

Document No. : SX-DSV03167

---

Revision No. : 5.1

---

Date of Issue : Apr. 1, 2022

---

Classification : ☐ New ☒ Change

---

# SPECIFICATIONS

Product Name : AC servo driver  
Product Series Name : MINAS-A6 series  
Product Model Number : DC24 / 48 V type

Motion Control Business Unit, Industrial Device Business Division  
Panasonic Industry Co., Ltd.

7-1-1 Morofuku, Daito—City, Osaka 574-0044, Japan

If you have any questions, please contact the seller (Sales office or Distributor) of the product.

**Panasonic**

# REVISIONS

[illegible]

## Contents

|   |    |
|---|----|
| 1. Scope.....   | 1  |
| 2. Way of looking at product numbers .....                        | 2  |
| 3. Product line-up.....   | 4  |
| 4. Specifications.....  | 5  |
| 5. Appearance and name of each part .....                         | 6  |
| 6. Outside dimensions .....                                       | 8  |
| 7. Configuration of connectors and terminal blocks .....          | 9  |
| 7-1 Main Power Supply Connector <b>XA-1</b> .....                 | 9  |
| 7-2 Control Power Supply Connector <b>XA-2</b> .....              | 9  |
| 7-3 Motor Connector <b>XB</b> .....                               | 9  |
| 7-4 USB connector <b>X1</b> .....                                 | 10 |
| 7-5 Serial bus connector <b>X2</b> .....                          | 10 |
| 7-6 Parallel I/O connector, <b>X4</b> .....                       | 11 |
| 7-7 External feedback device connector <b>X5</b> .....            | 14 |
| 7-8 Encoder connector <b>X6</b> .....                             | 15 |
| 7-9 Input / output signal interface .....                         | 16 |
| 8. Wiring and system configuration .....                          | 17 |
| 8-1 Wire rods used and maximum wiring length .....                | 17 |
| 8-2 Cable-Side connector .....                                    | 17 |
| 8-3 Precautions for wiring.....                                   | 18 |
| 8-3-1 Wiring to the power connector.....                          | 18 |
| 8-3-2 Wiring to connector <b>X4</b> .....                         | 20 |
| 8-3-3 Wiring to connector <b>X5</b> .....                         | 25 |
| 8-3-4 Wiring to connector <b>X6</b> .....                         | 27 |
| 8-4 Dynamic brake .....   | 29 |
| 8-5 Mounting direction and interval.....                          | 29 |
| 9. Compliance with the international standards .....              | 30 |
| 9-1 List of compatible standards for the servo driver.....        | 30 |
| 9-2 European Communities Directive .....                          | 30 |
| 9-2-1 Compliance with the EMC directive.....                      | 30 |
| 9-3 Configuration of peripheral devices.....                      | 31 |
| 9-3-1 Installation environment.....                               | 31 |
| 9-3-2 Power supply.....   | 31 |
| 9-3-3 Noise filter .....  | 31 |
| 9-3-4 Surge absorber.....   | 31 |
| 9-3-5 Ferrite core .....  | 31 |
| 9-4 List of servo drivers and applicable peripheral devices ..... | 32 |
| 9-5 Compliance with the UL standard.....                          | 32 |
| 9-6 Radio Waves Act of South Korea .....                          | 32 |
| 10. Safety Precautions.....                                       | 33 |
| 11. Life span .....   | 37 |
| 11-1 Expected life span of the servo driver.....                  | 37 |
| 12. Warranty .....  | 37 |
| 12-1 Warranty period .....  | 37 |
| 12-2 Warranty scope .....   | 37 |
| 12-3 Warranty service .....                                       | 37 |
| 13. Other .....   | 38 |
| 14. Other notes of specification .....                            | 39 |
| 15. Specifications for each model .....                           | 40 |

Appended table : Default value of the parameters

## 1. Scope

The contents of this specification document are related to the AC servo driver MINAS A6 series manufactured by Motion Control Business Unit, Panasonic Industry Co., Ltd.

This product is intended for industrial equipment. It cannot be used for any other purposes (e.g. for household).

### <Related documents>

Technical document - Functional Specifications - : SX- DSV03283

Technical document - Modbus communication and Block operation Specification - : SX- DSV03042

\* See our Web site for the above documents.

### **Operating Precautions**

Pay a special attention to following items because the part of internal board is exposed.

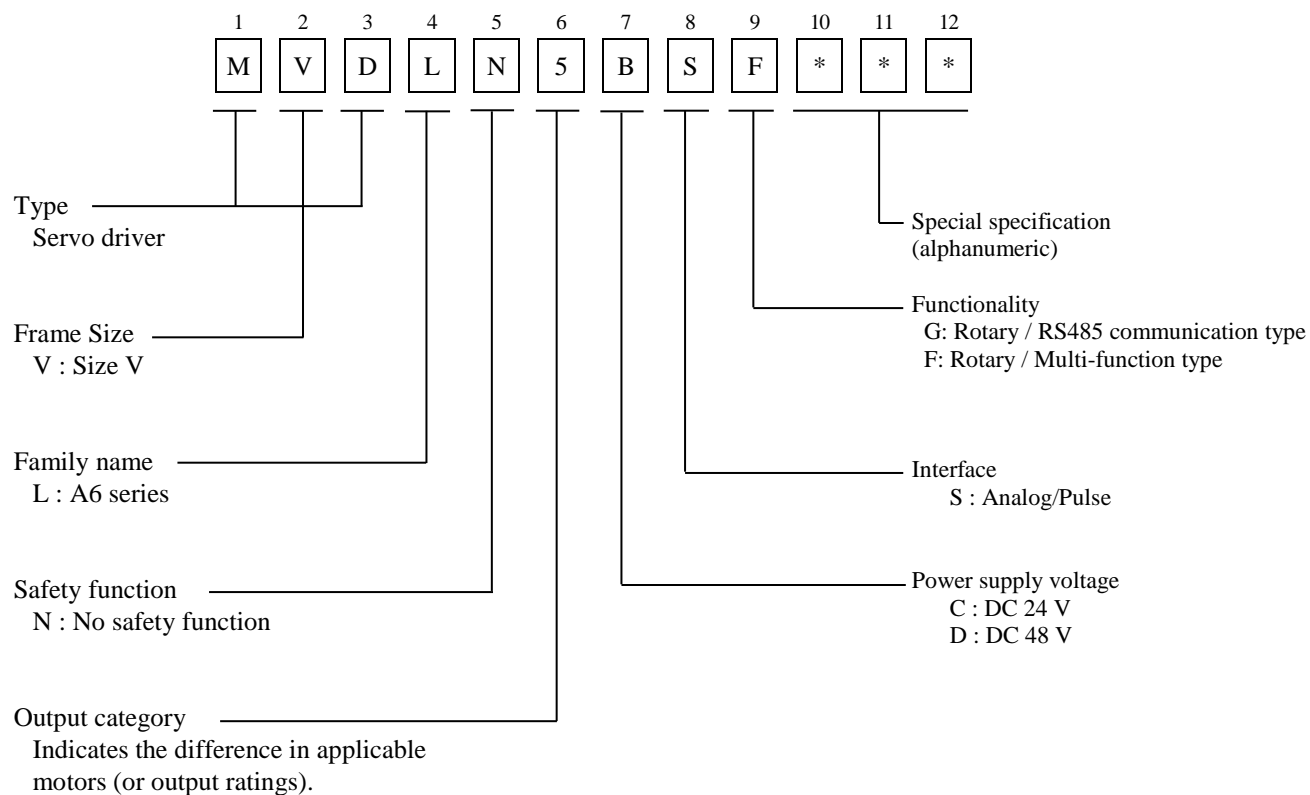
- When unpacking and installing, implement the measure against static electricity and handle it with great caution.
- Install the servo driver in an environment of Pollution degree 2 or 1, such as in the control panel of IP44 or more.

### <Precautions>

- (1) Reprinting or reproducing of part or the whole of the contents of this document is strictly forbidden.
- (2) The contents of this document is subject to change without prior notice for improvement of the product.

## 2. Way of looking at product numbers

Each segment of the product number has the following meaning.



## &lt; MINAS-A6 series (DC24 / 48 V type) Functional comparison &gt;

○:Usable ×:Not usable

| Function   |   | Product | [A6SG]<br>(RS485 Communication type)<br>Product number<br>ending with: G | [A6SF]<br>(Multifunction type)<br>Product number<br>ending with: F |
|--|---|---------|--|--|
| Control mode   | Position control                                |         | ○  | ○  |
|  | Velocity control<br>(Internal velocity command) |         | ○  | ○  |
|  | Velocity command<br>(Analog velocity command)   |         | ×  | ○  |
|  | Torque control                                  |         | ×  | ○  |
|  | Position/velocity control                       |         | ×  | ○  |
|  | Position/torque control                         |         | ×  | ○  |
|  | Velocity/torque control                         |         | ×  | ×  |
|  | Full-closed control                             |         | ×  | ○  |
| Analog input   |   |         | ×  | ○  |
| Safety functions                                     |   |         | ×  | ×  |
| Two-degree-of-freedom control (Position)             |   |         | ○  | ○  |
| Two-degree-of-freedom control (Velocity)             |   |         | ○  | ○  |
| Two-degree-of-freedom control (Full-closed)          |   |         | ×  | ○  |
| Damping function                                     |   |         | ○  | ○  |
| Model type damping filter                            |   |         | ○  | ○  |
| Feed forward function                                |   |         | ○  | ○  |
| Load variation suppression function                  |   |         | ○  | ○  |
| Third gain switching function                        |   |         | ○  | ○  |
| Friction torque compensation                         |   |         | ○  | ○  |
| Hybrid vibration suppression function                |   |         | ×  | ○  |
| Quadrant projection suppression function             |   |         | ○  | ○  |
| Torque limit switching function                      |   |         | ○  | ○  |
| Allowable motor operating range setting function     |   |         | ○  | ○  |
| Torque saturation protection function                |   |         | ○  | ○  |
| Infinite rotation absolute function                  |   |         | ○  | ○  |
| External scale position information monitor function |   |         | ×  | ○  |
| Communication functions                              | USB (for PANATERM connection)                   |         | ○  | ○  |
|  | RS232 (MINAS standard protocol)                 |         | ○  | ○  |
|  | RS485 (MINAS standard protocol)                 |         | ○  | ○  |
|  | Modbus-RTU *1                                   |         | ○  | ○  |
| Block operation *1                                   | Start on Modbus communication                   |         | ○  | ○  |
|  | Start on input signal                           |         | ○  | ○  |

- [A6SG] (RS485 Communication type): There are some functions that cannot be used.

Where applicable, these items are indicated with “Cannot be used in [A6SG]” in the descriptions contained in this reference for your confirmation.

- \*1 For details of Modbus communications and block operations, please refer to Technical reference (Modbus communication and Block operation Specification).

## 3. Product line-up

| Servo driver |      |                    | Applicable motor   |             |             |
|--------------|------|--------------------|--|-------------|-------------|
| Model No.    | Size | Power supply input | Model No.  | Rated power | Rated speed |
| MVDLN5CSG    | V    | DC 24 V            | Please contact the seller of the product<br>(Sales office or Distributor). |             |             |
| MVDLN5CSF    |      |                    |  |             |             |
| MVDLN5BSG    |      | DC 48 V            |  |             |             |
| MVDLN5BSF    |      |                    |  |             |             |

## 4. Specifications

## Basic specifications

|                      |                                   |                      |   |                                      |             |
|----------------------|-----------------------------------|----------------------|---|--------------------------------------|-------------|
| Basic specifications | Input power supply                | 24 V type            | DC24 V  | +21 % ( DC29 V )<br>-17 % ( DC20 V ) | (*Note 1,7) |
|                      |                                   | 48 V type            | DC48 V  | +21 % ( DC58 V )<br>-17 % ( DC40 V ) | (*Note 1,7) |
|                      | Operation conditions              | Temperature          | Operation temperature: 0 - 55 degrees C (no freezing)<br>Storage temperature: -20 - 65 degrees C (Max.temperature guarantee : 80 degrees C for 72 hours no condensation*)   |                                      |             |
|                      |                                   | Humidity             | Operation and storage humidity 20 - 85 %RH or less (no condensation*)   |                                      |             |
|                      |                                   | Height above the sea | Height above the sea level: 1000 meters or less   |                                      |             |
|                      |                                   | Vibration            | 5.88 m/s <sup>2</sup> or less, 10 - 60 Hz   |                                      |             |
|                      |                                   | Pollution degree     | Pollution degree 2 or 1   |                                      |             |
|                      | Insulation voltage                |                      | Resistant to 500 V AC between primary power supply and ground for a minute  |                                      |             |
|                      | Control method                    |                      | PWM method, sinusoidal drive  |                                      |             |
|                      | Encoder feedback                  |                      | 23Bit(resolution:8388608) 7cores-serial absolute encoder  |                                      |             |
|                      | External scale feedback (*Note 2) |                      | A/B phase, homing signal defferential input type<br>Panasonic supported serial communication type (*Note 3)   |                                      |             |
|                      | Control signal                    | Input                | General purpose 5 input<br>General purpose input functions can be selected by parameter.  |                                      |             |
|                      |                                   | Output               | General purpose 3 output<br>General purpose output functions can be selected by parameter.  |                                      |             |
|                      | Analogue signal                   | Input (*Note 2)      | 1 input (16 bit A/D: 1 input)   |                                      |             |
|                      |                                   | Output               | 1 output (analog monitor)   |                                      |             |
|                      | Pulse signal                      | Input                | 1 input port<br>Both line driver I/F and open collector I/F are supported with photo coupler input can be supported.<br>If use pulse signal, set Pr0.05 = 0 (Photo coupler input / Both line driver and open collector)<br>or 2 (Photo coupler inputs / Open collector) |                                      |             |
|                      |                                   | Output               | 3 outputs respectively<br>Encoder pulse or external scale pulse or position comparison is output by using the line driver.  |                                      |             |
|                      | Communication                     | USB                  | USB interface to connect to computers (setup software PANATERM) for parameter setting or status monitoring.<br>USB cable and wireless LAN dongle connection is possible. (*Note 4)  |                                      |             |
|                      |                                   | RS232                | 1:1 communication with the host controller is possible.   |                                      |             |
|                      |                                   | RS485                | 1:n communication with the host controller is possible.   |                                      |             |
|                      |                                   | Modbus-RTU           | 1:1 communication with superior controller is possible.( in case of RS232)<br>1: n communication with superior controller is possible.( in case of RS485) (*Note 5)   |                                      |             |
|                      | Safety terminal                   |                      | Not supported.  |                                      |             |
|                      | Front panel                       |                      | Not supported.  |                                      |             |
|                      | Regeneration                      |                      | Not supported.  |                                      |             |
|                      | Dynamic brake                     |                      | Built-in type   |                                      |             |
|                      | Control mode                      |                      | Selectable from the following 6 modes by parameter:<br>[1] position control [2] velocity control [3] torque control [4] position/velocity control<br>[5] position/torque control [6] full-closed control (*Note 6)  |                                      |             |

\*Please note that condensation tend to occur when temperature fall.

(Note 1) DC power using stabilized power supply (SELV) are provided with reinforced insulation.

Please do fluctuations in the DC power supply voltage does not exceed the supply voltage range of the servo driver also.

(Note 2) This function cannot be used with [A6SG].

(Note 3) Please refer to the collaboration catalog for the corresponding scale maker and part number.

(Note 4) Do not use wireless LAN dongle outside the usable regions because it becomes a violation of laws and regulations.

For details of functions and available regions, please check our website

(Note 5) For details of Modbus communication, please refer to Technical reference (Modbus communication and Block operation Specification).

(Note 6) Avarable control mode of [A6SG] is position control and .velocity control (internal verocity).

(Note 7) The servo driver can functionally drive the motor within the range of the input power supply voltage.

