Yaskawa Electric Corp.
Motion Control Division
Solution & Support Center
Marketing Section

Procedure for Replacing ∑-II with ∑-V

Applicable Model

Motor: ∑-II (SGMAH, SGMPH and SGMGH)

Servo Amplifier: ∑-II (SGDM and SGDH)

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1. Notes on Application

Check Item	Notes	
	Usage condition in ∑-II	Usage of ∑-V
Using SGDM/SGDH Type Servo Amplifier	Using S-phase output of absolute encoder	S-phase output is not available in SGDV. There are no alternatives. Please use the multi-turn data and initial incremental pulse. Or, please read data through PC communication (RS-422).
	Using reference input magnification function	The reference input magnification function is not available in SGDV. There are no alternatives. Switch by a host controller or MECHATROLINK communication.
	Using auto tuning function	The same auto-tuning function as Σ-II is not provided in SGDV. The tuneless function is the alternative function. Please use the advanced auto-tuning function or moment of inertia identification function of SigmaWin + when you need to know the moment of inertia ratio.
	Using speed bias function	The speed bias function is not provided in SGDV. The positioning time can be shortened by using "Positioning setting (model following control)" of the advanced auto-tuning function.
	Using auto gain switch function	The auto-gain function is not provided in SGDV. There are no alternatives. Please switch by using C-SEL signal in a host controller or MECHATROLINK communication.
	Using duct ventilation type	Please inquire to the factory. Although there is a model that corresponds to the duct ventilation type but the capacity is limited and the installation size is different.
Using Application Module	None	N/A

Using Application Module with SGDH Servo Amplifier	Using fully-closed I/F unit (JUSP-FC100)	Please use SGDV, which has a fully-closed option module. Please change the feedback signal from the linear scale to ± 1V analog signal output from 90 degree phase difference 2-phase pulse train. Then use the serial conversion unit (JZDP-D00□-000-E type).
	Using DeviceNet I/F unit (JUSP-NS300)	Currently we don't provide a replacement model in ∑-V series. Please inquire to the factory.
	Using ProfieBus I/F unit (JUSP-NS500)	Currently we don't provide a replacement model in ∑-V series. Please inquire to the factory.
	Using INDEXER module (JUSP-NS600)	Currently we don't provide a replacement model in ∑-V series. Please inquire to the factory.
	Using MECHATROLINK I/F unit (JUSP-NS100/-NS115)	Please use MECHATROLINK-II communication reference type servo amplifier (SGDV-□□□□1□ type). However, SGDH + JUSP-NS100/NS115 type and SGDV-□□□□1□ type are corresponding to different commands. Therefore the software change of the host controller side may be necessary. Please use SGDV, which has a fully-closed option module when performing the fully-closed control. Please change the feedback signal from the linear scale to ± 1V analog signal output from 90 degree phase difference 2-phase pulse train. Then please use the serial conversion unit (JZDP-D00□-000-E type).

	Using MP940 of one axis machine controller	MP940 equivalent products are not available in the option module. Please consider t replacing with a combination of MP2400/MP2300S of multi-axes machine controller, and MECHATROLINK-II communication reference servo amplifier (SGDV-□□□□1□ type) may be necessary.

The following functions and performances were improved by replacing ∑-II with ∑- V.

・Added the small capacity medium inertia series (SGMJV type) to the motor lineup.

・Increased the max speed of the motor from 5000rpm to 6000rpm. (SGMJV type and SGMAV type)

・Improved the speed frequency response characteristic for performance.

SGDM / SGDH 400Hz ⇒ SGDV 1.6kHz (Load inertia＝Rotor inertia of motor）

・Supports pulse train command input frequency of 4Mpps.

SIGN+PULSE and CW/CCW are 4Mpps. The A/B-phase 2-phase pulse train becomes 4Mpps at 1x2, 2Mpps at 2x2, and 1Mpps at 4x2.

However, it is 200kpps when connecting with open collector output.

・RoHS compliant as standard product.

・Safety standard (Safety Stop-0) embedded.

・PC connection changes from RS-232C communication to USB.

1-1. Check List when replacing ∑-II with ∑-V

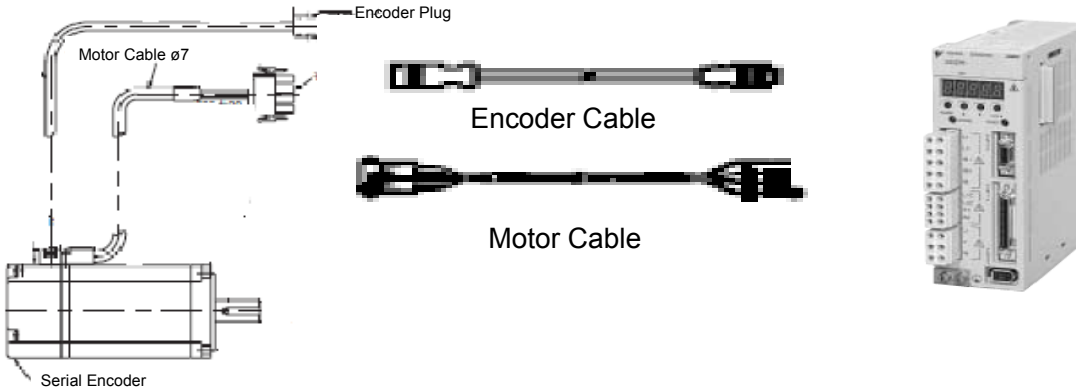
Category	Item	Items to be Checked	Checked
Motor	Main Body	<Confirmation of main body installation dimension/position> ・Please confirm installation dimensions of the motor and machine in-use. Pilot diameter Mounting hole pitch Mounting hole diameter Axis diameter Axis shape (straight, key, center tap, and taper)	
		<Confirmation of special specification> ・Please confirm whether the motor you are using is a special type. Please confirm the specification with the delivery specifications if you are using a special type.	
	Voltage	<Correspondence of AC100V specification> ・Both servo motor and servo amplifier were 100V version when using the AC100V power supply in ∑-II. However, only AC200V motors are available in the ∑-V. Select the proper 200V motor when using AC100V power supply servo amplifier	
	Cable	<Confirmation of wiring > ・Please confirm cable wiring, and also confirm that the machine has no interference.	
Servo Amplifier Hardware	Main Body	<Confirmation of main body mounting position> ・Please confirm the size (W・H・D) and the mounting hole position of the servo amplifier in-use.	
		<Confirmation of special specifications> ・Please confirm whether the servo amplifier in-use does not have your own NP, and product shape, and also confirm that any special processes etc. by referring to the delivery specifications.	
	Main Circuit	<Confirmation of wiring> ・The main circuit connector, terminal block position, array order, and dividing method are different between the servo amplifier in-use and the replacement servo amplifier. Please consider the substitution or extension of wiring when there is no enough room in wiring.	
		<AC100V specification> ・Corresponds with the voltage specification "F" (Input 100V, Output 200V. Double voltage) servo amplifier. The servo motors are AC200V.	

		<Single phase AC200V specification> ・Three-phase circuit AC200V is standard In the ∑-V series servo amplifier. Please change the parameter "Function selection switch B" when using single-phase power supply. (Pn00B.2=1) (Contents are the same as the motor voltage specifications) Connect to terminal L1 and L2 when using the single-phase power supply. Please note that the torque-speed characteristic is different from the three-phase circuit power supply specifications. Also please note that the size of 1.5kW single-phase AC200V servo amplifier (SGDV-120A□□A008000) is the same as the 3kW three-phase AC200V specification (SGDV-200A□□A).	
		<DC power supply input> ・Please change the parameter "Function selection switch 1" when using DC power supply input. (Pn001.2=1) Note) Connect the main circuit DC power supply only after changing the parameter.	
	Control Circuit	<Confirmation of wiring> ・ The control circuit connector, numbers of pins, array order might be different between the servo amplifier in-use and the replacement servo amplifier.	
Servo Amplifier Software	Software	<Confirmation of special software version> ・ Confirm whether the software of the servo amplifier in-use is standard software from the version number. Contact Yaskawa with the version number if you are not sure the software is standard or not. Software version can be confirmed with the handheld digital operator, or function Fn012 of built-in panel operator, and product data reading function of the supporting software SigmaWin+.	
	Constant	< Confirmation of user constants > ・Confirm the user constants of the servo amplifier in-use. SigmaWin + has a function to convert from the user constants of ∑-II into the parameter of ∑- V. ・Factory default setting of ∑-V servo adjustment parameter is “enable tuneless” (Pn170.0=1). Change it to “disable tuneless” (Pn170.0=0) when you perform the servo adjustment.	

	Others	In the Σ-II series, the stopping method is DB stop or free-run stop when an alarm is detected. On the other hand, factory setting for G2 is 0 speed stop in Σ-V series. It is possible to change to the DB stop or free-run stop when the parameter Pn00B.1=0 is set to 1 . The user constant conversion function of SigmaWin + is not able to convert this.	
Option ・ Others	Application module	<Confirmation of application module> ・Confirm the usage condition of application module when using SGDH servo amplifier. ∑-V series does not support all the application modules.	
	Peripherals	<Confirmation of the digital operator> ・The digital operators for ∑-II and ∑-V are different. Please purchase a new digital operator if needed.	
		<Confirmation of PC connection cable> ・The PC connection cables for ∑-II and ∑-V are different. Please purchase a new cable when using SigmaWin+.	

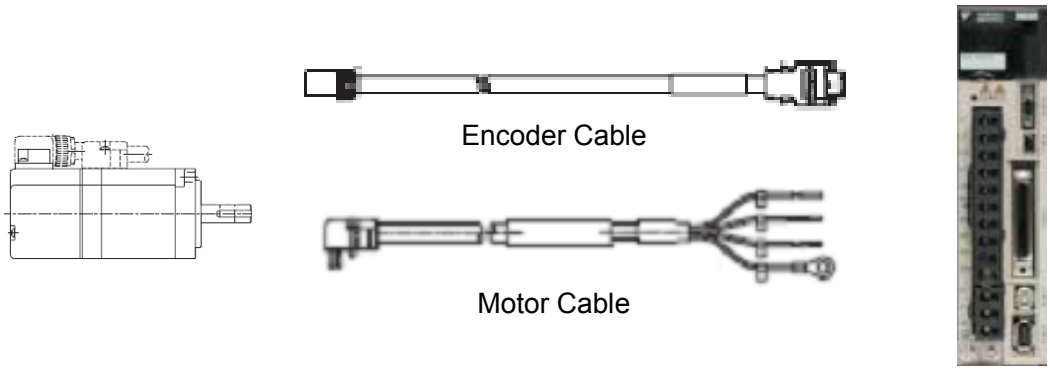
1-2. Concept of Replacement

When replacing ∑-II series servo motor/servo amplifier with ∑-V series, the following methods are available. The battery for data backup of absolute encoder is built in the ∑-II servo amplifier SGDM or SGDH. On the other hand, ∑-V has the encoder cable with the battery unit.



●Case 1

Replacing all the motors, servo amplifier, and cables with ∑-V series.

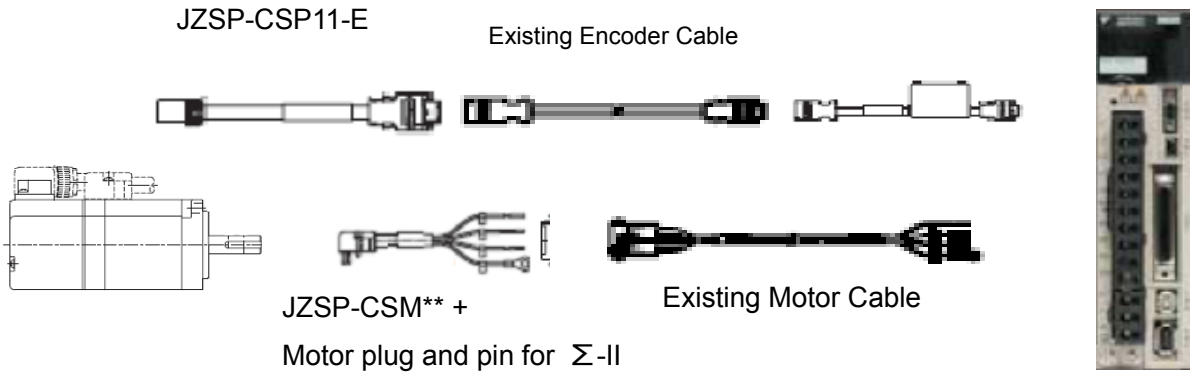


●Case 2

Replacing only the motor and amplifier. The existing cable can be used as is.

