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SERVO DRIVE UNIT

MAINTENANCE MANUAL BLIV-D Type A (1st Edition)

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LIST OF PUBLICATIONS

Version	Date of revision	Description	Applicable section
1st (V1.0)	2008.3.3	Newly created	All

SAFETY PRECAUTIONS

The control system that is explained in this manual contains various electric components and units. Please read this manual thoroughly and understand the electric wiring among the electric components, units, and power supply to avoid unexpected bodily injuries and malfunction or burnout of the electric components and units.

(1) Always turn off all the power supplies and discharge the electric charge remaining inside the system before connecting or disconnecting the units. Failure to follow this instruction may result in electric shock or other bodily injury as well as malfunction or burnout of the units.

(2) Check the specifications of the power supply to be connected to the units. Incorrect voltage or electrical polarity may cause unit malfunction or burnout.

(3) Check the inlet connections and outlet connections of all the units. Incorrect connection may cause unit malfunction or burnout.

(4) Always connect the earth wires as well as the PE wires for the magnetic power cabinet. Failure to follow this instruction may result in electric shock or other bodily injury due to an earth leakage.

(5) Set the overcurrent protective device such as circuit breakers or fuses. Failure to follow this instruction may result in fire or burnout of cables and units due to a short circuit.

(6) If you make the cables to connect the units by yourself, always use the cable of the size appropriate for load current especially for power cables. Insufficient current capacity may cause a fire or burnout of the cables due to overheating.

(7) Select the dust-repellent water-proof type of magnetic power cabinet or control box that houses various units. Dust or water may cause electric shock or other bodily injury as well as the unit malfunction or burnout.

(8) Always use thermostats which are built-in the motors and units to protect the mechanical device. Failure to follow this instruction may cause a fire or units burnout.

Following caution signs are used in this manual to draw attention to information of particular importance.

⚠ DANGER This sign is to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING This sign is to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION This sign is to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damages.

NOTICE This sign is to indicate general instructions for safe operation.

Keep this manual handy for reference.
Information in this document is subject to change without notice due to constant improvements.

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TABLE OF CONTENTS

SECTION 1 INTRODUCTION

This instruction manual describes how to maintain and inspect maintenance units (BLIV-D Type A) for conventional servo drive units (BLII-D type A).

Correspondences between conventional and maintenance units are shown in the table below.

Table 1-1 Table of correspondences between conventional and maintenance units

Conventional unit		Maintenance unit	Remarks
1-axis unit	BLII-D15A BLII-D30A BLII-D50A BLII-D75A BLII-D100A	BLIV-D100A	*1)
	BLII-D150A BLII-D200A	BLIV-D200A	*2)
2-axis unit	BLII-D1515A BLII-D3015A BLII-D5015A BLII-D7515A BLII-D3030A BLII-D5030A BLII-D7530A BLII-D5050A BLII-D7550A BLII-D7575A	BLIV-D7575A	*3)

*1) Maintenance units corresponding to conventional units with capacities from 15 A to 100 A are all integrated into the BLIV-D100A. To apply this maintenance unit to a conventional unit with each capacity, designate the capacity with the settings of the jumper connector and switches equipped with the unit. For further information, see Appendices 2 and 3.

*2) Maintenance units corresponding to conventional units with capacities from 150 A to 200 A are all integrated into the BLIV-D200A. To apply this maintenance unit to a conventional unit with each capacity, designate the capacity with the settings of the jumper connector and switches equipped with the unit. For further information, see Appendices 2 and 3.

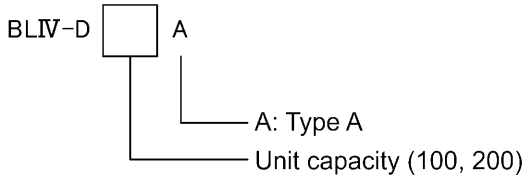
*3) Maintenance units corresponding to conventional units with capacities from 15 A to 75 A are all integrated into the BLIV-D7575A. To apply this maintenance unit to a conventional unit with each capacity, designate the capacity with the settings of the jumper connector and switches equipped with the unit. For further information, see Appendices 2 and 3.

SECTION 2 CONFIGURATION AND CONNECTION

1. Configuration

A BLIV-D drive unit consists of a control PC board and a power unit, and the product line is structured as shown in the table below.

・1-axis unit type



・2-axis unit type

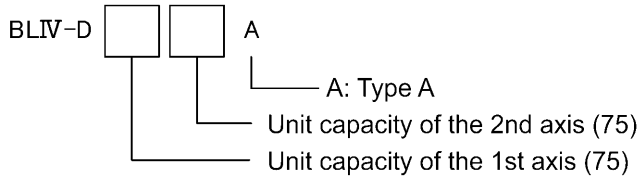
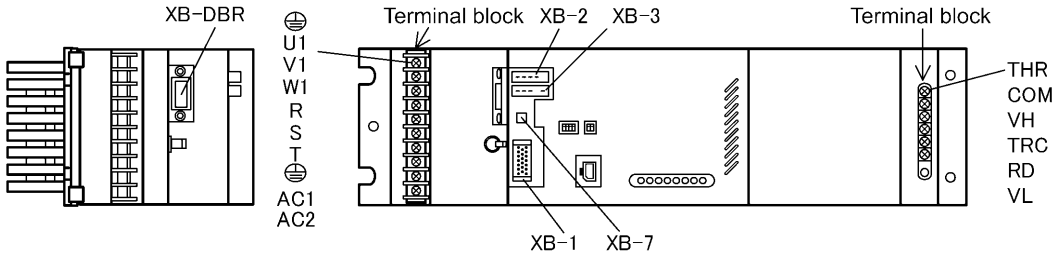


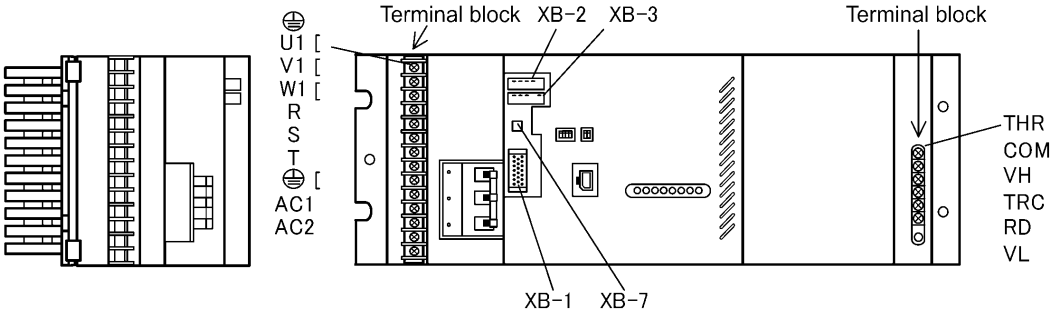
Table 2-1 BLIV-D product line structure

Product code	Product name	Remarks
U 0614-0006-001-11	BLIV-D100A	Compatible with 15 A, 30 A, 50 A, 75 A, and 100A Reworked version of BLII-D100A
U 0616-0006-001-11	BLIV-D200A	Compatible with 150 A and 200A Reworked version of BLII-D200A
U 0632-0006-001-11	BLIV-D7575A	Compatible with 15 A, 30 A, 50 A, and 75 A Reworked version of BLII-D7575A

BLIV-D100A External view



BLIV-D200A External view



BLIV-D7575A External view

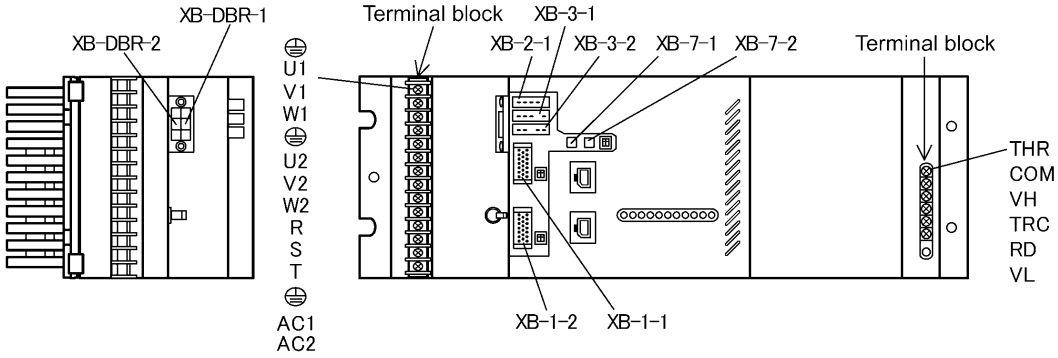


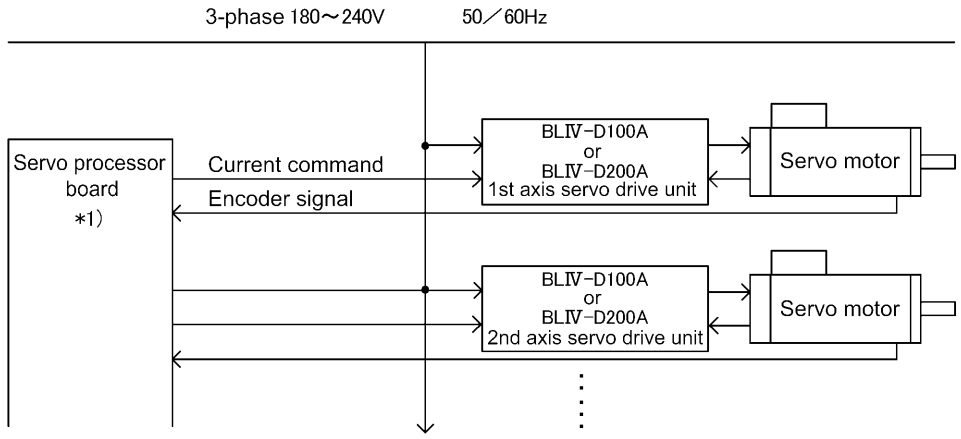
Fig. 2-1 Connector layout

2. Connection

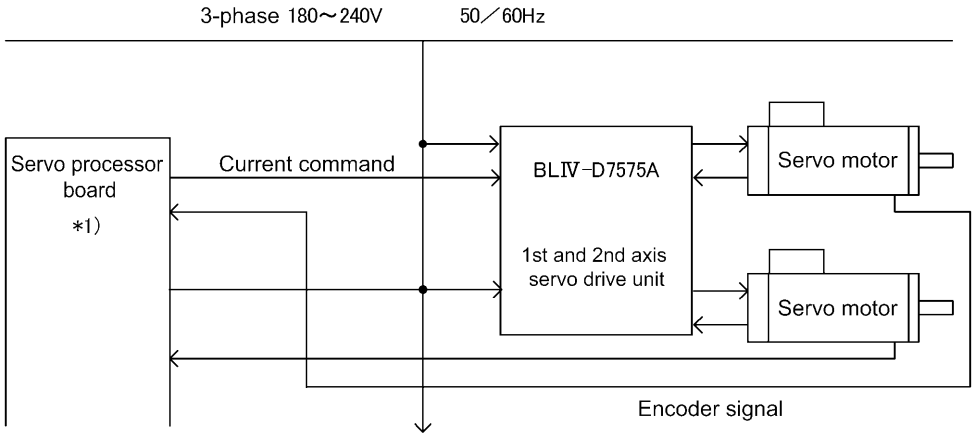
2-1. General connection diagram

A servo drive unit is connected to a 1-axis unit or 2-axis unit as below.

