

Servo Drives

Quick Start Guide

Position control by block
operation using input signals
(MINAS A6SG/A6SF)



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1 Introduction

1.1 Before you start

Before operating this product, read the safety instructions in the related *Operating Instructions*.

This product is for industrial use only.

Electrical connections must be made by qualified electrical personnel.

1.2 About this document

This *Quick Start Guide* is intended to help you set up a MINAS servo drive system. It is based on information from the MINAS series manuals and the practical experience of our engineers.

Step-by-step instructions will guide you through connecting a PLC to a MINAS servo driver and setting the most important parameters in the PC configuration software PANATERM.

1.3 Related documents

Please refer to the original servo drive manuals for detailed information. Click on the following links to download the documents from our Panasonic Download Center.

- Information on wiring, position control, and parameters:
[*Operating Instructions \(Overall\) AC Servo Motors & Driver MINAS A6 series*](#)
[*Technical Reference – Modbus communication and block operation specification SX-DSV03042*](#)
- Information on using the PANATERM configuration software:
[*Operation Manual: Set up support software PANATERM Ver. 6.0*](#)
- Information on how to reduce electromagnetic interference (EMI):
[*Recommendations for EMC-compliant wiring of servo drivers and motors*](#)
- Other Quick Start Guides:
[*QS2000, Position control by pulse and direction signals \(MINAS A5/A5E/A6SG/A6SF\)*](#)
[*QS2002, Position control by block operation using Modbus commands \(MINAS A6\)*](#)
[*QS2003, Position control in EtherCAT networks MINAS A5B/A6B*](#)
[*QS2004, Position control using RTEX \(MINAS A5N/A6N\)*](#)
[*QS3000, Velocity control \(MINAS A5/A6F\)*](#)
[*QS4000, Torque control \(MINAS A5/A6\)*](#)

[*QS5000, PANATERM - Trial run*](#)

[*QS5001, PANATERM - Auto-tuning*](#)

[*QS5002, PANATERM - Fit gain tuning*](#)

1.4 Available software

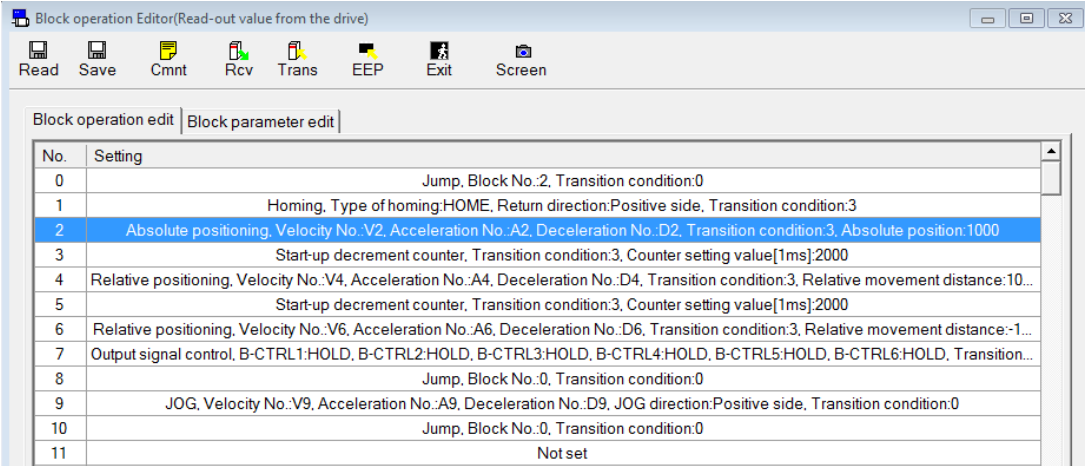
The following software is available free of charge in our Panasonic Download Center. Click on the link to start the download.

- [PC configuration software PANATERM](#)
- [PC programming software Control FPCWIN Pro 7](#)

2 Functional overview

Position control is a control mode in which the motor moves the load to a specified target position.

The servo driver can be controlled by a pulse train in the frequency range between 1Hz and 8MHz from a host controller such as a PLC or a CNC controller or by block operation. With block operation, the user defines the positioning parameters in command blocks. The MINAS A6 servo driver has a block memory capacity of 256 command blocks. All command blocks are saved in a block operation table in the servo driver.



