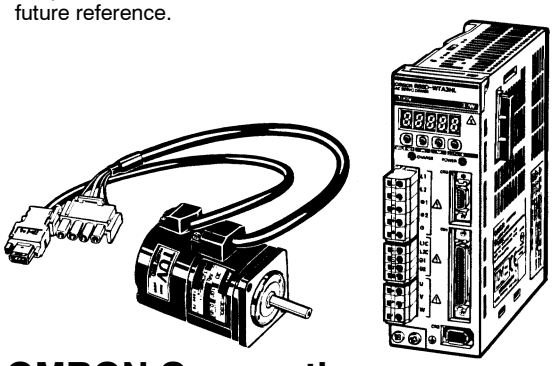
OMRON

OMNUC W-series
R88D-WT□ AC Servodrivers
R88M-W□ AC Servomotors

INSTRUCTION SHEET

Thank you for purchasing this OMRON product.
Please read this instruction sheet and thoroughly familiarize yourself with the functions and characteristics of the product before use. Please retain this sheet for future reference.



OMRON Corporation

■ Safety Precautions

Definition of Precautionary Information

⚠ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ Caution Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

General Warnings

The *User's Manual* may include illustrations of the product with protective covers removed in order to describe the components of the product in detail. Make sure that these protective covers are on the product before use.

Observe the following warnings when using the OMNUC Servomotor and Servodriver.

Consult your OMRON representative when using the product after a long period of storage.

⚠ WARNING Always connect the frame ground terminals of the Servodriver and the Servomotor to a ground of 100 Ω or less. Not connecting to a ground of 100 Ω or less may result in electric shock.

⚠ WARNING Do not touch the inside of the Servodriver. Doing so may result in electric shock.

⚠ WARNING Do not remove the front cover, terminal covers, cables, Parameter Units, or optional items while the power is being supplied. Doing so may result in electric shock.

⚠ WARNING Operation, maintenance, or inspection must be performed by authorized personnel. Not doing so may result in electric shock or injury.

⚠ WARNING Wiring or inspection must be performed at least 5 minutes after turning off the power supply. Doing so may result in electric shock.

⚠ WARNING Do not damage, pinch, or pull on the cables. Do not place excessive stress on the cables. Do not place heavy objects on the cables. Doing any of these may result in electric shock, operation stoppage, or burning.

⚠ WARNING Do not touch the rotating parts of the Servomotor under operation. Doing so may result in injury.

⚠ WARNING Provide an appropriate stopping device on the machine side to secure safety. (A holding brake is not a stopping device for securing safety.) Not doing so may result in injury.

⚠ WARNING Provide an external emergency stopping device that allows an instantaneous stop of operation and power interruption. Not doing so may result in injury.

⚠ WARNING Do not come close to the machine immediately after resetting momentary power interruption to avoid an unexpected restart. (Take appropriate measures to secure safety against an unexpected restart.) Doing so may result in injury.

⚠ Caution Use the Servomotors and Servodrivers in a specified combination. Not doing so may result in fire or damage to the products.

⚠ Caution Do not store or install in the following places. Doing so may result in fire or damage to the Product.

- Locations subject to direct sunlight.
- Locations subject to temperatures or humidity outside the range specified in the specifications.
- Locations subject to condensation as the result of severe changes in temperature.
- Locations subject to corrosive or flammable gases.
- Locations subject to dust (especially iron dust) or salts.
- Locations subject to shock or vibration.
- Locations subject to exposure to water, oil, or chemicals.

⚠ Caution Do not touch the Servodriver radiator, regenerative resistor, or Servomotor while the power is being supplied or soon after the power is turned OFF. Doing so may result in a skin burn due to the hot surface.

Storage and Transportation

⚠ Caution Do not hold by the cables or motor shaft while transporting the product. Doing so may result in injury or malfunction.

⚠ Caution Do not place any load exceeding the figure indicated on the product. Doing so may result in injury or malfunction.

⚠ Caution Use the motor eye-bolts only for transporting the Motor. Using them for transporting the machinery may result in injury or malfunction.