(1) Connected to 1-axis unit



(2) Connected 2-axis unit



1) For OSP5020: SVP Ⅱ D board
For OSP7000: SVP board

Fig. 2-2 System general block diagram

2-2. Connection diagram

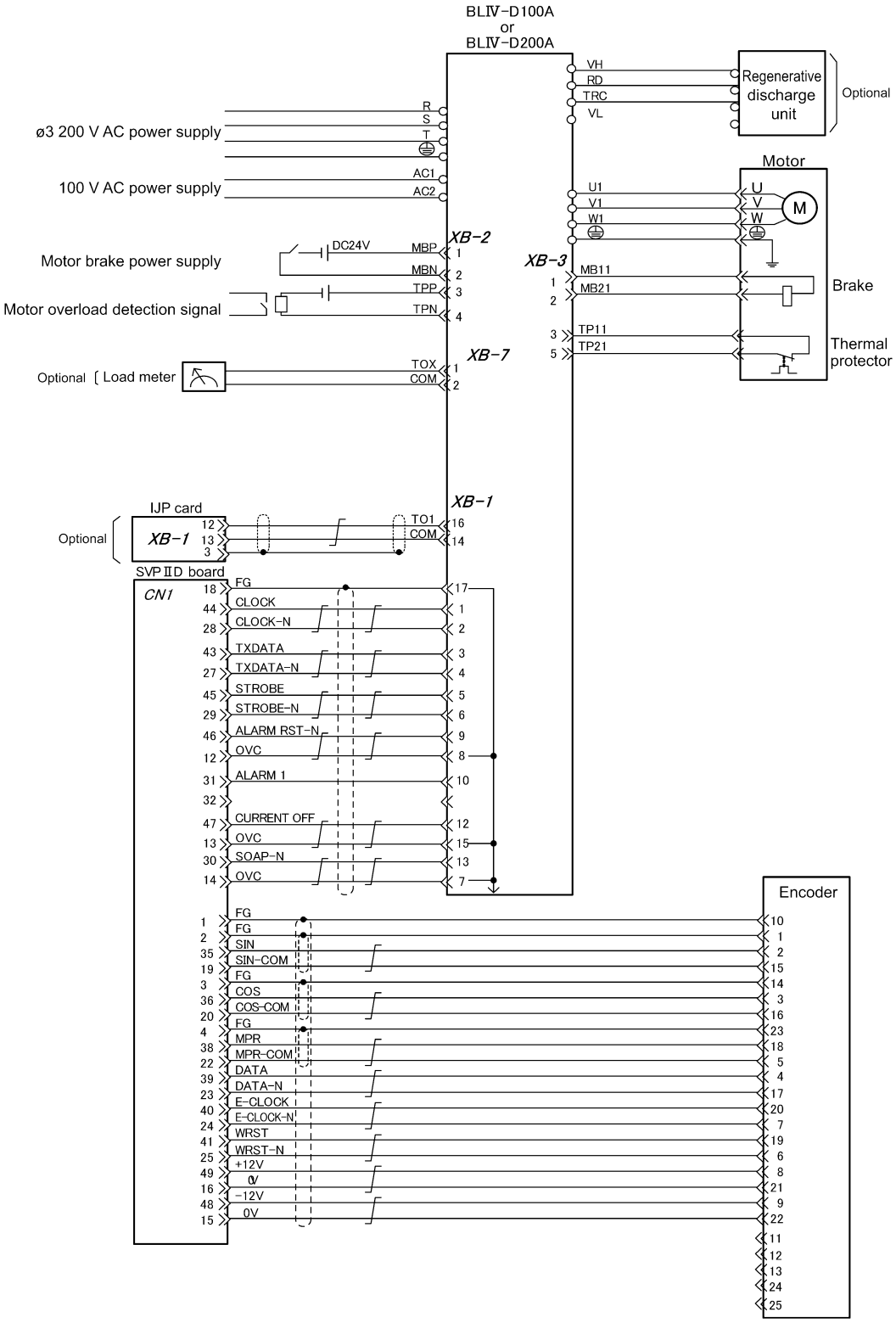


Fig. 2-3 OSP5020 System connection diagram (BLIV-D100A, BLIV-D200A)

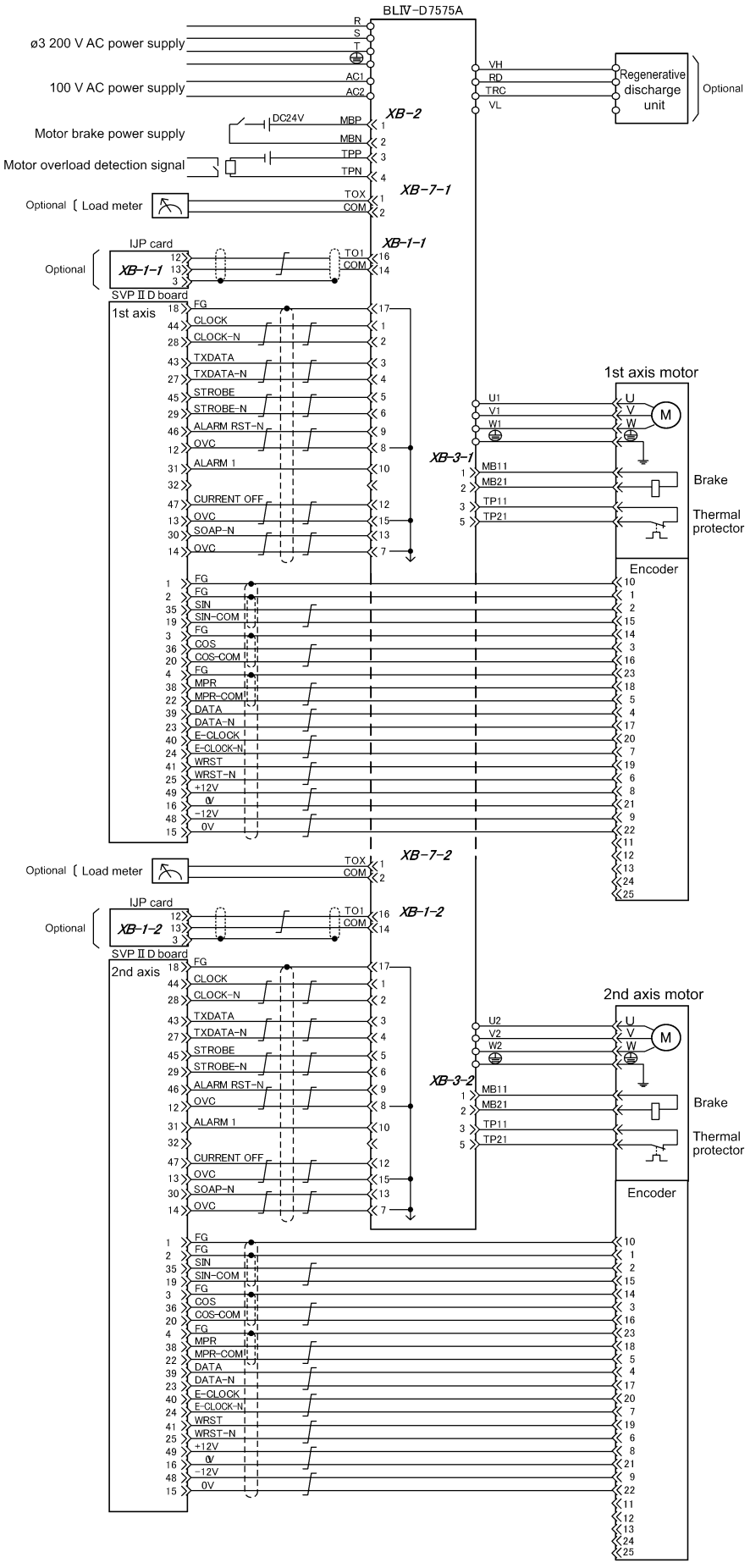


Fig. 2-4 OSP5020 System connection diagram (BLIV-D7575A)

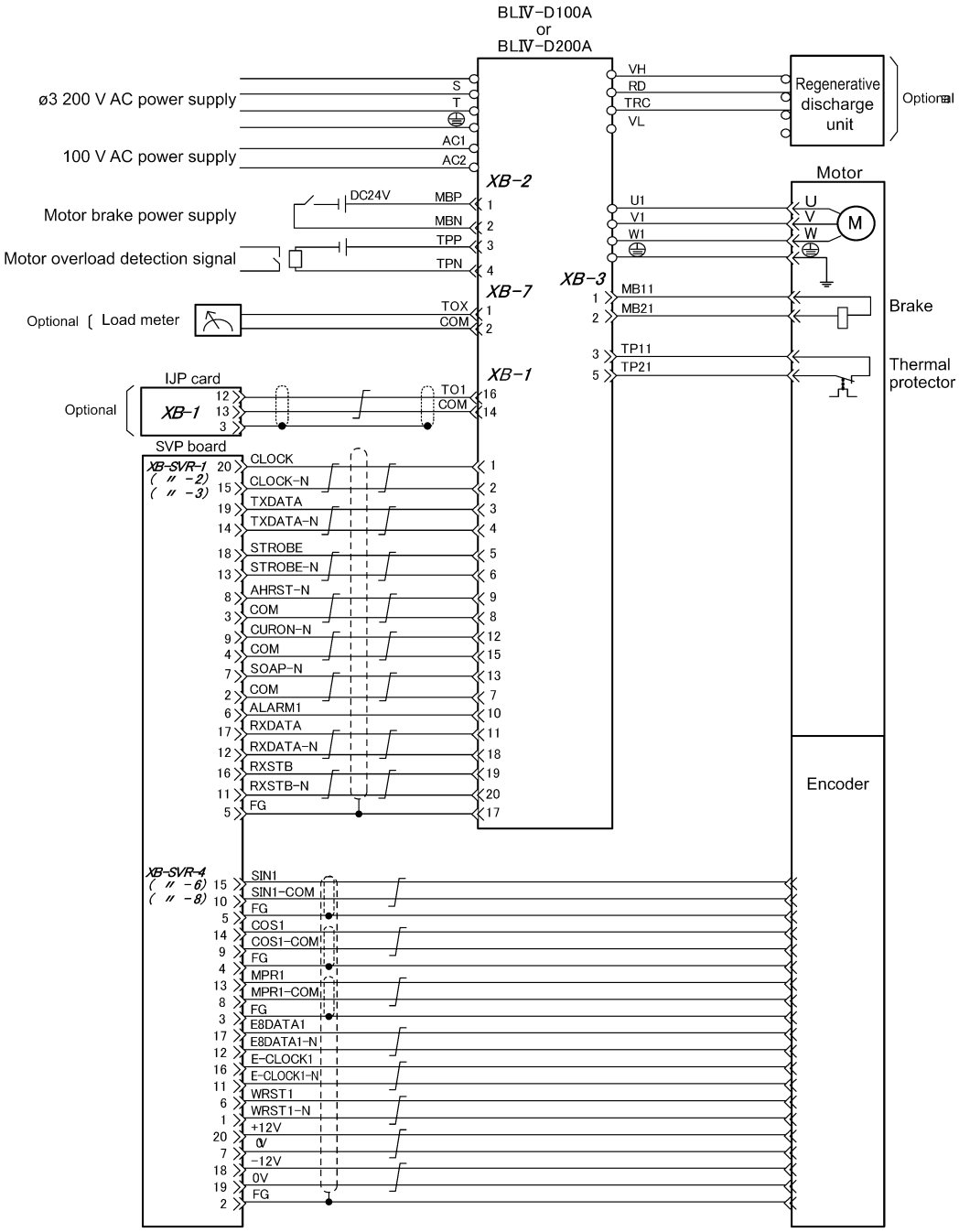


Fig. 2-5 OSP7000 System connection diagram (BLIV-D100A, BLIV-D200A)

