Oriental motor

ASTEP

AZ Series /

Motorized Actuator equipped with AZ Series

mini Driver

Pulse input type with RS-485 communication

USER MANUAL

This Manual describes product handling procedures and safety precautions.

[•] Please read it thoroughly to ensure safe operation.

[•] Always keep the manual where it is readily available.

Table of contents

1	Introduction 3		9	Flow of setting and operation34	
	1-1	Before using the product3	10	Guidance	35
	1-2	Operating manuals3	4.4	ID alconomicals	20
	1-3	Overview of the product5	11	ID share mode	
	1-4	System configuration5		11-1 Overview of ID share mode	
2	Safe	ty precautions6		11-2 Flow of setting of ID share mode	
2	Duas	autions for use8		11-3 Setting of share group	
3	Prec	autions for use		11-4 Setting of data to be read or written	
4	Preparation10			11-5 Executing read/write	
	4-1	Checking the product10	12	Addresses and codes lists	59
	4-2	How to identify the product model10		12-1 Addresses and codes specific to this	
	4-3	Products possible to combine10		product	59
	4-4	Information about nameplate10		12-2 Addresses and codes not compatible	
	4-5	Names and functions of parts11		with this product	
	4-6	Indication of LEDs12		12-3 I/O signals assignment list	69
5	Insta	allation13	13	Inspection and maintenance	72
	5-1	Installation location13		13-1 Inspection	72
	5-2	Installation method13		13-2 Warranty	72
_		nection15		13-3 Disposal	72
6			14	Troubleshooting	73
	6-1	Connection example15		14-1 Detection of communication errors	73
	6-2	Connecting the main power supply and the control power supply (CN1) 16		14-2 Alarms	
	6-3	Connecting the I/O signals (CN3)18		14-3 Information	76
	6-4	Connection diagram19		14-4 Troubleshooting and	
	6-5	Connecting the RS-485 communication		remedial actions	77
		cable (CN4)22	15	Cables	79
	6-6	Connecting the USB cable24		15-1 Connection cables (For cable type)	79
	6-7	Noise measures24		15-2 Connection cables	, ,
	6-8	Conformity to		(For connector type)	82
		EMC Directive/Regulations25		15-3 RS-485 communication cables	83
7	Expl	anation of I/O signals28		15-4 Power supply cable	84
	7-1	Input signals28		15-5 I/O signal cables	84
	7-2	Output signals30	16	Accessories	86
	7-3	Timing chart30		16-1 Pulse signal converter for	
8	Setti	ing of switches31		noise immunity	86
	8-1	Protocol31		16-2 Relay contact protection part/circuit	86
	8-2	Transmission rate31	17	Reference materials	87
	8-3	Pulse input mode32		17-1 Timing chart	87
	8-4	Resolution32		17-2 Specifications	
	8-5	Address number (server address)32		17-3 Regulations and standards	
	8-6	Termination resistor33			

1 Introduction

1-1 Before using the product

Only qualified personnel of electrical and mechanical engineering should work with the product.

Use the product correctly after thoroughly reading the section "2 Safety precautions" on p.6. In addition, be sure to observe the contents described in warning, caution, and note in this manual.

The product described in this manual is designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any compensation for damage caused through failure to observe this warning.

1-2 Operating manuals

■ Related operating manuals

For operating manuals, download from Oriental Motor Website Download Page or contact your nearest Oriental Motor sales office.

- AZ Series / Motorized Actuator equipped with AZ Series mini Driver Pulse input type with RS-485 communication USER MANUAL (this document)
- AZ Series / Motorized Actuator equipped with AZ Series OPERATING MANUAL Function Edition

Read the following operating manuals for motors and motorized actuators.

- OPERATING MANUAL Motor Edition
- OPERATING MANUAL Actuator Edition
- Motorized Actuator OPERATING MANUAL Function Setting Edition

■ How to use operating manuals

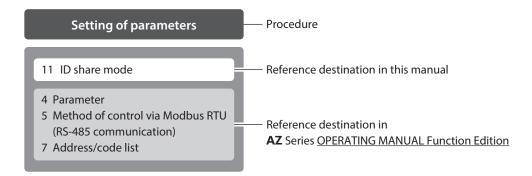
To use the product, read this manual together with the **AZ** Series <u>OPERATING MANUAL Function Edition</u>. This manual describes contents specific to the mini Driver pulse input type with RS-485 communication, and the **AZ** Series <u>OPERATING MANUAL Function Edition</u> describes contents common to the **AZ** Series products. Refer to the **AZ** Series <u>OPERATING MANUAL Function Edition</u> for the contents not included in this manual. Reference destinations are indicated according to the flow of use.

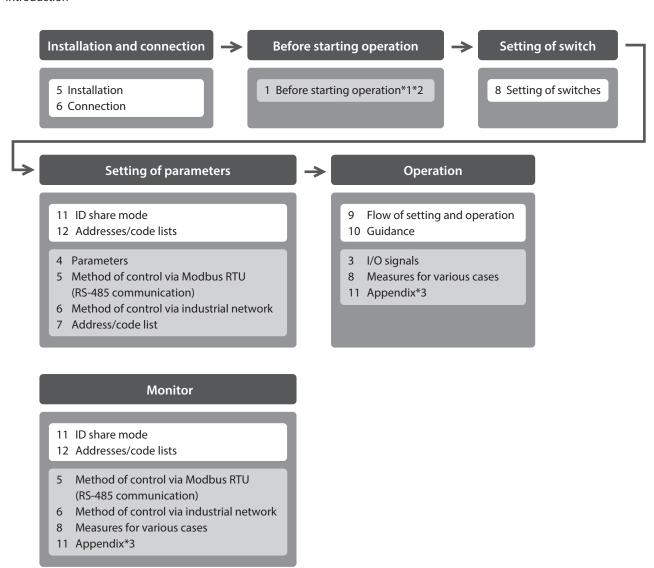
How to read reference destinations

The title name of the operating manual is described in the reference destination.



The title number described in the reference destination may be changed. Use the title name when checking the reference destination.





- *1 Refer to this manual for "Home setting." (\$\simp\$ p.36)
- *2 When a motorized actuator is used, the following contents cannot be operated via RS-485 communication. Use the support software **MEXEO2**.
 - · Copying the fixed value (parameter) of the ABZO sensor to driver
 - · Creation of recovery data file and method of recovery
- *3 Refer to this manual for "LEDs of the driver." (□ p.12)

Description of power supplies

This manual describes contents when a main power supply and a control power supply are used.

The mini Driver can also be used with a main power supply only.

When using it with only the main power supply, replace "main power supply and control power supply" or "control power supply" with "main power supply" to read this manual.

1-3 Overview of the product

This is a dedicated driver for the **AZ** Series products.

It is compatible with Modbus RTU (RS-485 communication) and can execute operation according to pulse signals from the host controller. In addition, position information and abnormal status can be monitored via RS-485 communication or industrial network using a network converter of Oriental Motor.

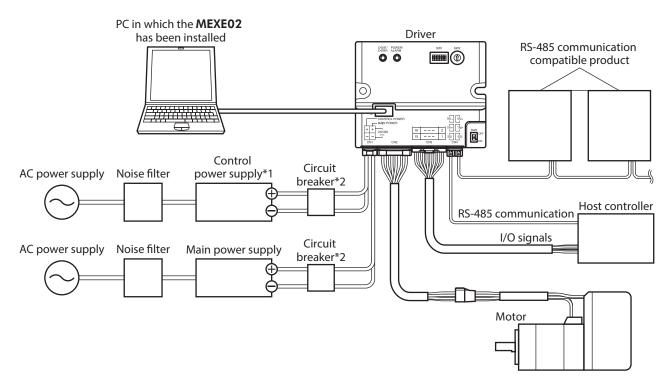
Compact and light weight

Compact and lightweight are achieved, offering the dimensions of $69 \times 56 \times 25$ mm (2.72×2.2×0.98 in.) and the mass of 84 g (3 oz.).

How to set parameters

Parameters can be set via RS-485 communication, industrial network using a network converter of Oriental Motor, or the support software **MEXEO2**.

1-4 System configuration



- *1 Connecting a control power supply can continue monitoring even if a main power supply is shut off. Connect it as necessary.
- *2 It is recommended that a circuit breaker or a circuit protector is connected because incorrect wiring may cause the internal input circuit to short-circuit.

2 Safety precautions

The precautions described below are intended to ensure the safe and correct use of the product, and to prevent the user and other personnel from exposure to the risk of injury. Use the product only after carefully reading and fully understanding these instructions.

∆WARNING	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
∴ CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
Note	The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.
memo	The items under this heading contain related information and contents to gain a further understanding of the text in this manual.

MARNING

General

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, in places subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock, or injury.
- Assign qualified personnel to the task of installing, wiring, operating/controlling, inspecting and troubleshooting
 the product. Handling by unqualified personnel may result in fire, electric shock, injury, or damage to equipment.
- Do not transport, install, connect, or inspect the product while the power is supplied. Doing so may result in electric shock.
- Do not touch the driver while the power is supplied. Doing so may result in fire or electric shock.
- When an alarm of the driver is generated (any of the driver's protective functions is triggered), remove the cause before resetting the alarm (protective function). Continuing the operation without removing the cause of the problem may result in malfunction of the motor and the driver, leading to injury or damage to equipment.

Installation

• Install the driver in an enclosure. Failure to do so may result in electric shock or injury.

Connection

- Observe the product specifications for the power supply voltage of the driver. Failure to do so may result in fire or electric shock.
- Connect the product securely according to the connection diagram. Failure to do so may result in fire or electric shock.
- Do not forcibly bend, pull, or pinch the connection cable. Doing so may result in fire or electric shock.

Operation

- Turn off the main power supply and the control power supply in the event of a power failure. Failure to do so may result in injury or damage to equipment.
- Do not remove the motor excitation during operation. Doing so may cause the motor to stop and lose the holding force, resulting in injury or damage to equipment.

Repair, disassembly, and modification

• Do not disassemble or modify the driver. Doing so may result in injury or damage to equipment.

!CAUTION

General

- Do not use the driver beyond the specifications. Doing so may result in electric shock, injury, or damage to equipment.
- Keep your fingers and objects out of the openings in the driver. Failure to do so may result in fire, electric shock, or injury.
- Do not touch the driver during operation or immediately after stopping. The surface is hot, and this may cause a skin burn(s).
- Do not forcibly bend or pull the cable that is connected to the driver. Doing so may cause damage to the product.

Installation

- Keep the area around the driver free of combustible materials. Failure to do so may result in fire or a skin burn(s).
- Do not leave anything around the driver that would obstruct ventilation. Doing so may result in damage to equipment.

Operation

- Use a motor and a driver only in the specified combination. An incorrect combination may cause a fire.
- Take measures against static electricity when operating the switches of the driver. Failure to do so may result in the driver malfunction or damage to equipment.
- Provide an emergency-stop device or emergency-stop circuit external to equipment so that the entire equipment will operate safely in the event of a system failure or malfunction. Failure to do so may result in injury.
- When moving the moving part manually, put the motor into a non-excitation state. Continuing the work while the motor is in an excitation state may result in injury.
- For the main power supply and the control power supply, use a DC power supply with reinforced insulation on its primary and secondary sides. Failure to do so may result in electric shock.
- When an abnormal condition has occurred, immediately stop operation to turn off the main power supply and the control power supply. Failure to do so may result in fire, electric shock, or injury.

3 Precautions for use

This chapter explains restrictions and requirements the user should consider when using the product.

Always use Oriental Motor cables to connect a motor and a driver.

Refer to p.79 for the cable models.

 When conducting the insulation resistance measurement or the dielectric strength test, be sure to separate the connection between the motor and the driver.

Conducting the insulation resistance measurement or the dielectric strength test with the motor and driver connected may result in damage to the product.

 Precaution when connecting a main power supply and a control power supply in a state of grounding the positive side

The USB connector, CN1 connector, and CN2 connector on the driver are not electrically insulated. When grounding the positive terminals of a main power supply and a control power supply, do not connect any equipment (PC, etc.) whose negative terminal is grounded. Doing so may cause the driver and this equipment to short, damaging both. When connecting, do not ground equipment.

Saving data to the non-volatile memory

Do not turn off the control power supply while writing the data to the non-volatile memory, and also do not turn off for five seconds after the completion of writing the data. Doing so may abort writing the data and cause an alarm of EEPROM error to generate. The non-volatile memory can be rewritten approximately 100,000 times.

Noise elimination measures

Refer to p.24 for noise elimination measures.

Regeneration

When operating a large load inertia at a high speed, the regenerative energy generated may increase the voltage of the main power supply, causing an alarm of Overvoltage to generate. To prevent damage to the driver, reconsider the operating conditions so that regenerative voltage does not generate.

Notes when the connection cable is used

Note the following points when an Oriental Motor cable is used.

When inserting the connector

Hold the connector main body, and insert it in straight securely. Inserting the connector in an inclined state may result in damage to terminals or a connection failure.

• When pulling out the connector

Pull out the connector in straight while releasing the lock part of the connector. Pulling out the connector with holding the cable may result in damage to the connector.

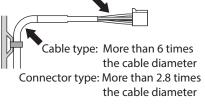
Bending radius of cable

• Use the cable in a condition where the bending radius of the cable is as follows.

Cable type: More than 6 times the cable diameter Connector type: More than 2.8 times the cable diameter

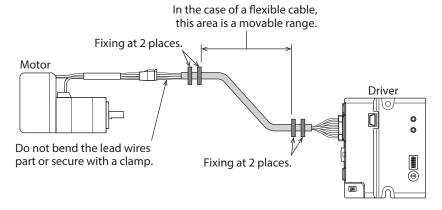
• Do not bend the lead wires part or secure with a clamp, etc. Doing so may result in damage to the connector.

Do not bend the lead wires part



• How to fix the cable

Fix the cable at two places near the connectors as shown in the figure or fix it with a wide clamp to take measures to prevent stress from being applied to the connectors.



4 Preparation

4-1 Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the Oriental Motor sales office from which you purchased the product.

- Driver 1 unit
- Instructions and Precautions for Safe Use......... 1 copy

4-2 How to identify the product model

Check the driver model against the model shown on the nameplate.

Refer to "4-4 Information about nameplate" for how to identify the nameplate.

$$\frac{AZD}{1}$$
 - $\frac{K}{2}$ $\frac{R}{3}$ $\frac{X}{4}$

1	Series	AZD: AZ Series driver
2	Power supply input	K : DC power input
3	Driver figure	R: Compact
4	Туре	X: Pulse input type with RS-485 communication

4-3 Products possible to combine

Products with which the driver can be combined are listed below. Check the model name of the product with the nameplate.

Power supply type	Product type	Applicable Series	Model name representing Series name*1	Example of model name
	Stepping motor	AZ Series	AZM	AZM46AK
	Motorized actuator	EAC Series*2	EACM	EACM2E05AZAK
		EAS Series*2	EASM	EASM4NXD005AZAK
		EZS Series*2	EZSM	EZSM6D005AZAK
DC power		DR Series	DR	DR28G2.5B03-AZAKU
input		DRS2 Series	DRSM	DRSM60-05A4AZAK
		DGII Series*2	DGM DGB DGR	DGM85R-AZAK DGB85R12-AZAKR DGR85R36-AZAKHR
		EH Series*2	EH	EH4-AZAKH
		L Series*2	LM	LM4F150AZAK-1

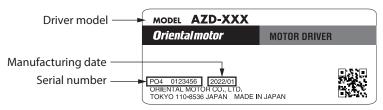
^{*1} The driver described in this manual can be combined with products that begin with these model names.

EAC Series, **EAS** Series, **EZS** Series: Check with the motor nameplate.

DGII Series, **EH** Series. **L** Series: Check with "P/N (Motor P/N)" described on the actuator nameplate.

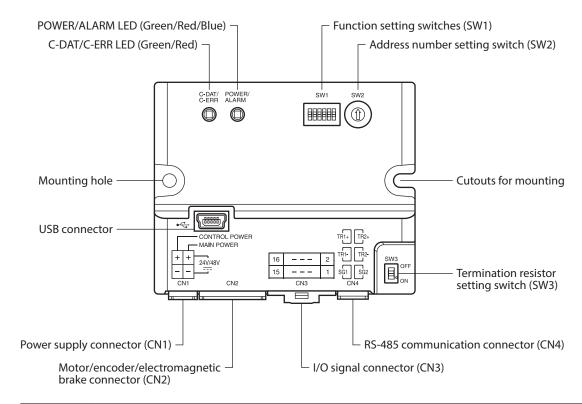
4-4 Information about nameplate

The figure shows an example.



^{*2} For these motorized actuators, the equipped motors have been evaluated to affix the CE Marking. The model name of the equipped motor can be checked as follows.

4-5 Names and functions of parts



Туре	Name	Description	
	C-DAT/C-ERR LED (Green/Red)	This LED indicates the status of RS-485 communication.	
LED	POWER/ALARM LED (Green/Red/Blue)	This LED indicates the status of the driver.	
	Function setting switches (SW1)	 No.1: Sets the protocol of RS-485 communication. Factory setting: ON No.2: Sets the transmission rate of RS-485 communication. Factory setting: ON No.3: Sets the pulse input mode. The factory setting of the pulse input mode depends on the destination country. 	
Switch		No.4: Sets a desired resolution per revolution of the motor output shaft. Factory setting: OFF No.5: Not used. No.6: Not used.	
	Address number setting switch (SW2)	Sets the address number (server address) of RS-485 communication. Factory setting: 1	
	Termination resistor setting switch (SW3)	Sets the termination resistor (120 Ω) of RS-485 communication. Factory setting: OFF	
	Power supply connector (CN1)	Connects a main power supply and a control power supply.	
	Motor/encoder/electromagnetic brake connector (CN2)	Connects the motor, the encoder, and the electromagnetic brake.	
Connector	I/O signal connector (CN3)	Connects the I/O signal cable.	
2322.01	RS-485 communication connector (CN4)	Connects the RS-485 communication cable.	
	USB connector • Canalana	Connects a PC in which the MEXE02 software has been installed. (USB2.0 mini-B port)	

4-6 Indication of LEDs

The status of the driver and RS-485 communication can be checked using the indication of LEDs.



The lighting colors of the POWER/ALARM LED and the C-DAT/C-ERR LED can be changed from green to white using the "LED (PWR/C-DAT) color changing" parameter.

■ POWER/ALARM LED

This LED indicates the status of the driver.

LED status	Description	
No light	The main power supply and the control power supply are not turned on.	
Green light	The main power supply and/or the control power supply are turned on.	
Blinking red	An alarm is being generated. The alarm message generated can be checked by counting the number of times the LED blinks. The LED is lit in green when the alarm is reset.	
Blinking blue	Information is being generated. The LED is lit in green when the information is cleared.	
Repeating "Green \rightarrow Red \rightarrow Simultaneously lit (*) \rightarrow No light"	This is the driver simulation mode.	

^{*} Green and red colors may overlap and it may be visible to yellow.

■ C-DAT/C-ERR LED

This LED indicates the status of RS-485 communication.

LED status	Description
Green light or blinking green	The driver communicates with the host controller properly via RS-485 communication.
Red light	An error occurs in communication with the host controller via RS-485 communication. The LED will be lit or blink in green when the communication status returns to the normal state.

5 Installation

5-1 Installation location

The driver is designed and manufactured to be incorporated in equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

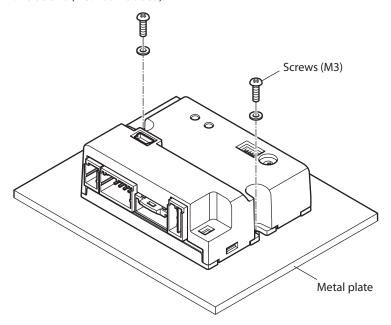
- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature: 0 to +50 °C (+32 to +122 °F) (non-freezing)
- Operating ambient humidity: 85 % or less (non-condensing)
- Area free of explosive atmosphere, toxic gas (such as sulfuric gas), or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields, or vacuum
- Up to 1,000 m (3,300 ft.) above sea level

5-2 Installation method

The driver can be installed in any direction.

Install the driver onto a flat metal plate offering high heat conductivity [material: aluminum, $150 \times 150 \times 2$ mm (5.91×5.91×0.08 in.) or equivalent].

When installing the driver, use the mounting holes and the cutouts for mounting to secure on the metal plate with two screws (M3: not included).

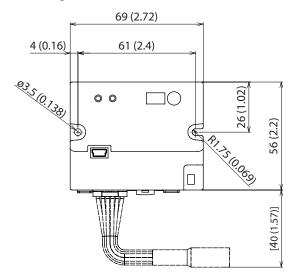


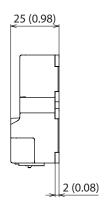


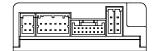
- Install the driver in an enclosure.
- Do not install any equipment that generates a large amount of heat or noise near the driver.
- Do not install the driver underneath a host controller or other equipment sensitive to heat.
- If the ambient temperature of the driver exceeds 50 °C (122 °F), reconsider the ventilation conditions such as providing forced cooling by using fans.