Case 2-1: for **SGMJV, SGMAV, SGMPS Motors**

JZSP-CSP12-E
(only when using Abs Encoder)



* Using the encoder side cable of the extension encoder cable of 30m to 50m for JZSP-CSP11-E.

* Yaskawa Control is preparing the motor side cable connecting to the existing motor cable.

Case 2-2: for **SGMGV and SGMSV Motors**

The existing cable cannot be used for Σ-V series because the main body side connector is different.

1-3. Replacement List

Replacing SGMAH with SGMJV

Type in-use of Σ-II series		Replacing type Σ-V series		Replacing Method		Note
Servo Amplifier	Servo Motor	Servo Amplifie	Servo Motor	Case 1	Case 2	
SGDM-A3ADA SGDH-A3AE	SGMAH-A3A	SGDV-R70A	SGMJV-A5A	Applicable	Applicable	30W version is not available. Use 50W . Axis diameter changes to ø8 from ø6
SGDM-A3BDA SGDH-A3BE	SGMAH-A3B	SGDV-R70F				
SGDM-A5ADA SGDH-A5AE	SGMAH-A5A	SGDV-R70A	SGMJV-A5A	Applicable	Applicable	Axis diameter changes to ø8 from ø6
SGDM-A5BDA SGDH-A5BE	SGMAH-A5B	SGDV-R70F				
SGDM-01ADA SGDH-01AE	SGMAH-01A	SGDV-R70A	SGMJV-01A	Applicable	Applicable	-
SGDM-01BDA SGDH-01BE	SGMAH-01B	SGDV-R70F				
SGDM-02ADA SGDH-02AE	SGMAH-02A	SGDV-1R6A	SGMJV-02A	Applicable	Applicable	-
SGDM-02BDA SGDH-02BE	SGMAH-02B	SGDV-2R1F				
SGDM-04ADA SGDH-04AE	SGMAH-04A	SGDV-2R8A	SGMJV-04A	Applicable	Applicable	-
SGDM-08ADA SGDH-08AE	SGMAH-08A	SGDV-5R5A	SGMJV-08A			Axis diameter changes to ø19 from ø16

Replacing SGMAH with SGMAV

Type in-use of Σ-II series		Replacing type Σ-V series		Replacing Method		Note
Servo Amplifier	Servo Motor	Servo Amplifie	Servo Motor	Case 1	Case 2	
SGDM-A3ADA SGDH-A3AE	SGMAH-A3A	SGDV-R70A	SGMAV-A5A	Applicable	Applicable	30W version is not available. Use 50W . Axis diameter changes to ø8 from ø6
SGDM-A3BDA SGDH-A3BE	SGMAH-A3B	SGDV-R70F				
SGDM-A5ADA SGDH-A5AE	SGMAH-A5A	SGDV-R70A	SGMAV-A5A	Applicable	Applicable	Axis diameter changes to ø8 from ø6
SGDM-A5BDA SGDH-A5BE	SGMAH-A5B	SGDV-R70F				
SGDM-01ADA SGDH-01AE	SGMAH-01A	SGDV-R70A	SGMAV-01A	Applicable	Applicable	-
SGDM-01BDA SGDH-01BE	SGMAH-01B	SGDV-R70F				
SGDM-02ADA SGDH-02AE	SGMAH-02A	SGDV-1R6A	SGMAV-02A	Applicable	Applicable	-
SGDM-02BDA SGDH-02BE	SGMAH-02B	SGDV-2R1F				
SGDM-04ADA SGDH-04AE	SGMAH-04A	SGDV-2R8A	SGMAV-04A	Applicable	Applicable	-
SGDM-08ADA SGDH-08AE	SGMAH-08A	SGDV-5R5A	SGMAV-08A			Axis diameter changes to ø19 from ø16

Replacing SGMPH with SGMJV or SGMPS

Type in-use of Σ-II series		Replacing type Σ-V series		Replacing Method		Note
Servo Amplifier	Servo Motor	Servo Amplifier	Servo Motor	Case 1	Case 2	
SGDM-01ADA SGDH-01AE	SGMPH-01A	SGDV-R70A	SGMJV-01A or SGMPS-01A	Applicable	Applicable	Flange angle changes to 40 from 60 mm when replacing with SGMJV. SGMJV encoder is either the incremental encoder 20bit, incremental encoder 13bit or absolute encoder 20bit. Flange angle is 60 mm (no change) when replacing with SGMPS. SGMPS encoder is either the incremental encoder 17bit or absolute encoder 17bit.
SGDM-01BDA SGDH-01BE	SGMPH-01B	SGDV-R70F				
SGDM-02ADA SGDH-02AE	SGMPH-02A	SGDV-1R6A	SGMJV-02A or SGMPS-02A	Applicable	Applicable	Flange angle changes to 60 from 80 mm when replacing with SGMJV. SGMJV encoder is either the incremental encoder 20bit, incremental encoder 13bit or absolute encoder 20bit. Flange angle is 80 mm (no change) when replacing with SGMPS. SGMPS encoder is either the incremental encoder 17bit or absolute encoder 17bit.
SGDM-02BDA SGDH-02BE	SGMPH-02B	SGDV-2R1F				
SGDM-04ADA SGDH-04AE	SGMPH-04A	SGDV-2R8A	SGMJV-04A or SGMPS-04A	Applicable	Applicable	Flange angle changes to 60 from 80 mm when replacing with SGMJV. SGMJV encoder is either the incremental encoder 20bit, incremental encoder 13bit or absolute encoder 20bit. Flange angle is 80 mm (no change) when replacing with SGMPS. SGMPS encoder is either the incremental encoder 17bit or absolute encoder 17bit.
SGDM-08ADA SGDH-08AE	SGMPH-08A	SGDV-5R5A	SGMJV-08A or SGMPS-08A	Applicable	Applicable	Flange angle changes to 80 from 120 mm and shaft diameter changes to ø19 from ø16 when replacing with SGMJV. SGMJV encoder is either the incremental encoder 20bit, incremental encoder 13bit or absolute encoder 20bit. Flange angle is 80 mm (no change) and shaft diameter is ø16 (no change) when replacing with SGMPS. SGMPS encoder is either the incremental encoder 17bit or absolute encoder 17bit.
SGDM-15ADA SGDH-15AE	SGMPH-15A	SGDV-120A	SGMPS-15A	Applicable	Applicable	SGMPS encoder is either the incremental encoder 17bit or absolute encoder 17bit.

Replacing SGMGH(1500rpm) with SGMGV

Type in-use of Σ-II series		Replacing type Σ-V series		Replacing Method		Note
Servo Amplifier	Servo Motor	Servo Amplifier	Servo Motor	Case 1	Case 2	
-	-	SGDV-3R8A	SGMGV-03A	N/A	N/A	Flange angle: 90mm Shaft diameter: ø14mm
SGDM-05ADA	SGMGH-05A□A	SGDV-3R8A01A	SGMGV-05A	Applicable	N/A	Flange angle: 130⇒90(mm) Shaft diameter: ø19⇒ø16(mm) Rotor inertia: 7.24⇒3.33(x10-4kg·m2)
SGDH-05AE		SGDV-3R8A11A			N/A	
SGDM-10ADA	SGMGH-09A□A	SGDV-7R6A01A	SGMGV-09A	Applicable	N/A	-
SGDH-10AE		SGDV-7R6A11A			N/A	
SGDM-15ADA	SGMGH-13A□A	SGDV-120A01A	SGMGV-13A	Applicable	N/A	Rotor inertia: 20.5⇒19.9(x10-4kg·m2)
SGDH-15AE		SGDV-120A11A			N/A	
SGDM-20ADA	SGMGH-20A□A	SGDV-180A01A	SGMGV-20A	Applicable	N/A	Flange angle: 180⇒130(mm) Shaft diameter: ø35⇒ø24(mm) Rotor inertia: 31.7⇒26.0(x10-4kg·m2)
SGDH-20AE		SGDV-180A11A			N/A	
SGDM-30ADA	SGMGH-30A□A	SGDV-330A01A	SGMGV-30A	Applicable	N/A	-
SGDH-30AE		SGDV-330A11A			N/A	
SGDM-50ADA	SGMGH-44A□A	SGDV-330A01A	SGMGV-44A	Applicable	N/A	-
SGDH-50AE		SGDV-330A11A			N/A	
SGDM-60ADA	SGMGH-55A□A	SGDV-470A01A	SGMGV-55A	Applicable	N/A	-
SGDH-60AE		SGDV-470A11A			N/A	
SGDM-75ADA	SGMGH-75A□A	SGDV-550A01A	SGMGV-75A	Applicable	N/A	-
SGDH-75AE		SGDV-550A11A			N/A	
SGDM-1AADA	SGMGH-1AA□A	SGDV-590A01A	SGMGV-1AA	Applicable	N/A	Rotor inertia: 281⇒242 (x10-4kg·m2)
SGDH-1AAE		SGDV-590A11A			N/A	
SGDM-1EADA	SGMGH-1EA□A	SGDV-780A01A	SGMGV-1EA	Applicable	N/A	Rotor inertia: 315⇒303 (x10-4kg·m2)
SGDH-1EAE		SGDV-780A11A			N/A	

Replacing SGMGH(1000min-1) with SGMGV

Capacity of the servo motor SGMGV and servo amplifier SGDV goes up

Type in-use of Σ-II series		Replacing type Σ-V series		Replacing Method		Note
Servo Amplifier	Serve Motor	Servo Amplifier	Serve Motor	Case 1	Case 2	
SGDM-05ADA	SGMGH-03A□B	SGDV-3R8A01A	SGMGV-05A	Applicable	N/A	Flange angle: 130⇒90(mm) Shaft diameter: ø19⇒ø16(mm) Rotor inertia: 7.24⇒3.33(x10-4kg·m2)
SGDH-05AE		SGDV-3R8A11A				
SGDM-08ADA	SGMGH-06A□B	SGDV-7R6A01A	SGMGV-09A	Applicable	N/A	Rated torque: 5.68⇒5.39(N·m) Peak torque: 14.1⇒13.8(N·m)
SGDH-08AE		SGDV-7R6A11A				
SGDM-10ADA	SGMGH-09A□B	SGDV-120A01A	SGMGV-13A	Applicable	N/A	Rotor inertial moment: 20.5⇒19.9(x10-4kg·m2) Rated torque: 8.62⇒8.34(N·m)
SGDH-10AE		SGDV-120A11A				
SGDM-15ADA	SGMGH-12A□B	SGDV-180A01A	SGMGV-20A	Applicable	N/A	Flange angle: 180⇒130(mm) Shaft diameter: ø35⇒ø24(mm) Rotar inertia moment: 31.7⇒26.0(x10-4kg·m2)
SGDH-15AE		SGDV-180A11A				
SGDM-20ADA	SGMGH-20A□B	SGDV-330A01A	SGMGV-30A	Applicable	N/A	Rated torque: 19.1⇒18.6(N·m)
SGDH-20AE		SGDV-330A11A				
SGDM-30ADA	SGMGH-30A□B	SGDV-330A01A	SGMGV-44A	Applicable	N/A	-
SGDH-30AE		SGDV-330A11A				
SGDM-50ADA	SGMGH-44A□B	SGDV-470A01A	SGMGV-55A	Applicable	N/A	Rated torque: 41.9⇒35.0(N·m) Peak torque: 107.0⇒87.6(N·m)
SGDH-50AE		SGDV-470A11A				
SGDM-60ADA	SGMGH-55A□B	SGDV-550A01A	SGMGV-75A	Applicable	N/A	Rated torque: 52.6⇒48.0(N·m) Peak torque: 136.9⇒119.0(N·m)
SGDH-60AE		SGDV-550A11A				

2. Motor

2-1. Comparison Table

▪Comparison table of SGMGH and SGMGV (w/o reduction gears)