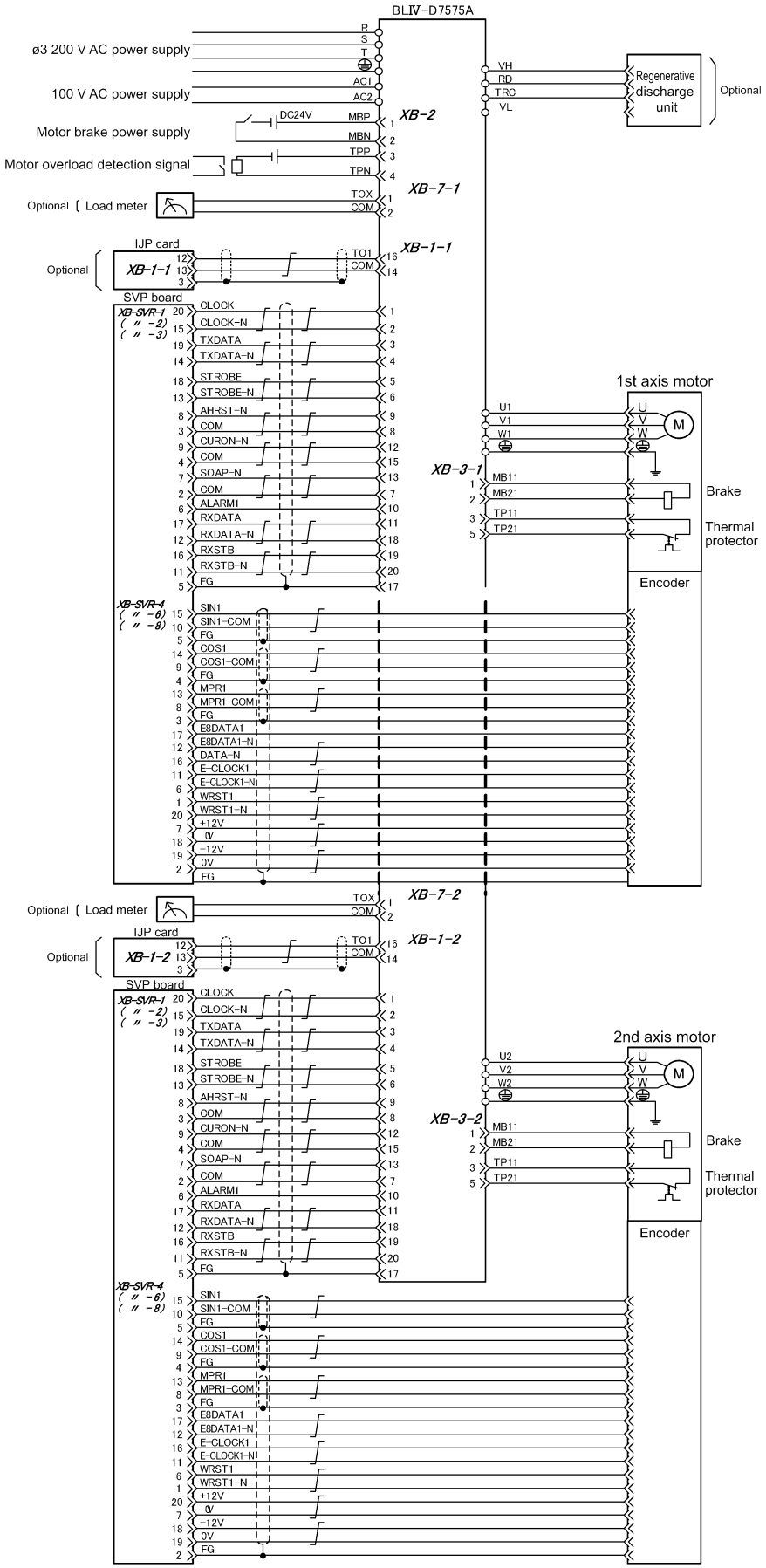


Fig. 2-6 OSP7000 System connection diagram (BLIV-D7575A)

2-3. Power supply and I/O connection diagram

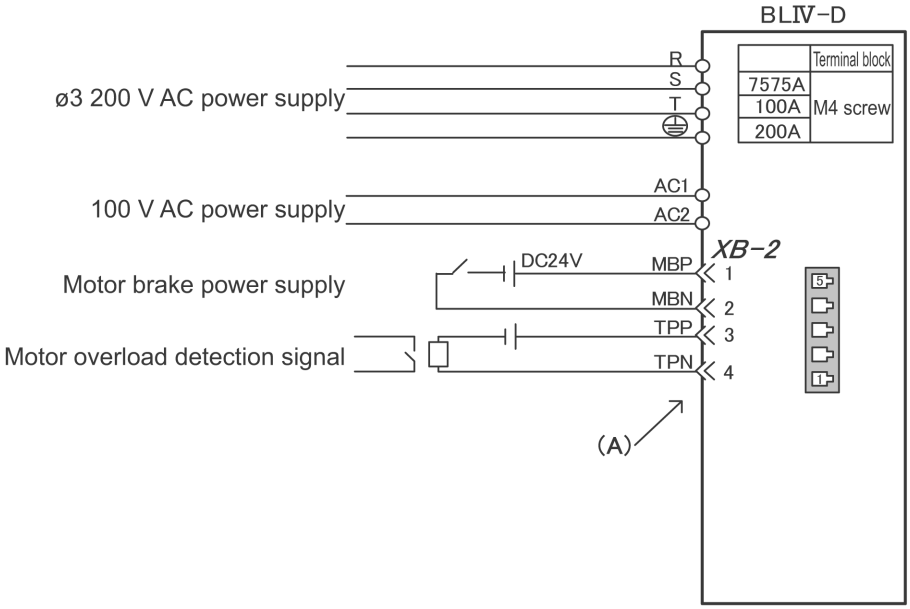


Fig. 2-7 Power supply and I/O connection diagram

		Okuma part No.	Model	Manufacturer
(A)	Connector Contact Keying plug	E3702-082-046 E3708-082-178 E3708-082-183	1-178288-5 1-175217-2 175855-1	Tyco Electronics AMP

2-4. Drive unit and servo motor connection diagram (OSP5020　BLIV-D100A, BLIV-D200A)

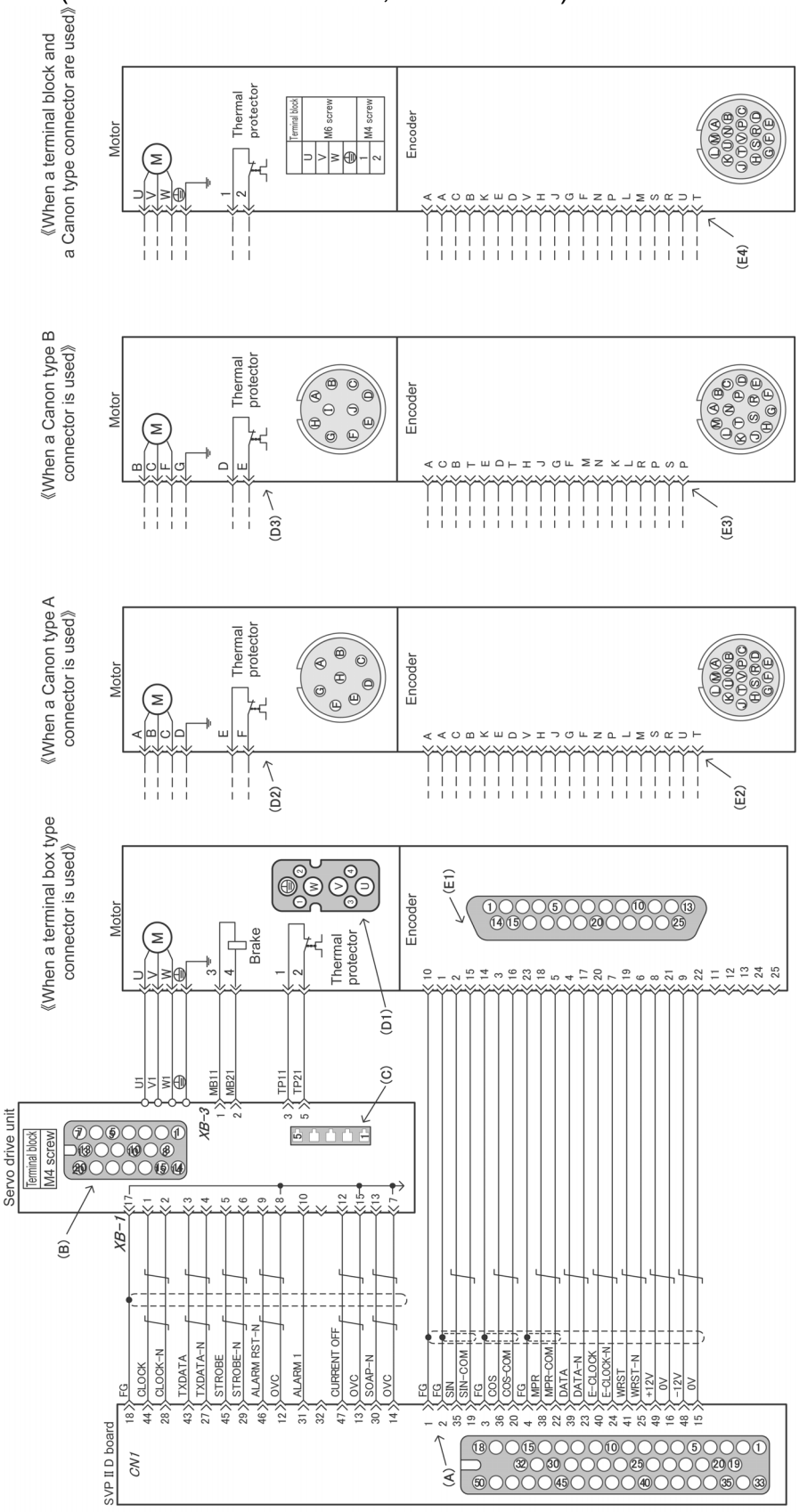


Fig. 2-8 Drive unit and servo motor connection diagram (OSP5020　BLIV-D100A, BLIV-D200A)

SECTION 2 CONFIGURATION AND CONNECTION

		Okuma part No.	Model	Manufacturer
(A)	Connector Contact	E3702-791-012 E3761-791-001	MRP-50F01 MRPF102	Honda Tsushin Kogyo
(B)	Connector Contact	E3702-791-010 E3761-791-001	MRP-20F01 MRPF102	Honda Tsushin Kogyo
(C)	Connector Contact Keying plug	E3702-082-046 E3708-082-178 E3708-082-183	1-178288-5 1-175217-2 175855-1	Tyco Electronics AMP
(D1)	Connector	E3700-566-107	TG33-8S-F0R	Japan Aviation Electronics Industry
(E1)	Connector Contact	E3700-566-048 E3708-566-032	DBUF-25S-F0 DC-20-22S-PKG100	Japan Aviation Electronics Industry
(D2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-152 E3702-566-144	MS3106B22-23S MS3108B22-23S	Japan Aviation Electronics Industry
(E2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry
(D3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-004 E3702-566-104	MS3106B18-1S MS3108B18-1S	Japan Aviation Electronics Industry
(E3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-008 E3702-566-108	MS3106B20-29S MS3108B20-29S	Japan Aviation Electronics Industry
(E4)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry

2-5. Drive unit and servo motor connection diagram (OSP5020 BLIV-D7575A)

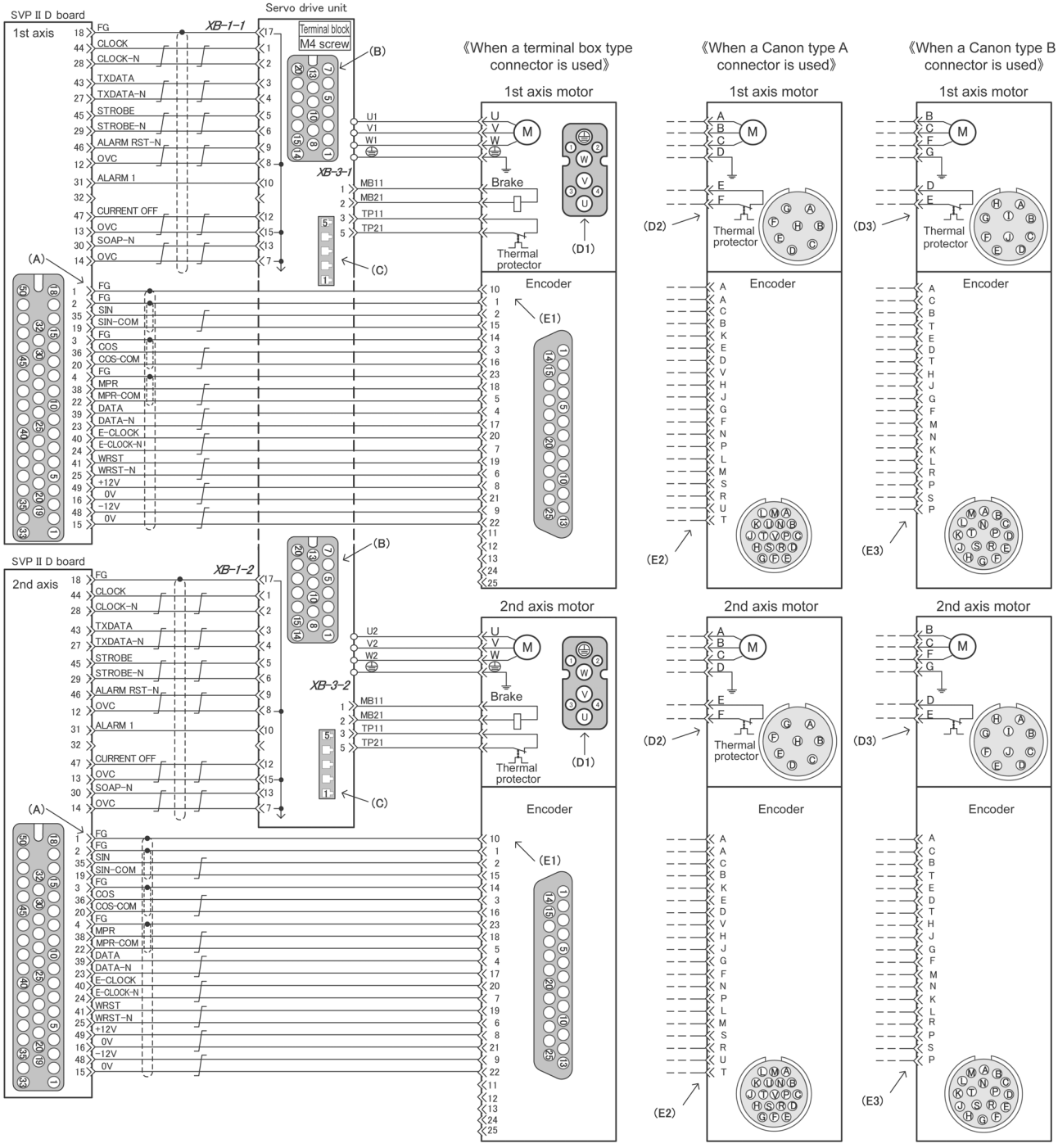


Fig. 2-9 Drive unit and servo motor connection diagram (OSP5020 BLIV-D7575A)

