

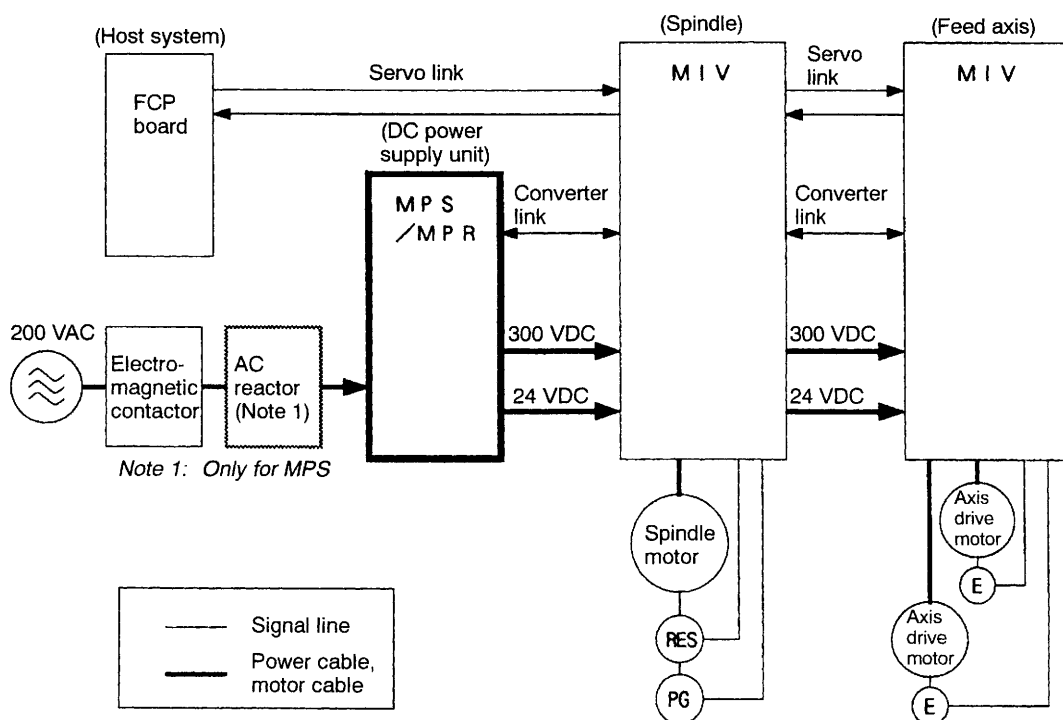
SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

Okuma motion control system (MCS) consists of an inverter unit and a DC power supply unit. This section describes the maintenance and inspection methods for the power supply unit.

1. System Configuration

A DC power supply unit is a unit to supply DC power to MIV unit. Connection of a power supply unit with peripheral is shown below.

- A DC power supply unit is connected to MIV unit to supply 300 VDC and 24 VDC (control power).
- A DC power supply unit executes communications with MIV unit through the converter link.
- There are two types of DC power supply unit according to the regeneration method: power regeneration type (to be referred to as MPS unit, hereafter) and resistor regeneration type (to be referred to as MPR unit, hereafter).
- MPS unit is used in the system that includes a spindle drive motor and MPR unit is used in the system that is consisted only of axis drive motors.
- A DC power supply unit can be connected to more than one MIV unit.



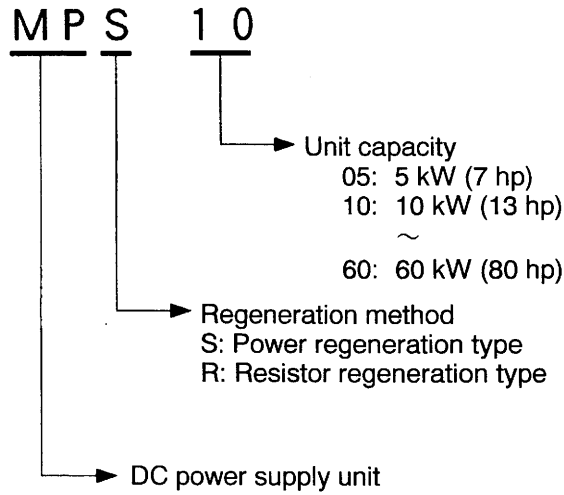
DC Power Supply Unit System Configuration

SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

2. Classification of DC Power Supply Units

2-1. Designation of DC Power Supply Units

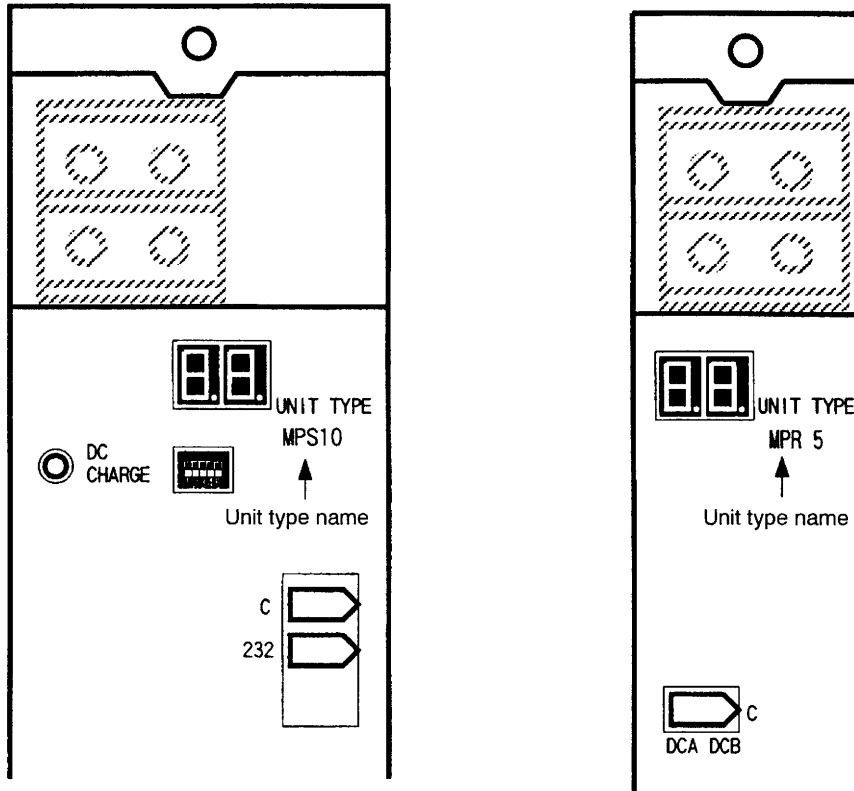
Power supply unit names consist of codes indicating regeneration method and unit capacity.



