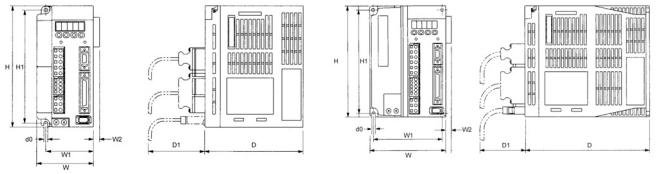
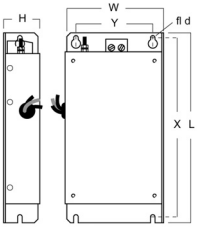
Installation

Servo Drive Dimensions



Model R88D	Case Style	Dimensions (mm) W	H	D	W1	W2	H1	D1	d0	Approx Weight (kg)	MCCB Rating Type D	Power Terminals Wire Size (mm^2)
WTA3H WTA5H WT01H WT02H	A	55	160	130	50	8	149	75	5	0.8	4	1.25
WT04H	A	75	160	130	63	8	149.5	75	5	1.1	8	2
WT08HH	A	90	160	180	63	8	149.5	75	5	1.7	11	2
WT15HH	B	110	250	180	100	8	238.5	75	6	3.8	19	3.5
WT05HF	B	110	160	180	100	8	149.5	75	5	2.8	1.7	2
WT10HF											3.4	2
WT15HF											4.6	3.5
WT20HF	B	110	250	180	100	8	238.5	75	6	3.8	7.1	3.5
WT30HF											9.8	3.5

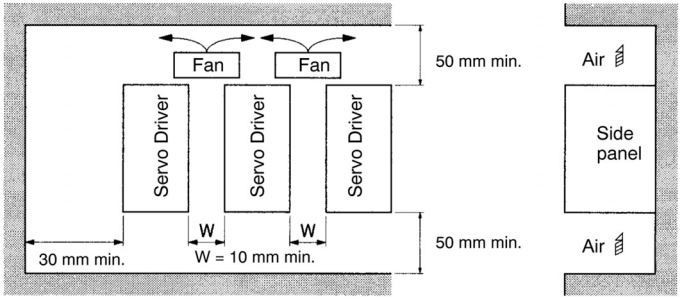
Filter



Drive	Filter	Current (A)	L (mm)	W (mm)	H (mm)	X (mm)	Y (mm)	d (mm)
up to R88D WT02H	R88A FIW 104E	4	202	55	32	192	33	M4
R88D WT04H	R88A FIW 107E	7	202	75	32	192	50	M4
R88D WT08HH	R88A FIW 115E	15	202	90	32	192	60	M4
R88D WT15HH	R88A FIW 125E	25	291	118	35	281	80	M4
R88D WT05HF to R88D WT15HF	R88A FIW 4006E	6	291	118	32	192	80	M4
R88D WT20HF R88D WT30HF	R88A FIW 4010E	10	291	118	35	281	80	M4

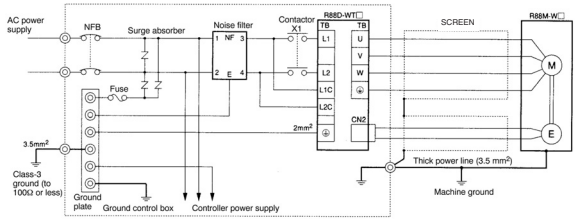
Space Around Drivers

- Install Servo Drivers 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 Servo Drivers are installed side by side to prevent uneven temperatures from developing inside the panel.
- Take the control cable's connector direction into account when installing the Servo Drivers.