The screenshot shows the 'Block operation Editor' window with a menu bar (Read, Save, Cmnt, Rcv, Trans, EEP, Exit, Screen) and two tabs: 'Block operation edit' and 'Block parameter edit'. The 'Block operation edit' tab is active, displaying a table with columns 'No.' and 'Setting'.

No.	Setting
0	Jump, Block No.:2, Transition condition:0
1	Homing, Type of homing:HOME, Return direction:Positive side, Transition condition:3
2	Absolute positioning, Velocity No.:V2, Acceleration No.:A2, Deceleration No.:D2, Transition condition:3, Absolute position:1000
3	Start-up decrement counter, Transition condition:3, Counter setting value[1ms]:2000
4	Relative positioning, Velocity No.:V4, Acceleration No.:A4, Deceleration No.:D4, Transition condition:3, Relative movement distance:10...
5	Start-up decrement counter, Transition condition:3, Counter setting value[1ms]:2000
6	Relative positioning, Velocity No.:V6, Acceleration No.:A6, Deceleration No.:D6, Transition condition:3, Relative movement distance:-1...
7	Output signal control, B-CTRL1:HOLD, B-CTRL2:HOLD, B-CTRL3:HOLD, B-CTRL4:HOLD, B-CTRL5:HOLD, B-CTRL6:HOLD, Transition...
8	Jump, Block No.:0, Transition condition:0
9	JOG, Velocity No.:V9, Acceleration No.:A9, Deceleration No.:D9, JOG direction:Positive side, Transition condition:0
10	Jump, Block No.:0, Transition condition:0
11	Not set

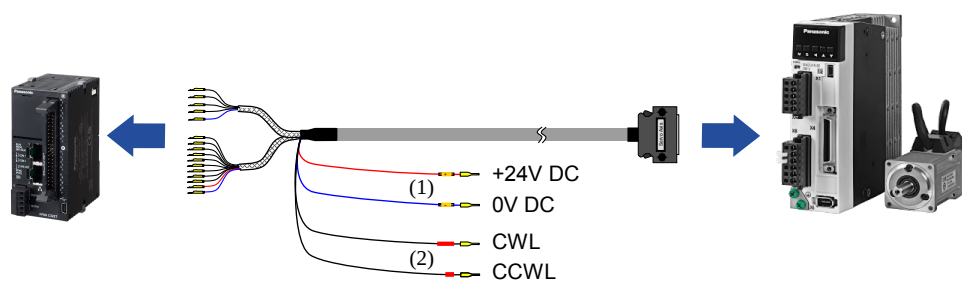
Block operation table

You can set the command blocks using the PANATERM configuration software or by Modbus commands if you are using a PLC with a Modbus RTU communication interface. The command blocks are either started by digital signals (e.g. STB, B-SEL1 to B-SEL128) from a PLC, a trigger switch, or by Modbus commands.

This *Quick Start Guide* explains how to wire and configure the servo driver for block operation using PLC signals.

Example

An FP0H PLC and a MINAS A6SF servo driver are connected to control the driver by I/O signals. If needed, additional signals, such as servo-ready, alarm, or positioning complete, can also be transmitted.



- (1) Connect to external power supply.
- (2) Connect to limit switches.

Data transmission between PLC and servo driver via connection cable

3 Wiring

3.1 Recommendations for wiring

It is the customer's responsibility to apply the countermeasures that they consider necessary to comply with current regulations on wiring, safety and reducing EMI.

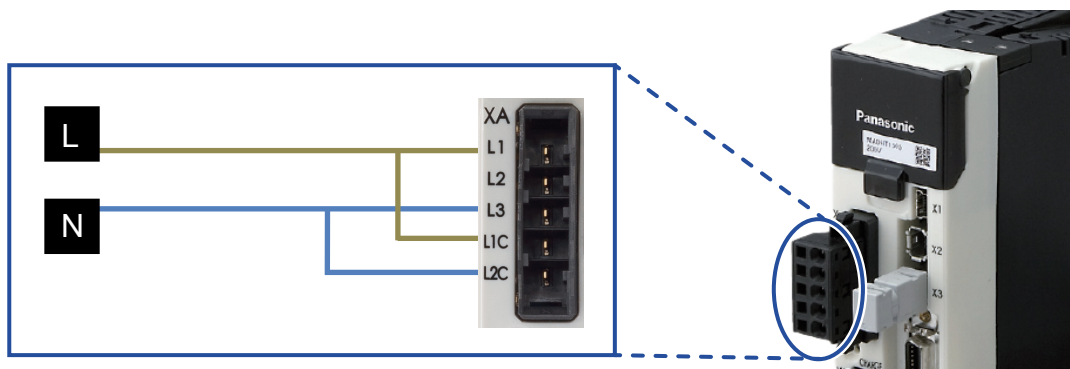
Do not forget to meet the specifications indicated in the hardware manual for each of the devices being wired. If any specifications in the manual conflict with the information in this document, the manufacturer's manual takes preference.