EIOSPCSA2002R01

DC power supply unit type name is shown at the front of the unit either by seal or printed characters.

When changing the unit, use the same type.



EIOSPCSA2003R01

2-2. Configuration of Power Supply Units

Component parts of a power supply unit are indicated below.

2-2-1. Power Regeneration Type MPS Unit

(1) MPS unit: power regeneration type

Configuration of 1 set of power supply unit: PSB + MFP1 card + MPS PU + MPS-ACL

In the table below, indication of "(1)" in the Q'ty column indicates that any of the indicated units should be selected meeting the motor capacity.

Category	Order Name	Q'ty	Order No.	Description
Control board	PSB-MPS10	(1)	1006-2103	Power regeneration type control board for MPS10
	PSB-MPS30	(1)	1006-2104	Power regeneration type control board for MPS20 to 60
Display card	MFP1 CARD	1	1006-2105	Card with status indicator
Power regeneration type unit	MPS10 PU	(1)	1006-2200	DC power supply unit: Continuous power supply capacity 11 kW (15 hp)
	MPS20 PU	(1)	1006-2201	DC power supply unit Continuous power supply capacity 20 kW (27 hp)
	MPS30 PU	(1)	1006-2202	DC power supply unit: Continuous power supply capacity 30 kW (40 hp)
	MPS45 PU	(1)	1006-2203	DC power supply unit: Continuous power supply capacity 45 kW (60 hp)
	MPS60 PU	(1)	1006-2204	DC power supply unit: Continuous power supply capacity 60 kW (80 hp)
AC choke coil	MPS10-ACL	(1)	1006-2285	AC reactor for MPS10 (with Capacitor)
	MPS20-ACL	(1)	1006-2281	AC reactor for MPS20 (with Capacitor)
	MPS30-ACL	(1)	1006-2282	AC reactor for MPS30 (with Capacitor)
	MPS45-ACL	(1)	1006-2283	AC reactor for MPS45 (with Capacitor)
	MPS60-ACL	(1)	1006-2284	AC reactor for MPS60 (with Capacitor)

2-2-2. Resistor Regeneration Type MPR Unit

(1) MPR unit: resistor regeneration type

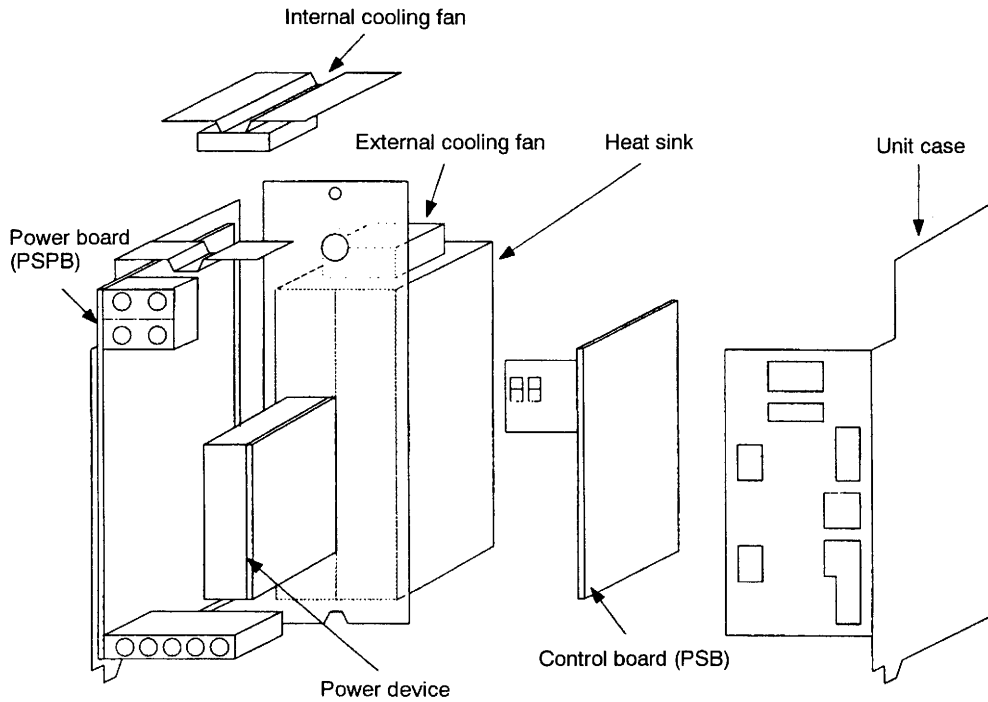
Configuration of 1 set of power supply unit: MPR* PU

Category	Order Name	Q'ty	Order No.	Description
Resistor regeneration type unit	MPR5 PU	(1)	1006-2205	DC power supply unit: Continuous power supply capacity 5 kW (6.7 hp)
	MPR10 PU	(1)	1006-2206	DC power supply unit: Continuous power supply capacity 10 kW (13.3 hp)