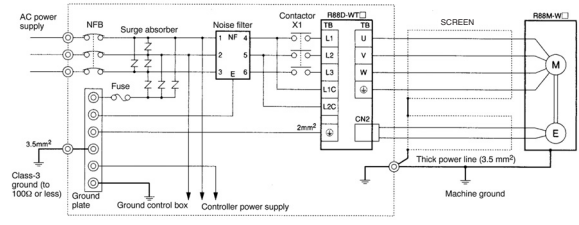


Wiring Method

- R88D-WTA3H □to R88D-WT15H(H) Servo Drivers (Single-phase Power Supply Input)



- R88D-WT05HF to R88D-WT30HF Servo Drivers (Three-phase Power Supply Input)

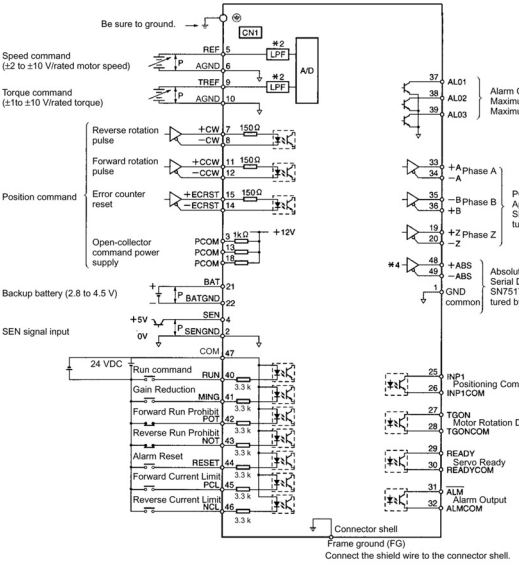


NOTE: R88D WT08HH AND R88D WT15HH servodrivers have changed from three phase specifications to single phase power supply specifications. Therefore connect main power supply shown above to L1 and L3 terminals.

Terminal Description

Symbol	Name	Function	
L1 L2 L3	Main circuit power supply input	R88D-WT □H (H) (30 to 1500 W) Single-phase 200/230 VAC (170 to 253 V), 50/60 Hz R88D–WT □HF (450W to 3 kW): Three-phase 380/460 V AC (323 to 528 V AC) 50/60 Hz	
⊕	Main circuit DC output (positive)	Do not connect anything to these terminals.	
⊕1 ⊕2	Connection terminals for DC Reactor for power supply harmonic control	Normally, short ⊕1 and ⊕2. When harmonic control measures are required, connect a DC Reactor between ⊕1 and ⊕ 2.	
⊖	Main circuit DC output (negative)	Do not connect anything to these terminals.	
L1C L2C	Control circuit power supply input	R88D-WT □H (H) (30 to 1500 W) Single-phase 200/230 VAC (170 to 253 V), 50/60 Hz R88D-WT □HF: 24 V DC (20.4 to 27.6 V DC)	
B1 B2 B3	External regeneration resistance connection terminal	30 to 400 W: These terminals normally do not need to be connected. If there is high regenerative energy, connect an External Regeneration Resistor between B1 and B2. 450 W to 3 kW: Normally short between B2 and B3. If there is high regenerative energy, remove the short bar between B2 and B3 and connect an External Regeneration Resistor between B1 and B2.	
U V W ⏚	Servomotor connection terminals	Red White Blue Green/Yellow	These are the output terminals to the Servomotor. Be careful to wire them correctly.
⏚	Frame ground	This is the ground terminal. Ground to a 100 Ω or less.	

