

mitsubishi

MELDAS AC SERVO

MDS-B-SVJ2 Series

Manual for Replacing

BNP-B2202B (ENG)

1. Introduction

This manual contains points to change and examine when replacing the MDS-A-SVJ Series servo drive unit with the MDS-B-SVJ2 Series servo drive unit. In replacing, also refer to Specifications and Instruction Manual (BNP-B3937).

(Note) The software version of MDS-B-SVJ2 to which this manual (BNP-B2202B) applies is version C0 or later.

1-1 Features of MDS-B-SVJ2

The MDS-B-SVJ2 Series servo drive unit is for NC, which was developed as the successor model to the MDS-A-SVJ Series. It has such features as below compared with SVJ.

1. CE Marking compliant (Compliant to European Safety Standard)
2. Installation convertibility with all the capacities of the SVJ series
3. New model, HC motor supported
4. 100,000 pulse ENC supported (OSA104, OSE104)
5. Standard regenerative resistor is integrated in drive unit (All capacities other than 100W)
6. Possible to integrate the battery for the absolute positioning system (MR-BAT) in drive unit (Battery unit is also possible to use.)
7. By wiring the control power supply separately, possible to break the power supply for the main circuit by contactor
8. New functions added (External observer, overshoot compensation, adoptive filter, etc)
9. Motor brake and contactor control sequence output (DO output)

1-2 Specification of MDS-B-SVJ2

The specification of MDS-B-SVJ2 is as follows. For detailed specification, refer to Specifications and Instruction Manual (BNP-B3937).

Servo drive unit model		SVJ2-01	SVJ2-03	SVJ2-04	SVJ2-06	SVJ2-07	SVJ2-10	SVJ2-20
Power supply	Voltage/Frequency	Three-phase AC200 to 230V / 50, 60Hz						
	Tolerable voltage fluctuation	Three-phase AC170 to 253V / 50, 60Hz						
	Tolerable frequency fluctuation	Within +/- 5%						
Method		Sine wave PWM control and current control method						
Dynamic brake		Built-in						
Regenerative resistor		External only	Built-in or external option					
External digital input		External emergency stop input						
External digital output		Contactor control output, brake control output						
External analog output		-/+ 10V, 2ch						
Protection function		Excessive current break, regenerative excessive voltage break, overload break (Electron thermal), servo motor excessive heat protection, detector error protection, regeneration error protection, insufficient voltage and momentary power failure protection, overspeed protection, excessive error protection						
Structure		Protection method: IP20						
Weight [kg]		0.7	0.7	0.7	1.1	1.5	2.0	2.0

1-3 Basic Rules in Replacing

To follow the content of this manual, the basic rules and compatibilities must be satisfied. If not, the installation of SVJ2 is considered to be newly selected installation.

In the case of replacing SVJ-01W or SVJ-03W (100V spec), carry out replacing after changing the power supply to be the three-phase 200V.

<Basic rules in replacing>

1. "Drive unit replacing" means replacing MDS-A-SVJ with MDS-B-SVJ2.
2. The basic idea of "replacing" is that replacing drive units after machine tool builders shift their orders for SVJ to those for SVJ2.
3. In selecting motor, select the one with which the equivalent output and control accuracy can be got.
4. The selected motor's flange diameter and shaft shape is compatible with the current one.