2-3. Construction of Power Supply Units

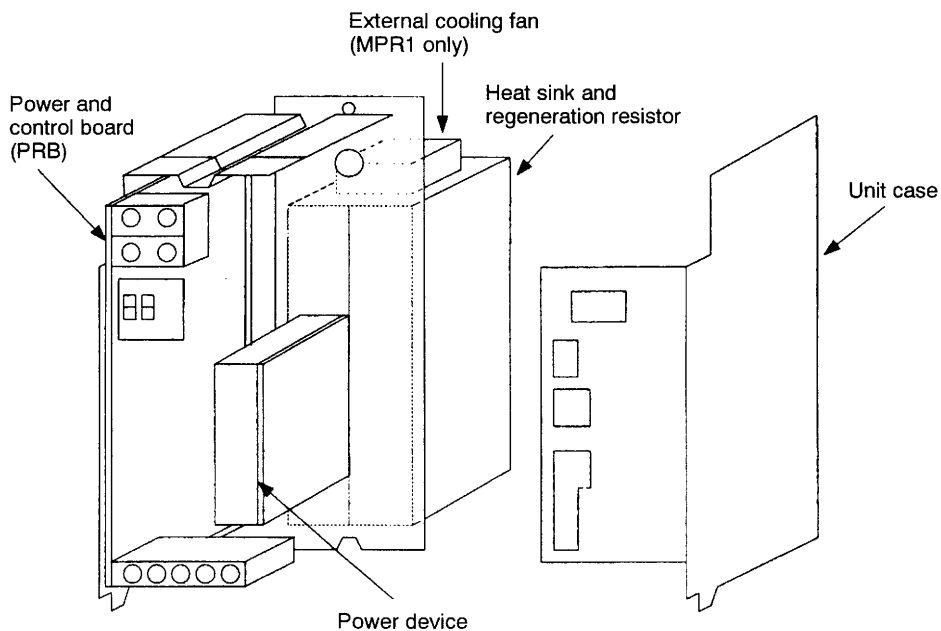
Construction of a power supply unit is shown below

(1) Construction of MPS10



EIOSPCSA2004R01

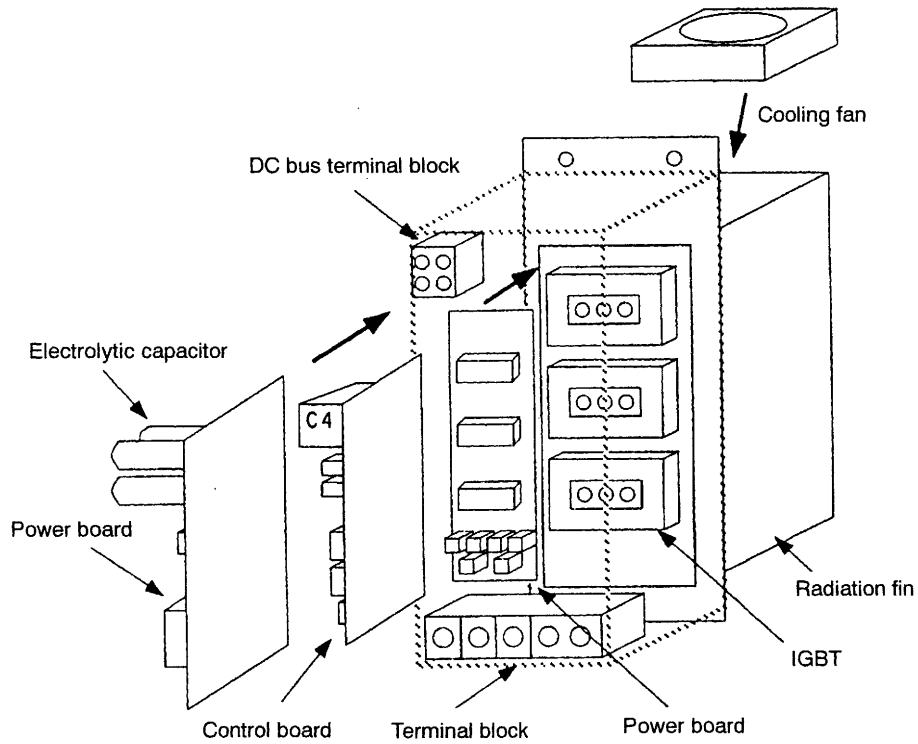
(2) Construction of MPR10/MPR5



EIOSPCSA2005R01

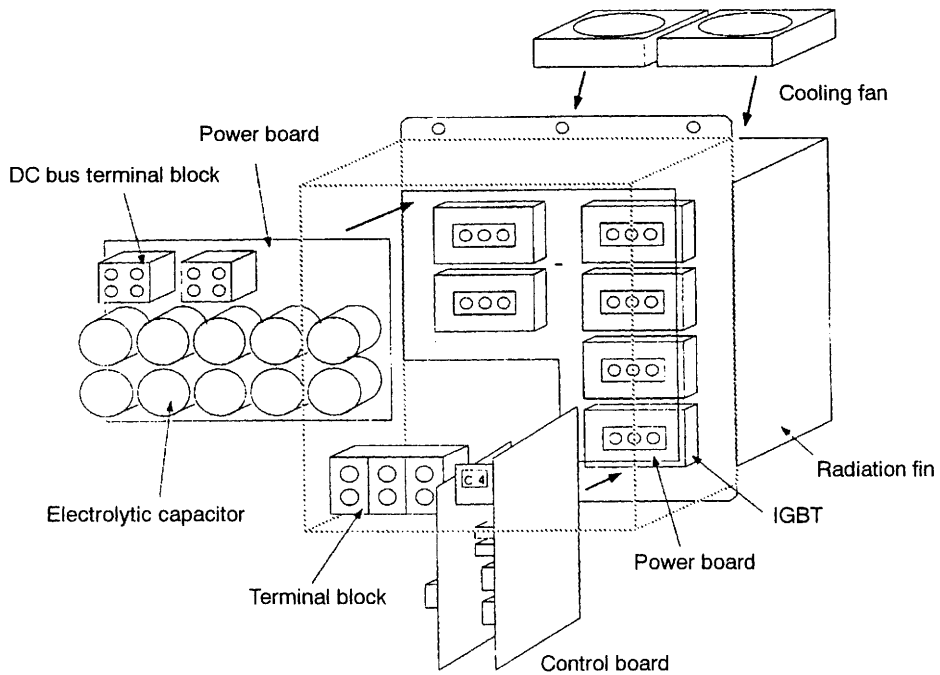
SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

