MPC-3024
4-Axis Motion Control Card

User's Manual (V1.5)

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Correction record

Version	Record
1.3->1.4	1. Correct JF2 Pin48 DEFINITIONS in Chapter 5
	2 Add JM1,JM2 description in Chapter 5
	3. Add PULSE OUTPUT circuit diagram in Chapter 6
	4. Correct EXTERNAL WIRING DIAGRAM IN Chapter 7
1.4->1.5	Modify 4. Layout and dimensions 6. I/O interface diagram

Contents

Notes on hardware installation

Please follow step by step as you are installing the control cards.

1. Be sure your system is power off.
2. Be sure your external power supply for the wiring board is power off.
3. Plug your control card in slot, and make sure the golden fingers are put in right contacts.
4. Fasten the screw to fix the card.
5. Connect the cable between the card and wiring board.
6. Connect the external power supply for the wiring board.
7. Recheck everything is OK before system power on.
8. External power on.

Congratulation! You have it.

For more detail of step by step installation guide, please refer the file “installation.pdf “ on the CD come with the product or register as a member of our user’s club at:

http://automation.com.tw/

to download the complementary documents.

1. Forward

Thank you for your selection of 4 axis motion control card. This card adopt the ASIC chip with complex motion functions including point to point, linear and circular interpolation, linear and s-curve acceleration/deceleration and several miscellaneous functions. Dll's of various functions will save you a lot of time in the motion related projects.

Our other motion control products:

MPC-3034 advanced 4 axes linear/circular/point to point (standard function) motion control card (PCI bus)

MPC-3028 8 axes linear/circular/point to point (standard function) motion control card (PCI bus)

MPC-3042A 2 axes linear/circular/point to point (standard function) motion control card with Pulse Referenced PI Control (PCI bus)

MPC-3042AL 2 axes linear/circular/point to point (standard function) motion control card (PCI bus)

MPC-3035 4 axes linear/circular/point to point (standard function) with advanced encoder counter function / with 2 8bit DA's motion control card (PCI bus)

MPC-3035L 4 axes linear/circular/point to point (standard function) with advanced encoder counter function motion control card (PCI bus)

Any comment is welcome,
please visit our website
http://www.automation.com.tw/
http://www.automation-js.com/ for the up to date information.

2. Features

2.1 Main card

- 2.1.1 4-axis servo/stepping motor control
- 2.1.2 4 28-bit up/down counter for incremental encoder
- 2.1.3 4 28-bit up/down counter for pulse handler input
- 2.1.4 Pulse output rate up to 6.55MHz
- 2.1.5 Pulse output options : OUT/DIR,CW/CCW
- 2.1.6 2~4 axes linear interpolation
- 2.1.7 Any 2 axes circular interpolation
- 2.1.8 S curve or T curve acceleration / deceleration in interpolation and positioning
- 2.1.9 Continuous interpolation
- 2.1.10 Speed change on the fly
- 2.1.11 Synchronized start motion
- 2.1.12 Position latch function
- 2.1.13 Simultaneously start/stop on multi-axes
- 2.1.14 Programmable interrupt conditions
- 2.1.15 Backlash compensation
- 2.1.16 Pulse handler function
- 2.1.17 Software limit switches protection
- 2.1.18 2 nibble configurable digital TTL I/O
- 2.1.19 Motion parameters change on the fly
- 2.1.20 Software key function

2.2 Din rail mounted wiring board

- 2.2.1 JS51050 dummy wiring board for JM3 pulse handler interface
- 2.2.2 ADP-3024DIN wiring board for JF1,2 motion control interface

3. Specifications

3.1 MPC-3024 Main card

Motion

3.1.1 Max pulse rate — 6,553,500 pps
3.1.2 Pulse output mode — Single phase: CLOCK,DIR
3.1.3 Dual phase — CW, CCW
3.1.4 Acceleration / Deceleration mode — linear ,S-curve mode
3.1.5 Homing mode — 14 types
3.1.6 Encoder up/down counter — 4 28bit counter
3.1.7 Pulse Handle up/down counter — 4 28 bit counter
3.1.8 Linear interpolation — any 2 up to 4 axis
3.1.9 Circular interpolation — any 2 axes

Digital I/O

3.1.10 Motion specific input — SRDY, ALM, LS+(EL+), LS-(EL-), SD, HOME(ORG), PCS, LTC per axis , EMG per card
3.1.11 Motion specific output — CMP,SVON,ERC,FIN per axis
3.1.12 General input — INP per axis
3.1.13 TTL I/O — 2 nibble configurable TTL I/O

General

3.1.14 Card ID — 16 locations set by rotary switch
3.1.15 Insulation resistance — 100 MΩ (min) at 1000Vdc
3.1.16 Isolation voltage — 2500Vac 1Min
3.1.17 I/O connector — 2 68pin female mini SCSI connector
3.1.18 External supply — DC 24±4V
3.1.19 Operation temperature — 0 to 70° C
3.1.20 Storage temperature — -20 to 80° C
3.1.21 Operation humidity — 5~95% RH, non-condensing
3.1.22 Dimensions — 175(W) * 122(H) mm , 6.9(W)*4.8(H)in

3.2 Din rail mounted wiring board

ADP-3024DIN for JF1,2 motion control interface

3.2.1 External supply — DC 24V±4V

3.2.2 Internal step down sps — 5V

3.2.3 General input — 4 with LED indicator

3.2.4 Output capacity — 8 N-MOS output, 1A continuous、120Vdc(max)
Option : 8 P-MOS output, 1A continuous、24Vdc(max)
Option : 8 Relay output, 3A continuous、250Vac(max)

3.2.5 Connector — 2 68pin mini SCSI female connector for main card connection

3.2.6 Specific servo control connectors — 4 D-type 26p (1 per axis)

3.2.7 Operation temperature — 0 to 70° C

3.2.8 Operation humidity — RH5~95%, non-condensed

3.2.9 Dimension — ADP-3024DIN(N) : 121(W) * 204(L) *47(H)mm;
4.8(W)*8.1(L)*1.9(H)in
ADP-3024DIN(P) / (R) : 121(W) * 204(L) *45(H)mm
4.8(W)*8.1(L)*1.8(H)in

