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BL SUPER
AC SERVO SYSTEM

BL860/861/862 (2-axle integrated type)

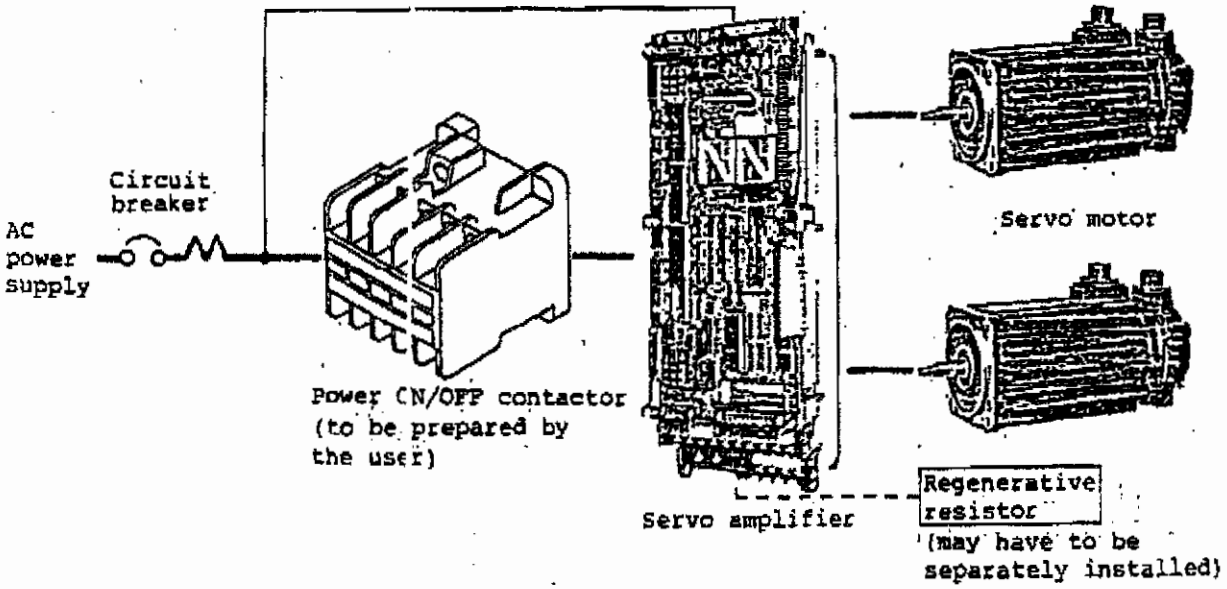
Operation Manual

SANYO DENKI CO., LTD.

"BL86 Series" AC Servo System is a speed control unit that is basically composed of a servo motor and servo amplifier. This unit may require a separate regenerative resistor unit depending on load and working conditions of a driving machine.

Carefully read this Manual for your proper application. Keep this Manual at an easily accessible place for your routine maintenance and service.

For further information, refer to Specification Manual M-04569 and Maintenance Manual M-04570.



Precautions for Unpacking

1. Never touch the printed circuit board (PCB) while unpacking the servo amplifier.

2. After unpacking the servo motor and servo amplifier, visually check them for trouble which may have occurred during shipment.

3. Check to see if parts on the servo amplifier PCB are free from notable deformation.

4. Check to make certain that both the servo motor and servo amplifier have type Nos. specified by you.

Particular Precautions before Use

1. Carefully protect the servo motor and servo amplifier from a shock or impact during installation. Use particular care to handle the servo motor, which is equipped with a critical and fragile encoder.

2. Be sure to connect the servo motor and amplifier to power supply of 200 to 230 V (+10%, -15%) AC, 50/60 Hz. Otherwise, serious trouble may result.

3. Make sure of safety in operation such as condition of the load before turning power ON and OFF for maintenance and service.

4. Never use the servo motor and amplifier in a place exposed to corrosive (such as acid and alkali), inflammable, or explosive gas or liquid.

5. Make certain that the servo motor and servo amplifier are grounded in accordance with electric standard, Grounding Class 3 (100 Ω or less).

6. Use the servo motor within an ambient temperature range from 0° to 40°C, and the servo amplifier from 0° to 55°C. Use them at a relative humidity of 90% or less.