■ Dimensions [Unit: mm (in.)]

Mass: 84 g (3 oz.)







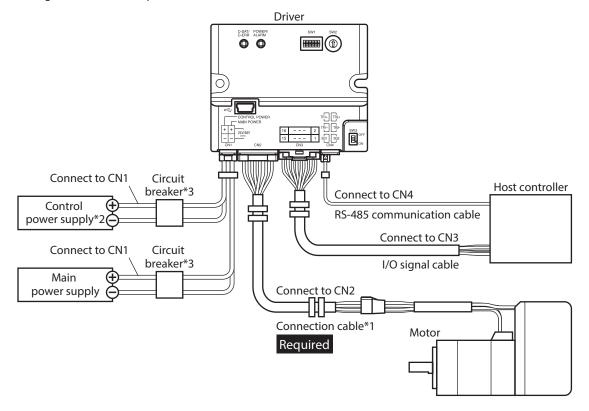
6 Connection

This chapter explains a connection example of a driver and a motor, connection methods of a main power supply and a control power supply, and others.

It also explains installation and wiring methods to conform to EMC Directive/Regulations as well as measures against electrical noise.

6-1 Connection example

The figure shows an example when the **AZM14** motor is connected.



- *1 It is an Oriental motor cable. Purchase is required separately.
- *2 Connecting the control power supply allows you to continue monitoring even if the main power supply is shut off. Connect it as necessary.
- *3 It is recommended that a circuit breaker or a circuit protector is connected because incorrect wiring may cause the internal input circuit to short-circuit.



- Connect the connectors securely. Insecure connections may cause malfunction or damage to the motor or the driver.
- When connecting the cables, secure them so that no load is applied to the connectors. Applying a load to the connector may result in a connection failure, causing the driver to malfunction.
- Keep 10 m (32.8 ft.) or less for the wiring distance between a motor and a driver. Exceeding 10 m (32.8 ft.) in the wiring distance may result in increase of the electrical noise emitted from the driver.
- Keep 2 m (6.6 ft.) or less for the cable length of the main power supply and control power supply cables.



- Before connecting or disconnecting a connector, turn off the main power supply and the control power supply, and check the POWER/ALARM LED has been turned off.
- When disconnecting the connector, pull out while pressing the latches on the connector with fingers.
- The ground (GND) of the CN1 connector, input common of the CN3 connector, and the signal ground (SG) of the CN4 connector are electrically insulated.

6-2 Connecting the main power supply and the control power supply (CN1)

Connect a main power supply to the CN1 connector.

Connecting the control power supply allows you to continue monitoring even if the main power supply is shut off. Connect it as necessary.



Make sure the polarity of the power supply before connecting. Reverse-polarity connection may cause damage to the driver.

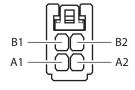
■ Applicable connector

Type	Part number	Applicable lead wire
Connector housing	1-1827864-2 (TE Connectivity)	• Wire size AWG 22 (0.34 to 0.37 mm ²) AWG 20 (0.51 to 0.53 mm ²)
Contact	1827589-2 (TE Connectivity)	AWG 18 (0.85 to 0.87 mm²) • Lead wire insulation outer diameter: ø1.4 to 2.2 mm (ø0.055 to 0.087 in.)
Designated crimp tool	2119142-1 (TE Connectivity)	Lead wire insulation strip length: 1.7 to 2.3 mm (0.067 to 0.091 in.)

■ Pin assignment

The figure shows the view from the insertion side of contacts.

Pin No.	Name	Description
A1	GND	Ground for control power supply
A2	GND	Ground for main power supply
B1	Control power supply	+24 VDC / +48 VDC
B2	Main power supply	+24 VDC / +48 VDC





A1 and A2 are not electrically insulated.

Voltage specifications

The voltage specifications of power supply input include the rated voltage and the allowable operating voltage. The voltage specifications are common for the main power supply and the control power supply.

Rated voltage	24 VDC±5 % 48 VDC±5 %
Allowable operating voltage	24 VDC input: 20 to 32 VDC (22.8 to 32 VDC)* 48 VDC input: 40 to 55 VDC

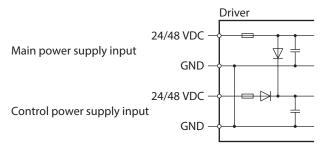
^{*} The value in parentheses () is the one when the electromagnetic brake motor is connected.



Set the "Main power mode" parameter to "0: 24 VDC" or "1: 48 VDC" when the main power supply starts up slowly or the voltage of the main power supply is unstable. (\Rightarrow p.63)

■ Internal input circuit

The driver can be used with the main power supply and control power supply, or with the main power supply only. When using only the main power supply, the power is supplied from the main power supply to the control power supply circuit inside the driver.



■ Power supply current capacity

• Current capacity for main power supply

The current capacity for the main power supply varies depending on the product combined. Check the current capacity in reference to the equipped motor model when using the **EAC** Series, **EAS** Series, or **EZS** Series.

The box (\square) in the model indicates an alphabet (\mathbf{B} , \mathbf{M} , or \mathbf{R}) representing the shape of the actuator.

Series	Model	Rated voltage	Power supply current capacity
	AZM14		0.4 A or more
	AZM15	24 VDC±5 %	0.5 A or more
AZ Series	AZM24, AZM26		1.4 A or more
EAC Series EAS Series	AZM46		1.6 A or more
EZS Series	AZM48	24 VDC±5 %	2.1 A or more
	AZM66	48 VDC±5 %	3.7 A or more
	AZM69		3.5 A or more
	DG□60	24 VDC±5 %	1.4 A or more
DGII Series	DG□85	24 VDC±5 % 48 VDC±5 %	1.6 A or more
	DG□130		3.7 A or more
DR Series	DR20	24 VDC+5 %	0.4 A or more
DK Series	DR28	24 VDC±3 %	1.3 A or more
DRS2 Series	DRSM42	24 VDC±5 %	1.5 A or more
DR32 Series	DRSM60	48 VDC±5 %	2.6 A or more
EH Series	EH3	24 VDC±5 %	0.4 A or more
En belles	EH4	24 VDC±3 %	1.4 A or more
L Series	LM2, LM4	24 VDC±5 % 48 VDC±5 %	3.7 A or more

Current capacity for control power supply

Data di valta va	Power supply current capacity		
Rated voltage	Without electromagnetic brake	With electromagnetic brake	
24 VDC±5 % 48 VDC±5 %	0.15 A	0.4 A*	

^{*} The **AZM46** type is 0.23 A.

Connecting the I/O signals (CN3) 6-3

Connect the I/O signal cable to the CN3 connector.



(memo) Wire the I/O signal cable as short as possible. The maximum input frequency will decrease as the cable length increases.

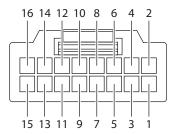
■ Applicable connector

Type	Part number	Applicable lead wire
Connector housing	501646-1600 (Molex Incorporated)	• Wire size AWG 26 to 22 (0.124 to 0.34 mm²)
Contact	501647-1100 (Molex Incorporated)	Lead wire insulation outer diameter: Ø0.95 to 1.5 mm (Ø0.037 to 0.059 in.)
Designated crimp tool	63819-2300 (Molex Incorporated)	Lead wire insulation strip length: 2.1 to 2.5 mm (0.083 to 0.098 in.)

■ Pin assignment

Pin No.	Name	Description*
16	CW+ [PLS+]	CW pulse input + [Pulse input +]
15	CW- [PLS-]	CW pulse input – [Pulse input –]
14	CCW+ [DIR+]	CCW pulse input + [Rotation direction input +]
13	CCW- [DIR-]	CCW pulse input – [Rotation direction input –]
12	IN-COM	Input common
11	IN0	Control input 0 (ZHOME)
10	IN1	Control input 1 (FREE)
9	IN2	Control input 2 (STOP)
8	IN3	Control input 3 (ALM-RST)
7	IN4	Control input 4 (P-PRESET)
6	OUT0+	Control output 0 (ALAA D)
5	OUT0-	Control output 0 (ALM-B)
4	OUT1+	Control output 1 (HOME END)
3	OUT1-	- Control output 1 (HOME-END)
2	OUT2+	Control output 2 (DEADV)
1	OUT2-	Control output 2 (READY)

The figure shows the view from the insertion side of contacts.

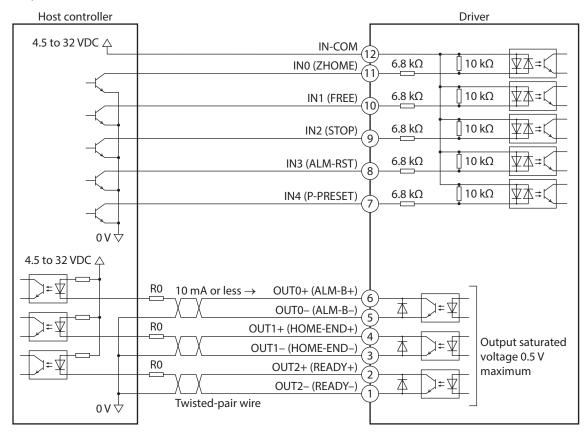


^{*} Values in brackets [] are signals when the 1-pulse input mode is set. Values in parentheses () are initial values.

6-4 Connection diagram

■ Connection example with a current sink output circuit

Values in parentheses () in the figure are initial values. For pin Nos.13 to 16, refer to the next section.

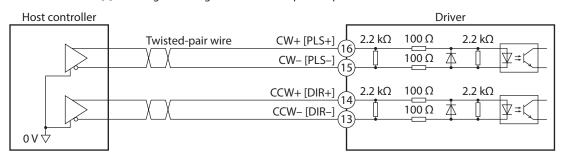


memo

- Use input signals at 4.5 to 32 VDC.
- Use output signals at 4.5 to 32 VDC, 10 mA or less. If the current exceeds 10 mA, connect an external resistor R0 to keep 10 mA or less.
- The saturated voltage of the output signal is 0.5 V maximum.

When the pulse input circuit of the driver is of line driver type

The pin Nos.13 to 16 are only available for inputting a pulse. Other functions cannot be assigned. Values in brackets [] in the figure are signals when the 1-pulse input mode is set.



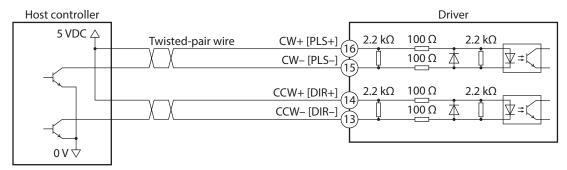
• When the pulse input circuit of the driver is of open collector type

The pin Nos.13 to 16 are only available for inputting a pulse. Other functions cannot be assigned. Values in brackets [] in the figure are signals when the 1-pulse input mode is set.

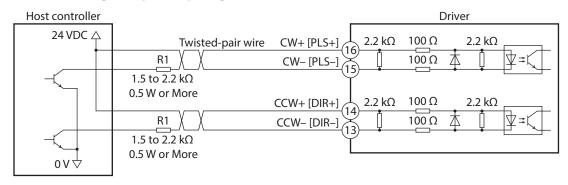


Use the CW [PLS] input and CCW [DIR] input at 5 to 24 VDC. When using signals at 24 VDC, connect an external resistor R1 (1.5 to 2.2 k Ω , 0.5 W or more). When using signals at 5 VDC, apply the voltage directly.

When the voltage of a pulse input signal is 5 VDC

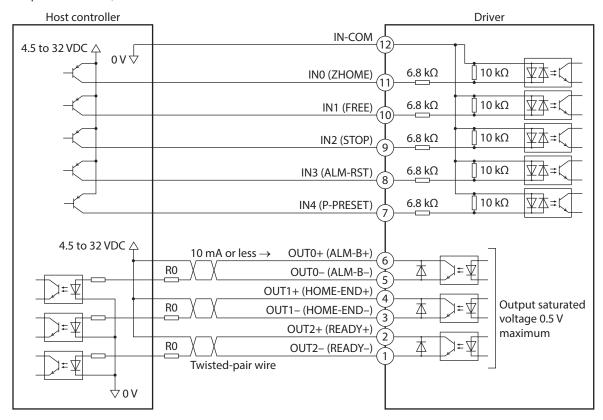


When the voltage of a pulse input signal is 24 VDC



■ Connection example with a current source output circuit

Values in parentheses () in the figure are initial values. For pin Nos.13 to 16, refer to the next section.

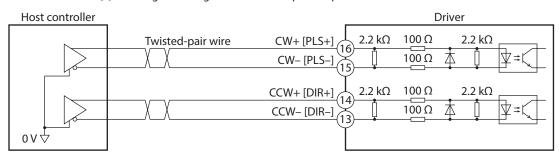


(memo)

- Use input signals at 4.5 to 32 VDC.
- Use output signals at 4.5 to 32 VDC, 10 mA or less. If the current exceeds 10 mA, connect an external resistor R0 to keep 10 mA or less.
- The saturated voltage of the output signal is 0.5 V maximum.

• When the pulse input circuit of the driver is of line driver type

The pin Nos.13 to 16 are only available for inputting a pulse. Other functions cannot be assigned. Values in brackets [] in the figure are signals when the 1-pulse input mode is set.



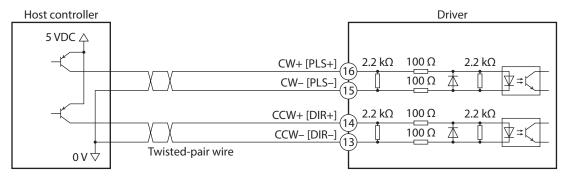
When the pulse input circuit of the driver is of open collector type

The pin Nos.13 to 16 are only available for inputting a pulse. Other functions cannot be assigned. Values in brackets [] in the figure are signals when the 1-pulse input mode is set.

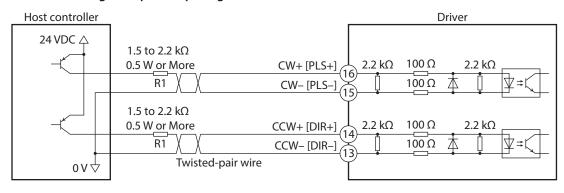


Use the CW [PLS] input and CCW [DIR] input at 5 to 24 VDC. When using signals at 24 VDC, connect an external resistor R1 (1.5 to 2.2 k Ω , 0.5 W or more). When using signals at 5 VDC, apply the voltage directly.

When the voltage of a pulse input signal is 5 VDC



When the voltage of a pulse input signal is 24 VDC



6-5 Connecting the RS-485 communication cable (CN4)

Connect the RS-485 communication cable to the CN4 connector.

A cable to connect with the host controller and that to connect between drivers are required to be provided by the customer. Cables to connect to the network converter are provided in Oriental Motor products separately. Refer to p.83 for the model name.

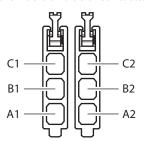
■ Applicable connector

Type	Part number	Applicable lead wire
Connector housing	1-1827579-1 (TE Connectivity)	• Wire size AWG 28 (0.08 mm²) AWG 26 (0.12 mm²)
Contact	1827588-2 (TE Connectivity)	AWG 24 (0.2 mm ²) AWG 22 (0.37 mm ²) • Lead wire insulation outer diameter:
Designated crimp tool	2119143-1 (TE Connectivity)	 Ø1.08 to 1.9 mm (Ø0.043 to 0.075 in.) Lead wire insulation strip length: 1.7 to 2.3 mm (0.067 to 0.091 in.)

■ Pin assignment

Pin No.	Signal name	Description
A1	SG1	Ground 1 for RS-485 communication
A2	SG2	Ground 2 for RS-485 communication
B1	TR1-	Negative side of signal 1 for RS-485 communication
B2	TR2-	Negative side of signal 2 for RS-485 communication
C1	TR1+	Positive side of signal 1 for RS-485 communication
C2	TR2+	Positive side of signal 2 for RS-485 communication

The figure shows the view from the insertion side of contacts.

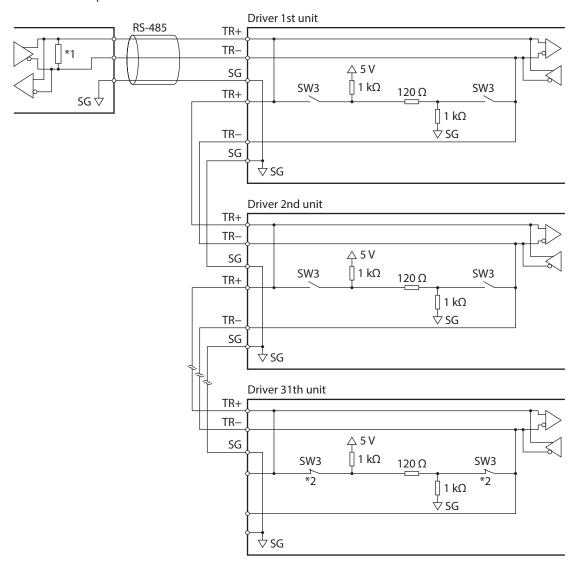


memo

SG1 and SG2, TR1– and TR2–, and TR1+ and TR2+ are internally connected.

■ Internal input circuit

The ground (GND) of the CN1 connector and the signal ground (SG) of the CN4 connector are electrically insulated. SW3 is a double-pole double-throw switch.



- *1 Termination resistor 120 Ω
- *2 Turn the termination resistor ON.

6-6 Connecting the USB cable

Using a USB cable with the following specifications, connect a PC in which the **MEXEO2** software has been installed to the USB connector.

Specifications	USB2.0 (Full speed)
Cable	Length: 3 m (9.8 ft.) or less Shape: A to mini B



- Connect the driver and a PC directly using a USB cable.
- In large electrically noisy environments, use the USB cable with a ferrite core or install a ferrite core to the USB cable.

6-7 Noise measures

There are two types of electrical noises: One is a noise to invade into the driver from the outside and cause the driver malfunction, and the other is a noise to emit from the driver and cause peripheral equipment malfunction. For the noise that is invaded from the outside, take measures to prevent the driver malfunction. It is needed to take adequate measures because signal lines are very likely to be affected by the noise.

For the noise that is emitted from the driver, take measures to suppress it.

■ Measures against electrical noise

There are the following three methods mainly to take measures against the electrical noise.

Noise suppression

- When relays or electromagnetic switches are used, use noise filters or CR circuits to suppress surge generated by them.
- Use an Oriental Motor connection cable when extending the wiring distance between a motor and a driver. Refer to p.79 for the model name. This is effective in suppressing the electrical noise emitted from the motor.
- Cover the driver by a metal plate such as aluminum. This is effective in shielding the electrical noise emitted from the driver.

Prevention of noise propagation

- Connect a noise filter on the input side of the DC power supply.
- Place the power lines, such as the motor and power supply cables, keeping a distance of 200 mm (7.87 in.) or more from the signal lines, and also do not bundle them or wire them in parallel. If a power cable and a signal cable have to cross, cross them at a right angle.
- Use shielded twisted pair cables for power lines and signal lines.
- Keep cables as short as possible without coiling and bundling extra lengths.
- Grounding multiple points will increase effect to block electrical noise because impedance on the grounding points is decreased. However, ground them so that a potential difference does not occur among the grounding points. I/O signal cables that include a ground wire are provided in Oriental Motor products. Refer to p.84 for the model name.
- To ground a shielded cable, use a metal cable clamp that can maintain contact with the entire circumference of the shielded cable, and ground as near the product as possible.



Suppression of effect by noise propagation

- Loop the noise propagated cable around a ferrite core. Doing so will prevent the propagated noise invades into the driver or emits from the driver. The frequency band in which an effect by the ferrite core can be seen is generally 1 MHz or more. Check the frequency characteristics of the ferrite core used. To increase the effect of noise attenuation by the ferrite core, loop the cable a lot.
- Change the transmission method of pulse signals to the line driver type which is less likely to be affected by electrical noise. If the pulse signal of the host controller is of the open collector type, use Oriental Motor's pulse signal converter for noise immunity. Refer to p.86 for the model name.

■ Noise suppression products

Noise filter

• Connect a noise filter (or equivalent) in the table below on the input side of the DC power supply. When a power transformer is used, be sure to connect a noise filter on the AC input side of the power transformer. Doing so will prevent the propagated noise through the power line. Install the noise filter as close to the input terminals of DC power supply as possible.

