Oriental motor

HM-60064-5

OPERATING MANUAL

Closed loop stepping motor and driver package αSTEP

AR Series FLEX AC power input

Built-in controller type Driver

Thank you for purchasing an Oriental Motor product.
This Operating 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.

Introduction

■ Before use

Only qualified personnel should work with the product. Use the product correctly after thoroughly reading the section "Safety precautions."
The product described in this manual has been designed and manufactured for use in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

● Operating manuals for the AR Series

Operating manuals for the **AR** Series FLEX AC power input built-in controller type are listed below.

- **AR Series OPERATING MANUAL Motor (Supplied with the product.)**

This manual explains the motor functions and how to install the motor, among others.

- **AR Series FLEX AC power input Built-in Controller Type OPERATING MANUAL Driver (this document)**

This manual explains the driver functions and how to install the driver, among others.

- **AR Series FLEX AC power input Built-in Controller Type USER MANUAL**

This manual explains the function, installation and connection of the motor and driver as well as operating method.
The "USER MANUAL" does not come with the product. For details, contact your nearest Oriental Motor sales office or download from Oriental Motor website download page.

Regulations and standards

■ UL Standards and CSA Standards

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

● Applicable Standards

Applicable Standards	Certification Body	File No./Certification No.
UL 508C CSA C22.2 No.14	UL	E171462

● COMPLIANCE WITH UL STANDARDS

- Drivers have no provision for solid state motor overload protection. Motor overload protection is required at end application.
- Drivers have no provision for motor over temperature protection. Motor over temperature protection is required at end application.
- For UL standard (UL 508C), the product is recognized for the condition of Maximum Surrounding Air Temperature 55 °C (131 °F).
- Class 2
- Drivers have no provision for solid state short circuit protection. Short circuit protection is required at end application.
- For a circuit breaker or fuse that connects in the power line of the driver, use the UL listing product.

■ EU Directives

● CE Marking

This product is affixed the CE Marking under the Low Voltage Directive and EMC Directive.

- **Low Voltage Directive**

This product is certified by TÜV Rheinland under the EN 61800-5-1.

Applicable Standards	EN 61800-5-1
Installation conditions	To be incorporated in equipment. Overvoltage category: II Pollution degree: 2 Protection against electric shock: Class I

- This product cannot be used with cables normally used for IT power distribution systems.
- Install the product within the enclosure in order to avoid contact with hands.
- Be sure to maintain a Protective Earth in case hands should make contact with the product. Securely ground the Protective Earth Terminals of the motor and driver.
- To protect against electric shock using an earth leakage breaker (RCD), connect a type B earth leakage breaker to the primary side of the driver.
- When using a circuit breaker (MCCB), use a unit conforming to the EN or IEC standard.
- Isolate the motor cable, power-supply cable and other drive cables from the signal cables (CN1, CN4 to CN9) by means of double insulation.
- The temperature of the driver's heat sink may exceed 90 °C (194 °F) depending on the driving conditions. Accordingly, take heed of the following items:
  - Do not touch the driver.
  - Do not use the driver near flammable objects.
  - Always conduct a trial operation to check the driver temperature.

- **EMC Directive**

This product has received EMC compliance under the conditions specified in "Example of installation and wiring" on the USER MANUAL. The conformance of your mechanical equipment with the EMC Directive will vary depending on such factors as the configuration, wiring, and layout for other control system devices and electrical parts used with this product. It therefore must be verified through conducting EMC measures in a state where all parts including this product have been installed in the equipment.

Applicable Standards

EMI	EN 55011 group1 class A EN 61000-6-4 EN 61800-3 EN 61000-3-2 EN 61000-3-3
EMS	EN 61000-6-2 EN 61800-3

This product is not intended to be used on a low-voltage public network which supplies domestic premises; radio frequency interference is expected if used on such a network.

■ Other Directive

RoHS Directive

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

Preparation

■ Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.
Model names for motor and driver combinations are shown on "Combinations of motors and drivers."

- Driver..... 1 unit
- CN1 connector (6 pins)..... 1 pc.
- CN3 connector (5 pins)..... 1 pc.
- CN5 connector (5 pins)..... 1 pc.
- CN8 connector (9 pins)..... 1 pc.
- CN9 connector (7 pins)..... 1 pc.
- Connector wiring lever (for CN3)..... 1 pc.
- OPERATING MANUAL Driver (this document)..... 1 copy

■ Combinations of motors and drivers

- □ will be filled with **A** (single shaft), **B** (double shaft) or **M** (with electromagnetic brake).
  For **AR911**, □ indicates **A** (single shaft) or **B** (double shaft).
  For geared type, □ indicates **A** (single shaft) or **M** (with electromagnetic brake).
- ■ represents a number indicating the gear ratio.
- ○ indicates the cable length (**-1**, **-2**, **-3**) when the connection cable is supplied.