7. Protect the servo motor and servo amplifier from water, cutting fluid, and rainwater, all of which would cause current leakage and a shock.

8. Never carry out the withstand voltage test nor megger test. If necessary, have contact with Sanyo Denki.

9. Improper wiring could cause the servo motor and servo amplifier to break down. Strictly follow the directions given in Specification Manual before and during wiring.

10. BL860, BL861 or 862 servo motor is not an induction motor. Therefore, do not try to change rotary directions of the servo motor by exchanging phases of the motor or input power. To change the rotary directions, refer to Specification Manual.

11. Be sure to provide the coil of the relay, electromagnetic contactor, solenoid, etc. with a surge absorber.

Caution on Delivery

Be sure to identify the servo motor and servo amplifier by type No., as shown below.

Never couple the servo amplifier with any motor having different rated pulses. Be sure to collate type No. of the servo amplifier with type No. of the servo motor soon after unpacking.

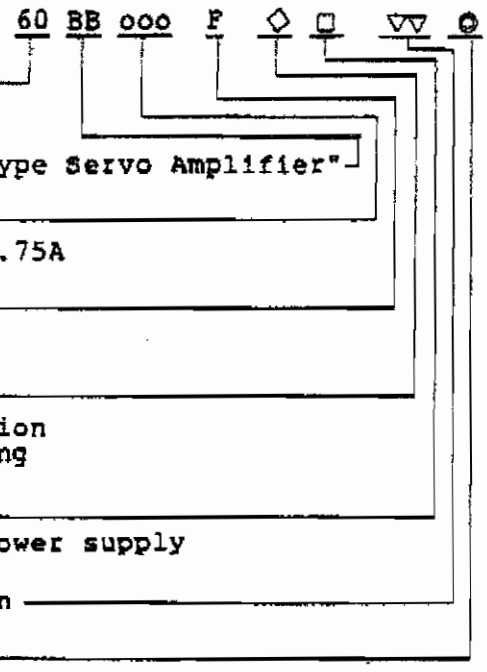
How to check type No.

1 Type No. of servo motor oo BM ooo △ □ ◇ ▽▽ ○

1. BL Series name
   60...BL860 61...BL861 62...BL862
2. Symbol of "Servo Motor"
3. Maximum continuous torque (Tc) (Note)
   030....30kg-cm 040,04A...40kg-cm 060,06A...60Kg-cm
   080....80Kg-cm 090,09A...90kg-cm 120.....120kg-cm
   220...220kg-cm
4. Maximum revolutions (Nm)
   B...2000 rpm (M: 1500 rpm),
   R...2500 rpm
5. Hold brake
   X...Not provided (standard), B...Provided
6. Type of detector
   E...Encoder
7. Identification of specification
8. Order of design

Note: Code Nos. 04A, 06A, and 09A indicate Tc 40, 60, and 90 kg-cm, respectively, but show that the respective motors are designed to particular specifications including installation size.

2 Type No. of servo amplifier



Accessories of Servo Amplifier

The servo amplifier is packed together with the following spare (or accessory) parts.
Carefully keep spare parts (fuses) at user's responsibility.

Part name	Type	Manufacturer	Q'ty	Application
Connector	MR-50LF	Honda Tsushin Kogyo	2	I/O signal connector (CN1)
Connector	MR-20LF	Honda Tsushin Kogyo	2	Encoder signal connector (CN2)
Fuse	DM16A (1.6A)	Daito Tsushinki	1	Spare fuse of PCB P1 (F1)
Fuse	MF51A (5A)	Kowa Tanshiban Seizo	1	Spare fuse for protecting control power supply (F1)

Regenerative Resistor

The regenerative resistor optionally available must be additionally installed outside the servo amplifier for special applications, for example, the load has great inertia, the motor is started and stopped repeatedly and frequently within a short period, or the motor is applied to a minus load.
For further information, refer to Specification Manual and drawings submitted for approval.

BL86 Series, Combinations of Motors with Devices

Identify your servo motor and servo amplifier by type No. for Sanyo's maintenance service.

