed control mode	
1	PWR	LG	LG	AGND
2	I	N.C.	VC	AOUT
3				
4				
5	I	SON*	SON*	SRV_ON
6				
7				
8	I	PC*	ST1*	Pin 3 of JP15~JP17
9				
10	PWR	SG	SG	EGND
11				
12				
13	PWR	COM	COM	E24V
14	I	Reset*	Reset*	ALM_RST
15	I	EMG	EMG	SW1 and Pin 10 of CNIO
16	I	LSP	LSP	EGND
17	I	LSN	LSN	EGND
18	O	ALM	ALM	ALARM
19				
20	PWR	SG	SG	EGND

註:有打*號的腳位是代表該訊號可以經由三菱伺服馬達驅動器(J2S) 的Para.43~48的設定來改變腳位定義名稱。

■ CN3_0 ~ CN3_2

三菱伺服馬達驅動器之的CN3的腳位中有3Pin是用來當成COM port使用，而其主要的用途是讓使用者利用三菱伺服馬達專用的軟體，如Melservo-161經由電腦透過COM Port來讀取驅動器，主要為設定驅動器及調機等使用. 因此，為了方便使用者使用故我們將此功能直接引入到端子板上， 使用者可以利用我們的CN232接口直接連接電腦的COM Port，再經由端子板上的JP8~JP9來選擇接到此端子板上的3軸中欲讀取的伺服馬達驅動器內容； 詳細的腳位內容描述如表2-11：

表2-11

I/O Signals in Servo Drive				Signals in DN-8368MB
Pin No.	I/O	Position control mode	Speed control mode	
1	PWR	LG	LG	AGND
2	O	TXD	TXD	Pin 2 of CN232 (selected by JP8)
3				
4				
5				
6				
7				
8				
9				
10				
11				
12	I	RXD	RXD	Pin 3 of CN232 (selected by JP9)
13	PWR	LG	LG	AGND
14	O	MO2	MO2	AIN
15				
16				
17				
18				
19				
20				

註1： MO2在Speed control mode可被當做PISO-VS600的參考回授值，因此當使用者若是搭配PISO-VS600使用此端子板時, 須將伺服馬達的參數17之值設定為0000，將Servo motor speed經由MO2輸出 (會直接接到PISO-VS600的analog input)。

■ 控制模式設定 (Control mode setting)

由於DN-8368MB是可以跟PISO-PS600 (position control mode) and PISO-VS600 (Speed control mode) 兩種控制卡搭配, 故我們特別將此兩種模式的特別要調之參數及注意事項來列出並提醒使用者，以避免不必要的錯誤產生：

- **Position Control mode：**
  1. 將伺服馬達驅動器上的Parameter 0 (STY) 之值設定為: 0000 (Position control) 。
  2. 將JP15~JP17之4-Pin Jumper放在 1-2位置 (由PISO-PS600/PISO-VS600之ERC來控制伺服馬達的CR訊號。

- **Speed control mode：**
  1. J2S 的 parameter 0 (STY) 要設成 0002 (speed control)
  2. 4 pin jumper (JP15-JP17) 放在 2-3 的位置 (由 VS600 的 ERC 控制 J2S 的 ST1) 或是放在 3-4 的位置 (J2S 的 ST1 直接接地, VS600 的 ERC不使用)
  3. J2S 的 parameter 17 (MOD) 要設成 0000， 將 Servo motor speed 經由 MO2 輸出 (會接到 VS600 的 analog input)
  4. 將 J2S 的 parameter 25 (VCM) 設定成適當的值 (Voltage Command 為 10V 時馬達的轉速)
  5. 將 J2S 的 parameter 29 (VCO) 設定成適當的值, 使 Voltage Command 為 0V 時馬達完全靜止

註： 當 J2S 設定在 Speed control mode 時， 一定要將 ST1 (代表正轉) 或 ST2 (代表反轉) 其中一 pin 接地馬達才會轉動，而馬達轉動的速度, 則是依據 SP1~SP3 的狀態決定, ，當 SP1~SP3都是 off 時， 馬達的轉速由 Voltage Command - VC 決定。

2.4 Jumper與 開關調撥設定

■ SW1 (EMG SW)

三菱的伺服馬達驅動器有一控制訊號是用來讓伺服馬達在緊急的情形下可以執行緊急停止， 而此訊號是一不必經由控制卡即可以讓馬達停止的重要訊號， 故我們在設計端子板時也考慮到客戶使用上的須求， 而特別將每軸的此訊號連接到端子板的 SW1開關， 供給客戶可以直接由硬體來設定為直接接到端子板的GND (此為出廠預設值)， 還是使用者接到外部的感應開關來當觸發點。 而SW1共有4組的訊號點, 其中1 ~ 3 分別就是被用來設定端子板的0/3 ~ 2/5 等三軸的緊急停止訊號的使用方式。 Fig. 2-2 是顯示 SW1 出廠預設值 (被直接接到EGND) ， 因此端子板上的CN1B_0 ~ CN1B_2的 ENG (Pin#2) 是無效； Fig. 2-3 是顯示 SW1 調撥設定為可以讓使用者經由端子板上的CNIO_0 ~ CNIO_2的 EMG 腳位與外部的感應開關結合使用。

