

EMC Installation Manual

DYNASERV
DD Servo Actuator
DM/SD, DR/SR Series



Compumotor
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IMPORTANT

User Information

To ensure that the equipment described in this user guide, as well as all the equipment connected to and used with it, operates satisfactorily and safely, all applicable local and national codes that apply to installing and operating the equipment must be followed. Since codes can vary geographically and can change with time, it is the user's responsibility to identify and comply with the applicable standards and codes. **WARNING:** *Failure to comply with applicable codes and standards can result in damage to equipment and/or serious injury to personnel.*

Personnel who are to install and operate the equipment should study this user guide and all referenced documentation prior to installation and/or operation of the equipment.

In no event will the provider of the equipment be liable for any incidental, consequential, or special damages of any kind or nature whatsoever, including but not limited to lost profits arising from or in any way connected with the use of this user guide or the equipment.

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(measures to meet the requirements of the EMC standard)	

For Safe Use of Product

- For the safe use of this product, the symbols  and  are used on the product concerned and in this manual. Either symbol on the product indicates that the operator must refer to the warnings and instructions in the manual in order to avoid injury or loss of life. Be sure to follow the warnings. Handling the product in a manner contradictory to the warnings may result in injury or loss of life.
- Completely understand the following instructions before reading the manual.
- This sheet and the manual must be kept on hand while the product is being used and must be passed on to those personnel using the product.

WARNING

KEEP AWAY FROM ROTATING PARTS!



- The motor rotor rotates at high speed. When coupling a load with it, do NOT allow personnel or objects to come within the sphere of its rotation.

ELECTRICAL SHOCK WARNING!

- To avoid electrical shock, make sure that you ground the product.
- Before connecting cables and wires to the driver, make sure that you turn the power off and unplug the power cord.
- When detaching the driver cover for maintenance or the like, make sure that you turn the power off and unplug the power cord.

FIRE AND ELECTRICAL SHOCK WARNING!




- If you notice an abnormal sound, strange odor or smoke coming from the product, immediately turn off the power and unplug the power cord. Then contact the nearest service representative.
- If you drop the product or if it receives a mechanical shock, immediately stop using it and turn off the power. Then contact the nearest service representative.
- Do not use the power supply with a voltage exceeding the range specified for the product.
- Be careful not to let any foreign material such as metal particles, flammable liquids, or water get into the openings on the product (e.g., the gaps around the rotating part or the vents of the driver). Should this happen, immediately turn off the power and then contact the nearest service representative.
- Do not bend, twist, squeeze, or pull the cables from the motor or index bottom with excessive force or subject them to heat or heavy weights.
- Users are strictly prohibited from making modifications to or repairing the product.

- For the safe use of this product, the symbols  and  CAUTION are used on the product concerned and in this manual. Either symbol on the product indicates that the operator must refer to the cautions and instructions in the manual in order to avoid injury, loss of life or damage to the product. Be sure to follow the cautions. Handling the product in a manner contradictory to the cautions may result in injury, loss of life or damage to the product.

 **CAUTION**

- Read this manual carefully before you begin operation. A mistake in operation or in wiring may result in damage to or failure of the product.
- Before turning on the power to the product, make sure that the product is properly wired. Incorrect wiring may cause an electrical shock or damage to the product.
- Make sure that the combination of motor and driver you use is correct. Using an incorrect combination may cause a failure in the product. Check the model number described on the name plate (showing the ratings).
- Follow the environmental conditions specified for storage and installation, such as temperature, humidity, and dust.
- Do not block the vents on the product, and ensure the specified clearance around the product. Poor ventilation causes overheating and leads to failure.
- The motor is heavy. Be careful in transportation and installation. When handling a weight that is more than 18 kg, use appropriate equipment for transportation or lifting.
- Install the motor and driver at their specified mounting angles.
- Keep the protection cover (transparent plastic) only the terminal strip on the driver always attached. It will prevent electrical shock due to careless handling.

Other Symbol Marks

-  Alternating current (AC)
-  Ground terminal
-  Protective ground terminal

1. Applicable Models

⚠ CAUTION

- ◆ Do not use the product in any way other than specified by the manufacturer. The provided protection circuit may not function otherwise.
- ◆ Use the specified combination of motor and driver. Failure to observe this caution may lead to electrical shock or fire.

This installation manual applies to the following models:

(1) DM/SD Series

Max. Torq	Type A Motor/Driver	Max. Torq	Type B Motor/Driver
50N	DM1050A□0*1C/SD1050A□2-□□□*1C	15N	DM1015B□0*1C/SD1015B□2-□□□*1C
100N	DM1100A□0*1C/SD1100A□2-□□□*1C	30N	DM1030B□0*1C/SD1030B□2-□□□*1C
150N	DM1150A□0*1C/SD1150A□2-□□□*1C	45N	DM1045B□0*1C/SD1045B□2-□□□*1C
200N	DM1200A□0*1C/SD1200A□2-□□□*1C	60N	DM1060B□0*1C/SD1060B□2-□□□*1C
		75N	DM1075B□0*1C/SD1075B□2-□□□*1C

(2) DR/SR Series

Max. Torq	Type A Motor/Driver	Max. Torq	Type B Motor/Driver
50N	DR1050A□0*1C/SR1050A□2-□□□*1C	8N	DR1008B□0*1C/SR1008B□2-□□□*1C
100N	DR1100A□0*1C/SR1100A□2-□□□*1C	15N	DR1015B□0*1C/SR1015B□2-□□□*1C
150N	DR1150A□0*1C/SR1150A□2-□□□*1C	30N	DR1030B□0*1C/SR1030B□2-□□□*1C
200N	DR1200A□0*1C/SR1200A□2-□□□*1C	45N	DR1045B□0*1C/SR1045B□2-□□□*1C
300N	DR1300A□0*1C/SR1300A□2-□□□*1C	60N	DR1060B□0*1C/SR1060B□2-□□□*1C
400N	DR1400A□0*1C/SR1400A□2-□□□*1C		