Installation and Wiring

Caution Do not step on or place a heavy object on the product. Doing so may result in injury.

Caution Do not cover the inlet or outlet ports and prevent any foreign objects from entering the product. Doing so may result in fire.

Caution Be sure to install the product in the correct direction. Not doing so may result in malfunction.

Caution Provide the specified clearances between the Servodriver and the control panel or with other devices. Not doing so may result in fire or malfunction.

Caution Do not apply any strong impact. Doing so may result in malfunction.

Caution Be sure to wire correctly and securely. Not doing so may result in motor runaway, injury, or malfunction.

Caution Be sure that all the mounting screws, terminal screws, and cable connector screws are tightened to the torque specified in the relevant manuals. Incorrect tightening torque may result in malfunction.

Caution Use crimp terminals for wiring. Do not connect bare stranded wires directly to terminals. Connection of bare stranded wires may result in burning.

Caution Always use the power supply voltage specified in the User's Manual. An incorrect voltage may result in malfunction or fire.

Caution Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied in places where the power supply is unstable. An incorrect power supply may result in malfunction.

Caution Install external breakers and take other safety measures against short-circuiting in external wiring. Insufficient safety measures against short-circuiting may result in fire.

Caution Take appropriate and sufficient countermeasures when installing systems in the following locations:

- Locations subject to static electricity or other forms of noise.
- Locations subject to strong electromagnetic fields and magnetic fields.
- Locations subject to possible exposure to radioactivity.
- Locations close to power supplies.

Caution Connect the battery with the correct polarity. Not doing so may result in damage or explosion.

Operation and Adjustment

Caution Ensure that there will be no adverse effect on equipment before performing trial operation. Not doing so may result in equipment damage.

Caution Check the newly set parameters for proper execution before actually running them. Not doing so may result in equipment damage.

Caution Do not make any extreme adjustments or setting changes. Doing so may result in unstable operation and injury.

Caution Separate the Servomotor from the machine, check for proper operation, and then connect to the machine. Not doing so may cause injury.

Caution When an alarm occurs, remove the cause, reset the alarm after confirming safety, and then resume operation. Not doing so may result in injury.

Caution Do not use the built-in brake of the Servomotor for ordinary braking. Doing so may result in malfunction.

Maintenance and Inspection

Caution Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, or electric shock.

Caution When a Unit is replaced, resume operation only after transferring to the new Unit the contents of the data required for operation. Not doing so may result in damage to equipment.

■ General Specifications for Servodrivers

Item		Specification
Ambient temperature		Operating: 0°C to 55°C Storage: −20°C to 85°C
Ambient humidity		Operating: 20 to 90% (with no condensation) Storage: 20 to 90% (with no condensation)
Storage and operating atmosphere		No corrosive gasses.
Vibration resistance		10 to 55 Hz in X, Y, and Z directions with 0.10-mm double amplitude or acceleration of 4.9 m/s^2 max. whichever is smaller
Impact resistance		Acceleration 19.6 m/s^2 max., in X, Y, and Z directions, three times
Insulation resistance		Between power supply terminals/power line terminals and FG: 1 MΩ (at 500 VDC)
Dielectric strength		Between power supply terminals/power line terminals and FG: 1,500 VAC at 50/60 Hz for 1 min Between control signals and FG: 500 VAC for 1 min
Protective structure		Built into panel. (IP10)
EC Directives	**EMC Directives**	EN55011 class A group 1
		EN50082-2
	Low Voltage Directive	EN50178
UL standards		UL508C
cUL standards		cUL C22.2 No. 14

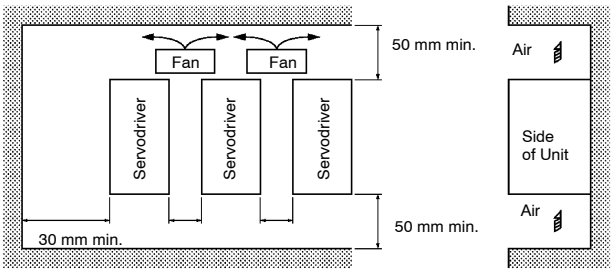
Note
1. The above items reflect individual evaluation testing. The results may differ under compounded conditions.
2. Absolutely do not conduct a withstand voltage test or a megger test on the Servodriver. If such tests are conducted, internal elements may be damaged.
3. Depending on the operating conditions, some Servodriver parts will require maintenance. Refer to the *User's Manual* for details.
4. The service life of the Servodriver is 50,000 hours at an average ambient temperature of 40°C (at 80% of the rated torque output).