SGMGV－ □□ □ □ □ □ □
└Type Name ① ② ③ ④ ⑤ ⑥

Series Name			Σ-Ⅱ	Σ－Ⅴ	Supplement
Servo Motor Type			SGMGH-	SGMGV-	
Capacity ①	0.3	kW	03	03	1000rpm model is not provided in SGMGV. If you are using SGMGH 1000rpm model (SGMGH-□□□□B) please use the 1500rpm model though the rated torque and externals are different.
	0.45		05	05	
	0.6		06	-	
	0.85/0.9		09	09	
	1.2		12	-	
	1.3		13	13	
	1.8/2.0		20	20	
	2.9/3.0		30	30	
	4.4		44	44	
	5.5		55	55	
	7.5		75	75	
	11		1A	1A	
	15		1E	1E	
Voltage Spec. ②	200V		A	A	-
	400V		D	D	
Detector ③	17bit serial incremental encoder		C	-	20bit serial incremental encoder
	20bit serial incremental encoder		-	D	-
	17bit absolute encoder		2	-	20 bit serial absolute encoder
	20bit serial absolute encoder		-	3	-
Rated Rotation Speed /Design Order ④	1500min-1		A	A	Standard: Totally enclosed, Self-cooling IP67 (excluding shaft penetrated part)
	1500min-1 (for high-accuracy machine tool)		C		
	1000min-1		B	-	1000rpm model is not provided please use the 1500rpm model.
	1000min-1 (for high-accuracy machine tool)		D	-	
Shaft-end Spec. ⑤	w/o straight key		2	2	-
	1/10 taper w/ key		3	-	Taper setting is not available Use straight key
	1/10 taper w/ woodruff key		5	-	
	Straight key tap		6	6	-
Option ⑥	No option		1	1	Set to "1" for no option instead of leaving as a blank
	DC90V brake		B	B	-
	DC24 brake		C	C	-
	DC90V brake w/ oil seal		D	D	-
	DC24V brake w/ oil seal		E	E	-
	w/ oil seal		S	S	-

・Comparison table of SGMAH, SGMPH and SGMAV, SGMJV (w/reduction gears)

SGMJV－ □□ □ □ □ □ □ □ □ □
└ Type Name ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

Series Name			Σ Ⅱ		Σ Ⅴ		Supplement
Servo Motor Type			SGMAH-	SGMPH-	SGMAV-	SGMJV-	
Capacity ①	30	W	A3	-	-	-	50W setting (30W setting is not available)
	50		A5	-	A5	A5	-
	100		01	01	01	01	-
	200		02	02	02	02	-
	400		04	04	04	04	-
	750		08	08	08	08	-
Voltage Spec. ②	100V	Standard	B		-		Corresponds by combining the Servo amplifier power supply spec. "F" and motor for 200V
		UL-Listed					
		CE-Listed					
	200V	Standard	A		A		-
		UL-Listed					
		CE-Listed					
Detector ③	13bit serial incremental encoder		A		-	A	20bit serial incremental encoder (13bit is selectable for SGMJV)
	16bit serial incremental encoder		B		-		20bit serial incremental encoder
	20bit serial incremental encoder		-		D		-
	16bit serial absolute encoder		1		-		20bit serial absolute encoder
	16bit serial absolute encoder (with super capacitor)		4		-		20bit serial absolute encoder Use a cable with battery because no super capacitor is available
	20bit serial absolute encoder		-		3		-
Design Order ④	Standard		A		A		SGMJV Standard: Fully-closed, Self-cooling IP65 (excluding shaft penetrated part)
	Drip-proof spec.		-	E	-		
Reduction Gears Spec. ⑤	Precision reduction gears		H		H		-
	General-purpose reduction gears		J		-		Precision reduction gears (General-purposereduction gears are not available)
Reduction Ratio ⑥	1/5		1		1		-
	1/9		2	-	2 ※		Corresponding to 50W
	3/31		3		-		Correspond by 1/9 (only 50W) or 1/11
	1/11		B		B ※		Not corresponding to 50W
	1/21		C		C		-
	1/33		7		7		-
Shaft-end Spec. ⑦	Flange mounting (no shaft)		0		0		-
	w/o straight key		2		2		-
	w/ straight key		4		-		Handle with straight key tap
	w/ straight key tap		6		6		-
	w/ straight tap		8		8		-
Option ⑧	No option		1		1		-
	90V brake		B		-		24V brake (90V brake is not available)
	24V brake		C		C		-

· Σ-II series
SGMAH:
Precision reduction gears 1/5, 1/9 (only 30W and 50W), 1/11 (other than 30W and 50W), 1/21, 1/33
General-purpose reduction gears1/5, 3/31, 1/21, 1/33
SGMPH:
Precision reduction gears 1/5, 1/11,1/21, 1/33

•Comparison Table of SGMGH and SGMGV (w/reduction gears)

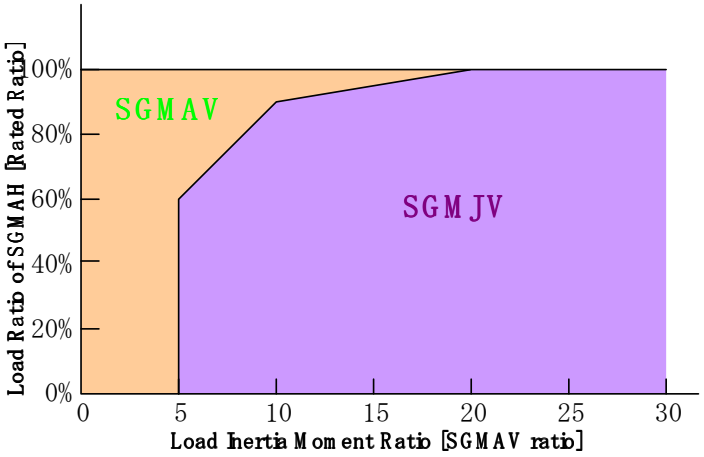
SGMG V— □□ □ □ □ □ □ □ □ □
└ Type Name ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

Series Name			Σ-Ⅱ	Σ－Ⅴ
Servo Motot type			SGMGH-	SGMGV-
Capacity ①	0.3	kW	03	Quotes in each case
	0.45		05	
	0.6		06	
	0.85/0.9		09	
	1.2		12	
	1.3		13	
	1.8/2.0		20	
	2.9/3.0		30	
	4.4		44	
	5.5		55	
	7.5		75	
	11		1A	
	15		1E	
Voltage Spec.	200V		A	
	400Ⅴ		D	
Detector ③	17bit serial incremental encode		C	
	20bit serial incremental encode		-	
	17bit absolute encoder		2	
	20bit serial absolute encoder		-	
Rated Rotation Seed / Design Order ④	1500min-1		A	
	1500min-1 (for high-accuracy machine		C	
	1000min-1		B	
	1000min-1 (for high-accuracy machine		D	
Reductio Gears Spec.⑤	Precision reduction gears		L	
	General-purpose reduction gear		E,F	
Reduction Ratio ⑥	1/5		1	
	1/6		A	
	1/9		2	
	1/11		B	
	1/20		5	
	1/21		C	
	1/29		7	
	1/45		8	
Shaft-end Spec. ⑦	Flange mounting (no shaft)		0	
	w/o straight key		2	
	w/ straight key		4	
	w/ straight key tap		6	
	w/ straight tap		8	
Brake Spec. ⑧	No brake		1	
	90V brake		B	
	24V brake		C	
Connector Spec. ⑨	Standard		N/A	
	w/ Drip-proof connector		D	

2-2. Characteristic

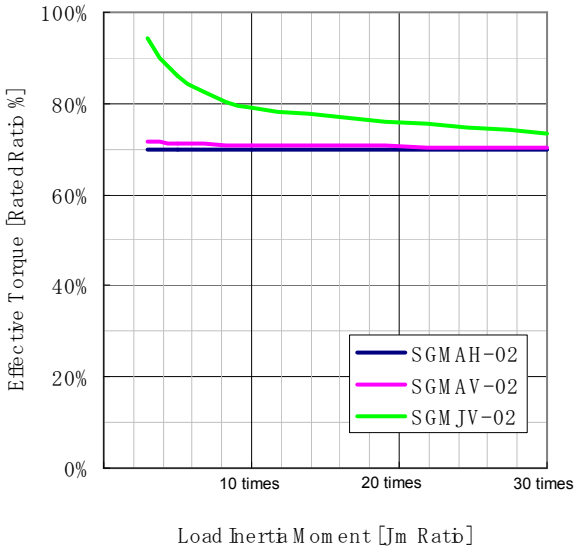
(Comparison between SGMAH,SGMPH and SGMJV,SGMAV)

Σ－Ⅱ	Σ－Ⅴ	Motor Characteresitc					
		Rotor Inertia Moment (x10^{-4} kg·m^2)		Rated Torque (N·m)		Peak Torque (N·m)	
Servo Motor	Servo Motor	Σ－Ⅱ	Σ－Ⅴ	Σ－Ⅱ	Σ－Ⅴ	Σ－Ⅱ	Σ－Ⅴ
SGMAH-A3A	SGMJV-A5A	0.0166	0.0414	0.0955	0.159	0.286	0.557
SGMAH-A5A	SGMJV-A5A	0.022	0.0414	0.159	0.159	0.477	0.557
SGMAH-01A	SGMJV-01A	0.0364	0.0665	0.318	0.318	0.955	1.11
SGMAH-02A	SGMJV-02A	0.106	0.259	0.637	0.637	1.91	2.23
SGMAH-04A	SGMJV-04A	0.173	0.442	1.27	1.27	3.82	4.46
SGMAH-08A	SGMJV-08A	0.672	1.57	2.39	2.39	7.16	8.36
SGMAH-A3A	SGMAV-A5A	0.0166	0.0242	0.0955	0.159	0.286	0.477
SGMAH-A5A	SGMAV-A5A	0.022	0.0242	0.159	0.159	0.477	0.477
SGMAH-01A	SGMAV-01A	0.0364	0.038	0.318	0.318	0.955	0.955
SGMAH-02A	SGMAV-02A	0.106	0.116	0.637	0.637	1.91	1.91
SGMAH-04A	SGMAV-04A	0.173	0.19	1.27	1.27	3.82	3.82
SGMAH-08A	SGMAV-08A	0.672	0.769	2.39	2.39	7.16	7.16
SGMPH-01A	SGMJV-01A	0.0491	0.0665	0.318	0.318	0.955	1.11
SGMPH-02A	SGMJV-02A	0.193	0.259	0.637	0.637	1.91	2.23
SGMPH-04A	SGMJV-04A	0.331	0.442	1.27	1.27	3.82	4.46
SGMPH-08A	SGMJV-08A	2.1	1.57	2.39	2.39	7.16	8.36



Please refer to the graph on the left to replace the SGM type with the SGMJV or SGMAV.

Replace with the SGMAV when the ratio of load moment of inertia and rotor moment of inertia is five times or less, or the load ratio is 60% or more. Else, replace with the SGMJV.



【 Reference 】

The graph on the left shows the load ratio when replacing the SGMAH which is using 70% load with the SGMJV and SGMAV.

The load ratio increases but the system is stable because the rotor moment of inertia of SGMJV is larger.

(Comparison between SGMGH and SGMGV)

Σ-Ⅱ (Rating 1500min-1)	Σ-V	Motor Characterestic					
		Rotor Inertia Moment (x10-4kg･m2		Rated Torque (N･m)		Peak Torque (N･m)	
Servo Motor	Servo Motor	Σ-Ⅱ	Σ－V	Σ-Ⅱ	Σ－V	Σ-Ⅱ	Σ－V
SGMGH-05A□A	SGMGV-05A	7.24	3.33	2.84	2.86	8.92	8.92
SGMGH-09A□A	SGMGV-09A	13.9	13.9	5.39	5.39	13.8	13.8
SGMGH-13A□A	SGMGV-13A	20.5	19.9	8.34	8.34	23.3	23.3
SGMGH-20A□A	SGMGV-20A	31.7	26.0	11.5	11.5	28.7	28.7
SGMGH-30A□A	SGMGV-30A	46.0	46.0	18.6	18.6	45.1	45.1
SGMGH-44A□A	SGMGV-44A	67.5	67.5	28.4	28.4	71.1	71.1
SGMGH-55A□A	SGMGV-55A	89.0	89.0	35.0	35.0	87.6	87.6
SGMGH-75A□A	SGMGV-75A	125	125	48.0	48.0	119	119
SGMGH-1AA□A	SGMGV-1AA	281	242	70.0	70.0	175	175
SGMGH-1EA□A	SGMGV-1EA	315	303	95.4	95.4	224	224

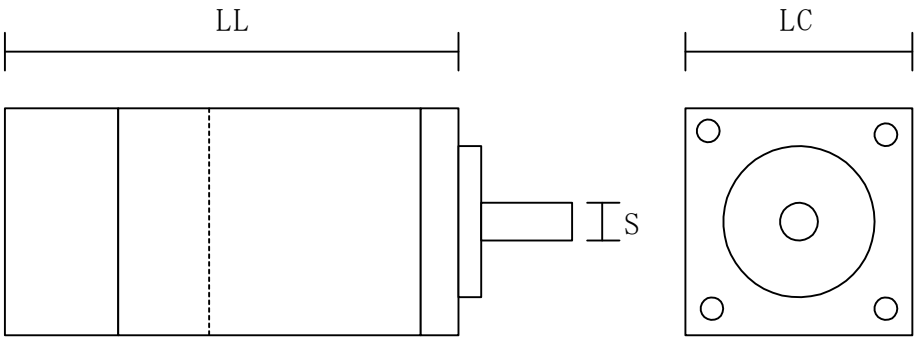
The capacity of the servo motor SGMGV and servo amplifier SGDV goes up because of the rated torque differences when replacing SGMGH (Rated 1000rpm) with SGMGV.