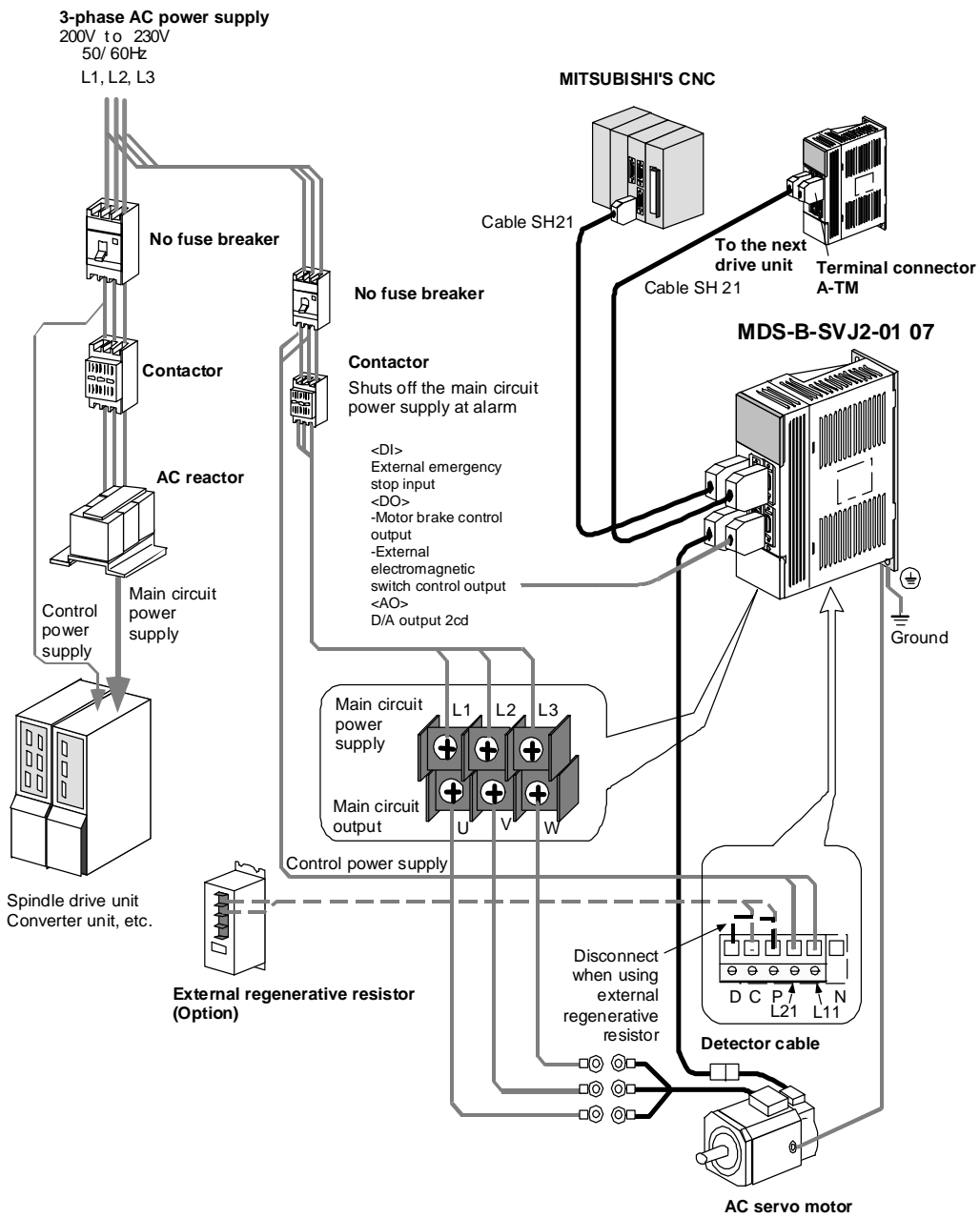
1-4 Additional points compared with version B

As the software version was upgraded to C0 from B (B0 to B4), functions below will be added by replacing SVJ with SVJ2.

1. All types of HC motors (HC52 to HC202, HC53 to HC153) are available, so the HA series motor can be replaced with the HC series.
2. Motors HA053 and HA13 can be replaced. (If replacing, the new motors should be HA053N and HA13N.)
3. Regenerative resistor of the SVJ series can be used. (Note that in this case, CE Marking cannot be acquired.)