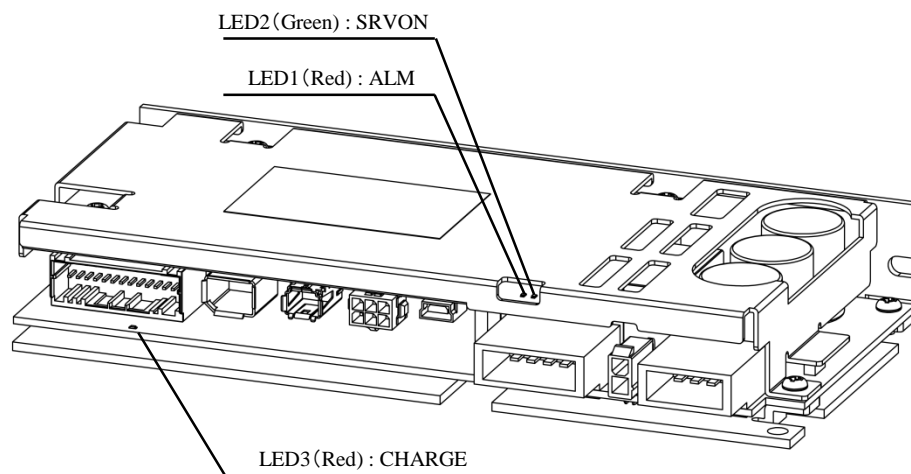
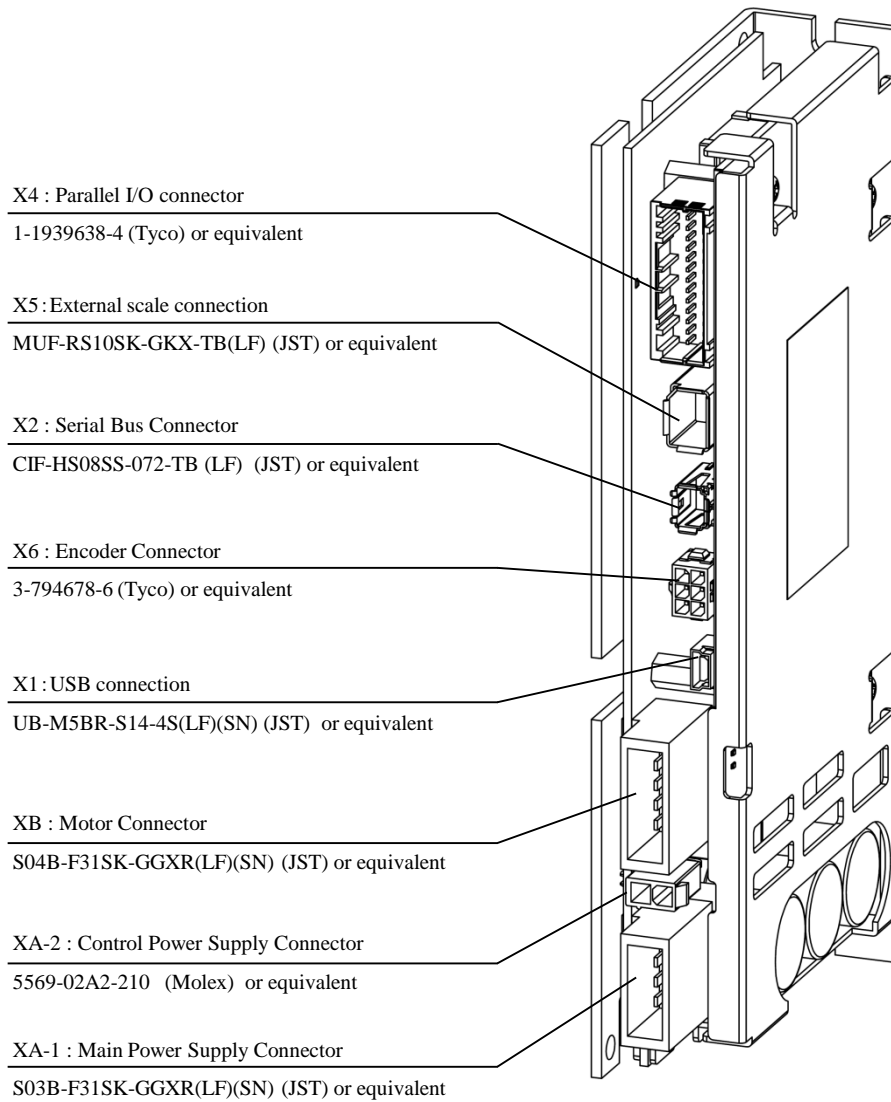
When input power supply voltage is below the rated value (24 V/48 V), overload protection might be triggered even speed and torque are within the rated range at some motor's specifications.



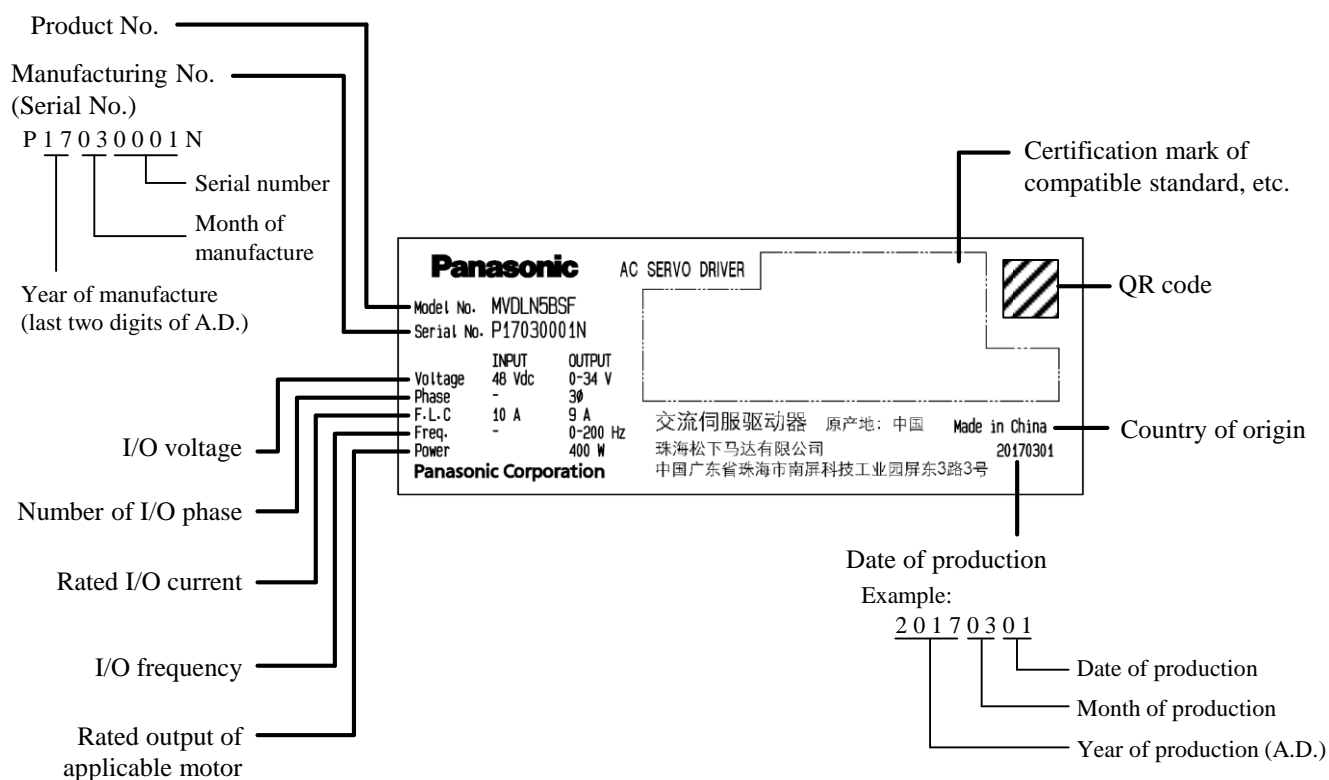
## 5. Appearance and name of each part

Below figure shows a multi-function type. The RS485 communication type is not provided with

**X5** (external scale connector) .



### Example of a rating plate



The values of the serial number part of the manufacturing number range from 1 to 33999. On the rating plate, it is indicated in four digits as in the format shown below.

“I” and “O” are not used for the fourth-digit alphabet.

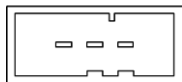
| Value of the serial number part | Indication on the rating plate |
|---------------------------------|--------------------------------|
| 1 - 9999                        | 0001 - 9999                    |
| 10000 - 10999                   | A000 - A999                    |
| 11000 - 11999                   | B000 - B999                    |
| ⋮                               | ⋮                              |
| 17000 - 17999                   | H000 - H999                    |
| 18000 - 18999                   | J000 - J999                    |
| ⋮                               | ⋮                              |
| 22000 - 22999                   | N000 - N999                    |
| 23000 - 23999                   | P000 - P999                    |
| ⋮                               | ⋮                              |
| 33000 - 33999                   | Z000 - Z999                    |



## 7. Configuration of connectors and terminal blocks


7-1 Main Power Supply Connector **XA-1**

Servo driver side : J. S. T. Mfg S03B-F31SK-GGXR(LF)(AU)

| Pin No. | Symbol      | Description   | Layout  |
|---------|-------------|---|---|
| 1       | P1 (+ Line) | <ul style="list-style-type: none"> <li>• Input DC48 V or DC24 V.</li> <li>• Use stabilized DC power source with reinforced insulation.</li> </ul> |  |
| 2       | N1 (- Line) |   |   |
| 3       | FG          | • Frame ground  |   |

7-2 Control Power Supply Connector **XA-2**

Servo driver side : Molex 5569-02A2-210

| Pin No. | Symbol      | Description   | Layout  |
|---------|-------------|---|---|
| 1       | P2 (+ Line) | <ul style="list-style-type: none"> <li>• Input DC48 V or DC24 V.</li> <li>• Use stabilized DC power source with reinforced insulation.</li> </ul> |  |
| 2       | N2 (- Line) |   |   |

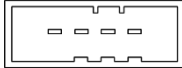
\* There is no anti-connection function on the driver.

Reverse connection is caused of failure.

Enough attention to the power supply wiring.

N-pin of Main power supply connector **XA-1** connect to control power supply connector **XA-2**.7-3 Motor Connector **XB**

Servo driver side : J. S. T. Mfg S04B-F31SK-GGXR(LF)(AU)

| Pin No. | Symbol | Description                            | Layout  |
|---------|--------|--|---|
| 1       | U      | • Connect U phase of the motor winding |  |
| 2       | V      | • Connect V phase of the motor winding |   |
| 3       | W      | • Connect W phase of the motor winding |   |
| 4       | FG     | • Connect FG wire of the motor         |   |

7-4 USB connector X1

Operations such as parameter setting/change, control status monitoring, error status/history browsing, and parameter saving/loading can be performed by connecting to a PC or a high-order NC via a USB connector.

| Name                 | Symbol | Pin No. | Description  |
|----------------------|--------|---------|--|
| USB signal           | VBUS   | 1       | • Used for communication with a PC or a high-order NC. |
|                      | D-     | 2       |  |
|                      | D+     | 3       |  |
| For manufacturer use | —      | 4       | • Do not connect anything.                             |
| Signal ground        | GND    | 5       | • Signal ground  |

The connector shape on the driver side is USB mini-B.

7-5 Serial bus connector X2

| Name          | Symbol | Pin No. | Description  |
|---------------|--------|---------|--|
| Signal ground | GND    | 1       | • Signal ground (*Note 1)                            |
| NC            | —      | 2       | • Do not connect                                     |
| RS232 signal  | TXD    | 3       | • Serial bus transmission and reception data (RS232) |
|               | RXD    | 4       |  |
| RS485 signal  | 485 -  | 5       | • Serial bus transmission and reception data (RS485) |
|               |        | 7       |  |
|               | 485+   | 6       |  |
|               |        | 8       |  |
| Frame ground  | FG     | shell   | • Frame ground                                       |

(Note 1) The signal ground GND is connected with the control circuit ground connected with the connector X4.

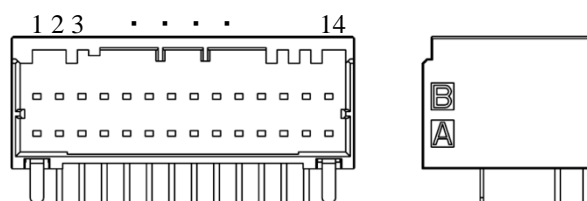
## 7-6 Parallel I/O connector, [X4]

A list of the pin assignment of the parallel I / O connector is as follows.

For details of each function, please refer the following pages.

| Pin No. | Symbol | Description                                   |
|---------|--------|---|
| A1      | OPC1   | Pulse signal input 1                          |
| A2      | OPC2   | Pulse signal input 2                          |
| A3      | PULS1  | Pulse signal input 1                          |
| A4      | PULS2  |   |
| A5      | SIGN1  | Pulse signal input 2                          |
| A6      | SIGN2  |   |
| A7      | SO1+   | Control output 1                              |
| A8      | SO1-   |   |
| A9      | SI-COM | Control input common                          |
| A10     | SI1    | Control input 1                               |
| A11     | SI2    | Control input 2                               |
| A12     | SI4    | Control input 4                               |
| A13     | SI7    | Control input 7                               |
| A14     | SI10   | Control input 10                              |
| B1      | OA+    | A-phase output /<br>Position compare output 1 |
| B2      | OA-    |   |
| B3      | OB+    | B-phase output /<br>Position compare output 2 |
| B4      | OB-    |   |
| B5      | OZ+    | Z-phase output /<br>Position compare output 3 |
| B6      | OZ-    |   |
| B7      | SO2+   | Control output 2                              |
| B8      | SO4+   | Control output 4                              |
| B9      | SO-COM | Control output common                         |
| B10     | GND    | Signal ground                                 |
| B11     | AIN    | Analog input (Note 1)                         |
| B12     | SP     | Analog output monitor                         |
| B13     | GND    | Signal ground                                 |
| B14     | FG     | Frame ground                                  |

Pin layout



(Note 1) This function cannot be used with [A6SG].

**Input signal (control)**

| Name                 | Symbol | Pin No. | Description   | Circuit |
|----------------------|--------|---------|---|---------|
| Control input common | SI-COM | A9      | <ul style="list-style-type: none"><li>• It is connected with the positive or negative electrode of the external DC power supply (12 - 24 V).</li><li>• Use 12 V (±5 %) to 24 V (±5 %) for power supply</li></ul>  | i-1     |
| Control input 1      | SI1    | A10     | <ul style="list-style-type: none"><li>• Functions are allocated according to parameters.</li><li>For details, refer to “Technical reference - Basic Functional Specifications -”.</li><li>• Note that there are limitations on function allocation.</li></ul> |         |
| Control input 2      | SI2    | A11     |   |         |
| Control input 4      | SI4    | A12     |   |         |
| Control input 7      | SI7    | A13     |   |         |
| Control input 10     | SI10   | A14     |   |         |

**Input signal (pulse train command)**

Pulse train interface with Photo coupler

| Name                | Symbol | Pin No. | Description   | Circuit |
|---------------------|--------|---------|---|---------|
| Command pulse input | OPC1   | A1      | <ul style="list-style-type: none"> <li>Input terminal for the position command pulse.</li> <li>Disabled in such control modes as the speed control or the torque control, which does not require position commands.</li> <li>The maximum allowable input frequency is 500 kpps for line driver input, and 200 kpps for open collector input.</li> </ul> | Di-1    |
|                     | PULS1  | A3      |   |         |
|                     | PULS2  | A4      |   |         |
| Command sign input  | OPC2   | A2      |   |         |
|                     | SIGN1  | A5      |   |         |
|                     | SIGN2  | A6      |   |         |

**Input signal (analog command)**

| Name                  | Symbol | Pin No. | Description   | Circuit |
|-----------------------|--------|---------|---|---------|
| Analog input (Note 1) | AIN    | B11     | <ul style="list-style-type: none"> <li>Analog input with 16 bit resolution.</li> <li>The maximum allowable input voltage is <math>\pm 10</math> V</li> <li>The function changes according to the control mode.</li> </ul> | Ai-1    |

(Note 1) This function cannot be used with [A6SG].

**Output signal (control)**

| Name                  | Symbol       | Pin No.  | Description  | Circuit |
|-----------------------|--------------|----------|--|---------|
| Control output 1      | SO1+<br>SO1- | A7<br>A8 | <ul style="list-style-type: none"> <li>Functions are allocated according to parameters.</li> <li>For details, refer to "Technical reference - Basic Functional Specifications -".</li> </ul>                 | o-1     |
| Control output 2      | SO2+         | B7       |  | o-2     |
| Control output 4      | SO4+         | B8       |  |         |
| Control output common | SO-COM       | B9       | <ul style="list-style-type: none"> <li>Connect to the negative terminal of an external DC power supply (12 to 24 V)</li> <li>The power capacity varies depending on a composition of I/O circuit.</li> </ul> |         |

**Encoder output signal / Position compare output signal**

| Name  | Symbol          | Pin No. | Description   | Circuit |
|---|-----------------|---------|---|---------|
| A-phase output /<br>Position compare output 1 | OA+ /<br>OCMP1+ | B1      | <ul style="list-style-type: none"> <li>Encoder signals or external scale signals for which frequency division was performed (A-phase, B-phase) are output as differential signals. (Equivalent to RS422)</li> <li>The division ratio can be set for the corresponding parameter.</li> <li>The ground of the line driver for the output circuit is connected to the signal ground (GND), i.e. non-insulated.</li> <li>The maximum output frequency is 4 Mpps (after quad edge evaluation).</li> <li>This differential signal should be received by a line receiver. (AM26C32 or equivalent).</li> <li>Connect a terminating resistor (approx. 330 Ω) between the line receiver inputs.</li> <li>Use a twisted pair cable with shield for wiring, and connect the shield wire to the connector shell.</li> <li>By setting bit 0 - bit 2 = 1 of Pr4.47 "Pulse output select", position compare function can be available.</li> </ul> | Do-1    |
|   | OA- /<br>OCMP1- | B2      |   |         |
| B-phase output /<br>Position compare output 2 | OB+ /<br>OCMP2+ | B3      |   |         |
|   | OB- /<br>OCMP2- | B4      |   |         |
| Z-phase output /<br>Position compare output 3 | OZ+ /<br>OCMP3+ | B5      |   |         |
|   | OZ- /<br>OCMP3- | B6      |   |         |

**Analog monitor signal**

| Name                  | Symbol | Pin No. | Description   | Circuit |
|-----------------------|--------|---------|---|---------|
| Analog monitor output | SP     | B12     | <ul style="list-style-type: none"> <li>Analog signal output for monitoring</li> <li>Monitoring object changes according to the parameter setting.</li> <li>Don't use analog output as command at power on and off.</li> </ul> | Ao-1    |

**Other**

| Name          | Symbol | Pin No.    | Description  | Circuit |
|---------------|--------|------------|--|---------|
| Frame ground  | FG     | B14        | Internally connected to the case.  | —       |
| Signal ground | GND    | B10<br>B13 | <ul style="list-style-type: none"> <li>Signal ground</li> <li>Internally insulated from Control output common (SO-COM).</li> <li>Internally connect to N-pin of power supply connector <b>XA-1</b> and <b>XA-2</b>.</li> </ul> | —       |



7-7 External feedback device connector **X5**

This connector is supported only for the multi-function type.

| Name  | Symbol | Pin No. | Description  |
|---|--------|---------|--|
| External scale power output                               | EX5V   | 1       | • External scale power output (Note 2) (Note 3)          |
|   | EX0V   | 2       | • Ground of external scale power output (Note 1)         |
| External scale signal input/output (Serial signal)        | EXPS   | 3       | • Serial signal non-inverting input/output               |
|   | /EXPS  | 4       | • Serial signal inverting input/output                   |
| External scale signal input (A/B/Z-phase signal) (Note 4) | EXA    | 5       | • A-phase signal non-inverting input                     |
|   | /EXA   | 6       | • A-phase signal inverting input                         |
|   | EXB    | 7       | • B-phase signal non-inverting input                     |
|   | /EXB   | 8       | • B-phase signal inverting input                         |
|   | EXZ    | 9       | • Z-phase signal non-inverting input                     |
|   | /EXZ   | 10      | • Z-phase signal inverting input                         |
| Frame ground  | FG     | Shell   | • It is connected with the case inside the servo driver. |

(Note 1) The external scale power output EX0V is connected with the control circuit ground that is connected to connector **X4**.