Σ-Ⅱ (Rating 1000min-1)	Σ-V	Motor Characterestic					
		Rotor Inertia Moment (x10-4kg･m2		Rated Torque (N･m)		Peak Torque (N･m)	
Servo Motor	Servo Motor	Σ-Ⅱ	Σ－V	Σ-Ⅱ	Σ－V	Σ-Ⅱ	Σ－V
SGMGH-03A□B	SGMGV-03A	7.24	2.48	2.84	1.96	7.17	5.88
	SGMGV-05A		3.33		2.86		8.92
SGMGH-06A□B	SGMGV-05A	13.9	3.33	5.68	2.86	14.1	8.92
	SGMGV-09A		13.9		5.39		13.8
SGMGH-09A□B	SGMGV-09A	20.5	13.9	8.62	5.39	19.3	13.8
	SGMGV-13A		19.9		8.34		23.3
SGMGH-12A□B	SGMGV-13A	31.7	19.9	11.5	8.34	28.0	23.3
	SGMGV-20A		26.0		11.5		28.7
SGMGH-20A□B	SGMGV-20A	46.0	26.0	19.1	11.5	44.0	28.7
	SGMGV-30A		46.0		18.6		45.1
SGMGH-30A□B	SGMGV-30A	67.5	46.0	28.4	18.6	63.7	45.1
	SGMGV-44A		67.5		28.4		71.1
SGMGH-44A□B	SGMGV-44A	89.0	67.5	41.9	28.4	107.0	71.1
	SGMGV-55A		89.0		35.0		87.6
SGMGH-55A□B	SGMGV-55A	125	89.0	52.6	35.0	136.9	87.6
	SGMGV-75A		125		48.0		119

2-3. Mounting Dimensions

(1) Without Reduction Gears (Standard)

Shaded area displays the part where size is different between the Σ-II motor and Σ-V motor.



Reduction Gears	Motor Capacity [W]	Brake	Σ-II Series SGMAH			Σ-V Series SGMAV			Σ-V Series SGMJV		
			LC	LL	S	LC	LL	S	LC	LL	S
No Reduction Gears	30	N/A	40	69.5	6						
		Available		101							
	50	N/A	40	77	6	40	70.5	8	40	69	8
		Available		108.5			115.5			114	
	100	N/A	40	94.5	8	40	82.5	8	40	82.5	8
		Available		135			127.5			127.5	
	200	N/A	60	96.5	14	60	80	14	60	80	14
		Available		136			120			120	
	400	N/A	60	124.5	14	60	98.5	14	60	98.5	14
		Available		164			138.5			138.5	
	750	N/A	80	145	16	80	115	19	80	115	19
		Available		189.5			160			160	

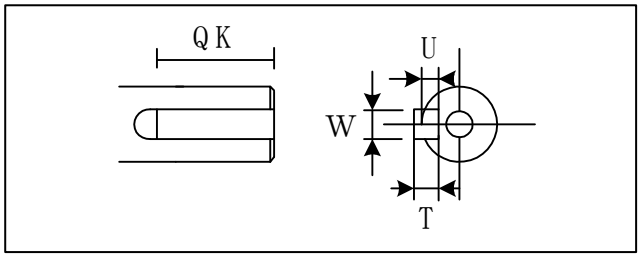
Reduction Gears	Motor Capacity [W]	Brake	Σ II Series SGMPH			Σ V Series SGMJV		
			LC	LL	S	LC	LL	S
No Reduction Gears	100	N/A	60	62	8	40	82.5	8
		Available		91			127.5	
	200	N/A	80	67	14	60	80	14
		Available		98.5			120	
	400	N/A	80	87	14	60	98.5	14
		Available		118.5			138.5	
	750	N/A	120	86.5	16	80	115	19
		Available		120			160	

Reduction Gears	Motor Capacity [kW]	Brake	Σ-Ⅱ Series SGMGH(1500r/min)			Σ-Ⅴ Series SGMGV		
			LC	LL	S	LC	LL	S
No Reduction Gears	0.45	N/A	130	138	19	90	139	16
		Available		176			172	
	0.85	N/A	130	161	19	130	137	19
		Available		199			173	
	1.3	N/A	130	185	22	130	153	22
		Available		223			189	
	1.8	N/A	180	166	35	130	171	24
		Available		217			207	
	2.9	N/A	180	192	35	180	160	35
		Available		243			208	
	4.4	N/A	180	226	35	180	184	35
		Available		277			232	
	5.5	N/A	180	260	42	180	221	42
		Available		311			265	
	7.5	N/A	180	334	42	180	257	42
		Available		385			311	
	11	N/A	220	338	42	220	331	42
		Available		383			382	
	15	N/A	220	457	55	220	393	55
		Available		519			482	

Reduction Gears	Motor Capacity [kW]		Brake		Σ-Ⅱ Series SGMGH(1000r/min)			Σ-Ⅴ Series (SGMGV)		
	Σ－Ⅱ	Σ－Ⅴ	Σ－Ⅱ	Σ－Ⅴ	LC	LL	S	LC	LL	S
No Reduction Gears	0.3	0.3	N/A	N/A	130	138	19	130	126	14
				Available					159	
		0.45	Available	N/A		176		130	139	16
				Available					172	
	0.6	0.45	N/A	N/A	130	161	19	130	139	16
				Available					172	
		0.85	Available	N/A		199		130	137	19
				Available					173	
	0.9	0.85	N/A	N/A	130	185	22	130	137	19
				Available					173	
		1.3	Available	N/A		223		130	153	22
				Available					189	
	1.2	1.3	N/A	N/A	180	166	35	130	153	22
				Available					189	
		1.8	Available	N/A		217		130	171	24
				Available					207	
	2.0	1.8	N/A	N/A	180	192	35	130	171	24
				Available					207	
		2.9	Available	N/A		243		180	160	35
				Available					208	
	3.0	2.9	N/A	N/A	180	226	35	180	160	35
				Available					208	
		4.4	Available	N/A		277		180	184	35
				Available					232	
	4.4	4.4	N/A	N/A	180	260	42	180	184	35
				Available					232	
		5.5	Available	N/A		311		180	221	42
				Available					265	
	5.5	5.5	N/A	N/A	180	334	42	180	221	42
				Available					265	
		7.5	Available	N/A		385		180	257	42
				Available					311	

● Shaft Key Size

Shaded area displays the part where size is different between the Σ-II motor and Σ-V motor.



Reduction Gears	Motor Capacity [W]	Oil Seal	Σ II Sereis SGMAH				Σ V Series SGMAV				Σ V Series SGMJV			
			QK	U	W	T	QK	U	W	T	QK	U	W	T
No Reduction Gears	30	N/A	14	1.2	2	2								
		Available												
	50	N/A	14	1.2	2	2	14	1.8	3	3	14	1.8	3	3
		Available												
	100	N/A	14	1.2	3	3	14	1.8	3	3	14	1.8	3	3
		Available												
	200	N/A	20	3	5	5	14	3	5	5	14	3	5	5
		Available	14											
	400	N/A	20	3	5	5	14	3	5	5	14	3	5	5
		Available	14											
	750	N/A	30	3	5	5	22	3.5	6	6	22	3.5	6	6
		Available	25											

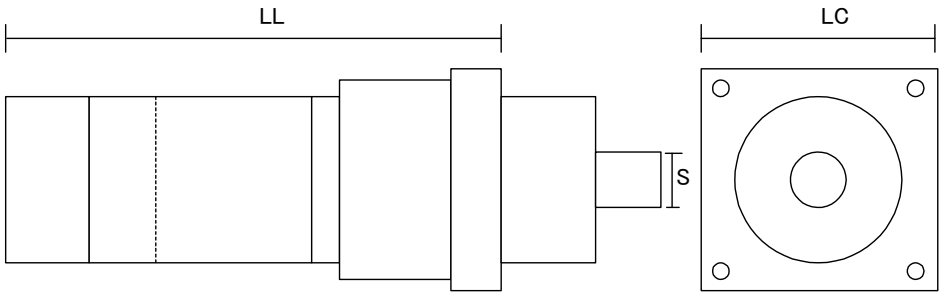
Reduction Gears	Motor Capacity [W]	Brake	Σ-II Series SGMPH				Σ－Ⅴ Series SGMJV			
			QK	U	W	T	QK	U	W	T
No Reduction Gears	100	N/A	14	1.8	3	3	14	1.8	3	3
		Available								
	200	N/A	16	3	5	5	14	3	5	5
		Available								
	400	N/A	16	3	5	5	14	3	5	5
		Available								
	750	N/A	22	3	5	5	22	3.5	6	6
		Available								

Please confirm the difference of the size individually by referring to the data in the catalog for the shaft key dimension of the SGMGH motor and SGMGV motor.

(2) With General-Purpose Reduction Gears

The customers need to prepare the general-purpose reduction gears by themselves or it might be necessary for them to consider replacing with a precise decelerator because there is no general-purpose reduction gears in the in the ∑-V. Please refer to the catalog for the detailed dimension.

All the SGMGV motor with reduction gears need to be quoted in each case.



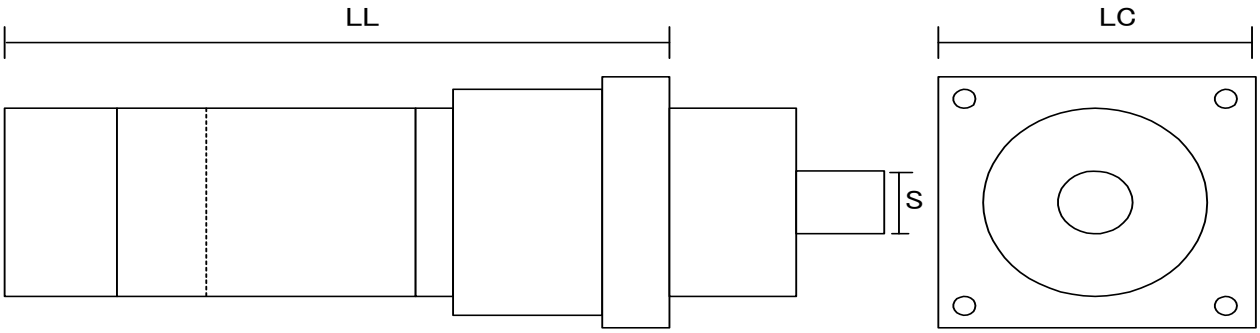
Reduction Gears	Motor Capacity [W]	Reduction Gear Ratio	Brake	Σ Ⅱ Series SGMAH			Σ Ⅴ Series (precision reduction gear ratio) SGMAV			SGMJV		
				LC	LL	S	LC	LL	S	LC	LL	S
General-Purpose Reduction Gears	30	1/5	N/A	60	101.5	14						
			Available		133							
		1/10.3	N/A	60	101.5	14						
			Available		133							
		1/21	N/A	60	116.5	14						
			Available		148							
		1/33	N/A	60	116.5	14						
			Available		148							
	50	1/5	N/A	60	109	14	40	110	10	40	108.5	10
			Available		140.5			155			153.5	
		1/10.3	N/A	70	114	16	40	110	10	40	108.5	10
			Available		145.5			155			153.5	
		1/21	N/A	70	131	16	40	119	10	40	117.5	10
			Available		162.5			164			162.5	
		1/33	N/A	70	131	16	60	134.5	16	60	133	16
			Available		162.5			179.5			178	
	100	1/5	N/A	70	131.5	16	40	122	10	40	122	10
			Available		172			167			167	
		1/10.3	N/A	70	131.5	16	60	146.5	16	60	146.5	16
			Available		172			191.5			191.5	
		1/21	N/A	90	153	20	60	146.5	16	60	146.5	16
			Available		194			191.5			191.5	
		1/33	N/A	90	153	20	90	149	25	90	149	25
			Available		194			194			194	
	150	1/5	N/A				40	134	8			
			Available					179				
		1/10.3	N/A				60	158.5	16			
			Available					203.5				
		1/21	N/A				90	161	16			
			Available					206				
		1/33	N/A				90	161	25			
			Available					206				
	200	1/5	N/A	90	138	20	60	144	16	60	144	16
			Available		177.5			184			184	
		1/10.3	N/A	90	138	20	60	144	16	60	144	16
			Available		177.5			184			184	
		1/21	N/A	105	165.5	25	90	151	25	90	151	25
			Available		205			191			191	
		1/33	N/A	105	165.5	25	90	151	25	90	151	25
			Available		205			191			191	
	400	1/5	N/A	90	166	20	60	162.5	16	60	162.5	16
			Available		223.5			202.5			202.5	
		1/10.3	N/A	105	172.5	25	90	169.5	25	90	169.5	25
			Available		212			209.5			209.5	
		1/21	N/A	120	200.5	32	90	169.5	25	90	169.5	25
			Available		240			209.5			209.5	
		1/33	N/A	120	200.5	32	120	202.5	40	120	202.5	40
			Available		240			242.5			242.5	
	550	1/5	N/A				90	195.5	25			
			Available					241.5				
		1/11	N/A				90	195.5	25			
			Available					241.5				
		1/21	N/A				120	228.5	40			
			Available					274.5				
		1/33	N/A				120	228.5	40			
			Available					274.5				
	750	1/5	N/A	105	193	25	90	193	25	90	193	25
			Available		237.5			238			238	
		1/10.3	N/A	120	196	32	90	193	25	90	193	25
			Available		240.5			238			238	
		1/21	N/A	145	223	40	120	219	40	120	219	40
			Available		267.5			264			264	
		1/33	N/A	145	223	40	120	219	40	120	219	40
			Available		267.5			264			264	