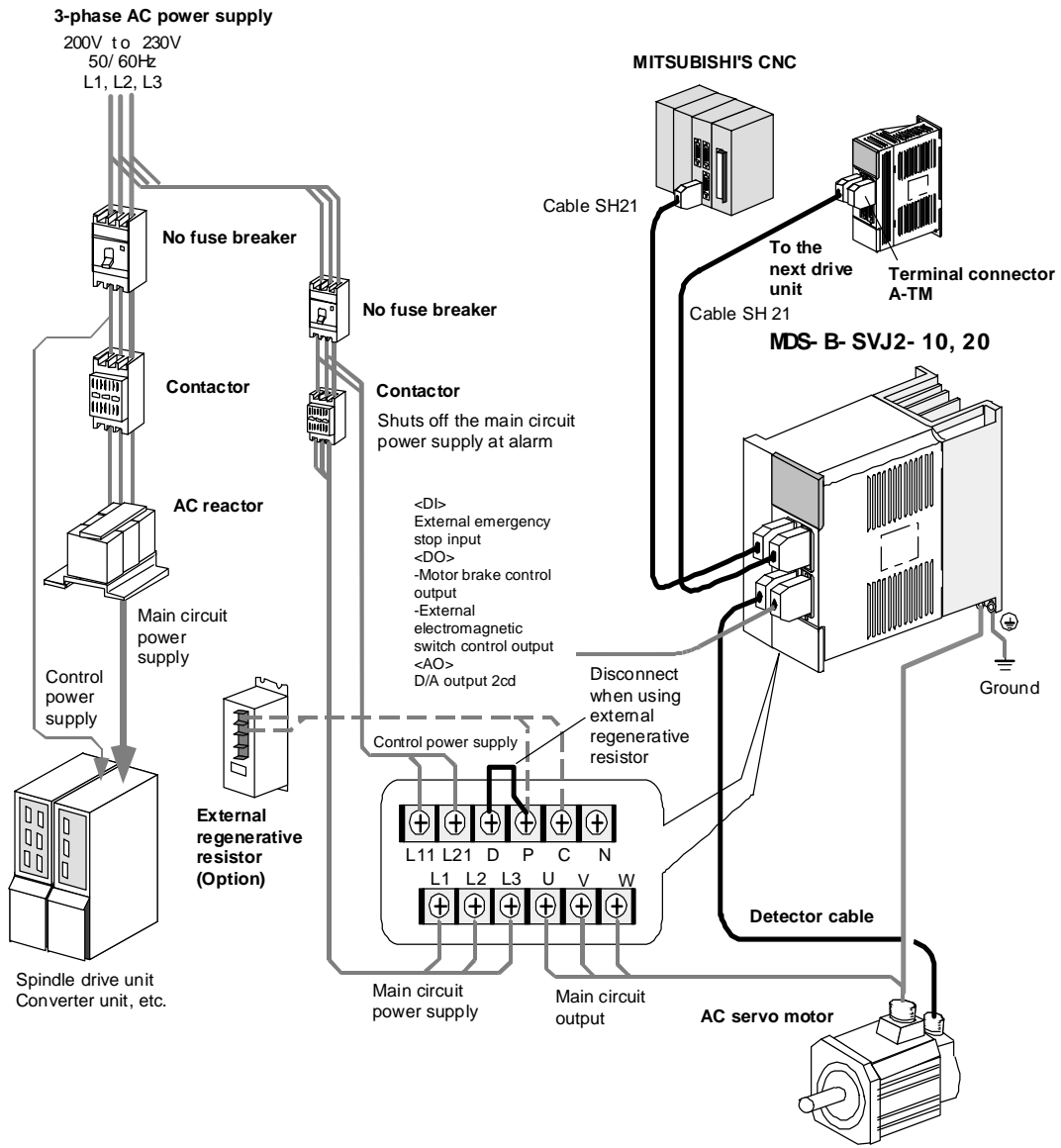
1-5 Basic Configuration of MDS-B-SVJ2

<MDS-B-SVJ2-01 to MDS-B-SVJ2-07>



! Danger When the power supply is shared with converter, if the total current capacity is over 60A, set up a no fuse breaker and contactor for the main circuit power supply for SVJ2 separately. If you use a no fuse breaker that is shared with a large capacity unit, the breaker sometimes doesn't work for short circuit accident of a small capacity drive unit, which may cause fire. For SVJ2, select a breaker whose type is NF60 or lower. (For selecting no fuse breakers, refer to Specifications and Instruction Manual.)

<MDS-B-SVJ2-10 to MDS-B-SVJ2-20>



2 POINTS TO EXAMINE IN REPLACING

In replacing, examine the points in the table below.