For detailed information on reducing EMI, please refer to [Recommendations for EMC-compliant wiring of servo drivers and motors](#).

3.2 Connectors of the servo driver

XA connector (main power connector)

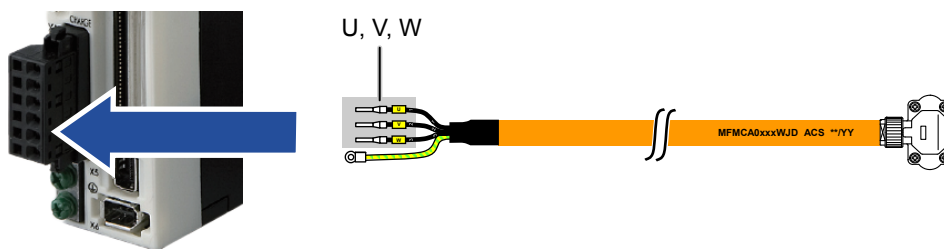
Connect the power supply cable to the XA connector. For a 1-phase power supply of 230V, connect a 2-wire cable to the servo driver as illustrated. The L2 pin is not used in 1-phase mode.



Wiring of the XA connector for a power supply of 230V

XB connector (motor connector)

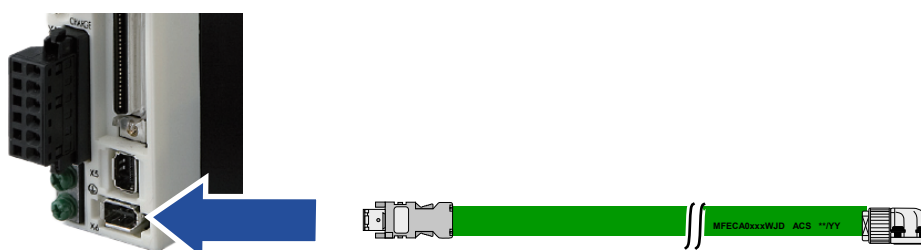
Connect the motor cable to the XB connector. The wires are labeled with the letters U, V, and W. Do not change the sequence of the motor phases, e.g. by connecting V to W.



Wiring of the XB connector for the motor power supply

X6 connector (encoder connector)

Connect the encoder cable to the X6 connector.

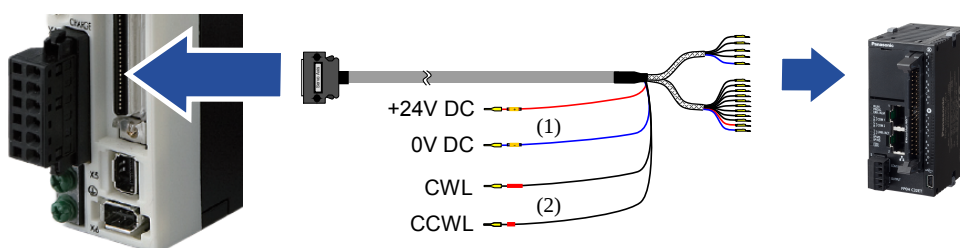


Wiring of the X6 connector for the encoder connection

X4 connector (I/O connector)

Connect the connection cable to the X4 connector and to the FP0H PLC. For PNP connections the preassembled connection cable DV0P0988WP-1 is available.

Panasonic provides different preassembled connection cables for connecting other PLC types.

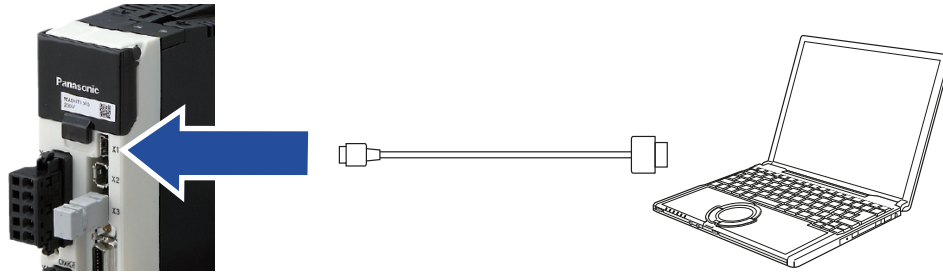


- (1) Connect to external power supply.
- (2) Connect to limit switches.