(3) Construction of MPS20/MPS30



EIOSPCSA2006R01

(4) Construction of MPS45 and MPS60



EIOSPCSA2007R01

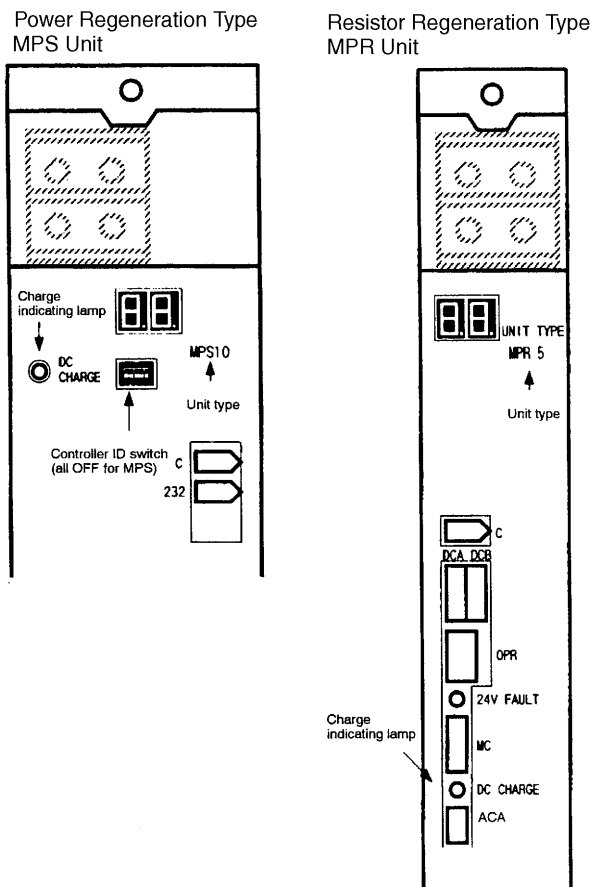
3. Cautions on Changing Units

The items that require special attention when changing DC power supply unit are indicated below.



A DC power supply unit (MPS/MPR) has a large-capacitance capacitor in the unit. When changing MIV unit, shut off the power and wait until the charge indicating lamp goes off. (Wait for at least 2 minutes after shutting off the power.)

- (1) For MPS unit, set the controller ID switch at all OFF.
MPR unit does not have a controller ID switch.
- (2) Unit type of DC power supply units differs according to the regeneration method and unit capacity.
When changing a unit, make sure to use the unit of the same type.



EIOSPCSA2008R01



High voltage is applied to the upper and lower terminal blocks in the unit. Do not remove the plastic terminal block cover while the power is on.

SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

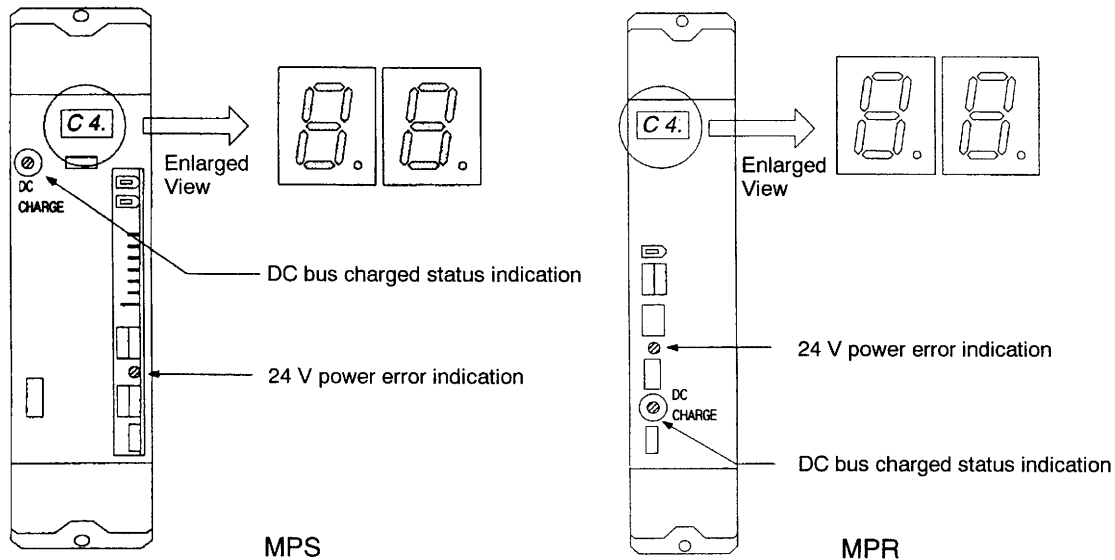
- (3) The procedure for removing the plastic cover at the upper and lower terminal blocks is indicated below.
- Plastic cover at the upper terminal block
After pushing in the lock lightly, tilt the cover 10 deg. to the front and the cover can be taken out upward.
 - Plastic cover at the lower terminal block
After pushing in the lock lightly, turn the cover 90 deg. then pull the cover to the front and the cover can be removed.

4. Indication of Operating Status

A DC power supply unit shows the operating status at the 7-segment LED provided at the front of the unit.

Two display modes (normal operation status display mode and alarm status display mode) are provided and at the occurrence of an alarm, the 7-segment LED displays an error number so that the cause of the alarm can be assumed.