		Okuma part No.	Model	Manufacturer
(A)	Connector Contact	E3702-791-012 E3761-791-001	MRP-50F01 MRPF102	Honda Tsushin Kogyo
(B)	Connector Contact	E3702-791-010 E3761-791-001	MRP-20F01 MRPF102	Honda Tsushin Kogyo
(C)	Connector Contact Keying plug	E3702-082-046 E3708-082-178 E3708-082-183	1-178288-5 1-175217-2 175855-1	Tyco Electronics AMP
(D1)	Connector	E3700-566-107	TG33-8S-F0R	Japan Aviation Electronics Industry
(E1)	Connector Contact	E3700-566-048 E3708-566-032	DBUF-25S-F0 DC-20-22S-PKG100	Japan Aviation Electronics Industry
(D2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-152 E3702-566-144	MS3106B22-23S MS3108B22-23S	Japan Aviation Electronics Industry
(E2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry
(D3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-004 E3702-566-104	MS3106B18-1S MS3108B18-1S	Japan Aviation Electronics Industry
(E3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-008 E3702-566-108	MS3106B20-29S MS3108B20-29S	Japan Aviation Electronics Industry
(E4)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry

2-6. Drive unit and servo motor connection diagram (OSP7000 BLIV-D100A, BLIV-D200A)

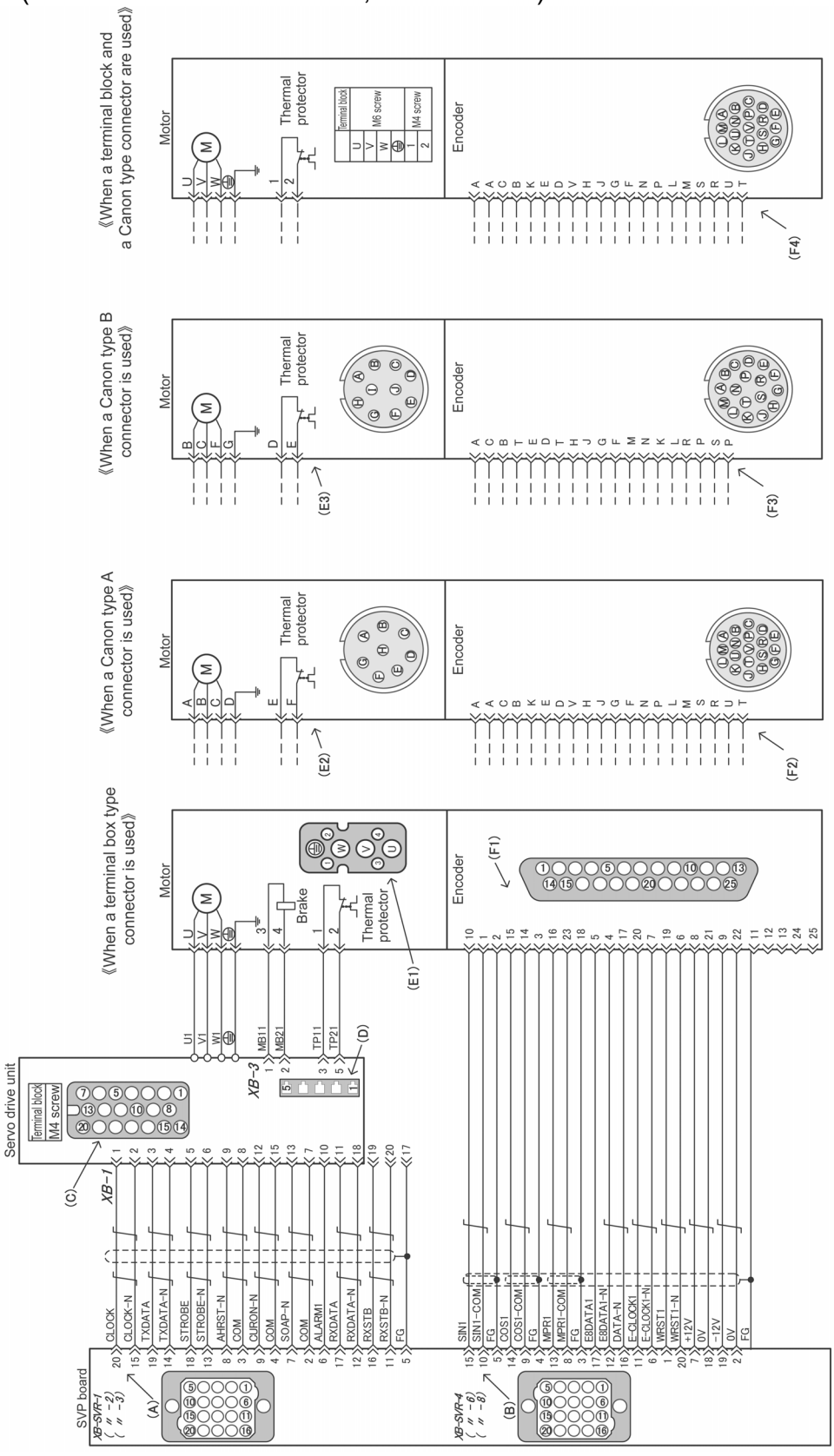


Fig. 2-10 Drive unit and servo motor connection diagram (OSP7000 BLIV-D100A, BLIV-D200A)

		Okuma part No.	Model	Manufacturer
(A)	Connector Contact	E3702-791-087 E3761-791-001	MRP-A20FS2 MRPF102	Honda Tsushin Kogyo
(B)	Connector Contact	E3702-791-086 E3761-791-001	MRP-A20FS1 MRPF102	Honda Tsushin Kogyo
(C)	Connector Contact	E3702-791-010 E3761-791-001	MRP-20F01 MRPF102	Honda Tsushin Kogyo
(D)	Connector Contact Keying plug	E3702-082-046 E3708-082-178 E3708-082-183	1-178288-5 1-175217-2 175855-1	Tyco Electronics AMP
(E1)	Connector	E3700-566-107	TG33-8S-F0R	Japan Aviation Electronics Industry
(F1)	Connector Contact	E3700-566-048 E3708-566-032	DBUF-25S-F0 DC-20-22S-PKG100	Japan Aviation Electronics Industry
(E2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-152 E3702-566-144	MS3106B22-23S MS3108B22-23S	Japan Aviation Electronics Industry
(F2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry
(E3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-004 E3702-566-104	MS3106B18-1S MS3108B18-1S	Japan Aviation Electronics Industry
(F3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-008 E3702-566-108	MS3106B20-29S MS3108B20-29S	Japan Aviation Electronics Industry
(F4)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry

2-7. Drive unit and servo motor connection diagram (OSP7000　BLIV-D7575A)

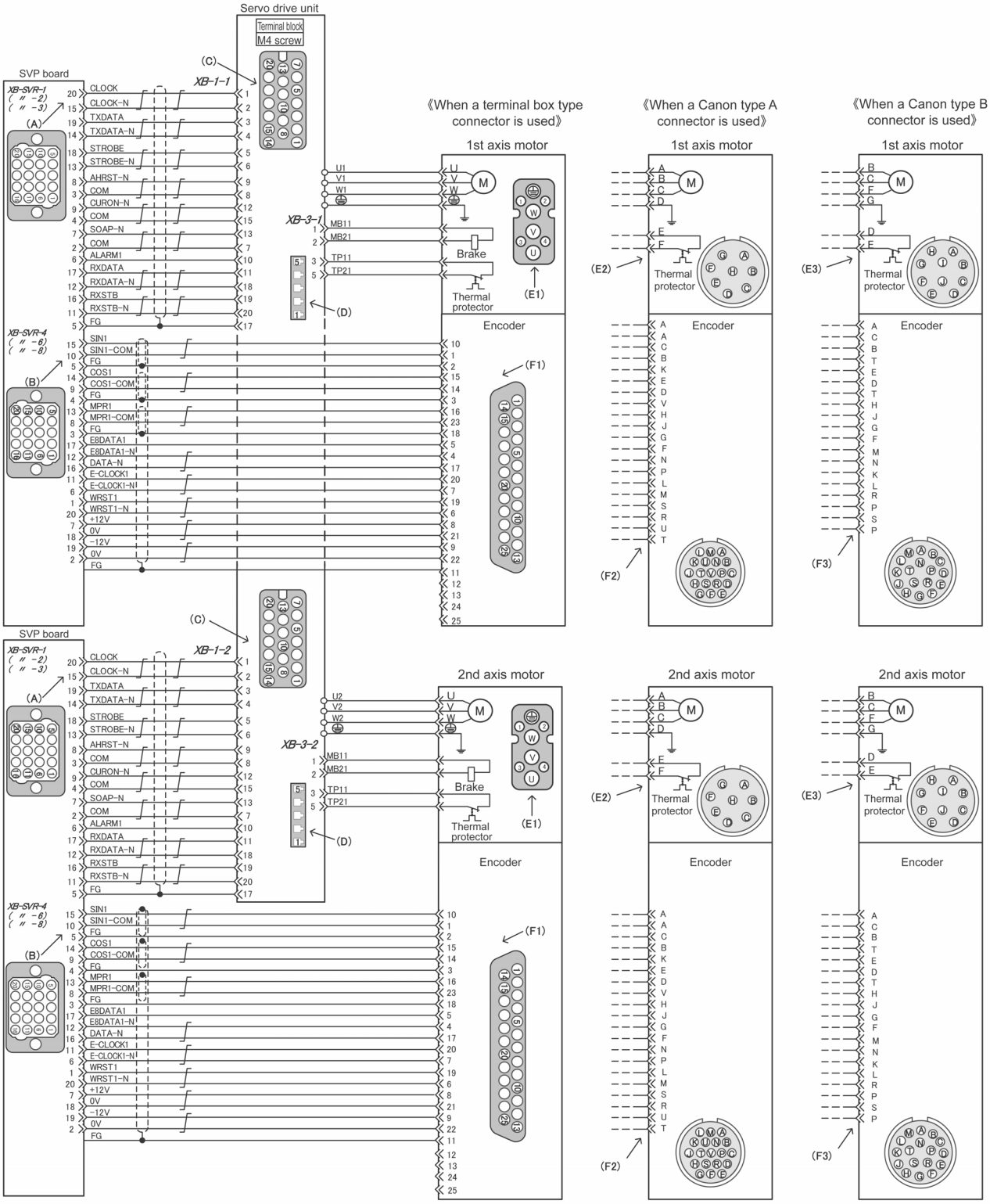


Fig. 2-11　Drive unit and servo motor connection diagram (OSP7000　BLIV-D7575A)

		Okuma part No.	Model	Manufacturer
(A)	Connector Contact	E3702-791-087 E3761-791-001	MRP-A20FS2 MRPF102	Honda Tsushin Kogyo
(B)	Connector Contact	E3702-791-086 E3761-791-001	MRP-A20FS1 MRPF102	Honda Tsushin Kogyo
(C)	Connector Contact	E3702-791-010 E3761-791-001	MRP-20F01 MRPF102	Honda Tsushin Kogyo
(D)	Connector Contact Keying plug	E3702-082-046 E3708-082-178 E3708-082-183	1-178288-5 1-175217-2 175855-1	Tyco Electronics AMP
(E1)	Connector	E3700-566-107	TG33-8S-F0R	Japan Aviation Electronics Industry
(F1)	Connector Contact	E3700-566-048 E3708-566-032	DBUF-25S-F0 DC-20-22S-PKG100	Japan Aviation Electronics Industry
(E2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-152 E3702-566-144	MS3106B22-23S MS3108B22-23S	Japan Aviation Electronics Industry
(F2)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry
(E3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-004 E3702-566-104	MS3106B18-1S MS3108B18-1S	Japan Aviation Electronics Industry
(F3)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-008 E3702-566-108	MS3106B20-29S MS3108B20-29S	Japan Aviation Electronics Industry
(F4)	Connector (straight) + Contact Connector (angle) + Contact	E3702-566-009 E3702-566-109	MS3106B22-14S MS3108B22-14S	Japan Aviation Electronics Industry

SECTION 3 OPERATION STATUS DISPLAY

A servo drive unit has LED indicators to monitor operation statuses.