● Standard type

Model	Motor model	Driver model
AR46□AD○	ARM46□C	ARD-AD
AR66□AD○	ARM66□C	
AR69□AD○	ARM69□C	
AR98□AD○	ARM98□C	
AR911□AD○	ARM911□C	
AR46□CD○	ARM46□C	ARD-CD
AR66□CD○	ARM66□C	
AR69□CD○	ARM69□C	
AR98□CD○	ARM98□C	
AR911□CD○	ARM911□C	

● TH geared type

Model	Motor model	Driver model
AR46□AD-T■○	ARM46□C-T■	ARD-AD
AR66□AD-T■○	ARM66□C-T■	
AR98□AD-T■○	ARM98□C-T■	
AR46□CD-T■○	ARM46□C-T■	ARD-CD
AR66□CD-T■○	ARM66□C-T■	
AR98□CD-T■○	ARM98□C-T■	

● PS geared type

Model	Motor model	Driver model
AR46□AD-PS■○	ARM46□C-PS■	ARD-AD
AR66□AD-PS■○	ARM66□C-PS■	
AR98□AD-PS■○	ARM98□C-PS■	
AR46□CD-PS■○	ARM46□C-PS■	ARD-CD
AR66□CD-PS■○	ARM66□C-PS■	
AR98□CD-PS■○	ARM98□C-PS■	

● PN geared type

Model	Motor model	Driver model
AR46□AD-N■○	ARM46□C-N■	ARD-AD
AR66□AD-N■○	ARM66□C-N■	
AR98□AD-N■○	ARM98□C-N■	
AR46□CD-N■○	ARM46□C-N■	ARD-CD
AR66□CD-N■○	ARM66□C-N■	
AR98□CD-N■○	ARM98□C-N■	

● Harmonic geared type

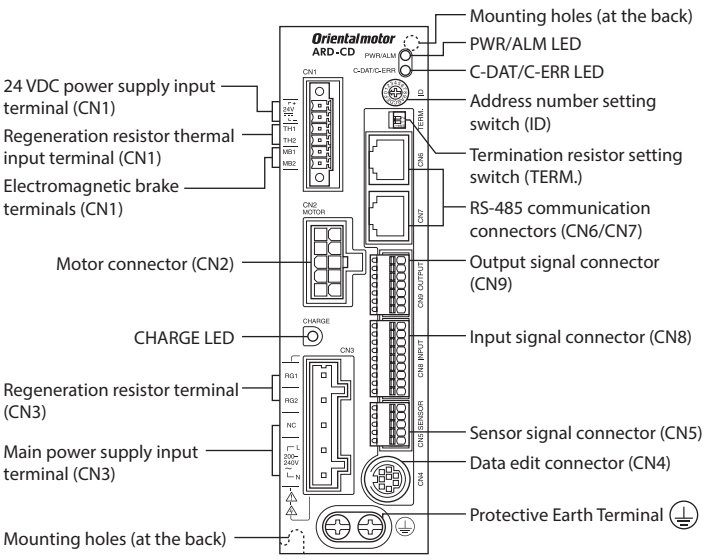
Model	Motor model	Driver model
AR46□AD-H■○	ARM46□C-H■	ARD-AD
AR66□AD-H■○	ARM66□C-H■	
AR98□AD-H■○	ARM98□C-H■	
AR46□CD-H■○	ARM46□C-H■	ARD-CD
AR66□CD-H■○	ARM66□C-H■	
AR98□CD-H■○	ARM98□C-H■	

■ Input/output power ratings

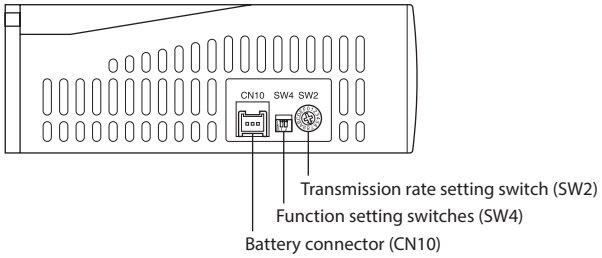
- □ indicates **A** (single shaft), **B** (double shaft) or **M** (with electromagnetic brake).
  In **AR911**, □ indicates **A** (single shaft) or **B** (double shaft). For geared type, □ indicates **A** (single shaft) or **M** (with electromagnetic brake).
- For geared type, ● represents the type of gear and number indicating the gear ratio.
- ○ indicates the cable length (**-1**, **-2**, **-3**) when the connection cable is supplied.