4-1. Arrangement of Status Indicating LED

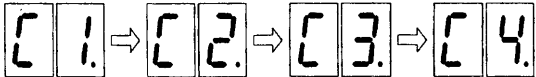
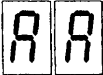


EIOSPCSA2009R01

7-segment LED	: Indicates the operation status or an error number at the occurrence of an error.
DC bus charged status indication lamp	: Indicates that the DC bus is being charged.
24 V power error indication lamp	: Indicates that output of 24 V power supply is suspended due to the occurrence of an error in the power supply circuit. (1) Over voltage of input: Source voltage exceeding 253 Vrms was input. (2) Over current of output: Load current of 24 V power supply was excessively high. (3) Over voltage of output: Output voltage was excessively high due to an error in the internal circuit.


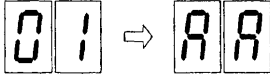
4-2. Contents of Indication

4-2-1. Indication of Normal Operation Status

Status	Indication by 7-segment LED (Example)	Remark
At power ON	 <p>Note 1: A decimal point blinks. Note 2: If an error occurred with MIV unit, "AA" is displayed (shown below) alternately with the indication shown above.</p> 	

- C1 : Indicates the status in which the initialization of the MPS/MPR unit has completed and the unit is waiting for the input of the PWON signal.
- C2 : Indicates the status the DC bus is charged. The MPS/MPR unit turns on the magnet switch after the completion of charge, then transfers to the C3 state after it has confirmed the input of correct AC voltage.
- C3 : Indicates the status the MPS/MPR unit is waiting for the ORPON signal.
- C4 : Indicates the status the MPS/MPR unit has received the OPRON signal and is ready for supplying the power to and MIV unit.

4-2-2. Indication of Alarm Status

Status	Indication by 7-segment LED (Example)	Remark
Error (An error has occurred only with MPS/MPR unit)	 <p>Note 1: A decimal point blinks.</p>	The error number of the error that has occurred is displayed. For error numbers, refer to 4-3 "Error Number Table".
Error (An error has occurred with both MPS/MPR unit and MIV unit.)	 <p>Note 2: The error number of the MPS/MPR unit error and "AA" are displayed alternately.</p>	For error numbers, refer to 4-3 "Error Number Table".

4-3. Error Number Tables

No.	Name	Description	Corrective Action
01	DC voltage alarm Over voltage (OV)	DC bus voltage of the unit raised excessively.	Change the MPS/MPR unit. Change the MIV unit.
02	DC voltage alarm Under voltage (UV)	DC bus voltage of the unit lowered excessively.	Change the MPS/MPR unit. Change the MIV unit.
03	Commercial power source error Open phase (PH)	One or more phases of three phases of the power source lowered excessively. Or, voltage distortion is excessively large.	Check the power source voltage. Change the MPS/MPR unit.
04	Commercial power source error Main circuit power source error	An error occurred with the power source voltage.	Check the power source voltage. Change the MPS/MPR unit.
05	Control power source error (+5 V voltage error)	In the control line, +5 V raised or lowered excessively.	Change the MPS/MPR unit.
06	Control power source error (+12 V voltage error)	In the control line, +12 V raised or lowered excessively.	Change the MPS/MPR unit.
07	Control power source error (-12 V voltage error)	In the control line, -12 V raised or lowered excessively.	Change the MPS/MPR unit.
08	Over current in power cable	Abnormal current flow in the power cable.	Check the power cable. Change the MPS unit.
09	Power device error (IPMF)	An error occurred with the power device.	Check the power cable. Change the MPS unit.
10	Converter bridge short- circuit (IOCR)	Abnormal current flow through the power device.	Check the power cable. Change the MPS unit.
11	Regeneration error	An error occurred with regeneration control.	Check the power cable. Change the MPS/MPR unit.
12	Overload in regenera- tion (ROH)	Temperature of regeneration resistor raised excessively. (MPR unit only)	Check the operation condi- tions. Change the MPR unit.
13	Heat sink overheat (FOH)	Temperature of heat sink raised exces- sively.	Check the operation condi- tions. Change the MPS/MPR unit.
14	Converter link error	An error occurred with data sending pro- cessing in the converter link.	Check the communication cables. Change the MPS/MPR unit.
15	A/D error	An error occurred in A/D conversion.	Change the MPS/MPR unit.
16	Undefined alarm	An alarm not defined occurred.	Change the MPS/MPR unit.
17	Control power supply error (+24 V voltage error)	In the control circuit, +24 V raised or low- ered excessively.	Check the control power source voltage . Change the MPS/MPR unit.
18 to 29	(Spare)		

SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

Alarms specific to MPS unit are indicated below.

No.	Name	Description	Corrective Action
30	INT6 loop error	An error occurred with CPU processing.	Change the MPS unit.
31	INT4 loop error	An error occurred with CPU processing.	Change the MPS unit.
32	INT2 loop error	An error occurred with CPU processing.	Change the MPS unit.
33	A/D error	An error occurred with CPU processing.	Change the MPS unit.
34	CPU address error	An error occurred with CPU processing.	Change the MPS unit.
35	DMA address error	An error occurred with CPU processing.	Change the MPS unit.
36	RAM initialization error	An error occurred with CPU processing.	Change the MPS unit.
37	RAM parity error	An error occurred with CPU processing.	Change the MPS unit.
38	NMI interruption	An error occurred with CPU processing.	Change the MPS unit.
39	General illegal instruction	An error occurred with CPU processing.	Change the MPS unit.
40	Slot illegal instruction	An error occurred with CPU processing.	Change the MPS unit.
41	Undefined trap instruction	An error occurred with CPU processing.	Change the MPS unit.
42	Undefined interruption	An error occurred with CPU processing.	Change the MPS unit.
43	DMAC interruption	An error occurred with CPU processing.	Change the MPS unit.
44	ITU interruption	An error occurred with CPU processing.	Change the MPS unit.
45	SCI interruption	An error occurred with CPU processing.	Change the MPS unit.
46	REF interruption	An error occurred with CPU processing.	Change the MPS unit.
47 to 49	(Spare)		