Manufacturer	Part number
SOSHIN ELECTRIC CO., LTD.	HF2010A-UPF
Schaffner EMC	FN2070-10-06

- Use the AWG 18 (0.75 mm²) or thicker wire for the input and output cables of the noise filter, and secure firmly using a cable clamp or others so that the cable does not come off the enclosure.
- Place the input cable as far apart as possible from the output cable, and do not wire the cables in parallel. If the input and output cables are placed at a close distance or if they are wired in parallel, the noise in the enclosure affects the power cable through stray capacitance, and the noise suppressing effect will be decreased.
- Connect the ground terminal of the noise filter to the grounding point, using as thick and short a wire as possible.
- When connecting a noise filter in an enclosure, wire the input cable of the noise filter as short as possible. Wiring in long distance may reduce the noise suppressing effect.

■ Oriental Motor's noise suppression products

I/O signal cables

This is a shielded cable for good noise immunity to connect the driver and host controller. The ground wires useful to grounding are come out from both ends of the cable. Refer to p.84 for the model name. The EMC testing is conducted using Oriental Motor's I/O signal cable.

Pulse signal converter for noise immunity

This product converts a pulse signal, which is output from the open collector output, to a pulse signal for good noise immunity by outputting the pulse signal again from the differential output. Refer to p.86 for the model name.

Surge suppressor

This product is effective to suppress the surge which occurs in a relay contact part. Connect it when using a relay or electromagnetic switch. A CR circuit for surge suppression and a CR circuit module are provided. Refer to p.86 for the model name.

6-8 Conformity to EMC Directive/Regulations

Effective measures must be taken against EMI that the motor and driver may give to adjacent control-system equipment, as well as EMS of the motor and driver themselves, in order to prevent a serious functional impediment in the machinery. The use of the following installation and wiring methods will enable the motor and driver to be compliant with EMC Directive/Regulations.

Oriental Motor conducts EMC testing on its motors and drivers in accordance with "Example of installation and wiring" on p.26. The user is responsible for ensuring the machine's compliance with EMC, based on the installation and wiring explained below.



This equipment is not intended for use in residential environments nor for use on a low-voltage public network supplied in residential premises, and it may not provide adequate protection to radio reception interference in such environments.

Connecting the main power supply and the control power supply

Use DC power supplies compliant with EMC Directive/Regulations for the main power supply and the control power supply. Use shielded cables to wire and ground as short as possible. Refer to "Prevention of noise propagation" on p.24 for grounding the shielded cable.

Ferrite core

Install the following ferrite core (or equivalent) to the places shown in "Example of installation and wiring" on p.26. Part No.: ZCAT3035-1330 (TDK Corporation)

• Connecting the motor cable

Use an Oriental Motor connection cable when extending the wiring distance between the motor and the driver. Refer to p.79 for the model name.

Connecting the signal cable

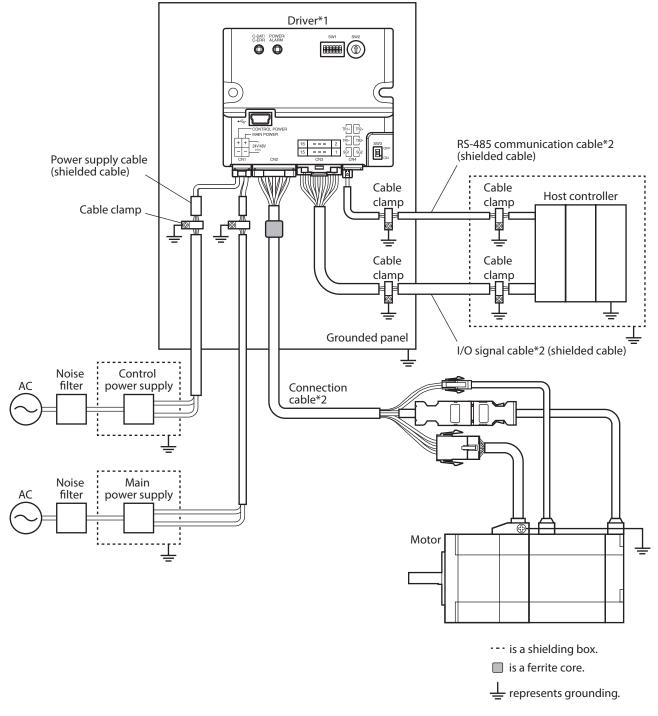
Refer to "Prevention of noise propagation" on p.24.

Grounding method

- Wires used to ground the motor must be as thick and short as possible so that no potential difference is generated between the grounding points.
- Choose a large, thick and uniformly conductive surface for the grounding point.

• Example of installation and wiring

The figure shows an example when the cable type electromagnetic brake motor is used.



^{*1} The driver is grounded by making the heat sink contact directly with the grounded panel.

^{*2} An Oriental Motor cable is used.



- The driver uses components that are sensitive to static electricity. Take measures against static electricity since it may cause the driver to malfunction or suffer damage.
- When connecting the following products, cover the motor cable with a shielded braided sleeving. Use the cable clamps to ground both ends of the shielded braided sleeving.
 - AZ Series: AZM14, AZM15, AZM24, AZM26

EAC Series: EACM2
EAS Series: EASM2
DR Series: DR20, DR28
DGII Series: DGM60, DGR60

- EH Series: EH3, EH4

7 Explanation of I/O signals

This chapter explains signals assigned to the I/O signal connector at the time of shipment.

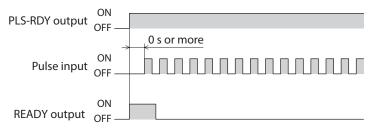
7-1 Input signals

All input signals of the driver are photocoupler inputs. The signal state represents a state of "ON: Carrying current" or "OFF: Not carrying current" for the internal photocoupler rather than the voltage level of the signal.

■ CW [PLS] input, CCW [DIR] input

These signals are used when the motor is operated by inputing a pulse signal.

The CW and CCW inputs are used for the 2-pulse input mode, and the PLS and DIR inputs for the 1-pulse input mode. Set the pulse input mode of the driver according to the pulse output mode of the host controller used. When inputting a pulse signal, make sure that the PLS-RDY output or the READY output is being ON.



When the motor is stopped, be sure to stop inputting a pulse signal (pulse input OFF).

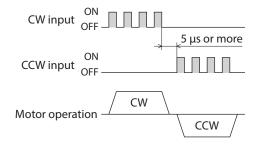
Maximum input pulse frequency

- When the host controller is of line driver output: 1 MHz (duty cycle 50 %)
- When the host controller is of open collector output: 250 kHz (duty cycle 50 %)

2-pulse input mode

When the CW input is turned from OFF to ON, the motor rotates in the clockwise direction by one step.

When the CCW input is turned from OFF to ON, the motor rotates in the counterclockwise direction by one step.



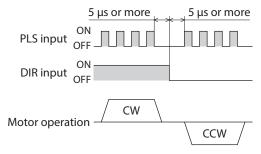


Do not input the CW input and the CCW input at the same time. The motor will not operate properly.

1-pulse input mode

When the PLS input is turned from OFF to ON while the DIR input is ON, the motor rotates in the clockwise direction by one step.

When the PLS input is turned from OFF to ON while the DIR input is OFF, the motor rotates in the counterclockwise direction by one step.



ZHOME input

When the ZHOME input is turned ON, the motor rotates to the home having set by the P-PRESET input or the **MEXEO2** software. Since no sensor is required, returning to the home can be performed at a high speed.

■ FREE input

When the FREE input is turned ON, the motor current is cut off. When an electromagnetic brake motor is used, the electromagnetic brake is also released. The motor output shaft can be rotated manually since the motor holding force is lost.



When a load is installed vertically, do not turn the FREE input ON. The motor loses its holding force, and the load may fall.

■ STOP input

When the STOP input is turned ON, the motor will stop. To resume the operation, turn the STOP input OFF, and then input an operation start signal or a pulse signal to the driver.



If the motor has been stopped by the STOP input when being operated by inputting a pulse signal, be sure to stop inputting a pulse signal. If the STOP input is turned OFF in a state of inputting a pulse signal, the motor may start rotating suddenly.



If the STOP input is turned ON while the motor is operated by inputting a pulse signal, the driver will not receive a pulse signal.

■ ALM-RST input

If the ALM-RST input is turned from OFF to ON while an alarm is generated, the alarm will be reset (the alarm will be reset at the ON edge of the ALM-RST input). Before resetting an alarm, always remove the cause of the alarm and ensure safety. Note that some alarms cannot be reset with the ALM-RST input.



When the motor is being operated by inputting a pulse signal, be sure to stop inputting a pulse signal before resetting the alarm.

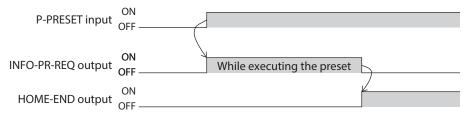
■ P-PRESET input

When the P-PRESET input is turned ON, the command position and the feedback position are rewritten to the value set in the "Preset position" parameter. At the same time, they are written to the non-volatile memory. However, position preset cannot be executed while the motor is being operated.



- Position preset cannot be executed while the motor is temporarily stopped by the PAUSE input.
- Even if the motor is being stopped, position preset cannot be executed while the TLC output is ON. Refer to the **AZ** Series <u>OPERATING MANUAL Function Edition</u> for details about the TLC output.

If position preset is executed, the INFO-PR-REQ output is turned ON. The INFO-PR-REQ output is a signal that is output while position preset is executed. When position preset is completed, the INFO-PR-REQ output is turned OFF and the HOME-END output is simultaneously turned ON.



7-2 Output signals

Output signals of the driver include photocoupler/open-collector output and line-driver output. The signal state represents a state of "ON: Carrying current" or "OFF: Not carrying current" for the internal photocoupler rather than the voltage level of the signal.

■ ALM-B output

If an alarm is generated, the ALM-B output is turned OFF to stop the motor. At the same time, the POWER/ALARM LED on the driver will blink in red. The ALM-B output is normally closed.

■ HOME-END output

The HOME-END output is turned ON at the following conditions.

- When the home is set
- When high-speed return-to-home operation is completed

■ READY output

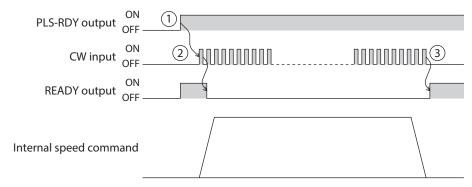
When the driver is ready to operate, the READY output is turned ON. Input an operation start signal to the driver after the READY output is ON.



Besides the READY output, the PLS-RDY output, which is turned ON when operation by inputting a pulse signal is ready to start, is also available. For details, refer to the **AZ** Series <u>OPERATING MANUAL</u> Function Edition.

7-3 Timing chart

- 1. Check the PLS-RDY output or the READY output has been turned ON.
- Input the CW pulse.The motor starts operation in the clockwise direction.
- 3. When the operation is completed, the READY output is turned ON.

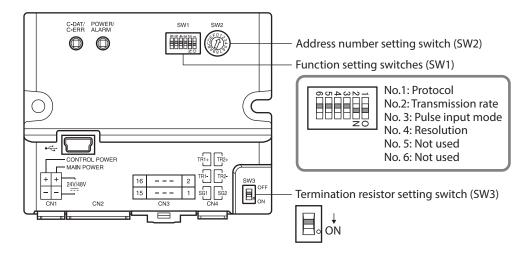


8 Setting of switches

The figure shows the setting state at the time of shipment.



When setting the switch, turn on the main power supply and the control power supply again. The new setting is enabled when the main power supply and the control power supply are turned on again.



8-1 Protocol

Set the protocol of RS-485 communication using the function setting switch SW1-No.1.

Factory setting: ON

SW1-No.1	Protocol
ON	Modbus RTU protocol
OFF	Connects to a network converter

8-2 Transmission rate

The transmission rate is set using the function setting switch SW1-No.2. Set the same value as the transmission rate of the host controller.

Factory setting: ON

■ When using with Modbus RTU protocol (RS-485 communication)

SW1-No.2	Transmission rate (bps)
ON	230,400
OFF	115,200

(memo)

To set a value other than the values in the table, set with the "Baudrate (Modbus)" parameter.

■ When using via industrial network with the setting of a network converter

Setting the transmission rate is not required.



When the driver is used via industrial network, the function setting switch SW1-No. 2 will be disabled. The switch can be set to either ON or OFF.

8-3 Pulse input mode

Set the pulse input mode of the driver according to the pulse output mode of the host controller.

Set the pulse input mode using the function setting switch SW1-No.3.

The factory setting of the pulse input mode depends on the destination country.

SW1-No.3	Pulse input mode
ON	1-pulse input mode
OFF	2-pulse input mode

8-4 Resolution

Set a desired resolution per revolution of the motor output shaft using the function setting switch SW1-No.4.

Factory setting: OFF

SW1-No.4	Resolution
ON	10,000 P/R
OFF	1,000 P/R

8-5 Address number (server address)

Set the address number (server address) using the address number setting switch SW2. Make sure that each address number (server address) set for each driver is not duplicated.

Factory setting: 1



- When the address number is set with the address number setting switch SW2, see below for the number of drivers that can be connected.
 - When using with Modbus RTU protocol (RS-485 communication): Up to 15 units
- When using via industrial network with the setting of a network converter: Up to 16 units
- When setting the address number with the **MEXEO2** software, the number of drivers that can be connected is 31 units maximum.

■ When using with Modbus RTU protocol (RS-485 communication)

The number of drivers that can be connected is 15 units maximum.

SW2	Address number (server address)
0	0*
1	1
2	2
3	3
4	4
5	5
6	6
7	7

SW2	Address number (server address)
8	8
9	9
Α	10
В	11
С	12
D	13
Е	14
F	15

^{*} In the case of Modbus protocol, do not use the address number 0 (server address 0) because it is reserved in the broadcast mode.

■ When using via industrial network with the setting of a network converter

The number of drivers that can be connected is 16 units maximum.

SW2	Address number (server address)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7

SW2	Address number (server address)
8	8
9	9
Α	10
В	11
С	12
D	13
Е	14
F	15

8-6 Termination resistor

Set a termination resistor to the driver located farthest (positioned at the end) from the host controller or the network converter.

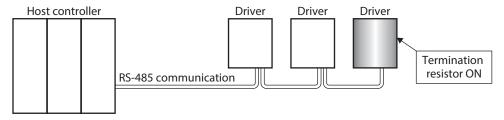
Set the termination resistor setting switch SW3 to ON to enable the termination resistor for RS-485 communication (120 Ω).

Factory setting: OFF

SW3	Termination resistor (120 Ω)
OFF	Disable
ON	Enable

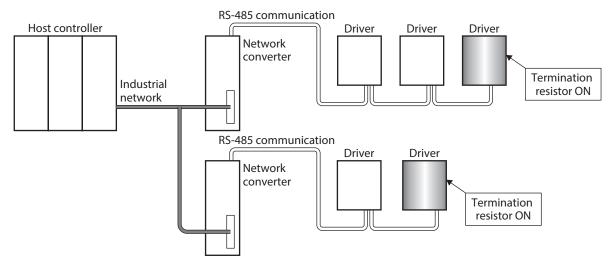
■ When using with Modbus RTU protocol (RS-485 communication)

Set a termination resistor to only one driver.



■ When using via industrial network with the setting of a network converter

In the case of the following system configuration, set a termination resistor to two drivers.



9 Flow of setting and operation

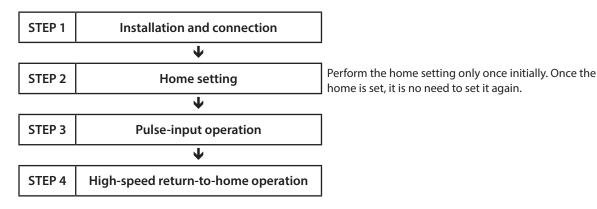
Details of are described in this manual.				
For details of, refer to the AZ Series <u>OPERATIN</u>	IG MANUAL Function Edition.			
inidicates the reference destination.				
The title number described in the reference checking the reference destination.	destination may be changed. Use the title name when			
Installs and connects the motor and the driver. 5 Installation 6 Connection				
V				
Sets the pulse input mode and resolution. 8 Setting of switches				
\				
Sets the home. 10 Guidance				
V				
Sets the base current and the command filter. 7 Address/code lists				
↓				
Assigns direct I/O. 12 Addresses/code lists				
V				
Sets the coordinates. 2 Operation				
↓				
Sets the items related to information and alarms. 14 Troubleshooting				
\				
Inputs pulses to operate the motor. 10 Guidance	* The following examples are available when operating by operation methods other than pulse input.			
	Return-to-home operationMacro operationDirect data operation			
	2 Operation 5 Method of control via Modbus RTU (RS-485 communication) 6 Method of control via industrial network			

10 Guidance

If you are new to this product, read this section to understand the operation flow. This chapter describes the operation that can be performed in a state of the factory setting.



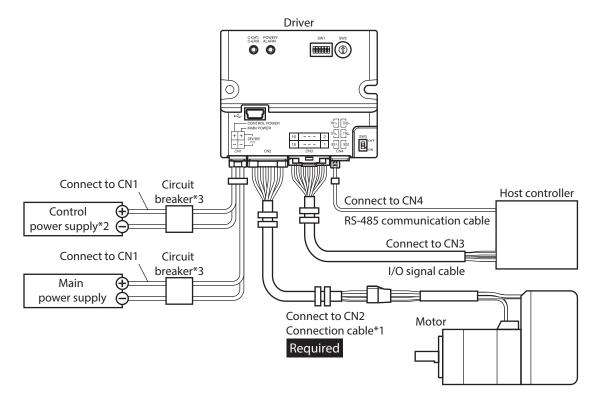
Before operating the motor, check the condition of the surrounding area to ensure safety.



■ Factory setting

Setting item	Factory setting
Pulse input mode	The factory setting of the pulse input mode depends on the destination country.
Resolution	SW1-No.4: OFF (1,000 P/R)

STEP 1 Check the installation and the connection.



- *1 It is an Oriental motor cable. Purchase is required separately.
- *2 Connecting a control power supply can continue monitoring even if a main power supply is shut off. Connect it as necessary.
- *3 It is recommended that a circuit breaker or a circuit protector is connected because incorrect wiring may cause the internal input circuit to short-circuit.

STEP 2 Set the home.

The home has not set at the time of shipment. Before starting operation, be sure to set the home.

Perform the home setting only once initially. Once the home is fixed, the home information is retained even if the power supply is shut off.

There are the following two methods to set the home.

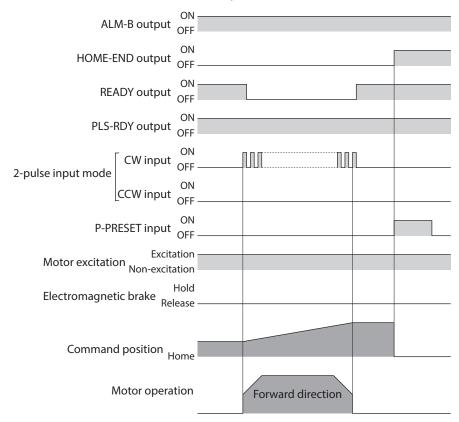
- Use the P-PRESET input to set the home.
- Use the MEXEO2 software to set the home.

This section describes how to set the home using the P-PRESET input. Refer to the **AZ** Series <u>OPERATING MANUAL</u> <u>Function Edition</u> for how to set the home using the **MEXEO2** software.



- The home is written to the non-volatile memory. The non-volatile memory can be rewritten
 approximately 100,000 times.
- The home has been set for some motorized actuators at the time of shipment. Set the home only when changing it from the factory setting.
- 1. Check that the ALM-B output, the READY output, and the PLS-RDY output are being ON.
- 2. Input a pulse and rotate the motor output shaft to the position desired to set as the home.
- 3. Check that the ALM-B output, the READY output, and the PLS-RDY output are being ON, and then turn the P-PRESET input ON.

The home is set and the HOME-END output is turned ON.



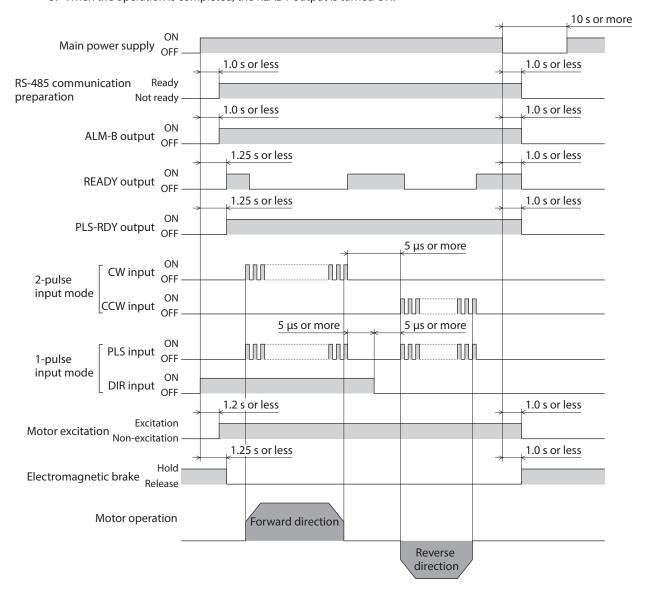
STEP 3 Perform pulse-input operation.