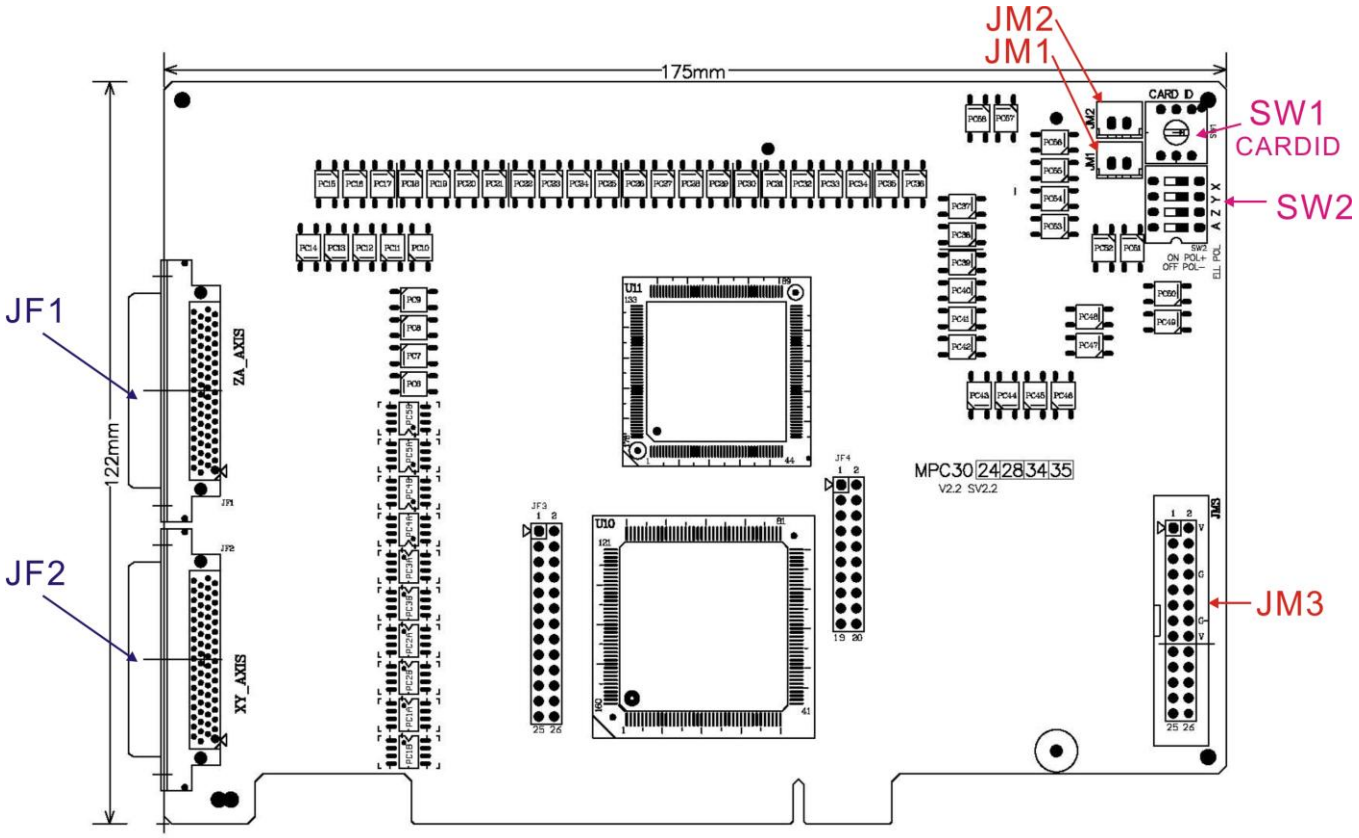
JS51050 for JM3 pulse handler interface

3.2.10 Connection cable — D-type 25P cable to connect main and wiring board

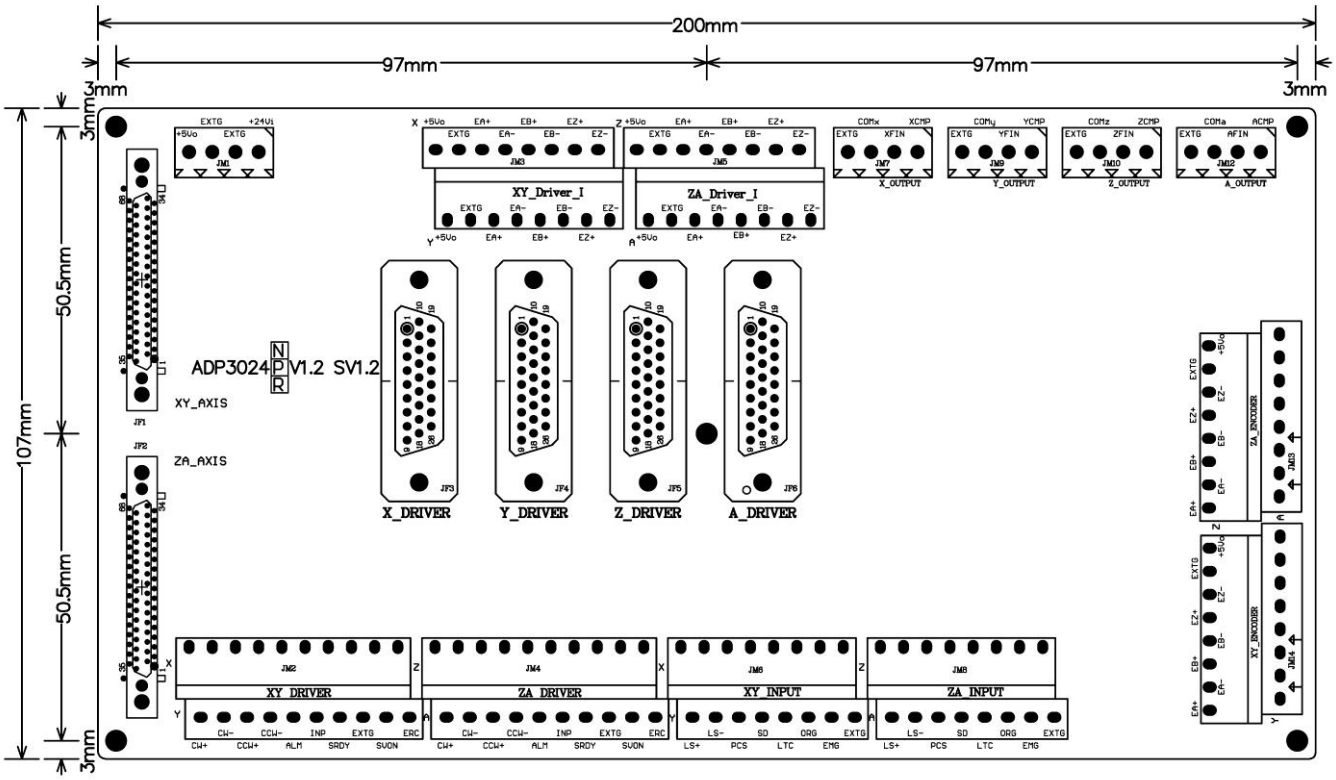
3.2.11 Dimension — 86(W)*79(L)*52(H)mm , 3.4(W)*3.2(L)*2.1(H)in