Wiring of the X4 connector for the host controller connection

X1 connector (USB connector for PC connection)

The servo driver is configured using the PC configuration software PANATERM. Use a commercially available USB A to mini-B cable to connect the PC to the servo driver.



Connector X1 for PC connection

3.3 Signal inputs and outputs of the X4 connector

For position control, the X4 connector of the MINAS A5/A6 servo driver is equipped with signal inputs and outputs.

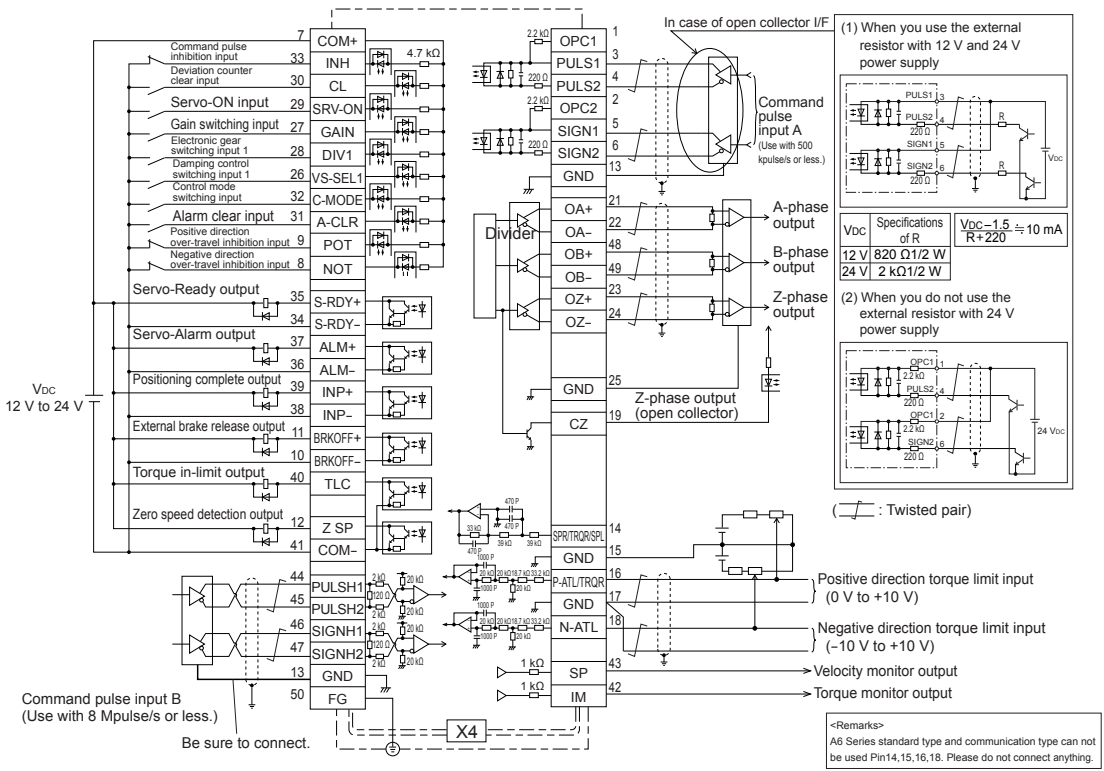
Wiring of the pulse train input depends on your source of pulses (PLC, CNC, or motion controller):

- For open collector outputs of a PLC with a maximum frequency of 200KHz and a maximum pulse voltage level of 24V, you have two options:
 - With external resistor (12V or 24V power supply), use the pins 3, 4, 5, 6.
 - Without external resistor (24V power supply only), use the pins 1, 2, 4, 6.
- For line driver outputs with a maximum frequency of 500kHz, use the pins 3, 4, 5, 6.
- For line driver outputs with a maximum frequency of 8MHz, use the pins 44, 45, 46, 47.