Max. Torq	Type E Motor/Driver
30N	DR1030E□0*1C/SR1030E□2-□□□*1C
70N	DR1070E□0*1C/SR1070E□2-□□□*1C
100N	DR1100E□0*1C/SR1100E□2-□□□*1C
130N	DR1130E□0*1C/SR1130E□2-□□□*1C
160N	DR1160E□0*1C/SR1160E□2-□□□*1C
220N	DR1220E□0*1C/SR1220E□2-□□□*1C
250N	DR1250E□0*1C/SR1250E□2-□□□*1C

(3) DR5000 Series

Max. Torq	Type B/E Motor/Driver
30N	DR5030B□0*1C/SR5030B□2-2□□*1C
50N	DR5050B□0*1C/SR5050B□2-2□□*1C
70N	DR5070B□0*1C/SR5070B□2-2□□*1C
70N	DR5070E□0*1C/SR5070E□2-2□□*1C
100N	DR5100E□0*1C/SR5100E□2-2□□*1C

2. Standards and Codes for Environmental Conditions

The following standards apply to this product:

EMC Standard	Electrical equipment designed for use within certain voltage limits
EN55011/EN55011-Class A EN50082/IEC1000-4-2 EN50082/IEC1000-4-3 EN50082/IEC1000-4-4 EN50082/IEC1000-4-6	IEC1010-1/EN61010-1 IEC 34-1

Note: Based on the premise that there is no static slide in the mounting position.

CAUTION

This is a class A product. In a domestic environment this product may cause radio interference in which cause the user may be required to take adequate measures.

3. Current, Power Consumption, and Cable Specifications

(1) AC Power Supply : 100–115V AC, 50–60Hz

MOTOR				DRIVER		WIRING					RECOMMENDED NOISE FILTER	
Model	Approx. mass	Max. torque	Rated power	Model	Rated power capacity	MCCB capacity	Main power wires (L1, L2, GND)	Power switch capacity	Control power supply wires	Motor wires (VA, VB, VC, GND)	Not for EMC standard	For EMC standard
	kg	Nm	W		VA	A	AWG	A	AWG	AWG	TOKIN	YPC
DM1015B	5.5	15	63	SD1015B	500	9	16	≥35	16	16	LF-210	OF002C-1
DM1030B	7.5	30	95	SD1030B	670	9	16	≥35	16	16	LF-210	OF002C-1
DM1045B	9.5	45	95	SD1045B	750	9	16	≥35	16	16	LF-210	OF002C-1
DM1060B	12	60	125	SD1060B	800	9	16	≥35	16	16	LF-210	OF002C-1
DM1075B	14	75	160	SD1075B	1050	16	14	≥35	16	16	LF-215	OF002C-1
DM1050A	14.5	50	106	SD1050A	710	9	16	≥35	16	16	LF-215	OF002C-1
DM1100A	19	100	212	SD1100A	1120	16	14	≥35	16	16	LF-215	OF002C-1
DM1150A	24	150	160	SD1150A	1120	16	14	≥35	16	16	LF-215	OF002C-1
DM1200A	29	200	212	SD1200A	1320	16	14	≥35	16	16	LF-215	OF002C-1
DR1008B	6	8	33.5	SR1008B	400	9	16	≥35	16	16	LF-210	OF002C-1
DR1015B	9	15	63	SR1015B	500	9	16	≥35	16	16	LF-210	OF002C-1
DR1030B	11	30	95	SR1030B	670	9	16	≥35	16	16	LF-210	OF002C-1
DR1045B	13	45	95	SR1045B	670	9	16	≥35	16	16	LF-210	OF002C-1
DR1060B	15.5	60	125	SR1060B	710	9	16	≥35	16	16	LF-215	OF002C-1
DR1050A	26	50	160	SR1050A	1000	16	14	≥35	16	16	LF-215	OF002C-1
DR1100A	31	100	212	SR1100A	1120	16	14	≥35	16	16	LF-215	OF002C-1
DR1150A	36	150	160	SR1150A	850	16	14	≥35	16	16	LF-215	OF002C-1
DR1200A	45	200	212	SR1200A	1060	16	14	≥35	16	16	LF-215	OF002C-1
DR1300A	55	300	160	SR1300A	900	16	14	≥35	16	16	LF-215	OF002C-1
DR1400A	65	400	212	SR1400A	1120	16	14	≥35	16	16	LF-215	OF002C-1
DR1030E	18	30	95	SR1030E	710	16	14	≥35	16	16	LF-215	OF002C-1
DR1070E	22	70	224	SR1070E	1120	16	14	≥35	16	16	LF-215	OF002C-1
DR1100E	26	100	212	SR1100E	1060	16	14	≥35	16	16	LF-215	OF002C-1
DR1130E	32	130	132	SR1130E	750	16	14	≥35	16	16	LF-215	OF002C-1
DR1160E	36	160	170	SR1160E	900	16	14	≥35	16	16	LF-215	OF002C-1
DR1220E	44	220	224	SR1220E	1120	16	14	≥35	16	16	LF-215	OF002C-1
DR1250E	48	250	265	SR1250E	1250	16	14	≥35	16	16	LF-215	OF002C-1