Control Connections



CN1 Control Inputs / Outputs

Pin No.	Signal name	Function	Contents
5	REF	Speed command input	Analog input terminal for speed commands. ±2 to ±10 V (Servomotor forward rotation with + voltage) parameter. Scale can be changed by means of user parameter Pn300 (speed command scale). Can be used as a speed limit input for torque control (by means of a Pn002.1 setting).
6	AGND	Speed command input ground	
9	TREF	Torque command input	Analog input terminal for torque commands. ±1 to ±10 V (Forward torque with + voltage). Scale can be changed by means of user parameter Pn400 (torque command scale). Can be used as a torque limit input or torque feed forward input for speed control or position control (by means of a Pn002.0 setting).
10	AGND	Torque command input ground	
3	PCOM	Open collector command power supply	To use open-collector output for inputting command pulses and deviation counter resets, connect the + inputs to these terminals and connect the – inputs to open-collector output terminals.
13			
18			
7	+PULS/ CW/A	Feed pulses, reverse pulses, or 90° phase difference pulses (A phase)	Pulse string input terminals for position commands. Line-input: Line driver input: 10 mA at 3 V Maximum response frequency: 500 kpps Open-collector input: 7 to 15 mA Maximum response frequency: 200 kpps Any of the following can be selected by means of a Pn200.0 setting: feed pulses or direction signals (PULS/SIGN); forward or reverse pulses (CW/CCW); 90° phase difference (A/B phase) signals (A/B).
8	-PULS/ CW/A		
11	+SIGN/ CCW/B	Direction signal, forward pulses, or 90° phase difference pulses (B phase)	
12	–SIGN/ CCW/B		
14	–ECRST	Deviation counter reset	Line-driver input: 10 mA at 3 V Open-collector input: 25 mA at 5V
15	+ECRST		ON: Pulse commands prohibited and deviation counter cleared.
4	SEN	Sensor ON input	ON: Absolute encoder's multi-turn amount and initial incremental pulses sent. Required when using an absolute encoder.
2	SENGND		
21	BAT	Backup battery input	Backup battery connector terminals for power interruption for absolute encoder. Connect the battery to either this terminal or CN8
22	BATGND		
47	COM	Power supply input for control DC	Power supply input terminal for sequence inputs (pins 40 to 46).
40 to 46	RUN [40]	RUN command input	ON: Servo ON (Starts power to Servomotor.)
	MING [41]	Gain reduction input	ON: Switches speed loop to P control and reduces speed gain.
	POT [42]	Forward drive prohibit input	Forward rotation overtravel input (OFF Prohibited; ON: Permitted).
	NOT [43]	Reverse drive prohibit input	Reverse rotation overtravel input (OFF Prohibited; ON: Permitted).
	RESET[44]	Alarm reset input	ON: Servo alarm status is reset.
	PCL [45]	Forward rotation current limit input	ON: Output current is limited by the value set in Pn404 (forward rotation external current limit).
	NCL [46]	Reverse rotation current limit input	ON: Output current is limited by the value set in Pn405 (reverse rotation external current limit).

Pin No.	Signal name	Function	Contents
40 to 46	RUN [40]	RUN command input	ON: Servo ON (Starts power to Servomotor.)
	MING [41]	Gain reduction input current limit input	ON: Switches speed loop to P control and reduces speed gain. (reverse rotation external current limit).
	RDIR [41]	Rotation direction command input	Specifies the direction of rotation for Servomotor rotation at the internally-set speed. OFF: Forward rotation, ON: Reverse rotation
	SPD1 [45]	Speed selection command 1 input	Selects the internally-set speed (Pn301, Pn302, Pn303).
	SPD2 [46]	Speed selection command 2 input	
	TVSEL [41]	Control mode switch input	ON: Change control mode
	PLOCK [41]	Position lock command input	ON: Position lock goes into effect when the motor rotation speed is no more than the position lock rotation speed with position Pn501.
	IPG [41]	Pulse disable input	ON: Command pulse inputs are ignored and the motor stops.
	GSEL	Gain change input	ON: Changes gain to No.2 speed gain (Pn104, Pn105,Pn106).

Note Function allocations for pin 40 to 46 sequence inputs can be set by means of user parameters Pn50A to Pn50D. In this table, the numbers enclosed in brackets indicate the default pin numbers (allocations). The allocations vary depending on the control mode.

Pin No.	Signal name	Function	Contents
1	GND	Ground common	Ground common terminal for the encoder output and alarm code output.
33	+A	Encoder phase-A + output	Outputs encoder pulses divided according to user parameter Pn201. Line driver output (conforming to RS-422A).
34	–A	Encoder phase-A – output	
36	+B	Encoder phase-B + output	
35	–B	Encoder phase-B – output	
19	+Z	Encoder phase-Z + output	Outputs encoder phase-Z signals (1 pulse/revolution). Line driver output (conforming to RS-422A).
20	–Z	Encoder phase-Z – output	