Model	Motor model	Driver model	Input			Output current
			Voltage	Frequency	Current	
AR46□AD●○	ARM46□C●	ARD-AD	Single-phase 100-120 V	50/60 Hz	2.4 A	0.49 A
AR66□AD●○	ARM66□C●				3.6 A	0.74 A
AR69□AD○	ARM69□C				4.9 A	0.92 A
AR98□AD●○	ARM98□C●				4.6 A	1.13 A
AR911□AD○	ARM911□C				5.9 A	1.27 A
AR46□CD●○	ARM46□C●	ARD-CD	Single-phase 200-240 V		1.5 A	0.49 A
AR66□CD●○	ARM66□C●				2.3 A	0.74 A
AR69□CD○	ARM69□C				3.0 A	0.92 A
AR98□CD●○	ARM98□C●				2.9 A	1.13 A
AR911□CD○	ARM911□C				3.7 A	1.27 A

■ Names and functions of parts



· Driver bottom face



Name	Description
PWR/ALM LED	• PWR (Green): This LED is lit while the 24 VDC power is input. • ALM (Red): This LED will blink when an alarm generates. It is possible to check the generated alarm by counting the number of times the LED blinks.
C-DAT/C-ERR LED	• C-DAT (Green): This LED will blink or lit steadily when the driver is communicating with the master station properly via RS-485 communication. • C-ERR (Red): This LED will illuminate when a RS-485 communication error occurs with the master station.
Address number setting switch (ID)	Use this switch when controlling the system via RS-485 communication. Use this switch and SW4-No.1 of the function setting switch, to set the address number of RS-485 communication. (Factory setting: 0)
Termination resistor setting switch (TERM.)	Use this switch when controlling the system via RS-485 communication. Set the termination resistor (120 Ω) of RS-485 communication. (Factory setting: OFF)
RS-485 communication connectors (CN6/CN7)	Connect the RS-485 communication cable.
Output signal connector (CN9)	Connect the output signals cable.
Input signal connector (CN8)	Connect the input signals cable.
Sensor signal connector (CN5)	Connects the limit sensor.
Data edit connector (CN4)	Connect a PC in which the accessory **MEXE02** has been installed, or the **OPX-2A** (sold separatery).
Protective Earth Terminal ⏚	Ground using a wire of AWG16 to 14 (1.25 to 2.0 mm^2).
24 VDC power supply input terminal (CN1-24V)	Connect the driver control power supply. +: 24 VDC power supply input −: Power supply GND
Regeneration resistor thermal input terminal (CN1-TH1/TH2)	Connect the accessory regeneration resistor **RGB100** (sold separately). If no regeneration resistor is connected, short the TH1 and TH2 terminals.
Electromagnetic brake terminals (CN1-MB1/MB2)	Connect the lead wires from the electromagnetic brake. MB1: Electromagnetic brake − (Black) MB2: Electromagnetic brake + (White)
Motor connector (CN2)	Connect the motor.
CHARGE LED (Red)	This LED will lit while the main power is input. After the main power has been turned off, the LED will turn off once the residual voltage in the driver drops to a safe level.
Regeneration resistor terminal (CN3-RG1/RG2)	Connect the accessory regeneration resistor **RGB100** (sold separately).
Main power supply input terminal (CN3)	• Single-phase 100-120 V L, N: Connect to single-phase 100-120 VAC. • Single-phase 200-240 V L, N: Connect to single-phase 200-240 VAC. • NC: Not used.
Mounting holes (two locations at the back)	These mounting holes are used to affix the driver with screws.

● Driver bottom face

Name	Description
Transmission rate setting switch (SW2)	Use this switch when controlling the system via RS-485 communication. Set the transmission rate of RS-485 communication. (Factory setting: 7)
Function setting switches (SW4)	Use this switch when controlling the system via RS-485 communication. No.1: Using this switch and the address number setting switch (ID), set the address number of RS-485 communication. (Factory setting: OFF) No.2: Set the protocol of RS-485 communication. (Factory setting: OFF)
Battery connector (CN10)	Connect the accessory battery **BAT01B** (sold separately).

Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. 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.

● General

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.
- Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire, electric shock, injury or damage to equipment.
- Do not transport, install the product, perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock.
- The terminals on the driver's front panel marked with ⚠ ⚠ symbol indicate the presence of high voltage. Do not touch these terminals while the power is on to avoid the risk of fire or electric shock.
- When the driver generates an alarm (any of the driver's protective functions is triggered), the motor will stop and lose its holding torque. Accordingly, provide measures to hold the moving part in place in the event of an alarm. Failure to do so may result in injury or equipment damage.
- When the driver generates an alarm (any of the driver's protective functions is triggered), first remove the cause and then clear the protection function. Continuing the operation without removing the cause of the problem may cause malfunction of the motor and driver, leading to injury or damage to equipment.

Installation

- The driver is Class I equipment. When installing the driver, do not touch the driver without grounding the driver first. Failure to do so may result in electric shock.
- Install the driver in the enclosure in order to prevent electric shock or injury.

Connection

- Keep the driver's input power voltage within the specified range. Failure to do so may result in fire or electric shock.
- Connect the cables securely according to the wiring diagram. Failure to do so may result in fire or electric shock.
- Do not forcibly bend, pull or pinch the cable. Doing so may fire and electric shock.

Operation

- Turn off the driver power in the event of a power failure. Or the motor may suddenly start when the power is restored and may cause injury or damage to equipment.

- Do not turn the FREE input to ON while the motor is operating. The motor will stop and lose its holding power. Doing so may result in injury or damage to equipment.

Maintenance and inspection

- Do not touch the connection terminals on the driver while the power is supplied or for at least 10 minutes after turning off the power. Before making wiring connections or carrying out checks, also wait for the CHARGE LED to turn off and check the voltage with a tester, etc. Failure to do so may result in electric shock.

Repair, disassembly and modification

- Do not disassemble or modify the driver. This may cause electric shock or injury. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

⚠Caution

Handling the product without observing the instructions that accompany a "Caution" symbol may result in injury or property damage.

General

- Do not use the driver beyond its 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 may cause a skin burn(s).
- Do not use other batteries than the accessory dedicated battery **BAT01B** (sold separately). Failure to do so may result in injury or damage to equipment.

Installation

- Do not leave anything around the driver that would obstruct ventilation. Doing so may result in damage to equipment.

Connection

- The data edit connector (CN4) and RS-485 communication connector (CN6/CN7) are not insulated. When grounding the positive terminal of the power supply, do not connect any equipment (PC, etc.) whose negative terminal is grounded. Doing so may cause the driver and these equipment to short, damaging both.

Operation

- Use a motor and driver only in the specified combination. An incorrect combination may cause a fire.
- Provide an emergency stop device or emergency stop circuit external to the 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.
- Before supplying power to the driver, turn all input signals to the driver OFF. Otherwise, the motor may start suddenly at power ON and cause injury or damage to equipment.
- Before moving the motor output shaft directly with the hands, confirm that the FREE input turns ON. Failure to do so may result in injury.
- Use a 24 VDC power supply that has been given reinforced insulation between the primary side and secondary side. Failure to do so may cause electric shock.
- Immediately when trouble has occurred, stop running and turn off the driver power. Failure to do so may result in fire, electric shock or injury.
- To prevent electric shock, use only an insulated screwdriver to adjust the driver's switches.

Maintenance and inspection

- To prevent the risk of electric shock, do not touch the terminals while performing the insulation resistance test or dielectric strength test.

Disposal

- To dispose of the driver, disassemble it into parts and components as much as possible and dispose of individual parts/components as industrial waste.

Precautions for use

This section covers limitations and requirements the user should consider when using the product.

- **Always use the cable (supplied or accessory) to connect the motor and driver.**

Be sure to use the cable (supplied or accessory) to connect the motor and driver. In the following condition, an appropriate accessory cable must be purchased separately.

- If a flexible cable is to be used.
- If a cable of 3 m (9.8 ft.) or longer is to be used.
- If a motor and driver package without a cable was purchased.

- **Perform the insulation resistance test or dielectric strength test separately on the motor and the driver.**

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

- **Motor excitation at power ON**

The motor is excited when the 24 VDC and main power is on. If the motor is required to be in non-excitation status when turning on the power, assign the C-ON input to the direct I/O or network I/O. In this case, the motor will be excited when turning the C-ON input ON. Refer to the USER MANUAL for details.