(2) AC Power Supply : 200–230V AC, 50–60Hz

MOTOR				DRIVER		WIRING					RECOMMENDED NOISE FILTER	
Model	Approx. mass	Max. torque	Rated power	Model	Rated power capacity	MCCB capacity	Main power wires (L1, L2, GND)	Power switch capacity	Control power supply wires	Motor wires (VA, VB, VC, GND)	Not for EMC standard	For EMC standard
	kg	Nm	W		VA	A	AWG	A	AWG	AWG	TOKIN	YPC
DM1015B	5.5	15	63	SD1015B	500	5	16	≥35	16	16	LF-210	OF002C-1
DM1030B	7.5	30	125	SD1030B	750	5	16	≥35	16	16	LF-210	OF002C-1
DM1045B	9.5	45	190	SD1045B	1000	9	16	≥35	16	16	LF-210	OF002C-1
DM1060B	12	60	190	SD1060B	1000	9	16	≥35	16	16	LF-210	OF002C-1
DM1075B	14	75	315	SD1075B	1400	9	16	≥35	16	16	LF-215	OF002C-1
DM1050A	14.5	50	106	SD1050A	710	9	16	≥35	16	16	LF-210	OF002C-1
DM1100A	19	100	212	SD1100A	1120	9	16	≥35	16	16	LF-210	OF002C-1
DM1150A	24	150	315	SD1150A	1500	9	16	≥35	16	16	LF-215	OF002C-1
DM1200A	29	200	425	SD1200A	1900	16	14	≥35	16	16	LF-215	OF002C-1
DR1008B	6	8	33.5	SR1008B	400	5	16	≥35	16	16	LF-210	OF002C-1
DR1015B	9	15	63	SR1015B	500	5	16	≥35	16	16	LF-210	OF002C-1
DR1030B	11	30	125	SR1030B	750	5	16	≥35	16	16	LF-210	OF002C-1
DR1045B	13	45	140	SR1045B	800	9	16	≥35	16	16	LF-210	OF002C-1
DR1060B	15.5	60	125	SR1060B	710	9	16	≥35	16	16	LF-210	OF002C-1
DR1050A	26	50	160	SR1050A	1000	9	16	≥35	16	16	LF-210	OF002C-1
DR1100A	31	100	212	SR1100A	1120	9	16	≥35	16	16	LF-210	OF002C-1
DR1150A	36	150	315	SR1150A	1500	9	16	≥35	16	16	LF-215	OF002C-1
DR1200A	45	200	425	SR1200A	1900	16	14	≥35	16	16	LF-215	OF002C-1
DR1300A	55	300	315	SR1300A	1400	16	14	≥35	16	16	LF-215	OF002C-1
DR1400A	65	400	425	SR1400A	1800	16	14	≥35	16	16	LF-215	OF002C-1
DR1030E	18	30	125	SR1030E	900	9	16	≥35	16	16	LF-210	OF002C-1
DR1070E	22	70	300	SR1070E	1400	9	16	≥35	16	16	LF-210	OF002C-1
DR1100E	26	100	315	SR1100E	1500	9	16	≥35	16	16	LF-210	OF002C-1
DR1130E	32	130	265	SR1130E	1250	9	16	≥35	16	16	LF-210	OF002C-1
DR1160E	36	160	335	SR1160E	1500	9	16	≥35	16	16	LF-215	OF002C-1
DR1220E	44	220	375	SR1220E	1600	16	14	≥35	16	16	LF-215	OF002C-1
DR1250E	48	250	425	SR1250E	1800	16	14	≥35	16	16	LF-215	OF002C-1
DR5070E	26	70	300	SR5070E	1250	9	16	≥35	16	16	LF-215	OF002C-1
DR5100E	32	100	425	SR5100E	1700	16	14	≥35	16	16	LF-215	OF002C-1
DR5030B	13.5	30	125	SR5030B	670	9	16	≥35	16	16	LF-210	OF002C-1
DR5050B	16	50	212	SR5050B	950	9	16	≥35	16	16	LF-215	OF002C-1
DR5070B	18	70	280	SR5070B	1180	9	16	≥35	16	16	LF-215	OF002C-1

4. Precautions in Installation

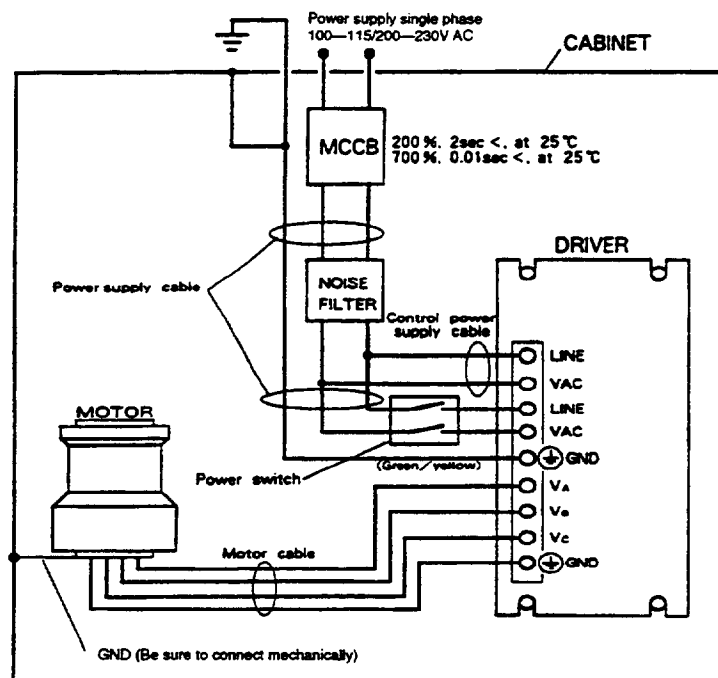
⚠ WARNING

- Grounding must be in accordance with domestic codes and consistent with sound local practices. Failure to observe this warning may lead to electrical shock or fire.

⚠ CAUTION

- Securely tighten screws of the power and motor output terminals. Failure to observe this caution can result in fire.