Category	Different points between SVJ and SVJ2	Points to examine	Note
Space	Connection directions of wiring are different.	Is there enough wiring space under the unit?	
		Are the wires long enough for SVJ2?	
	Regenerative resistors are different.	Is there space left for mounting regenerative resistor?	
	Unit capacity is different.	Is there enough space? (As the depth of the unit is longer. This point applies only to the case of HA-ME/MH73)	
Wiring	Connection directions of wiring are different.	Are the wires long enough? Do they reach the terminal box of SVJ2?	
	The control power supply is separate.	The control power input is connector. (SVJ2-07 and drive unit with smaller capacity)	
	Regenerative resistor is separate.	The regenerative resistor's connection is connector. (SVJ2-07 and drive unit with smaller capacity)	
	Ground with chassis.	Is FG wiring length enough?	
Motor	Motor series is changed.	Can your current motor continue to be used? -In the case of HA motor, should the motor be replaced to be the new model (HC)? -Can your current motor continue to be used? -With the current motor, does ENC have to be changed? -Is it necessary to change to new motor?	Refer to TABLE FOR MOTOR REPLACING.
Cable	Motor series is changed.	Can your current ENC cable be used?	
Regenerative resistor	Regenerative resistor series is changed.	Do you prefer to continue to use the regenerative resistor for SVJ? (In this case, CE Marking cannot be acquired.) In selecting the regenerative resistor for SVJ2, take the regenerative load of the current regenerative resistor into consideration.	Refer to TABLE FOR REGENERATIVE RESISTOR REPLACING.
No fuse breaker	Select the product with the same capacity.	Use the product with the same capacity. However, in the case of replacing SVJ-06 with SVJ2-07, capacity is bigger.	
Contactor	Select the product with the same capacity.	Use the product with the same capacity. As SVJ, contactor does not have to be equipped. (Note that in this case, CE Marking cannot be acquired basically.) However, in the case of replacing SVJ-06 with SVJ2-07, capacity is bigger.	
	The control power supply is separately wired.	Input the control power supply directly from the no fuse breaker. Use contactor only for the main circuit.	
Battery for absolute positioning system	The built-in one (MR-BAT) can be used.	Battery unit (MDS-A-BAT) can be also used.	
Parameter	Change parameters that have to be changed.	Change parameters that have to be changed.	Refer to TABLE FOR MOTOR REPLACING.
		Is servo tuning necessary?	
100V spec	The SVJ2 Series doesn't have the 100V specification, change to the 200V specification.		