4. Layout and dimension

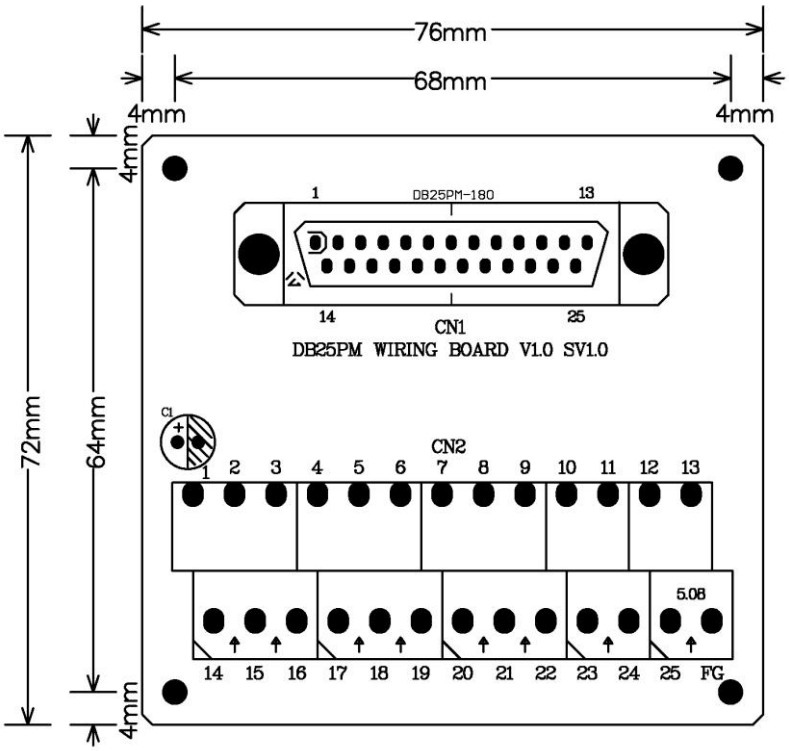
4.1 MPC-3024 Main card



4.2 ADP-3024DIN for JF1,2 Din rail mounted wiring board



4.3 JS51050 for JM3 25PM Din rail mounted dummy wiring board

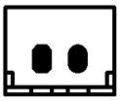


5. Pin definitions

5.1 JF1,JF2 Assignment / Definitions

PIN	I/O	Descriptions	PIN	I/O	Descriptions
1	I	Z/X_LS+(EL+) Positive over travel LS(EL) of Z/X axis	35	I	Z/X_LS-(EL-) Negative over travel LS(EL) of Z/X axis
2	I	Z/X_SD Slowdown LS(EL) of Z/X axis	36	I	Z/X_HOME(ORG) Home(ORG) LS(EL) of Z/X axis
3	I	Z/X_PCS Position change start signal of Z/X axis	37	I	Z/X_LTC Latch counter trigger of Z/X axis
4	O	Z/X_FIN General purpose output of Z/X axis	38	O	Z/X_CMP General out or compare out of Z/X axis
5	I	Z/X_EA+ Encoder phase A+ feedback of Z/X axis	39	I	Z/X_EA- Encoder phase A- feedback of Z/X axis
6	I	Z/X_EB+ Encoder phase B+ feedback of Z/X axis	40	I	Z/X_EB- Encoder phase B- feedback of Z/X axis
7	I	Z/X_EZ+ Encoder phase Z+ feedback of Z/X axis	41	I	Z/X_EZ- Encoder phase Z- feedback of Z/X axis
8	O	Z/X_CW+ CW+ or PULSE+ of Z/X axis	42	O	Z/X_CW- CW- or PULSE- of Z/X axis
9	O	Z/X_CCW+ CCW+ or DIR+ of Z/X axis	43	O	Z/X_CCW- CCW- or DIR- of Z/X axis
10	I	Z/X_INP General I/p of Z/X axis	44	I	Z/X_SRDY Servo Ready signal of Z/X axis
11	I	Z/XALM ALARM I/p of Z/X axis	45	O	XSVON -- Servo on of X axis
12	O	Z/X_ERC Output for resetting error counter of Z/X axis	46	I	A/Y_LS+(EL+) Positive over travel LS(EL) of A/Y axis
13	I	A/YLS-(EL-) Negative over travel LS(EL) of A/Y axis	47	I	A/Y_SD Slowdown LS(EL) of A/Y axis
14	I	A/Y_HOME(ORG) Home(ORG) LS(EL) of A/Y axis	48	I	A/Y_PCS Position change start signal of A/Y axis
15	I	A/Y_LTC Latch counter trigger of A/Y axis	49	O	A/Y_FIN General purpose output of A/Y axis
16	O	A/Y_CMP General out or compare out of A/Y axis	50	I	A/Y_EA+ Encoder phase A+ feedback of A/Y axis
17	I	A/Y_EA- Encoder phase A- feedback of A/Y axis	51	I	A/Y_EB+ Encoder phase B+ feedback of A/Y axis
18	I	A/Y_EB- Encoder phase B- feedback of A/Y axis	52	I	A/Y_EZ+ Encoder phase Z+ feedback of A/Y axis
19	I	A/Y_EZ- Encoder phase Z- feedback of A/Y axis	53	O	A/YCW+ CW+ or PULSE+ of A/Y axis
20	O	A/Y_CW- CW- or PULSE- of A/Y axis	54	O	A/Y_CCW+ CCW+ or DIR+ of A/Y axis
21	O	A/Y_CCW- CCW- or DIR- of A/Y axis	55	I	A/Y_INP General I/p of A/Y axis
22	I	A/Y_SRDY Servo Ready signal of A/Y axis	56	I	A/Y_ALM ALARM I/p of A/Y axis
23	O	A/YSVON Servo on of A/Y axis	57	O	A/Y_ERC Output for resetting error counter of A/Y axis
24 | 29		NC	58 | 63		NC
30	I	EMG Emergency stop, stop all axes	64	I	EXTG Common for external power (+24V and +5V)
31		NC	65		NC
32		EXTG Common for external power (+24V and +5V)	66		EXTG Common for external power (+24V and +5V)
33	O	+5V DC5V power output for external device	67	O	+5V DC5V power output for external device
34	I	+24V External DC24V power input	68	I	+24V External DC24V power input

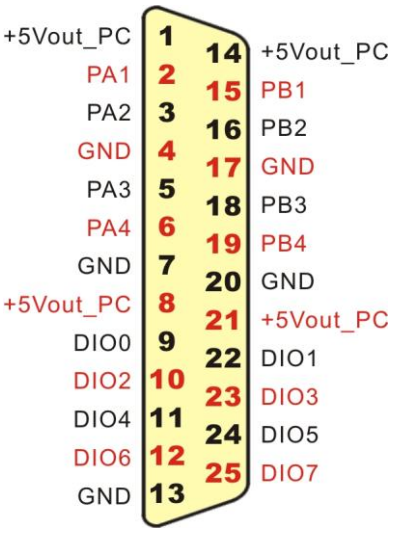
5.2 JM1,JM2 Assignment / Definitions

PIN	Description	 1	PIN	Description
1	CSTA: common start I/O		2	CSTP: common stop I/O

Note: Connect CSTA low to start motion from external.

Connect CSTP low to emergency stop motion from external.

5.3 JM3 Assignment / Definitions

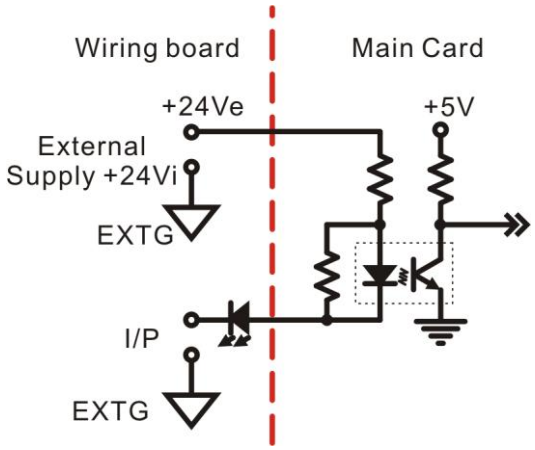
PIN	Description		PIN	Description
1	+5V from PC		14	+5V from PC
2	Pulse handler1 A phase input		15	Pulse handler1 B phase input
3	Pulse handler2 A phase input		16	Pulse handler2 B phase input
4	GND		17	GND
5	Pulse handler3 A phase input		18	Pulse handler3 B phase input
6	Pulse handler4 A phase input		19	Pulse handler4 B phase input
7	GND		20	GND
8	+5V from PC		21	+5V from PC
9	TTL I/O bit0		22	TTL I/O bit1
10	TTL I/O bit2		23	TTL I/O bit3
11	TTL I/O bit4		24	TTL I/O bit5
12	TTL I/O bit6		25	TTL I/O bit7
13	GND			

6. I/O interface diagram

6.1 JF1/2 ADP-3024DIN

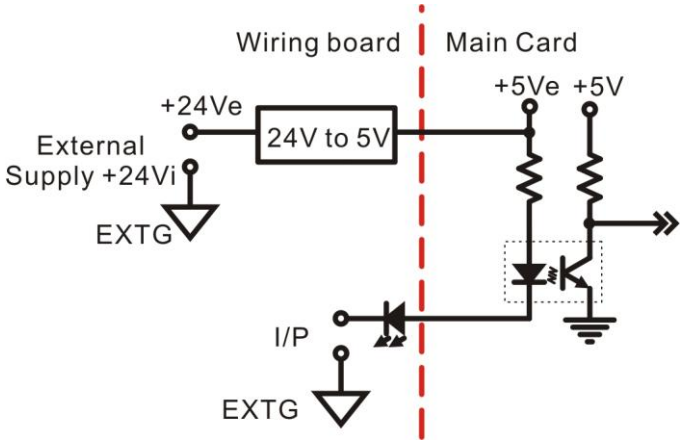
6.1.1 Input diagram

Type1 input:



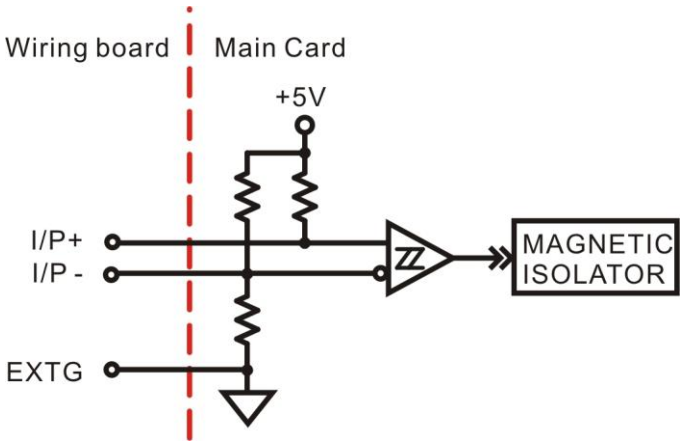
For input: LS+(EL+), LS-(EL-), HOME(ORG), SD,PCS,EMG, LTC

Type2 input:



For input: INP,SRDY,ALM

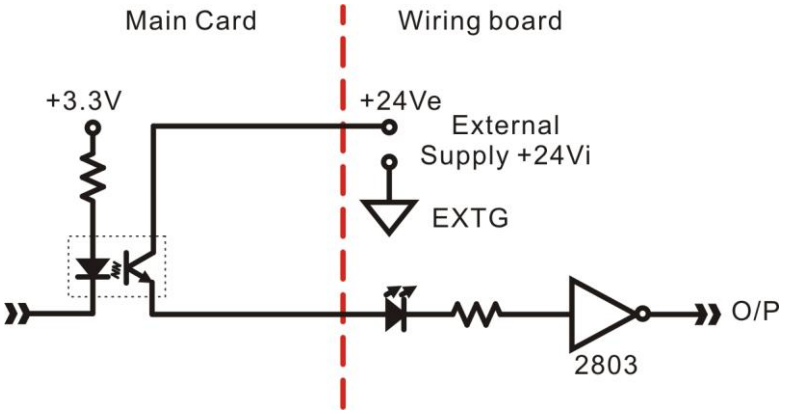
Type3 input:



For encoder feedback input : A+/-,B+/-,Z/-

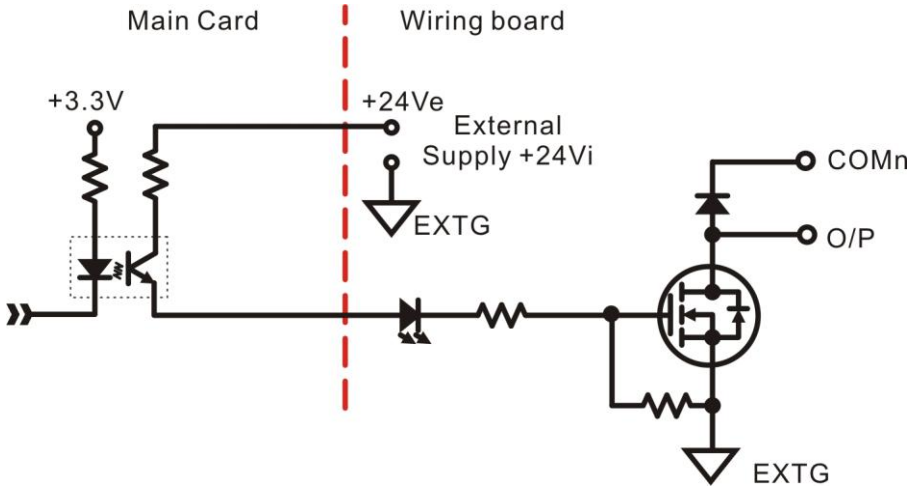
6.1.2 Output diagram

Type1 output:



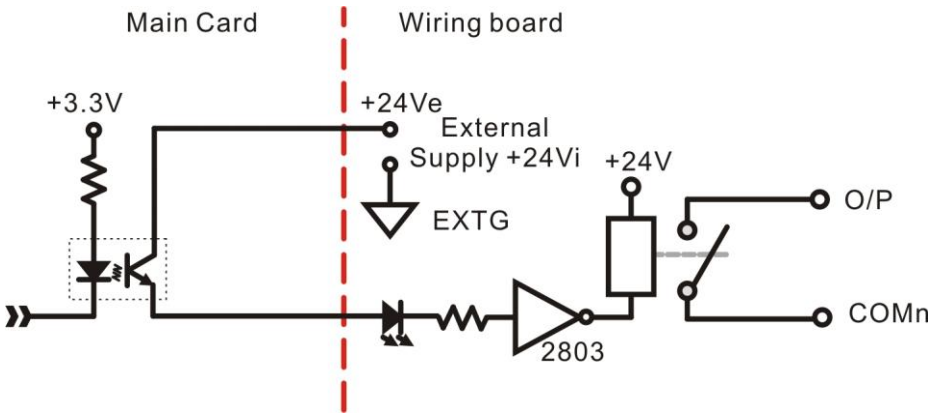
For SVON, ERC

Type2 output:



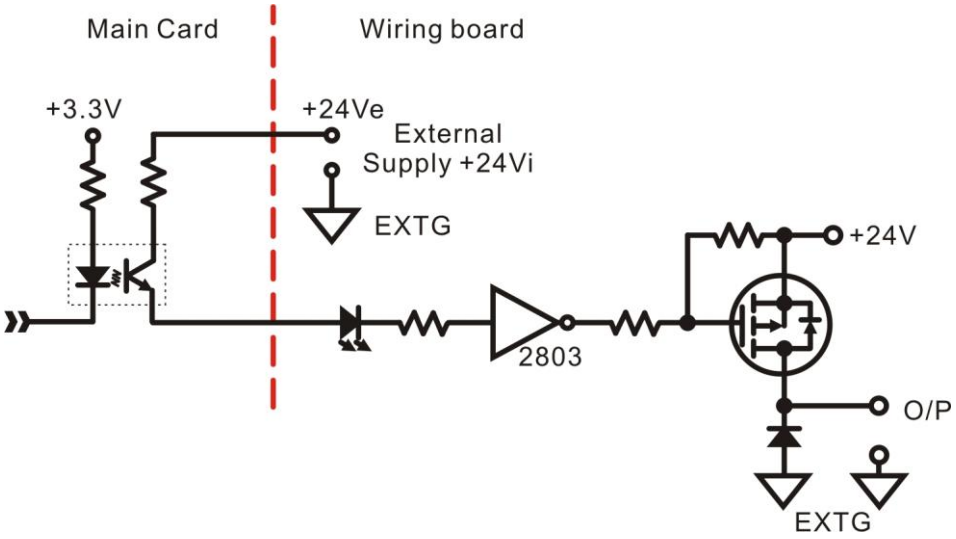
FIN,CMP(N-MOS)

Type3 output:



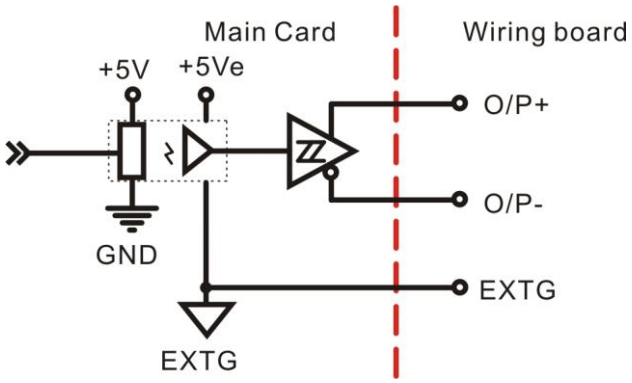
FIN,CMP(Relay)

Type4 output:



FIN,CMP(P-MOS)

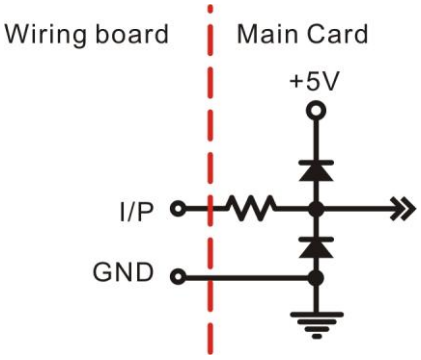
Type5 output:



For motion control pulse output : CW,CCW

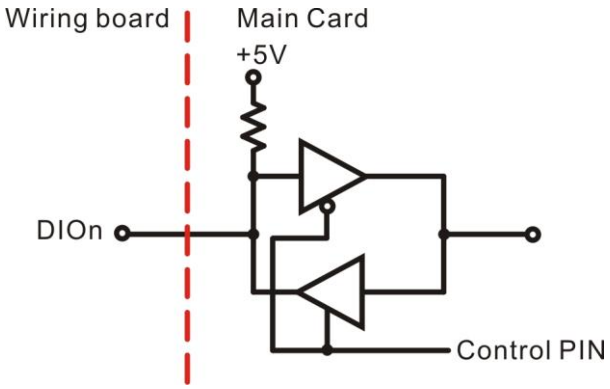
6.2 JM3 JS51050

Type 1 Input:



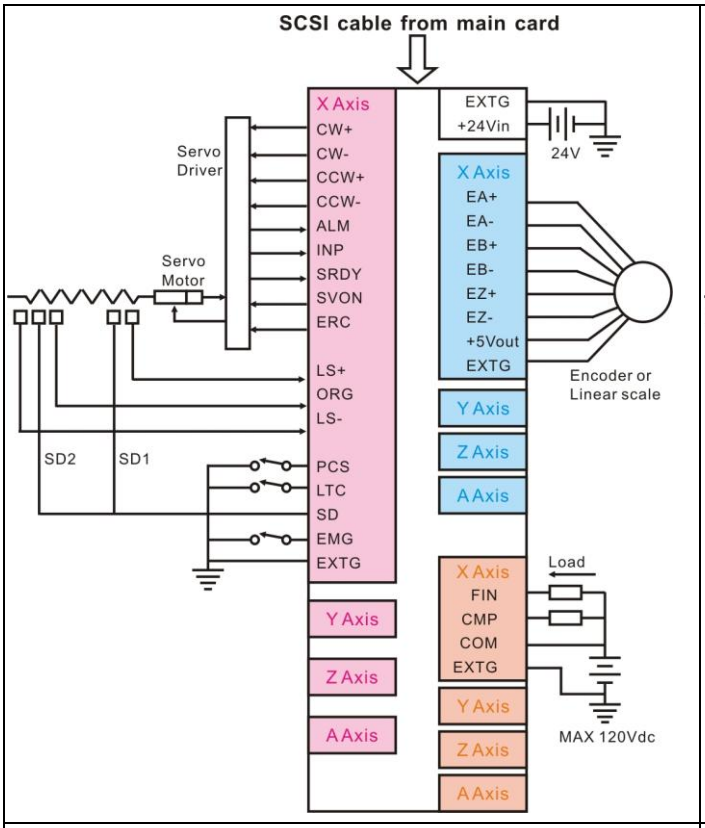
For Pulse Handler Input : PA,PB

Type 2 TTL I/O:

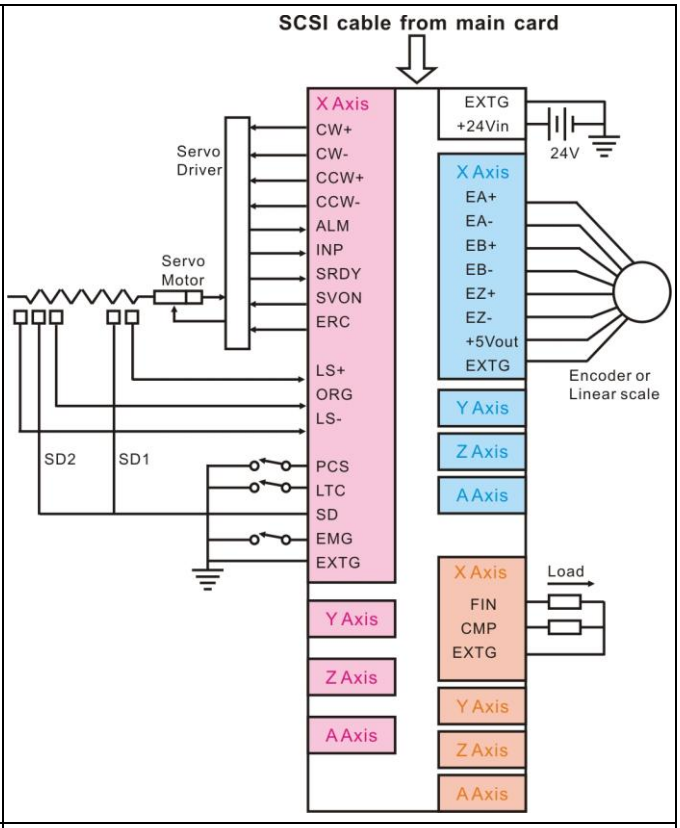


For DIO0 ~ DIO7

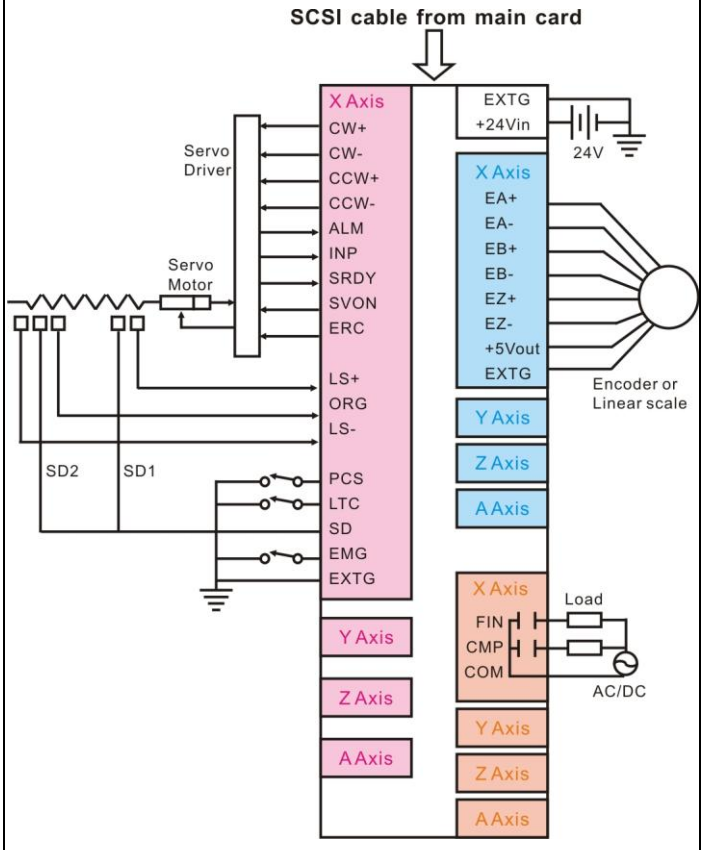
7. External wiring diagram



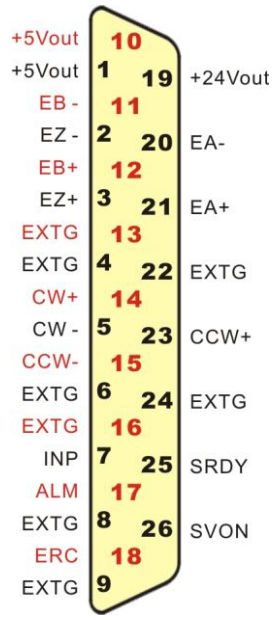
wiring board with NMOS output



wiring board with PMOS output



Wiring board with Relay output



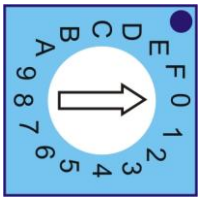
* User may connect the signals with this DB26 specific connectors (one axis per connector) or screw terminals.

Wiring board DB26 specific connector

8. Hardware settings

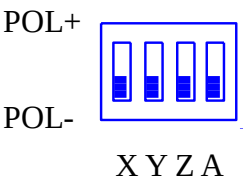
8.1 Card ID setting

Since PCI cards have plug and play function, the card ID is required for programmer to identify which card he/she will control without knowing the physical address assigned by the Windows. A 4 bits ROTARY switch (select from 0 to 0xF)for extinguishing the 16 identical card.



8.2 Polarity setting for over-travel limit switch

For different applications maybe you have different considerations, the polarity of over-travel limit switch can be set by on card Dip switch to meet your requirement.

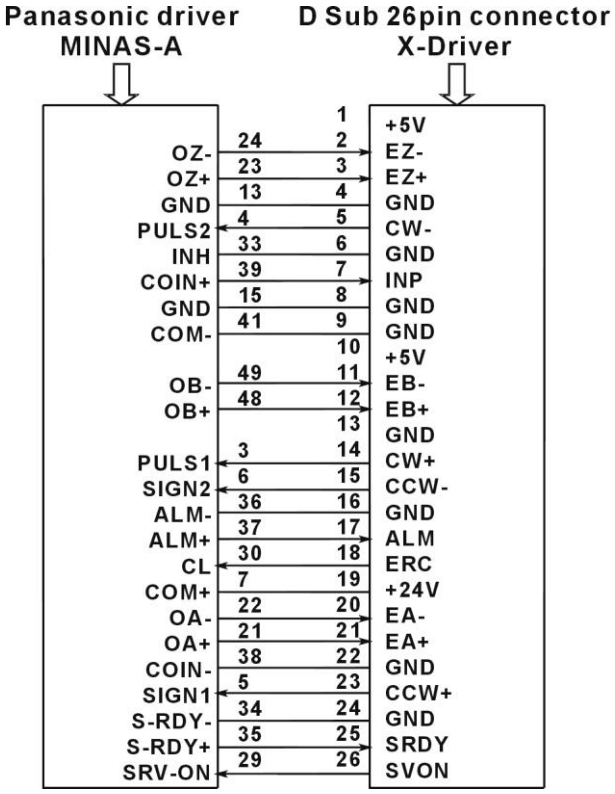


9. Applications

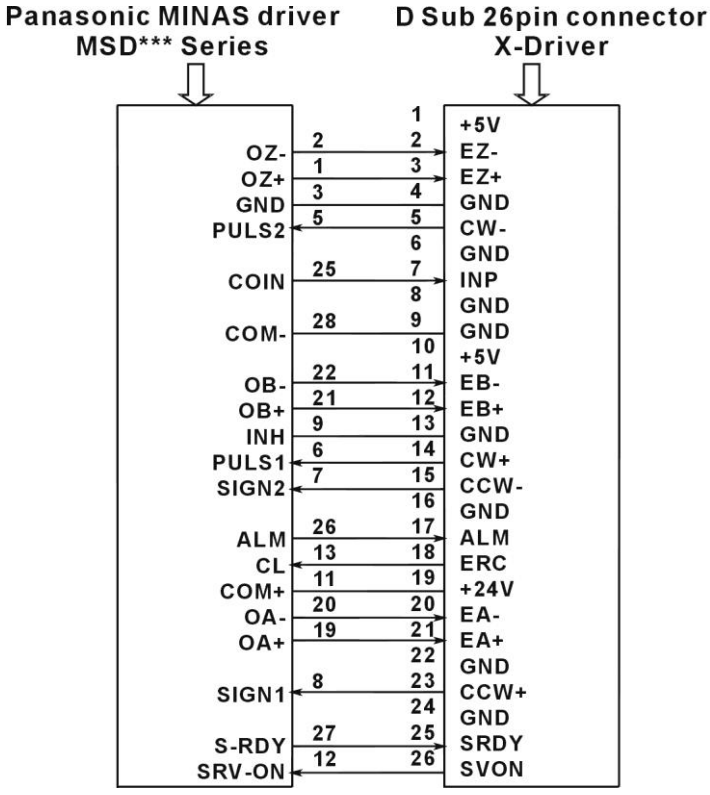
- Precision positioning control
- Precision speed control
- Contouring control
- X-Y table control
- Rotary machine control
- Robotic control
- Biotech sampling and handling
- Any combined control of servo and stepping motors

10. Wiring diagram examples

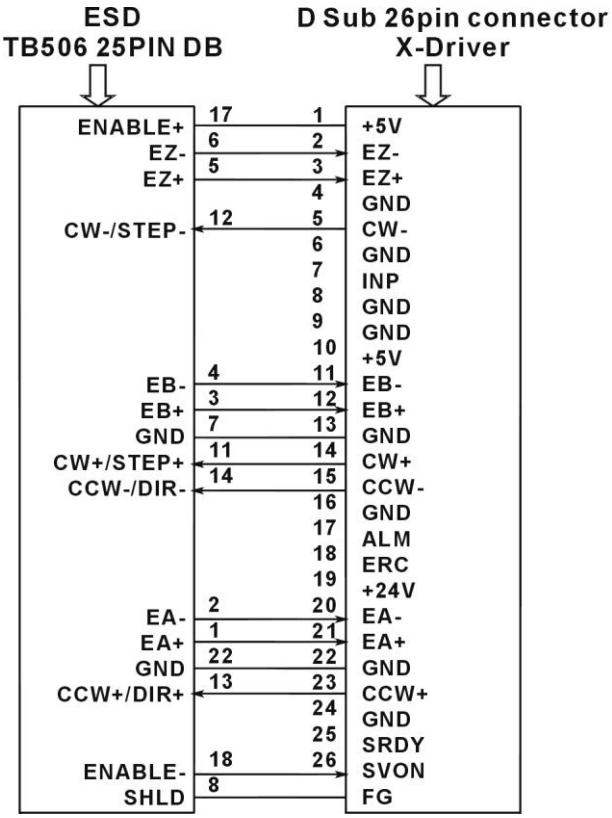
10.1 The wiring diagram for MPC-3024 wiring board to panasonic MINAS-A driver