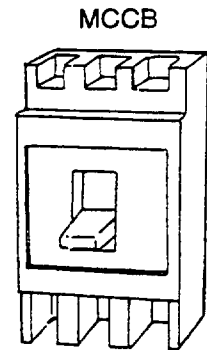
- (1) Install the motor and driver inside a cabinet in order to prevent operators from accidentally touching them.
- (2) Follow the specified mounting angles and orientations for the motor and driver.
- (3) Use the cables and connector specified on page 6 and 7.
- (4) For installation, observe the following precautions:
 - In conformance with local electrical codes, ground the driver's grounding terminal \oplus .
 - Be sure to connect the grounding wire of the motor to \perp of the driver.
 - Do NOT share the grounding cable or grounding rod with welding machines, power equipment, or other high-voltage devices.
 - Make the grounding wires as short as possible.
 - For the cable size of power and grounding wires, see page 6 and 7.
- (5) Installation must be conducted by personnel who have been instructed in the precautions to be followed during installation.
- (6) The controller to be connected must comply with EN61010-1 and EN60950-1.
- (7) The fuses built into the driver are:
 - F1: Little 218002; 250 V, 2 A; Type T
 - F2, F3: Little 314015; 250 V, 15 A; Type F



⚠ CAUTION

Use a molded-case circuit breaker (MCCB) or fuse to protect the power supply line from high voltage.

- This Driver directly connected to the commercial power supply without a transformer. Always use an MCCB or fuse to protect the servo system from accidental high voltage.
- Select an appropriate MCCB or fuse according to the Driver capacity and the number of Drivers to be used as shown below.



(8) Power distribution is normally provided by the customer. Figure 4.1 show examples of AC power distribution.

A switch or circuit breaker must be provided for connection of a permanently connected device or polyphase device. If the switch is not part of the device, the following description must be included in the documentation for installing the device:

- A switch or circuit breaker must be provided when installing the device.
- This switch or circuit breaker must be installed near the device within easy reach of the operator.
- This switch or circuit breaker must be marked clearly as a means of cutting off the power to the device.

The marking must be located close to the switch or circuit - breaker.

The power cable is branched to each unit by way of an MCCB. Each power system uses three terminals (AC and ground: IOS M4 to M6 screws).

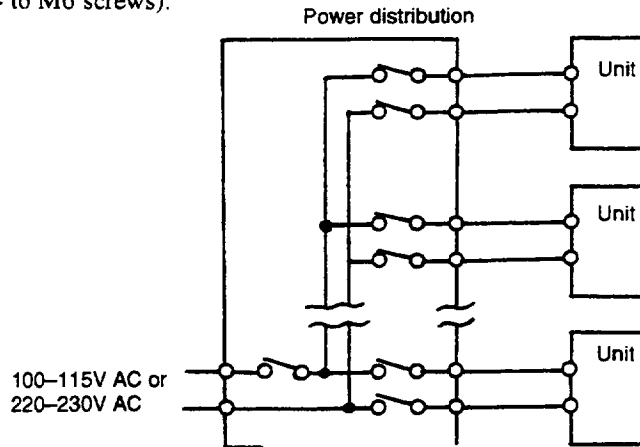
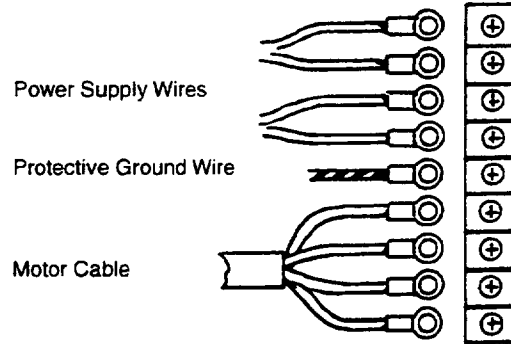


Figure 4.1 AC Power Distribution

(9) Power supply and motor wiring

- Make sure the power switch is turned OFF and remove the transparent cover.
- Connect the power supply wires and the protective ground wire to the power terminals and the ground terminals as shown below.
- Replace the transparent cover.



⚠ WARNING

To prevent electric shock, ensure the main power supply is turned OFF.
For power and ground wiring termination, use "crimp on" lugs (for 4-mm screws) with insulation sleeves (see figure 4.2).
To prevent fire, use 600V PVC insulated wire for power and ground wiring.

- Always use solderless lugs with insulating covering.
- Always use solderless lugs and matching crimp-on tool made by the same manufacturer.
- The crimp-on tool must be matched to the wire thickness.