In our example, we will use the following signal inputs and outputs:

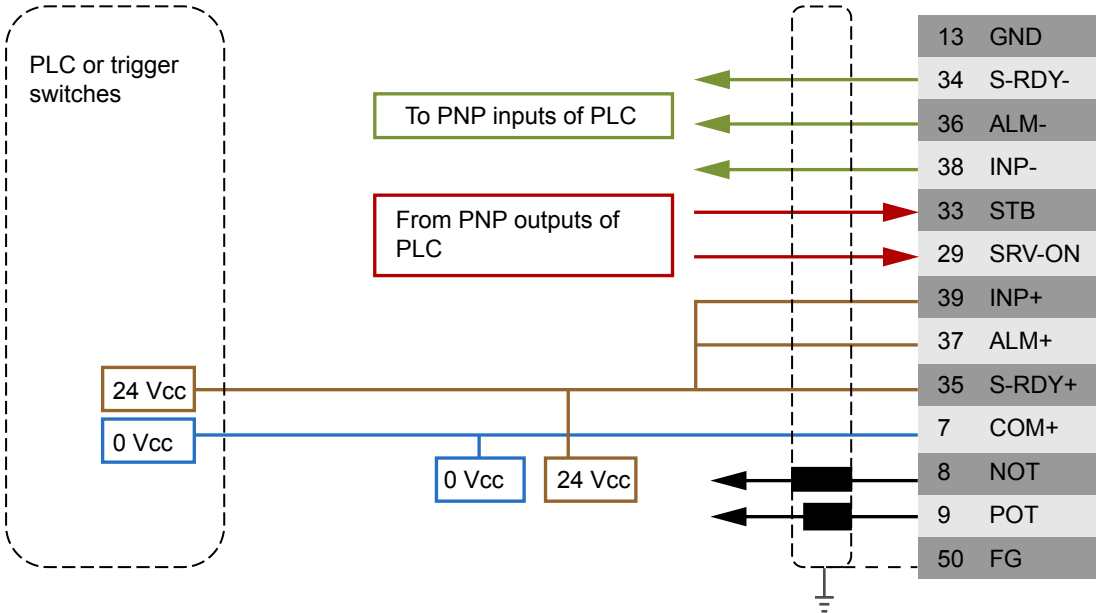
- SRV-ON (pin 29)
Servo-on input to energize the servo motor.
- COM+ (pin 7)
Common input for the power supply of the control signals.
- STB (pin number must be assigned in PANATERM)
Strobe input for starting block operation.
- B-SEL1 to B-SEL128 (pin numbers must be assigned in PANATERM)
Block number inputs for selecting block commands.
- S-RDY (pins 34–35)
Servo-ready output to indicate the ready state of the driver.
- ALM (pins 36–37)
Servo-alarm output
- INP (pins 38–39)
Positioning complete output which turns on when the target position is reached.

Please refer to the *Operating Instructions* of your MINAS A5/A6 servo driver to learn more about the signal inputs and outputs which might be useful for your application.