3. TABLE FOR MOTOR REPLACING

SVJ capacity	Current motor	SVJ2 capacity	New motor	ENC cable exchange	Parameter change				Servo tuning	
					SV009 SV010	SV011 SV012	SV019 SV020	SV025		
SVJ-01 or SVJ-01W	HA-FE053	SVJ2-01 (When replacing 01W, change power supply to 3-phase 200V)	⇒HA-FF053	Necessary	2048→8192	256→500	4→8	337C→227C	Unnecessary	
	HA-FH053		⇒HA-FF053	Necessary	2048→8192	256→500	8	227C	Unnecessary	
	HA-FE13		⇒HA-FF13	Necessary	2048→4096	256→300	4→8	337D→227D	Unnecessary	
	HA-FH13		⇒HA-FF13	Necessary	2048→4096	256→300	8	227D	Unnecessary	
	HA-ME053		⇒HC-MF053	Necessary	2048→4096	256→200	4→8	339C→229C	Necessary	
	HA-MH053		⇒HC-MF053	Necessary	2048→4096	256→200	8	229C	Necessary	
	HA-ME13		⇒HC-MF13	Necessary	2048→4096	256→300	4→8	339D→229D	Necessary	
	HA-MH13		⇒HC-MF13	Necessary	2048→4096	256→300	8	229D	Necessary	
SVJ-01	HA053-E30	SVJ2-01	⇒HA053N-E33	Necessary	2048	256	10→25	338C→228C	Unnecessary	
	HA13-E30		⇒HA13N-E33	Necessary	2048	256	10→25	338D→228D	Unnecessary	
SVJ-03 or SVJ-03W	HA-FE23	SVJ2-03 (When replacing 03W, change power supply to 3-phase 200V)	⇒HA-FF23	Necessary	2048→4096	256→700	4→8	337E→227E	Unnecessary	
	HA-FH23		⇒HA-FF23	Necessary	2048→4096	256→700	8	227E	Unnecessary	
	HA-FE33		⇒HA-FF33	Necessary	2048→4096	256→500	4→8	337F→227F	Unnecessary	
	HA-FH33		⇒HA-FF33	Necessary	2048→4096	256→500	8	227F	Unnecessary	
	HA-ME23		⇒HC-MF23	Necessary	2048→4096	256→400	4→8	339E→229E	Necessary	
	HA-MH23		⇒HC-MF23	Necessary	2048→4096	256→400	8	229E	Necessary	
SVJ-03	HA23N-E30	SVJ2-03	→HA23N-E33	Unnecessary	2048	256	25	006E→228E	Unnecessary	
	HA23N-E33		*HA23N-E33	Unnecessary	2048	256	25	006E→228E	Unnecessary	
	HA23N-A33		*HA23N-A33	Unnecessary	2048	256	25	226E→228E	Unnecessary	
	HA23N-E42		*HA23N-E42	Unnecessary	2048	256	100	226E→228E	Unnecessary	
	HA23N-A42		*HA23N-A42	Unnecessary	2048	256	100	226E→228E	Unnecessary	
	HA33N-E30		→HA33N-E33	Unnecessary	2048	256	25	006F→228F	Unnecessary	
	HA33N-E33		*HA33N-E33	Unnecessary	2048	256	25	006F→228F	Unnecessary	
	HA33N-A33		*HA33N-A33	Unnecessary	2048	256	25	226F→228F	Unnecessary	
	HA33N-E42		*HA33N-E42	Unnecessary	2048	256	100	226F→228F	Unnecessary	
	HA33N-A42		*HA33N-A42	Unnecessary	2048	256	100	226F→228F	Unnecessary	
	HA-ME43	→SVJ2-04	⇒HC-MF43	Necessary	2048→4096	256→300	4→8	3390→2290	Necessary	
	HA-MH43	⇒HC-MF43	Necessary	2048→4096	256→300	8	2290	Necessary		
	SVJ-06	HA-FE43	→SVJ2-04	⇒HA-FF43	Necessary	2048→4096	768→700	4→8	3370→2270	Unnecessary
		HA-FH43	⇒HA-FF43	Necessary	2048→4096	768→700	8	2270	Unnecessary	
HA-FE63		SVJ2-06	⇒HA-FF63	Necessary	2048→4096	768→700	4→8	3371→2271	Unnecessary	
HA-FH63			⇒HA-FF63	Necessary	2048→4096	768→700	8	2271	Unnecessary	
HA40N-E30			→HA40N-E33	Unnecessary	2048	512	25	0000→2200	Unnecessary	
HA40N-E33			→HC52-E33	Unnecessary	2048→8192	512	25	0000→22B0	Necessary	
			*HA40N-E33	Unnecessary	2048	512	25	0000→2200	Unnecessary	
			→HC52-E33	Unnecessary	2048→8192	512	25	0000→22B0	Necessary	
			*HA40N-A33	Unnecessary	2048	512	25	2200	Unnecessary	
HA40N-A33			→HC52-A33	Unnecessary	2048→8192	512	25	2200→22B0	Necessary	
			*HA40N-E42	Unnecessary	2048	512	100	2200	Unnecessary	
			→HC52-E42	Unnecessary	2048→8192	512	100	2200→22B0	Necessary	
			*HA40N-A42	Unnecessary	2048	512	100	2200	Unnecessary	
HA40N-A42			→HC52-A42	Unnecessary	2048→8192	512	100	2200→22B0	Necessary	
			→HA43N-E33	Unnecessary	2048	256/512	25	0080→2280	Unnecessary	
			→HC53-E33	Unnecessary	2048→4096	256/512→256	25	0080→22C0	Necessary	
			*HA43N-E33	Unnecessary	2048	256/512	25	0080→2280	Unnecessary	
HA43N-E33			→HC53-E33	Unnecessary	2048→4096	256/512→256	25	0080→22C0	Necessary	
			*HA43N-A33	Unnecessary	2048	256/512	25	2280	Unnecessary	
			→HC53-A33	Unnecessary	2048→4096	256/512→256	25	2280→22C0	Necessary	
		*HA43N-E42	Unnecessary	2048	256/512	100	2280	Unnecessary		
HA43N-A33		→HC53-E42	Unnecessary	2048→4096	256/512→256	100	2280→22C0	Necessary		
		*HA43N-A42	Unnecessary	2048	256/512	100	2280	Unnecessary		
		→HC53-A42	Unnecessary	2048→4096	256/512→256	100	2280→22C0	Necessary		
	→HC53-A42	Unnecessary	2048→4096	256/512→256	100	2280→22C0	Necessary			