50	1/9	Available					40	155	8	40	153.5	8
	1/21	N/A					40	119	8	40	117.5	8
		Available						164			162.5	
	1/33	N/A					60	134.5	16	60	133	16
		Available						179.5			178	
100	1/5	N/A	70	117	25		40	122	8	40	122	8
		Available		146				167			167	
	1/10.3	N/A	70	117	25		60	146.5	16	60	146.5	16
		Available		146				191.5			191.5	
	1/21	N/A	90	122	20		60	146.5	16	60	146.5	16
		Available		150.5				191.5			191.5	
	1/33	N/A	90	122	20		90	149	25	90	149	25
		Available		150.5				194			194	
150	1/5	N/A					40	134	8			
		Available						179				
	1/11	N/A					60	158.5	16			
		Available						203.5				
	1/21	N/A					90	161	16			
		Available						206				
	1/33	N/A					90	161	25			
		Available						206				
200	1/5	N/A	90	126.5	20		60	144	16	60	144	16
		Available		158				184			184	
	1/10.3	N/A	90	126.5	20		60	144	16	60	144	16
		Available		158				184			184	
	1/21	N/A	105	137	25		90	151	25	90	151	25
		Available		168.5				191			191	
	1/33	N/A	105	137	25		90	151	25	90	151	25
		Available		168.5				191			191	
400	1/5	N/A	105	157	25		60	162.5	16	60	162.5	16
		Available		188.5				202.5			202.5	
	1/10.3	N/A	105	157	25		90	169.5	25	90	169.5	25
		Available		188.5				209.5			209.5	
	1/21	N/A	120	164	32		90	169.5	25	90	169.5	25
		Available		195.5				209.5			209.5	
	1/33	N/A	120	164	32		120	202.5	40	120	202.5	40
		Available		195.5				242.5			242.5	
550	1/5	N/A					90	195.5	25			
		Available						241.5				
	1/11	N/A					90	195.5	25			
		Available						241.5				
	1/21	N/A					120	228.5	40			
		Available						274.5				
	1/33	N/A					120	228.5	40			
		Available						274.5				
750	1/5	N/A	105	156.5	25		90	193	25	90	193	25
		Available		189.5				238			238	
	1/10.3	N/A	120	163.5	32		90	193	25	90	193	25
		Available		196.5				238			238	
	1/21	N/A	1435	174.5	40		120	219	40	120	219	40
		Available		207.5				264			264	
	1/33	N/A	145	174.5	40		120	219	40	120	219	40
		Available		207.5				264			264	

(3) With Precision Reduction Gears

Please refer to the catalog for the detailed size.

All the SGMGV motor with reduction gears need to be quoted in each case.



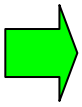
Reduction Gears	Motor Capacity [W]	Reduction Gear Ratio	Brake	Σ Ⅱ Sereis SGMAH			Σ Ⅴ Series SGMAV			SGMJV		
				LC	LL	S	LC	LL	S	LC	LL	S
Precision Reduction Gears	30	1/5	N/A	60	97.5	14						
			Available		129							
		1/9	N/A	60	97.5	14						
			Available		129							
		1/21	N/A	60	112.5	14						
			Available		144							
		1/33	N/A	60	112.5	14						
			Available		144							
	50	1/5	N/A	60	105	14	40	110	10	40	108.5	10
			Available		136.5			155			153.5	
		1/9	N/A	70	106	16	40	110	10	40	108.5	10
			Available		137.5			155			153.5	
		1/21	N/A	70	123	16	40	119	10	40	117.5	10
			Available		154.5			164			162.5	
		1/33	N/A	70	123	16	60	134.5	16	60	133	16
			Available		154.5			179.5			178	
	100	1/5	N/A	70	123.5	16	40	122	10	40	122	10
			Available		164			167			167	
		1/11	N/A	70	140.5	16	60	146.5	16	60	146.5	16
			Available		181			191.5			191.5	
		1/21	N/A	90	149.5	20	60	146.5	16	60	146.5	16
			Available		190			191.5			191.5	
		1/33	N/A	90	149.5	20	90	149	25	90	149	25
			Available		190			194			194	
	150	1/5	N/A				40	134	8			
			Available					179				
		1/11	N/A				60	158.5	16			
			Available					203.5				
		1/21	N/A				90	161	16			
			Available					206				
		1/33	N/A				90	161	25			
			Available					206				
	200	1/5	N/A	90	134.5	20	60	144	16	60	144	16
			Available		174			184			184	
		1/11	N/A	90	151.5	20	60	144	16	60	144	16
			Available		191			184			184	
		1/21	N/A	105	159.5	25	90	151	25	90	151	25
			Available		199			191			191	
		1/33	N/A	105	159.5	25	90	151	25	90	151	25
			Available		199			191			191	
	400	1/5	N/A	90	162.5	20	60	162.5	16	60	162.5	16
			Available		202			202.5			202.5	
		1/11	N/A	105	187.5	25	90	169.5	25	90	169.5	25
			Available		227			209.5			209.5	
		1/21	N/A	120	195.5	32	90	169.5	25	90	169.5	25
			Available		235			209.5			209.5	
		1/33	N/A	120	199.5	32	120	202.5	40	120	202.5	40
			Available		235			242.5			242.5	
	550	1/5	N/A				90	195.5	25			
			Available					241.5				
		1/11	N/A				90	195.5	25			
			Available					241.5				
		1/21	N/A				120	228.5	40			
			Available					274.5				
		1/33	N/A				120	228.5	40			
			Available					274.5				
	750	1/5	N/A	105	187	25	90	193	25	90	193	25
			Available		231.5			238			238	
		1/11	N/A	120	216	32	90	193	25	90	193	25
			Available		260.5			238			238	
		1/21	N/A	145	223	40	120	219	40	120	219	40
			Available		267.5			264			264	
		1/33	N/A	145	223	40	120	219	40	120	219	40
			Available		267.5			264			264	

Reduction Gears	Motor Capacity [W]	Reduction Gear Ratio	Brake	Σ Ⅱ Series SGMPH			Σ Ⅴ Series SGMAV			Σ Ⅴ Series SGMJV		
				LC	LL	S	LC	LL	S	LC	LL	S
Precision Reduction Gears	30	1/5	N/A									
			Available									
		1/9	N/A									
			Available									
		1/21	N/A									
			Available									
		1/33	N/A									
			Available									
	50	1/5	N/A				40	110	8	40	108.5	8
			Available					155			153.5	
		1/9	N/A				40	110	8	40	108.5	8
			Available					155			153.5	
		1/21	N/A				40	119	8	40	117.5	8
			Available					164			162.5	
		1/33	N/A				60	134.5	16	60	133	16
			Available					179.5			178	
	100	1/5	N/A	70	109	16	40	122	8	40	122	8
			Available		138			167			167	
		1/11	N/A	70	109	16	60	146.5	16	60	146.5	16
			Available		138			191.5			191.5	
		1/21	N/A	90	118	20	60	146.5	16	60	146.5	16
			Available		147			191.5			191.5	
		1/33	N/A	90	118	20	90	149	25	90	149	25
			Available		147			194			194	
	150	1/5	N/A				40	134	8			
			Available					179				
		1/11	N/A				60	158.5	16			
			Available					203.5				
		1/21	N/A				90	161	16			
			Available					206				
		1/33	N/A				90	161	25			
			Available					206				
	200	1/5	N/A	90	123	20	60	144	16	60	144	16
			Available		154.5			184			184	
		1/11	N/A	90	123	20	60	144	16	60	144	16
			Available		154.5			184			184	
		1/21	N/A	105	131	25	90	151	25	90	151	25
			Available		162.5			191			191	
		1/33	N/A	105	131	25	90	151	25	90	151	25
			Available		162.5			191			191	
	400	1/5	N/A	90	143	20	60	162.5	16	60	162.5	16
			Available		174.5			202.5			202.5	
		1/11	N/A	105	151	25	90	169.5	25	90	169.5	25
			Available		182.5			209.5			209.5	
		1/21	N/A	120	159	32	90	169.5	25	90	169.5	25
			Available		190.5			209.5			209.5	
		1/33	N/A	120	159	32	120	202.5	40	120	202.5	40
			Available		190.5			242.5			242.5	
	550	1/5	N/A				90	195.5	25			
			Available					241.5				
		1/11	N/A				90	195.5	25			
			Available					241.5				
		1/21	N/A				120	228.5	40			
			Available					274.5				
		1/33	N/A				120	228.5	40			
			Available					274.5				
	750	1/5	N/A	105	150.5	25	90	193	25	90	193	25
			Available		183.5			238			238	
		1/11	N/A	120	158.5	32	90	193	25	90	193	25
			Available		191.5			238			238	
		1/21	N/A	145	174.5	40	120	219	40	120	219	40
			Available		207.5			264			264	
		1/33	N/A	145	174.5	40	120	219	40	120	219	40
			Available		207.5			264			264	

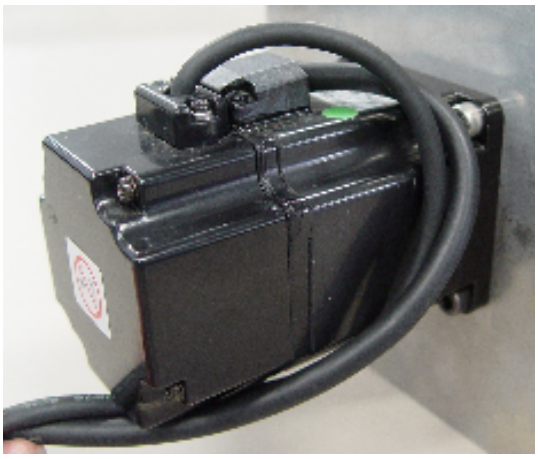
2-4. Notes on Machine Installation

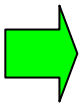
Please be cautious about the cable wiring as well as the size of the flange, pilot, and shaft at machine installation. The pictures shown below are part of the motor cable wiring of the □40 and □60.

□40



□60





3. Servo Amplifier

3-1. Type Comparison Table

1-3. Please refer to the replacement list

The servo amplifier type has been changed from the capacity value to output current value display.

3-2. Terminal Table

(1) Main Circuit Terminal

■主回路端子

All the main circuits of the Sigma-5 series are 3-phase input

Terminal Marking	Function
L1	Main circuit power supply input terminal
L2	
L3	
U	Servo motor connection terminal
V	
W	
L1C	Control power supply inpt terminal (100V/200V type)
L2C	
B1/(+)	External regenarative resistor connection terminal
B2	
B3	
(+)1	DC reactor conncetion terminal for power line harmonics contro
(+)2	
(-)1	
(-)2	
B1/(+)	Main circuit forward side terminal
P	
(-)	Main circuit reverse side terminal
(-)2	
N	

・AC 200V spec.　Main circuit terminal input allocation

II		V
50～400W	750W	50～750W
L1 L2 (+)1 (+)2 (-)	L1 L2 L3 (+)1 (+)2 (-)	L1 L2 L3 L1C L2C B1/(+) B2 B3 (-)1 (-)2
L1C L2C B1 B2	L1C L2C B1 B2 B3	
U V W	U V W	U V W

・Single-phase power supply AC200V:

It is possible to change to single phase power supply AC200V by the parameter (Factory setting is “3-phase power supply”) however, the torque - rotational speed characteristic is different from the three-phase power supply specification.