(Note 2) The external scale power output EX5V should be 5 V $\pm$ 5% and 250 mA at the maximum.

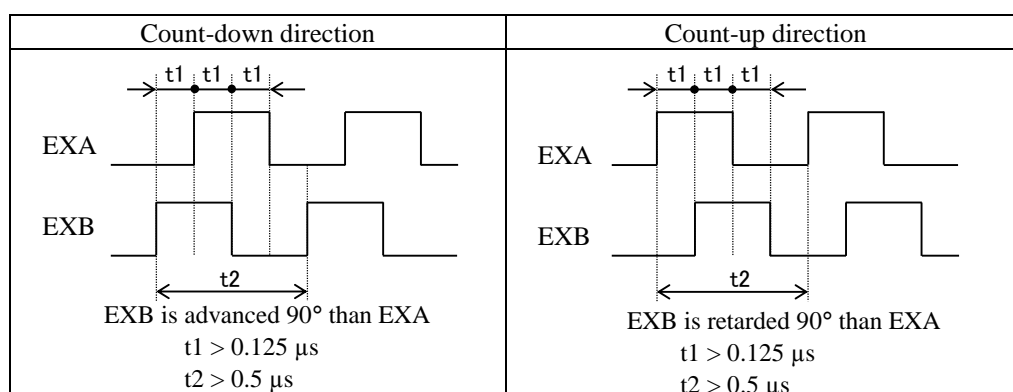
When using an external scale whose consumption current exceeds this value, external power supply should be prepared by the customer. It may take time to perform initialization after power-on, depending on external scales. In that case, it is possible to adjust by adjusting the parameter "power-on wait time" of the servo amplifier.

For details, refer to the technical data-Basic function specifications-.

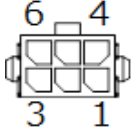
(Note 3) In case an external power supply is used for the external scale, make sure that the EX5V pin is open and no external power is supplied to the EX5V pin.

(Note 4) The maximum input frequency is 8 Mpps (after quad edge evaluation).

However, if the duty ratio of the external scale signal input is not 50%, it may not be able to be read normally.



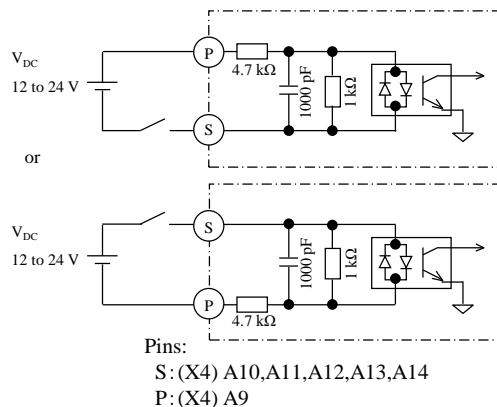
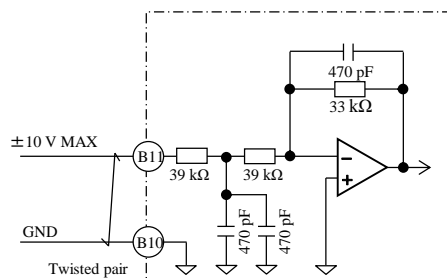
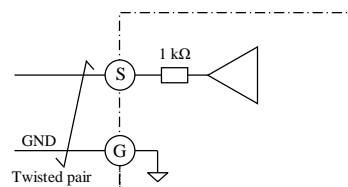
7-8 Encoder connector **X6**

| Name                                  | Symbol | Pin No. | Description                               | Layout  |
|---------------------------------------|--------|---------|---|---|
| —                                     | —      | 1       | Do not connect.                           |  |
| Encoder signal I/O<br>(serial signal) | PS     | 2       | Encoder signal non-inverting input/output |   |
|                                       | /PS    | 3       | Encoder signal inverting input/output     |   |
| Encoder power supply output           | E5V    | 4       | E5V (*Note 1)                             |   |
|                                       | E0V    | 5       | E0V (*Note 2)                             |   |
| Frame ground                          | FG     | 6       | FG  |   |

\*Note 1) The encoder power output E5V is connected with the control circuit ground that is connected to connector **X5** inside the servo driver.

\*Note 2) The encoder power output E0V is connected with the control circuit ground that is connected to Pin.1(E5V) of connector **X5** and signal ground of connector **X4** inside the servo driver.

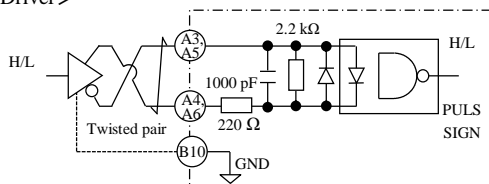
## 7-9 Input / output signal interface

i-1Ai-1Ao-1

S: (X4) B12,  
G: (X4) B10, B13  
Note) Outputting signal amplitude is  $\pm 10$  V

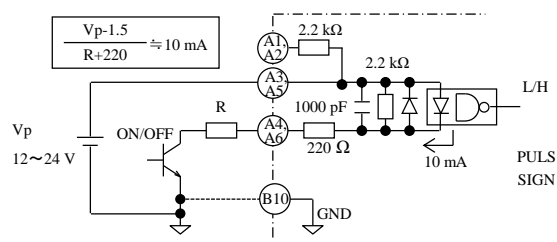
Di-1

## &lt;Line Driver&gt;

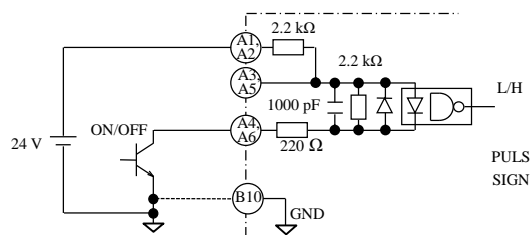
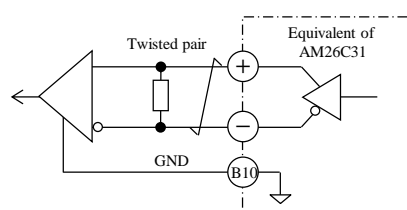


## &lt;Open Collector&gt;

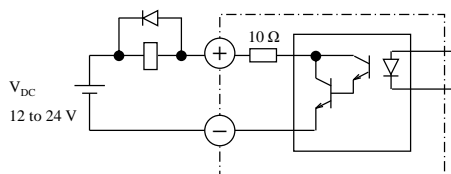
## ① 12-24 V Power supply with external resistor



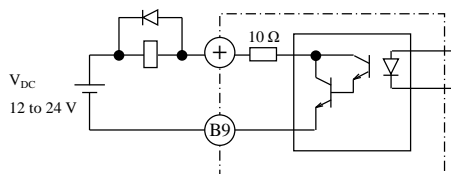
## ② 24 V Power supply without external resistor

Do-1

Note) Connect a terminating resistor (approx. 330  $\Omega$ ) between the input terminals of the line receiver.

o-1

Pins:  
+: A7    -: A8  
Note) To directly run the relay, attach a diode in parallel with the relay and in the direction shown in the figure above.

o-2

Pins:  
+: B7, B8  
Note) To directly run the relay, attach a diode in parallel with the relay and in the direction shown in the figure above.

## 8. Wiring and system configuration

## 8-1 Wire rods used and maximum wiring length

| Name  | Symbol | Maximum cable length (*Note 1) | Used cable  |
|---|--------|--------------------------------|---|
| Main power supply                           | XA-1   | 3 m                            | In accordance with<br>“15. Specifications for Each Model”                   |
| Control power supply                        | XA-2   | 3 m                            |   |
| Motor connection                            | XB     | 3 m                            |   |
| Encoder connection                          | X6     | 3 m                            | Common shielded twisted pair wire<br>Core wire 0.18 mm <sup>2</sup> or more |
| External feedback scale connection (Note 2) | X5     | 3 m                            |   |
| I/O connection                              | X4     | 3 m (Note 3)                   |   |

(Note 1) The above wiring length is the maximum value under the evaluation environment of Panasonic.

It does not guarantee the operation under the working environment of the customer.

The above wiring length is the maximum wiring length including tolerance of processing.

(Note 2) It is supported for the multi-function type only.

(Note 3) If use Open collector interface, maximum wiring length becomes 1 m.

## 8-2 Cable-Side connector

| Connector symbol | Part name          | Part number                         | Manufacturer     |
|------------------|--------------------|-------------------------------------|------------------|
| XA-1             | Receptacle Housing | F31FSS-03V-KX                       | J.S.T. Mfg.      |
|                  | Receptacle pin     | SF3F-**GF-P2.0<br>( ** = 41 or 71 ) |                  |
| XA-2             | Receptacle Housing | 5557-02R-210                        | Molex            |
|                  | Receptacle pin     | 5556TL                              |                  |
| XB               | Receptacle Housing | F31FSS-04V-KX                       | J.S.T. Mfg.      |
|                  | Receptacle pin     | SF3F-**GF-P2.0<br>( ** = 41 or 71 ) |                  |
| X2               | Connector          | 2040008-1                           | Tyco electronics |
|                  |                    | CIF-PCNS08KK-072R                   | J.S.T. Mfg.      |
| X4               | Receptacle Housing | 1-1827863-4                         | Tyco electronics |
|                  | Receptacle pin     | 1827587-2                           |                  |
| X5               | Connector          | MUF-PK10K-X                         | J.S.T. Mfg.      |
| X6               | Connector          | 794617-6                            | Tyco Electronics |
|                  | Pin                | 1-794610-2                          |                  |
|                  | Connector          | 43025-0600                          | Molex            |
|                  | Pin                | 43030-0002                          |                  |

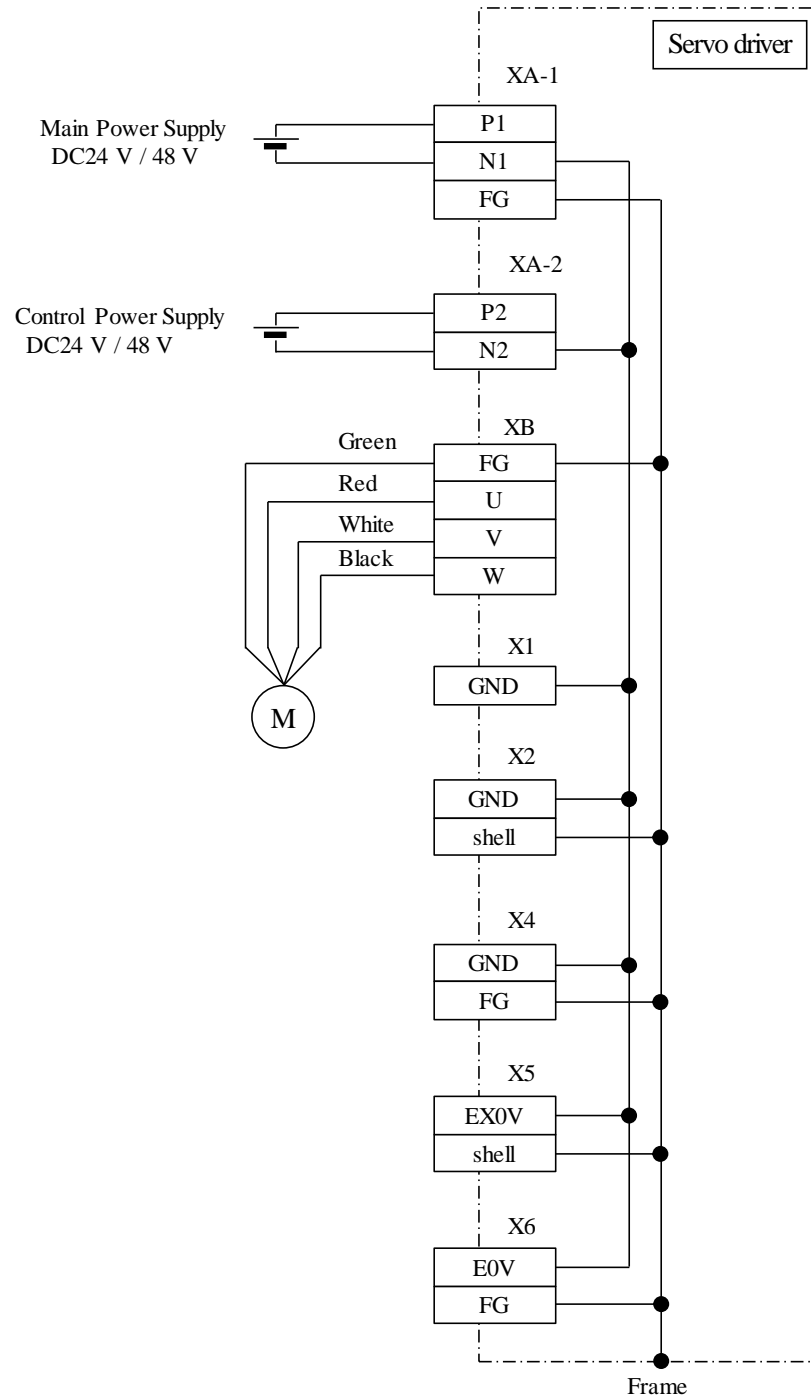
Use the above connector or equivalent.

## 8-3 Precautions for wiring

## 8-3-1 Wiring to the power connector

Below figure shows a multi-function type. The RS485 communication type is not provided with X5 (external scale connector) .

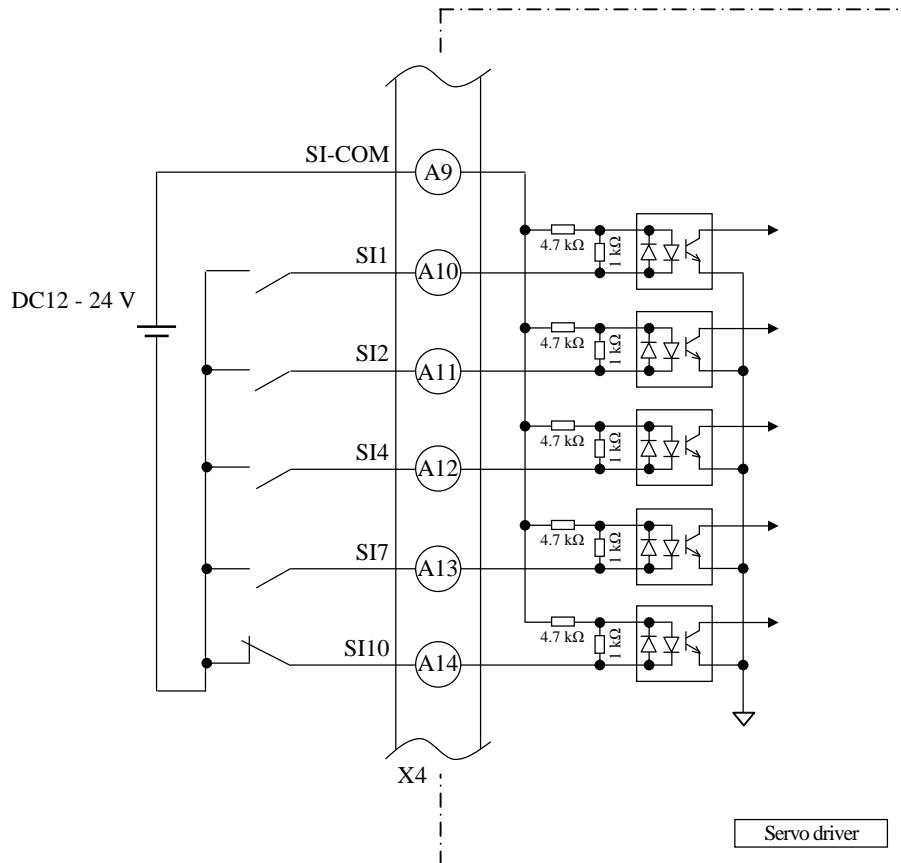
Below figure don't shows the all pins of each connectors.



- [1] The DC power supply might have a trip to protect its components from over-voltage that is caused by the regenerated energy from motor. In that case, it is necessary to install the diode for protecting from the feedback current and also to install the DC bus capacitor for storing the regenerated energy between the DC power supply and drivers.
- [2] So that the specified voltage at the input servo driver, consider the transient voltage drop due to the impedance wiring, select both the diameter of the power line and the length.
- [3] This servo driver does not mount the inrush current limit circuit. Inrush current is dependent on the characteristics and wiring impedance of the connection power, please check the actual machine.
- [4] This servo driver does not have a protective earth terminal because it is assumed to be connected to a stabilized power supply with reinforced insulation.  
The case is a functional ground.
- [5] Insert the connector securely until it is locked.
- [6] Apply power supply voltage as specified in the rating plate.
- [7] Install a molded-case circuit-breaker (MCCB), and in an emergency, be sure to shut off power supply outside the servo driver. When using an earth leakage breaker, take measures against high frequency.
- [8] Brake power supply for the motor with brake should be prepared by customer.
- [9] Apply power supply voltage after completing wiring.