SVJ capacity	Current motor	SVJ2 capacity	New motor	ENC cable exchange	Parameter change				Servo tuning
					SV009 SV010	SV011 SV012	SV019 SV020	SV025	
SVJ-06	HA-ME73	→SVJ2-07	⇒HC-MF73	Necessary	2048→4096	512→300	4→8	3391→2291	Necessary
	HA-MH73		⇒HC-MF73	Necessary	2048→4096	512→300	8	2291	Necessary
SVJ-10	HA80N-E30	SVJ2-10	→HA80N-E33	Unnecessary	2048	512	25	0001→2201	Unnecessary
			→HC102-E33	Unnecessary	2048→8192	512→384	25	0001→22B1	Necessary
	*HA80N-E33		Unnecessary	2048	512	25	0001→2201	Unnecessary	
	→HC102-E33		Unnecessary	2048→8192	512→384	25	0001→22B1	Necessary	
	HA80N-A33		*HA80N-A33	Unnecessary	2048	512	25	2201	Unnecessary
			→HC102-A33	Unnecessary	2048→8192	512→384	25	0001→22B1	Necessary
	HA80N-E42		*HA80N-E42	Unnecessary	2048	512	100	2201	Unnecessary
			→HC102-E42	Unnecessary	2048→8192	512→384	100	2201→22B1	Necessary
	HA80N-A42		*HA80N-A42	Unnecessary	2048	512	100	2201	Unnecessary
			→HC102-A42	Unnecessary	2048→8192	512→384	100	2201→22B1	Necessary
	HA83N-E30		→HA83N-E33	Unnecessary	2048	256/512	25	0081→2281	Unnecessary
			→HC103-E33	Unnecessary	2048→4096	256/512→256	25	0081→22C1	Necessary
	HA83N-E33		*HA83N-E33	Unnecessary	2048	256/512	25	0081→2281	Unnecessary
			→HC103-E33	Unnecessary	2048→4096	256/512→256	25	0081→22C1	Necessary
	HA83N-A33		*HA83N-A33	Unnecessary	2048	256/512	25	2281	Unnecessary
			→HC103-A33	Unnecessary	2048→4096	256/512→256	25	2281→22C1	Necessary
HA83N-E42	*HA83N-E42	Unnecessary	2048	256/512	100	2281	Unnecessary		
	→HC103-E42	Unnecessary	2048→4096	256/512→256	100	2281→22C1	Necessary		
HA83N-A42	*HA83N-A42	Unnecessary	2048	256/512	100	2281	Unnecessary		
	→HC103-A42	Unnecessary	2048→4096	256/512→256	100	2281→22C1	Necessary		
SVJ-20	HA93N-E30	SVJ2-20	→HA93N-E33	Unnecessary	2048	512	25	008A→228A	Unnecessary
			→HC153-E33	Unnecessary	2048→4096	512→256	25	008A→22C2	Necessary
	HA93N-E33		*HA93N-E33	Unnecessary	2048	512	25	008A→228A	Unnecessary
			→HC153-E33	Unnecessary	2048→4096	512→256	25	008A→22C2	Necessary
	HA93N-A33		*HA93N-A33	Unnecessary	2048	512	25	228A	Unnecessary
			→HC153-A33	Unnecessary	2048→4096	512→256	25	228A→22C2	Necessary
	HA93N-E42		*HA93N-E42	Unnecessary	2048	512	100	228A	Unnecessary
			→HC153-E42	Unnecessary	2048→4096	512→256	100	228A→22C2	Necessary
	HA93N-A42		*HA93N-A42	Unnecessary	2048	512	100	228A	Unnecessary
			→HC153-A42	Unnecessary	2048→4096	512→256	100	228A→22C2	Necessary
	HA100N-E30		→HA100N-E33	Unnecessary	2048	256/512	25	0002→2202	Unnecessary
			→HC202-E33	Unnecessary	2048→4096	256/512→384	25	0002→22B4	Necessary
	HA100N-E33		*HA100N-E33	Unnecessary	2048	256/512	25	0002→2202	Unnecessary
			→HC202-E33	Unnecessary	2048→4096	256/512→384	25	0002→22B4	Necessary
	HA100N-A33		*HA100N-A33	Unnecessary	2048	256/512	25	2202	Unnecessary
			→HC202-A33	Unnecessary	2048→4096	256/512→384	25	2202→22B4	Necessary
HA100N-E42	*HA100N-E42	Unnecessary	2048	256/512	100	2202	Unnecessary		
	→HC202-E42	Unnecessary	2048→4096	256/512→384	100	2202→22B4	Necessary		
HA100N-A42	*HA100N-A42	Unnecessary	2048	256/512	100	2202	Unnecessary		
	→HC202-A42	Unnecessary	2048→4096	256/512→384	100	2202→22B4	Necessary		

(Note 1) The arrow at the head of the SVJ2 capacity (→) means the capacity is not the same as the previous one.