(2) Control Circuit Terminal

[Analog Voltage ・ Pulse Train Reference Type]

Terminal Marking		Terminal Marking	Function
Σ－Ⅱ	Σ－Ⅴ		
50pin	50pin		
1,2,6,10,	1,2,6,10	GND	Ground
3	3	PL1	Battery for open collector reference
4	4	SEN	SEN signal input
5	5	V-REF	Speed reference input
7	7	PULS	Reference pulse input
8	8	/PULS	
9	9	T-REF	Torque reference input
11	11	SIGN	Reference code input
12	12	/SIGN	
13	13	PL2	Battery for open collector reference
14	14	/CLR	Clear input
15	15	CLR	
18	18	PL3	Battery for open collector reference
19	19	PCO	PG frequency dividing output C-phase
20	20	/PCO	
21	21	BAT(+)	Battery (+)
22	22	BAT(-)	Battery (-)
25	25	/V-CMP+(./COIN+)	Speed match detection output (*1)
26	26	/V-CMP-(./COIN-)	
27	27	/TGON+	Rotating detection output (*1)
28	28	/TGON-	
29	29	/S-RDY+	Servo-ready output (*1)
30	30	/S-RDY-	
31	31	ALM+	Servo alarm output (*1)
32	32	ALM-	
33	33	PAO	PG dividing output A-phase
34	34	/PAO	
35	35	PBO	PG dividing output B-phase
36	36	/PBO	
37	37	ALO1	Alarm code output
38	38	ALO2	
39	39	ALO3	
40	40	/S-ON	Servo ON input (*1)
41	41	/P-CON	P operation input (*1)
42	42	P-OT	Forward drive prohibit input (*1)
43	43	N-OT	Reverse drive prohibit input (*1)
44	44	/ALM-RST	Alarm reset (*1)
45	45	/P-CL	Forward side external torque limit input (*1)
46	46	/N-CL	Reverse side external torque limit input (*1)
47	47	+24VIN	External power supply input
48	—	PSO	S-phase signal output
49	—	/PSO	
Shell	Shell	FG	Frame ground

(*1): The sequence I/O is factory default setting
The allocation change is possible by using the user parameter

Please note that the CN1 I/O signal connector cover is **not compatible**

The CN2 encoder connector and CN5 analog monitor connector are compatible

【MECHATROLINK-II Communication Reference Type】

Terminal No.		Terminal Marking	Function
Σ－Ⅱ	Σ－Ⅴ		
50pin	26pin		
1,2,6,10	16	GND	Ground
21	14	BAT(+)	Battery (+)
22	15	BAT(-)	Battery (−)
25	—	/COIN+	Positioning completion output
26	—	/COIN-	
27	1	/BK+	Brake interlock output
28	2	/BK-	
29	—	/S-RDY+	Servo−ready output
30	—	/S-RDY-	
31	3	ALM+	Servo alarm output
32	4	ALM-	
37	—	ALO1	Alarm code output
38	—	ALO2	
39	—	ALO3	
41	9	/DEC	Homing deceleration switch input
42	7	P-OT	Forward drive prohibit input
43	8	N-OT	Reverse drive prohibit input
44	10	/EXT1	External latch signal 1 input
45	11	/EXT2	External latch signal 2 input
46	12	/EXT3	External latch signal 3 input
47	6	+24VIN	External power supply input
—	13	/SI0	General input
—	17	PAO	PG frequency dividing output A-phase
—	18	/PAO	
—	19	PBO	PG frequency dividing output B-phase
—	20	/PBO	
—	21	PCO	PG frequency dividing output C-phase
—	22	/PCO	
—	23	/SO2+	General−purpose output
—	24	/SO2-	
—	25	/SO3+	
—	26	/SO3-	
Shell	Shell	FG	Frame Ground

(*1): The sequence I/O is factory default setting
The allocation change is possible by using the user parameter

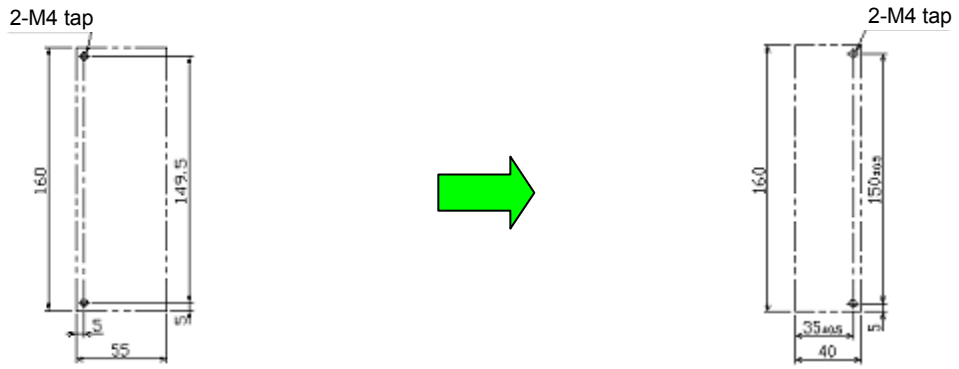
Please note that the CN1 I/O signal connector cover is **not compatible**

The CN2 encoder connector is compatible with CN5 analog monitor connector

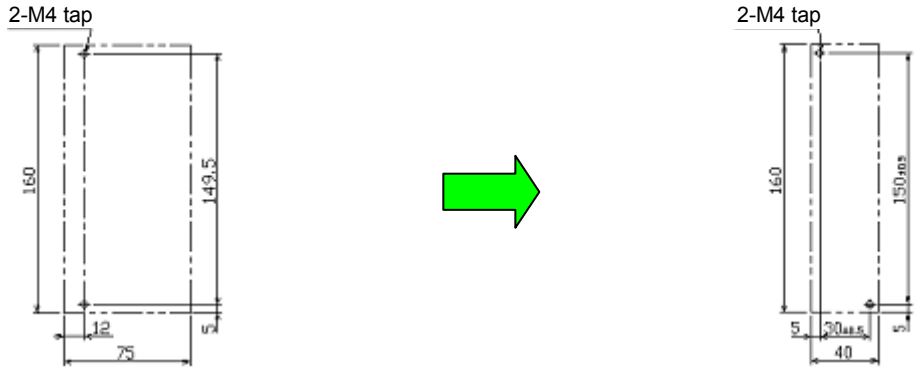
3-3. Installation Size

Σ-II series servo amplifier is not compatible with Σ-V series servo amplifier in the dimension and mounting dimension. The position of the screw for the installation is different.