Pin No.	Signal name	Function	Contents
48	+ABS	Absolute encoder signal + output	Outputs absolute encoder data. Line driver output (conforming to RS-422A).
49	–ABS	Absolute encoder signal - output	
37	ALO1	Alarm code output 1	When an alarm is generated for the Servo Driver, the contents of the alarm are output in code. Open collector output: 30 V DC, 20 mA max.
38	ALO2	Alarm code output 2	
39	ALO3	Alarm code output 3	
31	ALM	Alarm output	When an alarm is generated for the Servo Driver, the output is OFF. Open collector output (50 mA, 30 V DC max.)
32	ALMCOM		
25 to 30	INP1 [25]	Positioning completed output 1	ON when the position error is within the positioning completed range (Pn500). OFF when in a control mode other than position control mode.
	INP1COM [26]		
	INP2	Positioning completed output 2	ON when the position error is within the positioning completed range (Pn504). Always OFF when in a control mode other than position control mode.
	INP2COM		
	VCMP [25]	Speed conformity output	ON when the Servomotor speed error is within the speed conformity signal output range (Pn503). Always OFF when in a control mode other than speed control mode.
	VCMPCOM [26]		
	TGON [27]	Servomotor rotation detection output	ON when the Servomotor rotation speed exceeds the value set for the Servomotor rotation detection speed (Pn502).
	TGONCOM [28]		
	READY [29]	Servo ready output	ON if no errors are discovered after powering the main circuits.
	READYCOM [30]		
	CLIMT	Current limit detection output	ON if the output current is limited.
	CLIMTCOM		
	VLIMT	Speed limit detection output	ON if the speed is limited. Always OFF when in a control mode other than torque control mode.
	VLIMTCOM		
	BKIR	Brake interlock output	Holding brake timing signals are output according to user parameters Pn506, Pn507, and Pn508.
	BKIRCOM		
	WARN	Warning output	OFF when an overload warning or regeneration overload is detected.
	WARNCOM		
Shell	FG	Frame ground	Connection terminal for cable's shielded wire and FG line.

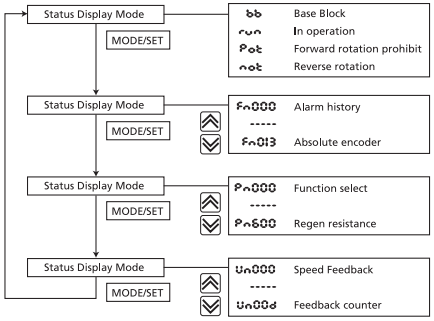
Note 1. Function allocations for pin 25 to 30 sequence outputs can be set by means of user parameters Pn50E to Pn510. In this table, the numbers enclosed in brackets indicate the default pin numbers (allocations). (The allocations vary depending on the control mode.)

Note 2. The interface for pin 25 to 30 sequence outputs is open-collector output (50 mA, 30 V DC max.).

Improper procedures can result in personal injury or equipment damage. Use the Quick Start Guide only if you are familiar with standard safety precautions common to servo drives. See Operation Manual I531 for further details.

Operator Display Contents and Mode Changes

Parameter designation: certain parameters such as Pn000 when displayed have 4 digits, each of these digits represents a different function. The rightmost digit is designated as Pn000.0, the next digit by Pn000.1 etc



Setting and Checking Parameters

• Operation Overview

• Use the following procedure to set and check parameters.

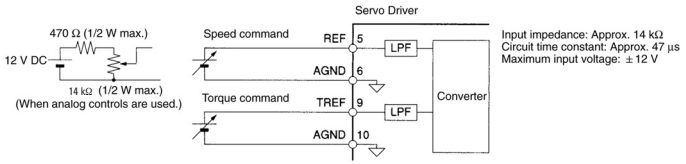
- Go into Setting Mode: MODE/SET
- Set the parameter number (Pn □□□): ▲, ▼, DATA/◀ less than 1 s ,
- Display the parameter setting: DATA/◀ for 1 s min.
- Change the setting: ▲, ▼, DATA/◀ less than 1 s , (Not required for checking only.)
- Save the changed setting to memory: DATA/◀ for 1 s min. (Not required for checking only.)
- Return to parameter number display: DATA/◀ for 1 s min.