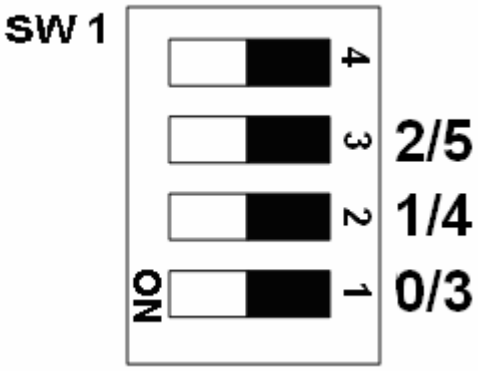

Fig. 2-2 EMG SW setting for normally GND (Default setting)

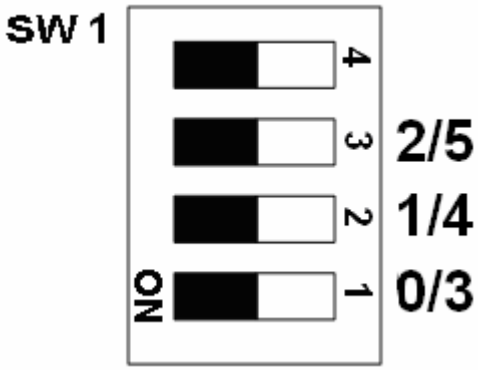

Fig. 2-3 EMG SW setting for user controlled signals.

■ JP1 ~ JP3

Jumper 1~3主要是用來設定LTC訊號的輸入電壓為是 24V (Jumper位置在1~2) 或 5V (Jumper位置在2~3)。 而此訊號的出廠預設值為 5V。

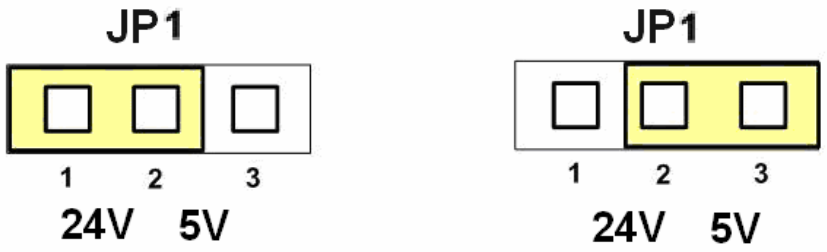

Fig. 2-4 Jumper 1~ Jumper 3 setting

■ JP4 ~ JP6

JP4 ~ JP6 主要是用來設定編碼器的訊號來源，可選擇直接從伺服馬達或由外部編碼器 (光學尺) 當輸入源Fig. 2-5 顯示設定訊號源是伺服馬達 (此為出廠預設值)。 Fig. 2-6 顯示設定訊號源為外部的編碼器。

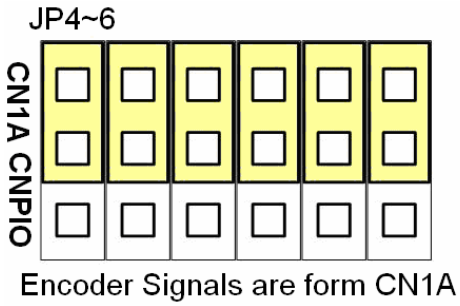

Fig. 2-5 Primary encoder signals setting

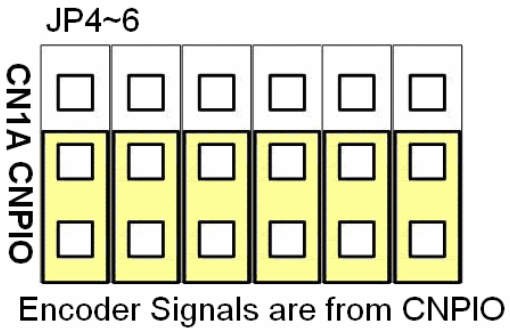

Fig. 2-6 External encoder signals setting

■ **JP7**

此Jumper主要是用來設定當SW1被切到ON時，，各軸的EMG訊號是直接接到EGND或者是由EMG/GDI11來搭配外部配接點使用,其設定內容詳如下圖所示：

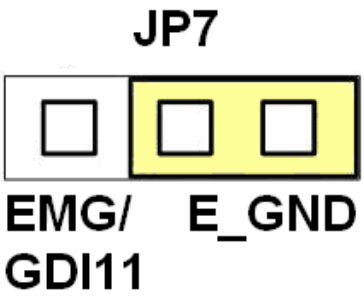

Fig 2- 7各軸的EMG訊號直接接到E_GND (出廠預設值)