8-3-2 Wiring to connector **X4**

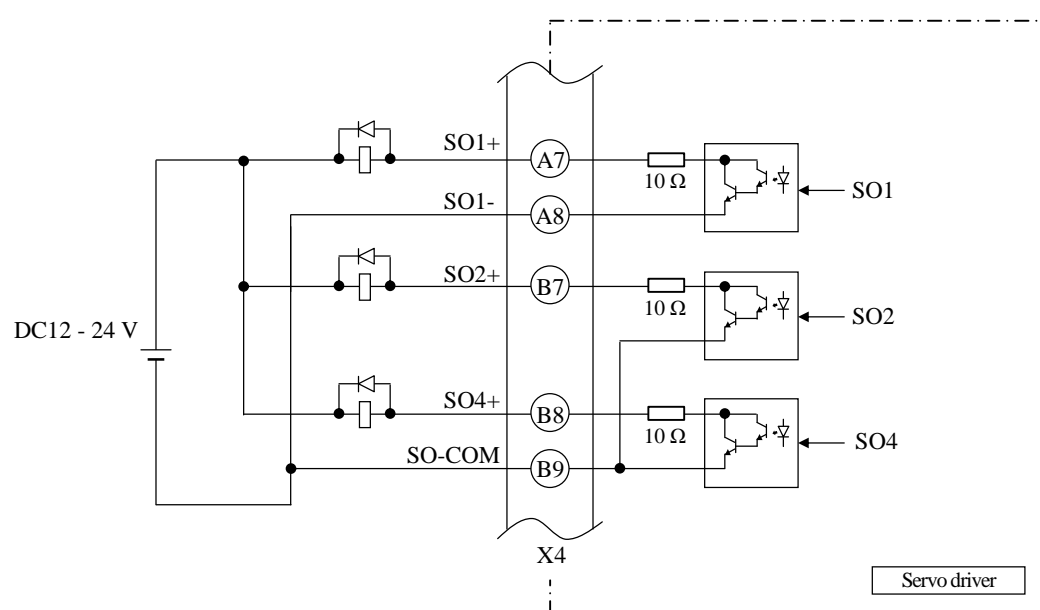
- [1] The customer is required to prepare the 12 to 24 VDC control signal power supply for external control to be connected to SI-COM and SO-COM.
- [2] Install peripheral devices close to the servo driver as much as possible so that wiring length is minimized (within 3 m).
- [3] Keep the wires away from the wiring of the power lines ( P1, N1, P2, N2, U, V, W, FG ) as much as possible (at least 30 cm). Do not route the wires through the same duct and do not tie them together.

**Control input**

The functions of pins A10-A14 should be allocated by parameters.  
For details, refer to “Technical Reference - Functional Specifications -”.

**Control output**

- [1] Pay attention to the polarity of the control signal power supply. Connection to the polarity opposite to that in the figure can cause damage to the servo driver.
- [2] When driving the relay directly using each output signal, be sure to mount a diode in parallel with the relay in the direction shown in the figure below. If a diode is not mounted or it is mounted in the reverse direction, the servo driver may be damaged.
- [3] When receiving each output signal by a logical circuit such as a gate, be careful not to be affected by noise.
- [4] The rated current, maximum current, and rush current applied to each output should be 40 mA, 50 mA, and 90 mA or less respectively.
- [5] A limiting resistor (10  $\Omega$ ) is connected to the output circuit.  
For the purpose of Darlington connection of the output transistor, voltage between the collector and the emitter  $V_{CE(SAT)}$  is approx. 1 V when the transistor is turned ON.  
Note that direct connection is impossible because the normal TTL IC cannot satisfy the VIL.

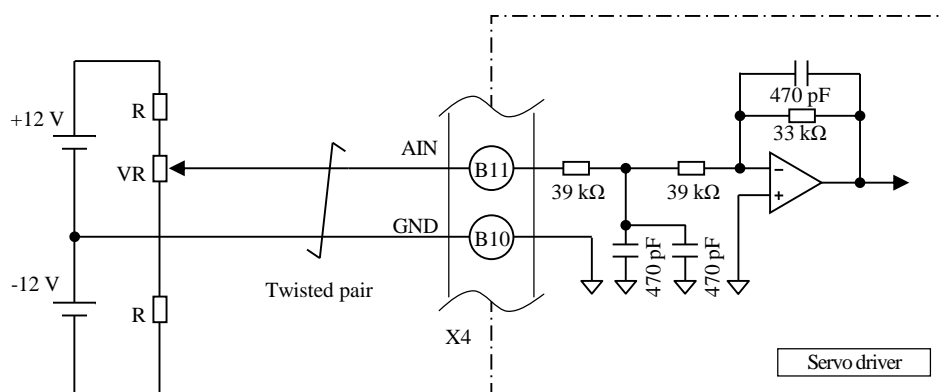


The functions of pins A7, A8, B7, B8 should be allocated by parameters.  
For details, refer to “Technical Reference - Functional Specifications -”.



**Analog signal input**

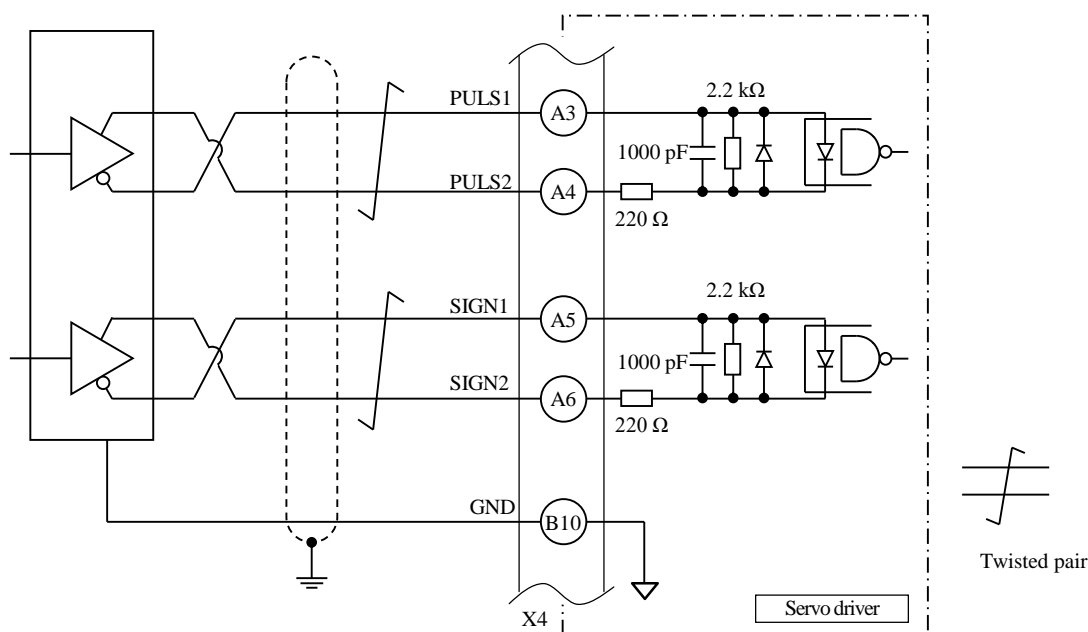
When configuring a simple command circuit using a variable resistor (VR) and resistors (R), it is as shown below.

**Pulse train command**

The pulse train command input can support both line driver and open collector interfaces, but in order to increase the certainty of signal transmissions, we recommend you to use the pulse train command input as an line driver interface as shown in the figure below.

Be aware that the line driver and open collector interfaces differ from each other in the connection to the servo driver.

● Line driver interface

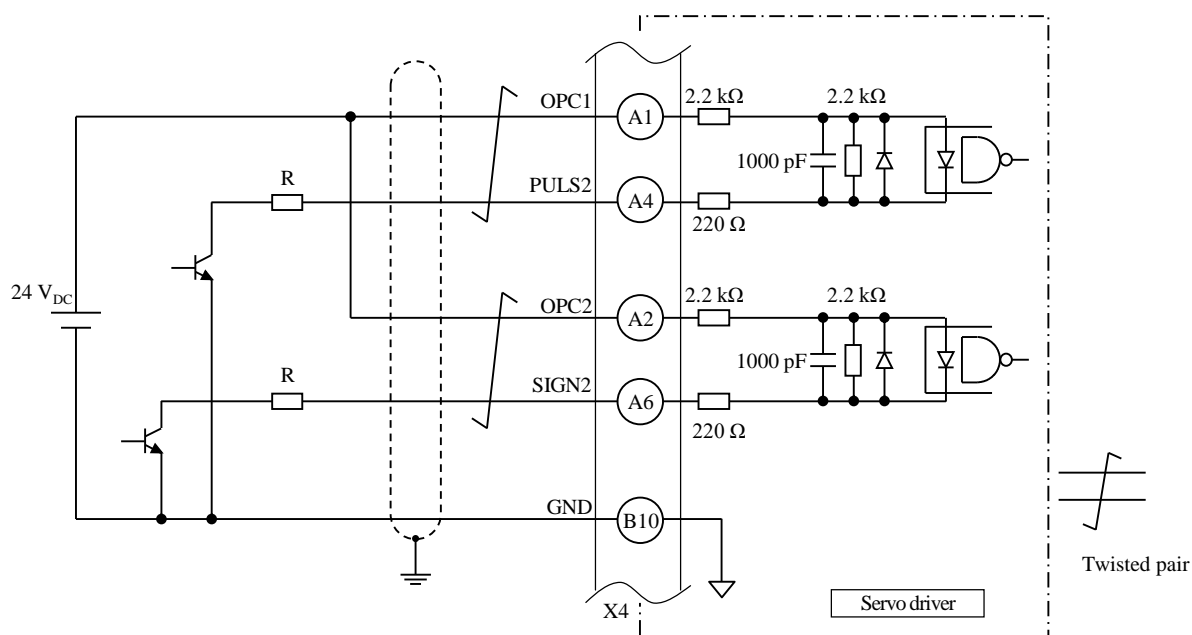
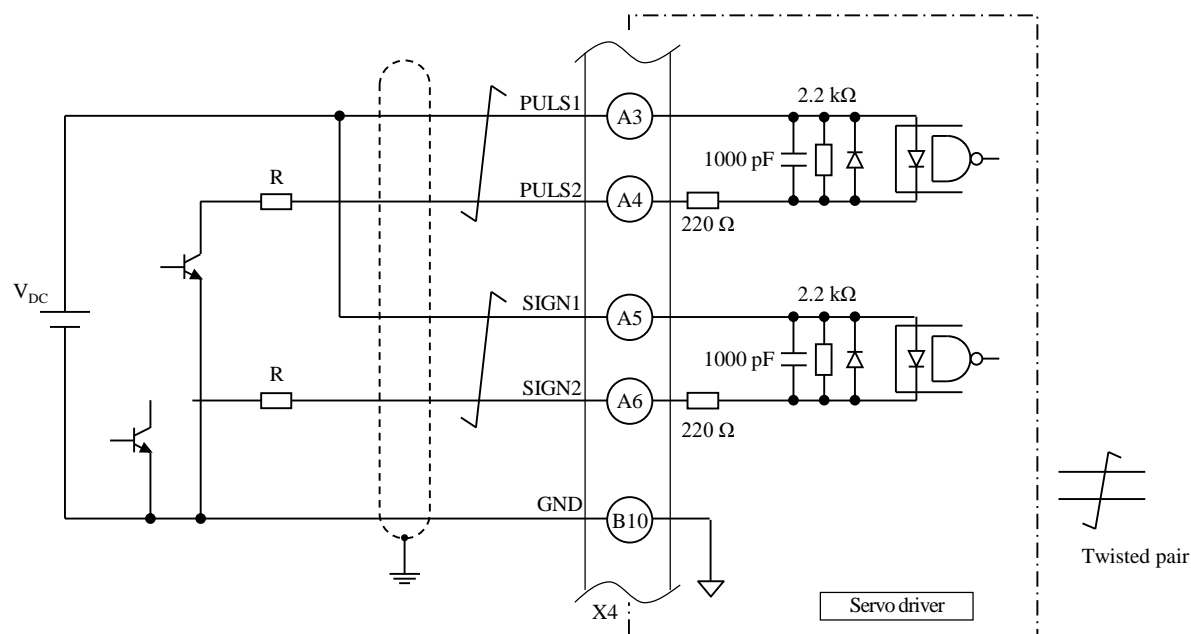


Allowable output voltage range of line driver :  $3.1\text{ V} \leq \text{VOH} - \text{VOL} \leq 4.7\text{ V}$

If the above condition cannot be satisfied, the input signal may be disturbed and the operation of the servo motor may become unstable.

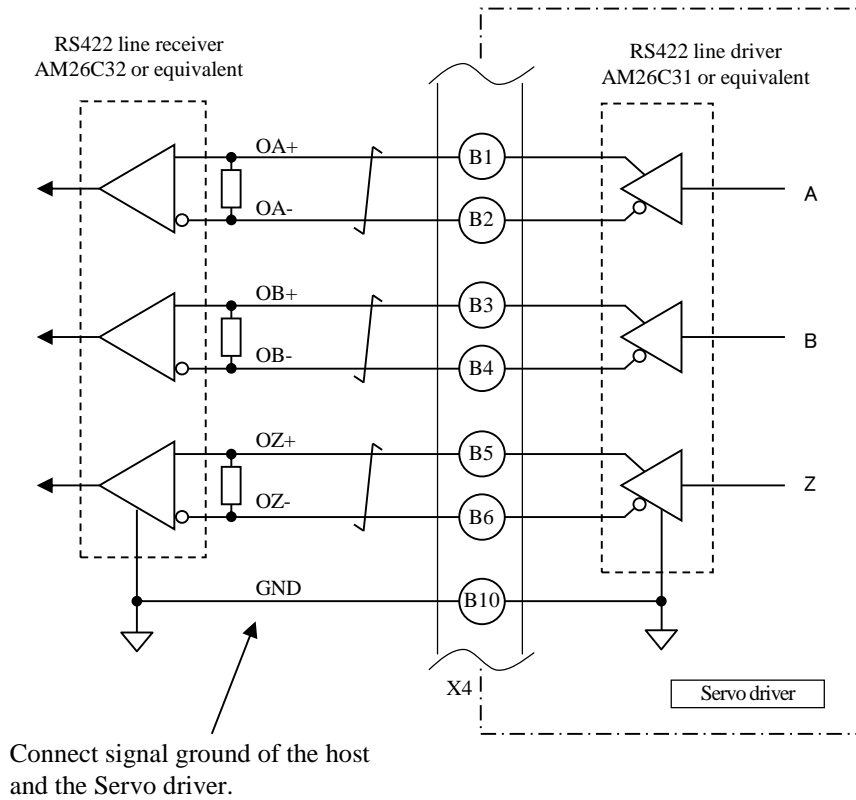
● Open collector interface

$$\frac{V_{DC} - 1.5}{R + 220} = 10 \text{ mA}$$



Note: Precautions for using the command pulse input as an open collector interface

- Shorten the wire length (up to 1 m).
- Be aware that the maximum pulse frequency of the open collector interface is small (200 kpps) compared with that (500 kpps) of the line driver interface.

**Feedback pulse of the rotary encoder**

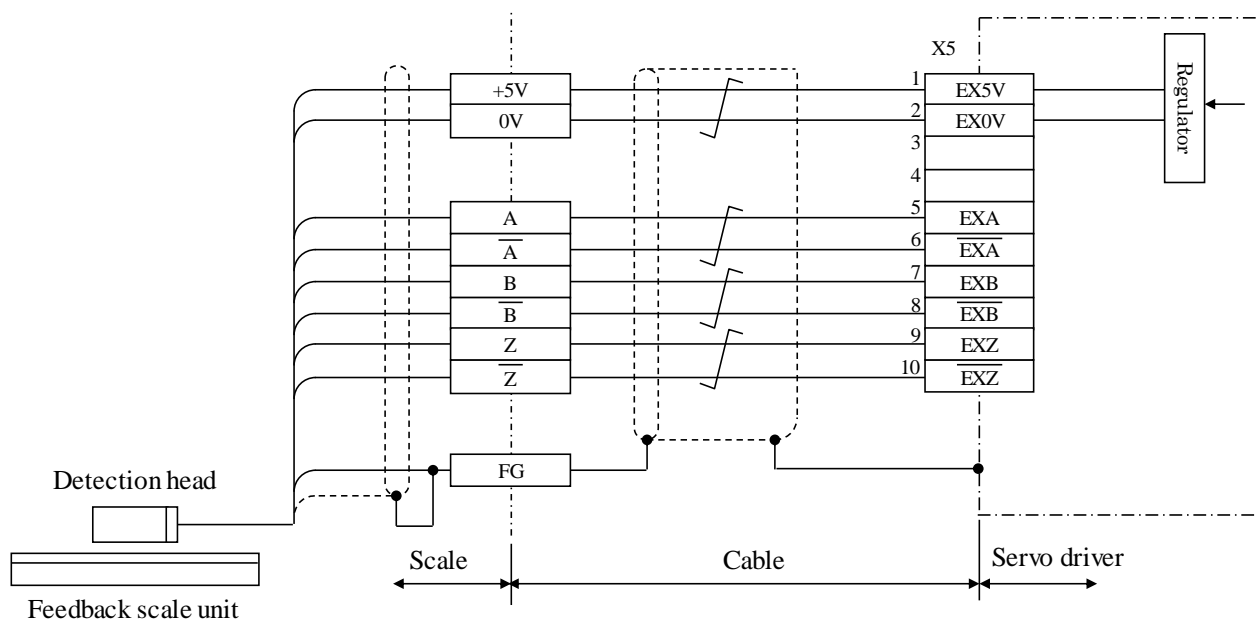
Note:

- [1] Use an RS422 line receiver (AM26C32 or equivalent) to receive output pulse.  
At that time, mount an appropriate terminating resistor (approx. 330  $\Omega$ ) between the line receiver inputs.
- [2] The maximum output frequency should be 4 Mpps (after quad edge evaluation) or less.