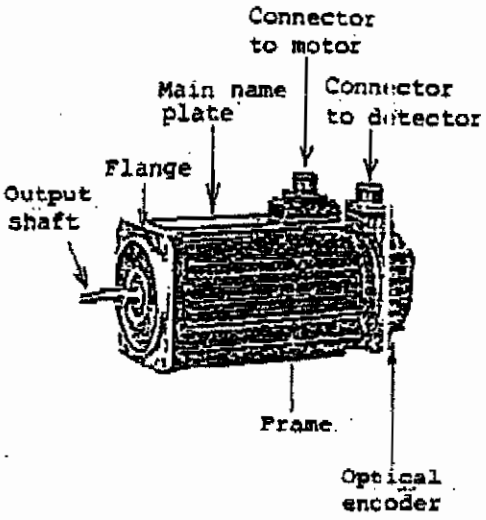
1. Standard specification 1

Servo amplifier Type No.	Servo motor specification		Power supply capacity per servo amplifier KVA	Current capacity per input contactor or fuse A
	Type No.	Optical encoder P/rev		
60BB030FXW00A	61□M06□B□E□□	6000 (5000 4000)	1.6	4.6
60BB030FXW01A	61□M09□B□E□□	6000 (5000 4000)	2.2	6.4
60BB030FXW02A	61□M06□R□E□□	6000 (5000 4000)	1.4	4.0
60BB030FXW03A	61□M04AR□E□□	6000 (5000 4000)	1.4	4.0
60BB030FXW70A	61□M06AMXE□□	20000	1.3	2.8

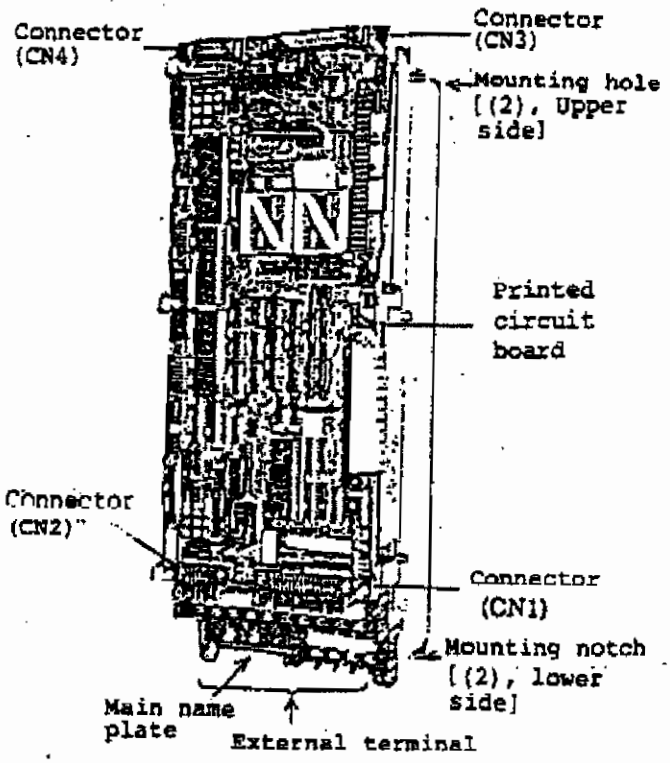
2. Standard specification 2

Servo amplifier Type No.	Servo motor specification		Power supply capacity per servo amplifier KVA	Current capacity per input contactor or fuse A
	Type No.	Optical encoder P/rev		
60BB050FXW00A	613M120B□E□□	6000 (5000 4000)	3.1	9.0
60BB050FXW01A	613M09□R□E□□	6000 (5000 4000)	2.0	5.8
60BB050FXW10A	623M080BXE□□	6000 (5000 4000)	1.7	4.9
60BB075FXW02A	61FM220B□E□□	6000 (5000 4000)	5.2	15.0
60BB075FXW03A	61FM120R□E□□	6000 (5000 4000)	3.0	8.7
60BB075FXW10A	62FM080BXE□□	6000 (5000 4000)	2.2	6.4