Speed Control Operation: Parameters and wiring

For analog speed control, including MC cards

Parameter	Name	Setting	Contents
Pn000.1	Control mode selection	0	Speed control by analogue command
		1	Position control by pulse train
		2	Torque control
		3	Internal set speeds
Pn300	Speed command scale	150-3000	0.01V / rated speed i.e. 1000 (default) gives rated speed at 10V
Pn305	Soft start accel time	0-10,000 ms	Acceleration and deceleration time between 0 and maximum rotation speed
Pn306	Soft start decel time	0-10,000 ms	

Speed and Torque Command Inputs



Position control operation: Parameters and wiring

For pulse control, including NC cards

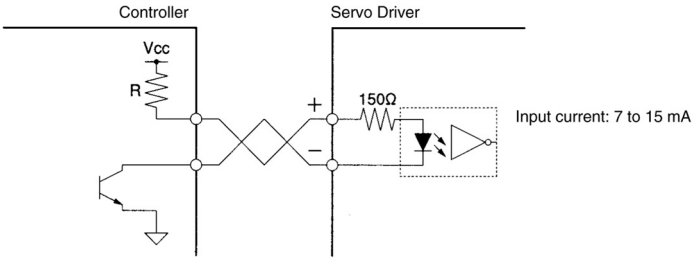
Parameter designation: certain parameters such as Pn000 when displayed have 4 digits, each of these digits represents a different function. The rightmost digit is designated as Pn000.0, the next digit by Pn000.1 etc

Parameter	Name	Setting	Contents
Pn000.1	Control mode selection	0	Speed control by analogue command
		1	Position control by pulse train
		2	Torque control
		3	Internal set speeds
Pn200.0	Command pulse mode	0	Pulse and direction +ve logic
		1	Forward pulse/reverse pulse +ve logic
		2	90° A/B phase x1 +ve logic
		3	90° A/B phase x2 +ve logic
		4	90° A/B phase x4 +ve logic
		5-9	As 0-4 but –ve logic
Pn202	Gear ratio G1	1-65535	Sets the pulse output rate per input pulse, value
Pn203	Gear ratio G2	1-65535	0.01<G1/G2<100
Pn207.0	Position command filter	0	Exponential Accel & Decel (Pn204)
		1	Linear Accel & Decel (Pn208)
Pn204	Primary filter (1) Soft start time constant	0-6400 x 0.01ms	Sets exponential acceleration and deceleration rates. Value entered gives time to 2/3 speed
Pn208	Primary filter (2) Soft start time constant	0-6400 x 0.01ms	Sets linear acceleration and deceleration rates. Value gives time to reach required speed.

Pulse Command Inputs

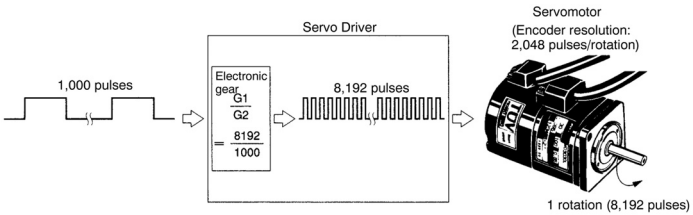
In the following diagram use these resistor values dependant on the supply voltage

Vcc	R
24V	2.2K ohms
12V	1k ohms
5V	180 ohms



Gear Ratio Settings

When set to G1/G2 = 8192/1000, the operation is the same as for a 1,000-pulses/rotation Servomonitor