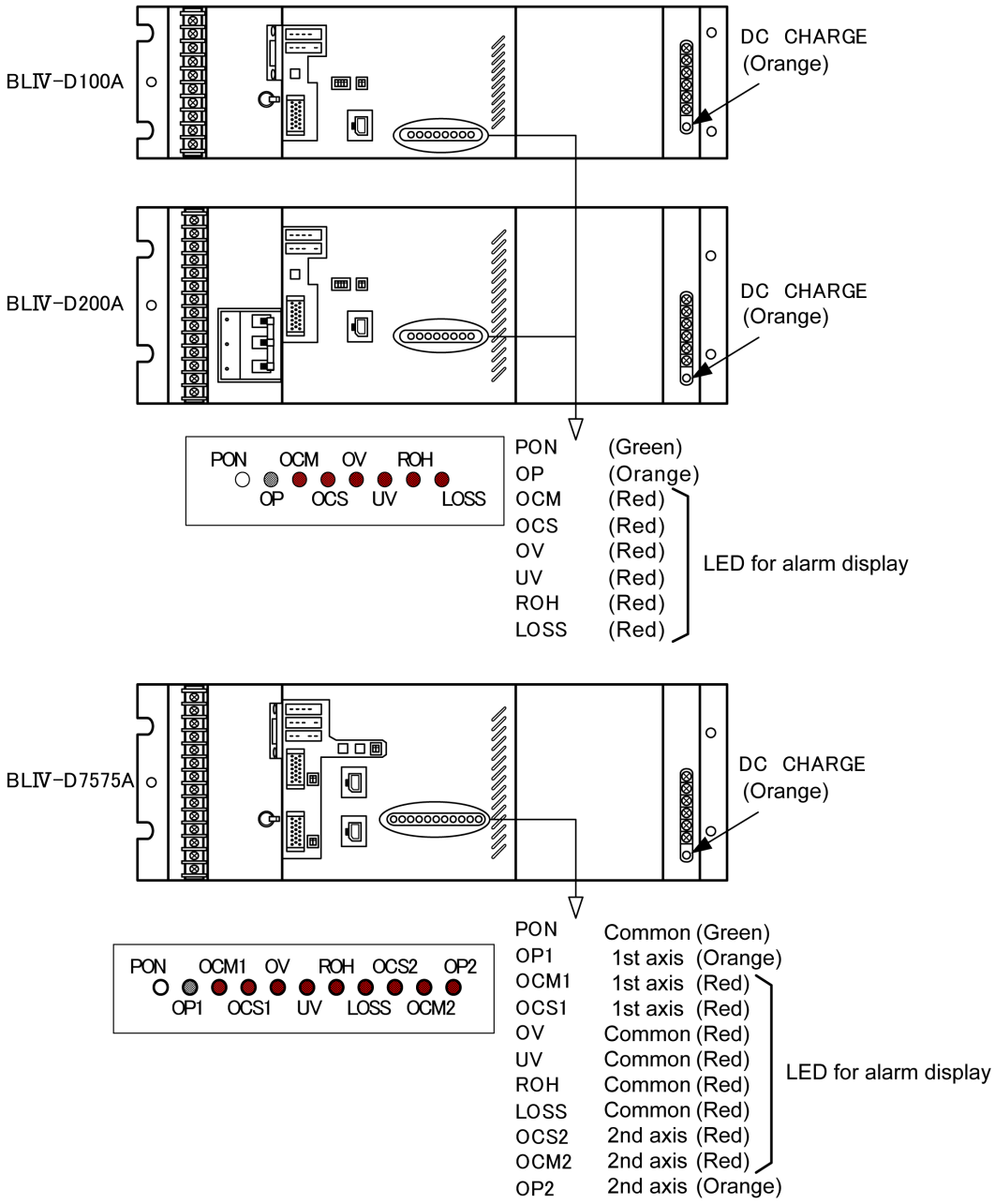


Fig. 3-1 LED operation status indicator layout

SECTION 3 OPERATION STATUS DISPLAY

Table 3-1 List of LED operation status indicators

LED name	LED color	Description (meaning when LED is lit)
DC CHARGE	Orange	- It indicates that the power is supplied to the main circuit.
PON	Green	- It indicates that the power is supplied to the control PC board.
OP* (OP)	Orange	- It indicates that the control circuit is reset by an external input (emergency stop input or resetting input) or an alarm.
OCM* (OCM)	Red	- It comes on when an overcurrent is output to the motor. - It blinks when the CPU on the control PC board is malfunctioning. (OCS, OCS1, and OCS2 also blink at the same time.)
OCS* (OCS)	Red	- It comes on when an overcurrent flows through the inverter circuit. - It blinks when the power device is overheated. - It blinks when the CPU on the control PC board is malfunctioning. (OCM, OCM1, and OCM2 also blink at the same time.)
OV	Red	- It comes on when the DC voltage of the inverter is unusually high.
UV	Red	- It comes on when the DC voltage of the inverter is unusually low.
ROH	Red	- It comes on when the regenerative discharge resistance is energized continuously due to the control circuit problem, or is overheated by the regenerative energy over.
LOSS	Red	- It comes on when the power voltage of the control circuit is beyond the safe operation range.

Description in parentheses ( ): For 1-axis unit

*=1: For the 1st axis of 2-axis unit

*=2: For the 2nd axis of 2-axis unit

SECTION 4 TROUBLESHOOTING

1. Check points

Before taking actions described in the subsection 2, check the points in the following table.

Table 4-1

Check point	Checking method	Action
Power supply	Verify that the input power is within the permissible range at input terminals R, S, and T of the servo drive unit. Permissible value: 180 to 220 V AC, 50/60 Hz	Adjust the input power to the permissible range.

2. Errors

2-1. PON LED does not come on.

Table 4-2

Cause	Check method	Action
The power voltage is unusually low.	See “Table 4-1 for check points.”	See Table 4-1.
The power voltage is unusually high.		
A fuse on the control PC board is blown.	-	Replace the servo drive unit.
The control PC board is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-2. OP LED comes on.

Table 4-3

Cause	Check method	Action
The operation power is not turned on.	Check if the emergency stop circuit works on the circuit for which a power sequence is set.	See the electric circuit diagram attached to the machine.
Servo resetting is forcefully applied.	Check if the switch 1 is turned on.	Properly set the switch 1 (turn it off).
An alarm is pending.	Check if any LED (red) is lit.	See the description of the LED (alarm) concerned.

2-3. OCM LED comes on.

Table 4-4

Cause	Check method	Action
The contact between the servo motor power wire and the terminal block is incomplete.	Check the terminal block screws to see if they are securely tightened. If there are intermediate points (connector, terminal block) between the drive unit and the servo motor, check all of them.	Securely tighten the terminal block screws.
The servo motor power wire is incorrectly connected.	Verify that the motor power wire is properly connected. If there are intermediate points (connector, terminal block) between the drive unit and the servo motor, check all of them.	Properly connect the wire.
The servo motor power wire is broken, short-circuited, or grounded.	Disconnect the wire from the drive unit and the servo motor, and perform a continuity check on it.	Replace the wire.
The connector *1) has a bad connection.	Check the connection of the connector.	Properly connect the connector.
The control PC board *2) inside the CPU rack is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the control PC board *2).
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.
The servo motor is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo motor.

*1) For 1-axis unit: XB-1
For 2-axis unit: XB-1-1、XB-1-2

*2) For OSP5020: SVP II D board
For OSP7000: SVP board

2-4. OCS LED comes on.

Table 4-5

Cause	Check method	Action
The contact between the servo motor power wire and the terminal block is incomplete.	Check the terminal block screws to see if they are securely tightened. If there are intermediate points (connector, terminal block) between the drive unit and the servo motor, check all of them.	Securely tighten the terminal block screws.
The servo motor power wire is incorrectly connected.	Verify that the motor power wire is properly connected. If there are intermediate points (connector, terminal block) between the drive unit and the servo motor, check all of them.	Properly connect the wire.
The servo motor power wire is broken, short-circuited, or grounded.	Disconnect the wire from the drive unit and the servo motor, and perform a continuity check on it.	Replace the wire.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-5. OV LED comes on.

Table 4-6

Cause	Check method	Action
The power voltage is unusually high.	See “Table 4-1 for check points.”	See Table 4-1.
The regenerative IGBT of the servo drive unit is faulty.	-	Replace the servo drive unit.
The regenerative resistor of the servo drive unit is broken.	Disconnect the VH and TRC of the terminal block for the regenerative register, and check the resistance of the disconnected wires (VH, TRC).	Replace the servo drive unit.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-6. UV LED comes on.

Table 4-7

Cause	Check method	Action
The breaker of the servo drive unit is turned off.	Check the status of the breaker.	Turn on the breaker.
The power voltage is unusually low.	See “Table 4-1 Check points.”	See Table 4-1.
Any phase of the power voltage (3-phase) is loss.	Check the power voltage (3-phase) using a tester.	Check the power wire.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-7. LOSS LED comes on.

Table 4-8

Cause	Check method	Action
The power voltage is unusually low.	See "Table 4-1 for check points."	See Table 4-1.
The power voltage is unusually high.		
A fuse on the control PC board is blown.	-	Replace the servo drive unit.
The control PC board is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-8. ROH LED comes on.

Table 4-9

Cause	Check method	Action
The motor is overloaded.	Check the load value displayed on the NC screen.	Review the cutting conditions set in the operation program.
The regenerative IGBT of the servo drive unit is faulty.	-	Replace the servo drive unit.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-9. OCM and OCS LED blink.

Table 4-10

Cause	Check method	Action
The CPU on the control PC board is faulty.	-	Replace the servo drive unit.
The setting of the switches (SW2) is incorrect. *1)	Check if the switches are set as specified in "Appendix 3 Tables of Switch and Jumper Connector Settings."	Correctly set the switches (SW2) *1).

*1) For BLIV-D100A and BLIV-D200A.

2-10. OCS LED blinks.

Table 4-11

Cause	Check method	Action
The power device is overheated.	Check the operation of the fan motor, which is attached to the heat sink of the servo drive unit.	Replace the servo drive unit.
The heat sink of the servo drive unit is contaminated with dust.	Check the heat sink for contamination.	Clean the heat sink by air blowing or using a vacuum cleaner.

2-11. DC CHARGE LED does not come on.

Table 4-12

Cause	Check method	Action
The breaker of the servo drive unit is turned off.	Check the status of the breaker.	Turn on the breaker.
The power voltage is unusually low.	See "Table 4-1 for check points."	See Table 4-1.
Any phase of the power voltage (3-phase) is loss.	Check the power voltage (3-phase) using a tester.	Check the power wire.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-12. DIFF OVER occurs.