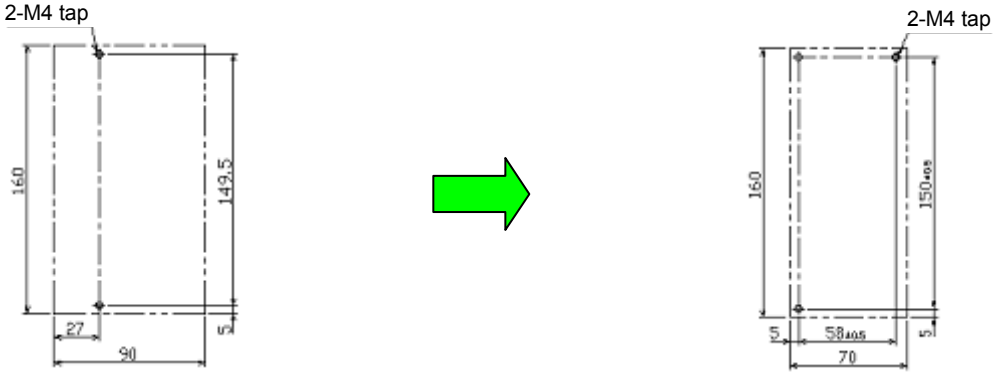
【AC200V 200W or less】



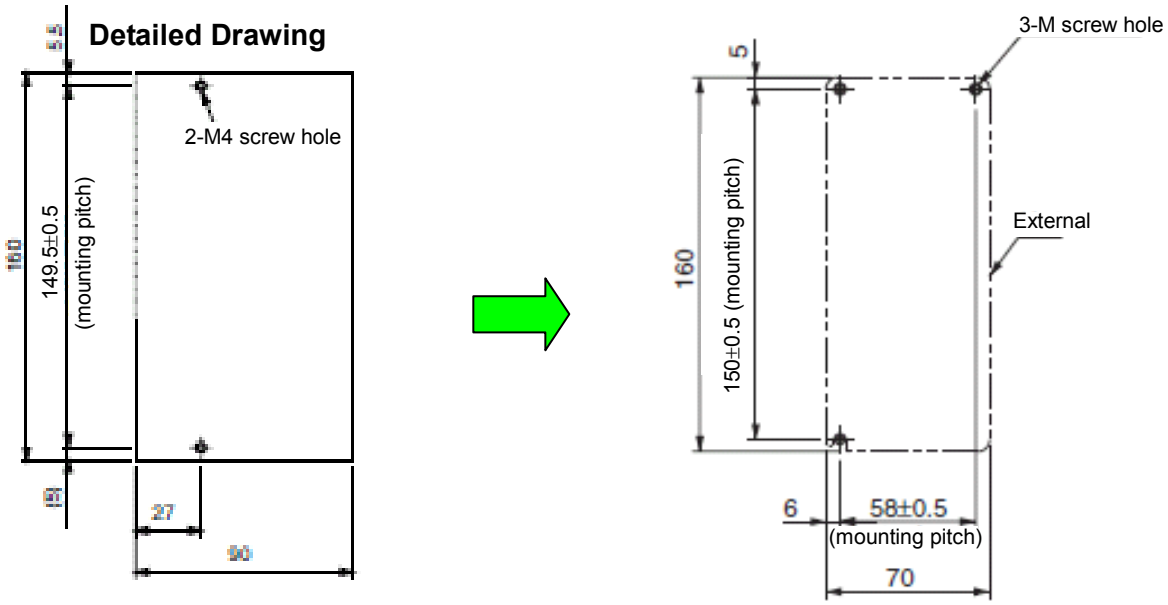
【AC100V 200W or less and AC200V 400W】



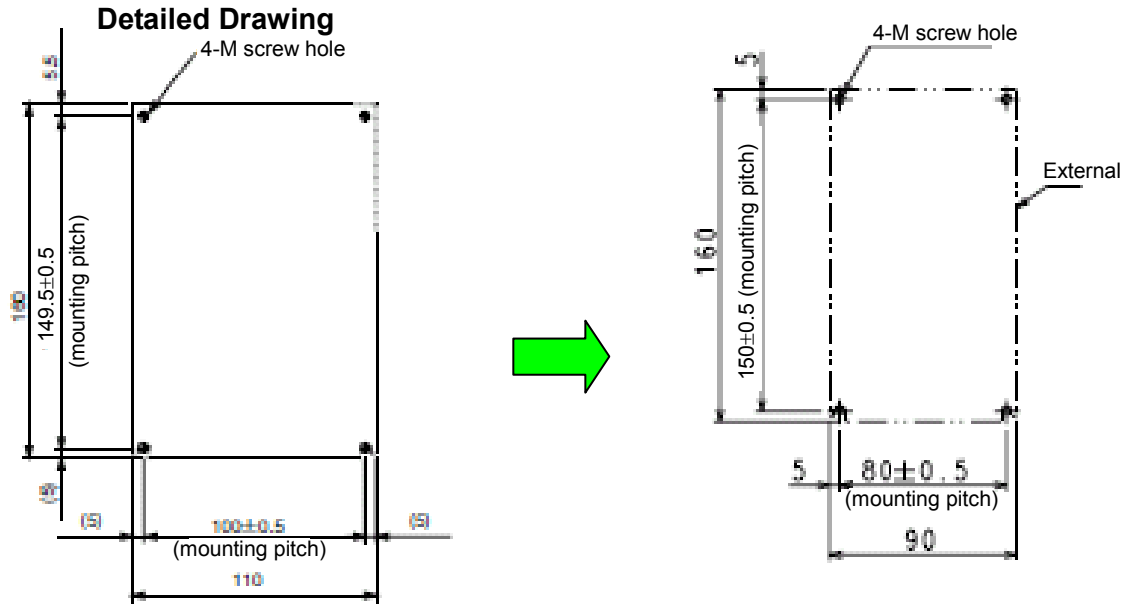
【AC100 400W and AC200V 750W】



【0.5kW~10.kW】

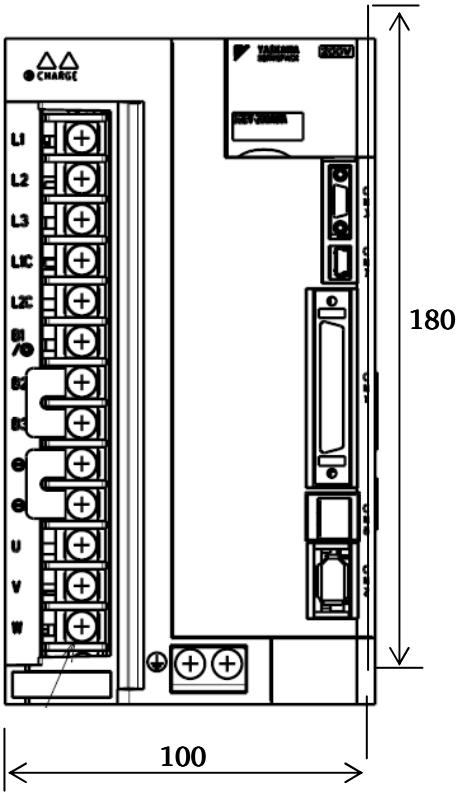
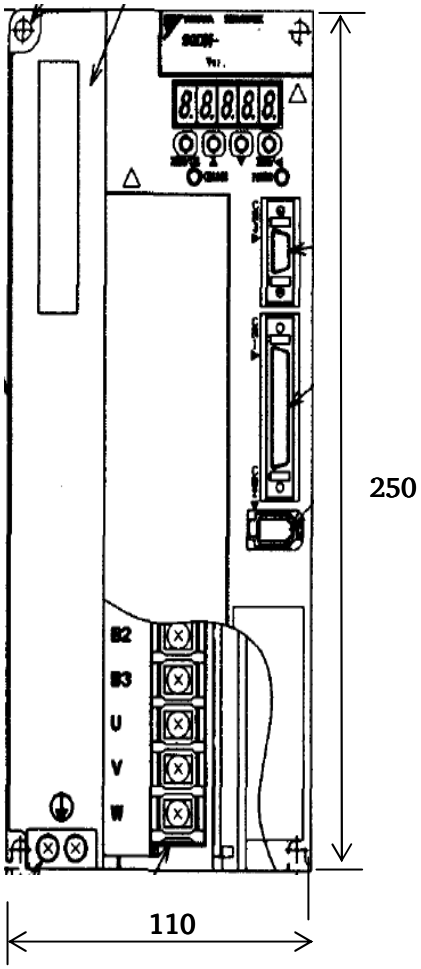


【1.5kW】

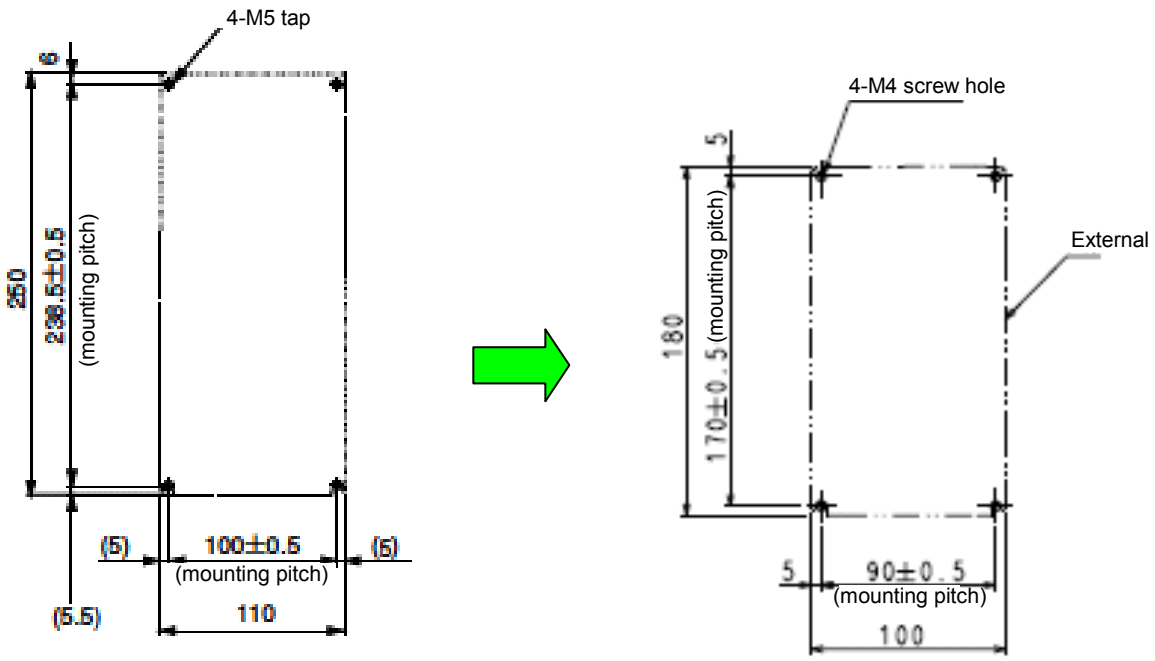


【2.0kW, 3.0kW】

Terminal Table

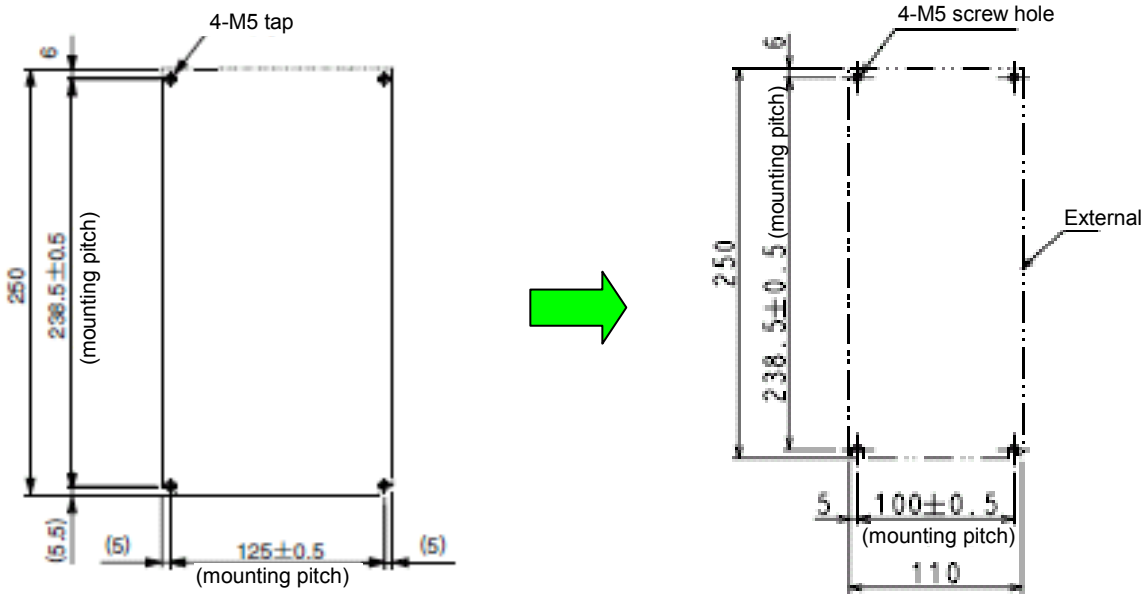
	Σ-V	Σ-II
External		
Terminal marking	L1,L2,L3,L1C,L2C,B1/+,B2,B3,-1,-2,U,V,W	L1,L2,L3,L1C,L2C,B1,B2,B3,+1,+2, －,U,V,W
Screw size	M4	M4
Screw pitch	11mm	13mm
Allowable crimping terminal size	φ9 or less	φ10 or less
Qty.	13 units	14 units

Detailed Drawing

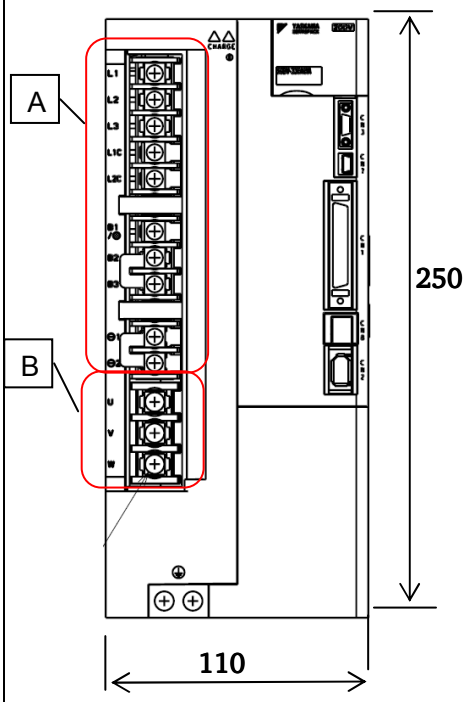
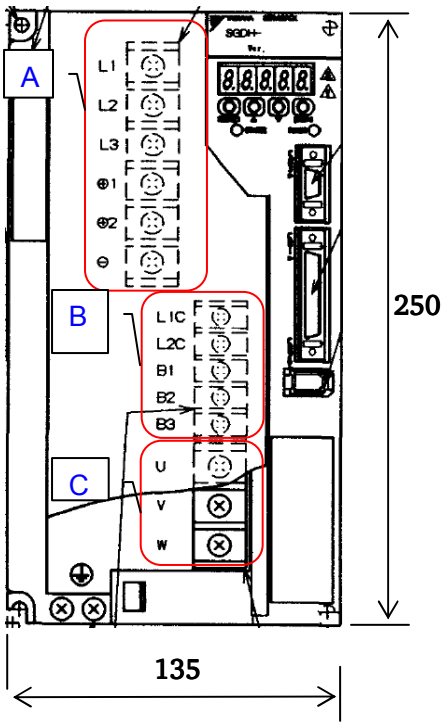


【5.0kW】

Detailed Drawing

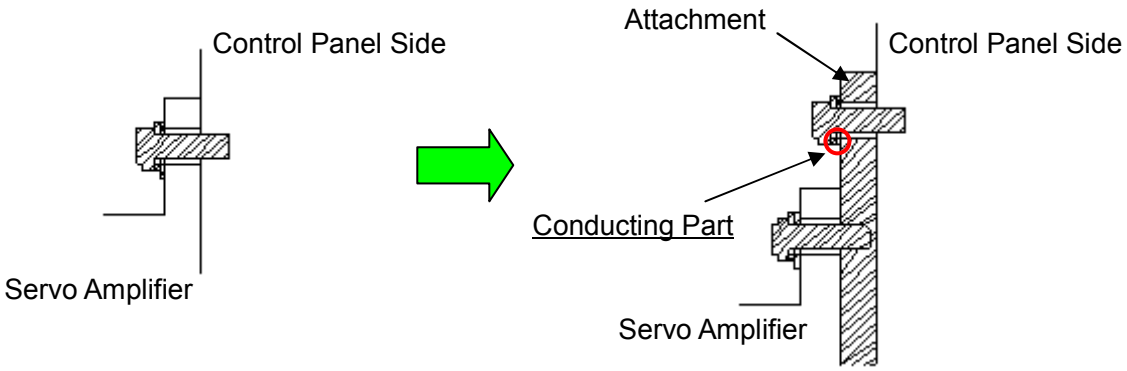


5kW Model Terminal Table

	Σ-V	Σ-II
External		
Terminal marking	A part (L1,L2,L3,L1C,L2C,B1/+,B2,B3,-1,-2)	A part (L1,L2,L3, +1,+2,－), C part (U,V,W)
Screw size	M4	M5
Screw pitch	11mm	16mm
Allowablecrimping terminal size	φ9 or less	φ13 or less
Qty.	10 units	6 units, 3 units
Terminal marking	B part (U,V,W)	B part (L1C,L2C,B1,B2,B3,)
Screw size	M4	M4
Screw pitch	13mm	11mm
Allowablecrimping terminal size	φ10 or less	φ9 or less
Qty.	3 units	5 units

3-4. Notes on control panel installation

Please note the differences of the electrical conduction state of the frame ground when using an attachment to accommodate the differences of the installation hole size. An alarm may occur and the machine may operate improperly because the amount of noise changes when the electrical conduction state changes.



The frame ground of the control panel and servo amplifier conduct through the installation screw.	When painting and/or surface treatment is given to the attachment for rust prevention, electrical conduction between the attachment and control panel may be impossible.