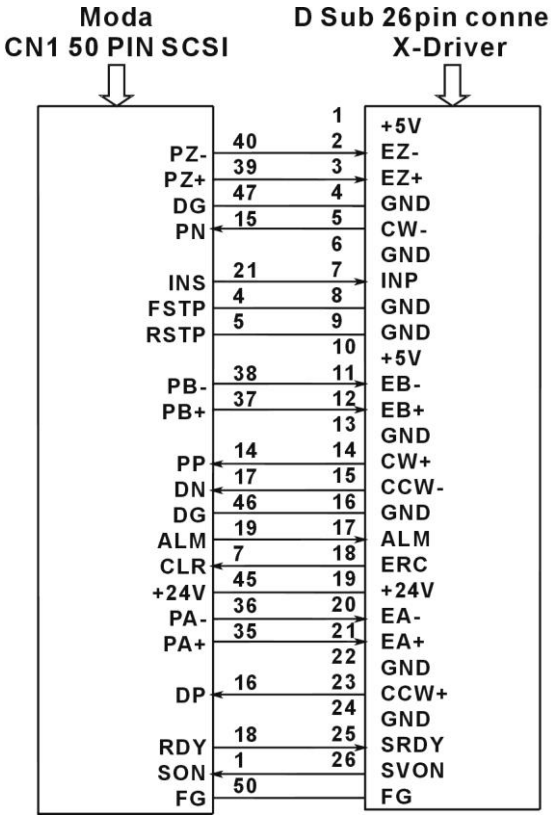
10.2 The wiring diagram for MPC-3024 wiring board to panasonic MINAS MSD*** driver



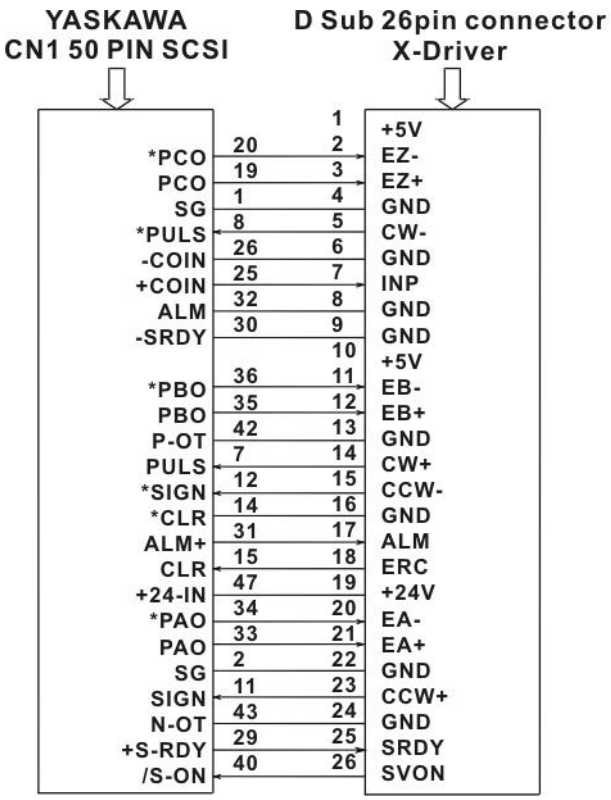
10.3 The wiring diagram for MPC-3024 wiring board to ESD servo driver



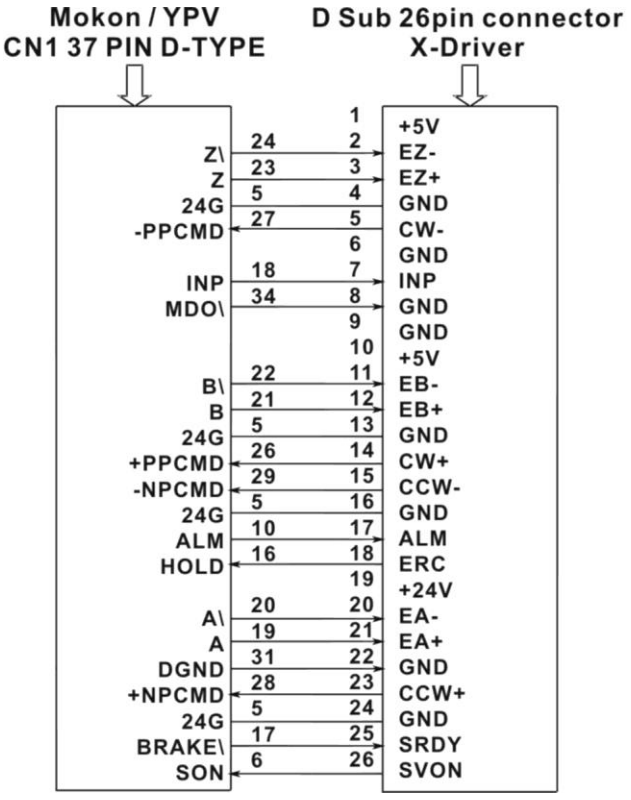
10.4 The wiring diagram for MPC-3024 wiring board to Moda servo driver



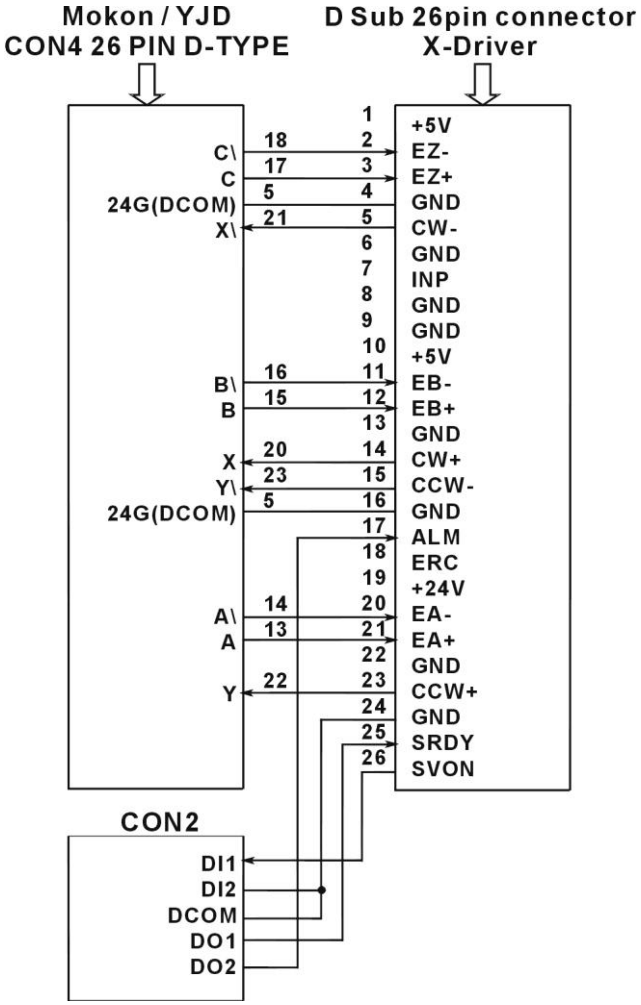
10.5 The wiring diagram for MPC-3024 wiring board to YASKAWA servo driver



