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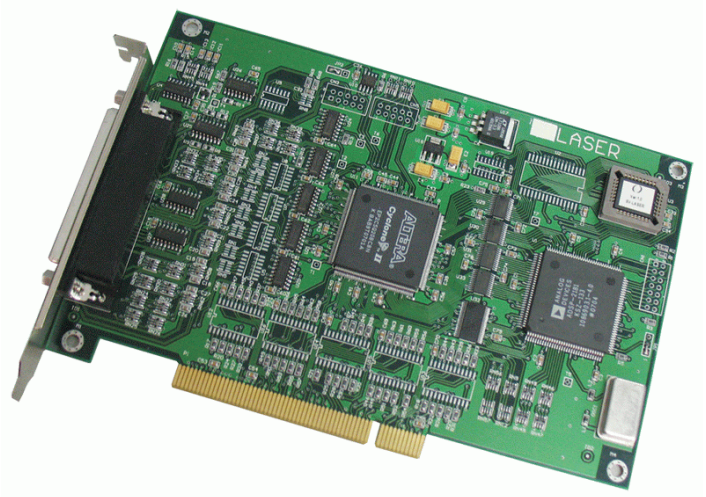
GE-S Series Motion Controller

User Manual



Be sure to hand over this manual to the user.

- Thank you for the purchase of GE-S Series Motion Controller.
- Please read this manual carefully to guarantee the correct operation before the controller is used.
- Please keep this manual carefully for reading and referring at any time.

Copyright Statement

 Notice	It is dangerous of the machinery in moving. It is the responsibility of the user to design the effective error handling system and security protection as the part of the machinery. Googol Technology has no obligation or responsibility for any incidental or consequential damages.

Foreword

Thank you for using Googol Motion Controller

Your own control system will be established supported by our first-class motion controller, perfect after-sale service and high-efficiency technical support.

More information about Googol products

The web of Googol Technology is *http://www.googoltech.com.cn*. More information about Googol Technology and its products can be obtained on the web, including the introduction of Googol Technology, products, technical support, latest products and so on.

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Purpose of this Programming Manual

By reading this manual, you can understand the basic structure of GE-S Motion Controller, learn the installation of motion controller, and study the connection of motion controller, motor control system and laser control system. Finally, you can complete the debug of motion control and laser control system.

User of this Programming Manual

This manual is applicable for those engineering staff with the basic knowledge of hardware and certain understanding of control.

Contents of this Programming Manual

There are three chapters and appendix in this manual. The first chapter is overview which introducing GE-S Series Motion Controller and how to buildup the electromechanical control system. The second chapter is quick start which introducing the installation and wiring of motion controller, the installation of drive program. The third chapter is system debug. And the technology specification of motion controller, typical wiring and troubleshooting are provided in appendix.

Relevant Documents

Please refer to “GE-S Series Motion Controller – Programming Manual” provided together with the product about the programming of GE-S Series Motion Controller.

Contents

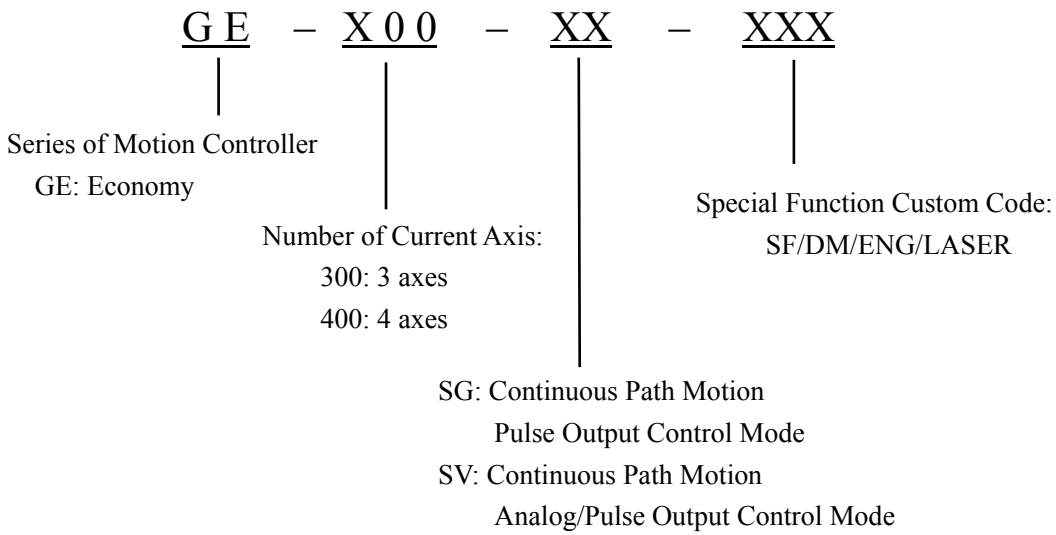
Chapter 1 Overview

1.1 Introduction

GE-S Series Motion Controller produced by Googol Technology can implement not only the coordinated motion of multi-axis but also the different special functions due to the various types of motion controllers. The motion controller can be used in many industries, such as drilling and milling, engraving, laser control and so on. The core of GE-S Series Motion Controller is composed of DSP and FPGA for realizing the high-powered computation.

IBM-PC and its compatible computer is the host of GE-S Series Motion Controller and the standard PCI bus is provided. Windows dynamic link library (DLL) is provided to implement the complex control functions by the motion controller. These control functions can be integrated with the required data processing, interface display, user interface and other application modules to create the special control system for meeting the requirements of various applications. The programming experience of C language or dynamic link library (DLL) in Windows should be possessed by the user when the motion controller is used.

1.2 Signification of GE-S Series Models



1.3 Function List of GE-S Series Motion Control

√ Included - Excluded * Optional

Features		DM	ENG	SG-LASER	SV-LASER
Bus	PCI	√	√	√	√
Control Cycle	200 μs (Constant)	√	√	√	√
Analog Output	Range: -10 V ~ +10 V	-	−	-	√
Pulse Output	3/4 axes	√	√	√	√
Encoder Input	Quadruple mode incremental encoder of 2/3/4/8 channels Max. Frequency: 4 MHz	√	√	√	√

Features		DM	ENG	SG-LASER	SV-LASER
Auxiliary Encoder	Quadruple mode incremental encoder of 1 channel Max. Frequency: 4 MHz	-	√	-	-
Limit Signal Input	Positive and negative limit opticalcoupler of each axis	√	√	√	√
Home Signal Input	1 channel opticalcoupler of each axis	√	√	√	√
Driver Alarm Signal Input	1 channel opticalcoupler of each axis	√	√	√	√
Driver Enable Signal Output	1 channel opticalcoupler of each axis	√	√	√	√
Driver Reset Signal Output	1 channel opticalcoupler of each axis	√	√	√	√
General Digital Signal Input	16 channels opticalcoupler	√	√	√	√
General Digital Signal Output	16 channels opticalcoupler	√	√	√	√
Interpolation	Linear interpolation Circular interpolation	√	√	√	√
Program Buffer	Pretreatment of motion trajectory	√	√	√	√
Filter	PID + Velocity feedforward + Acceleration feedforward	–	–	–	√
Hardware Capture	Index signal of encoder	√	√	√	√
	Home signal of origin	√	√	√	√
Safety Precaution	Set the following error limit	-	–	–	√
	Set the acceleration limit	√	√	√	√
	Set the output voltage saturation limit	-	–	-	√
Laser Switch (Enable) Control	1 channel, Differential output, TTL level, 30 mA	-	–	√	√
Laser power Control	2 channels PWM Output 2 channels DA Output	-	–	√	√
Laser Machining Process	Support scanning mode and vector mode	-	–	√	√
Supportable Laser Type	CO_2 and other gas laser YAG laser (Q pulse)	-	–	√	√

1.4 Components of GE-S Control System

1. A set of motion controller;
2. Host with PCI interface;
3. Step motor or servo motor and its driver;
4. Power of driver;

5. +24V DV power (for terminal board);
6. Home switch and positive/negative limit switch (optional as needed).

Both AC and DC servo motors can be selected.

To control servo motor

If GE-X00-SG-XXX Motion Controller is used, position control mode should be selected for the motor driver and the setting of pulse mode should be same for the motion controller and the driver.

If the pulse output function of GE-X00-SV-XXX Motion Controller is used, position control mode should be selected for the motor driver and the setting of pulse mode should be same for the motion controller and the driver.

If the analog output function of GE-X00-SV-XXX Motion Controller is used, velocity control mode should be selected for the motor driver. If you have any questions, please refer to your motor suppliers or contact with Googol Technology.

To control step motor

Two kinds of control signals are provided by the motion controller: positive/negative pulse and pulse + direction. When the step motor is controlled, the control mode is open loop control and the feedback signal of encoder is not required. The encoder is defaulted as closed when the motion controller is in the pulse output mode. If the encoder is connected to monitor the actual position from the external, the interrelated functions can be called to open the encoder during the programming.

The typical connection of control system with GE-300-SG-XXX Motion Controller can be seen in Figure 1-1.

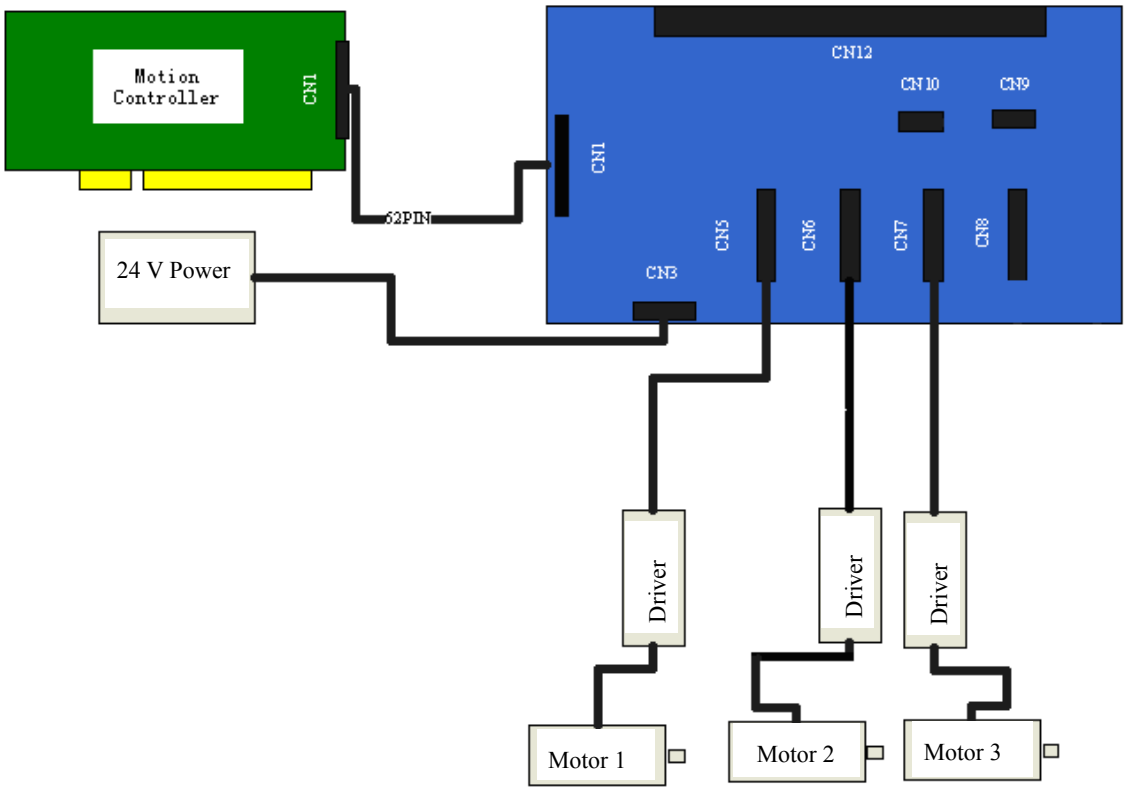


Figure 1-1 Control System with GE-300-SG-XXX Motion Controller

The typical connection of GE-400-SX-LASER Motion Controller can be seen in Figure 1-2.