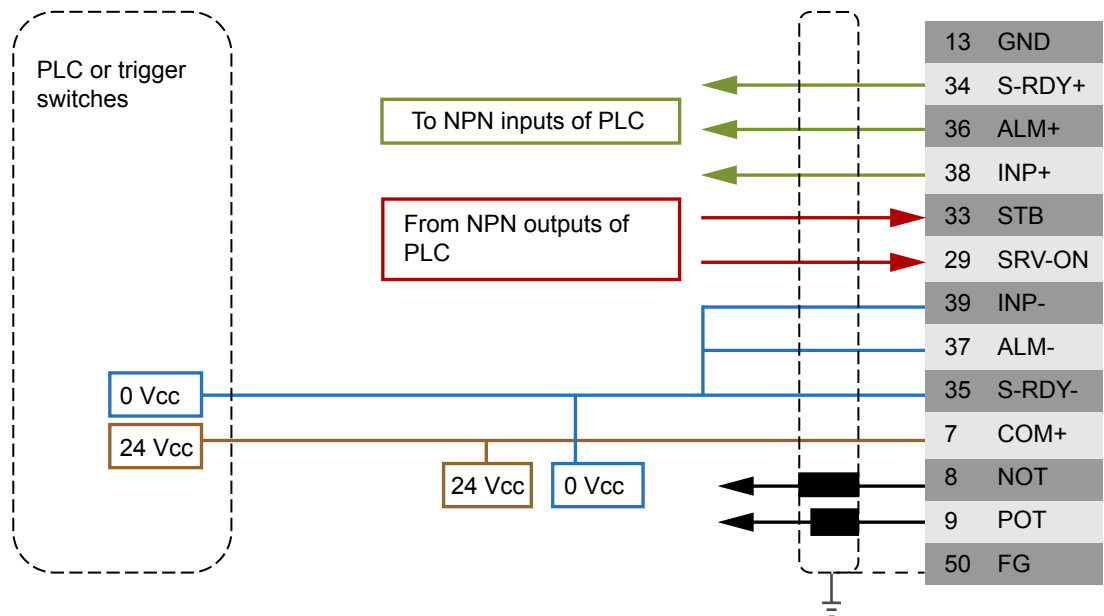


Signal inputs and outputs available on the X4 connector of the servo driver

3.4 PNP wiring of the X4 connector



3.5 NPN wiring of the X4 connector

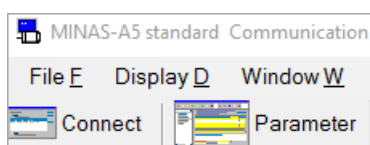


4 Make parameter settings in PANATERM

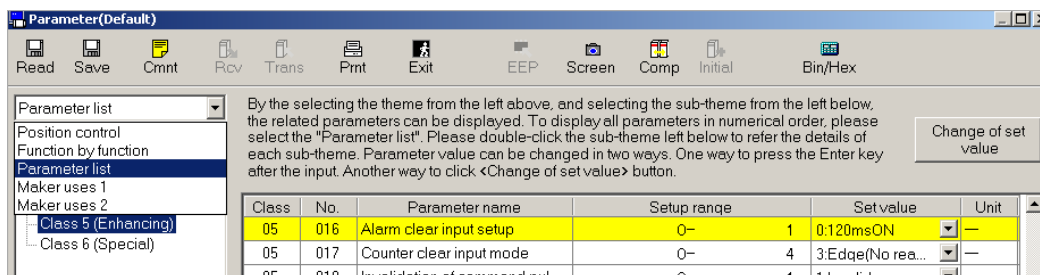
Use the PC configuration software PANATERM to configure the MINAS servo driver.

Click on the following link to download PANATERM from our Panasonic Download Center:
[PC configuration software PANATERM](#)

1. Connect your PC to the X1 connector and turn on the servo driver.
2. Start the PANATERM configuration software.
The software automatically detects the type of servo driver connected.
3. Select “OK” and confirm the connected series by selecting your type of servo driver.
4. Select the “Parameter” tab.



5. In the “Selection of parameter to be read” dialog, select “Read the default”. There is a message if the parameter values in the servo driver are not the default values. To overwrite the parameters in the servo driver, select the “Trans” icon.
6. Select the parameter list for your type of servo driver.



7. To change a parameter setting, select the desired parameter class and enter a value.
For parameter descriptions, please refer to the Operating Instructions. You can find each parameter by its unique parameter number. The parameter number is written in the format PrX.YY (X: Class, YY: No.).
8. Depending on the parameter, select the “Trans” or the “EEP” icon to transfer a setting to the servo driver. For yellow parameters, select the “EEP” icon. The parameters will be saved in the EEPROM of the servo driver. To activate the settings, you need to restart the servo driver.
All other parameters are transferred simply by selecting the “Trans” icon.

4.1 Basic parameters overview

There are basic parameters which are associated to position control.

The following table shows the setting range and description of the basic parameters.

Parameter	Range	Description
Pr0.00	0 or 1	Motor rotation direction
Pr0.01	0 to 6	Control mode
Pr6.28	0 to 2	Block operation mode

4.2 Pr0.00 (Motor rotation direction)

PANATERM parameter: "Rotational direction setting"

Setting range: 0 or 1

The default value is 1: Rotation in CCW direction (counterclockwise direction).

4.3 Pr0.01 (Control mode)

PANATERM parameter: "Control mode setting"

Setting range: 0 to 6

The default value is 0: Position control

Select 0: Position control (block operation mode only supports position control)

4.4 Pr6.28 (Block operation mode)

PANATERM parameter: "Special function selection"

Setting range: 0 to 2

The default value is 0: Block operation invalid

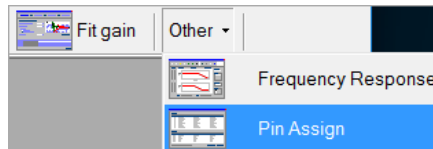
Select 2: Block operation valid (Input signal)

5 Make pin assignments in PANATERM

For some applications, the software function of physical pins of the servo driver must be changed. Use the PC configuration software PANATERM to make the pin assignment.