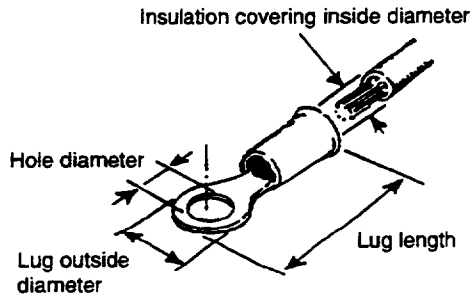
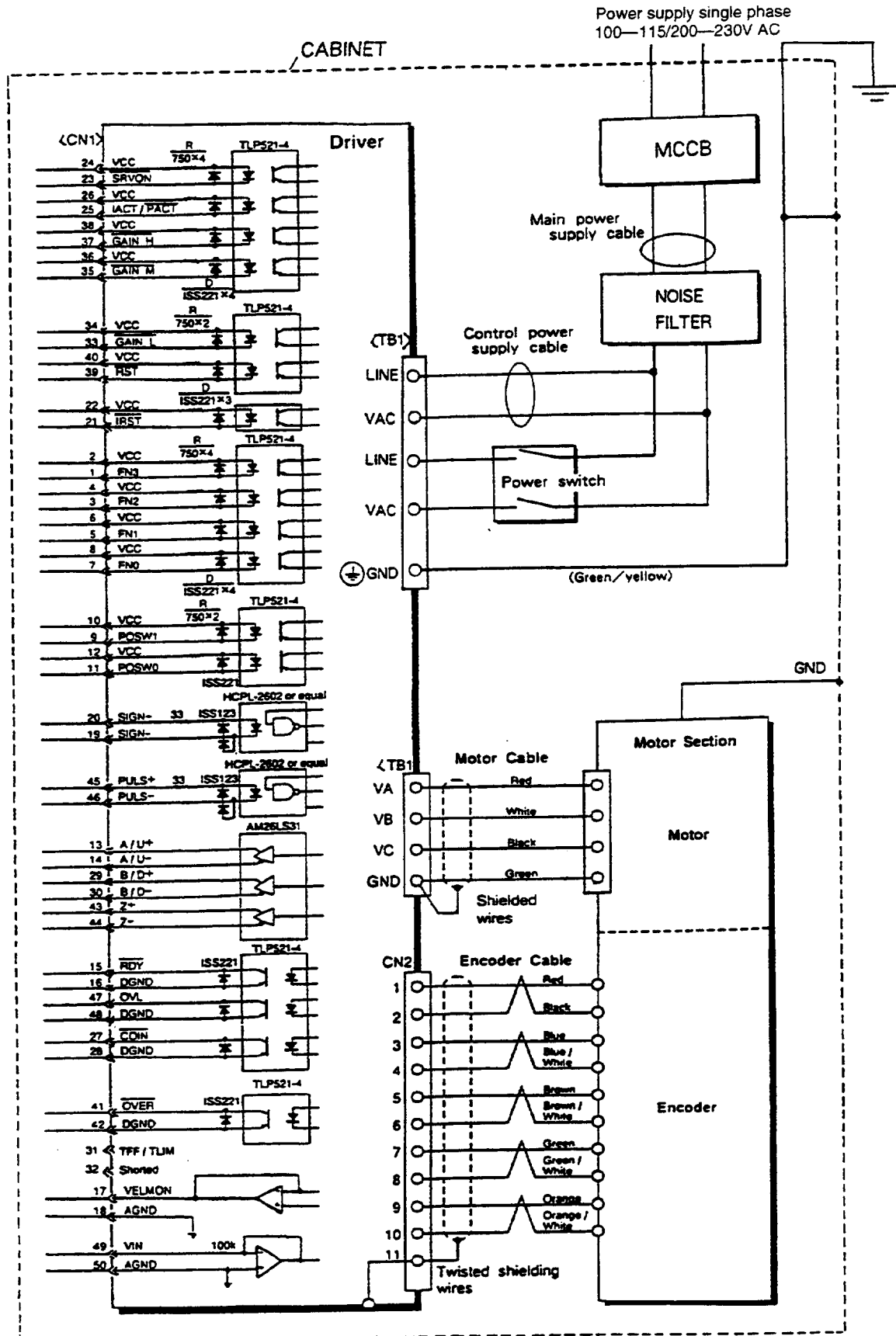