Name of Each part



Name of Each Part of Servo Motor



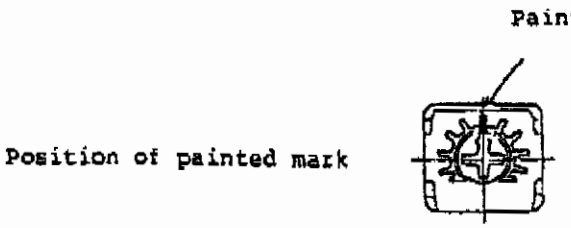
Name of Each Part of Servo Amplifier

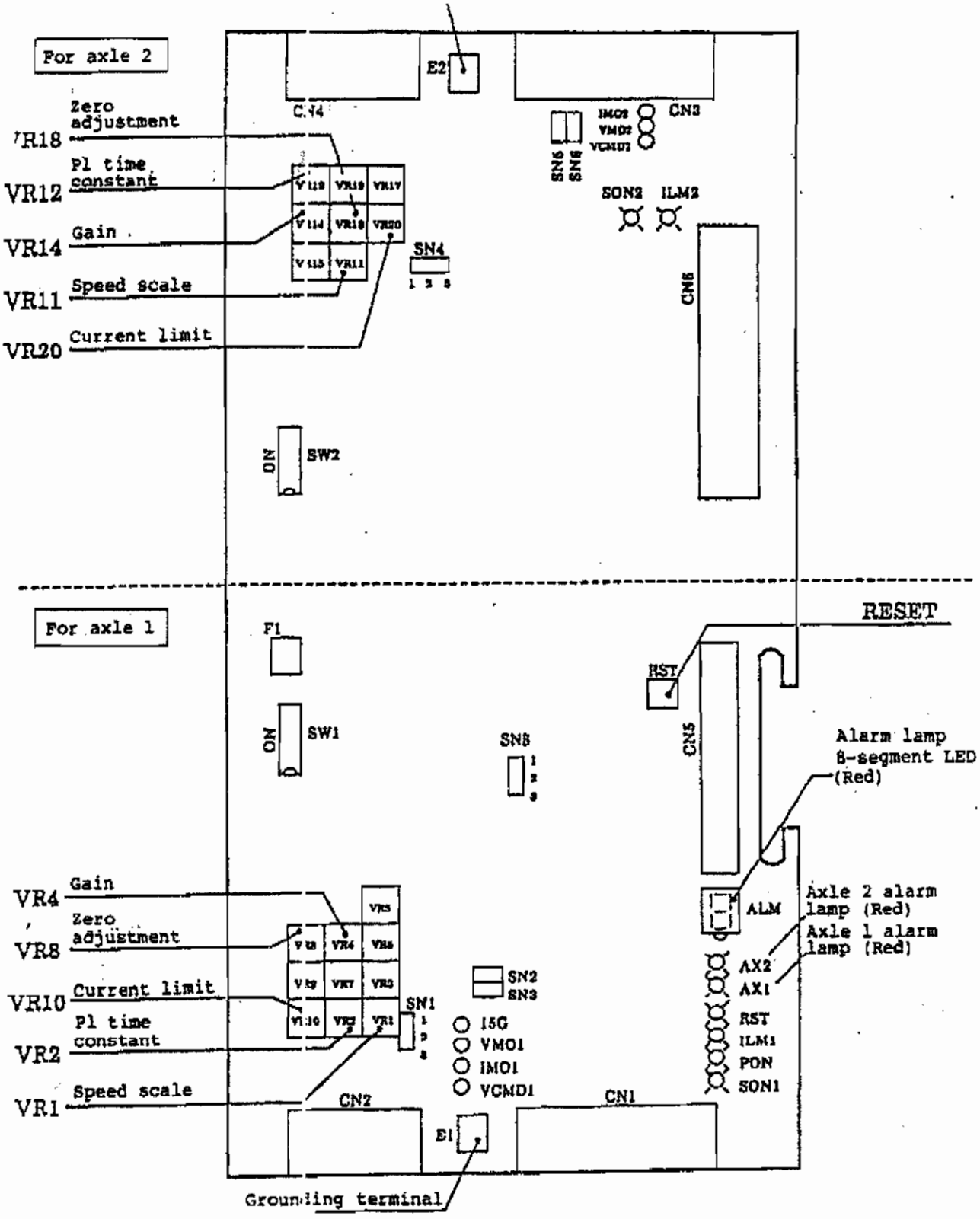
Adjustments

The servo amplifier is adjusted before shipment so that a combination of the servo amplifier with an applicable servo motor assures optimum characteristics. Therefore, never touch each adjusting resistor unless necessary. Carefully read Maintenance Manual M-04570 before making necessary adjustments.