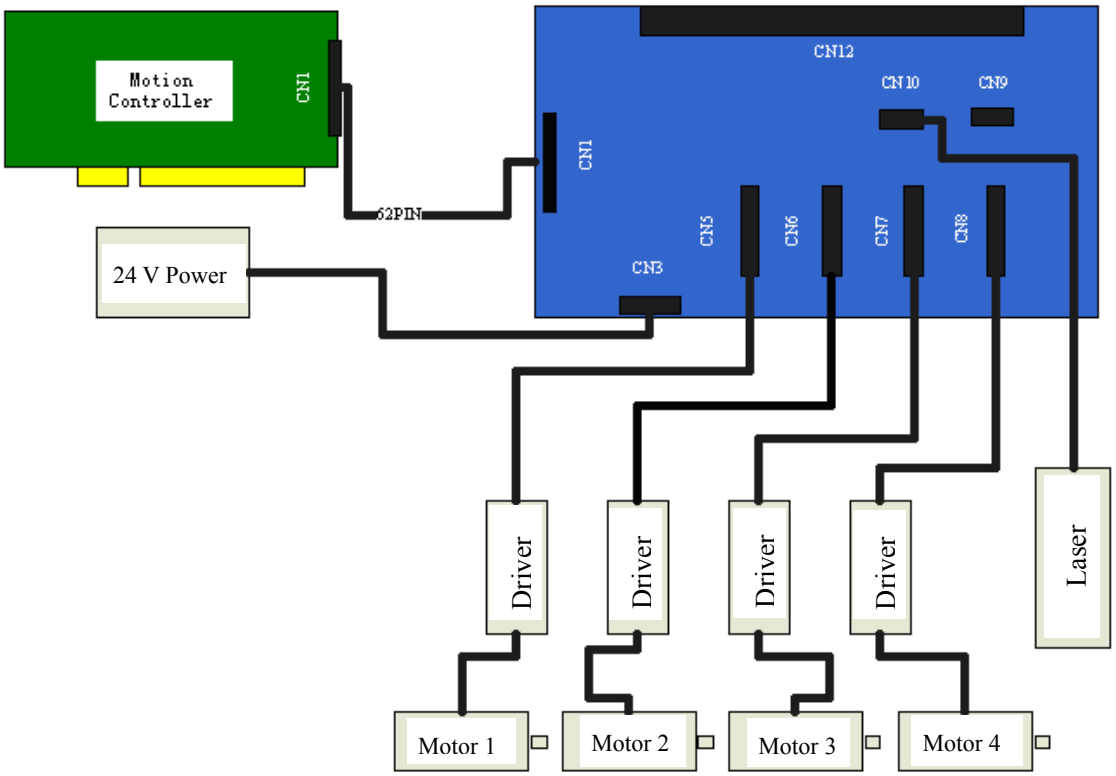


Figure 1-2 Control System with GE-400-SX-LASER Motion Controller

The typical connection of GE-400-SX-SF Motion Controller can be seen in Figure 1-3.

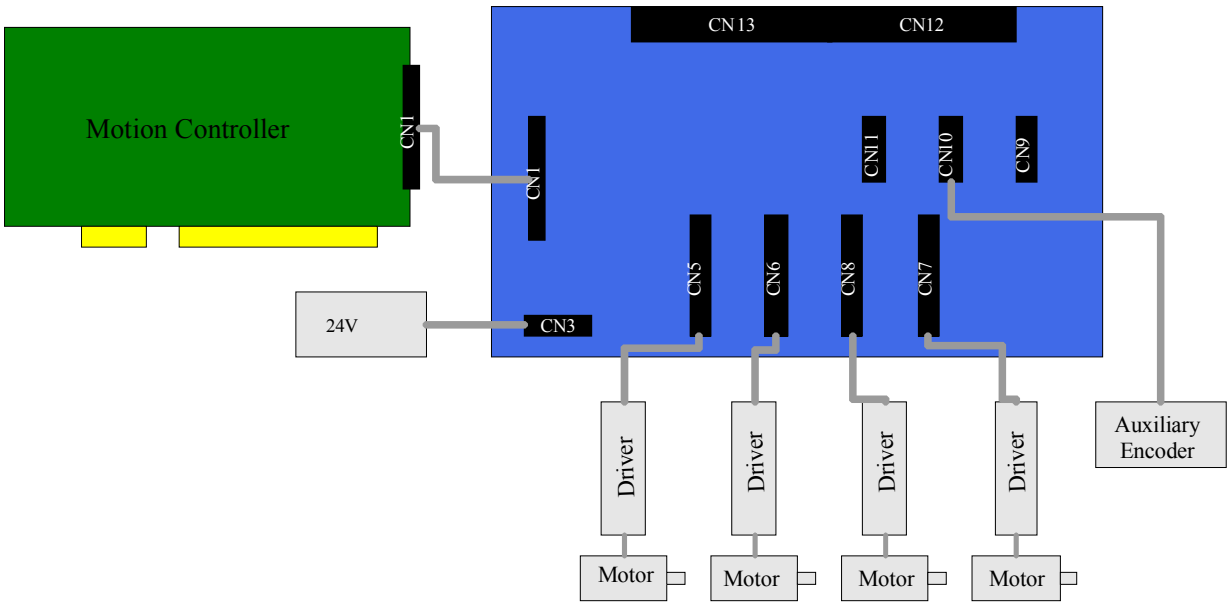


Figure 1-3 Control System with GE-400-SX-SF Motion Controller

Chapter 2 Quick Start

2.1 Open for Checkup

Before the package is opened, please check whether the product model indicating on the package is consistent with your order. After the package is opened, please check firstly whether the surface of the motion controller has mechanical damage and then check carefully whether all the accessories are submitted following the package list or the order contract.

If the surface of motion controller is damaged or the product is not complied, please do not use and immediately contact with Googol Technology or the product suppliers.

Product list of GE-S Series Motion Controller:

- One GE-S series controller, one terminal board (ACC);
- One 62 PIN cable;
- Two fusing resistors, two screws, one antistatic glove;
- One warranty card, One product CD

Notice	To prevent the motion controller from static damage, please touch the effectively grounded metal object to release the static charge carried by the body before contact with the controller circuit or plug/unplug the controller, and wear the anti-static gloves.

2.2 Overall Structure of GE-S Series Motion Controller

The overall structure of GE-S Series Motion Controller is showed in Figure 2-1.

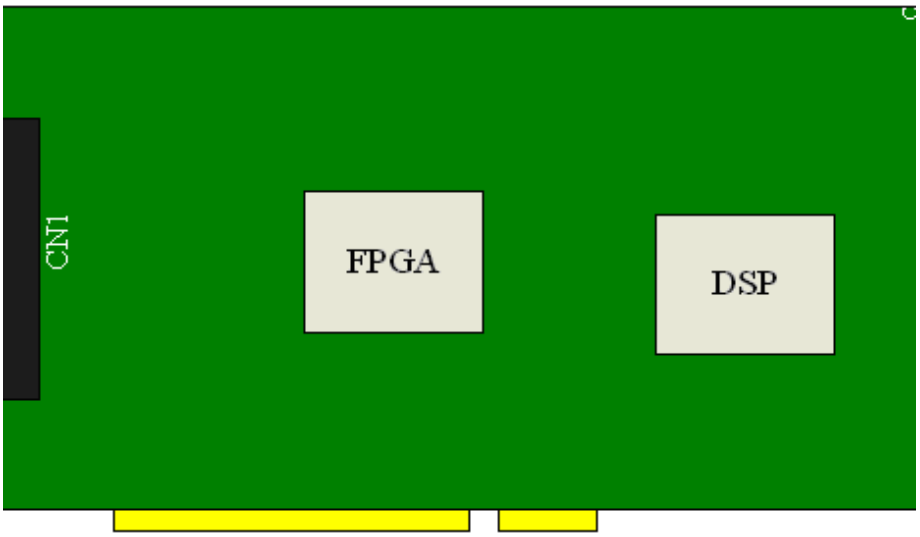


Figure 2-1 Schematic Diagram of the Structure of GE-S Motion Controller

The terminal interface of **GE-X00-SX-DM/ENG/LASER** Motion Controller is showed in Figure 2-2.

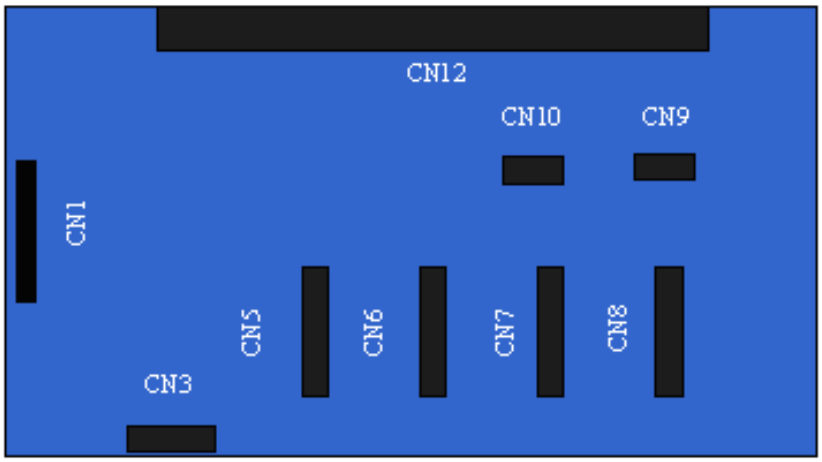


Figure 2-2 Schematic Diagram of Terminal Interface of GE-X00-SX-DM/ENG/LASER

The terminal interface of **GE-400-SX-SF** Motion Controller is showed in Figure 2-3.

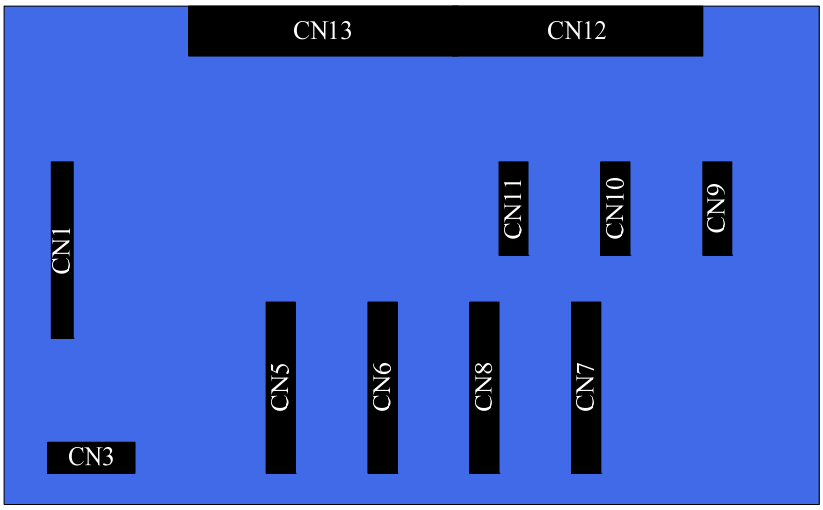


Figure 2-3 Schematic Diagram of Terminal Interface of GE-400-SX-SF

The definitions of terminal interface for GE-S Series Motion Controllers are showed in the following tables from Table 2-1 to Table 2-4.

Table 2-1 Definition of Terminal Interface of GE-300-SG-DM Motion Controller

Channel	Definition
CN1	Connection to Motion Controller
CN3	24 V external power interface
CN5	X-axis interface
CN6	Y-axis interface
CN7	Z-axis interface
CN8	Reserved
CN9	Reserved
CN10	Reserved
CN12	Special I/O interface General I/O interface

Table 2-2 Definition of Terminal Interface of GE-300-SG-ENG Motion Controller

Channel	Definition
CN1	Connection to Motion Controller
CN3	24 V external power interface
CN5	Current axis interface (X-axis)
CN6	Current axis interface (Y-axis)
CN7	Current axis interface (Z-axis)
CN8	Handwheel interface
CN9	Reserved
CN10	Reserved
CN12	Special I/O interface General I/O interface

Table 2-3 Definition of Terminal Interface of GE-400-SX-LASER Motion Controller

Channel	Definition
CN1	Connection to Motion Controller
CN3	24 V external power interface
CN5	Current axis interface (X-axis)
CN6	Current axis interface (Y-axis)
CN7	Current axis interface (Z-axis)
CN8	Current axis interface (A-axis)
CN9	Reserved
CN10	Laser control interface
CN12	Special I/O interface General I/O interface

Table 2-4 Definition of Terminal Interface of GE-400-SX-SF Motion Controller

Channel	Definition
CN1	Connection to Motion Controller
CN3	24 V external power interface
CN5	Current axis interface (X-axis)
CN6	Current axis interface (Y-axis)
CN7	Current axis interface (Z-axis)
CN8	Current axis interface (A-axis)
CN9	Extend module interface
CN10	Auxiliary encoder interface
CN11	High-speed I/O interface
CN12	Special I/O interface General I/O interface

The terminal board is connected with the motion controller by the 62 PIN cable with the interface of CN1.

2.3 Installation Procedures

Please setup the control system according to the following steps:

2.3.1 Step 1: Insert the Control System into the Computer

Please be careful to handle. To prevent the motion controller from static damage, please touch the effectively grounded metal object before contact with the controller circuit or plug/unplug the controller, and wear the anti-static gloves.

1. Close the power of computer.
2. Open the computer case, select a free PCI slot and remove the baffle of this slot with screwdriver.
3. Insert the motion controller into this slot firmly.
4. Tighten the screw on it.
5. Close the computer case, open the power of PC and start the computer.

2.3.2 Step 2: Install the Drivers of Motion Controller (only for Windows OS)

1. After the hardware has been installed and the computer has been started, Windows Operation System will detect the motion controller automatically and start “Add New Hardware Wizard”. In the wizard, click “Next”.
2. In the prompt of “What do you want Windows to do?” select “Search the device driver (recommended)” and click “Next”
3. Put the product CD into the CD-ROM.
4. Select “Specified Location”, use “Browse” to select the dictionary of your operation system in “CD-ROM:\Windows\Setup:”
5. Follow “Add New Hardware Wizard” and click “Next” until the installation is finished.
6. Check the device attributes of computer system and there will be a new device of “GoogolTech” controller.

2.3.3 Step 3: Establish the Communication between the Host and the Motion Controller

If there is a prompt of “communication successful “, the user can run the system. Otherwise, refer to *“Appendix D: Troubleshooting”* to find the problems and re-test after the troubleshooting. If necessary, contact with Googol Technology by the approaches on the manual cover.

2.3.4 Step 4: Connect the Motor with the Driver

Notice	It is suggested to remove the motor from the load when you use the card firstly for the safety. Don't connect the motor with any mechanical device before the installation and debug of control system has been finished. Only after the parameters of the card and the driver can be adjusted to control the motor, then the system can be connected, or else it may result in serious results.