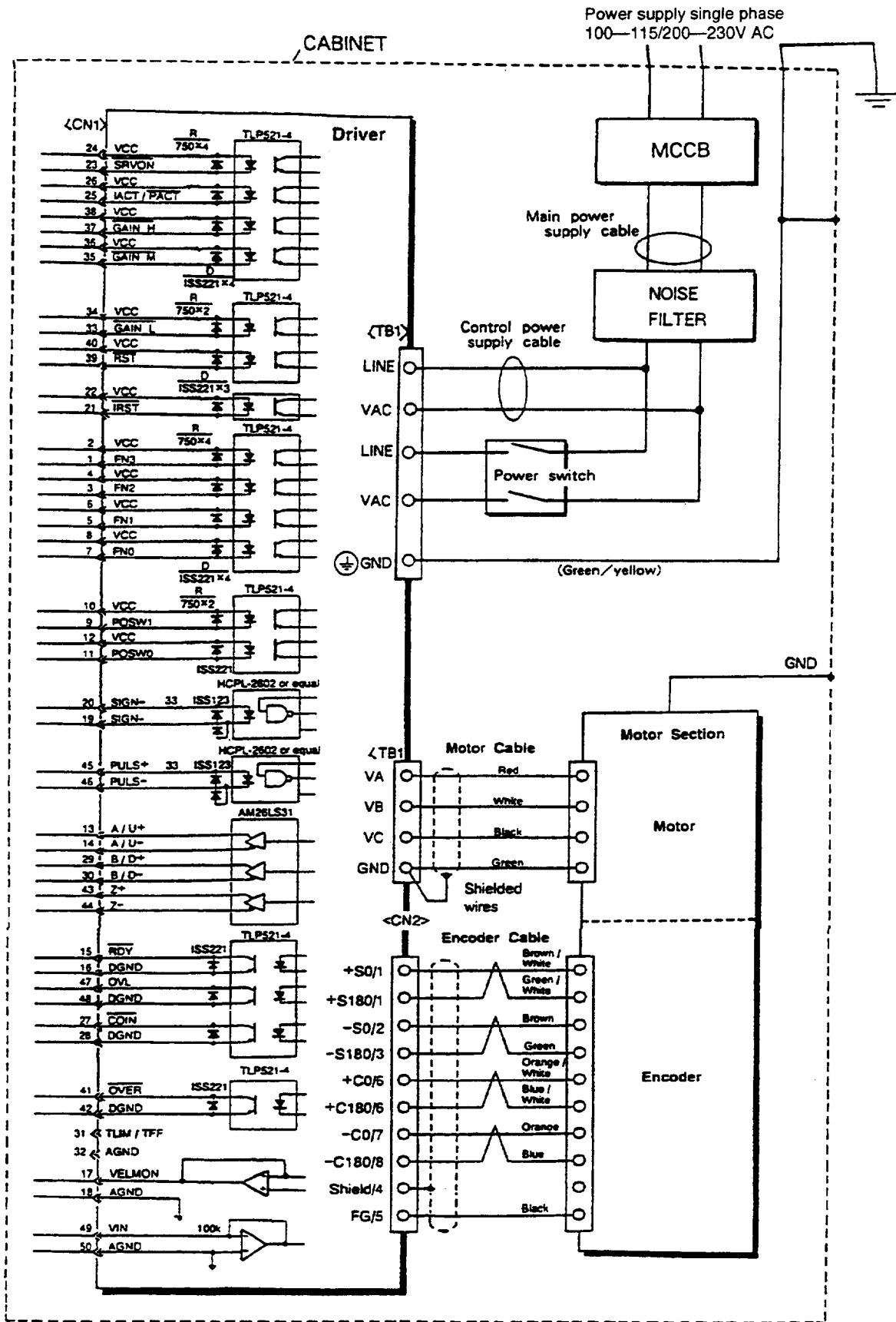
Figure 4.2 Solderless (crimp-on) Lug

5. Connection

(1) DM/SD Series



(2) DR/SR Series



6. Motor-section Mounting

The motor-section can be mounted either vertically or horizontally. However, incorrect mounting and an unsuitable location may shorten the motor's service life and cause problems. Therefore, always observe the following.

(1) Installation Location

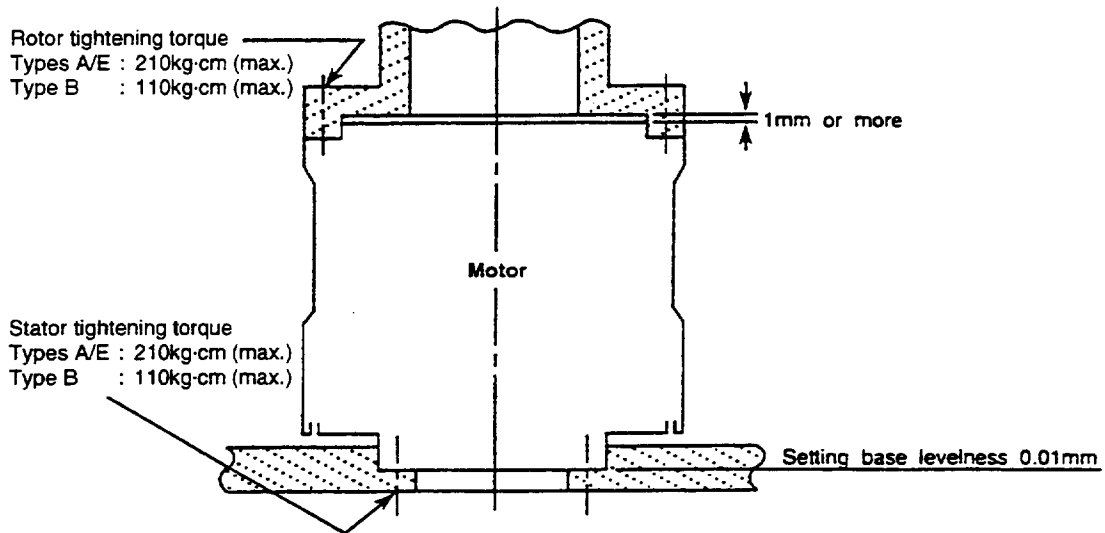
The motor is designed for indoor use. Therefore, installation must be where:

- There are no corrosive or explosive gases.
- The ambient temperature is between 5°C and 40°C.
- Dust concentration is low, with adequate air ventilation and low humidity.

Note: DYNASERV is not drip proof or oil proof, so it should be covered with a suitable drip proof and oil proof cover.

(2) Mechanical Coupling

- When coupling a load with the motor rotor section, make sure there is a clearance of more than 1mm between the motor's upper surface and the load.
- Secure the motor rotor and stator by tightening the setscrews with torques of less than the values given below.
- Motor base levelness deviation must be maintained at less than 0.01mm.



Note: When tightening the screws, always apply LOCTITE 601 or the equivalent to these screws to lock them.

⚠ CAUTION

The motor is heavy! Take care during transportation and installation. When handling a weight exceeding 18 kg, attach I bolts or the like to the screw holes for coupling of the load and use suitable hoisting equipment, etc. when transporting or moving the motor.

7. Driver Section Mounting

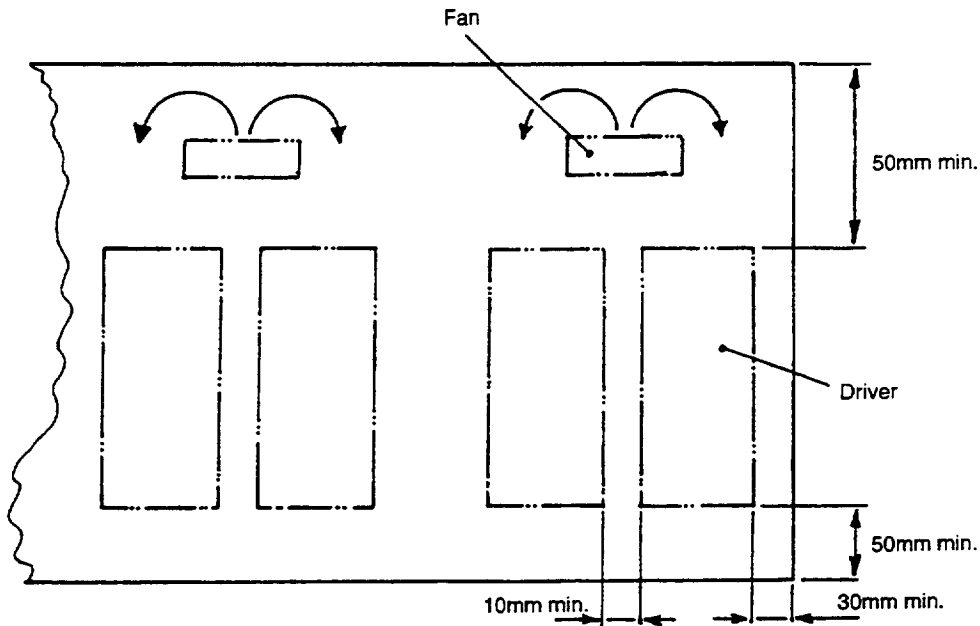
The standard driver is designed for rack mounting.