Table 4-13

Cause	Check method	Action
The setting of the switches (SW2, SW3) is incorrect.	Check if the switches are set as specified in "Appendix 3 Tables of Switch and Jumper Connector Settings."	Correctly set the switches (SW2, SW3).
The power voltage is unusually low.	See "Table 4-1 for check points."	See Table 4-1.
The servo motor power wire is incorrectly connected.	Verify that the servo motor power wire is properly connected. If there are intermediate points (connector, terminal block) between the drive unit and the servo motor, check all of them.	Properly connect the wire.
The axis brake is not released. ***1)**	Check the axis brake release circuit in the circuit for which a power sequence is set.	See the electric circuit diagram attached to the machine.
The axis brake is faulty. ***1)**	Supply the power to the axis brake to check if it can be released.	Replace the axis brake.
The frictional resistance of the sliding portion has been increased.	Check the load value displayed on the NC screen. Check if the lubricant (manufacturer, model) applied to the sliding surface is the one recommended by Okuma.	Replace the lubricant for the sliding surface with one recommended by Okuma.
	Check the load value displayed on the NC screen. Check if the jib of the sliding portion is securely clamped.	Adjust the gibs of the sliding portion. See the instruction manual for the machine.
The frictional resistance of the sliding portion has been decreased.	Check the load value displayed on the NC screen. Verify that the gibs of the sliding portion are properly tightened.	Adjust the jib of the sliding portion. See the instruction manual for the machine.
The servo drive unit is overloaded.	Check the load value displayed on the NC screen.	Review the cutting conditions set in the operation program.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.
The servo motor is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo motor.

*1) If the corresponding axis is an up-down axis, it is equipped with an axis brake.

2-13. Motor hunting occurs.

Table 4-14

Cause	Check method	Action
The setting of the switches (SW2, SW3) is incorrect.	Check if the switches are set as specified in "Appendix 3 Tables of Switch and Jumper Connector Settings."	Correctly set the switches (SW2, SW3).
The contact between the servo motor power wire and the terminal block is incomplete.	Check the terminal block screws to see if they are securely tightened. If there are intermediate points (connector, terminal block) between the drive unit and the servo motor, check all of them.	Securely tighten the terminal block screws.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.
The control PC board *1) inside the CPU rack is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the control PC board *1).
The encoder is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the encoder.
The servo motor is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo motor.

*1）For OSP5020: SVP Ⅱ D board
For OSP7000: SVP board

2-14. Motor is demagnetized.

Table 4-15

Cause	Check method	Action
The servo drive unit is faulty.	-	- Replace the servo drive unit. - At the same time, replace the servo motor.
The setting of the jumper connector *1) of the servo drive unit is incorrect.	The jumper connector *1) is connected although the current of the unit concerned is 15 A.	- Disconnect the jumper connector *1). - At the same time, replace the servo motor.
The setting of the switches *2) is incorrect.	Check if the switches are set as specified in “Appendix 3 Tables of Switch and Connector Jumper Settings.”	- Correctly set the switches *2). - At the same time, replace the servo motor.

*1) For 1-axis unit (Only BLⅣ-D100A): XB-DBR
For 2-axis unit: XB-DBR-1 or XB-DBR-2

*2) For 1-axis unit: SW2
For 2-axis unit: SW2 or SW3

2-15. Circuit protector trips.

Table 4-16

Cause	Check method	Action
The servo motor power wire is incorrectly connected.	Verify that the motor power wire is properly connected. If there are intermediate points (connector, terminal block) between the drive unit and the servo motor, check all of them.	Properly connect the wire.
The servo motor power wire is broken, short-circuited, or grounded.	Disconnect the wire from the drive unit and the servo motor, and perform a continuity check on it.	Replace the wire.
The servo drive unit is faulty.	Verify that all of the check points above are showing the proper values or properly set.	Replace the servo drive unit.

2-16. DC CHARGE does not turn off even if circuit protector is turned off.

Table 4-17

Cause	Check method	Action
The servo drive unit is faulty.	–	After leaving it for about 30 minutes, check if the DC CHARGE LED turns off and replace the servo drive unit.

SECTION 5 MAINTENANCE AND INSPECTIONS

1. Instruments for maintenance and inspections

Table 5-1 shows the instruments to be used for maintenance and inspections.

Table 5-1

Name	Type/Specification	Application
AC voltmeter	300 V	Measuring power voltage
Analog tester	Commercial tester	Checking resistance
Phillips head screwdriver	Medium, small	Replacing units

2. Procedures for replacing the drive unit

Table 5-2 shows the procedure for replacing the drive unit.

Table 5-2

Step	Description	Check point
1	Turn off the power.	Make sure that the DC CHARGE LED on the unit is turned off.
2	Disconnect the motor and power wires.	Make sure that the destination wire number is marked on each wire.
3	Disconnect the connectors *1).	Make sure that the destination connector name is marked on each connector.
4	Unfasten the screws clamping the connectors *2) and disconnect the connectors.	Make sure that the destination connector name is marked on each connector.
5	Replace the drive unit.	
6	Set the jumper connector and switches on the prepared driver unit.	
7	Connect the connectors *2) and fasten them with the screws	Check the destination of each connector.
8	Connect the connectors *1).	Check the destination of each connector.
9	Connect the motor and power wires.	Check the destination of each wire.
10	Conduct a trial run.	

*1) For 1-axis unit: XB-2, XB-3
For 2-axis unit: XB-2-1, XB-3-1, XB-3-2

*2) For 1-axis unit: XB-1
For 2-axis unit: XB-1-1, XB-1-2

DANGER **About step 1**
Before disconnecting the motor and power wires, turn off the power, and make sure that the DC CHARGE LED is turned off. Failure to follow this instruction will result in an electric shock.

CAUTION **About step 6**
Properly set the switches and the jumper connector. The servo motor will malfunction (will be demagnetized) if it is energized with an incorrect setting.

3. Procedures for conducting a trial run

Follow the procedure shown in Table 5-3 to conduct a trial run after replacing the drive unit.

Table 5-3

Step	Description	Remarks
1	- Make sure that the switches are properly set. - Check the setting (connected/disconnected) of the jumper connector *1).	See Appendices 2 and 3.
2	- Press the emergency stop button before turning on the power. - Turn on the power, and make sure that the PON (green) and OP (orange) LED indicators are lit. - Make sure that the LED indicators (red) on the servo drive unit are off.	
3	- After the NC is launched, reset the emergency stop button. - Make sure that the LED indicators (red) on the servo drive unit are off. - Make sure that the DC CHARGE (orange) LED on the servo drive unit is lit.	See "Section 3 Operation Status Display."
4	- Perform axis feed in manual mode (at low speed) to check the performance of the unit (make sure that no alarm is issued). - Check the performance of the unit in all feed speed ranges.	

*1) For 1-axis unit: (Only for BLIV-D100A); XB-DBR
For 2-axis unit: XB-DBR-1, XB-DBR-2

*2) For 1-axis unit: OP
For 2-axis unit: OP1, OP2

⚠ DANGER **About step 1**

Properly set the switches and the jumper connector. The servo motor will malfunction (will be demagnetized) if it is energized with an incorrect setting.

⚠ CAUTION **About step 4**

When checking the performance of the unit, exercise care not to strike it against a setup tool or jig.

APPENDIX 1 DESCRIPTION OF MONITOR TERMINALS

The waveform of the BLIV-D drive unit can be observed by connecting an oscilloscope to the monitor terminals. This is the same function as conventional units (BLII-D Type A). For details, see the "Drive Unit BLII-D, VAC II, VA III Maintenance Manual".

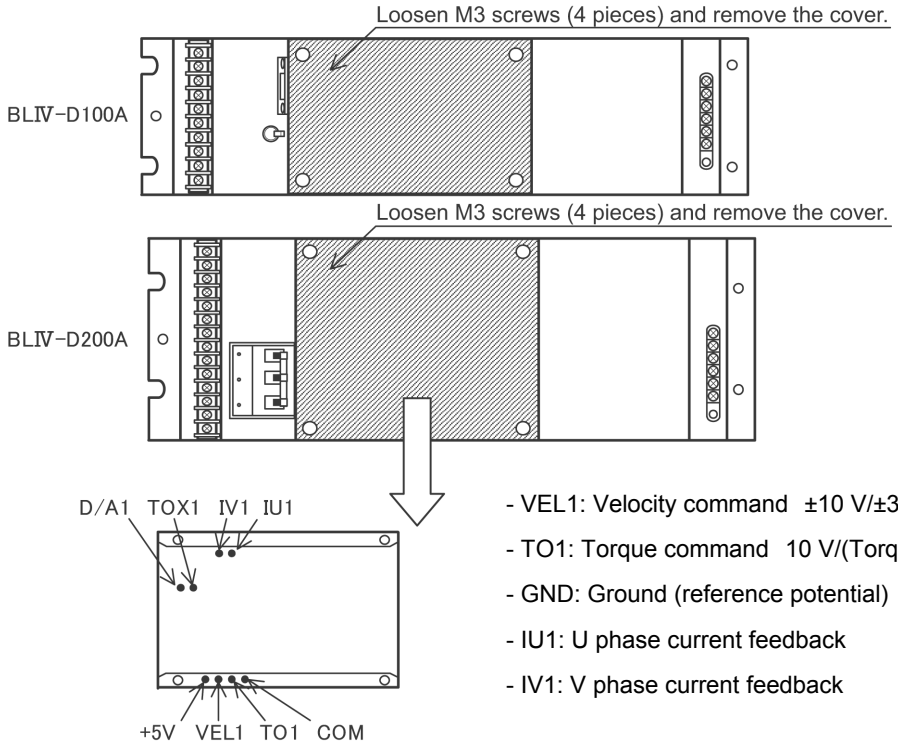


Fig. A1-1 Layout of monitor terminals of BLIV-D100A, BLIV-D200A

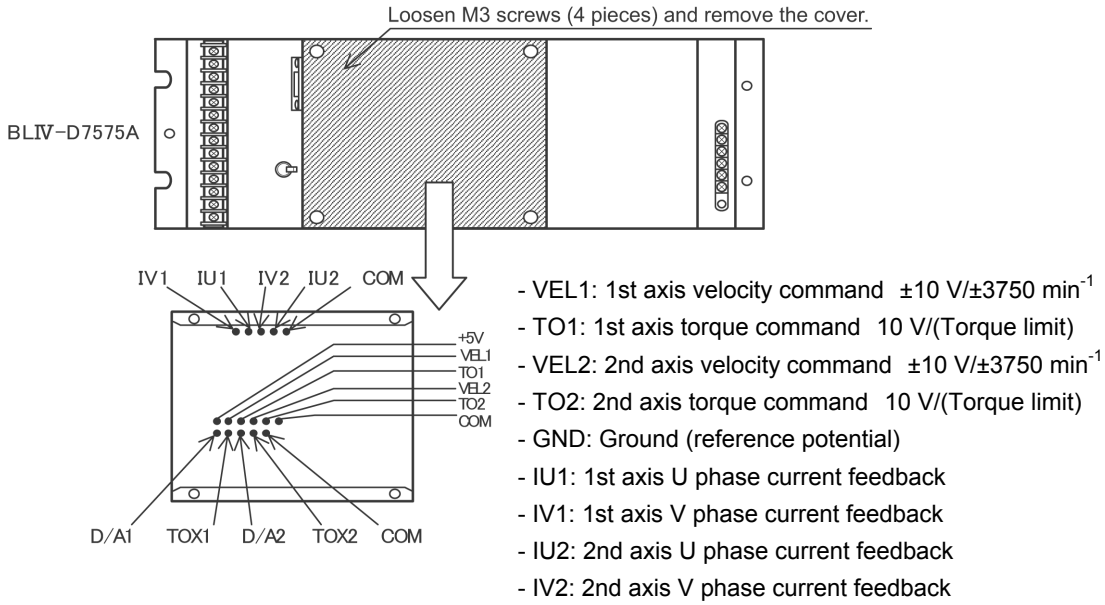


Fig. A1-2 Layout of monitor terminals of BLIV-D7575A

APPENDIX 2 SWITCH AND JUMPER CONNECTOR SETTINGS

BLIV-D Type A units have the different number and layout of switches from the conventional units (BLII-D Type A). Also it is provided with jumper connectors (excluding BLIV-D200A) that the conventional units do not have. These must be set (connected/disconnected) according to the capacity of the unit to be used.