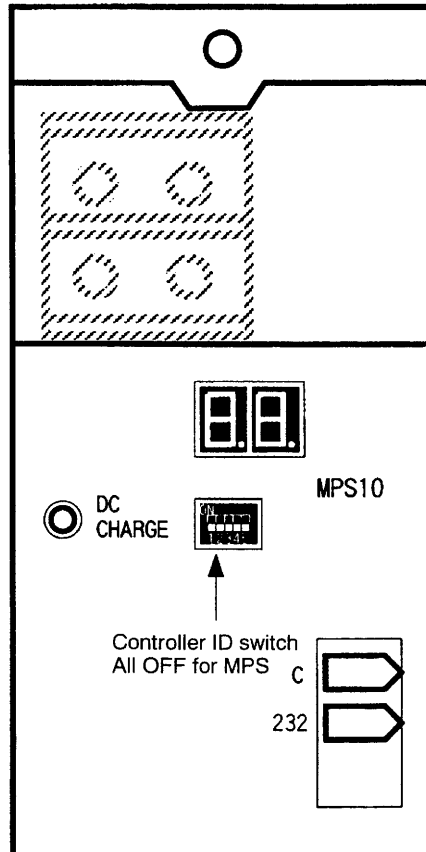
Alarms specific to MPS unit are indicated below.

No.	Name	Description	Corrective Action
50	INT6 loop error	An error occurred with CPU processing.	Change the MPR unit.
51	INT2 loop error	An error occurred with CPU processing.	Change the MPR unit.
52	RAM initialization error	An error occurred with CPU processing.	Change the MPR unit.
53	NMI interruption	An error occurred with CPU processing.	Change the MPR unit.
54	Undefined interruption	An error occurred with CPU processing.	Change the MPR unit.
55	FRT interruption	An error occurred with CPU processing.	Change the MPR unit.
56	8BT interruption	An error occurred with CPU processing.	Change the MPR unit.
57	SCI interruption	An error occurred with CPU processing.	Change the MPR unit.
58	A/D error	An error occurred with CPU processing.	Change the MPR unit.
59	(Spare)		

5. Controller ID Number

Since a DC power supply unit is not connected to the servo link, it is not necessary to set a controller ID number. With MPS unit, however, set the 5-bit controller ID switch to all OFF since the switch is used as the mode selection switch (changing to the adjustment mode). MPR unit does not have a controller ID switch.

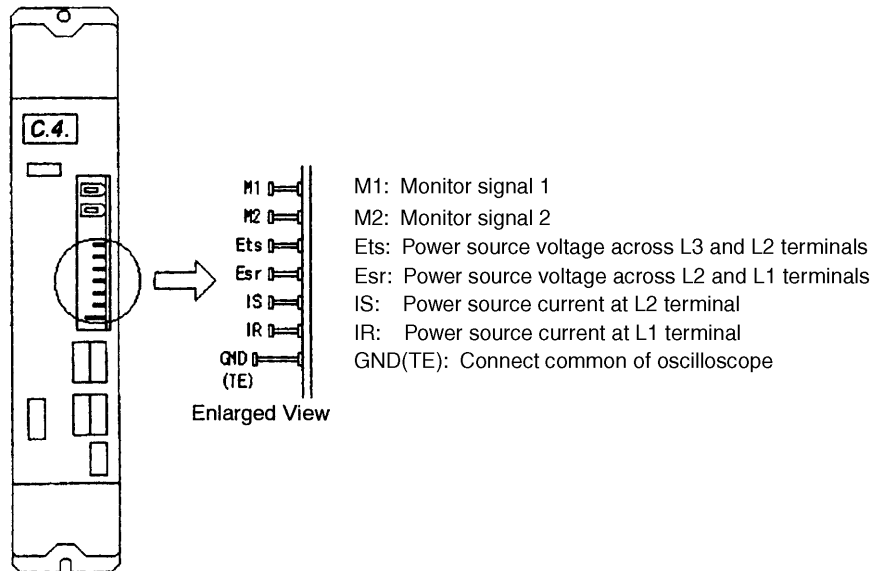
Power Regeneration Type MPS Unit



6. Description of Monitor Terminals

MPS unit has the monitor terminals to allow observation of waveform of power source voltage and current by connecting an oscilloscope to these terminals.

6-1. Arrangement of Monitor Terminals



6-2. Monitor Signals

Monitor Terminal	Description	Waveform (Example)
M1	Monitor signal <ul style="list-style-type: none"> Output voltage range: -3 V to +3 V (outputs an internal signal) 	
M2	Monitor signal <ul style="list-style-type: none"> Output voltage range: -3 V to +3 V (outputs an internal signal) 	
Ets Esr	Power source voltage <ul style="list-style-type: none"> Output voltage range: -2.5 V to +2.5 V Unit: V (multiplication factor: 1/151) Vpp = 3.8 V for 200 V power source T = 16.7 msec for 60 Hz power source 	
IS IR	Power source current <ul style="list-style-type: none"> Output voltage range: -2.5 V to +2.5 V Unit: Current limit value = 1.25 V (Current limit value varies according to the rated capacity of a unit.) 	

7. Connection

7-1. System Connection

Refer to 7-1 "System Connection" in Section 1.

7-2. Terminal Block Screw Size

Refer to 8 "DC Power Supply Unit External Dimensions".

7-3. Connectors

- (1) Connector name: C
Type (manufacturer): 53460-0611 (Molex)
Pin layout

1	SG	2	SG
3	PSRDY-N	4	SVALM-N
5	PSD	6	PSD-N

- (2) Connector name: DCA/B
Type (manufacturer): 1-178137-2 (AMP)
Pin layout

A-1	+24 V	B-1	+24 V
A-2	SG	B-2	SG
A-3	N.C.	B-3	N.C.