(1) Installation Location

- If there is a heat generation source near the installation location, ensure that the temperature does not exceed 40°C in the proximity of the driver by providing an appropriate heat shield or cover, etc.
- If there is a vibration generating source near the driver, then mount the driver on a rack with appropriate vibration insulators.
- Installation must be where the humidity is low, and where the surrounding environment is free from high temperatures, dust, metal powders or corrosive gases.

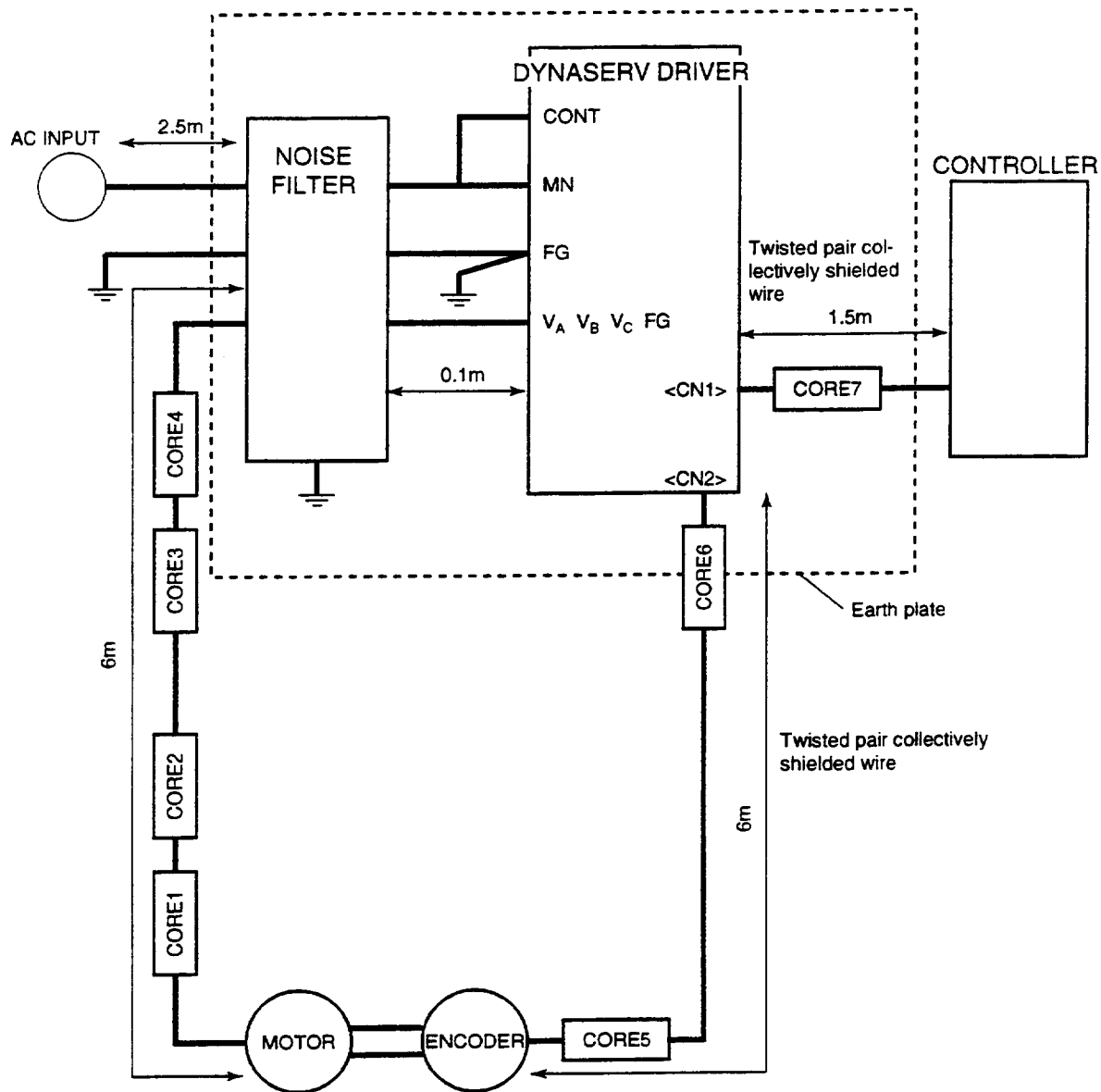
(2) Mounting Procedure

- Normally, the driver is rack mounted (L-shaped angle brackets) with its driver panel facing forward and its top and bottom surfaces horizontal.
- Mount the driver using 4-screw holes at the top and bottom of the driver panel.
- If mounting two or more drivers, provide clearance between the drivers as shown in the figure below.