- **Preventing electrical noise**

See the USER MANUAL for measures with regard to noise.

- **Preventing leakage current**

Stray capacitance exists between the driver's current-carrying line and other current-carrying lines, the earth and the motor, respectively.
A high-frequency current may leak out through such capacitance, having a detrimental effect on the surrounding equipment. The actual leakage current depends on the driver's switching frequency, the length of wiring between the driver and motor, and so on.
When providing a leakage current breaker, use the following products, for instance, which have high-frequency signal protection:
Mitsubishi Electric Corporation: NV series
Fuji Electric FA Components & Systems Co., Ltd.: EG and SG series

- **Saving data to the NV memory**

Do not turn off the 24 VDC power supply while data is being written to the NV memory and 5 seconds after the completion of data write. Doing so may abort the data write and cause an EEPROM error alarm to generate.
The NV memory can be rewritten approx. 100,000 times.

- **Connect the regeneration resistor RGB100 if gravitational operation or other operations involving up/down movement, or sudden starting/stopping of a large inertial load, will be repeated frequently.**

The overvoltage alarm will generate depending on the operating condition. When an alarm is generated, review the operating conditions or connect the regeneration resistor **RGB100**.

Installation

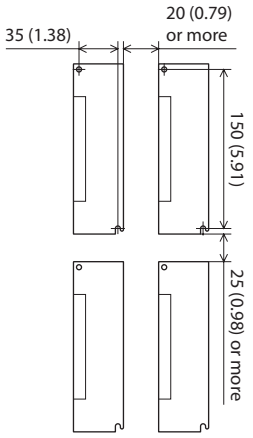
■ Location for installation

The driver is designed and manufactured to be incorporated in equipment. Install them 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 +55 °C (+32 to +131 °F) (non-freezing)
- Operating ambient humidity 85% or less (non-condensing)
- Area that is free of explosive atmosphere or 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
- 1000 m (3300 ft.) or lower above sea level

■ Installation method

The driver is designed so that heat is dissipated via air convection and conduction through the enclosure. Install the driver onto an appropriate flat metal plate having excellent vibration resistance and heat conductivity. [made of aluminum, 200×200×2 mm (7.87×7.87×0.08 in.) or equivalent]
When two or more drivers are to be installed side by side, provide 20 mm (0.79 in.) and 25 mm (0.98 in.) clearances in the horizontal and vertical directions, respectively. When installing the driver in an enclosure, use two screws (M4; not supplied) to secure the driver through the mounting holes.

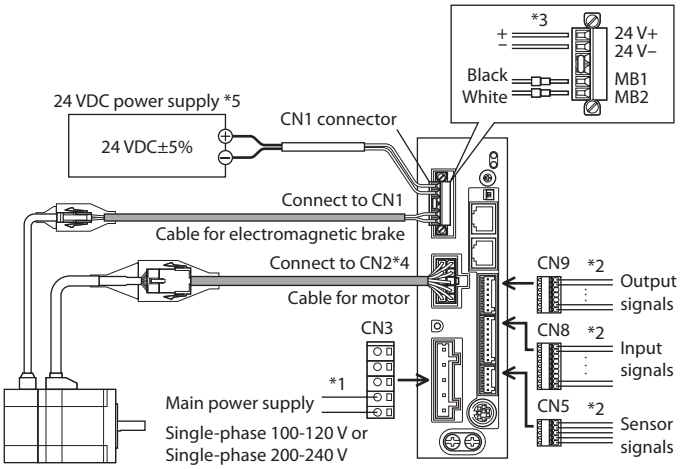


Unit: mm (in.)

memo
- Install the driver in an enclosure whose pollution degree is 2 or better environment, or whose degree of protection is IP54 minimum.
- Do not install any equipment that generates a large amount of heat or noise near the driver.
- Do not install the driver underneath the controller or other equipment vulnerable to heat.
- If the ambient temperature of the driver exceeds 55 °C (131 °F), improve the ventilation condition.
- Be sure to install the driver vertically (vertical position).

Connection

■ Connection example (electromagnetic brake motor)



*1 Lead wire for main power supply: AWG16 to 14 (1.25 to 2.0 mm^2)
*2 Lead wire for I/O signals: AWG26 to 20 (0.14 to 0.5 mm^2)
*3 Lead wire for CN1: AWG28 to 16 (0.08 to 1.25 mm^2)
*4 Connection between the motor and driver can be extended to a maximum of 30 m (98.4 ft.).
*5 The current capacity of the 24 VDC power supply is listed in the table below.