Connect the driver with the motor before it is connected with the motion controller. Please read the instruction of driver and connect it rightly. Test the drive and the motor according to the instruction of driver and ensure the normal work.

2.3.5 Step 5: Connect the Motion Controller with the Terminal Board

Notice	Understand the interface signals of motion controller and the interface definition of motor drive carefully. Connect properly and avoid plugging/unplugging the interface in live working. Otherwise, the system can not work due to the positive feedback of system and the damage of hardware resulted by the signal connection error or the live working.

Close the power of computer and take out the accessory 62 PIN shielded cable. Connect CN1 on the motion controller with CN1 on the terminal controller board.

2.3.6 Step 6: Connect the Driver, System I/O with the Terminal Board

(1) Connect the power of terminal board

CN3 on the terminal board is connected with the external power provided by the user. The port marked with +24 V on the board is connected with +24V. The port marked with OGND is connected with the external power ground. As for the voltage value of external power supply, it depends on the external sensors and the power requirements of the actuators. The power supply should be selected according to the actual requirements (default as 24 V, 3A). The connection can be seen in Figure 2-4.

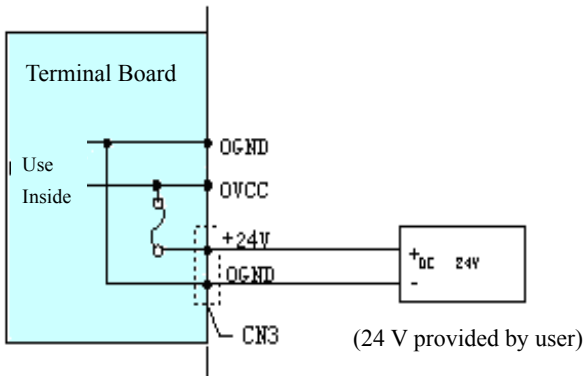


Figure 2-4 Connection of Terminal Board Power

(2) Connection of special input and special output

Special input include: drive alarm signal, home signal and limit signal. The special inputs are connected with the driver and external switch by CN5 (CN6, CN7) and CN12 on the terminal board. The definition of CN5 can be seen in Table 2-5. The definition of CN12 can be seen in Table 2-6.

Special output include: drive enable and drive alarm reset. The special outputs are connected with the driver by CN5, CN6 and CN7 on the terminal board. CN5 is corresponding to 1-axis. CN6

is corresponding to 2-axis. CN7 is corresponding to 3-axis. The pin definition of CN5～CN7 is same as seen in Table 2-5. The usage of these signals is determined by the requirement of the driver.

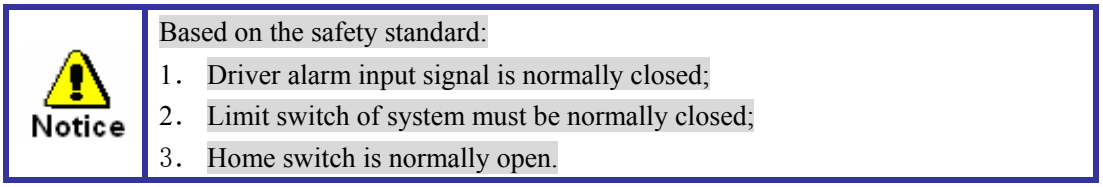


Table 2-5 Pin Definition of Control Interface CN5 (CN6, CN7) on Terminal Board

Pin	Signal	Description	Pin	Signal	Description
1	OGND	External power ground	14	OVCC	+24V output
2	ALM	Drive alarm	15	RESET	Reset driver
3	ENABLE	Drive enable signal	16	Reserved	Reserved
4	A-	Encoder input of A-	17	A+	Encoder input of A+
5	B-	Encoder input of B-	18	B+	Encoder input of B+
6	C-	Encoder input of C-	19	C+	Encoder input of C+
7	+5V	+5V power output	20	GND	Digital ground
8	Reserved	Reserved	21	Reserved	Reserved
9	DIR+	Step direction output	22	DIR-	Step direction output
10	GND	Digital ground	23	PULSE+	Step pulse output
11	PULSE-	Step pulse output	24	GND	Digital ground
12	Reserved	Reserved	25	Reserved	Reserved
13	GND	Digital ground			

Table 2-6 Pin Definition of General/Special Input/output Interface CN12 on Terminal Board

Pin	Signal	Description
1	EXI0	General input 1-channel
2	EXI1	General input 2-channel
3	EXI2	General input 3-channel
4	EXI3	General input 4-channel
5	EXI4	General input 5-channel
6	EXI5	General input 6-channel
7	EXI6	General input 7-channel
8	EXI7	General input 8-channel
9	EXI8	General input 9-channel
10	EXI9	General input 10-channel
11	EXI10	General input 11-channel
12	EXI11	General input 12-channel
13	EXI12	General input 13-channel
14	EXI13	General input 14-channel
15	EXI14	General input 15-channel
16	EXI15	General input 16-channel

17	HOME0	Home input of 1-axis
18	HOME1	Home input of 2-axis
19	HOME2	Home input of 3-axis
20	HOME3	Home input of 4-axis
21	LIMIT0+	Positive limit of 1-axis
22	LIMIT0-	Negative limit of 1-axis
23	LIMIT1+	Positive limit of 2-axis
24	LIMIT1-	Negative limit of 2-axis
25	LIMIT2+	Positive limit of 3-axis
26	LIMIT2-	Negative limit of 3-axis
27	LIMIT3+	Positive limit of 4-axis
28	LIMIT3-	Negative limit of 4-axis
29	EEO0	General output 1-channel
30	EEO1	General output 2-channel
31	EEO2	General output 3-channel
32	EEO3	General output 4-channel
33	EEO4	General output 5-channel
34	EEO5	General output 6-channel
35	EEO6	General output 7-channel
36	EEO7	General output 8-channel
37	EEO8	General output 9-channel
38	EEO9	General output 10-channel
39	EEO10	General output 11-channel
40	EEO11	General output 12-channel
41	EEO12	General output 13-channel
42	EEO13	General output 14-channel
43	EEO14	General output 15-channel
44	EEO15	General output 16-channel
45	+24V	+24V output
46	OGND	External power ground
47	+24V	+24V output
48	OGND	External power ground

For **GE-300-SG-DM** Motion Controller, other interfaces CN8, CN9 and CN10 are reserved.

For **GE-300-SG-ENG** Motion Controller, CN9 and CN10 are reserved; CN8 is handwheel interface which definition can be seen in Table 2-7.

Table 2-7 Pin Definition of Handwheel Interface CN8 on Terminal Board of GE-300-SG-ENG

Pin	Signal	Description	Pin	Signal	Description
4	A-	Encoder input of A-	17	A+	Encoder input of A+
5	B-	Encoder input of B-	18	B+	Encoder input of B+
6	C-	Encoder input of C-	19	C+	Encoder input of C+
7	+5V	+5V power output	20	GND	Digital ground

For **GE-400-SX-LASER** Motion Controller, CN9 is reserved, CN8 is the control interface of 4-axis which interface definition is same with CN5 (CN6, CN7) in Table 2-5. CN10 is laser control interface which definition can be seen in Table 2-8.

Table 2-8 Pin Definition of Laser Control Interface CN10 on Terminal Board of GE-400-SX-LASER

Pin	Signal	Description	Pin	Signal	Description
1	LASER+	Default as laser switch control signal. (also can be used to enable signal output of CO_2 Radio Frequency Tube） Low level after reset.	6	LASER-	Same to LASER+ (inverted output). High level after reset.
2	PWM1+	Laser power control signal (Duty Ratio output or Frequency output, default as Duty Ratio output) (1^{st} channel). Low level after reset.	7	PWM1-	Same to PWM1+ (inverted output). High level after reset.
3	PWM2+	Laser power control signal (Duty Ratio output or Frequency output, default as Duty Ratio output) (2^{nd} channel). Low level after reset.	8	PWM2-	Same to PWM2+ (inverted output). High level after reset.
4	DA1	Laser power control signal, 1^{st} channel. 0 V after reset.	9	GND	Digital ground
5	DA2	Laser power control signal, 2^{nd} channel. 0 V after reset.			

For **GE-400-SX-SF** Motion Controller, CN9 is extended module interface; CN10 is auxiliary encoder interface which pin definition can be seen in Table 2-9.

Table 2-9 Pin Definition of Handwheel Control Interface CN10 on Terminal Board of GE-400-SX-SF

Pin	Signal	Description	Pin	Signal	Description
1	A+	Encoder input	6	A-	Encoder input
2	B+	Encoder input	7	B-	Encoder input
3	C+	Encoder input	8	C-	Encoder input
4	Reserved	Reserved	9	GND	Digital ground
5	+5V	Power output			

The circuit diagram of special input/output signal described in Table 2-5 and Table 2-6 can be seen in Figure 2-5. The electrical definition of the input/output signals must be understood before the implement of accurate connection.

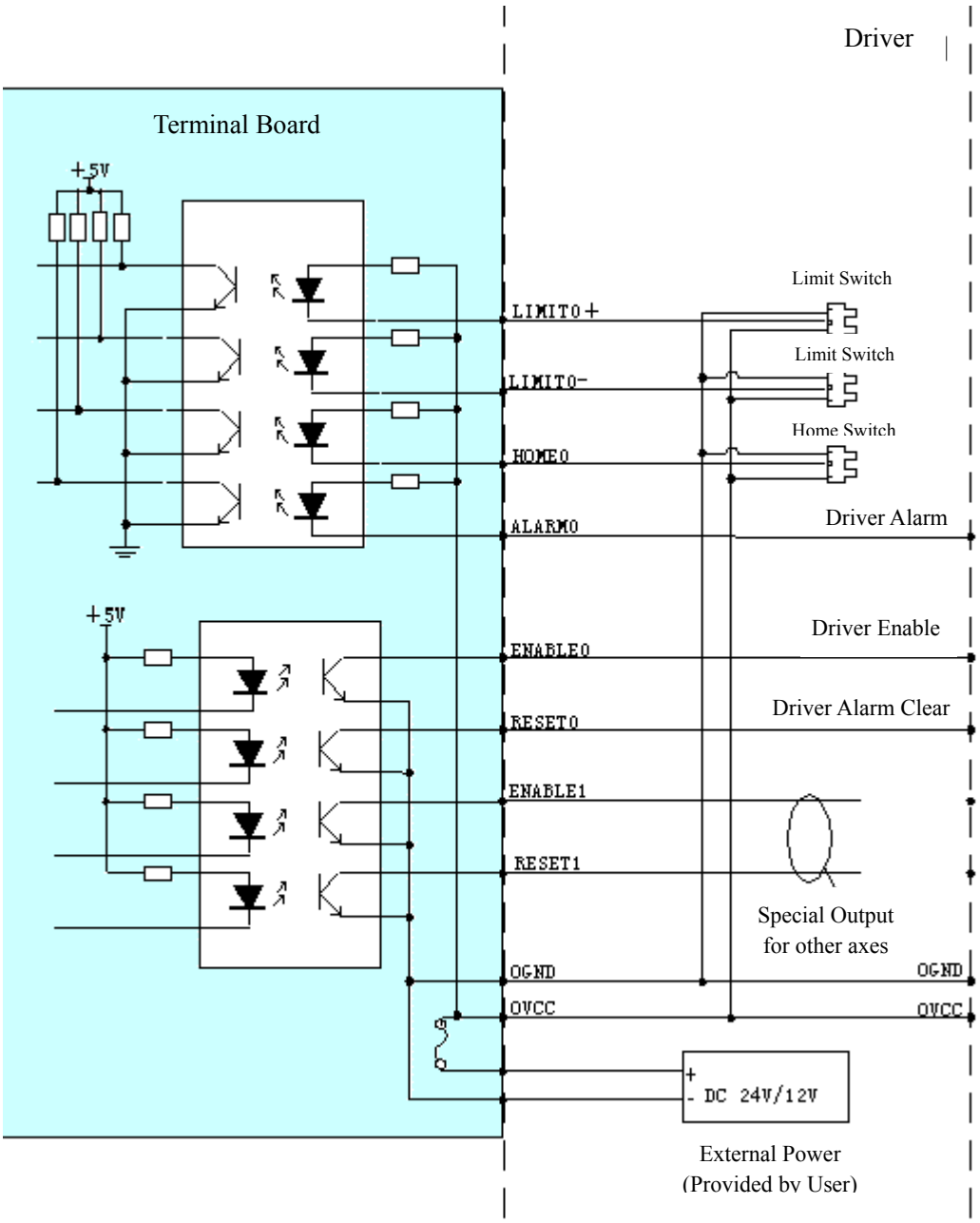


Figure 2-5 Circuit Diagram of Special Input/Output Signal

(3) Connection of Control Output Signal

For GE-X00-SG-XXX Motion Controller, it only can be used in pulse output mode. By default, each current axis outputs the value of pulse.

For GE-X00-SV-XXX Motion Controller, it can be used in pulse output mode or analog output mode. By default, each current axis outputs the value of analog. When it is used to control the step motor (or the servo motor is controlled by position mode), the output of current axis can be set as pulse output with the output setting command GT_CtrlMode(1) provided by the controller system.

a. Connection of Pulse Output

There are two modes of pulse output. One is pulse + direction mode, and the other is positive/negative pulse mode. The pulse + direction mode of output is defaulted. The command

GT_StepPulse can be called to switch to positive/negative pulse mode, and the command GT_StepDir also can be called to switch to pulse + direction mode.