8. Provision of Noise Filter (measures to meet the requirements of the EMC standard)

(1) Circuit Diagram



	DM/SD Series	DR/SR Series
Noise Filter	Yokogawa Precision Parts No. OF002C-1	
Cores 1 to 4	TDK # ZCAT 3035-1330	
Core 5	TDK # ZCAT 3035-1330	None
Core 6	TDK # ZCAT 3035-1330	TDK # ZCAT 2035-0930
Core 7	TDK # ZCAT 3035-1330	

(2) Precautions in Installation of Noise Filter

1. Connect the noise filter box to the driver as shown in the following figure.
2. Securely couple the front panels of both the filter box and driver together mechanically and electrically.
3. Firmly connect the lead wires from the noise filter box to the driver terminals as shown in the following figure.
4. For the dimensions of the noise filter box, see Fig. 8.2.

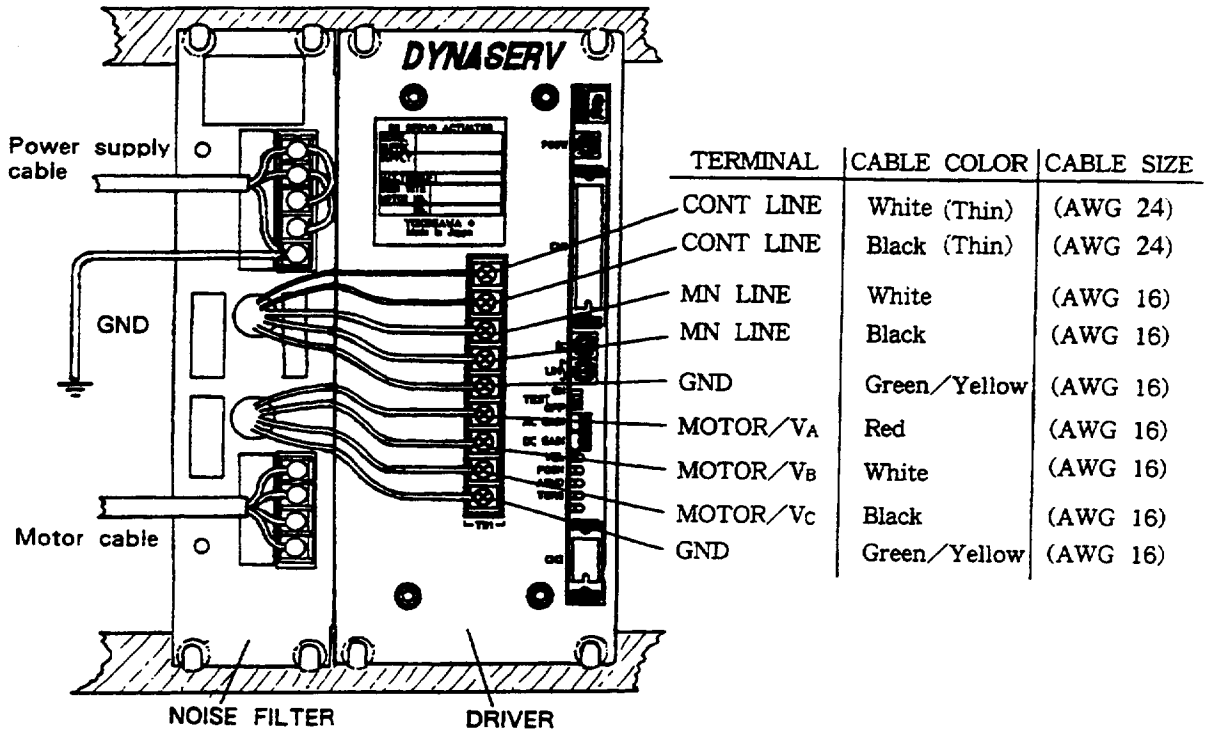


Figure 8.1 Connection Noise Filter and Driver

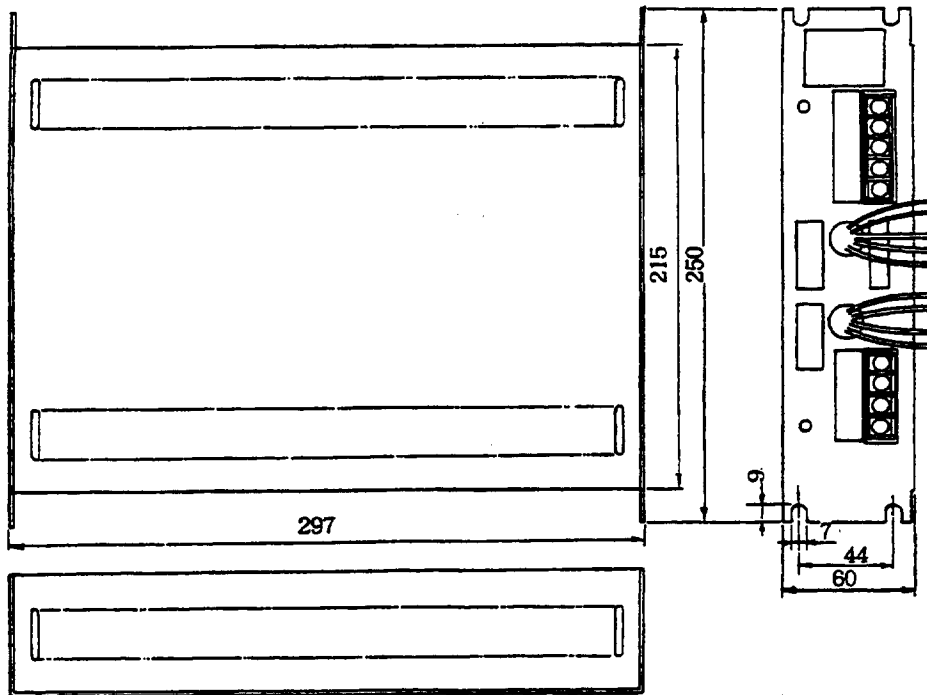


Figure 8.2 Noise Filter Box Dimensions (Unit: mm)