- 1. Check that the ALM-B output, the READY output, and the PLS-RDY output are being ON.
- Input a pulse to operate the motor.
 In the case of the 2-pulse input mode, inputting a pulse to turn the CW input ON operates the motor in the forward direction. Inputting a pulse to turn the CCW input ON operates it in the reverse direction.
 The READY output is turned OFF during operation.



In the case of the 2-pulse input mode, do not turn the CW input and the CCW input ON simultaneously. The motor will not operate properly.

3. When the operation is completed, the READY output is turned ON.

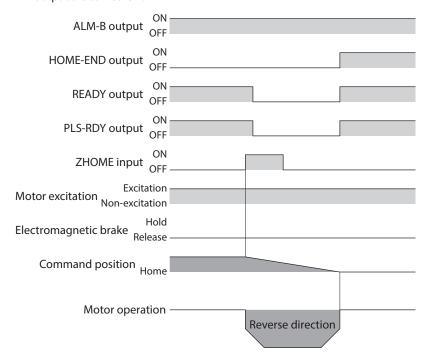


STEP 4 Perform high-speed return-to-home operation.

High-speed return-to-home operation is operation to return to the mechanical home on the absolute coordinates set in advance. Since the home is recognized by the ABZO sensor, return-to-home operation can be executed at the same speed as that of the normal positioning operation without using an external sensor.

When the ZHOME input is turned ON, high-speed return-to-home is started. The motor stops when the operation stop signal is turned ON on the way of operation.

- 1. Check that the ALM-B output, the READY output, and the PLS-RDY output are being ON.
- 2. Turn the ZHOME input ON. High-speed return-to-origin operation is started.
- 3. Check the READY output has been turned OFF and turn the ZHOME input OFF.
 When the motor reaches the mechanical home, the HOME-END output, the READY output, and the PLS-RDY output are turned ON.



STEP 5 Were you able to operate?

How did it go? Were you able to operate properly? If the motor does not operate, check the following points.

- Is the POWER/ALARM LED blinking in red?
 An alarm is being generated. Refer to p.75 for details.
- Are the main power supply, the control power supply, the motor, the I/O signal cable, and the RS-485 communication cable connected securely?

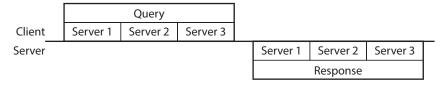
11 ID share mode

This chapter describes the ID share mode of Modbus RTU specific to the mini Driver.

When controlling the driver with other methods than the ID share mode, refer to the **AZ** Series OPERATING MANUAL Function Edition and "12 Addresses and codes lists" on p.59.

11-1 Overview of ID share mode

The ID share mode is Oriental Motor's unique transmission mode in which multiple servers share a communication ID. The client sends a query to multiple servers. Each server executes the processing and returns a response. To read/write in the ID share mode, it is required to set a group of servers (share group) that operates in the ID share mode.





Even if a share group is set, communication can be performed in the unicast mode or the broadcast mode.

■ Features of ID share mode

- A query can be sent from the client to multiple servers at once. Synchronization between servers is superior compared to the unicast mode.
- From the client, different information can separately be read/written from/to each server that shares the communication ID. Unlike the broadcast mode, different information can be written to multiple servers at one time.
- When a query is sent from the client, each server executes the processing and returns a response. Unlike the group send, a response is returned from all servers.

Overview of read

When reading data in the ID share mode, an ID of data to be read is required to set in the "Share read data" parameter. Setting the ID of data to be read in the "Share read data" parameter can read a value using the "Share read data" area of the ID share register address (*).

* It is the address dedicated to the ID share mode.

Setting an ID of data to be read

Register address	Name (parameter)
Upper: 0990h (2448) Lower: 0991h (2449)	Share read data 0
Upper: 0992h (2450) Lower: 0993h (2451)	Share read data 1
Upper: 0994h (2452) Lower: 0995h (2453)	Share read data 2



ID	Data to be read
0040h (64)	Present alarm
007Ch (124)	Driver temperature
007Dh (125)	Motor temperature

Reading a value

ID share register address	Name (area)
Upper: 0000h (0) Lower: 0001h (1)	Share read data 0
Upper: 0002h (2) Lower: 0003h (3)	Share read data 1
Upper: 0004h (4) Lower: 0005h (5)	Share read data 2



Value	Data to be read		
0	Present alarm		
383	Driver temperature		
426	Motor temperature		

■ Overview of write

When writing data in the ID share mode, an ID of data to be written is required to set in the "Share write data" parameter. Setting the ID of data to be written in the "Share write data" parameter can write a value using the "Share write data" area of the ID share register address (*).

* It is the address dedicated to the ID share mode.

Setting an ID of data to be written

Register address	Name (parameter)	
Upper: 09A8h (2472) Lower: 09A9h (2473)	Share write data 0	
Upper: 09AAh (2474) Lower: 09ABh (2475)	Share write data 1	
Upper: 09ACh (2476) Lower: 09ADh (2477)	Share write data 2	



ID	Data to be written
002Fh (47)	Direct data operation operating speed
0030h (48)	Direct data operation starting/changing rate
0031h (49)	Direct data operation stopping deceleration

Writing a value

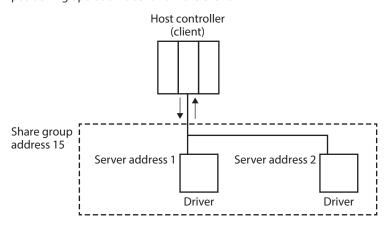
ID share register address	Name (area)
Upper: 0000h (0) Lower: 0001h (1)	Share write data 0
Upper: 0002h (2) Lower: 0003h (3)	Share write data 1
Upper: 0004h (4) Lower: 0005h (5)	Share write data 2



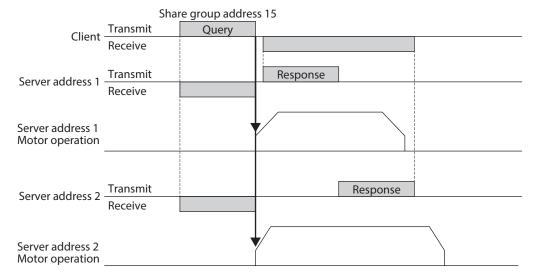
Value	Data to be written
1,000	Direct data operation operating speed
1,000	Direct data operation starting/changing rate
2,000	Direct data operation stopping deceleration

■ Example of operation

This section explains the operation when the share group is set as shown in the figure and the command of positioning operation is sent from the client.



When a query is sent from the client to the share group address 15, the server addresses 1 and 2 start positioning operation. When each server executes the processing, a response is returned sequentially. The order in which responses are returned is set in the "Share control local ID" parameter. $(\Box p.42)$



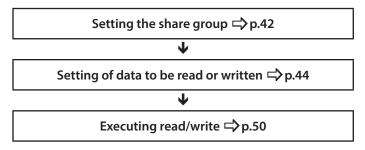
■ Corresponding function code

Function codes and message lengths supported by the ID share mode are shown below.

Function code	Function	Number of registers
03h	Reading from a holding register(s)	1 to 24
10h	Writing to multiple holding registers	1 to 24
17h	Reading/writing from/to multiple holding registers	Read: 1 to 24 Write: 1 to 24

11-2 Flow of setting of ID share mode

To read/write data in the ID share mode, setting the share group and the data to be read/written is required.



11-3 Setting of share group

Set a group (share group) that operates in the ID share mode to the driver. The share group can be set with the unicast mode or the **MEXEO2** software.

■ Related parameters

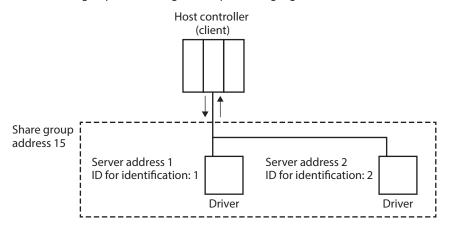
Recalculation and setup are immediately executed when the parameter is written.

MEXE02		address	Name Description		Setting range	Initial
code	Upper	Lower		•		value
p11	0980h (2432)	0981h (2433)	Share control global ID	Sets the communication ID shared in the ID share mode. The communication ID set here will be the share group address. Do not set "0" or the same value as the server address of the driver. The driver does not recognize the ID share mode, and it reads or writes a value different from the set data.	-1 (ID share mode is not used), 1 to 127 (Communication ID to share)	-1
	0982h (2434)	0983h (2435)	Share control number	Sets the number of server axes sharing the communication ID.	1 to 31	1
	0984h (2436)	0985h (2437)	Share control local ID	Sets an ID for identifying a server. Data is read/written in the order of ID set here. Set an ID consecutively starting from "1."	0 (ID share mode is not used), 1 to 31 (ID for server identification)	0

■ Setting example

This section explains how to set a share group in the figure.

To set a share group, use "Writing to multiple holding registers (10h)" of the function code.



Setting item

		Server address 1		Server address 2		
Description	Register address	Value write	Corresponding decimal	Value write	Corresponding decimal	
Share control global ID (upper)	0980h (2432)	0000h	15	0000h	15	
Share control global ID (lower)	0981h (2433)	000Fh	13	000Fh	13	
Share control number (upper)	0982h (2434)	0000h	2	0000h	2	
Share control number (lower)	0983h (2435)	0002h	2	0002h	2	
Share control local ID (upper)	0984h (2436)	0000h	0000h		2	
Share control local ID (lower)	0985h (2437)	0001h		0002h	2	

Setting flow

1. Send the following query in the unicast mode to set a share group to the driver of the server address 1.

Query (unicast mode)

Field name		Data	Description
Serve	Server address		Driver of server address 1
Functi	ion code	10h	Writing to multiple holding registers
	Register address (upper)	09h	Register address to start writing from
	Register address (lower)	80h	= Share control global ID (upper): 0980h
	Number of registers (upper)	00h	Number of registers to be written from the starting
	Number of registers (lower)	06h	register address = 6 registers (0006h)
	Number of data bytes	0Ch	Twice the number of registers in the query = 12
	Value write to register address (upper)	00h	Value written to register address 0980h
	Value write to register address (lower)	00h	= Share control global ID (upper): 0000h
	Value write to register address +1 (upper)	00h	Value written to register address 0981h
Data	Value write to register address +1 (lower)	0Fh	= Share control global ID (lower): 000Fh
	Value write to register address +2 (upper)	00h	Value written to register address 0982h
	Value write to register address+2 (lower)	00h	= Share control number (upper): 0000h
	Value write to register address +3 (upper)	00h	Value written to register address 0983h
	Value write to register address +3 (lower)	02h	= Share control number (lower): 0002h
	Value write to register address +4 (upper)	00h	Value written to register address 0984h
	Value write to register address +4 (lower)	00h	= Share control local ID (upper): 0000h
	Value write to register address +5 (upper)	00h	Value written to register address 0985h
	Value write to register address +5 (lower)	01h	= Share control local ID (lower): 0001h
Error	check (lower)	44h	Calculation result of CRC-16
Error o	check (upper)	D5h	Calculation result of ChC-16

Response (unicast mode)

	Field name	Data	Description	
Serve	address	01h	Same as query	
Functi	Function code		Same as query	
	Register address (upper)		Company	
Data	Register address (lower)	80h	Same as query	
Data	Number of registers (upper)	00h	Cama as guary	
	Number of registers (lower)		Same as query	
Error check (lower)		42h	Calculation result of CRC-16	
Error	heck (upper)	7Fh	Calculation result of CRC-16	

2. Set a share group to the driver of the server address 2 as in the step 1.



Parameters having set in the unicast mode are cleared when the main power supply and the control power supply are turned off because they are stored in RAM. If the "Write batch NV memory" of the maintenance command is executed, parameters are saved in the non-volatile memory. Therefore, they are retained even if the main power supply and the control power supply are turned off.

11-4 Setting of data to be read or written

Set the data to be read in the "Share read data" parameter and the data to be written in the "Share write data" parameter.

Data can be set with the unicast mode or the **MEXEO2** software.

■ Related parameters

Recalculation and setup are immediately executed when the parameter is written.

MEXE02	Register	address		2		Initial
code	Upper	Lower	Name	Description	Setting range	value
	0990h (2448)	0991h (2449)	Share read data 0			
	0992h (2450)	0993h (2451)	Share read data 1			
	0994h (2452)	0995h (2453)	Share read data 2			
	0996h (2454)	0997h (2455)	Share read data 3			
	0998h (2456)	0999h (2457)	Share read data 4			
	099Ah (2458)	099Bh (2459)	Share read data 5	Sets the ID of data to be read	ID list ⇔ p.45	0
	099Ch (2460)	099Dh (2461)	Share read data 6	in the ID share mode.	10 list -y p.43	0
	099Eh (2462)	099Fh (2463)	Share read data 7			
	09A0h (2464)	09A1h (2465)	Share read data 8			
	09A2h (2466)	09A3h (2467)	Share read data 9			
p11	09A4h (2468)	09A5h (2469)	Share read data 10			
PII	09A6h (2470)	09A7h (2471)	Share read data 11			
	09A8h (2472)	09A9h (2473)	Share write data 0			
	09AAh (2474)	09ABh (2475)	Share write data 1			
	09ACh (2476)	09ADh (2477)	Share write data 2			
	09AEh (2478)	09AFh (2479)	Share write data 3			
	09B0h (2480)	09B1h (2481)	Share write data 4	Sets the ID of data to be	ID list □> p.45	0
	09B2h (2482)	09B3h (2483)	Share write data 5	written in the ID share mode.		
	09B4h (2484)	09B5h (2485)	Share write data 6			
	09B6h (2486)	09B7h (2487)	Share write data 7			
	09B8h (2488)	09B9h (2489)	Share write data 8			
	09BAh (2490)	09BBh (2491)	Share write data 9			

MEXE02	Register	address	Name	Description	Setting range	Initial
code	Upper	Lower	Name	Description	Setting range	value
n11	09BCh (2492)	09BDh (2493)	Share write data 10	Sets the ID of data to be	ID list	
p11	09BEh (2494)	09BFh (2495)	Share write data 11	written in the ID share mode.	Refer to the next table.	0

• Data that can be set in the "Share read data" parameter and the "Share write data" parameter

This section shows data that can be read or written in the ID share mode. Use "ID" in the table when setting the data. "R/W" in the table represents "READ/WRITE."

IC)			
Hex	Dec	- Name	Description	R/W
002Ch	44	Direct data operation operation data number	Selects the operation data number used for direct data operation. [Setting range] 0 to 255	R/W
002Dh	45	Direct data operation operation type	Sets the operation type for direct data operation. [Setting range] 0: No setting 1: Absolute positioning 2: Incremental positioning (based on command position) 3: Incremental positioning (based on feedback position) 7: Continuous operation (position control) 8: Wrap absolute positioning 9: Wrap proximity positioning 10: Wrap absolute positioning (FWD) 11: Wrap absolute positioning (RVS) 12: Wrap absolute push-motion 13: Wrap proximity push-motion 14: Wrap push-motion (FWD) 15: Wrap push-motion (RVS) 16: Continuous operation (speed control) 17: Continuous operation (push-motion) 18: Continuous operation (torque control) 20: Absolute positioning push-motion (based on command position) 22: Incremental positioning push-motion (based on feedback position)	R/W
002Eh	46	Direct data operation position	Sets the target position for direct data operation. [Setting range] -2,147,483,648 to 2,147,483,647 steps	R/W
002Fh	47	Direct data operation operating speed	Sets the operating speed for direct data operation. [Setting range] -4,000,000 to 4,000,000 Hz	R/W
0030h	48	Direct data operation starting/changing rate	Sets the starting/changing rate or starting/changing time for direct data operation. [Setting range] 1 to 1,000,000,000 (1=0.001 kHz/s, 1=0.001 s, or 1=0.001 ms/kHz)	R/W
0031h	49	Direct data operation stopping deceleration	Sets the stopping deceleration rate or the stop time for direct data operation. [Setting range] 1 to 1,000,000,000 (1=0.001 kHz/s, 1=0.001 s, or 1=0.001 ms/kHz)	R/W
0032h	50	Direct data operation operating current	Sets the operating current for direct data operation. [Setting range] 0 to 1,000 (1=0.1 %)	R/W

IC)	Name	Description	R/W
Hex	Dec		·	
0033h	51	Direct data operation trigger	Sets the trigger for direct data operation. [Setting range] -7: Operation data number -6: Operation type -5: Position -4: Operating speed -3: Starting/changing speed rate -2: Stopping deceleration -1: Operating current 0: Disable 1: All data updated	R/W
0034h	52	Direct data operation forwarding destination	Selects the stored area when the next direct data is transferred during direct data operation. [Setting range] 0: Execution memory 1: Buffer memory	R/W
003Ah	58	Driver input command (2nd)	The same input command as "Driver input command (reference)" is automatically set.	W
003Ch	60	Driver input command (automatic OFF)	The same input command as "Driver input command (reference)" is automatically set. If the input signal is turned ON with this command, it is automatically turned OFF after 250 µs.	W
003Eh	62	Driver input command (reference)	Sets the input command to the driver.	W
003Fh	63	Driver output status	Reads the output status of the driver.	R
0040h	64	Present alarm	Indicates the alarm code presently being generated.	R
0056h	86	Present communication error	Indicates the communication error code received last time.	R
0063h	99	Command position	Indicates the present command position. When the wrap function is enabled, the value on the wrap coordinates is indicated.	R
0064h	100	Command speed (r/min)	Indicates the present command speed. (r/min)	R
0065h	101	Command speed (Hz)	Indicates the present command speed. (Hz)	R
0066h	102	Feedback position	Indicates the present feedback position.	R
0067h	103	Feedback speed (r/min)	Indicates the present feedback speed. (r/min)	R
0068h	104	Feedback speed (Hz)	Indicates the present feedback speed. (Hz)	R
006Ah	106	Direct I/O	Indicates the status of direct I/O. (Arrangement of bits ⇒ p.60)	R
006Bh	107	Torque monitor	Indicates the torque presently generated as a percentage of the maximum holding torque.	R
006Dh	109	Cumulative load monitor	Indicates the integrated value of the load during operation. (Internal unit) The load is cumulated regardless of the rotation direction of the motor. Refer to the AZ Series OPERATING MANUAL Function Edition for details about the cumulative load monitor.	R
007Ch	124	Driver temperature	Indicates the present driver temperature. (1=0.1 °C)	R
007Dh	125	Motor temperature	Indicates the present motor temperature. (1=0.1 °C)	R
007Eh	126	Odometer	Indicates the cumulative travel distance of the motor in revolutions. (1=0.1 krev) This cannot be cleared by the customer.	R
007Fh	127	Tripmeter	Indicates the travel distance of the motor in revolutions. (1=0.1 krev) This can be cleared by the customer.	R

IC)	Name	Description	R/W
Hex	Dec	Name	Description	I I VV
00A1h	161	Main power supply time	Indicates the time elapsed since the main power supply was turned on in minutes.	R
00A2h	162	Control power supply count	Indicates the number of times the control power supply was turned on.	R
00A3h	163	Inverter voltage	Indicates the inverter voltage of the driver. (1=0.1 V)	R
00A4h	164	Main power supply voltage	Indicates the main power supply voltage. (1=0.1 V)	R
00A9h	169	Elapsed time from BOOT	Indicates the time elapsed since the control power supply was turned on. For a driver that the control power supply is not connected, it indicates the time elapsed since the main power supply was turned on.	R
00ACh	172	RS-485 communication normal reception frame counter (All)	Indicates the number of normal frames received.	R
00ADh	173	RS-485 communication normal reception frame counter (Only own address)	Indicates the number of normal frames received to own address.	R
00B8h	184	I/O status 1		R
00B9h	185	I/O status 2		R
00BAh	186	I/O status 3		R
00BBh	187	I/O status 4	Indicates the ON-OFF status of the internal I/O.	R
00BCh	188	I/O status 5	(Arrangement of bits ➡ p.61)	R
00BDh	189	I/O status 6		R
00BEh	190	I/O status 7		
00BFh	191	I/O status 8		R
00C0h	192	Alarm reset	Resets the alarm being generated presently. Some alarms cannot be reset.	W
00D3h	211	Clear information	Clears the information.	W

■ Setting example of data to be read

To set data, use "Writing to multiple holding registers (10h)" of the function code.