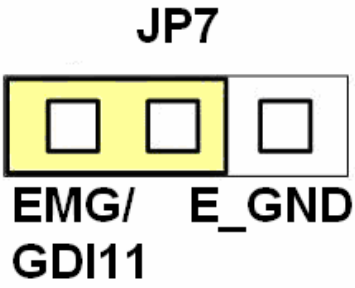

Fig. 2-8各軸的EMG訊號由EMG/GDI11來配接使用

■ **JP8 ~ JP9**

此組Jumper(JP8~JP9)主要是用來提供使用者可以選擇電腦連接過來的RS-232與端子板上的那一組三菱伺馬達驅動器連結， 而且每次的調整必須是JP8與JP9一起且一致的調整。 其設定內容詳如下圖所示：

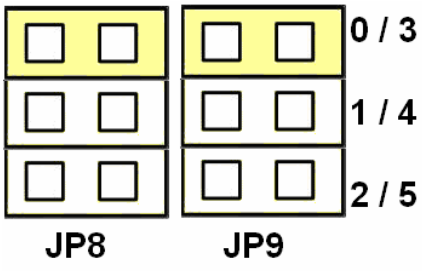

Fig. 2-9用來設定RS232與何軸連結 (出廠預設值為第0/3軸)

■ **JP10**

此組Jumper(JP10)主要是用來提供使用者可以選擇主卡的analog input是要連接到CNAIO的Pin#5~Pin#7或是J2S的MO2訊號(位於CN3上). 其設定內容詳如下圖所示：

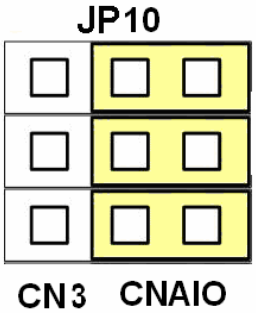

Fig. 2-10主卡的analog input是連接到CNAIO的Pin#5~Pin#7 (出廠設值)

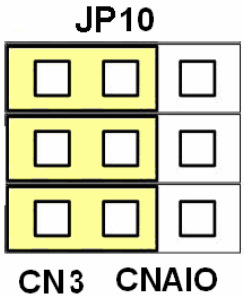

Fig. 2-11主卡的analog input是連接J2S的MO2訊號

■ **JP15 ~ JP17**

此組Jumper(JP15~JP17)主要是用來提供使用者配合其所使用的控制模式(Position Control/Speed control)來選擇主卡上的ERC訊號使用方法。 詳細使用方法請參考“Control Mode Setting” 章節。

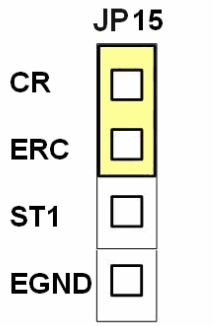

Fig. 2-12主卡的ERC訊號控制J2S的CR訊號 (出廠預設值)

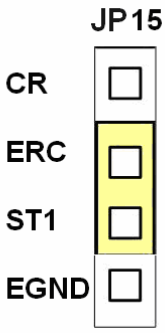

Fig. 2-13主卡的ERC訊號控制J2S的ST1訊號

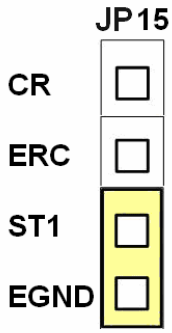

Fig. 2-14J2S的ST1訊號直接接到EGND

2.5 LED 功能描述

LED主要是用來顯示特別或重要的DI狀態, 此端子板上大致分成為兩部份， 一個為各軸的機台機械I/O (依序為: HOME, LMT- LMT- and RDY) 狀態顯示； 另一為Power LED and EMG LED狀態顯示； 這些LED的主要意義詳如下述：

- HOME： 運動控制軸的歸原點訊號。 當訊號被觸發作動時LED將會被點亮！

- LMT -： 運動控制軸的負極限訊號, 主要是用來決定硬體的負向運動的最大點; 當此訊號被觸發作動時，LED點將會被點亮 (由於實體電路為NO [Normal Open]， 所以當使用者的開關為Normal Close的設計時，則LED的顯示會剛好與前述相反) ！

- LMT +： 運動控制軸的正極限訊號， 主要是用來決定硬體的正向運動的最大點; 當此訊號被觸發作動時，LED點將會被點亮 (由於實體電路為NO [Normal Open]， 所以當使用者的開關為Normal Close的設計時，則LED的顯示會剛好與前述相反) ！

- RDY： 指示伺服馬達是否處於可以被控制的狀態; 當LED被點亮時即代表伺服馬達是處在可被控制的狀態。

- Power： 當端子板的電源入力端被正確的接入所要求電源後，Power LED將會被點亮.

- EMG： 主要是顯示EMG訊號是否被啟觸發做動，當被觸發作動則會點亮LED。