The pulse + direction output signal is outputted by the pins 9, 22, 23, 11 of CN5 (CN6, CN7) in the motion controller. GND is the pin of digital ground.

In pulse + direction output mode, the pins 23 and 11 output the differential pulse control signal, and the pins 9 and 22 output the differential motion direction control signal.

In positive/negative pulse mode, the pins 9 and 22 output the differential forward pulse control signal, and the pins 23 and 11 output the differential reverse pulse control signal.

If the drive doesn't need the differential signal, connect the signal to the positive port of differential signal output (pin 9 and 23), and the negative port is disconnected. The signal connection of pulse control output is showed in Figure 2-6. The output wave of different pulse direction is showed in Figure 2-7.

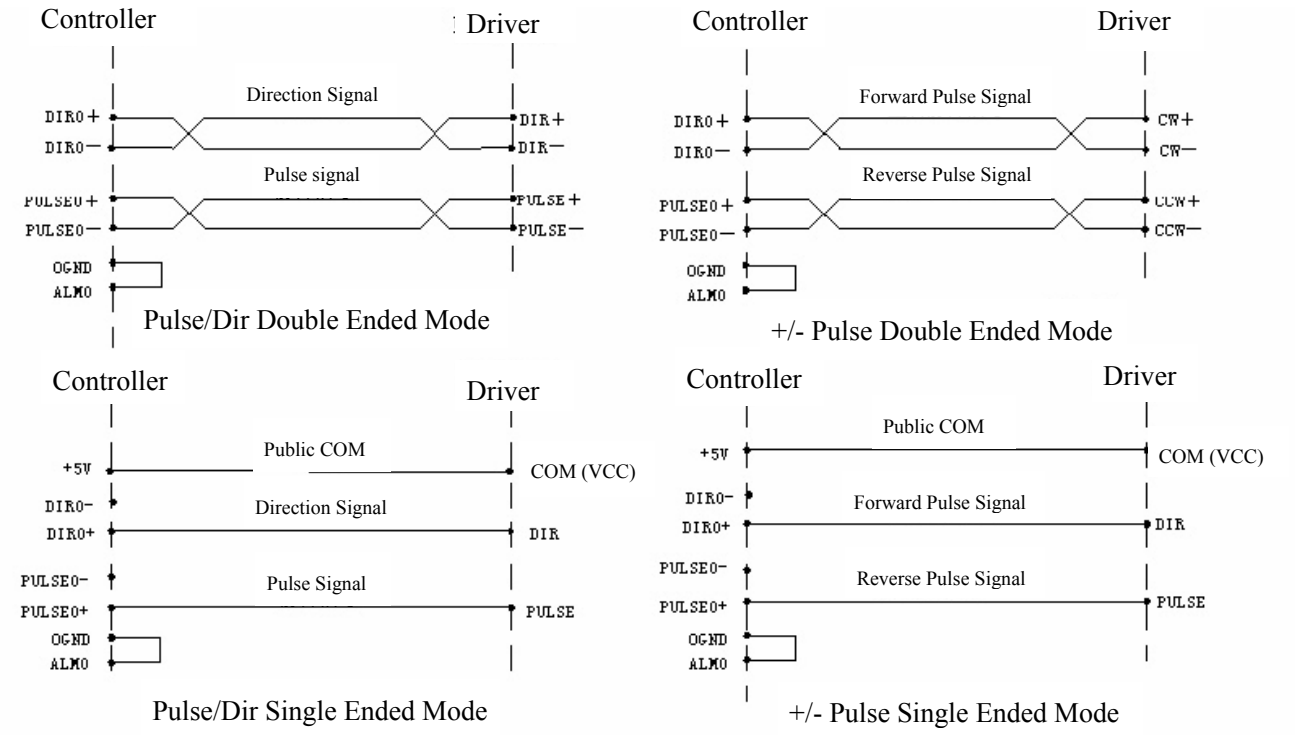


Figure 2-6 Signal Connection of Pulse Control Output

Output Mode	Pin	Positive	Negative
-Pulse + +Pulse	23-11 9-22		
Pulse + Direction	23-11 9-22		

Figure 2-7 Output Wave of Different Pulse Direction

b. Connection of analog output

The analog output is outputted by Pin 8 of CN5 (CN6, CN7). The reference ground is digital ground. The pin definition of CN5 (CN6, CN7) can be seen in Table 2-5. The electrical connection can be seen in Figure 2-8.

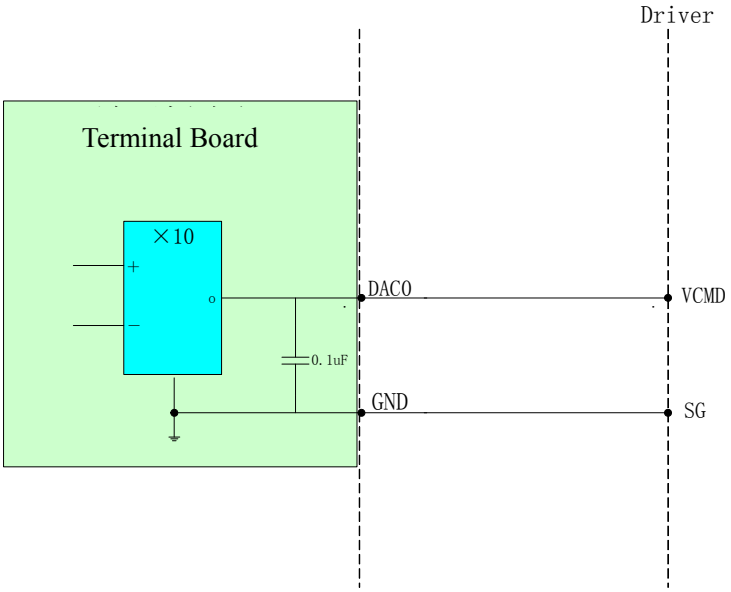


Figure 2-8 Electrical Connection of Analog Output

(4) Connection of General Digital Input/Output

The general digital input is connected by CN12 on terminal board. The pin definition of CN12 can be seen in Table 2-6 and its connection can be seen in Figure 2-9.

The general digital output is connected by CN12 on terminal board. The pin definition of CN12 can be seen in Table 2-6 and its connection can be seen in Figure 2-9. The power supply of general output can be led from CN12.

Prompt	When the general I/O output is connected with the inductive load, it should be considered to connect the diode for discharging the counter Electromotive Force.

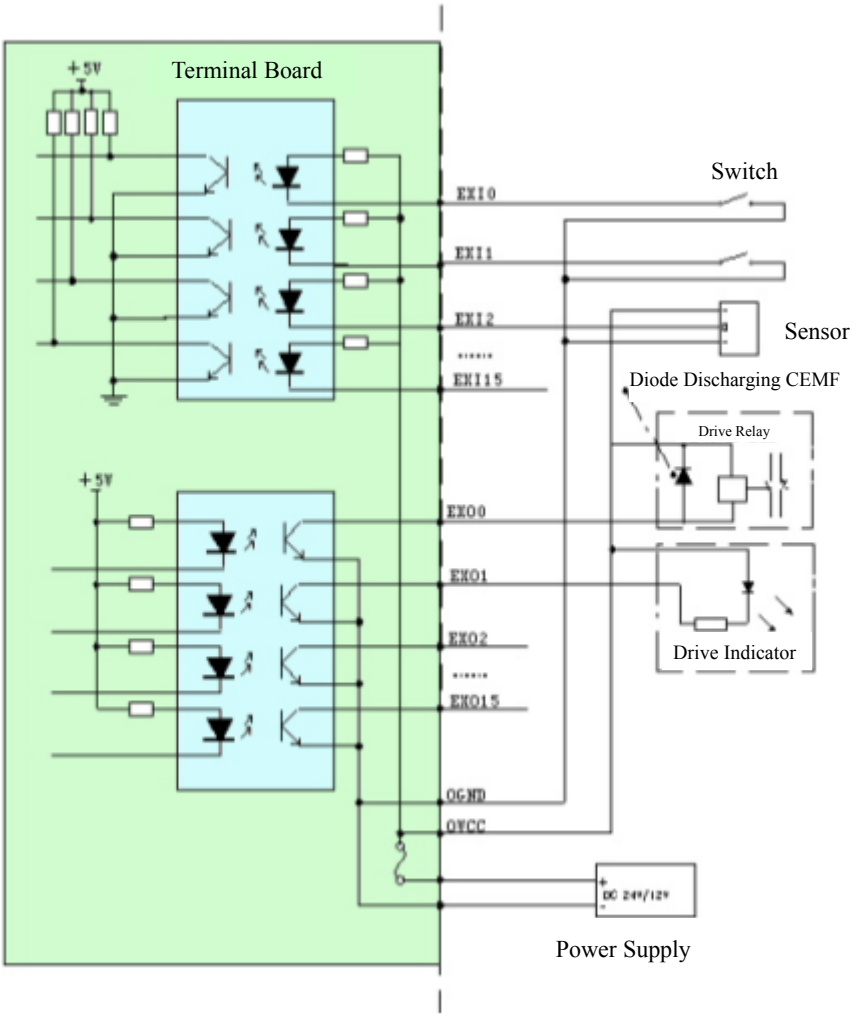


Figure 2-9 Connection of General Input/Output Signal

Chapter 3 System Debug

The system debug can be done by simple commands after the system hardware has been set and connected properly. In system debug, the correction of system wiring and the normal working of control system can be confirmed, and some simple trajectory can be implemented.

 Notice	It is suggested that the motor is disconnected with any mechanical device in the process of system debug for the safety. Please check the motor without any load. Close the laser output or turn off the laser power in system debug for avoiding any accidents.

Appendix A Technical Specification

Electrical Specification of GE-S Series Motion Controller

Bus

PCI

Control Cycle

200 μs

Pulse Output

Number of axis: 3/4 axes
Maximum Frequency: 256 KHz/1 MHz
Level Standard: TTL
Drive Capability: 30 mA
Duty ratio: 50 %
Nonlinear: <1 %
Reset level: low level

Analog Output

Output Range: -10V ~ +10V
Resolution: 16 bit

Encoder Input

Signal Standard: TTL-compatible quadrature signal of A and B
Input Mode: double ended or single ended input. The standard is double ended input.
（Note: If single ended input is used by the user, please contact with Googol Technology.）
Maximum Frequency: 4 MHz

I/O:56 channels, TTL-compatible, no Pull-up Resistance

Special Input:	LIMIT	(Positive)	4 channels
	LIMIT	（Negative）	4 channels
	HOME	（Home）	4 channels

General Input: 16 channels
General Output: 16 channels
Drive Capability: Maximum 30 mA

Optical Coupler I/O

Input:

Isolation Voltage: 5000 V RMS
Input Voltage: +24 V DC
Input Current: 3.7 mA ～ 7.6 mA
Transfer Lag: H→L 5 μs
L→H 3 μs

Output:

Isolation Voltage: 5000 V RMS
Collector-Open-Circuit Output, no Pull-up Resistance
$V_{ceo} \leq 50$ V
$V_{eco} \leq 5$ V
$I_c \leq 30$ mA
Average Output Delay: 8 μs

Duty Ratio Output (GE-400-SX-LASER, Laser Power Control)

Level Standard: TTL
Duty Ratio Range: 0-100 % (512 grades)
Drive Capability: Maximum 30 mA
Reset Level: Low level

Analog Output (GE-400-SX-LASER, Laser Power Control)

Output Range: 0 V ~ +5 V (4096 grades)
Resolution: 12 bit
Reset Status: 0 V

Laser Switch Output (GE-400-SX-LASER)