■ Installation

Space Around Drivers

Install Servodrivers according to the dimensions shown in the following illustration to ensure proper heat dispersion and convection inside the panel. Also install a fan for circulation if Servodrivers are installed side by side to prevent uneven temperatures from developing inside the panel.

When installing, allow for the dimensions of pulled out control cables.



W=10 mm min.

Mounting Direction

Mount the Servodrivers vertically (so that the model number and writing can be read).

Operating Environment

Be sure that the environment in which Servodrivers are operated meets the following conditions.

- Ambient operating temperature: 0°C to +55°C
- Ambient operating humidity: 20% to 90% (with no condensation)
- Atmosphere: No corrosive gases.

Ambient Temperature

Servodrivers should be operated in environments in which there is minimal temperature rise to maintain a high level of reliability.

Temperature rise in any Unit installed in a closed space, such as a control box, will cause the ambient temperature to rise inside the entire closed space. Use a fan or a air conditioner to prevent the ambient temperature of the Servodriver from exceeding 55°C.

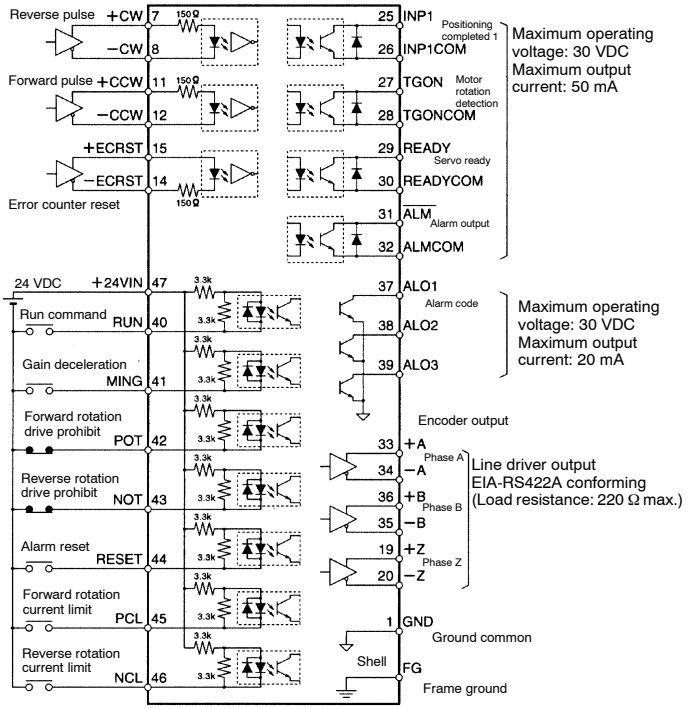
Unit surface temperatures may rise to as much as 30°C above the ambient temperature. Use heat-resistant materials for wiring, and keep separate any devices or wiring that are sensitive to heat.

The service life of a Servodriver is largely determined by the temperature around the internal electrolytic capacitors. The service life of an electrolytic capacitor is affected by a drop in electrolytic volume and an increase in internal resistance, which can result in overvoltage alarms, malfunctioning due to noise, and damage to individual elements. If a Servodriver is operated at an ambient temperature of 40°C at 80% of the rated torque output, then a service life of approximately 50,000 hours can be expected. A drop of 10°C in the ambient temperature will double the expected service life.