Model	Power supply current capacity
AR46	0.33 A or more
AR66, **AR69**, **AR98**	0.5 A or more

Note
- When cycling the power or plugging/unplugging the connector, turn off the power and wait for the CHARGE LED to turn off. Residual voltage may cause electric shock.
- Do not wire the power supply cable of the driver in the same cable duct with other power lines or motor cables. Doing so may cause malfunction due to noise.
- Have the connector plugged in securely. Insecure connections may cause malfunction or damage to the motor or driver.

memo When installing the motor to a moving part, use an accessory flexible cable offering excellent flexibility. Refer to the USER MANUAL for details.

■ Power supply current capacity

● Single-phase 100-120 V

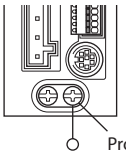
Model	Power supply current capacity
AR46	2.4 A or more
AR66	3.6 A or more
AR69	4.9 A or more
AR98	4.6 A or more
AR911	5.9 A or more

● Single-phase 200-240 V

Model	Power supply current capacity
AR46	1.5 A or more
AR66	2.3 A or more
AR69	3.0 A or more
AR98	2.9 A or more
AR911	3.7 A or more

■ Grounding the driver

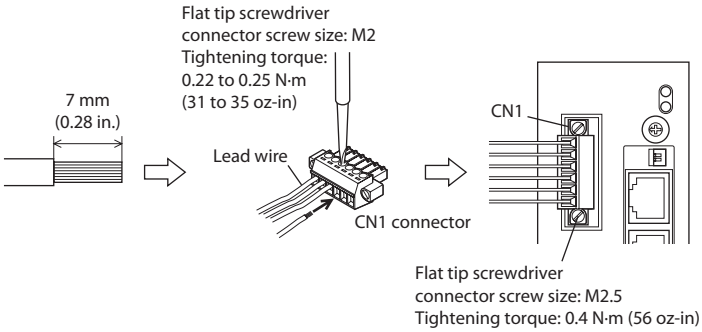
Be sure to ground the Protective Earth Terminal (screw size: M4) of the driver. You can ground either of the two Protective Earth Terminals.Grounding wire: AWG16 to 14 (1.25 to 2.0 mm^2)
Tightening torque: 1.2 N·m (10.6 lb-in)



The terminal that is not grounded is used as a service terminal. Use the service terminal according to your specific need, such as connecting it to the motor in order to ground the motor.
Do not share the Protective Earth Terminal with a welder or any other power equipment. When grounding the Protective Earth Terminal, use a round terminal and affix the grounding point near the driver.

■ CN1

Applicable lead wire: AWG28 to 16 (0.08 to 1.25 mm^2)
Length of the lead wire which can be peeled : 7 mm (0.28 in.)



● Connect to 24 VDC power supply

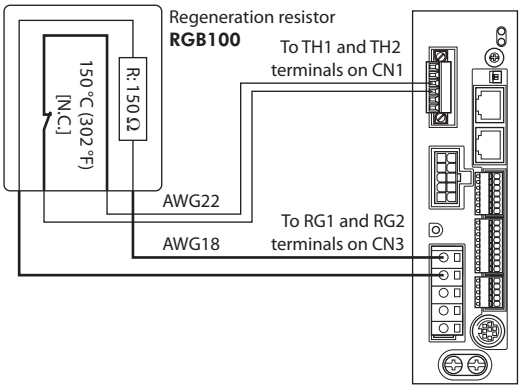
The 24 VDC power supply is for control circuit. Be sure to connect the power supply as below table.

Type	Power supply voltage	Power supply current capacity
Standard	24 VDC±5%	0.25 A or more
With electromagnetic brake	24 VDC±5%	**AR46**: 0.33 A or more
		AR66, **AR69**, **AR98**: 0.5 A or more

memo
- If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24±4% VDC.
- To cycle the 24 VDC power supply, wait for at least 1 minute after the power is cut off and then turn it back on.

● Connecting the regeneration resistor

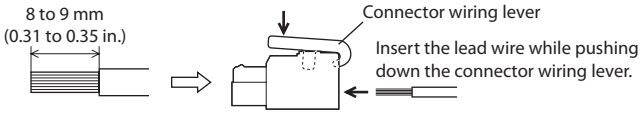
Connect the regeneration resistor **RGB100** if gravitational operation or other operations involving up/down movement, or sudden starting/stopping of a large inertial load, will be repeated frequently.



memo
- Before connecting the regeneration resistor, be sure to remove the jumper wire from the CN1 connector.
- If the current consumption of the regeneration resistor exceeds the allowable level, the thermostat will be triggered and a regeneration resistor overheat alarm will generate. If a regeneration resistor overheat alarm generates, turn off the power and check the content of the error.