This section explains an example that "Present alarm," "Driver temperature," and "Motor temperature" are set in the "Share read data" parameter of the server addresses 1 and 2.

Setting item

Doscription	Pagistar addrass	Data to be read	ID	
Description	Register address Data to be read		Hex	Dec
Share read data 0 (upper)	0990h (2448)	Present alarm	0000h	64
Share read data 0 (lower)	0991h (2449)	Fresent didini	0040h	
Share read data 1 (upper)	0992h (2450)	Driver temperature	0000h	124
Share read data 1 (lower)	0993h (2451)	Driver temperature	007Ch	
Share read data 2 (upper)	0994h (2452)		0000h	125
Share read data 2 (lower)	0995h (2453)	Motor temperature	007Dh	125

(memo) Different data can be set for each server address.

• Setting example

Server address 1: Present alarm, Driver temperature, Motor temperature

Server address 2: Odometer, Tripmeter, Main power supply time

Setting flow

1. Send the following query in the unicast mode, and set the data to be read to the driver of the server address 1.

Query (unicast mode)

	Field name		Description
Serve	Server address		Driver of server address 1
Functi	Function code		Writing to multiple holding registers
Reg	Register address (upper)	09h	Register address to start writing from
	Register address (lower)	90h	= Share read data 0 (upper): 0990h
	Number of registers (upper)	00h	Number of registers to be written from the starting
	Number of registers (lower)	06h	register address = 6 registers (0006h)
	Number of data bytes	0Ch	Twice the number of registers in the query
	Value write to register address (upper)	00h	
	Value write to register address (lower)	00h	Value written to register addresses 0990h and 0991h
	Value write to register address +1 (upper)	00h	= Present alarm ID (0000h, 0040h)
Data	Value write to register address +1 (lower)	40h	
	Value write to register address +2 (upper)	00h	
	Value write to register address +2 (lower)	00h	Value written to register addresses 0992h and 0993h
	Value write to register address +3 (upper)	00h	= Driver temperature ID (0000h, 007Ch)
	Value write to register address +3 (lower)	7Ch	
	Value write to register address +4 (upper)	00h	
	Value write to register address +4 (lower)	00h	Value written to register addresses 0994h and 0995h
	Value write to register address +5 (upper)	00h	= Motor temperature ID (0000h, 007Dh)
	Value write to register address +5 (lower)	7Dh	
Error	check (lower)	10h	Calculation result of CRC-16
Error o	check (upper)	C1h	Calculation result of CRC-10

Response (unicast mode)

	Field name	Data	Description	
Server address		01h	Same as query	
Functi	on code	10h	Same as query	
Register address (upper)		09h	Cama as guary	
Data	Register address (lower)	90h	Same as query	
Dala	Data Number of registers (upper)		Samo as quary	
	Number of registers (lower)		Same as query	
Error check (lower)		43h	Calculation result of CRC-16	
Error	heck (upper)	BAh	Calculation result of CRC-16	

2. Set the data to be read to the driver of the server address 2 as in the step 1.



Parameters having set in the unicast mode are cleared when the main power supply and the control power supply are turned off because they are stored in RAM. If the "Write batch NV memory" of the maintenance command is executed, parameters are saved in the non-volatile memory. Therefore, they are retained even if the main power supply and the control power supply are turned off.

■ Setting example of data to be written

To set parameters, use "Writing to multiple holding registers (10h)" of the function code. This section explains an example that "Direct data operation operating speed," "Direct data operation starting/ changing rate,", and "Direct data operation stopping deceleration" are set in the "Share write data" parameter of the server addresses 1 and 2.

Setting item

Description	Register address	Data to be written	ID	
Description	negister address	Data to be written	Hex	Dec
Share write data 0 (upper)	09A8h (2472)	Direct data operation operating speed	0000h	47
Share write data 0 (lower)	09A9h (2473)	Direct data operation operating speed	002Fh	4/
Share write data 1 (upper)	09AAh (2474)	Direct data eneration starting/changing rate	0000h	48
Share write data 1 (lower)	09ABh (2475)	Direct data operation starting/changing rate	0030h	40
Share write data 2 (upper)	09ACh (2476)	Direct data eneration stepping deceleration	0000h	40
Share write data 2 (lower)	09ADh (2477)	Direct data operation stopping deceleration	0031h	49

memo

Different data can be set for each server address.

• Setting example

Server address 1: Direct data operation operating speed, Direct data operation starting/changing

rate, Direct data operation stopping deceleration

Server address 2: Direct data operation operation data number, Direct data operation operation

type, Direct data operation operating current

Setting flow

1. Send the following query in the unicast mode, and set the data to be written to the driver of the server address 1.

Query (unicast mode)

Field name		Data	Description
Server address		01h	Driver of server address 1
Function code		10h	Writing to multiple holding registers
Regi	Register address (upper)	09h	Register address to start writing from
		= Share write data 0 (upper): 09A8h	
	Number of registers (upper)	00h	Number of registers to be written from the starting
	Number of registers (lower)	06h	register address = 6 registers (0006h)
	Number of data bytes	0Ch	Twice the number of registers in the query
	Value write to register address (upper)	00h	
	Value write to register address (lower)	00h	Value written to register addresses 09A8h and 09A9h
	Value write to register address +1 (upper)	00h	= Direct data operation operating speed ID (0000h, 002Fh)
	Value write to register address +1 (lower)	2Fh	
	Value write to register address +2 (upper)	00h	
	Value write to register address +2 (lower)	00h	Value written to register addresses 09AAh and 09ABh
	Value write to register address +3 (upper)	00h	= Direct data operation starting/changing rate ID (0000h, 0030h)
	Value write to register address +3 (lower)	30h	
	Value write to register address +4 (upper)	00h	
	Value write to register address +4 (lower)	00h	Value written to register addresses 09ACh and 09ADh
	Value write to register address +5 (upper)	00h	= Direct data operation stopping deceleration ID (0000h, 0031h)
	Value write to register address +5 (lower)	31h	
Error	heck (lower)	FAh	Calculation result of CRC-16
Error	heck (upper)	DAh	Calculation result of CRC-10

Response (unicast mode)

	Field name	Data	Description	
Server address		01h	Same as query	
Functi	on code	10h	Same as query	
Register address (upper)		09h	Cama as guary	
Data	Register address (lower)	A8h	Same as query	
Data	Number of registers (upper)	00h	C	
Number of registers (lower)		06h	Same as query	
Error check (lower)		C2h	Calculation result of CRC-16	
Error o	heck (upper)	77h	Calculation result of CRC-16	

2. Set the data to be written to the driver of the server address 2 as in the step 1.



Parameters having set in the unicast mode are cleared when the main power supply and the control power supply are turned off because they are stored in RAM. If the "Write batch NV memory" of the maintenance command is executed, parameters are saved in the non-volatile memory. Therefore, they are retained even if the main power supply and the control power supply are turned off.

11-5 Executing read/write

Read and write data in the ID share mode.

The following function codes are used for reading and writing data.

- Read only: Reading from a holding register(s) (03h)
- Write only: Writing to multiple holding registers (10h)
- Read/write: Read/write of multiple holding registers (17h)

When "Read/write of multiple holding registers (17h)" of the function code is used, write is executed first, and then read is executed. Queries are sent in the order of read and write. The order to send cannot be changed.

■ Read

Read the value (16 bits) using the "Share read data" area of the ID share register address. Up to 24 successive registers $(24 \times 16 \text{ bits})$ can be read.

Read the upper and lower values at the same time. If not, an invalid value may be read.

If multiple holding registers are read, they are executed in the order of ID share register addresses.

ID share register address of "Share read data" area

ID share reg	ister address	Name	
Upper	Lower	Name	
0000h (0)	0001h (1)	Share read data 0	
0002h (2)	0003h (3)	Share read data 1	
0004h (4)	0005h (5)	Share read data 2	
0006h (6)	0007h (7)	Share read data 3	
0008h (8)	0009h (9)	Share read data 4	
000Ah (10)	000Bh (11)	Share read data 5	

ID share register address		Name	
Upper	Lower	Name	
000Ch (12)	000Dh (13)	Share read data 6	
000Eh (14)	000Fh (15)	Share read data 7	
0010h (16)	0011h (17)	Share read data 8	
0012h (18)	0013h (19)	Share read data 9	
0014h (20)	0015h (21)	Share read data 10	
0016h (22)	0017h (23)	Share read data 11	

■ Write

Write the value (16 bits) using the "Share write data" area of the ID share register address. Up to 24 registers (24×16 bits) can be written.

Write the upper and lower values at the same time. If not, an invalid value may be written.

Write is executed in the order of ID share register addresses. Note that even when an exception response is returned because some data is invalid as being outside the specified range, etc., other data may have been written properly.

ID share register address of "Share write data" area

ID share reg	ister address	Name				
Upper	Lower	Name				
0000h (0)	0001h (1)	Share write data 0				
0002h (2)	0003h (3)	Share write data 1				
0004h (4)	0005h (5)	Share write data 2				
0006h (6)	0007h (7)	Share write data 3				
0008h (8)	0009h (9)	Share write data 4				
000Ah (10)	000Bh (11)	Share write data 5				

ID share reg	ister address	Name	
Upper	Lower	Name	
000Ch (12)	000Dh (13)	Share write data 6	
000Eh (14)	000Fh (15)	Share write data 7	
0010h (16)	0011h (17)	Share write data 8	
0012h (18)	0013h (19)	Share write data 9	
0014h (20)	0015h (21)	Share write data 10	
0016h (22)	0017h (23)	Share write data 11	

Example of read

Read "Present alarm," "Driver temperature" and "Motor temperature" from the server addresses 1 and 2.

		Serv	er address 1	Server address 2		
Description	ID share register address	Value read	Corresponding decimal	Value read	Corresponding decimal	
Present alarm (upper)	0000h (0): Share read data 0 (upper)	0000h	0	0000h	48	
Present alarm (lower)	0001h (1): Share read data 0 (lower)	0000h	0	0030h		
Driver temperature (upper)	0002h (2): Share read data 1 (upper)	0000h	383	0000h	450	
Driver temperature (lower)	0003h (3): Share read data 1 (lower)	017Fh	363	01C2h	430	
Motor temperature (upper)	0004h (4): Share read data 2 (upper)	0000h 426		0000h	F20	
Motor temperature (lower)	0005h (5): Share read data 2 (lower)	01AAh	420	021Ah	538	

Query (ID share mode)

	Field name		Description
Serve	Server address		Share group address 15
Funct	ion code	03h	Reading from a holding register(s)
	ID share register address (upper)	00h	ID share register address to start reading from
Data	ID share register address (lower)	00h	= Share read data 0 (upper): 0000h
Dala	Number of registers (upper)	00h	Number of registers to be read from the starting ID share
	Number of registers (lower)	0Eh	register address = 14 registers (000Eh) *
Error	Error check (lower)		Coloulation result of CDC 16
Error	theck (upper)	20h	Calculation result of CRC-16

- * Number of registers = (number of ID share register addresses to be read + 1) \times Share control number
- Number of register addresses to be read: 6 (0000h to 0005h)
- +1: Error check for between servers
- Share control number: 2



Note that the number of registers in the ID share mode is calculated differently from that in other transmission modes of RS-485 communication.

Response (ID share mode)

	Field name			Description
Server	Server address			Same as query
Functi	on co	ode	03h	Same as query
	Nun	nber of data bytes	1Ch	Twice the number of registers in the query
		Value read from ID share register address (upper)	00h	Value read from ID share register address
		Value read from ID share register address (lower)	00h	0000h = Present alarm (upper): 0000h
		Value read from ID share register address +1 (upper)	00h	Value read from ID share register address
		Value read from ID share register address +1 (lower)	00h	0001h = Present alarm (lower): 0000h
		Value read from ID share register address +2 (upper)	00h	Value read from ID share register address
		Value read from ID share register address +2 (lower)	00h	0002h = Driver temperature (upper): 0000h
Data	*1	Value read from ID share register address +3 (upper)	01h	Value read from ID share register address
	'	Value read from ID share register address +3 (lower)	7Fh	0003h = Driver temperature (lower): 017Fh
		Value read from ID share register address +4 (upper)	00h	Value read from ID share register address
		Value read from ID share register address +4 (lower)	00h	0004h = Motor temperature (upper): 0000h
		Value read from ID share register address +5 (upper)	01h	Value read from ID share register address
		Value read from ID share register address +5 (lower)	AAh	0005h = Motor temperature (lower): 01AAh
		Error check for between servers (lower) *3	B6h	Calculation result of CRC-16 (The value
		Error check for between servers (upper) *3	10h	varies depending on the monitor value.)
		Value read from ID share register address (upper)	00h	Value read from ID share register address
		Value read from ID share register address (lower)	00h	0000h = Present alarm (upper): 0000h
		Value read from ID share register address +1 (upper)	00h	Value read from ID share register address
		Value read from ID share register address +1 (lower)	30h	0001h = Present alarm (lower): 0030h
		Value read from ID share register address +2 (upper)	00h	Value read from ID share register address
		Value read from ID share register address +2 (lower)	00h	0002h = Driver temperature (upper): 0000h
Data	*2	Value read from ID share register address +3 (upper)	01h	Value read from ID share register address
Data	_	Value read from ID share register address +3 (lower)	C2h	0003h = Driver temperature (lower): 01C2h
		Value read from ID share register address +4 (upper)	00h	Value read from ID share register address
		Value read from ID share register address +4 (lower)	00h	0004h = Motor temperature (upper): 0000h
		Value read from ID share register address +5 (upper)	02h	Value read from ID share register address
		Value read from ID share register address +5 (lower)	1Ah	0005h = Motor temperature (lower): 021Ah
		Error check for between servers (lower) *3	ACh	Calculation result of CRC-16 (The value
		Error check for between servers (upper) *3	AAh	varies depending on the monitor value.)
Error c	heck	(lower)	00h	Calculation result of CRC-16
Error c	heck	(upper)	00h	Calculation result of City-10

^{*1} Server address 1 (Share control local ID: 1)

^{*2} Server address 2 (Share control local ID: 2)

 $^{^{*3}}$ Whenever data is sent to each server, error check is performed on the data having sent until then.

■ Example of write

Write "Direct data operation operating speed," "Direct data operation starting/changing rate," and "Direct data operation stopping deceleration" to the server addresses 1 and 2.

		Serv	er address 1	Server address 2		
Description	ID share register address	Value write	Corresponding decimal	Value write	Corresponding decimal	
Direct data operation operating speed (upper)	0000h (0): Share write data 0 (upper)	0000h	1,000	0000h	2,000	
Direct data operation operating speed (lower)	0001h (1): Share write data 0 (lower)	03E8h	1,000	07D0h		
Direct data operation starting/changing rate (upper)	0002h (2): Share write data 1 (upper)	0000h	1,000	0000h	2,000	
Direct data operation starting/changing rate (lower)	0003h (3): Share write data 1 (lower)	03E8h	1,000	07D0h		
Direct data operation stopping deceleration (upper)	0004h (4): Share write data 2 (upper)	0000h	2,000	0000h	F 000	
Direct data operation stopping deceleration (lower)	0005h (5): Share write data 2 (lower)	07D0h	2,000 1388h		5,000	

Query (ID share mode)

		Field name	Data	Description
Servei	Server address			Share group address 15
Functi	ion co	ode	10h	Writing to multiple holding registers
	ID s	hare register address (upper)	00h	ID share register address to start writing
	ID s	hare register address (lower)	00h	from = Share write data 0 (upper): 0000h
	Nur	nber of registers (upper)	00h	Number of registers to be written from
	Nur	nber of registers (lower)	0Ch	the starting ID share register address = 12 registers (000Ch) *1
	Nur	nber of data bytes	18h	Twice the number of registers in the query
		Value write to ID share register address (upper)	00h	Value written to ID share register address 0000h = Direct data operation operating
		Value write to ID share register address (lower)	00h	speed (upper): 0000h
		Value write to ID share register address +1 (upper)	03h	Value written to ID share register address 0001h = Direct data operation operating
Data		Value write to ID share register address +1 (lower)	E8h	speed (lower): 03E8h
		Value write to ID share register address +2 (upper)	00h	Value written to ID share register address 0002h = Direct data operation starting/
	*2	Value write to ID share register address +2 (lower)	00h	changing rate (upper): 0000h
	"2	Value write to ID share register address +3 (upper)	03h	Value written to ID share register address 0003h = Direct data operation starting/
		Value write to ID share register address +3 (lower)	E8h	changing rate (lower): 03E8h
		Value write to ID share register address +4 (upper)	00h	Value written to ID share register address
		Value write to ID share register address +4 (lower)	00h	0004h = Direct data operation stopping deceleration (upper): 0000h
		Value write to ID share register address +5 (upper)	07h	Value written to ID share register address
		Value write to ID share register address +5 (lower)	D0h	deceleration (lower): 07D0h

		Field name	Data	Description
		Value write to ID share register address (upper)	00h	Value written to ID share register address
		Value write to ID share register address (lower)	00h	0000h = Direct data operation operating speed (upper): 0000h
		Value write to ID share register address +1 (upper)	07h	Value written to ID share register address
		Value write to ID share register address +1 (lower)	D0h	0001h = Direct data operation operating speed (lower): 07D0h
		Value write to ID share register address +2 (upper)	00h	Value written to ID share register address
Dete	*3	Value write to ID share register address +2 (lower)	00h	0002h = Direct data operation starting/ changing rate (upper): 0000h
Data	"3	Value write to ID share register address +3 (upper)	07h	Value written to ID share register address
		Value write to ID share register address +3 (lower)	D0h	0003h = Direct data operation starting/ changing rate (lower): 07D0h
		Value write to ID share register address +4 (upper)	00h	Value written to ID share register address
		Value write to ID share register address +4 (lower)	00h	0004h = Direct data operation stopping deceleration (upper): 0000h
		Value write to ID share register address +5 (upper)	13h	Value written to ID share register address
		Value write to ID share register address +5 (lower)	88h	0005h = Direct data operation stopping deceleration (lower): 1388h
Error check (lower)			99h	Calculation result of CRC-16
Error c	heck	(upper)	21h	Calculation result of ChC-10

^{*1} Number of registers = (Share control number) × Number of ID share register addresses to be written

- Share control number: 2
- Number of register addresses to be written: 6 (0000h to 0005h)
- *2 Server address 1 (Share control local ID: 1)
- *3 Server address 2 (Share control local ID: 2)



Note that the number of registers in the ID share mode is calculated differently from that in other transmission modes of RS-485 communication.

Response (ID share mode)

	Field name	Data	Description
Server address		0Fh	Same as query
Function code		10h	Same as query
	ID share register address (upper)	00h	Cama as guary
Data	ID share register address (lower)	00h	Same as query
Dala	Number of registers (upper)	00h	Company
	Number of registers (lower)	0Ch	Same as query
Error check (lower)		C1h	Calculation result of CRC-16
Error	heck (upper)	22h	Calculation result of CRC-16

■ Example of read/write

Write values to "Direct data operation operating speed," "Direct data operation starting/changing rate," and "Direct data operation stopping deceleration" first, and read "Present alarm," "Driver temperature," and "Motor temperature."