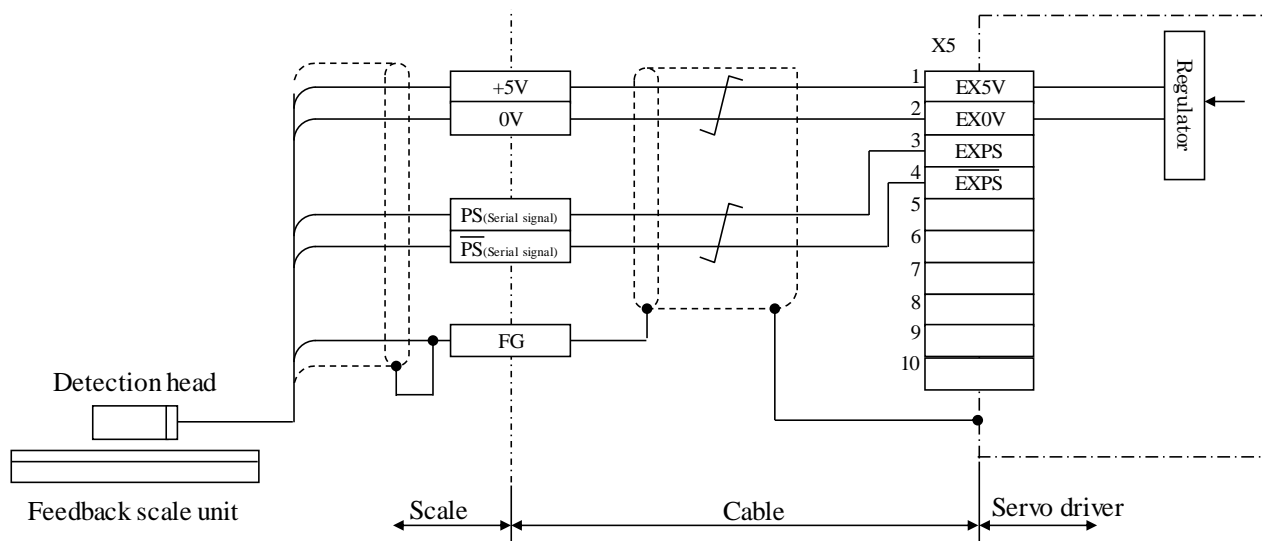
8-3-3 Wiring to connector **X5**

- [1] It is supported for the multi-function type only.
- [2] The core wire of the external scale cable should be a strand wire of 0.18 mm<sup>2</sup> or more. Use a common shielded twisted pair wire.
- [3] The maximum cable length should be 3 m or less. If the wiring length is long, double wiring is recommended for the 5 V power supply to reduce influence of voltage drop.
- [4] Connect the exterior covering of the shield wire on the motor side to the shield of the shield wire from the external scale.  
Be sure to connect the exterior covering of the shield wire on the servo driver side to the shell of **X5** (FG).
- [5] Keep the wires away from the wiring of the power lines (P1, N1, P2, N2, U, V, W, FG ) as much as possible (at least 30 cm). Do not route the wires through the same duct and do not tie them together.
- [6] Do not connect anything to the idle pin of **X5**.
- [7] Power that can be supplied from **X5** is max. 5 V $\pm$ 5% and 250 mA. When using an external scale whose consumption current exceeds this value, the corresponding power supply should be prepared by the customer. It may take time to perform initialization after power-on, depending on external scales. Make a design so as to satisfy the operation timing after supplying power.
- [8] When driving an external scale using external power supply, make the EX5V pin open so that voltage is not supplied to this pin from outside. In addition, connect 0 V (GND) of the external power supply with EX0V ( **X5** 2pin) of the driver to obtain the same electric potential.

### Wiring example of A/B phase, the origin signal differential input type

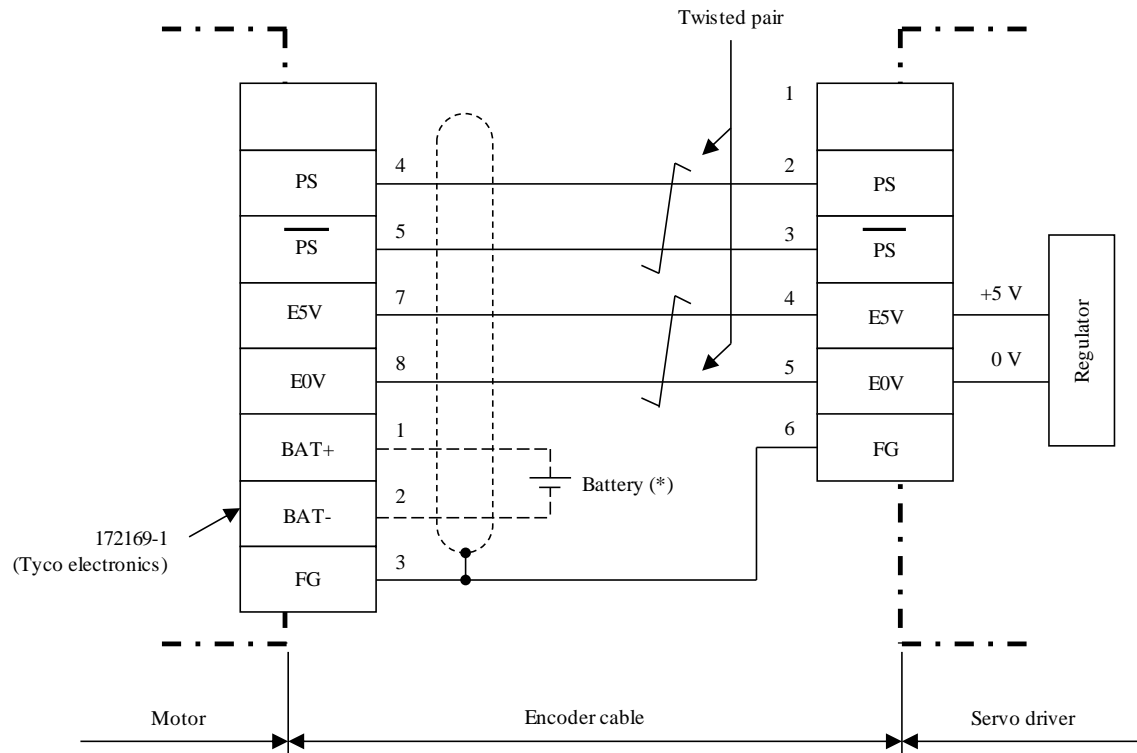


### Wiring example of the serial communication type



8-3-4 Wiring to connector **X6**

- [1] The core wire of the encoder cable should be a strand wire of 0.18 mm<sup>2</sup> or more. Use a common shielded twisted pair wire.
- [2] The maximum cable length should be 3 m or less. If the wiring length is long, double wiring is recommended for the 5 V power supply to reduce influence of voltage drop.
- [3] Be sure to connect the shield wires of the encoder cable to the FG terminal on the motor side and the shell of **X6** (FG) on the servo driver side.
- [4] Keep the wires away from the wiring of the power lines (P1, N1, P2, N2, U, V, W, FG ) as much as possible (at least 30 cm). Do not route the wires through the same duct and do not tie them together.



(\*) When not use absolute system, remove battery.

### Precautions when using the battery for the absolute encoder

- If the battery voltage drops, an error occurs in the absolute encoder.  
Voltage drop is caused by either the end of the battery life or a voltage delay.
  - [1] Note that the battery life is shortened depending on surrounding environmental conditions.
  - [2] A lithium battery has the minimum transient voltage (voltage delay phenomenon). Voltage may drop temporarily when the battery starts discharging current. Therefore, it is necessary to refresh the battery before using it.
    - <When using the battery for the first time>
 

If you use battery unit DV0P2990 (built-in battery: ER6V 3.6V made by TOSHIBA LIFESTYLE PRODUCTS & SERVICES), which is an optional item of Panasonic, connect the connector with lead wire to CN601 as shown in the right figure and set it aside for five minutes.

Then, disconnect the connector from CN601 and attach it to the servo driver.

Even when a battery is prepared by the customer, it is recommended to perform refreshing before using it. For the refreshing procedure, consult with the corresponding battery manufacturer.
    - <After mounting the battery unit>
 

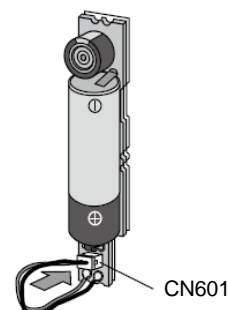
It is recommended to perform turning ON/OFF of the control power supply approx. once in a day.
- Incorrect use of the battery can cause troubles such as corrosion of the product due to leakage from the battery or risks such as breakage of the battery. Therefore, be sure to observe the following.
  - [1] Make sure that the directions of the positive and negative electrodes are correct.
  - [2] If the battery that has been used for a long period or the battery that cannot be used any more is kept set in the device, troubles such as leakage may occur. Replace it with a new one promptly. (As a guide, it is recommended to replace the battery every two years.)
    - The electrolytic solution of the battery is not only highly corrosive, which corrodes peripheral parts, but also conductive, which can cause short circuiting. Periodical replacement is needed.
  - [3] Do not dismantle the battery and do not put it into a fire.
    - Never dismantle it because it is very dangerous if the scattered content enters the eye. Putting it into a fire or heating it may cause a bursting, which is dangerous.
  - [4] Do not short circuit the battery and do not peel the battery tube.
    - If a metal or the like touches the positive or negative electrode terminal of the battery, large current is applied at a time, which weakens the battery.

Further, heavy heat generation may occur, resulting in bursting, which is dangerous.
  - [5] This battery cannot be charged. Do not charge the battery.
- Disposal of the used battery after replacement is regulated by some municipalities. Dispose of the battery according to the regulations of each municipality.
- Air transportation
 

At the time of transportation by aircraft (both passenger airplane and cargo airplane), it is necessary to make an application with regard to hazardous materials. (UN packaging is required.)

When requesting air transportation, it is required to submit necessary documents (such as a parameter sheet and SDS) to the transport company. Please make the request for it via the distributor.
- UN packaging
 

For details, contact each transport company.



#### 8-4 Dynamic brake

The servo driver has a dynamic brake built in for emergency stop.

The dynamic brake can be operated in the following cases.

- [1] When power supply is turned off
- [2] When the servo is turned off
- [3] When the protective function is operated
- [4] When drive prohibiting input (POT, NOT) of connector X4 is operated

During deceleration in the above cases [1] to [4] or after the stop of the servo driver, whether the dynamic brake is operated or free run is applied can be selected by setting the parameter.

However, when the control power input is turned off, the dynamic brake of the servo driver is kept operated.

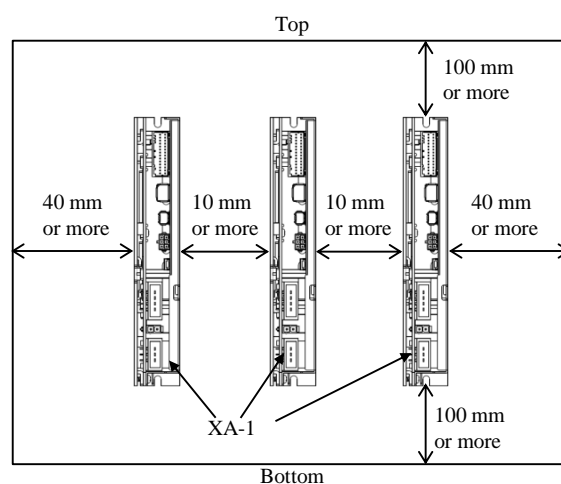
The dynamic brake is provided only for the short-time usage in case of emergency stop.

Therefore, note the following points.

- [1] Do not start or stop operation by turning on/off the servo ON signal. Otherwise, the dynamic brake circuit built in the servo driver may get damaged.
- [2] Do not drive the motor with external power.  
If the motor is driven from outside, it will work as a generator. Therefore, short circuit current is applied during operation of the dynamic brake, which can cause smoking or ignition. In addition, the dynamic brake may be disconnected, which can cause disabling the operation.
- [3] If the dynamic brake is operated during high-speed operation, provide stop time for approx. 10 minutes.  
If the dynamic brake is used beyond that condition, the brake may be disconnected, which can cause disabling the operation.

#### 8-5 Mounting direction and interval

- Install the servo driver in an environment of Pollution degree 2 or 1, such as in the control panel of IP54 or more.
  - Secure the surrounding space for effective cooling.
  - Satisfy the environmental conditions for the inside of the control panel.
  - Fix the servo driver to the conductive frame.
  - If the servo driver is mounted to a painted portion, anti-noise measures can be taken by installing it after peeling off the paint.
  - The temperature around the servo driver should be measured at a position 50 mm away from the side or bottom surface of the driver. If it is impossible to measure the temperature at a position 50 mm away from it, perform measurement at the mid point in the clearance between the obstacle and the driver.
  - As shown below, install the servo amplifier so that the connector XA - 1 faces downward.
- When other installation directions, use at ambient temperature of 45 ° C or less.





## 9. Compliance with the international standards

### 9-1 List of compatible standards for the servo driver

|                       |                       | Applicable standard   |
|-----------------------|-----------------------|---|
| European EU Directive | EMC directive         | EN 55011:2009/A1:2010 (Group 1, Class A)<br>EN61000-6-2<br>EN61000-6-4<br>EN 61800-3:2004/A1:2012 (Category C3, Second environment) |
|                       | Low voltage directive | EN61800-5-1   |
| UL standard           |                       | UL61800-5-1 (File No. E164620)<br>Power conversion equipment - component  |
| CSA standard          |                       | C22. 2 No. 274-13   |
| KC                    |                       | KN11<br>KN61000-4-2,3,4,5,6,8,11  |

EN : Europaischen Norman  
 UL : Under writers Laboratoris  
 CSA : Canadian Standards Association  
 KC : Radio Waves Act(South Korea)

### 9-2 European Communities Directive

We achieve compliance with the standards related to the Low Voltage Directive, so that the embedded machines and devices can easily comply with the EC Directive.

#### 9-2-1 Compliance with the EMC directive

EN 55011

Warning: Class A equipment is intended for use in an industrial environment.

In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

EN 61800-3

This type of PDS is not intended to be used on a low-voltage public network which supplies domestic premises;

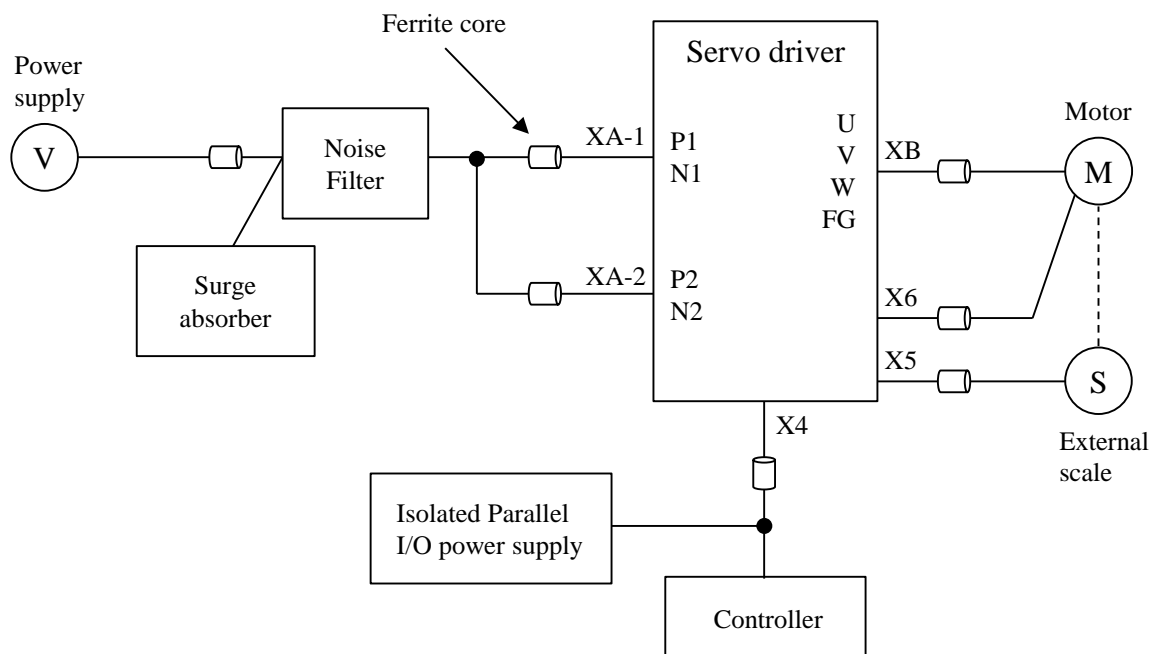
Radio frequency interference is expected if used on such a network.

The manufacturer shall provide a guide for installation and use, including recommended mitigation devices.

### 9-3 Configuration of peripheral devices

#### 9-3-1 Installation environment

Use the servo driver under the environment at pollution degree 2 or 1 stipulated in IEC60664-1.



#### 9-3-2 Power supply

DC power using stabilized power supply (SELV) are provided with reinforced insulation or double insulation.

|        |                 |               |
|--------|-----------------|---------------|
| DC24 V | DC20 V – DC29 V | +21 %<br>-17% |
| DC48 V | DC40 V – DC58 V | +21 %<br>-17% |

- (1) Use them under the environment of overvoltage category I defined in IEC60664-1.
- (2) Use insulated-type 12 to 24 VDC power supply for parallel I/O in compliance with the CE marking or the EN standard (EN60950).

#### 9-3-3 Noise filter

When using multiple units of servo drivers and installing one noise filter collectively in the power supply section, consult with the noise filter manufacturer.

#### 9-3-4 Surge absorber

Install a surge absorber on the primary side of the noise filter.

<Request>

When performing a withstand test for the machines and devices, be sure to remove the surge absorber.

Otherwise, the surge absorber may get damaged.

#### 9-3-5 Ferrite core

Install the ferrite cores for signal lines in all cables (power supply, motor, encoder, and interface cables).