Alarm Table

Display	Alarm code			Error detection function	Cause of error
	ALO1	ALO2	ALO3		
A.02	OFF	OFF	OFF	Parameter corruption	The checksum for the parameters read from the EEP-ROM does not match.
A.03	OFF	OFF	OFF	Main circuit detection error	There is an error in the detection data for the power supply circuit.
A.04	OFF	OFF	OFF	Parameter setting error	Incorrect parameter setting.
A.05	OFF	OFF	OFF	Motor mismatch	The Servomotor does not match the Servo Driver.
A.10	ON	OFF	OFF	Overcurrent	Overcurrent detected, or improper radiation shield temperature rise detected. (1.5 to 3 kW only).
A.30	ON	ON	OFF	Regeneration error	Regeneration circuit damaged due to large amount of regenerative energy.
A.32	ON	ON	OFF	Regeneration overload	Regenerative energy exceeded the regeneration resistance.
A.40	OFF	OFF	ON	Overvoltage	Main circuit DC voltage above the allowable range
A.41	OFF	OFF	ON	Low voltage	Main circuit DC voltage below the allowable range
A.51	ON	OFF	ON	Overspeed	Servomotor rotation speed exceeded the maximum speed.
A.71	ON	ON	ON	Overload	Output torque exceeded 245% of rated torque.
A.72	ON	ON	ON	Overload	Output torque continued at 120% to 245% of rated torque.
A.73	ON	ON	ON	Dynamic brake overload	Regenerative energy exceeded the dynamic brake resistance during dynamic brake operation.
A.74	ON	ON	ON	Inrush resistance overload	Inrush current exceeded the inrush resistance during power supply inrush.
A.7A	ON	ON	ON	Overheat shield.	Abnormal temperature rise detected in radiation
A.81	OFF	OFF	OFF	Backup error (ABS)	Encoder backup power supply dropped.
A.82	OFF	OFF	OFF	Checksum error (ABS)	Checksum error for encoder memory data.
A.83	OFF	OFF	OFF	Battery error (ABS) (to 2.7 V or lower).	Encoder battery voltage dropped
A.b4	OFF	OFF	OFF	Absolute error (ABS)	Encoder internal data error
A.85	OFF	OFF	OFF	Overspeed error (ABS)	Servomotor rotation speed exceeded 200 r/min when encoder power was turned ON.
A.86	OFF	OFF	OFF	Encoder overheating (ABS)	Abnormal encoder temperature rise detected.
A.b1	OFF	OFF	OFF	Speed command input reading error	The A/D end signal was not output from the A/D converter within a fixed time.
A.b2	OFF	OFF	OFF	Torque command input reading error	The A/D end signal was not output from the A/D converter within a fixed time.
A.bF	OFF	OFF	OFF	System error	A control circuit system error was detected.
A.C1	ON	OFF	ON	Runaway detected.	The Servomotor rotated in the opposite direction from the command.
A.C8	ON	OFF	ON	Multi-turn data error (ABS)	Absolute encoder setup was incorrect.
A.C9	ON	OFF	ON	Encoder communications error	No communication between encoder and Servo Driver
A.Ca	ON	OFF	ON	Encoder parameter error	Encoder parameters are corrupted.
A.Cb	ON	OFF	ON	Encoder data error	Data from the encoder is corrupted.
A.CC	ON	OFF	ON	Multi-turn limit discrepancy	The multi-turn limits for the encoder and the Servo Driver do not conform.
A.d0	ON	ON	OFF	Deviation counter overflow	Deviation counter's residual pulses exceeded the deviation counter overflow level set in Pn505.
A.F1	OFF	ON	OFF	Missing phase detected.	Main-circuit power supply missing phase or disconnection detected.
CPF00	---	---	---	Parameter Unit transmission error 1	Data could not be transmitted after the power supply was turned ON.
CPF01	---	---	---	Parameter Unit transmission error 2	Transmission timeout error

Warning Table

Display	Alarm code			Warning detection function	Meaning
	ALO1	ALO2	ALO3		
A91	ON	OFF	OFF	Overload	When a warning occurs before the overload alarm (A.71, A.72) is reached, the alarm may be generated if the Servomotor continues to operate.
A92	OFF	ON	OFF	Regeneration overload	When a warning occurs before the regeneration overload alarm (A.32) is reached, the alarm may be generated if the Servomotor continues to operate.

OMRON

W Series Servo System
quick start guide

020 8450 4646
General telephone enquiries and technical support

020 8450 0173
24hr technical helpsheet/datasheet faxback service

020 8233 1468
Factory automation technical support

oeeuk_sales@eu.omron.com
Direct e-mail address for sales enquiries

020 8450 8087
Fax number

uk_techsupport@eu.omron.com
Direct e-mail address for technical support

www.omron.co.uk
UK website

www.omronsupport.net
UK website for technical support

1 Apsley Way, Staples Corner, London, NW2 7HF