		Serv	er address 1	Server address 2		
Description	ID share register address	Value write	Corresponding decimal	Value write	Corresponding decimal	
Direct data operation operating speed (upper)	0000h (0): Share write data 0 (upper)	0000h	1,000	0000h	2,000	
Direct data operation operating speed (lower)	0001h (1): Share write data 0 (lower)	03E8h	1,000	07D0h		
Direct data operation starting/changing rate (upper)	0002h (2): Share write data 1 (upper)	0000h	1,000	0000h	2,000	
Direct data operation starting/changing rate (lower)	0003h (3): Share write data 1 (lower)	03E8h	1,000	07D0h		
Direct data operation stopping deceleration (upper)	0004h (4): Share write data 2 (upper)	0000h	2,000	0000h	F 000	
Direct data operation stopping deceleration (lower)	0005h (5): Share write data 2 (lower)	07D0h	2,000 1388h		5,000	

		Serv	er address 1	Server address 2		
Description	ID share register address	Value read	Corresponding decimal	Value read	Corresponding decimal	
Present alarm (upper)	0000h (0): Share read data 0 (upper)	0000h	0	0000h	48	
Present alarm (lower)	0001h (1): Share read data 0 (lower)	0000h	0	0030h	40	
Driver temperature (upper)	0002h (2): Share read data 1 (upper)	0000h	383	0000h	450	
Driver temperature (lower)	0003h (3): Share read data 1 (lower)	017Fh	363	01C2h	430	
Motor temperature (upper)	0004h (4): Share read data 2 (upper)	0000h	426	0000h	538	
Motor temperature (lower)	0005h (5): Share read data 2 (lower)	01AAh	420	021Ah	330	

Query (ID share mode)

	Field name	Data	Description
Server	address	0Fh	Share group address 15
Functi	on code	17h	Read/write of multiple holding registers
	(Read) ID share register address (upper)	00h	ID share register address to start reading
	(Read) ID share register address (lower)		from= Share read data 0 (upper): 0000h
	(Read) Number of registers (upper)	00h	Number of registers to be read from the starting ID share register address =
	(Read) Number of registers (lower)	0Eh	14 registers (000Eh) *1
Data	(Write) ID share register address (upper)	00h	ID share register address to start writing
	(Write) ID share register address (lower)	00h	from = Share write data 0 (upper): 0000h
	(Write) Number of registers (upper)	00h	Number of registers to be written from the starting ID share register address =
	(Write) Number of registers (lower)		12 registers (000Ch) *2
	(Write) Number of data bytes	18h	Twice the number of registers in the query

		Field name	Data	Description			
		Value write to ID share register address (upper)	00h	Value written to ID share register address			
		Value write to ID share register address (lower)	00h	0000h = Direct data operation operating speed (upper): 0000h			
		Value write to ID share register address +1 (upper)	03h	Value written to ID share register address			
		Value write to ID share register address +1 (lower)	E8h	0001h = Direct data operation operating speed (lower): 03E8h			
		Value write to ID share register address +2 (upper)	00h	Value written to ID share register address 0002h = Direct data operation starting/			
	*3	Value write to ID share register address +2 (lower)	00h	changing rate (upper): 0000h			
	3	Value write to ID share register address +3 (upper)	03h	Value written to ID share register address 0003h = Direct data operation starting/			
		Value write to ID share register address +3 (lower)	E8h	changing rate (lower): 03E8h			
		Value write to ID share register address +4 (upper)	00h	Value written to ID share register address 0004h = Direct data operation stopping			
		Value write to ID share register address +4 (lower)	00h	deceleration (upper): 0000h			
		Value write to ID share register address +5 (upper)	07h	Value written to ID share register address 0005h = Direct data operation stopping			
Data		Value write to ID share register address +5 (lower)	D0h	deceleration (lower): 07D0h			
Data		Value write to ID share register address (upper)	00h	Value written to ID share register address 0000h = Direct data operation operating			
		Value write to ID share register address (lower)	00h	speed (upper): 0000h			
		Value write to ID share register address +1 (upper)	07h	Value written to ID share register addres 0001h = Direct data operation operating			
		Value write to ID share register address +1 (lower)	D0h	speed (lower): 07D0h			
		Value write to ID share register address +2 (upper)	00h	Value written to ID share register address 0002h = Direct data operation starting/			
	*4	Value write to ID share register address +2 (lower)	00h	changing rate (upper): 0000h			
	4	Value write to ID share register address +3 (upper)	07h	Value written to ID share register address 0003h = Direct data operation starting/			
		Value write to ID share register address +3 (lower)	D0h	changing rate (lower): 07D0h			
		Value write to ID share register address +4 (upper)	00h	Value written to ID share register address 0004h = Direct data operation stopping			
		Value write to ID share register address +4 (lower)	00h	deceleration (upper): 0000h			
		Value write to ID share register address +5 (upper)	13h	Value written to ID share register address 0005h = Direct data operation stopping			
		Value write to ID share register address +5 (lower)	88h	deceleration (lower): 1388h			
		(lower)	A2h	Calculation result of CRC-16			
Error c	heck	(upper)	94h				

- *1 Number of registers = (number of ID share register addresses to be read + 1) \times Share control number
 - Number of register addresses to be read: 6 (0000h to 0005h)
 - +1: Error check between servers
 - Share control number: 2
- *2 Number of registers = (Share control number) \times Number of ID share register addresses to be written
 - Share control number: 2
 - Number of register addresses to be written: 6 (0000h to 0005h)
- *3 Server address 1 (Share control local ID: 1)
- *4 Server address 2 (Share control local ID: 2)



Note that the number of registers in the ID share mode is calculated differently from that in other transmission modes of RS-485 communication.

Response (ID share mode)

		Field name	Data	Description		
Server	addr	ress	0Fh	Same as query		
Functi	on co	ode	17h	Same as query		
	(Rea	ad) Number of data bytes	1Ch	Twice the number of registers in the query		
		Value read from ID share register address (upper)	00h	Value read from ID share register address		
		Value read from ID share register address (lower)	00h	0000h = Present alarm (upper): 0000h		
		Value read from ID share register address +1 (upper)	00h	Value read from ID share register address		
		Value read from ID share register address +1 (lower)	00h	0001h = Present alarm (lower): 0000h		
		Value read from ID share register address +2 (upper)	00h	Value read from ID share register address		
		Value read from ID share register address +2 (lower)	00h	0002h = Driver temperature (upper): 0000h		
	*1	Value read from ID share register address +3 (upper)	01h	Value read from ID share register address		
	'	Value read from ID share register address +3 (lower)	7Fh	0003h = Driver temperature (lower): 017Fh		
		Value read from ID share register address +4 (upper)	00h	Value read from ID share register address		
		Value read from ID share register address +4 (lower)	00h	0004h = Motor temperature (upper): 0000h		
		Value read from ID share register address +5 (upper)	01h	Value read from ID share register address		
		Value read from ID share register address +5 (lower)	AAh	0005h = Motor temperature (lower): 01AAh		
		Error check for between servers (lower) *3	A2h	Calculation result of CRC-16 (The value		
Data		Error check for between servers (upper) *3	04h	varies depending on the monitor value.)		
		Value read from ID share register address (upper)	00h	Value read from ID share register address		
		Value read from ID share register address (lower)	00h	0000h = Present alarm (upper): 0000h		
		Value read from ID share register address +1 (upper)	00h	Value read from ID share register address		
		Value read from ID share register address +1 (lower)	30h	0001h = Present alarm (lower): 0030h		
		Value read from ID share register address +2 (upper)	00h	Value read from ID share register address		
		Value read from ID share register address +2 (lower)	00h	0002h = Driver temperature (upper): 0000h		
	*2	Value read from ID share register address +3 (upper)	01h	Value read from ID share register address		
		Value read from ID share register address +3 (lower)	C2h	0003h = Driver temperature (lower): 01C2h		
		Value read from ID share register address +4 (upper)	00h	Value read from ID share register address		
		Value read from ID share register address +4 (lower)	00h	0004h = Motor temperature (upper): 0000h		
		Value read from ID share register address +5 (upper)	02h	Value read from ID share register address		
		Value read from ID share register address +5 (lower)	1Ah	0005h = Motor temperature (lower): 021Ah		
		Error check for between servers (lower) *3	ACh	Calculation result of CRC-16 (The value		
		Error check for between servers (upper) *3	AAh	varies depending on the monitor value.)		

Field name	Data	Description
Error check (lower)	00h Calculation result of CRC-16	
Error check (upper)	00h	Calculation result of CRC-16

^{*1} Server address 1 (Share control local ID: 1)

^{*2} Server address 2 (Share control local ID: 2)

^{*3} Whenever data is sent to each server, error check is performed on the data having sent until then.

12 Addresses and codes lists

Refer to the **AZ** Series <u>OPERATING MANUAL Function Edition</u> for addresses and codes not described in this chapter. This chapter describes the following.

- Addresses and codes specific to this product
- Addresses and codes not compatible with this product among those described in the AZ series <u>OPERATING</u> MANUAL Function Edition

12-1 Addresses and codes specific to this product

This section describes the following addresses and codes.

- Addresses and codes specific to this product
- Descriptions specific to this product among addresses and codes described in the **AZ** series <u>OPERATING MANUAL</u> <u>Function Edition</u>

■ Monitor commands

commu	dbus nication address Lower	Name				Description			Industrial network Command code					
00D4h (212)	00D5h (213)	Direct I/O		icates the s ual input. (put, and the	206Ah (8298)								
0148h (328)	0149h (329)	Main power supply voltage	Ind	icates the v	oltage of th	ne main pov	ver supply.	(1=0.1 V)	20A4h (8356)					
			The	table belo	w shows th	of the funct e relation b witch (SW1	etween the	switch (SW1). read value						
				READ		1	V1							
				value	No. 4	No. 3	No. 2	No. 1						
			-	0	ON	ON	ON	ON						
		DIP SW	-	1	ON	ON ON	ON OFF	OFF						
			-	3	ON ON	ON	OFF	OFF	20A5h					
			-	4	ON	OFF	ON	ON						
014Ah	014Bh		-	5	ON	OFF	ON	OFF						
(330)	(331)		DIP SW	DIP SW	-	6	ON	OFF	OFF	ON	(8357)			
							-	7	ON	OFF	OFF	OFF		
									-	8	OFF	ON	ON	ON
											9	9	OFF	ON
			-	10	OFF	ON	OFF	ON						
				11	OFF	ON	OFF	OFF						
				12	OFF	OFF	ON	ON						
				13	OFF	OFF	ON	OFF						
				14	OFF	OFF	OFF	ON						
				15	OFF	OFF	OFF	OFF						
0150h (336)	0151h (337)	RS-485 reception frame counter	1	icates the r RS-485 con	20A8h (8360)									
0170h (368)	0171h (369)	I/O status 1	Indi	icates the C	N-OFF stat	us of the in	ternal I/O.		20B8h (8376)					
0172h (370)	0173h (371)	I/O status 2	(Arr	angement	of bits 🖒 p	o.61)			20B9h (8377)					

commu	dbus nication address	Name	Description	Industrial network Command code
Upper	Lower			Command code
0174h (372)	0175h (373)	I/O status 3		20BAh (8378)
0176h (374)	0177h (375)	I/O status 4		20BBh (8379)
0178h (376)	0179h (377)	I/O status 5	Indicates the ON-OFF status of the internal I/O.	20BCh (8380)
017Ah (378)	017Bh (379)	I/O status 6	(Arrangement of bits ⇒ p.61)	20BDh (8381)
017Ch (380)	017Dh (381)	I/O status 7		20BEh (8382)
017Eh (382)	017Fh (383)	I/O status 8		20BFh (8383)

Direct I/O

The arrangement of bits for direct I/O is indicated.

Modbus communication Register address		Description									
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8			
00D4h	1	-	_	_	_	_	_	_			
(212)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
	-	-	_	_	_	DOUT2	DOUT1	DOUT0	206Ah		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8298)		
00D5h	VIR-IN3	VIR-IN2	VIR-IN1	VIR-IN0	-	_	CCW [DIR]	CW [PLS]			
(213)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
	_	_	_	DIN4	DIN3	DIN2	DIN1	DIN0			

I/O status

The arrangement of bits for internal I/O is indicated.

Input signals

Modbus communication Register address				Descri	iption				Industrial network Command code	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
0170h	SLIT	HOMES	RV-LS	FW-LS	RV-BLK	FW-BLK	-	_		
(368)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	SPD-LMT	CRNT-LMT	T-MODE	PLS-DIS	PLS- XMODE	CCM	_	НМІ	20B8h	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8376)	
0171h	_	INFO-CLR	LAT-CLR	_	-	EL-PRST	P-PRESET	ALM-RST		
(369)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	BREAK- ATSQ	PAUSE	STOP	STOP- COFF	CLR	C-ON	FREE	Not used		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
0172h	_	_	RV-PSH	FW-PSH	RV-SPD	FW-SPD	RV-POS	FW-POS		
(370)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	RV-JOG-C	FW-JOG-C	RV-JOG-P	FW- JOG-P	RV-JOG-H	FW- JOG-H	RV-JOG	FW-JOG	20B9h	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8377)	
0173h	D-SEL7	D-SEL6	D-SEL5	D-SEL4	D-SEL3	D-SEL2	D-SEL1	D-SEL0		
(371)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	_	_	ZHOME	HOME	NEXT	_	SSTART	START		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
0174h	R15	R14	R13	R12	R11	R10	R9	R8		
(372)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	R7	R6	R5	R4	R3	R2	R1	R0	20BAh	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8378)	
0175h	_	MON-CLK	MON- REQ1	MON- REQ0	TEACH	_	_	_		
(373)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	M7	M6	M5	M4	МЗ	M2	M1	MO		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
0176h	_	_	_	-	_	_	_	_		
(374)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	_	_	_	_	_	_	_	_	20BBh	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8379)	
0177h	_	-	_	_	_	_	-	_		
(375)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	_	_	_	_	_	_	_	_		

Output signal

Modbus communication Register address				Desci	ription				Industrial network Command code	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
0178h	MAREA	-	TIM	RND- ZERO	ZSG	RV-SLS	FW-SLS	RND-OVF		
(376)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	ORGN- STLD	PRST- STLD	PRST-DIS	_	_	ELPRST- MON	ABSPEN	HOME- END	20BCh	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8380)	
0170h	AUTO-CD	CRNT	VA	TLC	_	IN-POS	_	SYS-BSY		
0179h (377)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
,	INFO	MOVE	PLS-RDY	READY	SYS-RDY	ALM-B	ALM-A	CONST- OFF		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
017Ah	_	-	_	_	_	_	_	_		
(378)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
, ,	_	-	USR- OUT1	USR- OUT0	_	_	-	MON-OUT	20BDh	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8381)	
017Bh	_	_	-	_	_	_	MBC	MPS		
(379)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	AREA7	AREA6	AREA5	AREA4	AREA3	AREA2	AREA1	AREA0		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
017Ch	D-END7	D-END6	D-END5	D-END4	D-END3	D-END2	D-END1	D-END0		
(380)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	M-ACT7	M-ACT6	M-ACT5	M-ACT4	M-ACT3	M-ACT2	M-ACT1	M-ACT0		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	20BEh	
017Dh	M-CHG	-	DCMD- FULL	DCMD- RDY	PLS-LOST	NEXT-LAT	JUMP1- LAT	JUMP0- LAT	(8382)	
(381)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	DELAY- BSY	SEQ-BSY	PAUSE- BSY	OPE-BSY	_	_	SPD- LMTD	CRNT- LMTD		
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
017Eh	INFO-RBT	INFO- CFG	INFO- IOTEST	INFO- DSLMTD	_	_	-	_		
(382)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	_	_	INFO- ODO	INFO- TRIP	INFO- CULD1	INFO- CULD0	INFO-RV- OT	INFO-FW- OT	20BFh	
	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	(8383)	
017Fh	INFO- NET-E	INFO- RND-E	INFO- EGR-E	_	INFO-PR- REQ	INFO- ZHOME	INFO- START	INFO-SPD		
(383)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	_	INFO- OLTIME	INFO- UVOLT	INFO- OVOLT	INFO- MTRTMP	INFO- DRVTMP	INFO- POSERR	INFO- USRIO		

■ Parameter R/W commands

Each timing to update parameters is shown in the table. In this manual, each update timing is represented in an alphabet.

Notation	Description
Α	Recalculation and setup are immediately executed when the parameter is written.
В	Recalculation and setup are executed when the operation is stopped.
С	Recalculation and setup are executed after Configuration is executed or the main power supply and control power supply are turned on again.
D	Recalculation and setup are executed after the main power supply and control power supply are turned on again.

• Base setting parameter

Modbus communication Register address		Name	Description			strial vork nd code
Upper				READ	WRITE	
03FAh (1018)	03FBh (1019)	Main power mode	Sets the voltage mode of the main power supply. The voltage mode of the main power supply is discriminated in 50 ms after the main power supply is turned on. Set the Main power mode (41FAh) to "0: 24 VDC" or "1: 48 VDC" when the main power supply starts up slowly or the voltage of the main power supply is unstable. [Setting range] -1: Automatic discrimination (discriminates the input main power supply voltage automatically.) 0: 24 VDC 1: 48 VDC [Initial value: -1]	D	01FDh (509)	11FDh (4605)

• Information setting parameters

Modbus communication Register address		Name	Description	Update	Industrial network Command code	
Upper	Lower				READ	WRITE
0356h (854)	0357h (855)	Overvoltage information (INFO-OVOLT)	Sets the condition in which the overvoltage information (INFO-OVOLT) is generated. [Setting range] 140 to 630 (1=0.1 V) [Initial value: 630]	A	01ABh (427)	11ABh (4523)
0358h (856)	0359h (857)	Undervoltage information (INFO-UVOLT)	Sets the condition in which the undervoltage information (INFO-UVOLT) is generated. [Setting range] 140 to 630 (1=0.1 V) [Initial value: 140]	А	01ACh (428)	11ACh (4524)

• Direct I/O setting parameters

Modbus communication Register address		Name	Description	Update		l network nd code
Upper	Lower	-			READ	WRITE
1080h (4224)	1081h (4225)	DIN0 input function	Selects an input signal to be assigned to DIN0. [Setting range] Input signal list □ p.69 [Initial value: 37 (ZHOME)]	С	0840h (2112)	1840h (6208)
1082h (4226)	1083h (4227)	DIN1 input function	Selects an input signal to be assigned to DIN1. [Setting range] Input signal list □ p.69 [Initial value: 1 (FREE)]	С	0841h (2113)	1841h (6209)
1084h (4228)	1085h (4229)	DIN2 input function	Selects an input signal to be assigned to DIN2. [Setting range] Input signal list □ p.69 [Initial value: 5 (STOP)]	С	0842h (2114)	1842h (6210)
1086h (4230)	1087h (4231)	DIN3 input function	Selects an input signal to be assigned to DIN3. [Setting range] Input signal list ➡ p.69 [Initial value: 8 (ALM-RST)]	С	0843h (2115)	1843h (6211)
1088h (4232)	1089h (4233)	DIN4 input function	Selects an input signal to be assigned to DIN4. [Setting range] Input signal list □ p.69 [Initial value: 9 (P-PRESET)]	С	0844h (2116)	1844h (6212)
10C0h (4288)	10C1h (4289)	DOUT0 (Normal) output function	Selects an output signal to be assigned to DOUT0. [Setting range] Output signal list ⇒ p.70 [Initial value: 130 (ALM-B)]	С	0860h (2144)	1860h (6240)
10C2h (4290)	10C3h (4291)	DOUT1 (Normal) output function	Selects an output signal to be assigned to DOUT1. [Setting range] Output signal list ⇒ p.70 [Initial value: 144 (HOME-END)]	С	0861h (2145)	1861h (6241)
10C4h (4292)	10C5h (4293)	DOUT2 (Normal) output function	Selects an output signal to be assigned to DOUT2. [Setting range] Output signal list p.70 [Initial value: 132 (READY)]	С	0862h (2146)	1862h (6242)

• LED status indication setting parameters

Modbus communication Register address		Name	Description	Update		l network nd code
Upper	Lower				READ	WRITE
03D0h (976)	03D1h (977)	Number of times GREEN blinks at power on	Sets the number of times that the C-DAT/C-ERR LED blinks in green when the main power supply is turned on. [Setting range] 0 to 9 times [Initial value: 0]	А	01E8h (488)	11E8h (4584)
03D2h (978)	03D3h (979)	Number of times RED blinks at power on	Sets the number of times that the C-DAT/C-ERR LED blinks in red when the main power supply is turned on. [Setting range] 0 to 9 times [Initial value: 0]	А	01E9h (489)	11E9h (4585)
03D4h (980)	03D5h (981)	Number of times BLUE blinks at power on	Sets the number of times that the C-DAT/C-ERR LED blinks in blue when the main power supply is turned on. [Setting range] 0 to 9 times [Initial value: 0]	A	01EAh (490)	11EAh (4586)
03EAh (1002)	03EBh (1003)	LED-OUT mode	Sets the information to be indicated by the POWER/ALARM LED and the C-DAT/C-ERR LED. [Setting range] Check with the table below. [Initial value: 1]	A	01F5h (501)	11F5h (4597)
03F4h (1012)	03F5h (1013)	LED-OUT-BLUE function (I/O status output)	Selects the output signal to be indicated by the blue LED.* [Setting range] Output signal list ⇒ p.70 [Initial value: 128 (CONST-OFF)]	А	01FAh (506)	11FAh (4602)
03F6h (1014)	03F7h (1015)	LED-OUT-BLUE inverting mode (I/O status output)	Changes the ON-OFF status of the output signal to be indicated by the blue LED. [Setting range] 0: Not invert 1: Invert [Initial value: 0]	А	01FBh (507)	11FBh (4603)
03F8h (1016)	03F9h (1017)	LED (PWR/C-DAT) color switching	Sets the lighting color of the POWER/ ALARM LED and the C-DAT/C-ERR LED. [Setting range] 0: Green 1: White [Initial value: 0]	А	01FCh (508)	11FCh (4604)

 $[\]mbox{\ensuremath{^{\ast}}}$ This is enabled when the "LED-OUT mode" parameter is set to "0."

Setting range of "LED-OUT mode" parameter

Setting value	POWER/ALARM LED	C-DAT/C-ERR LED	
-3	LED is not lightened*		
-2	LED is not lightened (except when an alarm is generated)*		
-1		LED is not lightened	
0	Normal operation	I/O status	
1		Normal operation	

^{*} The POWER/ALARM LED is lit in red for maximum one second when the main power supply is turned on.