The setting of switches and jumper connectors is shown below.

Table A2-1 Switch and jumper connector settings (BLIV-D100)

Item	Symbol on BLIV-D	Description
Switch setting	SW1	Turn off all switches.
	SW2	15A ; Turn off all switches. 30A ; Turn on only 1. 50A ; Turn on only 2. 75A ; Turn on only 1 and 2. 100A; Turn on only 3.
Jumper connector	XB-DBR	15A ; Disconnect. 30A to 100A; Connect.

Table A2-2 Switch and jumper connector settings (BLIV-D200)

Item	Symbol on BLIV-D	Description
Switch setting	SW1	Turn off all switches.
	SW2	150A ; Turn on only 1 and 3. 200A ; Turn on only 2 and 3.
Jumper connector	- (Not provided)	

Table A2-3 Switch and jumper connector settings (BLIV-D7575A)

Item	Symbol on BLIV-D	Description
Switch setting	SW1	Turn off all switches.
	1st axis; SW2 2nd axis; SW3	15A ; Turn off all switches. 30A ; Turn on only 1. 50A ; Turn on only 2. 75A ; Turn on only 1 and 2.
Jumper connector	1st axis; XB-DBR-1 2nd axis; XB-DBR-2	15A ; Disconnect. 30A to 75A; Connect.

⚠CAUTION Properly set the switches and the jumper connector. The servo motor will malfunction (will be demagnetized) if it is energized with an incorrect setting.

APPENDIX 2 SWITCH AND JUMPER CONNECTOR SETTINGS

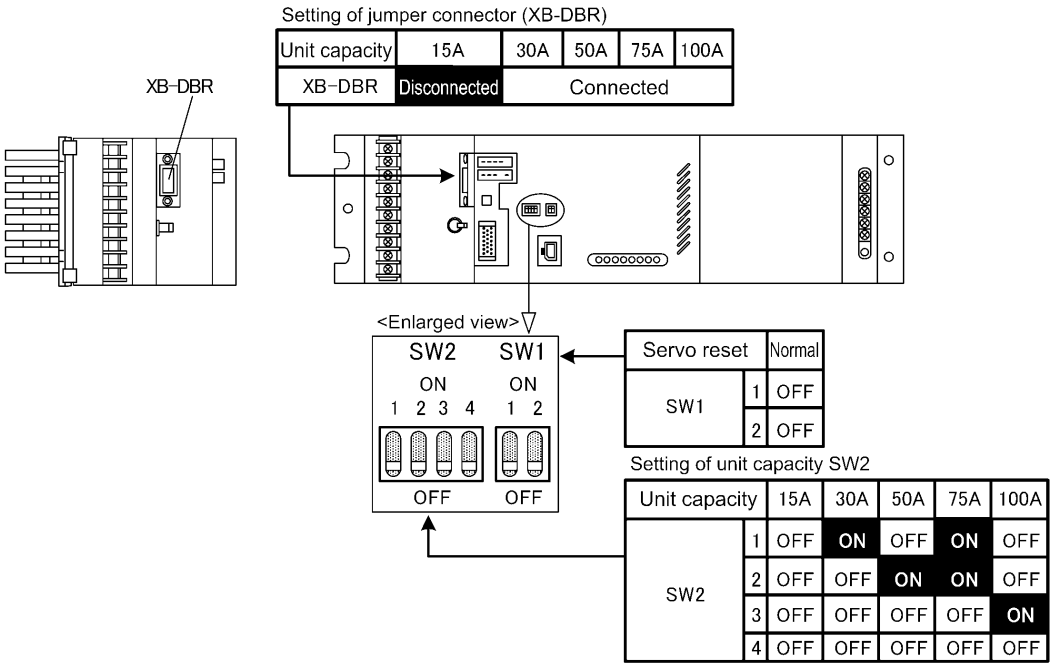


Fig. A2-1 Switch and jumper connector setting (BLIV-D100A)

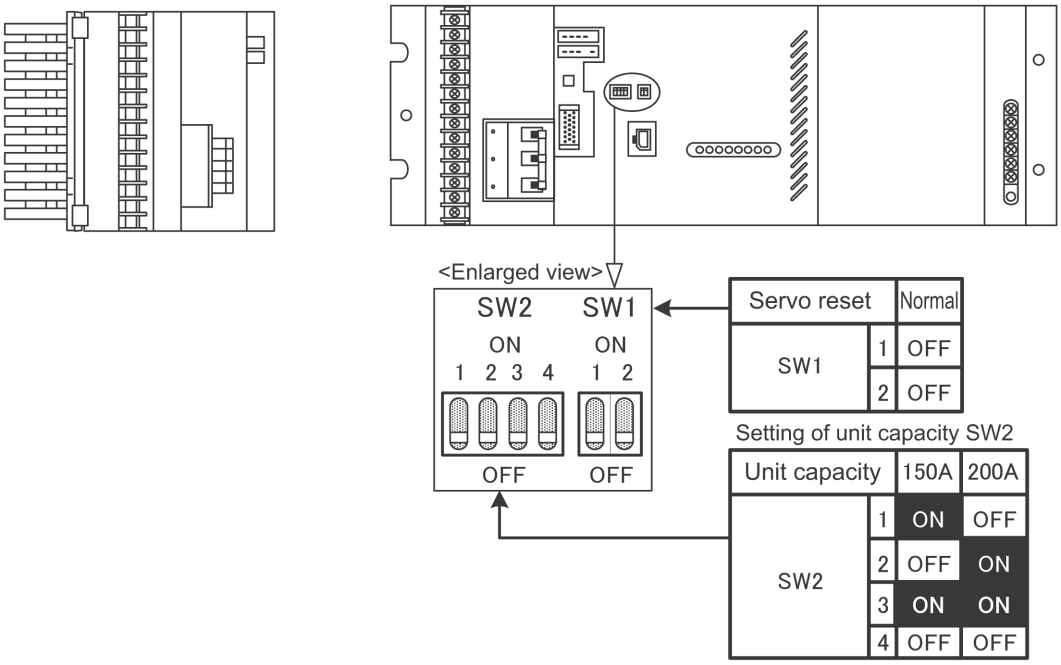


Fig. A2-2 Switch setting (BLIV-D200A)

APPENDIX 2 SWITCH AND JUMPER CONNECTOR SETTINGS

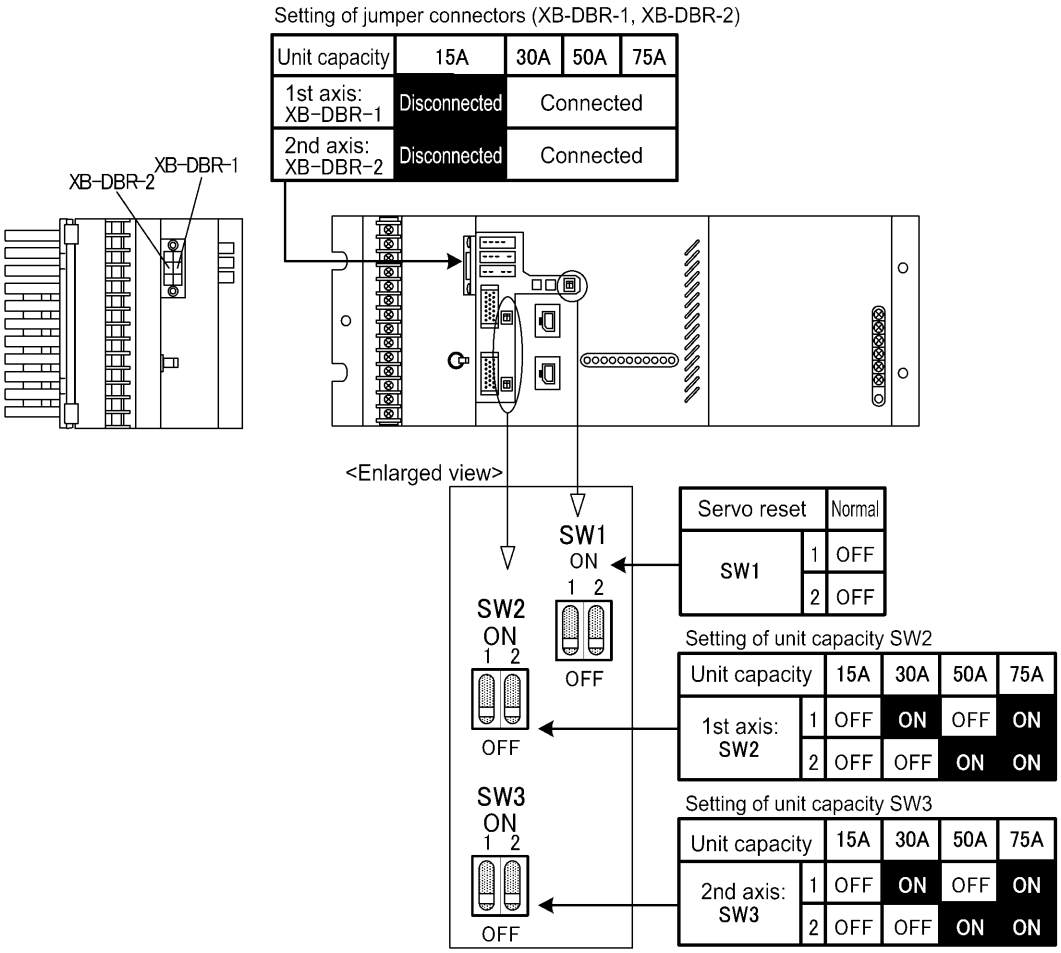


Fig. A2-3 Switch and jumper connector setting (BLIV-D7575A)

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS.

⚠CAUTION Properly set the switches and the jumper connector. The servo motor will malfunction (will be demagnetized) if it is energized with an incorrect setting.

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

1. QR series motors

Table A3-1 (1/2)

QR series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-MQ25E-20 *	BL-MQ25E-30 *	BL-MQ50E-20 *	BL-MQ50E-30 *	BL-MQ80E-20*
Rated output [kW]	0.5	0.75	1	1.5	1.5
Servo drive unit capacity	30 A	30 A	30 A	30 A	50 A
Rated current [Arms]	3	4.5	5.1	6..5	7.5
Current limit [A]	13	18.5	25	25	33
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	①234	①234	①234	①234	1②34
Setting SW 2. SW3 *2)	① 2	① 2	① 2	① 2	1 ②
Remarks					
Jumper connector	Connect	Connect	Connect	Connect	Connect

Table A3-1 (2/2)

QR series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-MQ120E-20 *	BL-MQ120E-30 *	BL-MQ180E-20 *		
Rated output [kW]	2.4	3.6	3.7		
Servo drive unit capacity	50 A	75 A	75 A		
Rated current [Arms]	12.1	16	22		
Current limit [A]	44.4	62.5	62.5		
Setting SW 1	1 2	1 2	1 2		
Setting SW 2 *1)	1②34	①②34	①②34		
Setting SW 2. SW3 *2)	1 ②	① ②	① ②		
Remarks					
Jumper connector	Connect	Connect	Connect		

*1) For 1-axis unit

*2) For 2-axis unit

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

2. HT series motors

Table A3-2 (1/6)

HT series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-H10E-20 *	BL-H20E-20 *	BL-MH51E-20 *	BL-MH101E-12 *	BL-MH101E-20 *
Rated output [kW]	0.2	0.4	1	1.2	2
Servo drive unit capacity	15 A	15 A	30 A	30 A	50 A
Rated current [Arms]	1.8	1.9	6	5	8.4
Current limit [A]	7.6	7.3	25	21	35.6
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	1234	1234	①234	①234	1②34
Setting SW 2. SW3 *2)	1 2	1 2	① 2	① 2	1 ②
Remarks					
Jumper connector	**Disconnect**	**Disconnect**	Connect	Connect	Connect

Table A3-2 (2/6)

HT series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-MH151E-12 *	BL-MH151E-20 *	BL-MH201E-12 *	BL-MH201E-20 *	
Rated output [kW]	1.8	3	2.4	4	
Servo drive unit capacity	50 A	75 A	50 A	75 A	
Rated current [Arms]	9.3	15.4	9.8	15.7	
Current limit [A]	39.2	62.5	41.6	62.5	
Setting SW 1	1 2	1 2	1 2	1 2	
Setting SW 2 *1)	1②34	①②34	1②34	①②34	
Setting SW 2. SW3 *2)	1 ②	① ②	1 ②	① ②	
Remarks					
Jumper connector	Connect	Connect	Connect	Connect	