4. Cable and Peripherals

■ Connector for I/O Signal

Analog･Pulse Train Reference Type

Name	Type	
	Σ-Ⅱ	Σ-Ⅴ
Connector terminal block conversion unit	JUSP-TA50P	JUSP-TA50PG-E
One-sided individual pull out cable	JZSP-CKI01-1	JZSP-CSI01-1-E
	JZSP-CKI01-2	JZSP-CSI01-2-E
	JZSP-CKI01-3	JZSP-CSI01-3-E
Connector kit (for CN1)	JZSP-CKI9-1	JZSP-CSI9-1-E

MECHATROLINK-II Communication Reference Type

Name	Type	
	Σ-Ⅱ	Σ-Ⅴ
Connector terminal block conversion unit	JUSP-TA50P	JUSP-TA26P-E
Connector kit (for CN1)	JZSP-CKI9-1	JZSP-CSI9-2-E

■ Analog Monitor

Name	Type	
	Σ-Ⅱ	Σ-Ⅴ
Cable for analog monitor	JZSP-CA01	JZSP-CA01-E

■ PC Connection Cable

Name	Type	
	Σ-Ⅱ	Σ-Ⅴ
PC connection cable	JZSP-CMS01	JZSP-CVS06-02-E
	JZSP-CMS02	
	JZSP-CMS03	

■ MECHATROLINK Communication Cable

Name	Type	
	Σ-Ⅱ	Σ-Ⅴ
Cable with both-ended connector	JEPMC-W6002-A6	JEPMC-W6002-A5-E
	JEPMC-W6002-02	JEPMC-W6002-01-E
	JEPMC-W6003-**	JEPMC-W6002-**-E
Terminator	JEPMC-W6023	JEPMC-W6022-E

■ Cable for Safety Feature

Name	Type	Type
	Σ-Ⅱ	Σ-Ⅴ
Cable for safety feature	-	JZSP-CVH03-03-E
Cable kit for safety feature	-	2013595-1

■ Digital Operator

Name	Type	
	Σ-Ⅱ	Σ-Ⅴ
Digital operator	JUSP-OP02A-2	JUSP-OP05A-1-E
	JUSP-OP02A-1	
Cable for digital operator (for JUSP-OP02A-	JZSP-CMS00-1	—
	JZSP-CMS00-2	
	JZSP-CMS00-3	

■ Noise Filter

AC100V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Noise filter	30W	FN2070-6/07	—
	50W/R70F	FN2070-6/07	FN2070-6/07
	100W/R90F	FN2070-6/07	FN2070-6/07
	200W/2R1F	FN2070-10/07	FN2070-10/07
	400W/2R8F	—	FN2070-16/07

AC200V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Noise filter	30W	FN2070-6/07	—
	50W/R70A	FN2070-6/07	FN258L-7/07
	100W/R90A	FN2070-6/07	FN258L-7/07
	200W/1R6A	FN2070-6/07	FN258L-7/07
	400W/2R8A	FN2070-10/07	FN258L-7/07
	0.5kW/3R8A	FN258L-7/07	FN258L-7/07
	750W/5R5A	FN258L-16/07	FN258L-16/07
	1.0kW/7R6A	FN258L-16/07	FN258L-16/07
	1.5kW/120A	FN258L-16/07	HF3020C-UQC
	2.0kW/180A	FN258L-16/07	HF3020C-UQC
	3.0kW/200A	FN258L-30/07	HF3030C-UQC
	5.0kW/330A	FMAC-0934-5010	HF3050C-UQC

AC400V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Noise filter	0.5kW/1R9D	FN258L-7/07	FN258L-7/07
	1.0kW/3R5D	FN258L-7/07	FN258L-7/07
	1.5kW/5R4D	FN258L-7/07	FN258L-7/07
	2.0kW/8R4D	FN258L-16/07	FN258L-16/07
	3.0kW/120D	FN258L-16/07	FN258L-16/07
	5.0kW/170D	FS5559-35-33	FMAC-0934-5010

■ Battery

Name	Type	
	Σ-Ⅱ	Σ-Ⅴ
Battery	JZSP-BA01	JZSP-BA01
	JZSP-BA01-1	Equivalent to ER6V C3N
	Equivalent to ER6V C3	
Battery unit	—	JUSP-BA01

■ Brake Power Supply

Name	Input Voltage	Type	
		Σ-Ⅱ	Σ-Ⅴ
Brake power supply (for DC90V brake)	AC100V	LPDE-1H01	LPDE-1H01-E
	AC200V	LPSE-2H01	LPSE-2H01-E
Brake power supply (for DC24V brake)		Customer Provides	Customer Provides

■ DC Reactor for Power Line Harmonics Control

AC100V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
DC reactor for power line harmonics control	30W	—	—
	50W/R70F	—	X5053
	100W/R90F	X5063	X5053
	200W/2R1F	X5062	X5054
	400W/2R8F	—	X5056

AC200V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
DC reactor for power line harmonics control	30W	—	—
	50W/R70A	—	X5061
	100W/R90A	X5071	X5061
	200W/1R6A	X5070	X5061
	400W/2R8A	X5069	X5061
	0.5kW/3R8A	X5061	X5061
	750W/5R5A	X5061	X5061
	1.0kW/7R6A	X5061	X5061
	1.5kW/120A	X5060	X5060
	2.0kW/180A	X5060	X5060
	3.0kW/200A	X5059	X5059
	5.0kW/330A	X5068	X5068

AC400V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
DC reactor for power line harmonics control	0.5kW/1R9D	X5074	X5074
	1.0kW/3R5D	X5075	X5075
	1.5kW/5R4D	X5075	X5075
	2.0kW/8R4D	X5076	X5076
	3.0kW/120D	X5076	X5076
	5.0kW/170D	X5077	X5077

■ Surge Absorber/Surge Protector/Surge Suppressor

AC100V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Surge absorber/Surge protector/Surge suppressor	30W	TU-25C120	—
	50W/R70F	TU-25C120	LT-C12G801WS
	100W/R90F		
	200W/2R1F		
	400W/2R8F	—	

AC200V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Surge absorber/Surge protector/Surge suppressor	30W	TU-25C240	—
	50W/R70A	TU-25C240	LT-C32G801WS
	100W/R90A		
	200W/1R6A		
	400W/2R8A		
	750W/5R5A		
	0.5kW/3R8A		
	1.0kW/7R6A		
	1.5kW/120A		
	2.0kW/180A		
	3.0kW/200A		
	5.0kW/330A		

AC400V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Surge absorber/Surge protector/Surge suppressor	0.5kW/1R9D	Built-In	LT-C35G102WS
	1.0kW/3R5D		
	1.5kW/5R4D		
	2.0kW/8R4D		
	3.0kW/120D		
	5.0kW/170D		

■ Electromagnetic Contactor

AC100V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Electromagnetic contactor	30W	HI-11J	—
	50W/R70F	HI-11J	SC-03
	100W/R90F		
	200W/2R1F		
	400W/2R8F	—	SC-4-1

AC200V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Electromagnetic contactor	30W	HI-11J	—
	50W/R70A	HI-11J	SC-03
	100W/R90A		
	200W/1R6A		
	400W/2R8A		
	0.5kW/3R8A		
	750W/5R5A	HI-15J	SC-4-1
	1.0kW/7R6A		
	1.5kW/120A		
	2.0kW/180A	HI-20J	SC-5-1
	3.0kW/200A		
	5.0kW/330A	HI-25J	SC-N1

AC400V

Name	Servo Capacity/Current Display	Type	
		Σ-Ⅱ	Σ-Ⅴ
Electromagnetic contactor	0.5kW/1R9D	HI-15JCU	SC-4-1/G
	1.0kW/3R5D		
	1.5kW/5R4D		
	2.0kW/8R4D	HI-20JCU	SC-5-1/G
	3.0kW/120D		
	5.0kW/170D	HI-25JCU	SC-N2S/G

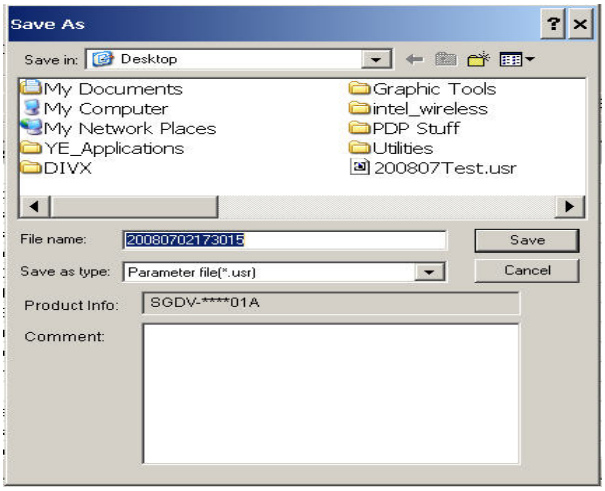
5. Parameter Converter

The user constant of the Σ-II series servo amplifier is able to be converted automatically into the parameter of the Σ-V servo amplifier by using a parameter converter in the Sigma V engineering tool SigmaWin+Ver.5.00 or later.

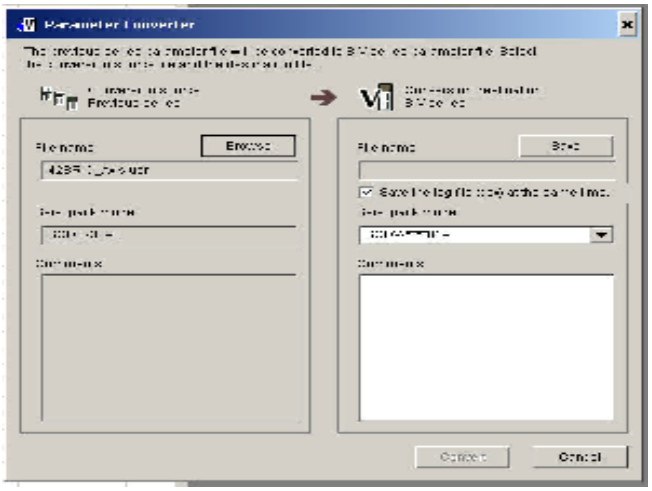
The procedure is shown below.

1. Open the Sigma 2 Component of SigmaWin + then confirm and save the user constant of the Σ-II servo amplifier.
   If a user constant file taken from the servo amplifier is available use that file.

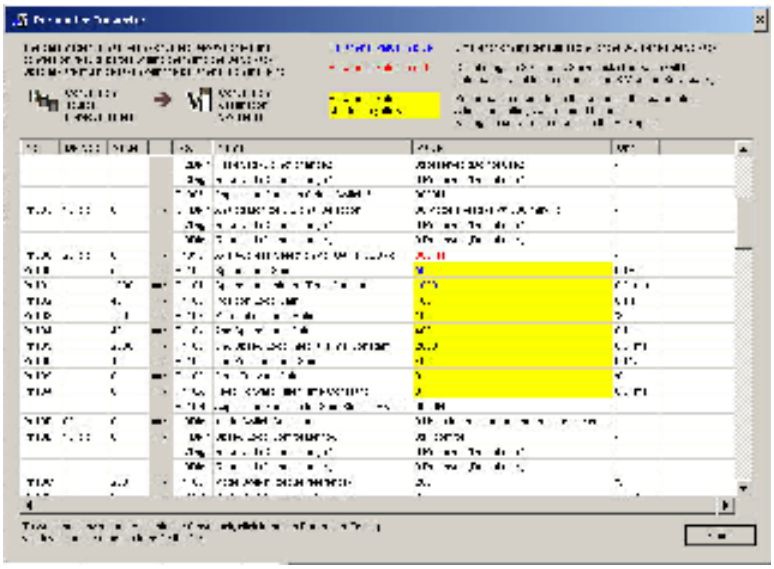
【Example of user constant save screen】



【Example of parameter converter screen】



2. Open the Sigma V Component, and start the parameter converter.
3. Specify the user constant file of the Σ-II servo amplifier which was saved in step 1 to the former conversion file name.
4. Specify where to save the converted file.
5. The user constant is converted to the parameter when the conversion button is pushed. The part where readjustment might be needed is highlighted in yellow.



6. Click "Write to the Servo" button on the parameter edit screen to write the conversion result in the servo amplifier after connecting to the writing destination servo amplifier online.

Parameter Converter Directions

- The tune-less function is valid for the parameter converted (Pn170.0=1)
- The gain parameter readjustment is necessary because there is a possibility that the rotor inertia of the motor changes when disabling the tune-less function (Pn170.0=0).
- Change the reference of the host controller, or change the setting of an electronic gear because the resolution of the encoder changes when using positional control mode.

Revision History

Revision No.	Date	Changes
0	5/16/2007	First edition
<1>	7/5/2007	Use "L1" and "L2" terminals as a main circuit terminal when using SGDV in the single phase power supply.
<2>	7/9/2007	Changed the shaft end specification with the reduction gears due to DPI-C-7015.
<3>	11/7/2007	Newly added the following. Notes of replacement from MECHATROLINK and parameter converter. Stop methods of auto-tuning, velocity bias, at alarm occurrence.
<4>	2/12/2008	Newly added 100V model, models up to 200V medium capacity 5kW and SGMPS support.