• RS-485 communication setting parameter

Modbus communication Register address		Name	Description		Industrial Update Comma	
Upper	Lower				READ	WRITE
138Ch (5004)	138Dh (5005)	Communication error detection (Modbus)	When the RS-485 communication error has occurred for the set number of times, an alarm of RS-485 communication error is generated. [Setting range] 0 (disable), 1 to 10 times [Initial value: 3]	А	09C6h (2502)	19C6h (6598)

12-2 Addresses and codes not compatible with this product

■ Monitor command

	Modbus con Register	nmunication address	Name	Industrial network Command code
	Upper	Lower		Command code
•	014Eh (334)	014Fh (335)	ROT SW1	20A7h (8359)

■ Base setting parameters

Modbus communication		Name	Industria	l network
Register address			Comma	nd code
Upper	Lower		READ	WRITE
024Eh	024Fh	Base current setting source	0127h	1127h
(590)	(591)		(295)	(4391)
0256h	0257h	Command filter time constant setting source	012Bh	112Bh
(598)	(599)		(299)	(4395)

■ Power removal function setting parameters

All parameters are disabled (not compatible).

■ I/O parameters

Modbus communication		Name	Industria	l network
Register address			Comma	nd code
Upper	Lower		READ	WRITE
0E2Ch	0E2Dh	PLS-OUT output data selection	0716h	1716h
(3628)	(3629)		(1814)	(5910)
0E2Eh	0E2Fh	PLS-OUT maximum frequency	0717h	1717h
(3630)	(3631)		(1815)	(5911)

■ Direct I/O setting parameters

Modbus communication Register address		Name		Industrial network Command code		
Upper	Lower		READ	WRITE		
108Ah	108Bh	DIN5 input function	0845h	1845h		
(4234)	(4235)		(2117)	(6213)		
108Ch	108Dh	DIN6 input function	0846h	1846h		
(4236)	(4237)		(2118)	(6214)		
108Eh	108Fh	DIN7 input function	0847h	1847h		
(4238)	(4239)		(2119)	(6215)		
1090h	1091h	DIN8 input function	0848h	1848h		
(4240)	(4241)		(2120)	(6216)		
1092h	1093h	DIN9 input function	0849h	1849h		
(4242)	(4243)		(2121)	(6217)		
10AAh	10ABh	DIN5 inverting mode	0855h	1855h		
(4266)	(4267)		(2133)	(6229)		
10ACh	10ADh	DIN6 inverting mode	0856h	1856h		
(4268)	(4269)		(2134)	(6230)		
10AEh	10AFh	DIN7 inverting mode	0857h	1857h		
(4270)	(4271)		(2135)	(6231)		
10B0h	10B1h	DIN8 inverting mode	0858h	1858h		
(4272)	(4273)		(2136)	(6232)		
10B2h	10B3h	DIN9 inverting mode	0859h	1859h		
(4274)	(4275)		(2137)	(6233)		
10C6h	10C7h	DOUT3 (Normal) output function	0863h	1863h		
(4294)	(4295)		(2147)	(6243)		
10C8h	10C9h	DOUT4 (Normal) output function	0864h	1864h		
(4296)	(4297)		(2148)	(6244)		
10CAh	10CBh	DOUT5 (Normal) output function	0865h	1865h		
(4298)	(4299)		(2149)	(6245)		
10E6h	10E7h	DOUT3 inverting mode	0873h	1873h		
(4326)	(4327)		(2163)	(6259)		
10E8h	10E9h	DOUT4 inverting mode	0874h	1874h		
(4328)	(4329)		(2164)	(6260)		
10EAh	10EBh	DOUT5 inverting mode	0875h	1875h		
(4330)	(4331)		(2165)	(6261)		
110Ah	110Bh	DIN5 composite input function	0885h	1885h		
(4362)	(4363)		(2181)	(6277)		
110Ch	110Dh	DIN6 composite input function	0886h	1886h		
(4364)	(4365)		(2182)	(6278)		
110Eh	110Fh	DIN7 composite input function	0887h	1887h		
(4366)	(4367)		(2183)	(6279)		
1110h	1111h	DIN8 composite input function	0888h	1888h		
(4368)	(4369)		(2184)	(6280)		
1112h	1113h	DIN9 composite input function	0889h	1889h		
(4370)	(4371)		(2185)	(6281)		
1126h	1127h	DOUT3 composite output function	0893h	1893h		
(4390)	(4391)		(2195)	(6291)		
1128h	1129h	DOUT4 composite output function	0894h	1894h		
(4392)	(4393)		(2196)	(6292)		
112Ah	112Bh	DOUT5 composite output function	0895h	1895h		
(4394)	(4395)		(2197)	(6293)		
1146h	1147h	DOUT3 composite inverting mode	08A3h	18A3h		
(4422)	(4423)		(2211)	(6307)		

Modbus communication Register address		Name		Industrial network Command code		
Upper	Lower		READ	WRITE		
1148h	1149h	DOUT4 composite inverting mode	08A4h	18A4h		
(4424)	(4425)		(2212)	(6308)		
114Ah	114Bh	DOUT5 composite inverting mode	08A5h	18A5h		
(4426)	(4427)		(2213)	(6309)		
1166h	1167h	DOUT3 composite logical combination	08B3h	18B3h		
(4454)	(4455)		(2227)	(6323)		
1168h	1169h	DOUT4 composite logical combination	08B4h	18B4h		
(4456)	(4457)		(2228)	(6324)		
116Ah	116Bh	DOUT5 composite logical combination	08B5h	18B5h		
(4458)	(4459)		(2229)	(6325)		
118Ah	118Bh	DIN5 ON signal dead-time	08C5h	18C5h		
(4490)	(4491)		(2245)	(6341)		
118Ch	118Dh	DIN6 ON signal dead-time	08C6h	18C6h		
(4492)	(4493)		(2246)	(6342)		
118Eh	118Fh	DIN7 ON signal dead-time	08C7h	18C7h		
(4494)	(4495)		(2247)	(6343)		
1190h	1191h	DIN8 ON signal dead-time	08C8h	18C8h		
(4496)	(4497)		(2248)	(6344)		
1192h	1193h	DIN9 ON signal dead-time	08C9h	18C9h		
(4498)	(4499)		(2249)	(6345)		
11AAh	11ABh	DIN5 1 shot signal	08D5h	18D5h		
(4522)	(4523)		(2261)	(6357)		
11ACh	11ADh	DIN6 1 shot signal	08D6h	18D6h		
(4524)	(4525)		(2262)	(6358)		
11AEh	11AFh	DIN7 1 shot signal	08D7h	18D7h		
(4526)	(4527)		(2263)	(6359)		
11B0h	11B1h	DIN8 1 shot signal	08D8h	18D8h		
(4528)	(4529)		(2264)	(6360)		
11B2h	11B3h	DIN9 1 shot signal	08D9h	18D9h		
(4530)	(4531)		(2265)	(6361)		
11C6h	11C7h	DOUT3 OFF delay time	08E3h	18E3h		
(4550)	(4551)		(2275)	(6371)		
11C8h	11C9h	DOUT4 OFF delay time	08E4h	18E4h		
(4552)	(4553)		(2276)	(6372)		
11CAh	11CBh	DOUT5 OFF delay time	08E5h	18E5h		
(4554)	(4555)		(2277)	(6373)		

■ Extended input setting parameters

All parameters are disabled (not compatible).

■ Differential output setting parameters

All parameters are disabled (not compatible).

12-3 I/O signals assignment list

■ Input signals

To assign signals via industrial network, use the "assignment numbers" in the table instead of the signal names.

Assignment number	Signal name
0	Not used
1	FREE
2	C-ON
3	CLR
4	STOP-COFF
5	STOP
6	PAUSE
7	BREAK-ATSQ
8	ALM-RST
9	P-PRESET
10	EL-PRST
13	LAT-CLR
14	INFO-CLR
16	HMI
18	CCM
19	PLS-XMODE
20	PLS-DIS
21	T-MODE
22	CRNT-LMT
23	SPD-LMT
26	FW-BLK
27	RV-BLK
28	FW-LS
29	RV-LS
30	HOMES
31	SLIT
32	START

Assignment number	Signal name
33	SSTART
35	NEXT
36	HOME
37	ZHOME
40	D-SEL0
41	D-SEL1
42	D-SEL2
43	D-SEL3
44	D-SEL4
45	D-SEL5
46	D-SEL6
47	D-SEL7
48	FW-JOG
49	RV-JOG
50	FW-JOG-H
51	RV-JOG-H
52	FW-JOG-P
53	RV-JOG-P
54	FW-JOG-C
55	RV-JOG-C
56	FW-POS
57	RV-POS
58	FW-SPD
59	RV-SPD
60	FW-PSH
61	RV-PSH
64	M0

	or tire orginal ha		
Assignment number	Signal name		
65	M1		
66	M2		
67	M3		
68	M4		
69	M5		
70	M6		
71	M7		
75	TEACH		
76	MON-REQ0		
77	MON-REQ1		
78	MON-CLK		
80	R0		
81	R1		
82	R2		
83	R3		
84	R4		
85	R5		
86	R6		
87	R7		
88	R8		
89	R9		
90	R10		
91	R11		
92	R12		
93	R13		
94	R14		
95	R15		

■ Output signals

To assign signals via industrial network, use the "assignment numbers" in the table instead of the signal names.

Assignment number	Signal name	Assignment number	Signal name		Assignment number	Signal name
0	Not used	54	FW-JOG-C_R	•	138	IN-POS
1	FREE_R	55	RV-JOG-C_R		140	TLC
2	C-ON_R	56	FW-POS_R		141	VA
3	CLR_R	57	RV-POS_R		142	CRNT
4	STOP-COFF_R	58	FW-SPD_R		143	AUTO-CD
5	STOP_R	59	RV-SPD_R		144	HOME-END
6	PAUSE_R	60	FW-PSH_R		145	ABSPEN
7	BREAK-ATSQ_R	61	RV-PSH_R		146	ELPRST-MON
8	ALM-RST_R	64	M0_R	_	149	PRST-DIS
9	P-PRESET_R	65	M1_R		150	PRST-STLD
10	EL-PRST_R	66	M2_R	_	151	ORGN-STLD
13	LAT-CLR_R	67	M3_R		152	RND-OVF
14	INFO-CLR_R	68	M4_R	_	153	FW-SLS
16	HMI_R	69	M5_R		154	RV-SLS
18	CCM_R	70	M6_R	_	155	ZSG
19	PLS-XMODE_R	71	M7_R		156	RND-ZERO
20	PLS-DIS_R	75	TEACH_R	_	157	TIM
21	T-MODE_R	76	MON-REQ0_R		159	MAREA
22	CRNT-LMT_R	77	MON-REQ1_R	_	160	AREA0
23	SPD-LMT_R	78	MON-CLK_R		161	AREA1
26	FW-BLK_R	80	RO_R	_	162	AREA2
27	RV-BLK_R	81	R1_R		163	AREA3
28	FW-LS_R	82	R2_R	_	164	AREA4
29	RV-LS_R	83	R3_R		165	AREA5
30	HOMES_R	84	R4_R	_	166	AREA6
31	SLIT_R	85	R5_R		167	AREA7
32	START_R	86	R6_R	_	168	MPS
33	SSTART_R	87	R7_R		169	MBC
35	NEXT_R	88	R8_R	_	176	MON-OUT
36	HOME_R	89	R9_R		180	USR-OUT0
37	ZHOME_R	90	R10_R	_	181	USR-OUT1
40	D-SEL0_R	91	R11_R		192	CRNT-LMTD
41	D-SEL1_R	92	R12_R	_	193	SPD-LMTD
42	D-SEL2_R	93	R13_R		196	OPE-BSY
43	D-SEL3_R	94	R14_R	_	197	PAUSE-BSY
44	D-SEL4_R	95	R15_R		198	SEQ-BSY
45	D-SEL5_R	128	CONST-OFF		199	DELAY-BSY
46	D-SEL6_R	129	ALM-A		200	JUMP0-LAT
47	D-SEL7_R	130	ALM-B		201	JUMP1-LAT
48	FW-JOG_R	131	SYS-RDY		202	NEXT-LAT
49	RV-JOG_R	132	READY		203	PLS-LOST
50	FW-JOG-H_R	133	PLS-RDY		204	DCMD-RDY
51	RV-JOG-H_R	134	MOVE		205	DCMD-FULL
52	FW-JOG-P_R	135	INFO		207	M-CHG
53	RV-JOG-P_R	136	SYS-BSY	-	208	M-ACT0

Assignment number	Signal name		
209	M-ACT1		
210	M-ACT2		
211	M-ACT3		
212	M-ACT4		
213	M-ACT5		
214	M-ACT6		
215	M-ACT7		
216	D-END0		
217	D-END1		
218	D-END2		
219	D-END3		
220	D-END4		
221	D-END5		
222	D-END6		
223	D-END7		
224	INFO-USRIO		
225	INFO-POSERR		
226	INFO-DRVTMP		
227	INFO-MTRTMP		
228	INFO-OVOLT		

Assignment number	Signal name		
229	INFO-UVOLT		
230	INFO-OLTIME		
232	INFO-SPD		
233	INFO-START		
234	INFO-ZHOME		
235	INFO-PR-REQ		
237	INFO-EGR-E		
238	INFO-RND-E		
239	INFO-NET-E		
240	INFO-FW-OT		
241	INFO-RV-OT		
242	INFO-CULD0		
243	INFO-CULD1		
244	INFO-TRIP		
245	INFO-ODO		
252	INFO-DSLMTD		
253	INFO-IOTEST		
254	INFO-CFG		
255	INFO-RBT		

13 Inspection and maintenance

13-1 Inspection

It is recommended that periodic inspections are conducted for the items listed below after each operation of the motor. If an abnormality occurs, discontinue any use and contact your nearest Oriental Motor sales office.

■ Inspection item

- Check if the openings in the driver are clogged.
- Check if the installation place of the driver is loose.
- Check if any of the connection parts of the driver is loose.
- Check if dust is deposited on the driver.
- Check if the driver has unusual smells or appearance defects.



The driver uses semiconductor components. Static electricity may damage the semiconductor components of the driver, so be extremely careful when handling them.

13-2 Warranty

Check on the Oriental Motor Website for the product warranty.

13-3 Disposal

Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.

14 Troubleshooting

14-1 Detection of communication errors

This driver has functions to detect abnormalities that may occur in communication, including two types: communication errors and alarms.

■ Communication errors

If a communication error of the RS-485 communication error (error code 84h) occurs, the C-DAT/C-ERR LED will be lit in red and the POWER/ALARM LED will blink in blue. When any other communication error occurs, all LEDs remain off. The communication error can be checked with the "Communication error history" command or the **MEXEO2** software.



The communication error history is cleared when the main power supply and control power supply of the driver is turned off because it is stored in RAM.

Communication error list

For RS-485 communication

Refer to the AZ Series OPERATING MANUAL Function Edition for details about causes.

Type of communication error	Error code	Cause
RS-485 communication error	84h	A transmission error was detected.
Command not yet defined	88h	An exception response (exception code 01h, 02h) was detected.
Execution disable due to user I/F communication in progress	89h	An exception recognice (exception code 04h) was detected
Execution disable due to non-volatile memory processing in progress	8Ah	An exception response (exception code 04h) was detected.
Out of setting range	8Ch	An exception response (exception code 03h, 04h) was detected.
Command execute disable	8Dh	An exception response (exception code 04h) was detected.

For industrial network

Error code	Type of communication error	Cause	Remedial action
84h	RS-485 communication error	One of the following errors was detected. • Framing error • BCC error	 Check the connection with the network converter. Check the setting of RS-485 communication.
88h	Command not yet defined	A command requested by the host controller could not be executed because of being undefined.	Check the setting value for the command.Check the flame configuration.
89h	Execution disable due to user I/F communication in progress	A command requested by the host controller could not be executed because the driver and the MEXEO2 software was being communicated.	Wait until the MEXE02 software is completed processing.
8Ah	Execution disable due to non-volatile memory processing in progress	A command could not be executed because the driver was under processing of the non-volatile memory. Internal processing was in progress. (SYS-BSY is ON.) An alarm of the EEPROM error was being generated.	 Wait until the internal processing is completed. When an alarm of EEPROM error was generated, initialize parameters via RS-485 communication or using the MEXEO2 software.

Error code	Type of communication error	Cause	Remedial action
8Ch	Out of setting range	The setting data requested by the host controller could not be executed due to out of range.	Check the setting data.
8Dh	Command execute disable	When the command is unable to execute, it was tried to execute.	Check the driver status.

■ Alarms related to communication

If an alarm is generated, the ALM-A output is turned ON and the ALM-B output is turned OFF to stop the motor. The POWER/ALARM LED blinks in red simultaneously.

• Alarm lists related to communication

For RS-485 communication

Alarm code	Alarm type	Cause
84h	RS-485 communication error	The RS-485 communication error occurred consecutively by the number of times set in the "Communication error detection (Modbus)" parameter.
85h	RS-485 communication timeout	The time set in the "Communication timeout (Modbus)" parameter has elapsed, and yet the communication could not be established with the host controller.

For industrial network

Alarm code	Alarm type	Cause
81h	Network bus error	The host network of the network converter was in a disconnected state while the motor was operated.
83h	Communication switch setting error	The setting of the function setting switch SW1-No.2 was out of specifications.
84h	RS-485 communication error	A communication error with the network converter occurred three times consecutively.
85h	RS-485 communication timeout	Communication with the network converter was not performed for more than 200 ms.
8Eh	Network converter error	An alarm was generated in the network converter.

14-2 Alarms

If an alarm specific to this product is generated, the motor will stop. The POWER/ALARM LED blinks in red simultaneously.

At this time, the motor current is cut off and the motor holding force is lost. When an electromagnetic brake motor is used, the electromagnetic brake is in a state of holding the motor shaft.

Before resetting an alarm, always remove the cause of the alarm and ensure safety, and perform one of the reset operations specified below.

- Execute the alarm reset via RS-485 communication.
- Turn the ALM-RST input ON. (It is enabled at the ON edge.)
- Execute the alarm reset using the **MEXE02** software.
- Turn off the main power supply and the control power supply, and on again. (The main power supply only if the control power supply is not connected)

This section explains alarms specific to this product. Refer to the **AZ** Series <u>OPERATING MANUAL Function Edition</u> when any other alarm not described here is generated.

Alarm code	Number of LED blinks	Alarm type	Cause	Remedial action	How to reset
22h	3	Overvoltage	 The voltage of the main power supply exceeded the permissible value (*). A large load inertia was suddenly stopped. Vertical operation (elevating operation) was performed. 	 Check the input voltage of the main power supply. Reduce a load. Increase the acceleration/ deceleration time or slow the acceleration/deceleration rate. 	Any of reset operations
29h	9	CPU peripheral circuit error	 A temperature significantly higher or lower than the specifications was detected. The driver internal circuit was damaged. 	 Reconsider the ambient temperature and ventilation condition. Turn off the main power supply and the control power supply, and check if the driver is damaged. After that, turn on the main power supply and the control power supply again. If the alarm has still not reset, the driver may be damaged. Contact your nearest Oriental Motor sales office. 	Turn on the main power supply and control power supply again

^{*} It is 36 VDC when the "Main power mode" parameter is set to "24 VDC," and 63 VDC when set to "48 VDC."

14-3 Information

The driver is equipped with a function to generate information output before an alarm is generated. If information is generated, the POWER/ALARM LED blinks in blue.

This section explains information specific to this product. Refer to the **AZ** Series <u>OPERATING MANUAL Function</u> <u>Edition</u> when information not included here is generated.

Information item	Information bit output signal	Cause	Clear condition
Overvoltage	INFO-OVOLT	 The voltage of the main power supply exceeded the value set in the "Overvoltage information" parameter. A large load inertia was suddenly stopped. Vertical operation (elevating operation) was performed. 	The voltage of the main power supply fell below the value set in the "Overvoltage information" parameter.
Undervoltage	INFO-UVOLT	 The voltage of the main power supply fell below the value set in the "Undervoltage information" parameter. The main power supply was shut off momentarily or a voltage was insufficient. 	The voltage of the main power supply exceeded the value set in the "Undervoltage information" parameter.

Related parameters

Parameter name	Description	Initial value
Overvoltage information	Sets the condition in which the overvoltage information (INFO-OVOLT) is generated.	
(INFO-OVOLT)	[Setting range] 140 to 630 (1=0.1 V)	630
Undervoltage information	Sets the condition in which the undervoltage information (INFO-UVOLT) is generated.	140
(INFO-UVOLT)	[Setting range] 140 to 630 (1=0.1 V)	140

14-4 Troubleshooting and remedial actions

In motor operation, the motor or the driver may not operate properly due to an improper setting or wrong connection.