## 9-4 List of servo drivers and applicable peripheral devices

|                | Optional part number | Part number of manufacturer | Manufacturer              |
|----------------|----------------------|-----------------------------|---------------------------|
| Noise filter   | —                    | SUP-EK15-ER-6               | Okaya Electric Industries |
| Surge Absorber | —                    | B3082                       | Okaya Electric Industries |
| Ferrite Core   | DV0P1460             | ZCAT3035-1330               | TDK                       |

\* The number of turns toward the ferrite core is once for each frame.

## Note

- Select a noise filter with a capacity suitable for the power supply capacity (in consideration of load conditions).

## 9-5 Compliance with the UL standard

## [1] Installation environment

Install the servo driver under the environment at pollution degree 2 stipulated in IEC60664-1.

Use copper conductor wires whose temperature rating is 75°C or higher.

## [2] Branch circuit protection

Protect the branch circuit in accordance with the NEC (National Electrical Code) and the local standard.

## [3] Overload protection and overheating protection

The servo driver has a built-in function to protect against servo motor overload.

The overload protection function is operated based on the specified time limit characteristics when current has reached 115% or more of the rating.

The servo motor is not provided with an overheating protection function.

When it is necessary to satisfy the NEC, implement overheating protection measures for the servo motor.

This servo driver has the thermal memory (shut down) function specified in EN61800-5-1: 2007 / A1:

2016, but does not have the thermal memory (loss of Power) and speed sensitivity functions.

## [4] Other

This servo driver is certified as “Component”.

## 9-6 Radio Waves Act of South Korea

The servo driver is a Class A device (broadcast communication device for business use) based on the Radio Waves Act of South Korea.

Use the product after understanding the following precautions.

**A 급 기기 (업무용 방송통신기자재)**

이 기기는 업무용(A 급) 전자파적합기기로서 판매자

또는 사용자는 이 점을 주의하시기 바라며, 가정외의

지역에서 사용하는 것을 목적으로 합니다.

( 대상기종 : **Servo Driver** )

[Reference translation]

Class A device (broadcast communication device for business use)

This product is an electromagnetic wave generating device for business use (Class A), which is intended for the use in places other than household.

The distributor and the user should be attentive to this point.

(Applicable model: Servo Driver)



# Safety Precautions

## 10. Safety Precautions

The following explanations are for things that must be observed in order to prevent harm to people and damage to property.

■ The degree of the injury or damage caused when using the product improperly is categorized and an explanation is provided.

|                |   |
|----------------|---|
| <b>DANGER</b>  | Indicates “actions carrying a significant risk of death or serious injury.”                 |
| <b>CAUTION</b> | Indicates “actions carrying the risk of the occurrence of minor injury or property damage.” |

■ The actions to be observed are explained with the following symbols.

|  |  |
|--|--|
|  | Indicates actions that must not be performed.          |
|  | Indicates actions that must be performed without fail. |



## DANGER



- (1) Use the product in an environment of pollution degree 2 or 1 (a place where the product will not come in contact with foreign matter such as dust, metal particles and oil mist, or liquids such as water, oil and polishing liquid). Avoid using the product near flammable objects, in an atmosphere of corrosive gas (such as H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, Cl<sub>2</sub>) or storing or using the product in an atmosphere of flammable gas.
- (2) Do not place inflammable material near a motor, a driver, or a regenerative resistance.
- (3) Do not drive the motor with external torque. Motor generates electricity by external torque. Dynamic brake circuit will be damaged and it is possible that short-circuit current cause smoke or combustion.
- (4) Do not damage the cable nor place too much stress or heavy object on the cable. Do not pinch the cable.
- (5) Do not operate the product while the cable is dipped in oil or water.
- (6) Do not install the equipment near a heating object such as a heater or a large wire-wound resistor. (Install a thermal shield, etc. to avoid the influences of heating object.)
- (7) Do not connect the motor to the commercial power source directly.
- (8) Do not use the equipment under conditions subject to strong vibrations or an impact shock. Please attach the anti-vibration equipment to servo driver mounting surface if you install the servo driver in the vicinity of the vibration source.
- (9) Be sure not to touch the rotating part of the motor during operation.
- (10) Do not touch the keyway of the output shaft of the motor with bare hands.
- (11) Be sure not to insert your hand into the driver and not to touch exposed part of printed-circuit board.
- (12) Do not touch the motor, the heat sink of the driver nor the surrounding equipment since they will be hot.
- (13) Do not perform wiring nor operate the product with wet hand.
- (14) Be sure that the wiring task is performed by electrical engineer.
- (15) There is no protective device attached to the motor other than the specified ones. Please protect them with an overcurrent protective device, a ground-fault circuit interrupter, an over temperature preventing device, an emergency stop device, and the like.



# Safety Precautions



## DANGER



- (16) When starting operation of the driver after an earthquake, please make sure that there is no abnormality as to the installation condition of the driver and the motor and the safety of the machine before starting operation.
- (17) After turning off the power, the inside circuit remains charged at a high voltage for a while. When moving, wiring or inspection the equipment, completely shut off the power supply input outside the driver and leave for 15 minutes or longer before working.
- (18) To prevent causing fire or accident resulting in injury or death due to improper installation or mounting at the occurrence of earthquake, please install or mount the device securely.
- (19) Install an external emergency shutoff circuit to stop operation and interrupt power immediately upon emergency. Emission of smoke or dust may occur due to a fault of a motor or a driver used in combination. For example, if the system is energized with the regenerative control power transistor shorted by failure, overheating of a regenerative resistor installed outside the driver may occur and it may emit smoke and dust. If a regenerative resistor is connected outside a driver, provide a means of detecting overheating such as a thermal protector to shut off power upon detecting abnormal heating.
- (20) Install the motor, the driver, and the surrounding devices on nonflammables such as metal.
- (21) Perform wiring correctly and securely. Insecure and incorrect wiring may be the cause of abnormal motor operation and its damage by fire.  
Also, please make sure that no electrical conducting material such as a scrap of electric wire get inside the driver at the time of performing installation and wiring task.
- (22) Connect the cables securely, and firmly insulate the current-carrying part with insulating material.
- (23) When using a bundling wire is inserted into the metal ducts, because burning for wire allowable current is decreased by the temperature rise.
- (24) Be sure to install a fuseless breaker in a power supply. Be sure to connect grounding terminals and grounding wires. To prevent an electric shock and malfunction, grounding resistance at 100  $\Omega$  or lower is recommended.
- (25) Tighten the screws on the terminal block for connection securely at appropriate torque shown in the specifications of the driver.
- (26) When building a system by using the safety feature, design it by fully understanding and being compliant with the related safety standards and items described in our operation manual or technical reference.



## CAUTION



- (27) When transferring the product, do not hold the cable or the shaft of the motor.
- (28) Do not adjust or modify the gain of the driver extremely, nor let the operation or movement of the machine be unstable.
- (29) After recovering from power failure, do not get close to the machine because there is a possibility that the machine restarts suddenly.  
Setting must be made to the machine so that safety for the worker is ensured when the machine restarted suddenly.
- (30) When the equipment is energized, keep away from the motor and mechanism driven by the motor in case of malfunction.
- (31) Do not apply strong shock to the shaft of the motor.
- (32) Be sure not to start or stop the motor with the electromagnetic contactor installed on the main power source side.
- (33) Do not switch on or off the main power supply of the driver frequently.
- (34) Since the brake built in the motor is used for maintenance, do not use it as a stopping device (braking) to ensure the safety of the machine.
- (35) Be careful not to drop or to topple over the product when transferring or performing installation task.



# Safety Precautions



## CAUTION



- (36) Do not clime on the motor or place heavy object on the motor.
- (37) Do not cover the louver on the driver nor insert foreign matter.
- (38) Do not use the product in an area exposed to direct sunlight. And when storing the product, avoid direct sunlight and keep the temperature and the humidity within the range specified for when the product is in use.
- (39) Never overhaul or modify the motor.  
Overhauling will be performed at our company or at the retailers approved by our company
- (40) Do not start/stop the a product by the turning on/off the servo ON command (SRV-ON).  
Otherwise the dynamic brake circuit built in the servo driver may get damaged.



- (41) Use the motor and the driver in the combination specified by our company. Please confirm the performance and the safety at customer when the motor is used in combination with another driver.
- (42) Due to the trouble with the motor or the driver combined, the motor may be damaged by fire, or smoking or dusting might occur. Please consider these possibilities when they are to be used in a clean room or the like.
- (43) Perform proper installation which is in proportion to the output and the weight of the main body.
- (44) Keep the ambient temperature and humidity of the installed motor within the range of allowable temperature and humidity.
- (45) Observe the specified installation method and the orientation of the product.
- (46) Keep a space as specified between the driver and the inner surface of the control panel, or between the driver and the other devices when installing the product.
- (47) Use the eyebolt attached to motor only for transferring the motor, but not for transferring the equipment. And do not use them with the speed reducer or heat sink attached to the motor.
- (48) Install a relay used to break the circuit at the time of emergency stop in series with the relay used to control the brake.
- (49) Fix the motor at the time of test run, and confirm its movement after isolating it from the mechanical system, and then mount it on the machine.
- (50) Verify that an input power supply voltage satisfies the driver specifications before turning on the power and start operation.  
An input voltage higher than rated may cause ignition and smoking in the driver, which may cause malfunction or burning of a motor in some cases.
- (51) When an alarm status occurs, remove a cause of the problem before restarting.  
Careless restarting without removing a cause of problem may cause malfunction or burning of a motor.
- (52) The brake built in the motor may not be maintained due to its life span, the mechanical structure, and so on. Please install a stopping device to ensure the safety on the machine side.
- (53) The driver generates heat by operating a motor. A driver used in a sealed box may cause an extreme rise of temperature.  
Consider cooling so that an ambient temperature around the driver satisfies an operating range.
- (54) Maintenance should be performed by the specialist.
- (55) If the product is not to be used for a long period of time, be sure to turn off the power.
- (56) Allow approx. 10 minutes pause when the dynamic brake is activated during high-speed running.  
Resistor is damaged and the dynamic brake might not work when using it under more critical operating condition.
- (57) Fix the cable so that stress is not applied to the connection parts such as the connector and terminal block.
- (58) Use stabilized power supply (SELV) provided with reinforced insulation.

- The capacity of the capacitor for the power supply circuit decreases over time. It is recommended to replace it every five years or so, in order to prevent secondary accidents due to malfunction. Replacement should be performed in our factory or our designated factory.



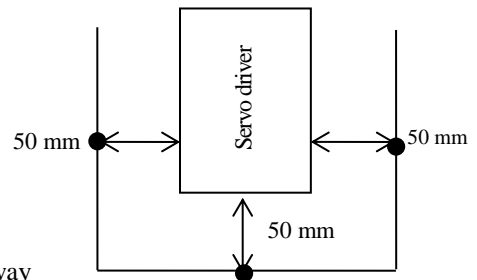
# Safety Precautions

## Temperature around the servo driver

The life span of the servo driver significantly depends on ambient temperature.

Make sure that temperature within 50 mm from the servo driver does not exceed the working temperature range.

If it is impossible to measure temperature in a place 50 mm away from the servo driver, perform measurement at the mid point in the clearance between the obstacle and the servo driver.



**Working temperature range: 0 - 55°C**

## 11. Life span

(This is not a guaranteed item.)

### 11-1 Expected life span of the servo driver

When the servo driver is used continuously under the following conditions, the expected life span is 28,000 hours. Definition of life ... The time from when the product is shipped until the capacity of the electrolytic capacitor is reduced by 20%

|            |                     |   |                               |
|------------|---------------------|---|-------------------------------|
| Conditions | Input power supply  | : | DC 24 V or DC 48 V            |
|            | Ambient temperature | : | 55 °C                         |
|            | Above sea level     | : | 100 m or less                 |
|            | Output torque       | : | Constant rated torque         |
|            | Rotation speed      | : | Constant rated rotation speed |

Life span changes significantly depending on working conditions.

## 12. Warranty

### 12-1 Warranty period

The manufacturer warrants the quality of its product for one year after purchasing by customer or one and a half year after the month of production at our factory. The warranty, however, is not applicable to the following, even within the period of warranty:

- (1) Failures due to wrong use, inappropriate repair or modifications.
- (2) Failures due to falling after purchase and damages during transportation.
- (3) Failures due to the use out of product specifications.
- (4) Failures due to fire, earthquake, lightning strike, wind and flood damage, salt pollution, abnormal voltage, and other natural disasters and accidents.
- (5) Failures due to penetration of water, oil, metal, or any other foreign materials.
- (6) Failures of internal components, which exceeded their described standard life.

### 12-2 Warranty scope

During the warranty period, we will only replace or repair the defective single product we delivered, if the failure is caused due to our fault. In the above, our responsibility is limited to the replacement or repair of the above single product we delivered. We are not liable for any damage to you or a third party, caused in association with the failure of the product we delivered. Further, we are not liable for any failure and damage to you or a third party, caused by the above 12-1 exemptions and any one of the following.

- (1) Failures due to the mounting or use of our product against the instructions and warnings described in this specification.
- (2) Failures due to the combination of our product and the equipment that mounted our product.
- (3) Failures due to your negligence of our instructions described in this specification.
- (4) Other equipment failures not attributable to our responsibility.

### 12-3 Warranty service

Please contact your dealers when you need to apply for warranty, including investigation of failure cause and request for repair. If you return our product directly to Panasonic Motor, after obtaining an approval from your dealer, please obtain the application form for repair and investigation from your dealer, enter the necessary information on it, and attach it to our product. In principle, you need to pay the transportation cost.



## 13. Other

- (1) Precautions for export of this product and the equipment incorporating this product.  
If the end user or end purpose of this product relates to military affairs, armament and so on, this product may be subject to the export regulations prescribed in "Foreign Exchange and Foreign Trade Control Law." To export this product, take thorough examination, and follow the required export procedure.
- (2) This product was designed to be used with general industrial products or the like. It is not designed to be used with a device dealing with human life or as a device to be used in unusual circumstances such as nuclear power management, use with aerospace instruments, use in transportation, use with medical equipment, use with various types of safety devices, or use with a device for which high level of cleanliness is required.
- (3) Please make the final decision at customer as to the specification of the completed product, compliance with laws and regulations, and its compatibility with the equipment and parts attached by customer in respects such as the structure, dimensions, service life, and characteristics.
- (4) There is a possibility that the completed device of customer may malfunction due to troubles (such as signal disconnection and signal phase interruption) or operation out of the setting by applying external noise/static electricity. Therefore, customer is required to make a fail-safe design and secure safety within the operable range in the place of operation.
- (5) Since excessive loading of the product may be the cause of load collapsing, follow the instructions indicated.
- (6) When the motor is to be operated without electrically connecting the shaft of the motor to the ground, depending on the actual equipment and the installing environment, problems such as the bearing sound will be louder may occur due to the occurrence of electrical corrosion at the motor bearing. So please confirm and verify the matter at customer.
- (7) Apply adequate tightening torque to the product mounting screw by taking into consideration strength of the screw and the characteristics of material to which the product is installed.
- (8) There is a possibility that the noise resistance performance may be affected depending on the wiring conditions (such as a grounding method, cable length, and shielding state of signal wires). Therefore, customer's completed devices should also be checked for the noise resistance performance.
- (9) When discarding the product, dispose it as an industrial waste.
- (10) When discarding the battery, isolate the battery with a tape or the like, and discard it according to the regulations of the local government.
- (11) Some of the parts or the like may be modified to improve the performance, but the improvement will be implemented within the range of satisfying the items in this specification.
- (12) The specification change of the product shall be implemented with the specification delivered by our company or a document specified by customer. And when the functions or characteristics are affected, the specification will be changed after being verified and confirmed with a prototype.
- (13) When the specification is changed, the price may also be changed in some cases.
- (14) If there is an item other than the items described in this specification and needs to be specified, please notify us beforehand.
- (15) If malfunctioning has occurred, the matter shall be addressed by discussing the matter with both parties according to the items indicated in this specification.
- (16) Failure of this product depending on its content, may generate smoke of about one cigarette.  
Take this into consideration when the application of the machine is clean room related.
- (17) Do not use benzene, thinner, alcohol, and acid or alkaline detergent, because they can discolor and damage the product.

## 14. Other notes of specification

- Main power supply and the control circuit are not isolated. Please Insulate processing if necessary
- LED Display

This servo driver has some LEDs to confirm the condition of servo driver.