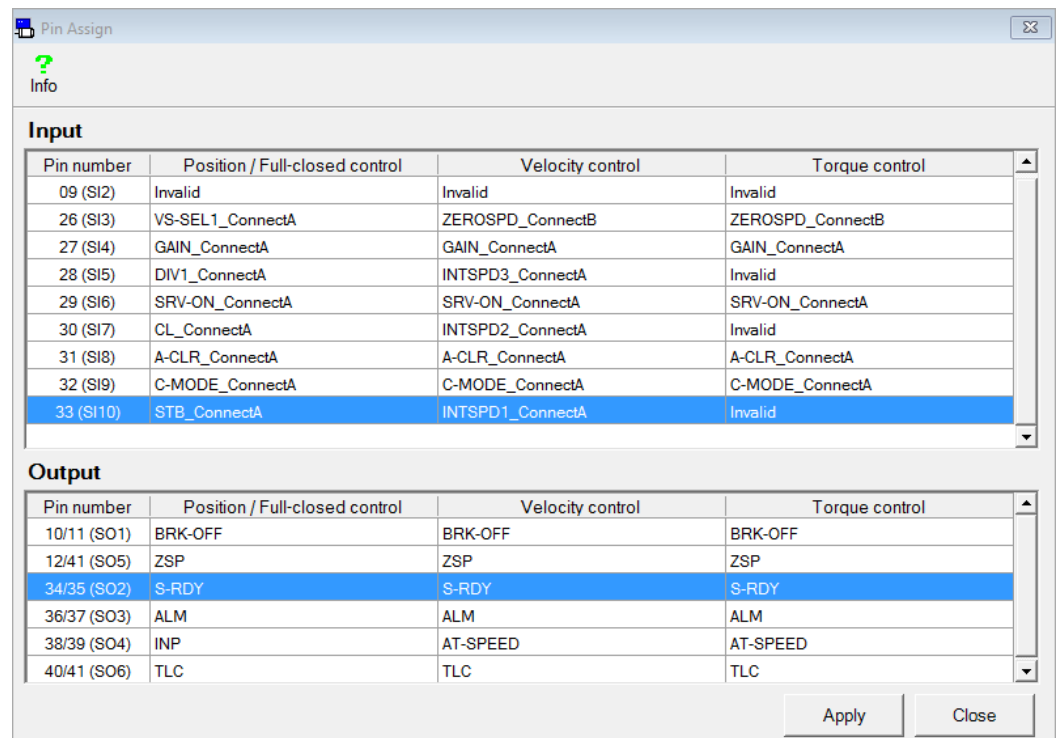
For this connection example, only the STB signal must be assigned to an input pin.

1. Connect your PC to the servo driver.
2. Start the PANATERM configuration software.
3. Select "Other" > "Pin Assign".



The current pin assignment is uploaded from the servo driver.

4. Select an arbitrary input which is not required by your application and double-click. In this example, double-click on the line of pin number 33.

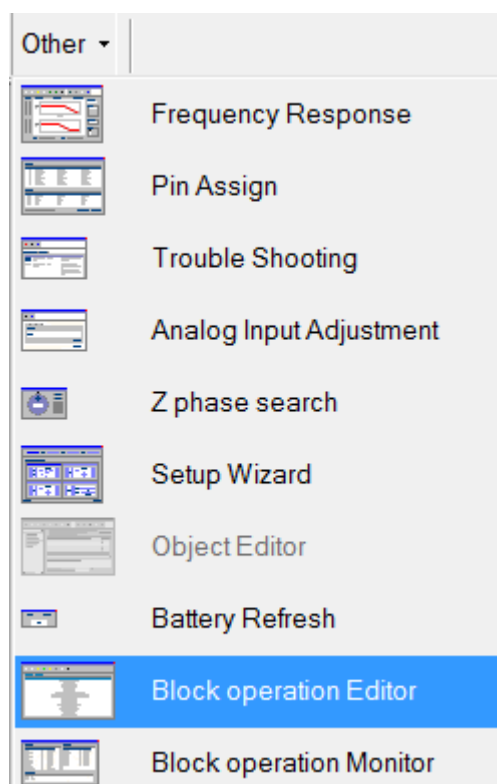


5. Select the desired function. In this example, select the STB signal.
6. Select "Apply" to transfer the pin assignment to the servo driver.