Level Standard: TTL
Drive Capability: Maximum 30 mA
Reset Level: Low level

Power Supply

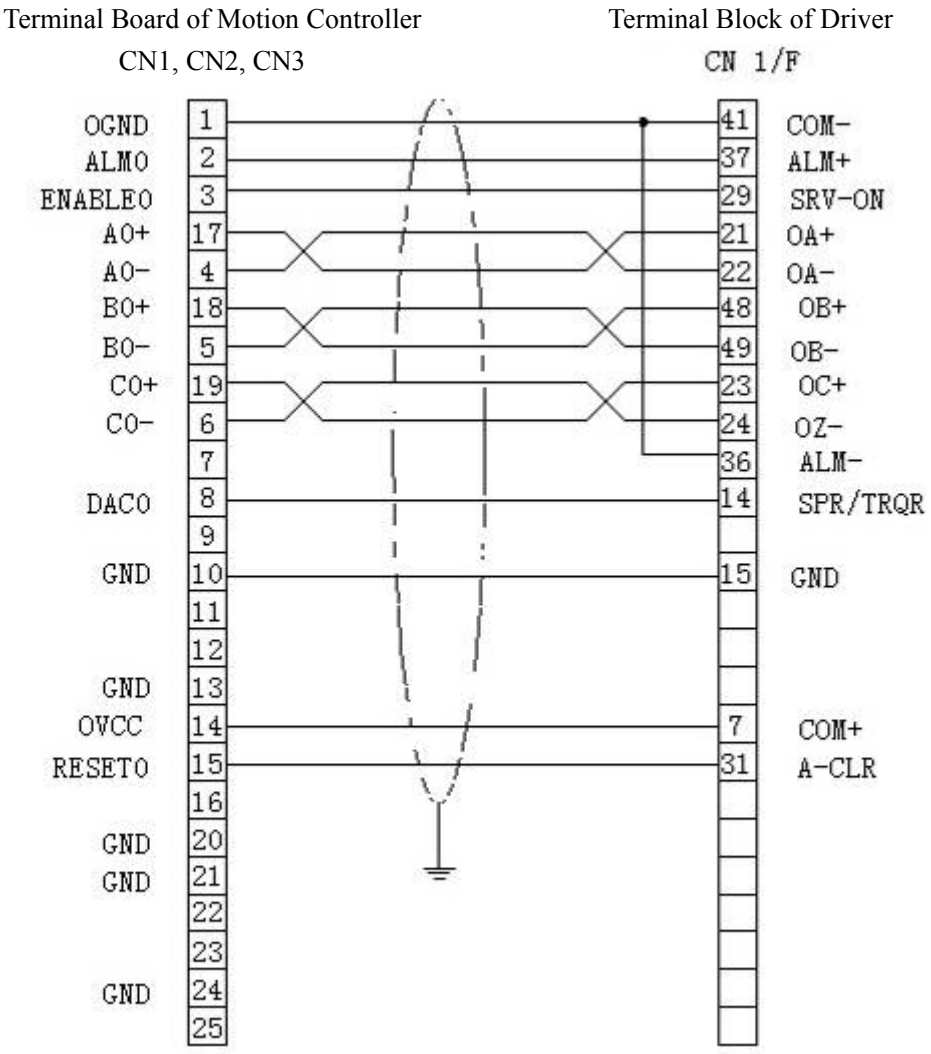
Voltage: 24 V
Current: 3 A above

Dimension

122 mm×185 mm

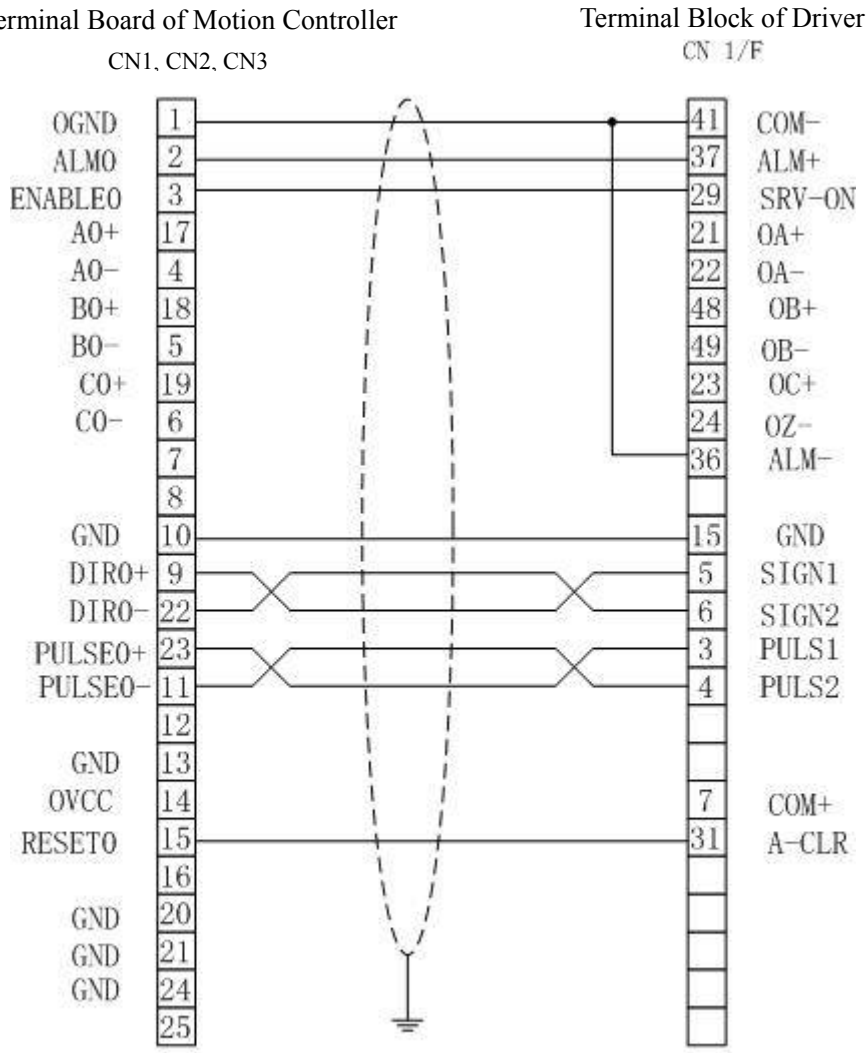
Appendix B Typical Wiring

B.1 Wiring with Panasonic MSDA Series Driver in Velocity Control Mode



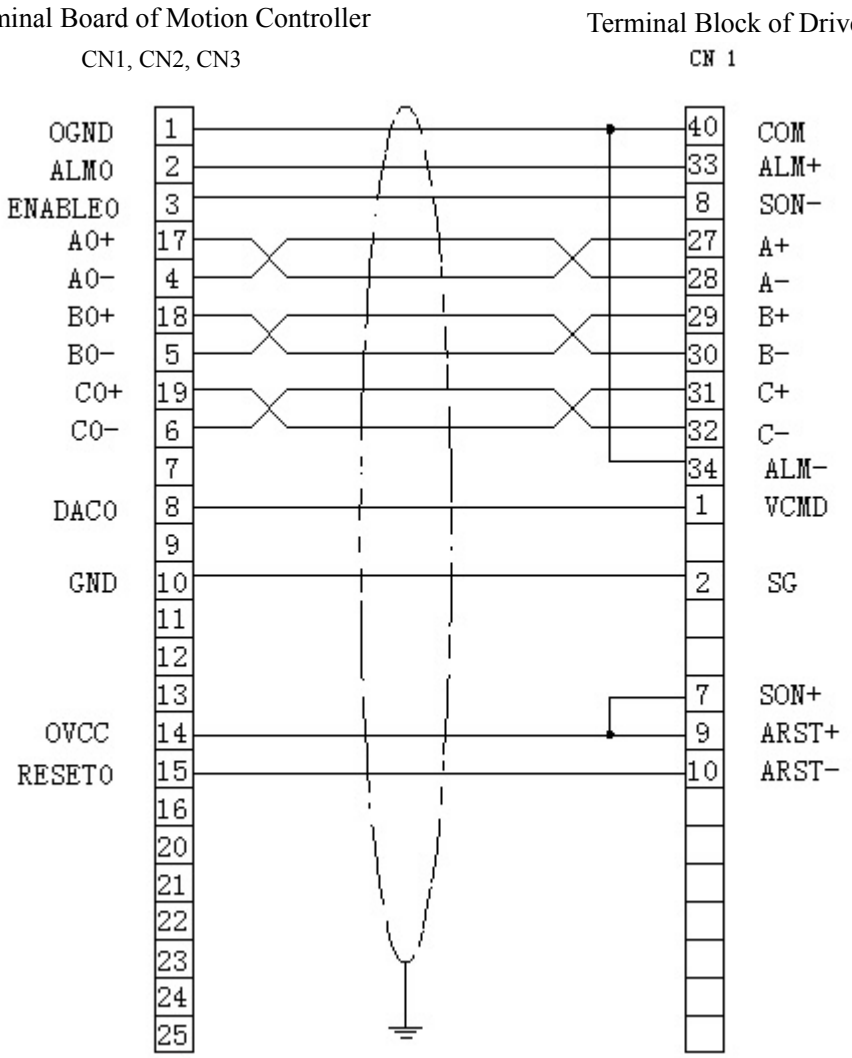
Panasonic MSDA Series Driver in Velocity Control Mode

B. 2 Wiring with Panasonic MSDA Series Driver in Position Control Mode



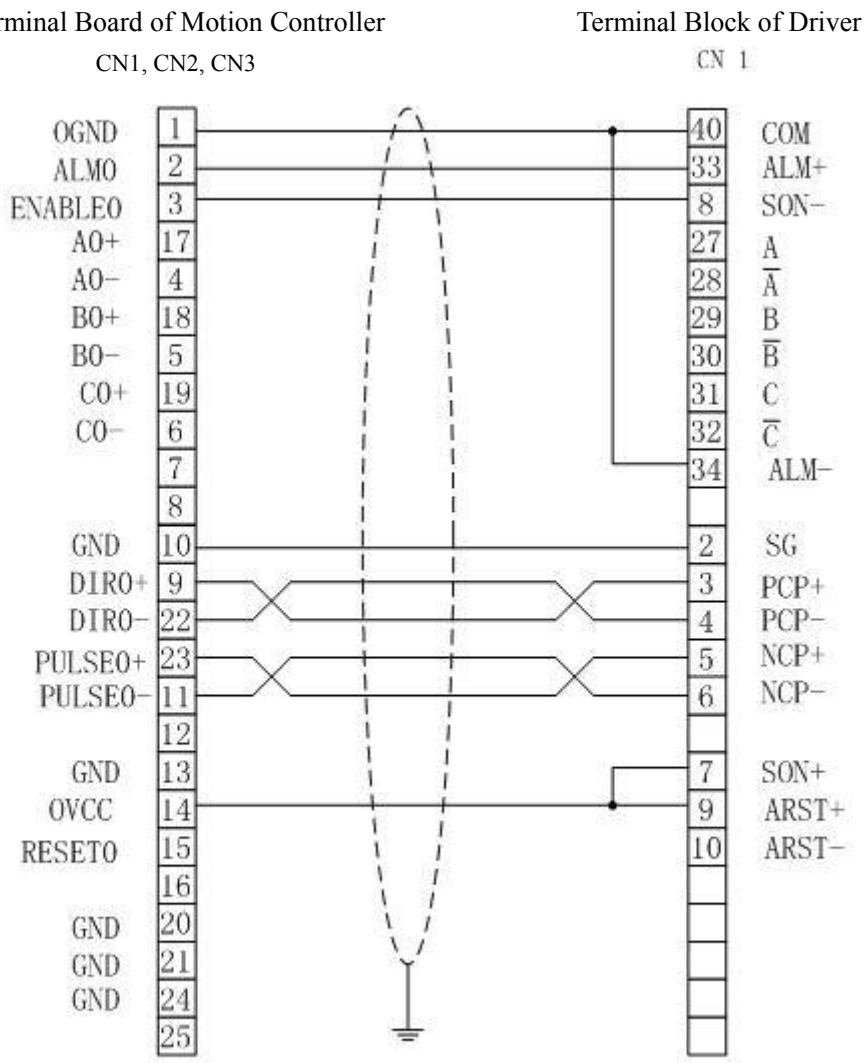
Panasonic MSDA Series Driver in Position Control Mode

B. 3 Wiring with SANYO DENKI PV1 Series Driver in Velocity Control Mode



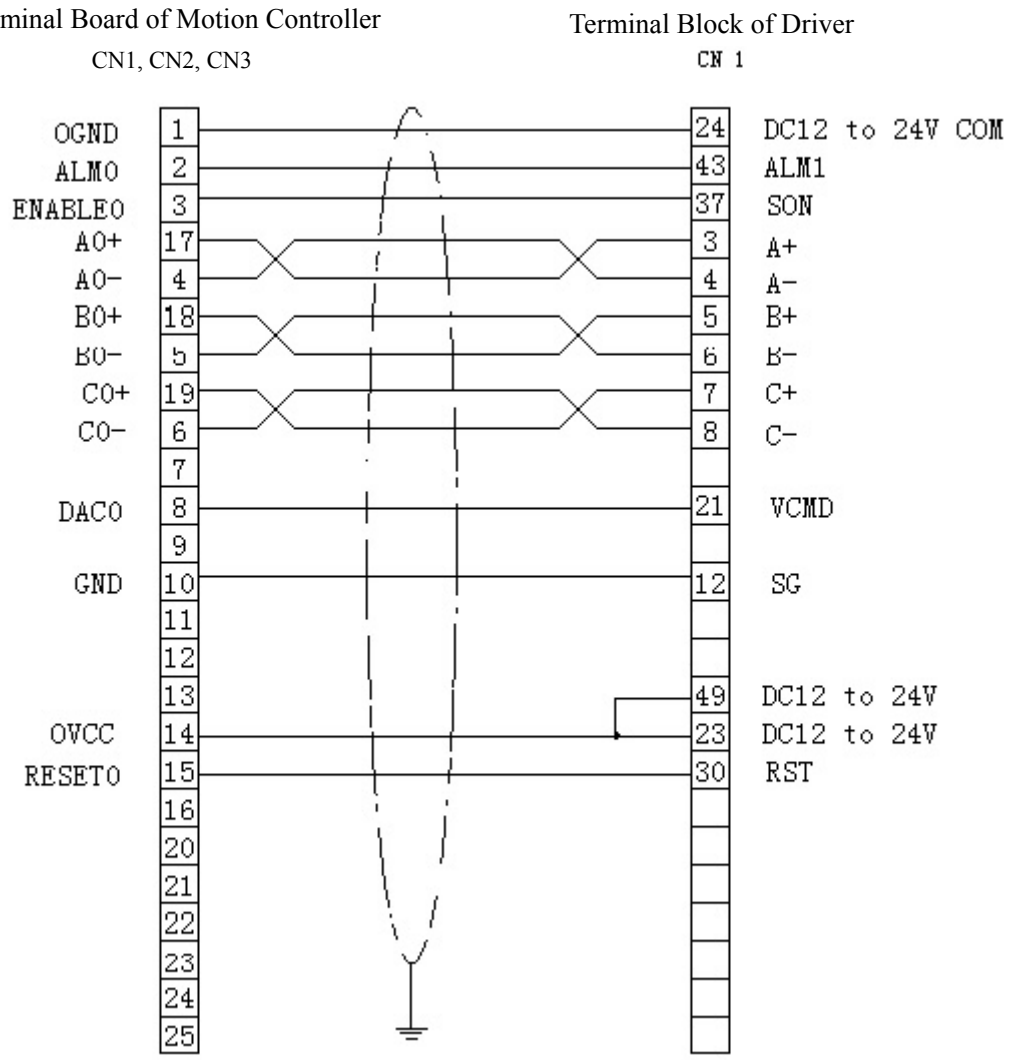
SANYO DENKI PV1 Series Driver in Velocity Control Mode