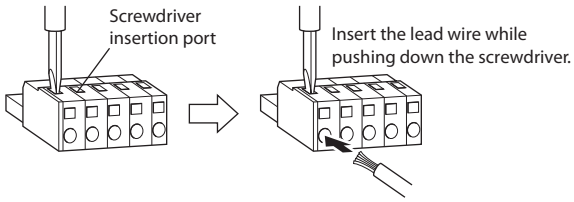
■ CN3

Applicable lead wire: AWG16 to 14 (1.25 to 2.0 mm^2)
Length of the lead wire which can be peeled : 8 to 9 mm (0.31 to 0.35 in.)

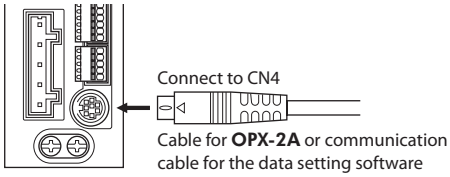


You can also use a flat-tip screwdriver.

Insert a flat-tip screwdriver with a tip of 3.0 to 3.5 mm (0.12 to 0.14 in.) in width, and insert the bar terminal or cable while pushing down the screwdriver.



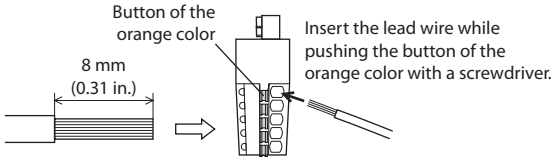
■ CN4



⚠Caution The data edit connector (CN4) and RS-485 communication connector (CN6/CN7) are not insulated. When grounding the positive terminal of the power supply, do not connect any equipment (PC, etc.) whose negative terminal is grounded. Doing so may cause the driver and these equipment to short, damaging both.

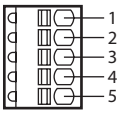
■ CN5, CN8, CN9

Applicable lead wire: AWG26 to 20 (0.14 to 0.5 mm^2)
Length of the lead wire which can be peeled : 8 mm (0.31 in.)



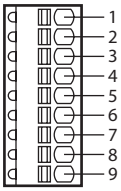
● CN5 pin assignment

Pin No.	Signal name	Description
1	+LS	+limit sensor input
2	−LS	−limit sensor input
3	HOMES	Mechanical home sensor input
4	SLIT	Slit sensor input
5	IN-COM2	Sensor signals common



● CN8 pin assignment

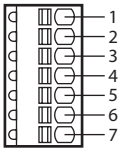
Pin No.	Signal name	Description *
1	IN0	Control input 0 (HOME)
2	IN1	Control input 1 (START)
3	IN2	Control input 2 (M0)
4	IN3	Control input 3 (M1)
5	IN4	Control input 4 (M2)
6	IN5	Control input 5 (FREE)
7	IN6	Control input 6 (STOP)
8	IN7	Control input 7 (ALM-RST)
9	IN-COM1	Input signals common



* ( ): Initial value

● CN9 pin assignment

Pin No.	Signal name	Description *
1	OUT0	Control output 0 (HOME-P)
2	OUT1	Control output 1 (END)
3	OUT2	Control output 2 (AREA1)
4	OUT3	Control output 3 (READY)
5	OUT4	Control output 4 (WNG)
6	OUT5	Control output 5 (ALM)
7	OUT-COM	Output signals common

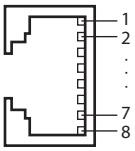


* ( ): Initial value

■ CN6, CN7

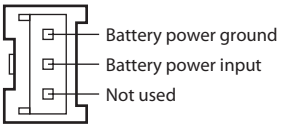
- **Pin assignment**

Pin No.	Signal name	Description
1	N.C.	Not used
2	GND	GND
3	TR+	RS-485 communication signal (+)
4	N.C.	Not used
5	N.C.	Not used
6	TR−	RS-485 communication signal (−)
7	N.C.	Not used
8	N.C.	Not used



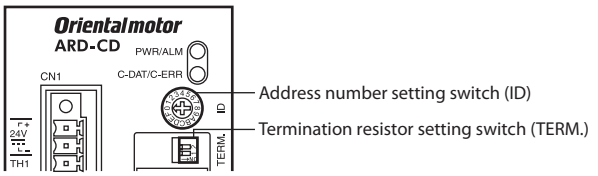
■ CN10

Connect an accessory battery set **BAT01B** (sold separately) for the absolute-position backup system.
When the battery is connected to the battery connector (CN10) of the driver and the power is turned on, the battery will start charging. It takes approx. 32 hours to fully charge the battery [at an ambient temperature of 20 °C (68 °F)].