6 Enter block commands in PANATERM

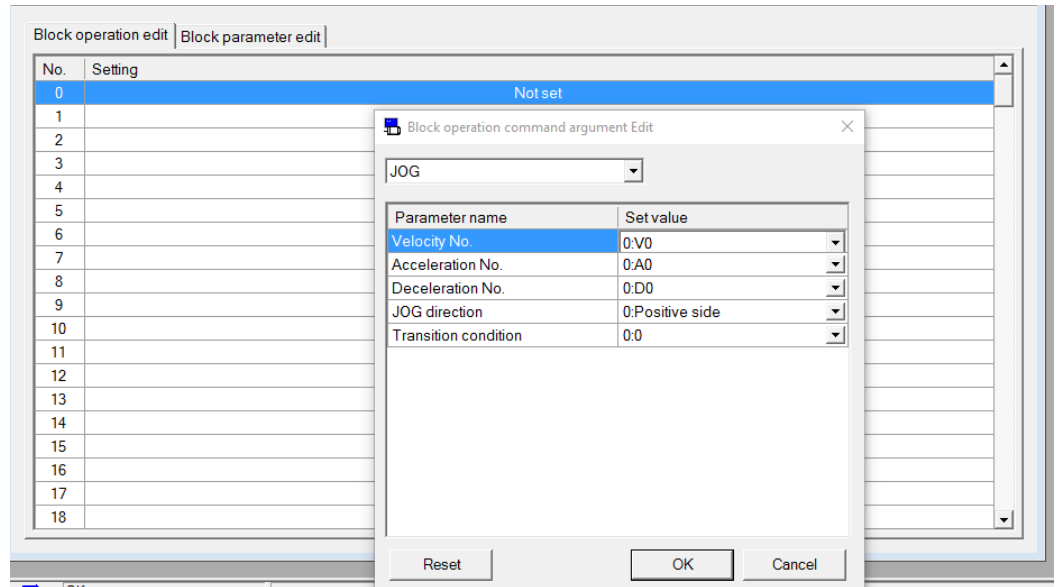
To enter block commands, you need to start the block operation editor.

1. Connect your PC to the servo driver.
2. Start the PANATERM configuration software.
The software automatically detects the type of servo driver connected.
3. Select "OK" and confirm the connected series by selecting your type of servo driver.
4. Select "Other" > "Block operation Editor".



5. In the "Selection of parameter to be read" dialog, select "Read the default". There is a message if the parameter values in the servo driver are not the default values. To overwrite the parameters in the servo driver, select the "Trans" icon.
6. Double-click the first line in the table on the "Block operation edit" tab.

7. Select the desired command (e.g. "JOG") and select "OK".



8. Select the "Block parameter edit" tab to enter the desired values for velocity, acceleration, deceleration, etc.

Block operation edit		Block parameter edit			
Class	No.	Parameter name	Setup range	Set value	Unit
60	000	Block operation velocity V0	0- 20000	100	r/min
60	001	Block operation velocity V1	0- 20000	0	r/min
60	002	Block operation velocity V2	0- 20000	0	r/min
60	003	Block operation velocity V3	0- 20000	0	r/min
60	004	Block operation velocity V4	0- 20000	0	r/min
60	005	Block operation velocity V5	0- 20000	0	r/min
60	006	Block operation velocity V6	0- 20000	0	r/min
60	007	Block operation velocity V7	0- 20000	0	r/min
60	008	Block operation velocity V8	0- 20000	0	r/min
60	009	Block operation velocity V9	0- 20000	0	r/min
60	010	Block operation velocity V10	0- 20000	0	r/min
60	011	Block operation velocity V11	0- 20000	0	r/min
60	012	Block operation velocity V12	0- 20000	0	r/min
60	013	Block operation velocity V13	0- 20000	0	r/min
60	014	Block operation velocity V14	0- 20000	0	r/min
60	015	Block operation velocity V15	0- 20000	0	r/min
60	016	Block operation acceleration A0	0- 10000	10	ms/(3000r/min)
60	017	Block operation acceleration A1	0- 10000	0	ms/(3000r/min)
60	018	Block operation acceleration A2	0- 10000	0	ms/(3000r/min)
60	019	Block operation acceleration A3	0- 10000	0	ms/(3000r/min)

7 Help us improve

Please feel free to contact us if you have any questions, or if you have any suggestions for improvement. In that case, we ask you to include the Quick Start Guide number in the email subject line. You can find the number starting with "QS" on the cover page.

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8 Record of changes

QS2001_V1.0_EN, 2019.07

First edition



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