Precaution -- Check the adjusting resistor for position.

Check to see if each adjusting resistor points the painted mark before maintenance or troubleshooting.





Layout of PCB P1

2 To check the motor for revolutions and currents (torques), observe the waveform with the speed monitor and current monitor of the connector CN_3^1.

Use a measuring device with input impedance of 1 MΩ or more to observe the waveform.

- Speed monitor (VMO_2^1) ..... ±3V ±5%/1000rpm
  Contactor CN_3^1, pins ⑰ and ⑯
  (Pin ⑯ is a common pin.)
- Current monitor (IMO_2^1) ... ±10V ±20%/Maximum continuous armature current
  Contactor CN_3^1, pins ⑱ and ⑯
  (Pin ⑯ is a common pin.)

When VMO voltage and IMO voltage are measured, revolutions (N) and a load torque (T_L) may be found in the following equations.

- Revolutions (N) (rpm) : $N = 1000 \times \frac{\text{VMO voltage}}{3}$
- Load torque (T_L) (kg-cm) : $T_L = T_{PS} \times \frac{\text{IMO voltage}}{10}$
  (where T_{PS} = maximum continuous torque)

Servo Error

1 Trouble indicating lamp

When the trouble indicating lamp (8-segment LED: red) turns ON, identify the indicated trouble by the lighting segment according to the following table. Press the RESET (SW1) push-button, or turn power supply OFF.

2 Type and abbreviation of alarm

Refer to Maintenance Manual for troubleshooting in detail.

Abbre-viation	Segment indication	Content of alarm	Action with servo amplifier
OC	1	Over current in the motor and V bus	. Servo amplifier has power circuit opened at the base.
OL	2	Motor is overloaded.	
OH	3	Heat sink is overheated.	
CB	4	MCB (circuit protector) is opened.	
OV	5	Regenerative resistor is in trouble (voltage, time).	
OS	6	Overspeed	. Servo amplifier is self-maintaining until being reset.
PE	7	Power supply trouble (±15V)	
DE	8	Sensor trouble	. The servo alarm is output.
MPE	9	Main circuit (DC) voltage drops.	

Abbre-viation	Segment indication	Content of alarm	Action with servo amplifier
FP	[A]	Main power supply lacks a phase.	. The alarm is turned into a code signal output to the interface.
SE	[C]	Overrun	
CPUE	☐ Turned OFF	CPU trouble	. Servo amplifier has power circuit opened at the base. . Servo amplifier is self-maintaining until being reset. . The signal "Servo Alarm" is output.
	[.]	A dot keeps lighting during normal operation.	

Note: Classification between axle 1 and axle 2 is performed by the indicator (LED: RED).

Maintenance

Neither the servo motor nor servo amplifier requires special maintenance. Perfo:m the simplest maintenance shown below for longer service life of the servo motor and servo amplifier.

Check procedure

Object	Check conditions			Check item	Check method	Counter-measures
	Interval	During operation	During a stop			
Servo motor	Routine	o		Vibration	Check whether vibration is larger than usual.	Have contact with Sanyo Denki.
	Routine	o		Sound	Check whether unusual sound occurs.	
	As required		o	Cleaning	Check appearance for soil and dirt.	Clean with rags or compressed air.*1
	One year		o	Measure insulation resistance.	Have contact with Sanyo Denki.	
	5000 hours*2		o	Replace oil seal.		
Servo amplifier	As required		o	Cleaning	Check whether dirt deposits on mounted parts.	Clean with compressed air.*1
	One year		o	Loosened screws	Check the external terminal and connectors CN1 and CN2 for screws.	Re-tighten loosened screws.

*1 Check to make certain that compressed air is free from oil mist, moisture, and other foreign matter before cleaning.

*2 Indicates that the servo motor is intended for a waterproof or oil-proof application and should therefore be checked or replaced at this interval.