When the motor operation cannot be performed properly, refer to the contents provided in this section and take an appropriate remedial action.

If the problem persists, contact your nearest Oriental Motor sales office.

Phenomenon	Possible cause	Remedial action
The motor is not excited.The motor output shaft can	Connection error of the motor cable.	Check the motor connection.
be rotated by hand.	The FREE input is being ON.	Turn the FREE input OFF.
The motor has a holding torque even if it is put into a non-excitation state.	Effect of dynamic brake.	If the motor is put into a non-excitation state using the C-ON input or the STOP-COFF input, the motor windings are brought into a state of being short-circuited inside the driver, generating a larger holding torque than when no current is supplied (dynamic brake). To release the dynamic brake, shut off the main power supply and control power supply or turn the FREE input ON.
	When an electromagnetic brake motor is used, the electromagnetic brake is in a state of holding the motor shaft.	 Check the connection of the electromagnetic brake. Make the input voltage of the control power supply higher than 22.8 VDC.
The motor door not votate	The position (travel amount) is not set in the operation data when positioning operation is performed.	Check the operation data.
The motor does not rotate.	When JOG operation, high-speed JOG operation, or continuous macro operation is performed, the input signal in the forward direction and that in the reverse direction are simultaneously ON.	Turn both input signals in the forward direction and the reverse direction OFF, and then turn either one ON.
	The STOP input is being ON.	Turn the STOP input OFF.
The motor rotates in the direction opposite to the specified direction.	The "Motor rotation direction" parameter is set wrongly.	Check the setting of the "Motor rotation direction" parameter.
The gearhead output shaft rotates in the direction opposite to the motor.	A geared motor that rotates in the direction opposite to the motor output shaft is used.	 With the TS geared type, the gearhead output shaft rotates in the direction opposite to the motor when the gear ratio is 20 or 30. With the Harmonic geared type, the gearhead output shaft always rotates in the direction opposite to the motor.
	Connection error of the motor cable or the power supply cable.	Check the connections for the driver, the motor, and the main power supply.
Motor operation is unstable.	A value set in the "Base current" parameter is too low.	Check the setting of the "Base current" parameter. If the motor current value is low with respect to a load, the torque will also be low and the operation will be unstable.
	The "Main power mode" parameter is set wrongly.	Check the setting of the "Main power mode" parameter.
	The main power supply starts up slowly or the voltage of the main power supply is unstable.	Set the "Main power mode" parameter to "0: 24 VDC" or "1: 48 VDC" according to the rated voltage of the main power supply.

Phenomenon	Possible cause	Remedial action
Motor vibration is too large.	The load is small.	Lower the current with the "Base current" parameter. If the motor output torque is too large with respect to a load, vibration will increase.
	The "Main power mode" parameter is set wrongly.	Check the setting of the "Main power mode" parameter.
	The main power supply starts up slowly or the voltage of the main power supply is unstable.	Set the "Main power mode" parameter to "0: 24 VDC" or "1: 48 VDC" according to the rated voltage of the main power supply.
The electromagnetic brake is not put into a state of releasing	The power is not supplied to the electromagnetic brake.	Check the connection of the electromagnetic brake.
the motor shaft.	A voltage for the electromagnetic brake is insufficient.	Make the input voltage of the control power supply higher than 22.8 VDC.



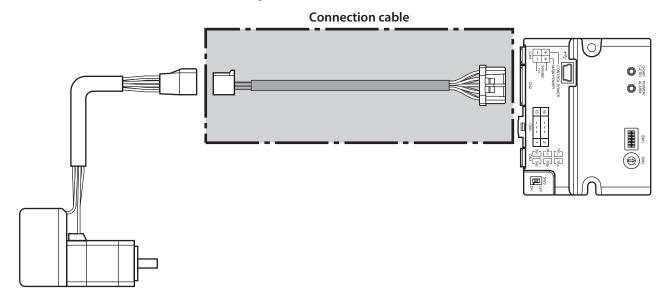
When an alarm is being generated, check the alarm message via RS-485 communication or using the **MEXEO2** software.

15 Cables

15-1 Connection cables (For cable type)

■ Connection cables/Flexible connection cables (For AZM14, AZM15, AZM24, AZM26)

These cables are used when connecting a motor and a driver.



(memo) When installing the motor on a moving part, use a flexible cable.

Connection cables

For motor/encoder

Model	Length [m (ft.)]
CCM005Z2AAF	0.5 (1.6)
CCM010Z2AAF	1 (3.3)
CCM030Z2AAF	3 (9.8)
CCM050Z2AAF	5 (16.4)
CCM100Z2AAF	10 (32.8)

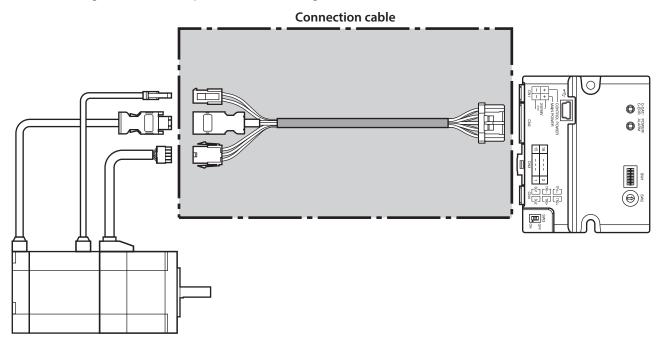
• Flexible connection cables

For motor/encoder

Model	Length [m (ft.)]
CCM005Z2AAR	0.5 (1.6)
CCM010Z2AAR	1 (3.3)
CCM030Z2AAR	3 (9.8)
CCM050Z2AAR	5 (16.4)
CCM100Z2AAR	10 (32.8)

■ Connection cables/Flexible connection cables (For AZM46, AZM48, AZM66, AZM69)

These cables are used when connecting a motor and a driver. The figure shows an example when the electromagnetic brake motor is used.



memo

When installing the motor on a moving part, use a flexible cable.

Connection cables

For motor/encoder

Model	Length [m (ft.)]	
CCM005Z2ABF	0.5 (1.6)	
CCM010Z2ABF	1 (3.3)	
CCM030Z2ABF	3 (9.8)	
CCM050Z2ABF	5 (16.4)	
CCM100Z2ABF	10 (32.8)	

For motor/encoder/electromagnetic brake

Model	Length [m (ft.)]	
CCM005Z2ACF	0.5 (1.6)	
CCM010Z2ACF	1 (3.3)	
CCM030Z2ACF	3 (9.8)	
CCM050Z2ACF	5 (16.4)	
CCM100Z2ACF	CF 10 (32.8)	

Flexible connection cables

For motor/encoder

Model Length [m		
CCM005Z2ABR	0.5 (1.6)	
CCM010Z2ABR	1 (3.3)	
CCM030Z2ABR	3 (9.8)	
CCM050Z2ABR	5 (16.4)	
CCM100Z2ABR	10 (32.8)	

For motor/encoder/electromagnetic brake

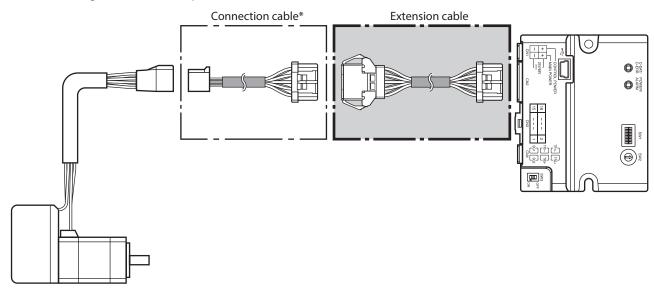
Model Length [m (f		
CCM005Z2ACR	0.5 (1.6)	
CCM010Z2ACR	1 (3.3)	
CCM030Z2ACR	3 (9.8)	
CCM050Z2ACR	5 (16.4)	
CCM100Z2ACR	10 (32.8)	

■ Extension cables/Flexible extension cables

These cables are used when extending a connection cable (add between the driver and connection cable). Use if the length of the connection cable used is not enough when extending the distance between a motor and a driver.

The extension cables and the flexible extension cables are common to all motors.

The figure shows an example when the **AZM14** motor is connected.



* Use the connection cable used.



- When installing the motor on a moving part, use a flexible cable.
- When extending the wiring length by connecting an extension cable to the connection cable, make the total cable length 10 m (32.8 ft.) or less.

Extension cables

Model	Length [m (ft.)]	
CCM010Z2ADFT	1 (3.3)	
CCM030Z2ADFT	3 (9.8)	
CCM050Z2ADFT 5 (16.4)		
	- ()	

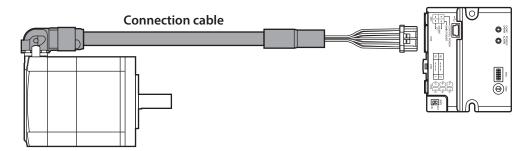
Flexible extension cables

Model	Length [m (ft.)]	
CCM010Z2ADRT 1 (3.3)		
CCM030Z2ADRT	3 (9.8)	
CCM050Z2ADRT	5 (16.4)	

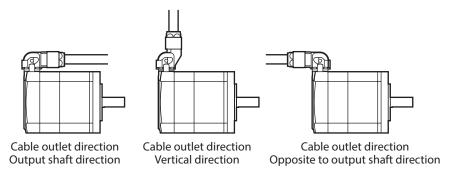
15-2 Connection cables (For connector type)

■ Connection cables/Flexible connection cables

These cables are used when connecting a motor and a driver.



The model name of the connection cable varies depending on the outlet direction from the motor. Refer to the figures below.



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When installing the motor on a moving part, use a flexible cable.

Connection cables

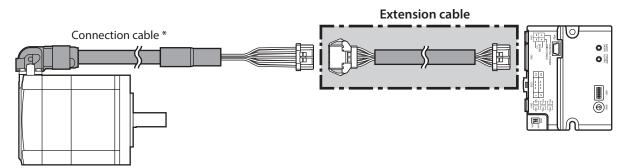
Longth	Cable outlet direction		
Length [m (ft.)]	Output shaft direction	Vertical direction	Opposite to output shaft direction
0.2 (0.7)	CCM002Z1EFF	CCM002Z1EVF	CCM002Z1EBF
0.5 (1.6)	CCM005Z1EFF	CCM005Z1EVF	CCM005Z1EBF
1 (3.3)	CCM010Z1EFF	CCM010Z1EVF	CCM010Z1EBF
2 (6.6)	CCM020Z1EFF	CCM020Z1EVF	CCM020Z1EBF
3 (9.8)	CCM030Z1EFF	CCM030Z1EVF	CCM030Z1EBF
5 (16.4)	CCM050Z1EFF	CCM050Z1EVF	CCM050Z1EBF
7 (23.0)	CCM070Z1EFF	CCM070Z1EVF	CCM070Z1EBF
10 (32.8)	CCM100Z1EFF	CCM100Z1EVF	CCM100Z1EBF

• Flexible connection cables

Length	Cable outlet direction		
[m (ft.)]	Output shaft direction	Vertical direction	Opposite to output shaft direction
0.5 (1.6)	CCM005Z1EFR	CCM005Z1EVR	CCM005Z1EBR
1 (3.3)	CCM010Z1EFR	CCM010Z1EVR	CCM010Z1EBR
2 (6.6)	CCM020Z1EFR	CCM020Z1EVR	CCM020Z1EBR
3 (9.8)	CCM030Z1EFR	CCM030Z1EVR	CCM030Z1EBR
5 (16.4)	CCM050Z1EFR	CCM050Z1EVR	CCM050Z1EBR
7 (23.0)	CCM070Z1EFR	CCM070Z1EVR	CCM070Z1EBR
10 (32.8)	CCM100Z1EFR	CCM100Z1EVR	CCM100Z1EBR

■ Extension cables/Flexible extension cables

These cables are used when extending a connection cable (add between the driver and connection cable). Use if the length of the connection cable used is not enough when extending the distance between a motor and a driver.



* Use the connection cable used.



- When installing the motor on a moving part, use a flexible cable.
- When extending the wiring length by connecting an extension cable to the connection cable, make the total cable length 10 m (32.8 ft.) or less.

Extension cables

Model	odel Length [m (ft.)]	
CCM010Z2ADFT	1 (3.3)	
CCM030Z2ADFT	3 (9.8)	
CCM050Z2ADFT	5 (16.4)	

• Flexible extension cables

Model	Length [m (ft.)]	
CCM010Z2ADRT 1 (3.3)		
CCM030Z2ADRT	3 (9.8)	
CCM050Z2ADRT 5 (16.4)		

15-3 RS-485 communication cables

These cables are used when connecting a driver with a network converter.

Model	Length [m (ft.)]	
CC02FLT6	6 2 (6.6)	
CC05FLT6	5 (16.4)	



These cables cannot be used for connection between drivers.

15-4 Power supply cable

This cable is used when connecting a driver to power supplies.

Model	Length [m (ft.)]	Number of poles
LCD06Z2AY	0.6 (2)	4

15-5 I/O signal cables

These cables are used when connecting the I/O signals of the host controller to the driver.

■ Connector assembly type

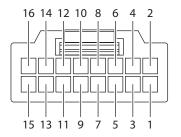
This is a cable allowing simple and easy connection with the driver. A connector is assembled at the driver side.

Model	Length [m (ft.)]	Number of poles
LCD06Z2BY	0.6 (2)	16

Pin assignment

Pin No.	Signal name*	Color of lead wire
1	OUT2- (READY-)	Brown
2	OUT2+ (READY+)	Red
3	OUT1- (HOME-END-)	Orange
4	OUT1+ (HOME-END+)	Yellow
5	OUT0- (ALM-B-)	Green
6	OUT0+ (ALM-B+)	Blue
7	IN4 (P-PRESET)	Purple
8	IN3 (ALM-RST)	Gray
9	IN2 (STOP)	White
10	IN1 (FREE)	Black
11	IN0 (ZHOME)	Brown
12	IN-COM	Red
13	CCW- [DIR-]	Orange
14	CCW+ [DIR+]	Yellow
15	CW- [PLS-]	Green
16	CW+ [PLS+]	Blue
	·	

The figure shows the view from the insertion side of contacts.



^{*} Values in brackets [] are signals when the 1-pulse input mode is set. Values in parentheses () are initial values.

■ General-purpose type

These are shielded cables for control I/O of the driver offering good noise immunity. The ground wires useful to grounding are come out from both ends of the cable. Select the cable suitable for the number of I/O signals connected.

Model list

Length	Number of lead wires			
[m (ft.)]	6 pieces	10 pieces	12 pieces	16 pieces
0.5 (1.6)	CC06D005B-1	CC10D005B-1	CC12D005B-1	CC16D005B-1
1 (3.3)	CC06D010B-1	CC10D010B-1	CC12D010B-1	CC16D010B-1
1.5 (4.9)	CC06D015B-1	CC10D015B-1	CC12D015B-1	CC16D015B-1
2 (6.6)	CC06D020B-1	CC10D020B-1	CC12D020B-1	CC16D020B-1



(memo) To use the cable, make sure to provide contacts by yourself and crimp the lead wires.

16 Accessories

16-1 Pulse signal converter for noise immunity

This product converts a pulse signal, which is output from the open collector output, to a pulse signal for good noise immunity by outputting the pulse signal again from the differential output.

Model: VCS06

16-2 Relay contact protection part/circuit

■ CR circuit for surge suppression

This product is effective to suppress the surge which occurs in a relay contact part. Use it to protect the contacts of the relay or switch.

Model: EPCR1201-2

CR circuit module

This product is effective to suppress the surge which occurs in a relay contact part. Use it to protect the contacts of the relay or switch.

Four pieces of CR circuit for surge suppression are mounted on the compact circuit, and this product can be installed to the DIN rail. This product can make the wiring easily and securely since it also supports terminal block connection.

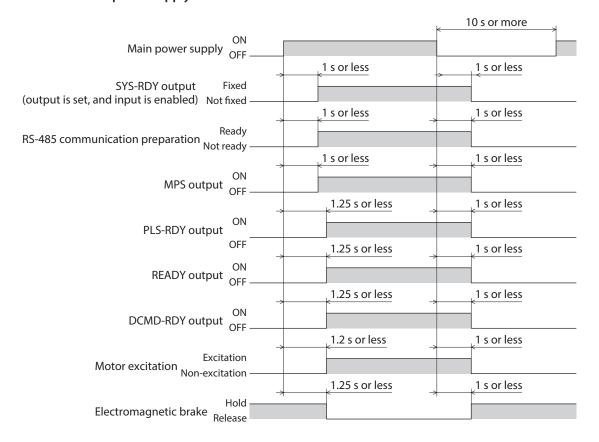
Model: VCS02

17 Reference materials

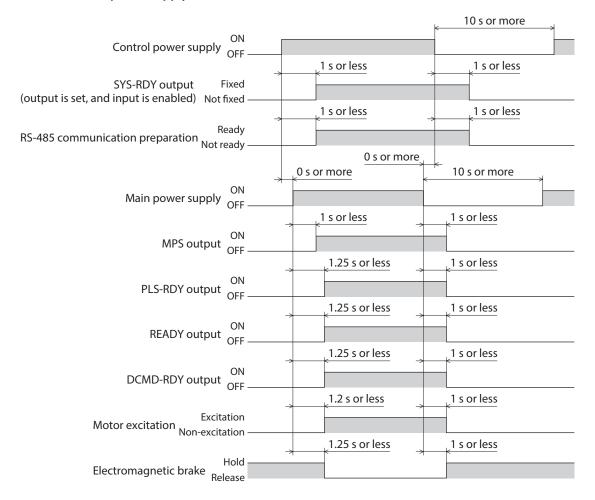
17-1 Timing chart

■ Power activation

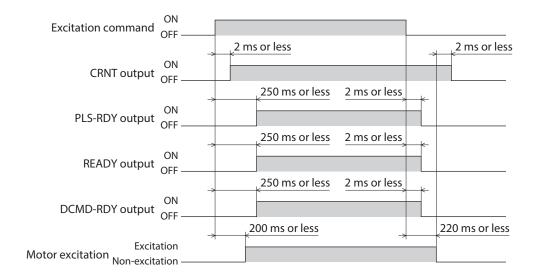
When a control power supply is not connected



• When a control power supply is connected



■ Excitation



17-2 Specifications

■ Product specifications

	Rated voltage	24 VDC±5 % 48 VDC±5 %
Main power supply	Input current	0.4 to 3.7 A*1
	Allowable operating voltage	24 VDC input: 20 to 32 VDC (22.8 to 32 VDC)*2 48 VDC input: 40 to 55 VDC
Control power supply	Rated voltage	24 VDC±5 % 48 VDC±5 %
	Input current	0.15 A (0.4 A)*3
	Allowable operating voltage	24 VDC input: 20 to 32 VDC (22.8 to 32 VDC)*2 48 VDC input: 40 to 55 VDC
Interface	Pulse input	3 to 5.25 VDC Maximum input pulse frequency Line driver output: 1 MHz (duty cycle 50 %) Open-collector output: 250 kHz (duty cycle 50 %)
	Control input	4.5 to 32 VDC
	Control output	4.5 to 32 VDC 10 mA or less

^{*1} The input current varies depending on the motor combined. Check on p.17.

■ General specifications

Degree of protection		IP20	
Operating environment	Ambient temperature	0 to +50 °C (+32 to +122 °F) (non-freezing)	
	Humidity	85 % or less (non-condensing)	
	Altitude	Up to 1,000 m (3,300 ft.) above sea level	
	Surrounding atmosphere	No corrosive gas or dust. No exposure to water or oil.	
Storage environment Shipping environment	Ambient temperature	−25 to +70 °C (−13 to 158 °F) (non-freezing)	
	Humidity	85 % or less (non-condensing)	
	Altitude	Up to 3,000 m (10,000 ft.) above sea level	
	Surrounding atmosphere	No corrosive gas or dust. No exposure to water or oil.	

 $^{^{*}2}$ The value in parentheses () is the one when the electromagnetic brake motor is connected.

^{*3} The value in parentheses () is the one when the electromagnetic brake motor is connected. The **AZM46** type is 0.23 A.

17-3 Regulations and standards

■ UL Standards, CSA Standards

This product is recognized by UL under the UL and CSA Standards.

Check the AZ Series for recognition information about UL Standards.

■ CE Marking / UKCA Marking

This product is affixed with the marks under the following directives/regulations.

• EU EMC Directive / UK EMC Regulation

Refer to "6-8 Conformity to EMC Directive/Regulations" on p.25 for details about conformity.

• EU RoHS Directive/UK RoHS Regulation

This product does not contain the substances exceeding the restriction values.

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