B. 4 Wiring with SANYO DENKI PV1 Series Driver in Position Control Mode



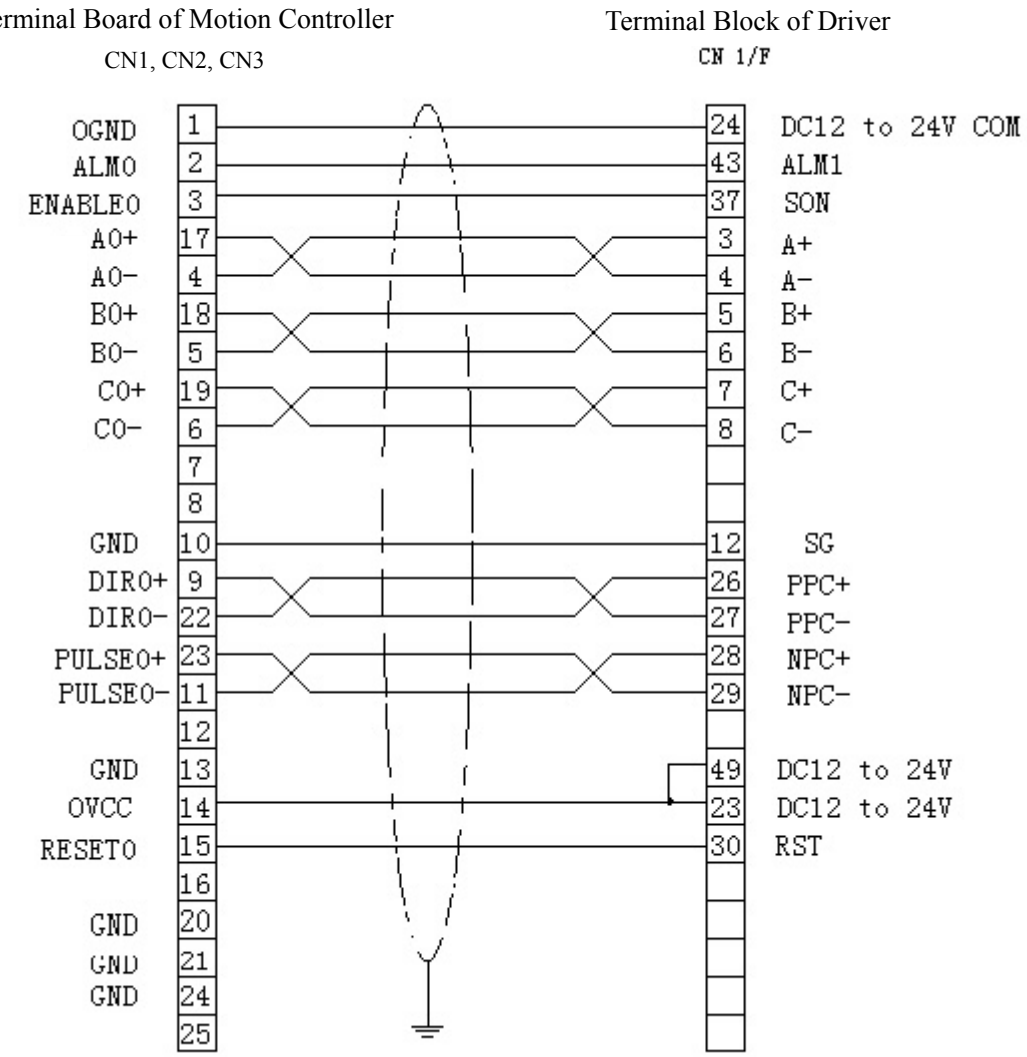
SANYO DENKI PV1 Series Driver in Position Control Mode

B. 5 Wiring with SANYO DENKI PY0/PY2 Series Driver in Velocity Control Mode



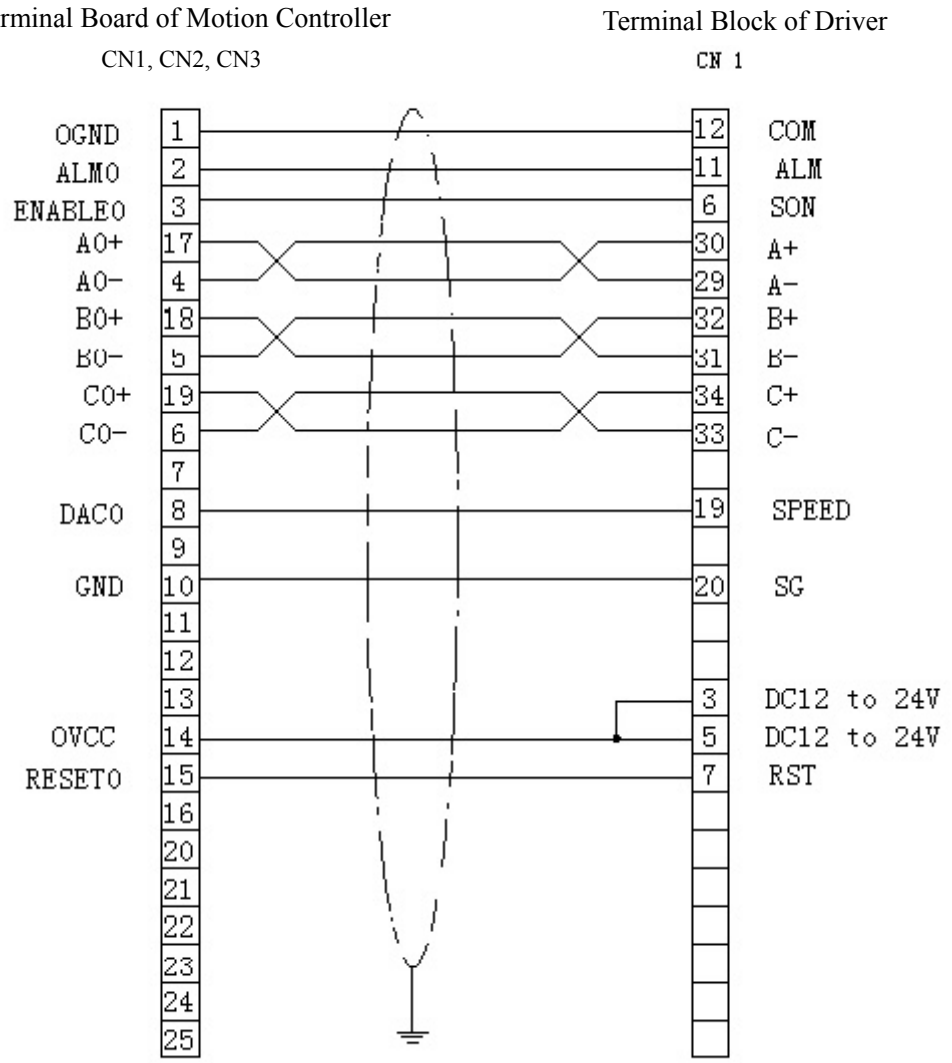
SANYO DENKI PY0/PY2 Series Driver in Velocity Control Mode

B.6 Wiring with SANYO DENKI PY0/PY2 Series Driver in Position Control Mode



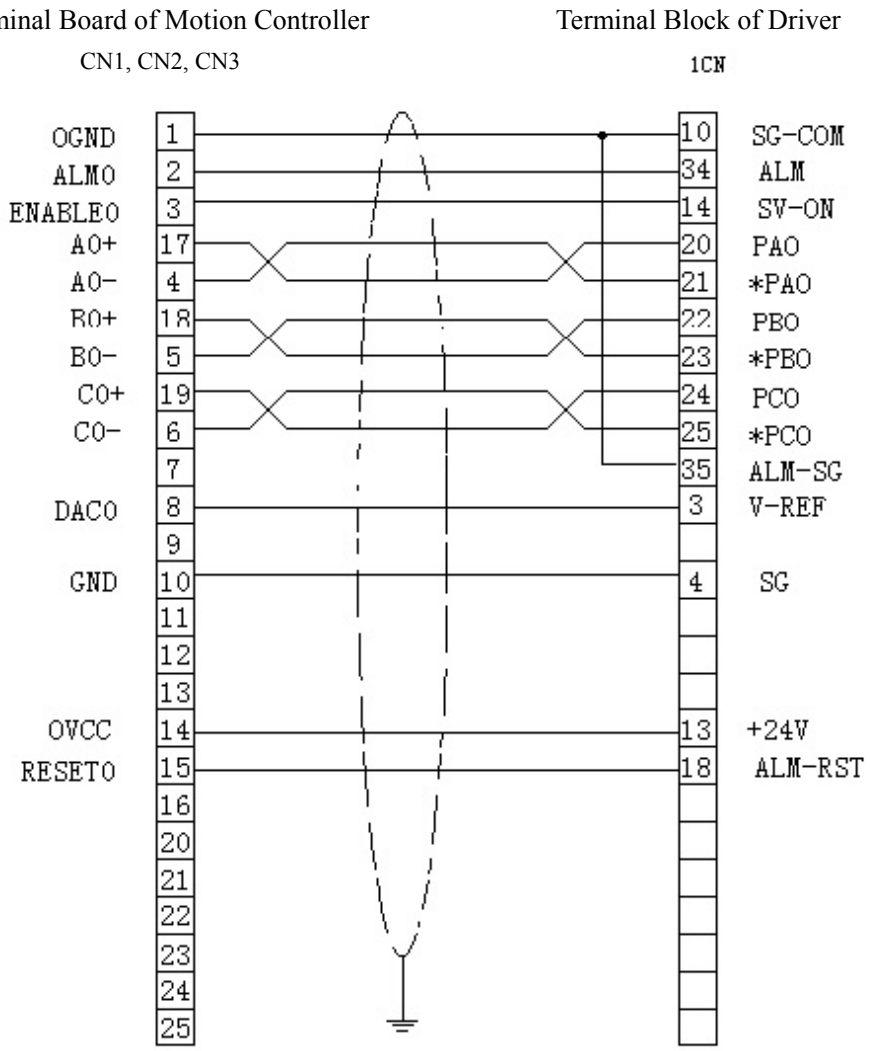
SANYO DENKI PY0/PY2 Series Driver in Position Control Mode

B. 7 Wiring with SANYO DENKI PU Series Driver in Velocity Control Mode



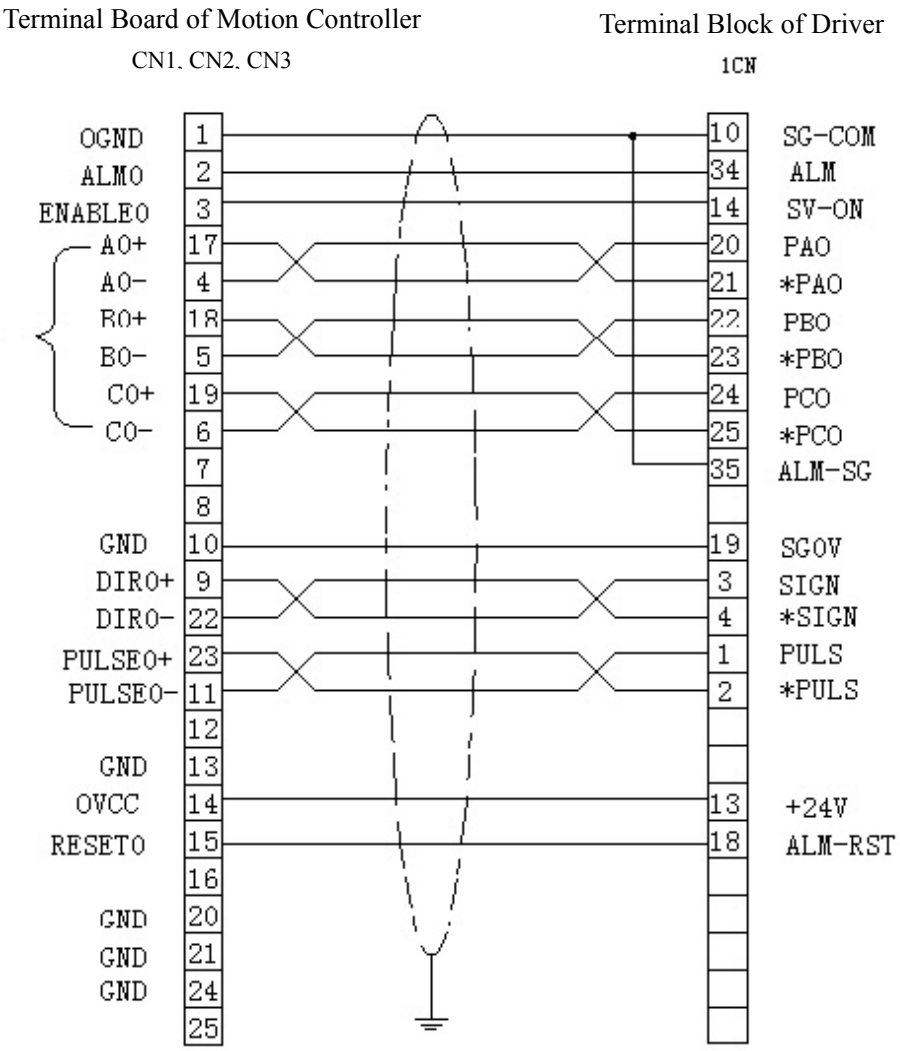
SANYO DENKI PU Series Driver in Velocity Control Mode