*1) For 1-axis unit

*2) For 2-axis unit

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

Table A3-2 (3/6)

HT series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-MH201E-30*		BL-MH301E-12 *	BL-MH301E-20 *	
Rated output [kW]	5.1	5.1	3.6	6	6
Servo drive unit capacity	75 A	100 A	75 A	75 A	100 A
Rated current [Arms]	24.8	24.8	15.4	25.6	25.6
Current limit [A]	62.5	83.3	62.5	62.5	83.3
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	①②34	12③4	①②34	①②34	12③4
Setting SW 2. SW3 *2)	① ②	———	① ②	① ②	———
Remarks					
Jumper connector	Connect	Connect	Connect	Connect	Connect

Table A3-2 (4/6)

HT series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-MH401E-12*		BL-H700E-10 *	BL-H700E-20 *	BL-H401E-20 *
Rated output [kW]	4.8	4.8	7	14	8
Servo drive unit capacity	75 A	100 A	150 A	150 A	150 A
Rated current [Arms]	19	19	30	60	34.7
Current limit [A]	62.5	83.3	125	125	125
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	①②34	12③4	①234	①234	①234
Setting SW 2. SW3 *2)	① ②	———	———	———	———
Remarks					
Jumper connector	Connect	Connect	———	———	———

*1) For 1-axis unit

*2) For 2-axis unit

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

Table A3-2 (5/6)

HT series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-H700E-20 *	BL-MH301E-20 *	BL-MH101E-60 *	BL-MH201E-30 *	BL-H700E-10 *
Rated output [kW]	14	6	6	5.1	7
Servo drive unit capacity	200 A	150 A	150 A	150 A	200 A
Rated current [Arms]	60	25.6	25	24.8	30
Current limit [A]	166.7	108	106	105.2	166.7
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	1②③4	①2③4	①2③4	①2③4	1②③4
Setting SW 2. SW3 *2)	———	———	———	———	———
Remarks		3 times the rated toque	Special	3 times the rated toque	Special
Jumper connector	———	———	———	———	———

Table A3-2 (6/6)

HT series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-MH401E-20*				
Rated output [kW]	8				
Servo drive unit capacity	200 A				
Rated current [Arms]	34.7				
Current limit [A]	147.2				
Setting SW 1	1 2				
Setting SW 2 *1)	1②③4				
Setting SW 2. SW3 *2)	———				
Remarks	3 times the rated toque				
Jumper connector	———				

*1) For 1-axis unit

*2) For 2-axis unit

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

3. SR series motors

Table A3-3 (1/3)

SR series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-S10E-30 *	BL-S10E-30 *	BL-MS45E-30 *	BL-MS50E-20 * -1	BL-MS50E-30 *
Rated output [kW]	0.3	0.3	1.4	1	1.5
Servo drive unit capacity	15 A	15 A	30 A	30 A	50 A
Rated current [Arms]	1.38	1.38	5.9	4.3	6.5
Current limit [A]	8.33	5.3	24.7	18	27.8
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	1234	1234	①234	①234	1②34
Setting SW 2. SW3 *2)	1 2	1 2	① 2	① 2	1 ②
Remarks	5 times the rated toque	3 times the rated toque			
Jumper connector	**Disconnect**	**Disconnect**	Connect	Connect	Connect

Table A3-3 (2/3)

SR series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Item \ Motor model	BL-MS75E-20 *	BL-MS75E-30 *	BL-MS125E-20 *	BL-MS125E-30 *	BL-MS125E-60 *
Rated output [kW]	1.5	2.3	2.5	3.8	7.7
Servo drive unit capacity	50 A	50 A	75 A	75 A	150 A
Rated current [Arms]	6.6	9.7	11.1	16.1	33.7
Current limit [A]	27.8	41.6	47.1	62.5	125
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	1②34	1②34	①②34	①②34	①2③4
Setting SW 2. SW3 *2)	1 ②	1 ②	① ②	① ②	———
Remarks					
Jumper connector	Connect	Connect	Connect	Connect	———

*1) For 1-axis unit

*2) For 2-axis unit

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

Table A3-3 (3/3)

SR series *: Alphabetic character representing an output end shape, brake-equipped type, etc. (example: S, SB, T)					
Motor model / Item	BL-MS140E-30 *			BL-MS140E-20 *	BL-MS45E-30*
Rated output [kW]	4.3	4.3	4.3	2.8	1.4
Servo drive unit capacity	75 A	100 A	150 A	100 A	50 A
Rated current [Arms]	16.8	16.8	16.8	12.3	5.9
Current limit [A]	62.5	83.3	125	83.3	41.6
Setting SW 1	1 2	1 2	1 2	1 2	1 2
Setting SW 2 *1)	①②34	12③4	①2③4	12③4	1②34
Setting SW 2. SW3 *2)	① ②	———	———	———	1 ②
Remarks					
Jumper connector	Connect	Connect	———	Connect	Connect

*1) For 1-axis unit

*2) For 2-axis unit

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

4. G series motors

Table A3-4 (1/1)

G series					
Item \ Motor model	BL-MG16E-30/80B				
Rated output [kW]	0.4				
Servo drive unit capacity	15 A				
Rated current [Arms]	2.47				
Current limit [A]	9.78				
Setting SW 1	1 2				
Setting SW 2 *1)	1234				
Setting SW 2. SW3 *2)	1 2				
Remarks					
Jumper connector	**Disconnect**				

*1) For 1-axis unit

*2) For 2-axis unit

APPENDIX 3 TABLES OF SWITCH AND JUMPER CONNECTOR SETTINGS

5. SGM series motors

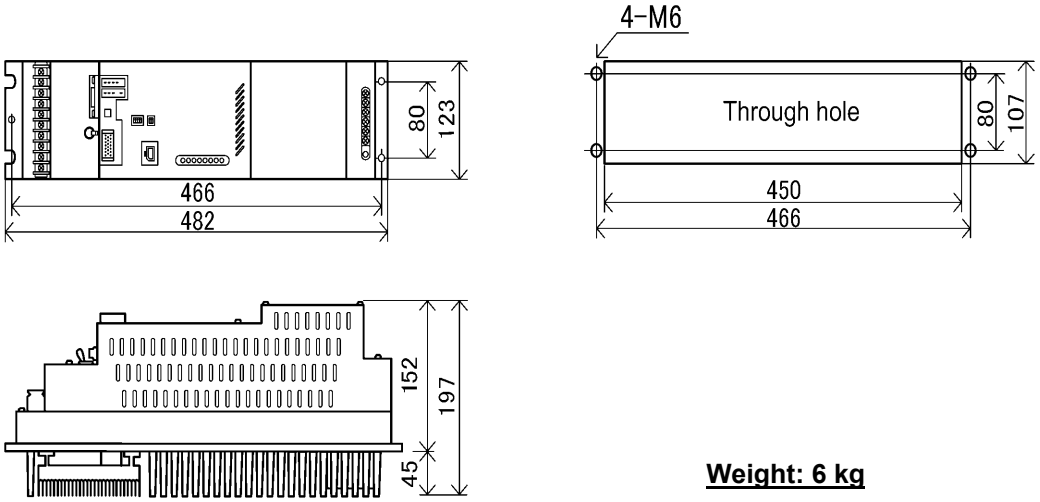
Table A3-5 (1/1)

SGM series					
Item \ Motor model	SGM-08A00K11	SGM-08A00K21			
Rated output [kW]	0.71	0.71			
Servo drive unit capacity	30 A	30 A			
Rated current [Arms]	4.4	4.4			
Current limit [A]	18.7	18.7			
Setting SW 1	1 2	1 2			
Setting SW 2 *1)	①234	①234			
Setting SW 2. SW3 *2)	① 2	① 2			
Remarks	w/o a brake	w/ a brake			
Jumper connector	Connect	Connect			

*1) For 1-axis unit

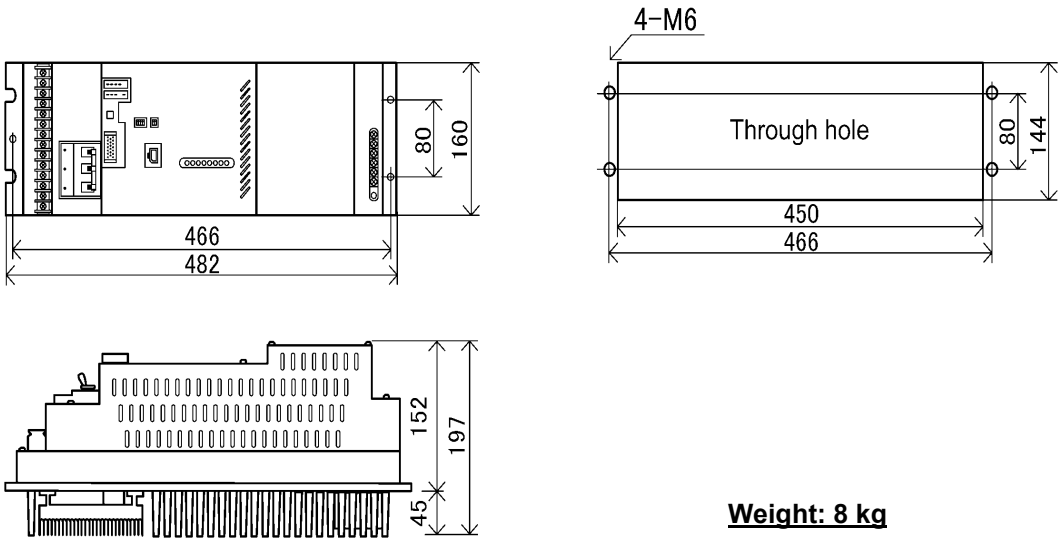
*2) For 2-axis unit

APPENDIX 4 APPEARANCE AND WEIGHT OF UNIT



Weight: 6 kg

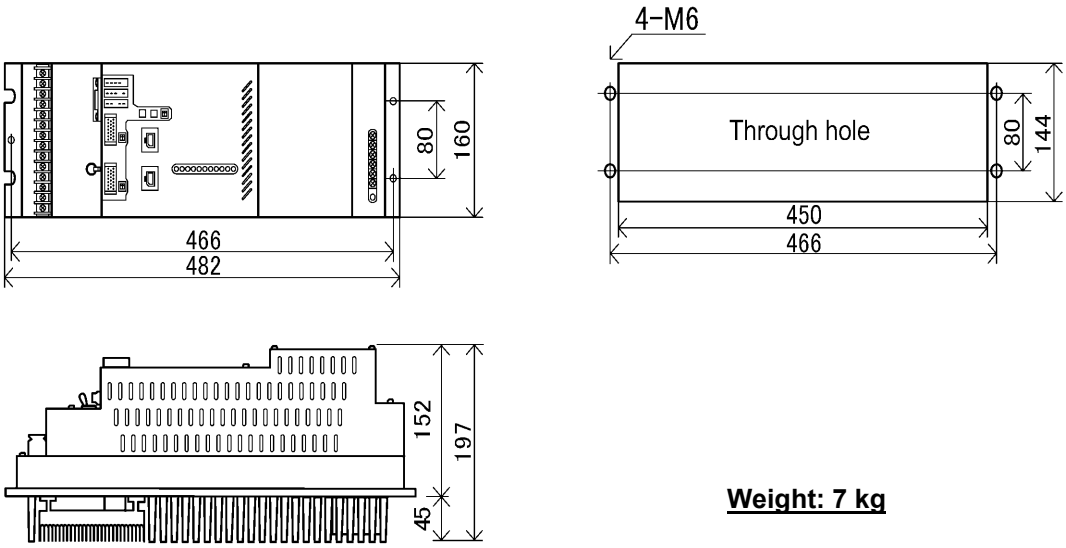
Fig. A4-1 Appearance of BLIV-D100A unit



Weight: 8 kg

Fig. A4-2 Appearance of BLIV-D200A unit

APPENDIX 4 APPEARANCE AND WEIGHT OF UNIT



Weight: 7 kg

Fig. A4-3 Appearance of BLIV-D7575A unit