(Note 2) The meaning of the symbols at the head of the new motor is as follows.

*: Your current motor can be used.

→: By changing the detectors, your current motor can be used.

⇒: The motors must be replaced.

(Note 3) As for parameter values, the value before the arrow is the value to change. (Conventional parameter → New parameter) If there is only one value in a cell, it means that change is not necessary.

(Note 4) "256/512" in parameter change cells of SV011 and SV012 means "SV011=256, SV012=512".

(Note 5) If servo tuning is necessary, gain and filter (VGN, PGN, etc.) must be tuned after replacing.

4.TABLE FOR REGENERATIVE RESISTOR REPLACING

Current regenerative resistor	Connection	Regenerative resistor efficiency	Current regenerative load level	Capacity of new drive unit	New regenerative resistor	Regenerative resistor efficiency	Parameter change SV036
No regenerative resistor				SVJ2-01	No regenerative resistor		1000
MR-RB013	1	18W		When continuing to use MR-RB013			1100→9100
			Lower than 40%	SVJ2-01	MR-RB032	30W	1100→1200
				SVJ2-03 to 06	Standard built-in resistor	10W	1100→1000
				SVJ2-07	Standard built-in resistor	20W	1100→1000
			Higher than 40%	SVJ2-01 to 06	MR-RB032	30W	1100→1200
				SVJ2-07	Standard built-in resistor	20W	1100→1000
MR-RB033	1	36W		When continuing to use MR-RB033			1200→9200
			Lower than 60%	SVJ2-01 to 07	MR-RB032	30W	1200
			Higher than 40%	SVJ2-01 to 07	MR-RB12	100W	1200→1300
	2 in parallel	72W		When continuing to use MR-RB033			1200→9200
			No limit	SVJ2-10 to 20	Standard built-in resistor	100W	1200→1000
				When continuing to use MR-RB033			1200→9200
	4 in parallel	144W		When continuing to use MR-RB033			1200→9200
			Lower than 50%	SVJ2-20	Standard built-in resistor	100W	1200→1000
			Higher than 50%	SVJ2-20	MR-RB30	300W	1200→1500
	MR-RB064	1	72W		When continuing to use MR-RB064		
No limit				SVJ2-10 to 20	Standard built-in resistor	100W	1300→1000
2 in parallel		144W		When continuing to use MR-RB064			1300→9300
			Lower than 50%	SVJ2-20	Standard built-in resistor	100W	1300→1000
			Higher than 50%	SVJ2-20	MR-RB30	300W	1300→1500
2 in parallel		144W		When continuing to use MR-RB064			1F00→9F00
				SVJ2-06 to 07	MR-RB12	100W	1F00→1300
				SVJ2-06 to 07	MR-RB32	300W	1F00→1400
MR-RB34		1	300W		When continuing to use MR-RB34		
	No limit			SVJ2-10 to 20	MR-RB30	300W	1400
	2 in parallel	600W		When continuing to use MR-RB34			1400→9400
Lower than 60%			SVJ2-20	MR-RB50	500W	1400→1600	
MR-RB063	1	72W		When continuing to use MR-RB063			1500→9500
			No limit	SVJ2-01 to 07	MR-RB12	100W	1500→1300
	2 in parallel	144W		When continuing to use MR-RB063			1500→9500
			Lower than 50%	SVJ2-10 to 20	Standard built-in resistor	100W	1500→1000
			Higher than 50%	SVJ2-10 to 20	MR-RB30	300W	1500
	4 in parallel	288W		When continuing to use MR-RB063			1500→9500
			No limit	SVJ2-20	MR-RB30	300W	1500

(Note 1) If you use regenerative resistors for SVJ, CE Marking cannot be acquired basically.

(Note 2) In replacing regenerative resistor for SVJ2, different regenerative resistors will be chosen depending on the regenerative load (thermo monitor) of the current regenerative resistor for SVJ. Select regenerative resistors by taking the necessary regenerative efficiency for SVJ into consideration.

(Note 3).As for parameter values, the value before the arrow is the value before changing. If there is only one value in a cell, it means that change is not necessary.