B.8 Wiring with YASKAWA SERVOPACK Series Driver in Velocity/Moment Control Mode



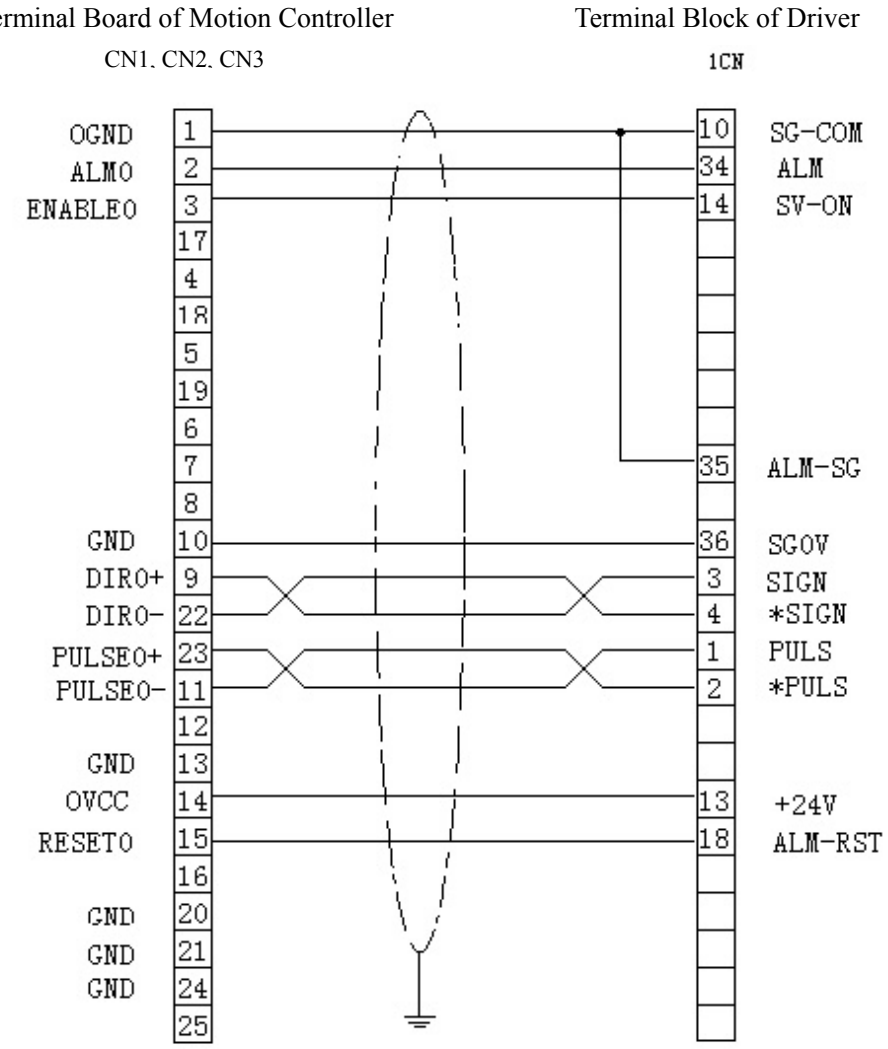
YASKAWA SERVOPACK Series Driver in Velocity/Moment Control Mode

B.9 Wiring with YASKAWA SERVOPACK Series Driver in Position Control Mode



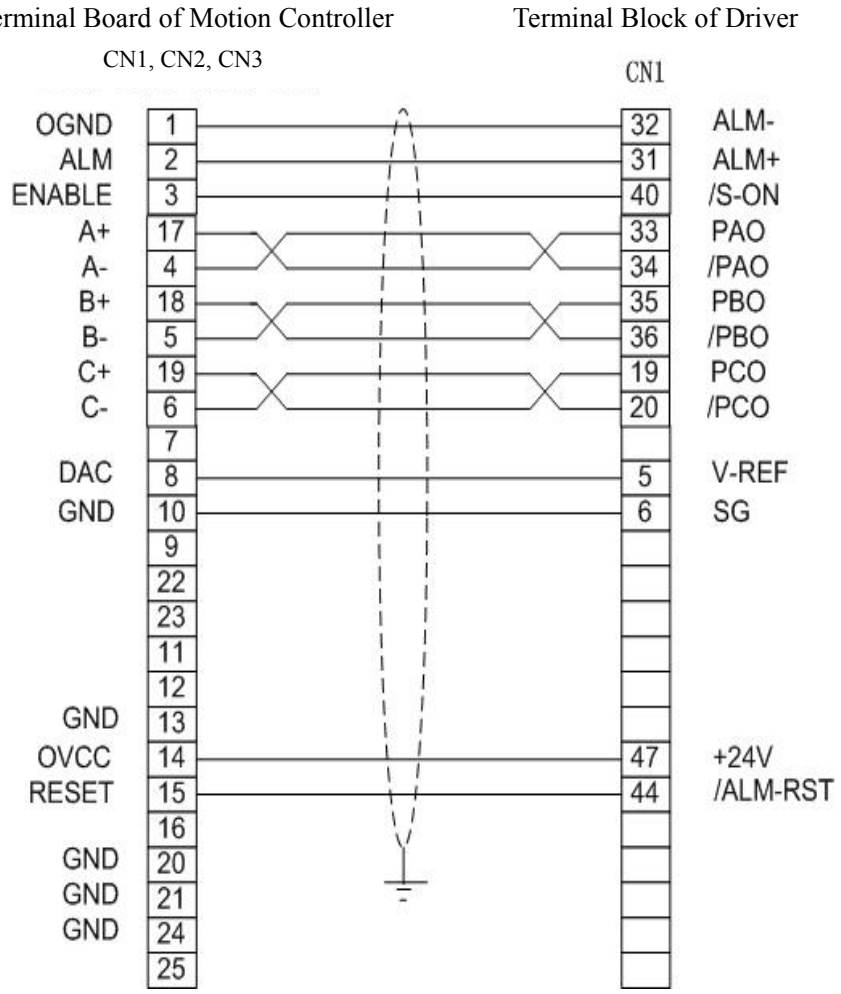
YASKAWA SERVOPACK Series Driver in Position Control Mode

B. 10 Wiring with YASKAWA SGDE Series Driver in Position Control Mode



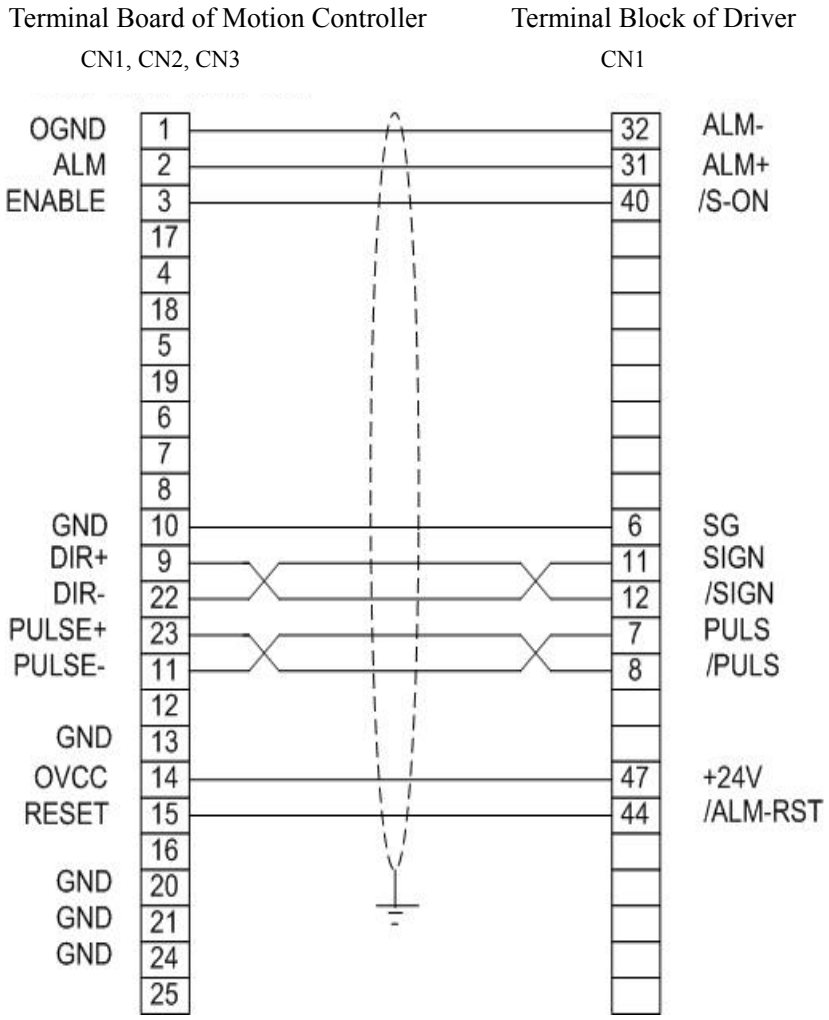
YASKAWA SGDE Series Driver in Position Control Mode

B. 11 Wiring with YASKAWA SGDM Driver in Velocity Control Mode



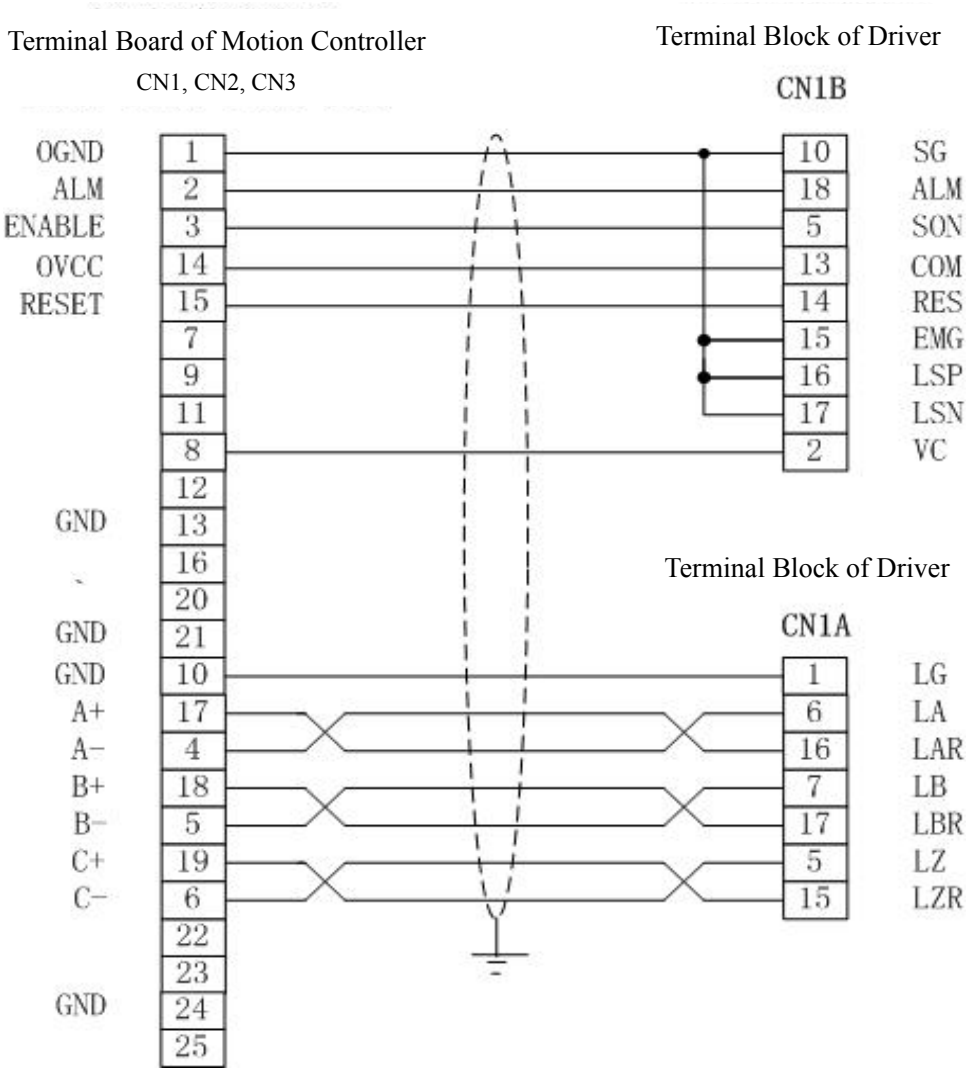
YASKAWA SGDM Driver in Velocity Control Mode