■ Wiring

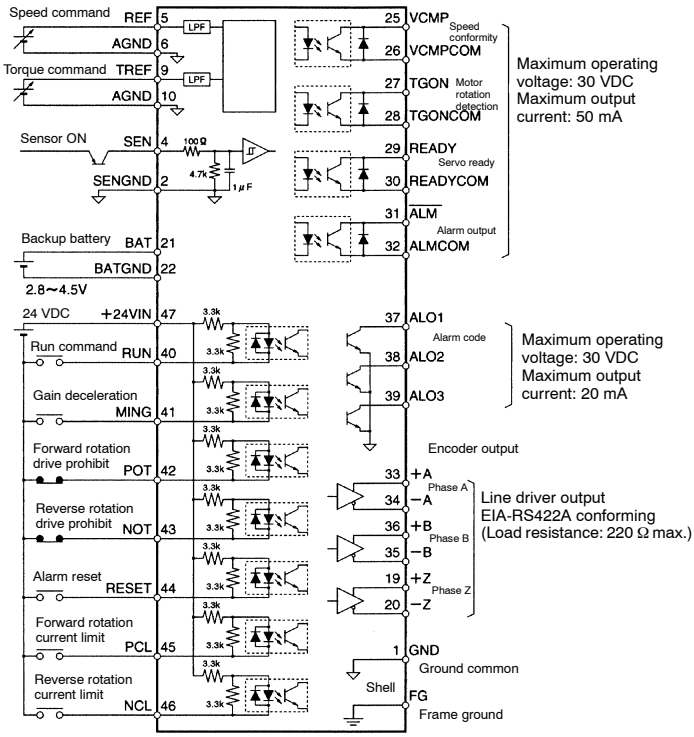
Control I/O Signal Connections

• Position Control (Pulse Train Input)



Note Inputs for pins 40 to 46 and outputs for pins 25 to 30 can be changed with parameter settings. (The above diagram shows the settings at time of delivery.)

• Speed Control/Torque Control (Analog Input)



Note
1. It is necessary to make parameter settings when performing speed control or torque control (control mode selection).
2. Inputs for pins 40 to 46 and outputs for pins 25 to 30 can be changed with parameter settings. (The above diagram shows the settings at time of delivery.)
3. Do not connect pins 2, 4, 21, and 22 unless a motor with an absolute encoder is used.

Terminal Block Specifications and Wire Sizes

The following table gives the specifications for the Servodriver terminal block.

• Terminal Block Specifications

Signal	Name	Function	
L1 L2 L3	Main circuit power supply input	R88D-WT□H (30 to 400 W): Single-phase 200/230 VAC (170 to 253 VAC) 50/60 Hz R88D-WT□H (500 W to 6 kW): 3-phase 200/230 VAC (170 to 253 VAC) 50/60 Hz R88D-WT□HL (30 to 200 W): Single-phase 100/115 VAC (85 to 127 VAC) 50/60 Hz	
+	Main circuit DC output (forward rotation)	(Do not connect this terminal.) Only the R88D-WT60H has this terminal.	
+ 1 +2	Connection terminals for DC reactor to suppress high frequency power supply	Short these terminals for normal use. When suppression of high frequencies is required, connect these terminals to a DC reactor. (R88D-WT60H does not have these terminals.)	
–	Main circuit DC output (reverse rotation)	(Do not connect this terminal.)	
L1C L2C	Control circuit power supply input	R88D-WT□H: Single-phase 200/230 VAC (170 to 253 VAC) 50/60 Hz R88D-WT□HL: Single-phase 100/115 VAC (85 to 127 VAC) 50/60 Hz	
B1 B2 B3	Connection terminals for externally connected regenerative resistor	30 to 400 W: Normally no connections are required between these terminals. If the regenerative energy is large, connect an external regenerative resistor between B1 and B2. 500 W to 5 kW: Short B2 and B3 for normal use. If the regenerative energy is large, remove the shorting bar from between B2 and B3 and connect an external regenerative resistor between B1 and B2. 6 kW: Connect an external regenerative resistor between B1 and B2.	
U	Motor connection terminals	Red	These are the output terminals to the Servomotor. Be careful to wire them correctly.
V		White	
W		Blue	
⏚		Green/ yellow	
⏚	Frame ground	The ground terminal for both the motor output and power supply input. Connect to a ground of 100 Ω or less.	