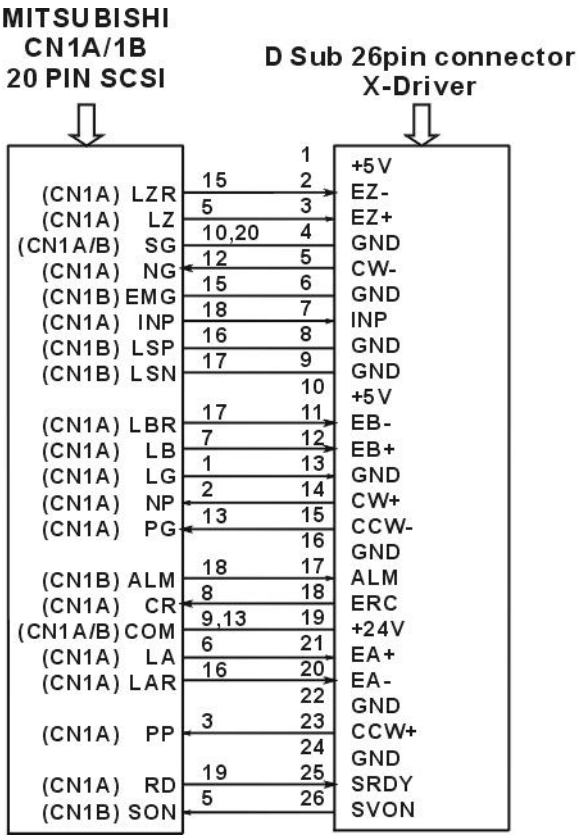
10.6 The wiring diagram for MPC-3024 wiring board to Mokon / YPV servo driver



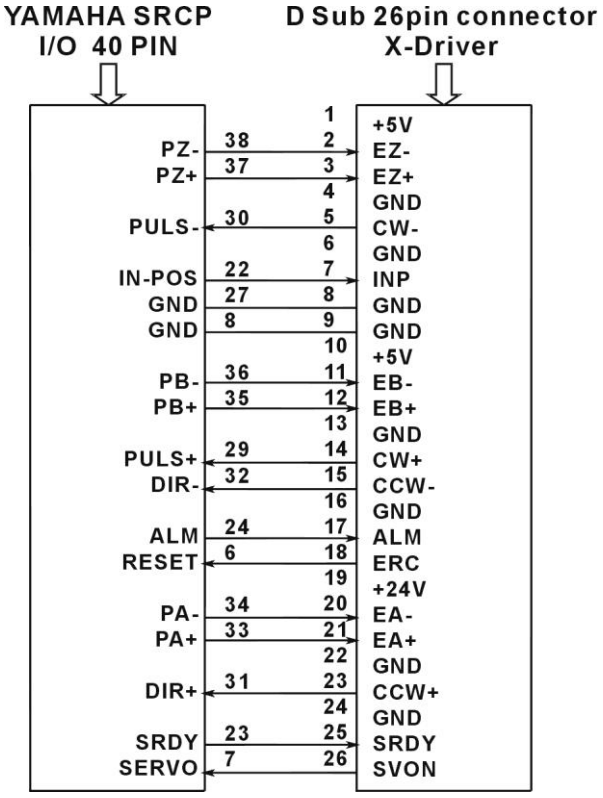
10.7 The wiring diagram for MPC-3024 wiring board to Mokon / YJD servo driver



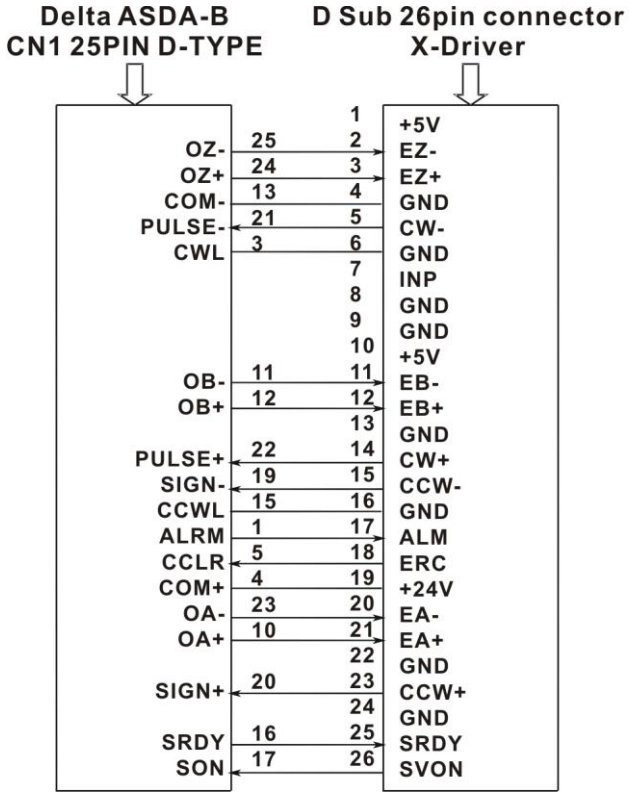
10.8 The wiring diagram for MPC-3024 wiring board to MITSUBISHI J2-SUPER servo driver



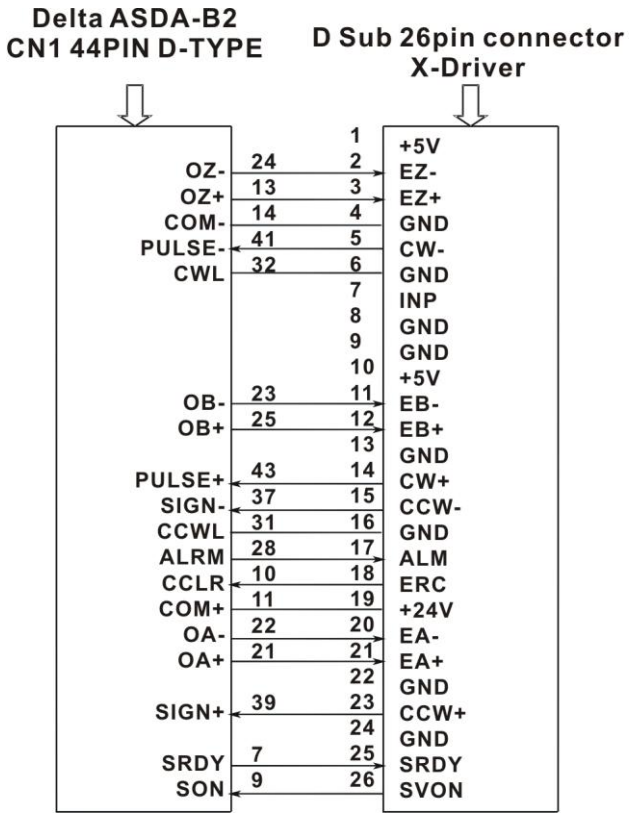
10.9 The wiring diagram for MPC-3024 wiring board to YAMAHA SRCP servo driver



10.10 The wiring diagram for MPC-3024 wiring board to Delta ASDA-B servo driver



10.11 The wiring diagram for MPC-3024 wiring board to Delta ASDA-B2 servo driver



11. Ordering information

PRODUCT	DESCRIPTIONS
MPC-3024	4-axis motion control card for servo/step motor control
ADP-3024 DIN(N)	DIN rail mounted wiring board matched MPC-3024 /3028/3034 , General output: 8 power NMOS
ADP-3024 DIN(P)	DIN rail mounted wiring board matched MPC-3024 /3028/3034 , General output: 8 power PMOS
ADP-3024 DIN(R)	DIN rail mounted wiring board matched MPC-3024 /3028/3034 , General output: 8 relays
JS51050	DIN rail mounted dummy wiring board (for JM3)
FVC01	F to V Module
M266868152	68-pin mini-SCSI cable 1.5M (2 axes control signal granted in one cable)
M266868301	68-pin mini-SCSI cable 3.0M (2 axes control signal granted in one cable)
M270325X4	D type 25p male-female cable 1.5M
M270325X4S	D type 25p male-female cable 1.5M,shielding
M270325X0	D type 25p male-female cable 3.0M
M270325X0S	D type 25p male-female cable 3.0M,shielding
SM23404	Extension kit for JM3 (bracket and flat cable for 25p D-type connector)