B. 12 Wiring with YASKAWA SGDM Driver in Position Control Mode



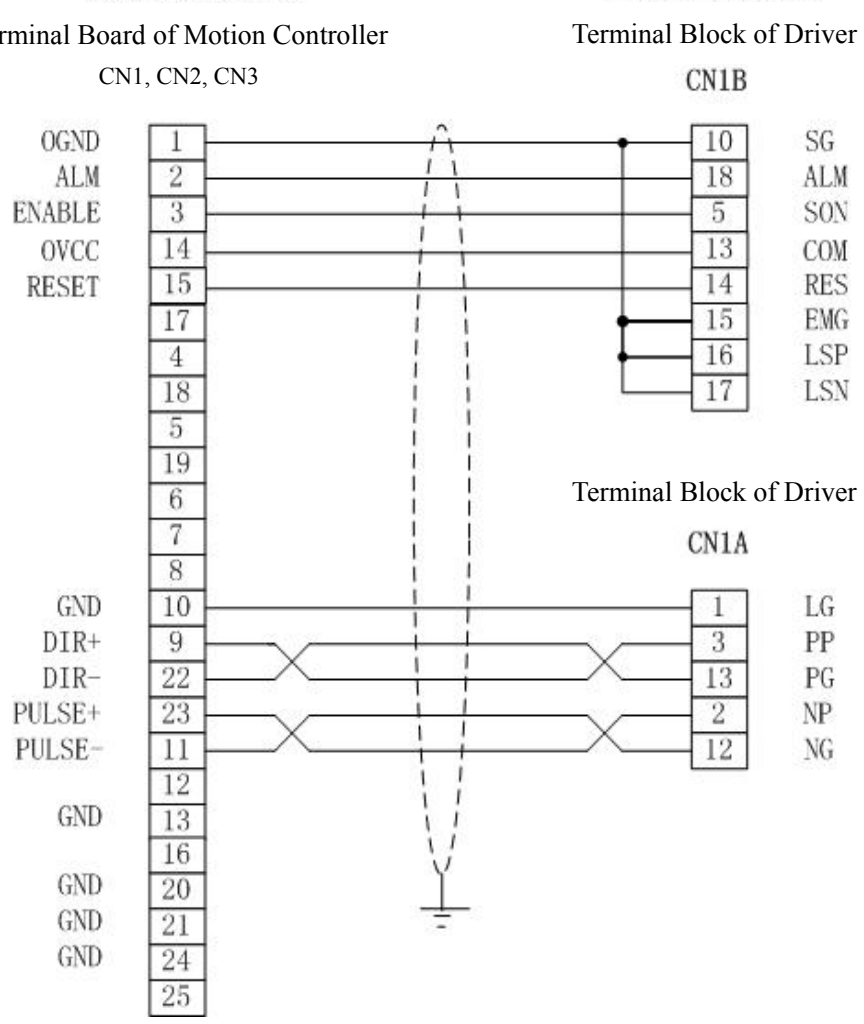
YASKAWA SGDM Driver in Position Control Mode

B. 13 Wiring with Mitsubishi MELSERVO-J2-Super Series Driver in Velocity Control Mode



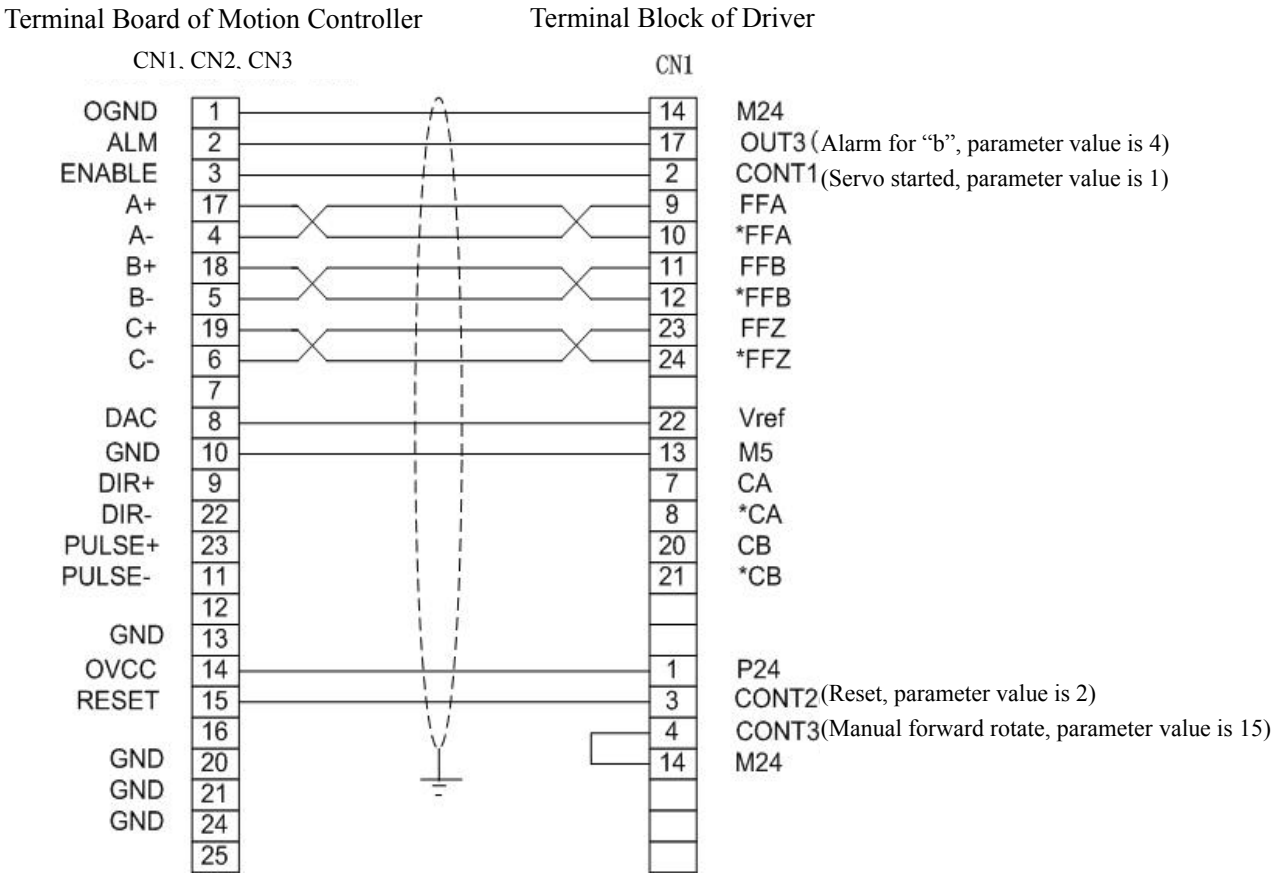
Mitsubishi MELSERVO-J2-Super Series Driver in Velocity Control Mode

B. 14 Wiring with Mitsubishi MELSERVO-J2-Super Series Driver in Position Control Mode



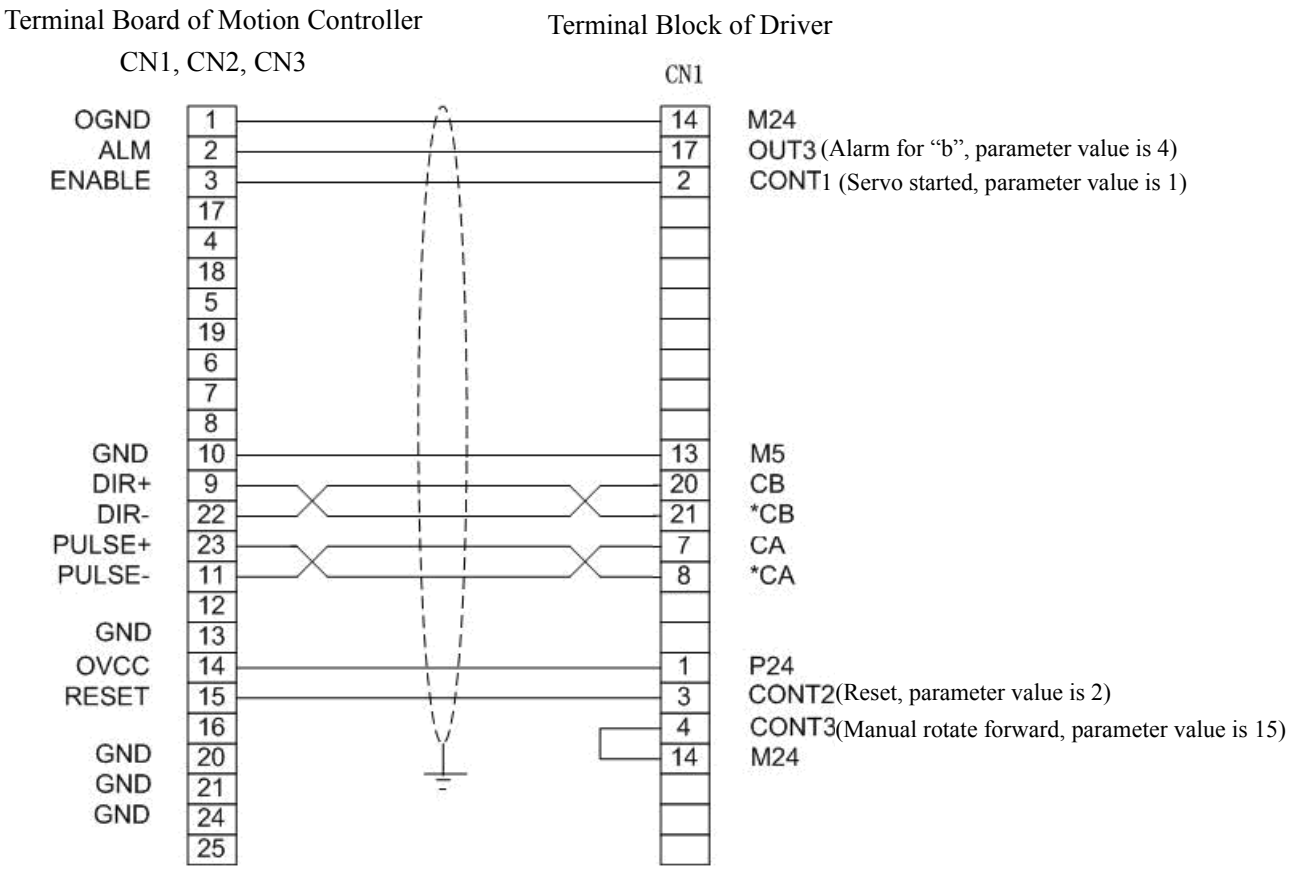
MELSERVO-J2-Super Series Driver in Position Control Mode

B. 15 Wiring with Fuji FALDIC-W Series Driver in Velocity Control Mode



Fuji FALDIC-W Series Driver in Velocity Control Mode

B. 16 Wiring with Fuji FALDIC-W Series Driver in Position Control Mode



Fuji FALDIC-W Series Driver in Position Control Mode

Appendix C Troubleshooting

	Trouble	Reason	Handling
1	The host can not be started or other hardware work abnormally after the motion controller has been installed.	The installation of motion controller has not finished.	Reinstall the motion controller.
		PCI bus interface is damaged.	Change to another PCI slot and retry. Change to another computer and retry. Change to another motion controller and retry.
2	Communication error between the host and the motion controller.	Refer to Trouble 1	Same as above
		Chip of motion controller is damaged.	Replace the motion controller.
		Unmatchable of the hardware and the software of motion controller	Replace the motion controller or the supporting software.
3	Motor is out of control.	The positive/negative limit switches are all the triggering status. The setting of limit switch trigger level is not right.	Reset the trigger level of limit switch.
		Disable of the drive	Call the command GT_AxisOn( ) and enable the drive.
		Unmatchable of the control mode setting.	Check the control mode of driver to ensure the matching with motion controller.
		Alarm of motor driver	Check the reason of motor driver alarm. Reset the motor driver. If the driver has no alarm signal output, connect the pin1 with pin2 of CN5-CN8 or call the related command to close the alarm signal input.
		Abnormal work of motion controller.	Check the status of motion controller and correct it.
		Incorrect of the motor wiring	Check the wiring according to the instruction
		Incorrect of grounding	Check the grounding according to the instruction
		Too small of the motor moment	Check the motor driver.
4	As the motor driver is electrified (without servo-on signal), the motor runs suddenly when it is power-on.	Motion controller is in the uncertain status at the moment of power-on and power-off, but the motor is in working status.	Before the power-on of the host, ensure that the motor driver is power-off. (Electrify the light-current first, then the heavy-current)
5	Incorrect of input/output signal	Error of wiring.	Check the wiring.
		No external power supply.	Check the external power supply.
		Error of grounding.	Reconnect the ground wire.
		The input/output interface of motion controller is damaged.	Replace the motion controller.
		The fusing resistor of 5 V or 24 V is burnout.	Replace the fusing resistor.

	Trouble	Reason	Handling
6	Error of general I/O output	Check whether the interface of corresponding I/O device is matched with the interface of GE-S Series Motion Controller.	Because I/O output of GE-S Series Motion Controller is collector-open-circuit output, the interface of I/O device must be matched with it. If the load capability of motion controller is not enough, it is suggested to replace the terminal board of power output.
		Check whether the required drive current of external I/O device is matched with the load capability provided by GE-S Series Motion Controller.	
7	No output of laser.	Maybe the laser is damaged.	Check whether the laser is damaged. Maybe the laser tube is damaged. The reference ground of laser control signal is digital ground. Don't take the OGND on the terminal board as the reference ground. Check the output of laser control signal of GE-400-SX-LASER Motion Controller.
		Error of the laser control signal interface.	
		No output of GE-400-SX -LASER Motion Controller.	

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