ALM

| LED status    |              | Condition of servo driver |
|---------------|--------------|---------------------------|
| LED1<br>(Red) | Lighting on  | Alarm occurs              |
|               | Lighting off | Normally                  |

SRVON

| LED status      |              | Condition of servo driver |
|-----------------|--------------|---------------------------|
| LED2<br>(Green) | Lighting on  | Servo ON                  |
|                 | Lighting off | Servo OFF                 |

## 15. Specifications for each model

| Model   | MVDLN5CSF                     | MVDLN5BSF                     |
|---|-------------------------------|-------------------------------|
| Power supply input                                  | DC 24 V                       | DC 48 V                       |
| Maximum output current                              | 33.3 Ao-p                     | 30.4 Ao-p                     |
| Current rating                                      | 9.4 Arms                      | 8.6 Arms                      |
| Input capacitance of Main power supply (*Note 1)    | 1800 uF                       | 1640 uF                       |
| Input capacitance of Control power supply (*Note 1) | 3600 uF                       | 820 uF                        |
|   |                               |                               |
| Rotary encoder feedback signal                      | Resolution : 8388608 P/r      | Resolution : 8388608 P/r      |
|   |                               |                               |
| Torque limit  | 250 %                         | 250 %                         |
|   |                               |                               |
| Ambient temperature                                 | 0 - 55 °C                     | 0 - 55 °C                     |
|   |                               |                               |
| Main power supply cable                             | HVSF 1.25~2.0 mm <sup>2</sup> | HVSF 1.25~2.0 mm <sup>2</sup> |
|   | AWG14~16                      | AWG14~16                      |
| Control power supply cable                          | HVSF 0.5~0.75 mm <sup>2</sup> | HVSF 0.5~0.75 mm <sup>2</sup> |
|   | AWG18~20                      | AWG18~20                      |
| Functional Grounding cable                          | HVSF 1.25~2.0 mm <sup>2</sup> | HVSF 1.25~2.0 mm <sup>2</sup> |
|   | AWG14~16                      | AWG14~16                      |
| Motor cable   | HVSF 1.25~2.0 mm <sup>2</sup> | HVSF 1.25~2.0 mm <sup>2</sup> |
|   | AWG14~16                      | AWG14~16                      |
|   |                               |                               |
| Rush current suppression                            | No limit by driver            | No limit by driver            |
| Regenerative discharge                              | Not supported                 | Not supported                 |
|   |                               |                               |
| Weight  | Approx 0.35 kg                | Approx 0.35 kg                |
| Dimensions  | 89×180×30 mm                  | 89×180×30 mm                  |

(Note 1) Rated capacitance specified by parts manufacturer

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value of Panaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

| PARAMETER    |          |   |                  | MODEL        |          | MINAS-A6 SizeV series  |                  |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|--------------|----------|---|------------------|--------------|----------|------------------------|------------------|--------------|----------|------------------------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--|
| Cate<br>gory | Pr.      | Parameter                                 | Default<br>value | Cate<br>gory | Pr.      | Parameter              | Default<br>value | Cate<br>gory | Pr.      | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |  |
| 1            | 0<br>*1  | 1st position loop gain                    | 48.0             | 1            | 31<br>*1 | For manufacturer's use | 48.0             | 1            | 62<br>*1 | For manufacturer's use | 0.0              |              |     |           |                  |              |     |           |                  |  |
|              | 1<br>*1  | 1st velocity loop gain                    | 27.0             |              | 32<br>*1 | For manufacturer's use | 27.0             |              | 63<br>*1 | For manufacturer's use | 48.0             |              |     |           |                  |              |     |           |                  |  |
|              | 2<br>*1  | 1st velocity integration time<br>constant | 21.0             |              | 33<br>*1 | For manufacturer's use | 21.0             |              | 64<br>*1 | For manufacturer's use | 27.0             |              |     |           |                  |              |     |           |                  |  |
|              | 3        | 1st velocity detection filter             | 0                |              | 34<br>*1 | For manufacturer's use | 0.84             |              | 65<br>*1 | For manufacturer's use | 21.0             |              |     |           |                  |              |     |           |                  |  |
|              | 4<br>*1  | 1st torque filter                         | 0.84             |              | 35       | For manufacturer's use | 250              |              | 66<br>*1 | For manufacturer's use | 0.84             |              |     |           |                  |              |     |           |                  |  |
|              | 5<br>*1  | 2nd position loop gain                    | 48.0             |              | 36<br>*1 | For manufacturer's use | 100.0            |              | 67       | For manufacturer's use | 250              |              |     |           |                  |              |     |           |                  |  |
|              | 6<br>*1  | 2nd velocity loop gain                    | 27.0             |              | 37<br>*1 | For manufacturer's use | 100.0            |              | 68<br>*1 | For manufacturer's use | 100.0            |              |     |           |                  |              |     |           |                  |  |
|              | 7<br>*1  | 2nd velocity integration time<br>constant | 21.0             |              | 38<br>*1 | For manufacturer's use | 0.0              |              | 69<br>*1 | For manufacturer's use | 100.0            |              |     |           |                  |              |     |           |                  |  |
|              | 8        | 2nd velocity detection filter             | 0                |              | 39<br>*1 | For manufacturer's use | 48.0             |              | 70<br>*1 | For manufacturer's use | 0.0              |              |     |           |                  |              |     |           |                  |  |
|              | 9<br>*1  | 2nd torque filter                         | 0.84             |              | 40<br>*1 | For manufacturer's use | 27.0             |              | 71<br>*1 | For manufacturer's use | 48.0             |              |     |           |                  |              |     |           |                  |  |
|              | 10<br>*1 | Velocity feed-forward gain                | 100.0            |              | 41<br>*1 | For manufacturer's use | 21.0             |              | 72<br>*1 | For manufacturer's use | 27.0             |              |     |           |                  |              |     |           |                  |  |
|              | 11<br>*1 | Velocity feed-forward filter              | 0.00             |              | 42<br>*1 | For manufacturer's use | 0.84             |              | 73<br>*1 | For manufacturer's use | 21.0             |              |     |           |                  |              |     |           |                  |  |
|              | 12<br>*1 | Torque feed-forward gain                  | 100.0            |              | 43       | For manufacturer's use | 250              |              | 74<br>*1 | For manufacturer's use | 0.84             |              |     |           |                  |              |     |           |                  |  |
|              | 13<br>*1 | Torque feed-forward filter                | 0.00             |              | 44<br>*1 | For manufacturer's use | 100.0            |              | 75       | For manufacturer's use | 250              |              |     |           |                  |              |     |           |                  |  |
|              | 14       | 2nd gain setting                          | 1                |              | 45<br>*1 | For manufacturer's use | 100.0            |              | 76<br>*1 | For manufacturer's use | 100.0            |              |     |           |                  |              |     |           |                  |  |
|              | 15       | Position control switching<br>mode        | 0                |              | 46<br>*1 | For manufacturer's use | 0.0              |              | 77<br>*1 | For manufacturer's use | 100.0            |              |     |           |                  |              |     |           |                  |  |
|              | 16<br>*1 | Position control switching delay<br>time  | 1.0              |              | 47<br>*1 | For manufacturer's use | 48.0             |              | 78<br>*1 | For manufacturer's use | 0.0              |              |     |           |                  |              |     |           |                  |  |
|              | 17       | Position control switching level          | 0                |              | 48<br>*1 | For manufacturer's use | 27.0             |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 18       | Position control switching<br>hysteresis  | 0                |              | 49<br>*1 | For manufacturer's use | 21.0             |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 19<br>*1 | Position gain switching time              | 1.0              |              | 50<br>*1 | For manufacturer's use | 0.84             |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 20       | Velocity control switching<br>mode        | 0                |              | 51       | For manufacturer's use | 250              |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 21<br>*1 | Velocity control switching<br>delay time  | 0.0              |              | 52<br>*1 | For manufacturer's use | 100.0            |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 22       | Velocity control switching level          | 0                |              | 53<br>*1 | For manufacturer's use | 100.0            |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 23       | Velocity control switching<br>hysteresis  | 0                |              | 54<br>*1 | For manufacturer's use | 0.0              |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 24       | Torque control switching mode             | 0                |              | 55<br>*1 | For manufacturer's use | 48.0             |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 25<br>*1 | Torque control switching delay<br>time    | 0.0              |              | 56<br>*1 | For manufacturer's use | 27.0             |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 26       | Torque control switching level            | 0                |              | 57<br>*1 | For manufacturer's use | 21.0             |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 27       | Torque control switching<br>hysteresis    | 0                |              | 58<br>*1 | For manufacturer's use | 0.84             |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 28<br>*1 | For manufacturer's use                    | 100.0            |              | 59       | For manufacturer's use | 250              |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 29<br>*1 | For manufacturer's use                    | 100.0            |              | 60<br>*1 | For manufacturer's use | 100.0            |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |
|              | 30<br>*1 | For manufacturer's use                    | 0.0              |              | 61<br>*1 | For manufacturer's use | 100.0            |              |          |                        |                  |              |     |           |                  |              |     |           |                  |  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

| PARAMETER    |          |  |                  | MODEL        |     | MINAS-A6 SizeV series  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|--------------|----------|--|------------------|--------------|-----|------------------------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|
| Cate<br>gory | Pr.      | Parameter                              | Default<br>value | Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
| 2            | 0        | Adaptation filter mode                 | SF 0<br>SG 1     | 2            | 31  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 1        | 1st notch frequency                    | 5000             |              | 32  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 2        | 1st notch width                        | 2                |              | 33  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 3        | 1st notch depth                        | 0                |              | 34  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 4        | 2nd notch frequency                    | 5000             |              | 35  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 5        | 2nd notch width                        | 2                |              | 36  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 6        | 2nd notch depth                        | 0                |              | 37  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 7        | 3rd notch frequency                    | 5000             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 8        | 3rd notch width                        | 2                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 9        | 3rd notch depth                        | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 10       | 4th notch frequency                    | 5000             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 11       | 4th notch width                        | 2                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 12       | 4th notch depth                        | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 13       | Damping filter switching<br>selection  | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 14<br>*1 | 1st damping frequency                  | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 15<br>*1 | 1st damping filter setting             | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 16<br>*1 | 2nd damping frequency                  | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 17<br>*1 | 2nd damping filter setting             | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 18<br>*1 | 3rd damping frequency                  | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 19<br>*1 | 3rd damping filter setting             | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 20<br>*1 | 4th damping frequency                  | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 21<br>*1 | 4th damping filter setting             | 0.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 22<br>*1 | Command smoothing filter               | 9.2              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 23<br>*1 | Command FIR filter                     | 1.0              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 24       | 5th notch frequency                    | 5000             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 25       | 5th notch width                        | 2                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 26       | 5th notch depth                        | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 27<br>*1 | 1st vibration control width<br>setting | 0.00             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 28<br>*1 | 2nd vibration control width<br>setting | 0.00             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 29<br>*1 | 3rd vibration control width<br>setting | 0.00             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 30<br>*1 | 4th vibration control width<br>setting | 0.00             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

| PARAMETER    |                                |   |                  | MODEL        |     | MINAS-A6 SizeV series |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|--------------|--------------------------------|---|------------------|--------------|-----|-----------------------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|
| Cate<br>gory | Pr.                            | Parameter   | Default<br>value | Cate<br>gory | Pr. | Parameter             | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
| 3            | 0                              | Inside/outside speed setting<br>switching                         | SF 0<br>SG 1     |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 1                              | Speed command direction<br>designation selection                  | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 2                              | Speed command input gain  | 500              |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 3                              | Speed command input inversion                                     | 1                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 4                              | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 5                              | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 6                              | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 7                              | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 8                              | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 9                              | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 10                             | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 11                             | Speed setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 12                             | Acceleration time setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 13                             | Deceleration time setting   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 14                             | S-shape acceleration /<br>deceleration setting                    | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 15                             | Speed zero clamp function<br>selection                            | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 16                             | Zero clamp level speed setting                                    | 30               |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 17                             | Torque command selection  | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 18                             | Torque command direction<br>designation selection                 | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 19<br>*1                       | Torque command input gain   | 3.0              |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 20                             | Torque command input<br>inversion                                 | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 21                             | Speed limit value 1   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 22                             | Speed limit value 2   | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 23                             | External scale type selection                                     | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 24                             | External scale division<br>numerator                              | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 25                             | External scale division<br>denominator                            | 10000            |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 26                             | External scale direction<br>inversion                             | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 27                             | Invalidate external scale Z-phase<br>wire disconnection detection | 0                |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 28                             | Hybrid deviation excess setting                                   | 16000            |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
| 29           | Hybrid deviation clear setting | 0   |                  |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |                                |   |                  |              |     |                       |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53  
\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

| PARAMETER    |          |  |                  | MODEL        |     |   |                  | MINAS-A6 SizeV series |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|--------------|----------|--|------------------|--------------|-----|---|------------------|-----------------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--|--|
| Cate<br>gory | Pr.      | Parameter                              | Default<br>value | Cate<br>gory | Pr. | Parameter   | Default<br>value | Cate<br>gory          | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |  |  |
| 4            | 0        | SI1 input selection                    | 197379           | 4            | 31  | Positioning completion range                      | 10               |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 1        | SI2 input selection                    | 394758           |              | 32  | Positioning completion output setting             | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 2        | For manufacturer's use                 | 0                |              | 33  | INP hold time                                     | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 3        | SI4 input selection                    | 263172           |              | 34  | Zero speed  | 50               |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 4        | For manufacturer's use                 | 0                |              | 35  | Speed coincidence width                           | 50               |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 5        | For manufacturer's use                 | 0                |              | 36  | Attainment speed                                  | 1000             |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 6        | SI7 input selection                    | 7                |              | 37  | Mechanical braking setting during no operation    | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 7        | For manufacturer's use                 | 0                |              | 38  | Mechanical braking setting during operation       | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 8        | For manufacturer's use                 | 0                |              | 39  | Brake release speed setting                       | 30               |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 9        | SI10 input selection                   | 136              |              | 40  | Warning output select 1                           | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 10       | SO1 output selection                   | 4                |              | 41  | Warning output select 2                           | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 11       | SO2 output selection                   | 65793            |              | 42  | Positioning completion range 2                    | 10               |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 12       | For manufacturer's use                 | 65793            |              | 43  | No use  | -                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 13       | SO4 output selection                   | 131586           |              | 44  | Position compare output pulse width setting       | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 14       | For manufacturer's use                 | 0                |              | 45  | Position compare output polarity select           | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 15       | For manufacturer's use                 | 0                |              | 46  | No use  | -                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 16       | Analog monitor 1 type                  | 0                |              | 47  | Pulse output select                               | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 17       | Analog monitor 1 output gain           | 0                |              | 48  | Position compare value 1                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 18       | For manufacturer's use                 | 4                |              | 49  | Position compare value 2                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 19       | For manufacturer's use                 | 0                |              | 50  | Position compare value 3                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 20       | For manufacturer's use                 | 0                |              | 51  | Position compare value 4                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 21       | Analog monitor output setting          | 0                |              | 52  | Position compare value 5                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 22       | Analog input 1 (AI1) offset setting    | 0                |              | 53  | Position compare value 6                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 23<br>*1 | Analog input 1 (AI1) filter setting    | 0.00             |              | 54  | Position compare value 7                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 24<br>*1 | Analog input 1 (AI1) excessive setting | 0.0              |              | 55  | Position compare value 8                          | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 25       | For manufacturer's use                 | 0                |              | 56  | Position compare output delay compensation amount | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 26<br>*1 | For manufacturer's use                 | 0.00             |              | 57  | Position compare output assignment setting        | 0                |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 27<br>*1 | For manufacturer's use                 | 0.0              |              |     |   |                  |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 28       | For manufacturer's use                 | 0                |              |     |   |                  |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 29<br>*1 | For manufacturer's use                 | 0.00             |              |     |   |                  |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |
|              | 30<br>*1 | For manufacturer's use                 | 0.0              |              |     |   |                  |                       |     |           |                  |              |     |           |                  |              |     |           |                  |  |  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor



| PARAMETER    |          |   |                  | MODEL        |          |  |                  | MINAS-A6 SizeV series |     |   |                  |              |     |           |                  |              |     |           |                  |
|--------------|----------|---|------------------|--------------|----------|--|------------------|-----------------------|-----|---|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|
| Cate<br>gory | Pr.      | Parameter   | Default<br>value | Cate<br>gory | Pr.      | Parameter  | Default<br>value | Cate<br>gory          | Pr. | Parameter   | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
| 5            | 0        | 2nd. command division/<br>multiplication numerator    | 0                | 5            | 31       | Axis number  | 1                | 5                     | 62  | Modbus mirror register setting<br>5                     | 17429            |              |     |           |                  |              |     |           |                  |
|              | 1        | 3rd. command division/<br>multiplication numerator    | 0                |              | 32       | Command pulse input<br>maximum setup/digital filter          | 4000             |                       | 63  | Modbus mirror register setting<br>6                     | 17418            |              |     |           |                  |              |     |           |                  |
|              | 2        | 4th command division/<br>multiplication numerator     | 0                |              | 33       | Pulse regeneration output limit<br>enable                    | 0                |                       | 64  | Modbus mirror register setting<br>7                     | 17427            |              |     |           |                  |              |     |           |                  |
|              | 3        | Pulse output division<br>denominator                  | 0                |              | 34       | For manufacturer's use                                       | 4                |                       | 65  | Modbus mirror register setting<br>8                     | 17419            |              |     |           |                  |              |     |           |                  |
|              | 4        | Drive prohibition input setting                       | 1                |              | 35       | For manufacturer's use                                       | 0                |                       | 66  | Deterioration diagnosis<br>convergence judgment time    | 0                |              |     |           |                  |              |     |           |                  |
|              | 5        | Sequence at drive prohibition                         | 0                |              | 36       | For manufacturer's use                                       | 0                |                       | 67  | Deterioration diagnosis inertia<br>ratio upper limit    | 0                |              |     |           |                  |              |     |           |                  |
|              | 6        | Sequence at servo-off                                 | 0                |              | 37       | Modbus connection setting                                    | 0                |                       | 68  | Deterioration diagnosis inertia<br>ratio lower limit    | 0                |              |     |           |                  |              |     |           |                  |
|              | 7        | For manufacturer's use                                | 0                |              | 38       | Modbus communication setting                                 | 0                |                       | 69  | Deterioration diagnosis<br>unbalanced load upper limit  | 0                |              |     |           |                  |              |     |           |                  |
|              | 8        | For manufacturer's use                                | 1                |              | 39       | Modbus response waiting time                                 | 0                |                       | 70  | Deterioration diagnosis<br>unbalanced load lower limit  | 0                |              |     |           |                  |              |     |           |                  |
|              | 9        | For manufacturer's use                                | 70               |              | 40       | Modbus communication<br>timeout time                         | 0                |                       | 71  | Deterioration diagnosis<br>dynamic friction upper limit | 0                |              |     |           |                  |              |     |           |                  |
|              | 10       | Sequence at alarm                                     | 0                |              | 41       | For manufacturer's use                                       | 0                |                       | 72  | Deterioration diagnosis<br>dynamic friction lower limit | 0                |              |     |           |                  |              |     |           |                  |
|              | 11       | Immediate stop torque setting                         | 0                |              | 42       | Modbus broadcast setting                                     | 0                |                       | 73  | Deterioration diagnosis viscous<br>friction upper limit | 0                |              |     |           |                  |              |     |           |                  |
|              | 12       | Overload level setting                                | 0                |              | 43       | No use   | -                |                       | 74  | Deterioration diagnosis viscous<br>friction lower limit | 0                |              |     |           |                  |              |     |           |                  |
|              | 13       | Over-speed level setting                              | 0                |              | 44       | No use   | -                |                       | 75  | Deterioration diagnosis velocity<br>setting             | 0                |              |     |           |                  |              |     |           |                  |
|              | 14<br>*1 | Allowable motor operating<br>range setting            | 1.0              |              | 45<br>*1 | Quadrant projection positive<br>direction compensation value | 0.0              |                       | 76  | Deterioration diagnosis torque<br>average time          | 0                |              |     |           |                  |              |     |           |                  |
|              | 15       | Control input signal read<br>setting                  | 0                |              | 46<br>*1 | Quadrant projection negative<br>direction compensation value | 0.0              |                       | 77  | Deterioration diagnosis torque<br>upper limit           | 0                |              |     |           |                  |              |     |           |                  |
|              | 16       | Alarm clear input setting (A-<br>CLR)                 | 0                |              | 47       | Quadrant projection<br>compensation delay time               | 0                |                       | 78  | Deterioration diagnosis torque<br>lower limit           | 0                |              |     |           |                  |              |     |           |                  |
|              | 17       | Counter clear input setting<br>(CL)                   | 3                |              | 48<br>*1 | Quadrant projection<br>compensation filter setting L         | 0.00             |                       | 79  | Modbus mirror register setting<br>9                     | 17410            |              |     |           |                  |              |     |           |                  |
|              | 18       | Command pulse prohibition<br>input (INH) disable      | 1                |              | 49<br>*1 | Quadrant projection<br>compensation filter setting H         | 0.00             |                       | 80  | Modbus mirror register setting<br>10                    | 17411            |              |     |           |                  |              |     |           |                  |
|              | 19       | Command pulse prohibition<br>input (INH) read setting | 0                |              | 50       | For manufacturer's use                                       | 0                |                       | 81  | Modbus mirror register setting<br>11                    | 16398            |              |     |           |                  |              |     |           |                  |
|              | 20       | Position setting unit selection                       | 0                |              | 51       | For manufacturer's use                                       | 0                |                       | 82  | Modbus mirror register setting<br>12                    | 16402            |              |     |           |                  |              |     |           |                  |
|              | 21       | Torque limit selection                                | 1                |              | 52       | For manufacturer's use                                       | 0                |                       | 83  | Modbus mirror register setting<br>13                    | 16411            |              |     |           |                  |              |     |           |                  |
|              | 22<br>*2 | 2nd torque limit                                      | 500              |              | 53       | For manufacturer's use                                       | 0                |                       | 84  | Modbus mirror register setting<br>14                    | 16405            |              |     |           |                  |              |     |           |                  |
|              | 23       | Torque limit switching setting 1                      | 0                |              | 54       | For manufacturer's use                                       | 0                |                       | 85  | Modbus mirror register setting<br>15                    | 16406            |              |     |           |                  |              |     |           |                  |
|              | 24       | Torque limit switching setting 2                      | 0                |              | 55       | For manufacturer's use                                       | 0                |                       | 86  | Modbus mirror register setting<br>16                    | 0                |              |     |           |                  |              |     |           |                  |
|              | 25<br>*2 | Positive direction torque limit<br>for external input | 500              |              | 56       | Slow stop deceleration time<br>setting                       | 0                |                       |     |   |                  |              |     |           |                  |              |     |           |                  |
|              | 26<br>*2 | Backward direction torque limit<br>for external input | 500              |              | 57       | Slow stop S-shape acceleration<br>and deceleration setting   | 0                |                       |     |   |                  |              |     |           |                  |              |     |           |                  |
|              | 27<br>*1 | For manufacturer's use                                | 3.0              |              | 58       | Modbus mirror register setting<br>1                          | 24591            |                       |     |   |                  |              |     |           |                  |              |     |           |                  |
|              | 28       | For manufacturer's use                                | 1                |              | 59       | Modbus mirror register setting<br>2                          | 24592            |                       |     |   |                  |              |     |           |                  |              |     |           |                  |
|              | 29       | RS232 communication baud<br>rate setting              | 2                |              | 60       | Modbus mirror register setting<br>3                          | 16421            |                       |     |   |                  |              |     |           |                  |              |     |           |                  |
|              | 30       | RS485 communication baud<br>rate setting              | 2                |              | 61       | Modbus mirror register setting<br>4                          | 24613            |                       |     |   |                  |              |     |           |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

PARAMETER

MODEL MINAS-A6 SizeV series

| Cate<br>gory | Pr.      | Parameter  | Default<br>value | Cate<br>gory | Pr.      | Parameter   | Default<br>value | Cate<br>gory | Pr.      | Parameter                                   | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
|--------------|----------|--|------------------|--------------|----------|---|------------------|--------------|----------|---|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|
| 6            | 0<br>*1  | For manufacturer's use   | 0.0              | 6            | 31       | Real-time auto tuning<br>estimation speed                         | 1                | 6            | 62       | 1st resonance damping ratio                 | 0                |              |     |           |                  |              |     |           |                  |
|              | 1        | No use   | -                |              | 32       | Real-time auto tuning custom<br>setting                           | 0                |              | 63<br>*1 | 1st anti-resonance frequency                | 0.0              |              |     |           |                  |              |     |           |                  |
|              | 2        | Speed deviation excess setting   | 0                |              | 33       | For manufacturer's use  | 1000             |              | 64       | 1st anti-resonance damping<br>ratio         | 0                |              |     |           |                  |              |     |           |                  |
|              | 3        | No use   | -                |              | 34<br>*1 | Hybrid vibration suppression<br>gain                              | 0.0              |              | 65<br>*1 | 1st response frequency                      | 0.0              |              |     |           |                  |              |     |           |                  |
|              | 4        | JOG trial run command speed  | 300              |              | 35<br>*1 | Hybrid vibration suppression<br>filter                            | 0.10             |              | 66<br>*1 | 2nd resonance frequency                     | 0.0              |              |     |           |                  |              |     |           |                  |
|              | 5        | Position control third gain<br>effective time                            | 0.0              |              | 36       | Dynamic brake operation input                                     | 0                |              | 67       | 2nd resonance damping ratio                 | 0                |              |     |           |                  |              |     |           |                  |
|              | 6        | Position control third gain scale<br>factor                              | 100              |              | 37       | Oscillation detection threshold<br>value                          | 0.0              |              | 68<br>*1 | 2nd anti-resonance frequency                | 0.0              |              |     |           |                  |              |     |           |                  |
|              | 7        | Additional value to torque<br>command                                    | 0                |              | 38       | Warning mask setting  | 4                |              | 69       | 2nd anti-resonance damping<br>ratio         | 0                |              |     |           |                  |              |     |           |                  |
|              | 8        | Torque compensation value in<br>positive direction                       | 0                |              | 39       | Warning mask setting 2  | 0                |              | 70<br>*1 | 2nd response frequency                      | 0.0              |              |     |           |                  |              |     |           |                  |
|              | 9        | Torque compensation value in<br>negative direction                       | 0                |              | 40       | No use  | -                |              | 71       | 3rd damping depth                           | 0                |              |     |           |                  |              |     |           |                  |
|              | 10       | Function expansion setting   | 16               |              | 41       | 1st damping depth   | 0                |              | 72       | 4th damping depth                           | 0                |              |     |           |                  |              |     |           |                  |
|              | 11       | Current response setting   | 100              |              | 42<br>*1 | Two-stage torque filter time<br>constant                          | 0.00             |              | 73<br>*1 | Load estimation filter                      | 0.00             |              |     |           |                  |              |     |           |                  |
|              | 12       | No use   | -                |              | 43       | Two-stage torque filter<br>damping term                           | 0                |              | 74<br>*1 | Torque compensation<br>frequency 1          | 0.0              |              |     |           |                  |              |     |           |                  |
|              | 13       | Second inertia ratio   | 250              |              | 44       | No use  | -                |              | 75<br>*1 | Torque compensation<br>frequency 2          | 0.0              |              |     |           |                  |              |     |           |                  |
|              | 14       | Immediate stop time at the time<br>of alarming                           | 200              |              | 45       | No use  | -                |              | 76       | Load estimation count                       | 0                |              |     |           |                  |              |     |           |                  |
|              | 15       | Second overspeed level setting   | 0                |              | 46       | No use  | -                |              | 87       | For manufacturer's use                      | 0                |              |     |           |                  |              |     |           |                  |
|              | 16       | For manufacturer's use   | 0                |              | 47       | Function expansion setting 2                                      | 1                |              | 88       | Absolute multi-rotation data<br>upper limit | 0                |              |     |           |                  |              |     |           |                  |
|              | 17       | For manufacturer's use   | 0                |              | 48<br>*1 | Adjustment filter   | 1.2              |              | 97       | Function expansion setting 3                | 0                |              |     |           |                  |              |     |           |                  |
|              | 18<br>*1 | Power turn-on wait time  | 0.0              |              | 49       | Command response filter/adjustment<br>filter damping term setting | 15               |              | 98       | Function expansion setting 4                | 0                |              |     |           |                  |              |     |           |                  |
|              | 19       | Encoder Z-phase setting  | 0                |              | 50<br>*1 | Viscous friction compensation<br>gain                             | 0.0              |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 20       | External scale Z-phase<br>expansion setting                              | 0                |              | 51       | Immediate stop completion<br>wait time                            | 0                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 21       | Serial absolute external scale Z-<br>phase setting                       | 0                |              | 52       | For manufacturer's use  | 0                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 22       | AB-phase output external scale AB<br>phase regeneration method selection | 0                |              | 53       | For manufacturer's use  | 0                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 23       | Load fluctuation correction<br>gain                                      | 0                |              | 54       | For manufacturer's use  | 0                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 24<br>*1 | Load fluctuation correction<br>filter                                    | 0.53             |              | 55       | No use  | -                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 25       | No use   | -                |              | 56       | No use  | -                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 26       | No use   | -                |              | 57       | Torque saturation error<br>protection detection time              | 0                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 27       | Warning latch time   | 5                |              | 58       | Serial absolute external scale Z<br>phase shift amount            | 0                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 28       | Special function selection   | 0                |              | 59       | No use  | -                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 29       | No use   | -                |              | 60       | 2nd damping depth   | 0                |              |          |   |                  |              |     |           |                  |              |     |           |                  |
|              | 30       | For manufacturer's use   | 0                |              | 61<br>*1 | 1st resonance frequency   | 0.0              |              |          |   |                  |              |     |           |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

PARAMETER

MODEL MINAS-A6 SizeV series

| Cate<br>gory | Pr. | Parameter                               | Default<br>value | Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
|--------------|-----|---|------------------|--------------|-----|------------------------|------------------|--------------|-----|------------------------|------------------|--------------|-----|------------------------|------------------|--------------|-----|-----------|------------------|
| 7            | 0   | For manufacturer's use                  | 0                | 7            | 31  | For manufacturer's use | 0                | 7            | 62  | No use                 | -                | 7            | 93  | For manufacturer's use | 0                |              |     |           |                  |
|              | 1   | For manufacturer's use                  | 0                |              | 32  | For manufacturer's use | 0                |              | 63  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 2   | No use                                  | -                |              | 33  | For manufacturer's use | 0                |              | 64  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 3   | For manufacturer's use                  | 0                |              | 34  | For manufacturer's use | 0                |              | 65  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 4   | For manufacturer's use                  | 0                |              | 35  | For manufacturer's use | 0                |              | 66  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 5   | For manufacturer's use                  | 0                |              | 36  | For manufacturer's use | 0                |              | 67  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 6   | For manufacturer's use                  | 0                |              | 37  | For manufacturer's use | 0                |              | 68  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 7   | For manufacturer's use                  | 0                |              | 38  | For manufacturer's use | 0                |              | 69  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 8   | For manufacturer's use                  | 0                |              | 39  | For manufacturer's use | 0                |              | 70  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 9   | For manufacturer's use                  | 0                |              | 40  | No use                 | -                |              | 71  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 10  | For manufacturer's use                  | 0                |              | 41  | For manufacturer's use | 0                |              | 72  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 11  | For manufacturer's use                  | 0                |              | 42  | No use                 | -                |              | 73  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 12  | For manufacturer's use                  | 0                |              | 43  | No use                 | -                |              | 74  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 13  | For manufacturer's use                  | 0                |              | 44  | No use                 | -                |              | 75  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 14  | For manufacturer's use                  | 0                |              | 45  | No use                 | -                |              | 76  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 15  | For manufacturer's use                  | 0                |              | 46  | No use                 | -                |              | 77  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 16  | For manufacturer's use                  | 0                |              | 47  | No use                 | -                |              | 78  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 17  | No use                                  | -                |              | 48  | No use                 | -                |              | 79  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 18  | No use                                  | -                |              | 49  | No use                 | -                |              | 80  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 19  | No use                                  | -                |              | 50  | No use                 | -                |              | 81  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 20  | For manufacturer's use                  | 0                |              | 51  | No use                 | -                |              | 82  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 21  | For manufacturer's use                  | 1                |              | 52  | No use                 | -                |              | 83  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 22  | Special function expansion<br>setting 1 | 0                |              | 53  | No use                 | -                |              | 84  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 23  | For manufacturer's use                  | 0                |              | 54  | No use                 | -                |              | 85  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 24  | For manufacturer's use                  | 0                |              | 55  | No use                 | -                |              | 86  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 25  | For manufacturer's use                  | 0                |              | 56  | No use                 | -                |              | 87  | For manufacturer's use | 0                |              |     |                        |                  |              |     |           |                  |
|              | 26  | For manufacturer's use                  | 0                |              | 57  | No use                 | -                |              | 88  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 27  | For manufacturer's use                  | 0                |              | 58  | No use                 | -                |              | 89  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 28  | For manufacturer's use                  | 0                |              | 59  | No use                 | -                |              | 90  | No use                 | -                |              |     |                        |                  |              |     |           |                  |
|              | 29  | For manufacturer's use                  | 0                |              | 60  | No use                 | -                |              | 91  | For manufacturer's use | 0                |              |     |                        |                  |              |     |           |                  |
|              | 30  | For manufacturer's use                  | 0                |              | 61  | No use                 | -                |              | 92  | For manufacturer's use | 0                |              |     |                        |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

MINAS-A6 SizeV series

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value of Panaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

| PARAMETER    |     |                        |                  | MODEL        |     | MINAS-A6 SizeV series  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|--------------|-----|------------------------|------------------|--------------|-----|------------------------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|
| Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
| 9            | 0   | For manufacturer's use | 1                | 9            | 31  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 1   | For manufacturer's use | 0.000            |              | 32  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 2   | For manufacturer's use | 0.00             |              | 33  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 3   | For manufacturer's use | 0                |              | 34  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 4   | For manufacturer's use | 0.00             |              | 35  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 5   | For manufacturer's use | 0.0              |              | 36  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 6   | For manufacturer's use | 0.0              |              | 37  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 7   | For manufacturer's use | 0.0              |              | 38  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 8   | For manufacturer's use | 0.00             |              | 39  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 9   | For manufacturer's use | 0.00             |              | 40  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 10  | For manufacturer's use | 0                |              | 41  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 11  | For manufacturer's use | 1                |              | 42  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 12  | For manufacturer's use | 80               |              | 43  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 13  | For manufacturer's use | 50               |              | 44  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 14  | For manufacturer's use | 10               |              | 45  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 15  | No use                 | -                |              | 46  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 16  | No use                 | -                |              | 47  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 17  | For manufacturer's use | 0                |              | 48  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 18  | For manufacturer's use | 0                |              | 49  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 19  | For manufacturer's use | 0                |              | 50  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 20  | For manufacturer's use | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 21  | For manufacturer's use | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 22  | For manufacturer's use | 200              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 23  | For manufacturer's use | 50               |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 24  | For manufacturer's use | 100              |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 25  | For manufacturer's use | 40               |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 26  | For manufacturer's use | 40               |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 27  | For manufacturer's use | 1000             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 28  | For manufacturer's use | 1.00             |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 29  | For manufacturer's use | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 30  | For manufacturer's use | 0                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53  
\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

PARAMETER

MODEL  
MINAS-A6 SizeV series

| Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter              | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
|--------------|-----|------------------------|------------------|--------------|-----|------------------------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|
| 15           | 0   | For manufacturer's use | 0                | 15           | 31  | For manufacturer's use | 5                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 1   | No use                 | -                |              | 32  | No use                 | -                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 2   | No use                 | -                |              | 33  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 3   | No use                 | -                |              | 34  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 4   | No use                 | -                |              | 35  | For manufacturer's use | 0                |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 5   | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 6   | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 7   | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 8   | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 9   | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 10  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 11  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 12  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 13  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 14  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 15  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 16  | For manufacturer's use | 2                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 17  | For manufacturer's use | 4                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 18  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 19  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 20  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 21  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 22  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 23  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 24  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 25  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 26  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 27  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 28  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 29  | No use                 | -                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 30  | For manufacturer's use | 6                |              |     |                        |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53

\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor

PARAMETER

MODEL MINAS-A6 SizeV series

| Cate<br>gory | Pr. | Parameter  | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value | Cate<br>gory | Pr. | Parameter | Default<br>value |
|--------------|-----|--|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|--------------|-----|-----------|------------------|
| 56           | 0   | The parameters for<br>block operations of<br>Modbus communications |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | ~   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 127 |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
| 57           | 0   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | ~   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 127 |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
| 58           | 0   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | ~   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 127 |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
| 59           | 0   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | ~   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 127 |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
| 60           | 0   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | ~   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 127 |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
| 61           | 0   | For manufacturer's use   |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | ~   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 31  |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
| 62           | 0   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | ~   |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              | 127 |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |
|              |     |  |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |              |     |           |                  |

\*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point.  
Ex) Pr6.24 Disturbance observer filter ... Value ofPanaterm : 0.53 / Value of parameter-file : 53  
\*2 The maximum Torque limit value (Pr.0.13,Pr.5.22,Pr.5.25,Pr.5.26) varies by the applicable motor