Terminal Block Current and Wire Sizes

The following tables give the rated effective currents flowing to the terminal block and the sizes of the electrical wires.

• Servodrivers with 100-VAC Input (R88D-WT□HL)

Item		Unit	WTA3HL	WTA5HL	WT01HL	WT02HL
Power supply capacity		kVA	0.15	0.25	0.4	0.6
Main circuit power supply input (L1, L2) (see note 1)	Rated current	A (rms)	1.1	1.8	3.0	5.2
	Wire size	mm^2	1.25	1.25	1.25	1.25
	Screw size	---	---			
	Tightening torque	N•m	---			
Control circuit power supply input (L1C, L2C)	Rated current	A (rms)	0.13	0.13	0.13	0.13
	Wire size	mm^2	1.25	1.25	1.25	1.25
	Screw size	---	---			
	Tightening torque	N•m	---			
Motor connection terminals (U, V, W, ⏚) (see note 2)	Rated current	A (rms)	0.44	0.64	0.91	2.1
	Wire size	mm^2	1.25	1.25	1.25	1.25
	Screw size	---	---			
	Tightening torque	N•m	---			
Frame ground (⏚)	Wire size	mm^2	2	2	2	2
	Screw size	---	M4	M4	M4	M4
	Tightening torque	N•m	1.2	1.2	1.2	1.2
No-fuse breaker or fuse capacity		A (rms)	4	4	4	6

Note 1. If terminals +1, +2, B1, and B2 are used, the wire sizes are the same as for L1 and L2.
2. Connect a special power cable made by OMRON to the motor connection terminals.

• Servodrivers with 200-VAC Input (R88D-WT□H)

Item		Unit	WTA3H	WTA5H	WT01H	WT02H	WT04H	WT05H	WT08H	WT10H	WT15H	WT20H	WT30H	WT50H	WT60H
Power supply capacity		kVA	0.2	0.25	0.4	0.75	1.2	1.4	1.9	2.3	3.2	4.3	5.9	7.5	12.5
Main circuit power supply input (L1, L2 or L1, L2, L3) (see note 1)	Rated current	A (rms)	0.8	1.1	2.0	3.4	5.5	4.0	5.4	7.0	9.5	12.0	17.0	28.0	32.0
	Wire size	mm^2	1.25	1.25	1.25	1.25	2	2	2	2	3.5	3.5	3.5	5.5	8
	Screw size	---	---									M4	M4	M5	M6
	Tightening torque	N•m	---				---	---				1.2	1.2	2	2.5
Control circuit power supply input (L1C, L2C)	Rated current	A (rms)	0.13	0.13	0.13	0.13	0.13	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.27
	Wire size	mm^2	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	Screw size	---	---									M4	M4	M4	M4
	Tightening torque	N•m	---									1.2	1.2	1.2	1.2
Motor connection terminals (U, V, W, ⏚) (see note 2)	Rated current	A (rms)	0.44	0.64	0.91	2.1	2.8	3.0	5.7	7.6	11.6	18.5	24.8	32.9	46.9
	Wire size	mm^2	1.25	1.25	1.25	1.25	1.25	2	2	3.5	3.5	3.5	5.5	8	14
	Screw size	---	---									M4	M4	M5	M6
	Tightening torque	N•m	---									1.2	1.2	2	2.5
Frame ground (⏚)	Wire size	mm^2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Screw size	---	M4	M4	M4	M4	M4	M4	M4	M4	M4	M4	M4	M4	M8
	Tightening torque	N•m	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6
No-fuse breaker or fuse capacity		A (rms)	4	4	4	4	8	4	7	7	10	13	17	28	32

Note 1. If terminals +1, +2, B1, and B2 are used, the wire sizes are the same as for L1, L2 and L3.
2. Connect a special power cable made by OMRON to the motor connection terminals.

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