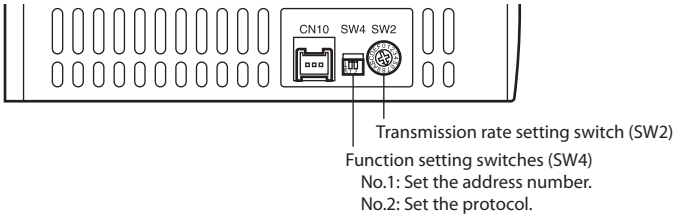


Setting

- Driver front face



- Driver bottom face



memo Be sure to turn off the driver power before setting the switches. If the switches are set while the power is still on, the new switch settings will not become effective until the driver power is cycled.

■ Address number

Set the address number using the address number setting switch (ID) and SW4-No.1 of the function setting switch. Make sure each address number you set for each driver is unique.

Factory setting ID: 0, SW4-No.1: OFF

ID	Address number	
	SW4-No.1: OFF	SW4-No.1: ON
0	0 *	16
1	1	17
2	2	18
3	3	19
4	4	20
5	5	21
6	6	22
7	7	23

ID	Address number	
	SW4-No.1: OFF	SW4-No.1: ON
8	8	24
9	9	25
A	10	26
B	11	27
C	12	28
D	13	29
E	14	30
F	15	31

* When selecting Modbus protocol, do not use the address number 0 since it is reserved for broadcasting.

■ Protocol

Set the protocol of RS-485 communication using the SW4-No.2 of the function setting switch.

Factory setting OFF

SW4-No.2	Protocol
ON	Modbus RTU mode
OFF	Network converter

■ Transmission rate

Set the transmission rate using transmission rate setting switch (SW2). The transmission rate to be set should be the same as the transmission rate of the master device.

Factory setting 7

SW2	Transmission rate
0	9600 bps
1	19200 bps
2	38400 bps
3	57600 bps

SW2	Transmission rate
4	115,200 bps
5, 6	Not used
7	Network converter
8 to F	Not used

memo Do not set SW2 to positions 5, 6 and 8 to F.

■ Termination resistor

Set both No.1 and No.2 of the termination resistor setting switch (TERM.) to ON, and then set the termination resistor (120 Ω) of RS-485 communication.

Factory setting Both No.1 and No.2 are OFF.

TERM.-No.1, No.2	Termination resistor (120 Ω)
Both are OFF	Disabled
Both are ON	Enabled

memo If either of No.1 or No.2 is set to ON, the communication error may generate.

Inspection

It is recommended that periodic inspections be conducted for the items listed below after each operation of the motor. If an abnormal condition is noted, discontinue any use and contact your nearest office.

● During inspection

- The openings in the driver are not blocked.
- Are any of the driver mounting screws or driver connectors loose?
- Is there attachment of dust, etc., on the driver?
- Are there any strange smells or appearances within the driver?

Note The driver uses semiconductor elements. Handle the driver with care since static electricity may damage semiconductor elements.

General specifications

Degree of protection		IP10
Operation environment	Ambient temperature	0 to +55 °C (+32 to +131 °F) (non-freezing) *
	Humidity	85% or less (non-condensing)
	Altitude	Up to 1000 m (3300 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust, water or oil
Storage environment	Ambient temperature	−25 to +70 °C (−13 to +158 °F) (non-freezing)
	Humidity	85% or less (non-condensing)
	Altitude	Up to 3000 m (10000 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust, water or oil
Shipping environment	Ambient temperature	−25 to +70 °C (−13 to +158 °F) (non-freezing)
	Humidity	85% or less (non-condensing)
	Altitude	Up to 3000 m (10000 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust, water or oil

* When installing a motor to a heat sink of a capacity at least equivalent to an aluminum plate [200×200×2 mm (7.87×7.87×0.08 in.)].

• Please contact your nearest Oriental Motor office for further information.

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