- (3) Connector name: OPR
Type (manufacturer): 178303-2 (AMP)
Pin layout

B-1	DBRC	A-1	DBRC-N
B-2	PWON	A-2	PWON-N
B-3	OPRON	A-3	OPRON-N

- (4) Connector name: MC
Type (manufacturer): 1-179276-2 (AMP)
Pin layout

1	MC
2	MCCOM

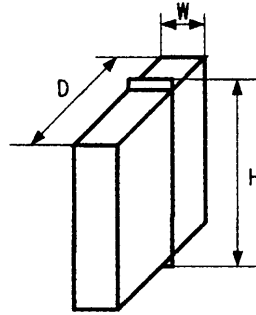
- (5) Connector name: ACA
Type (manufacturer): 1-178138-2 (AMP)
Pin layout

1	R
2	S
2	T

M4 terminal block is used for MPS20, MPS30, MPS45 and MPS60.

8. DC Power Supply Unit External Dimensions

8-1. MPS Unit



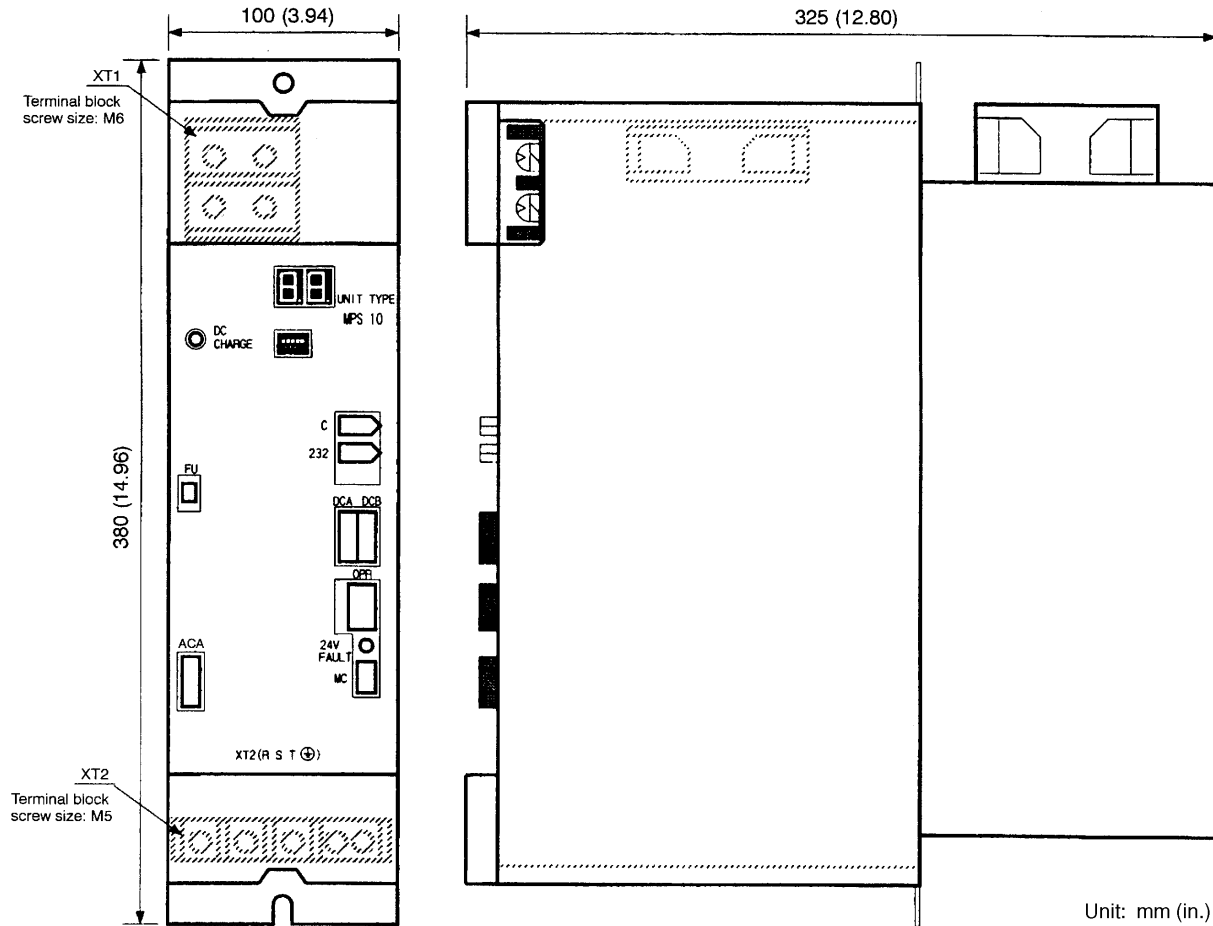
EIOSPCSA2018R01

Unit Type	Rated Cont. Capacity {kW (hp)}	External Dimensions H × W × D {mm (in)}	Weight {kg (lb)}
MPS10	10 (13.3)	380 × 100 × 325 (14.96 × 3.94 × 12.79)	7.7 (16.9)
MPS20	20 (27)	380 × 150 × 325 (14.96 × 5.91 × 12.79)	11.8 (26.0)
MPS30	30 (40)	380 × 150 × 325 (14.96 × 5.91 × 12.79)	11.8 (26.0)
MPS45	45 (60)	380 × 300 × 325 (14.96 × 11.8 × 12.79)	25 (55)
MPS60	60 (80)	380 × 300 × 325 (14.96 × 11.8 × 12.79)	25 (55)

8-2. MPR Unit

Unit Type	Rated Cont. Capacity {kW (hp)}	External Dimensions H × W × D {mm (in)}	Weight {kg (lb)}
MPR5	5 (6.7)	380 × 60 × 325 (14.96 × 2.36 × 12.79)	5.4 (11.9)
MPR10	10 (13.3)	380 × 100 × 325 (14.96 × 3.94 × 12.79)	8.0 (17.6)

SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

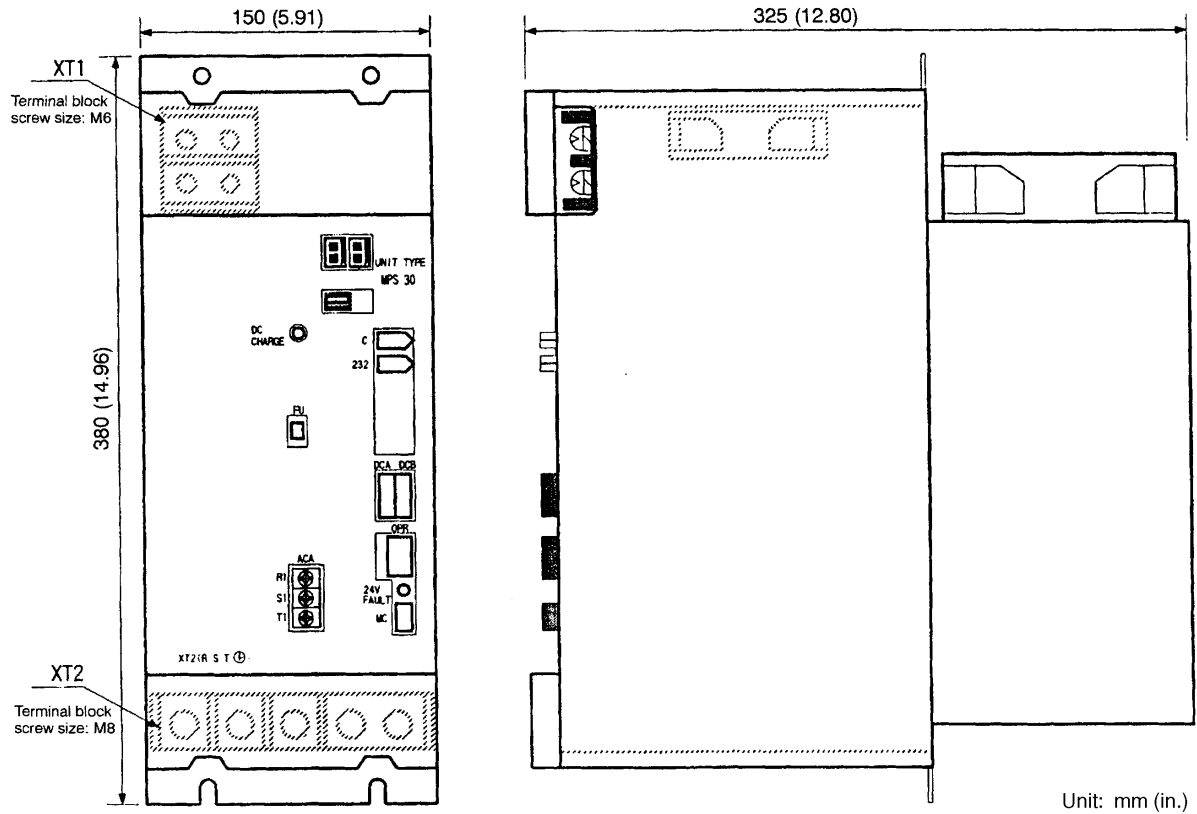


Unit: mm (in.)

EIOSPCSA2019R01

MPS Unit: Power Regeneration Type
 Unit Type: MPS10
 Unit Weight: 7.7 kg (16.94 lb)

SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

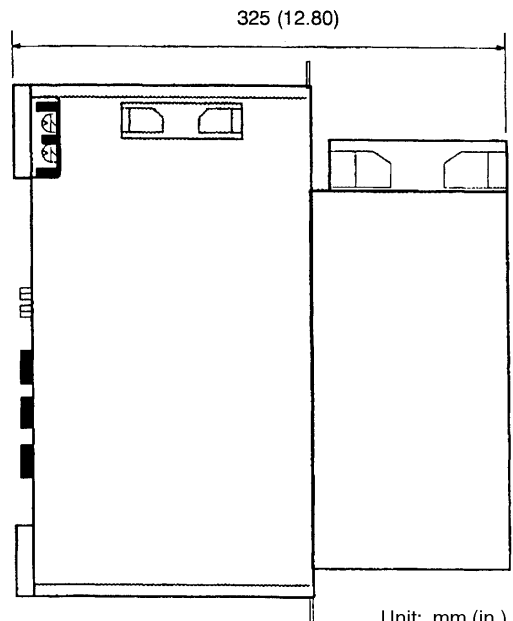
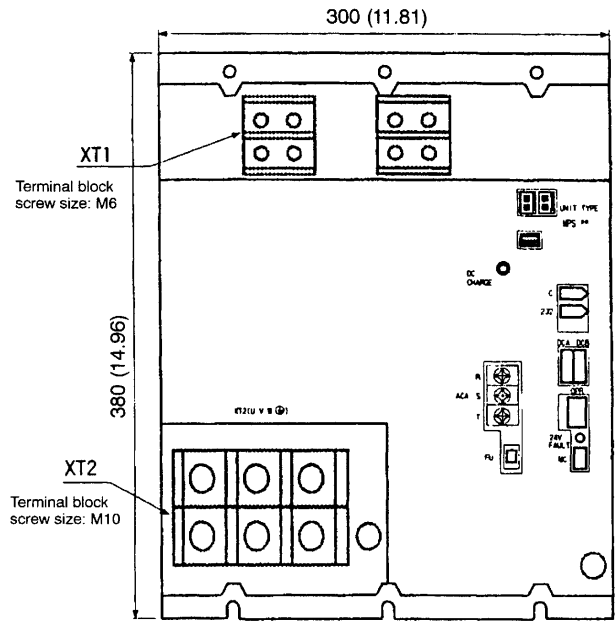


Unit: mm (in.)

EIOSPCSA2020R01

MPR Unit: Resistor Regeneration Type
 Unit Type: MPS20 to 30
 Unit Weight: 11.8 kg (26.0 lb)

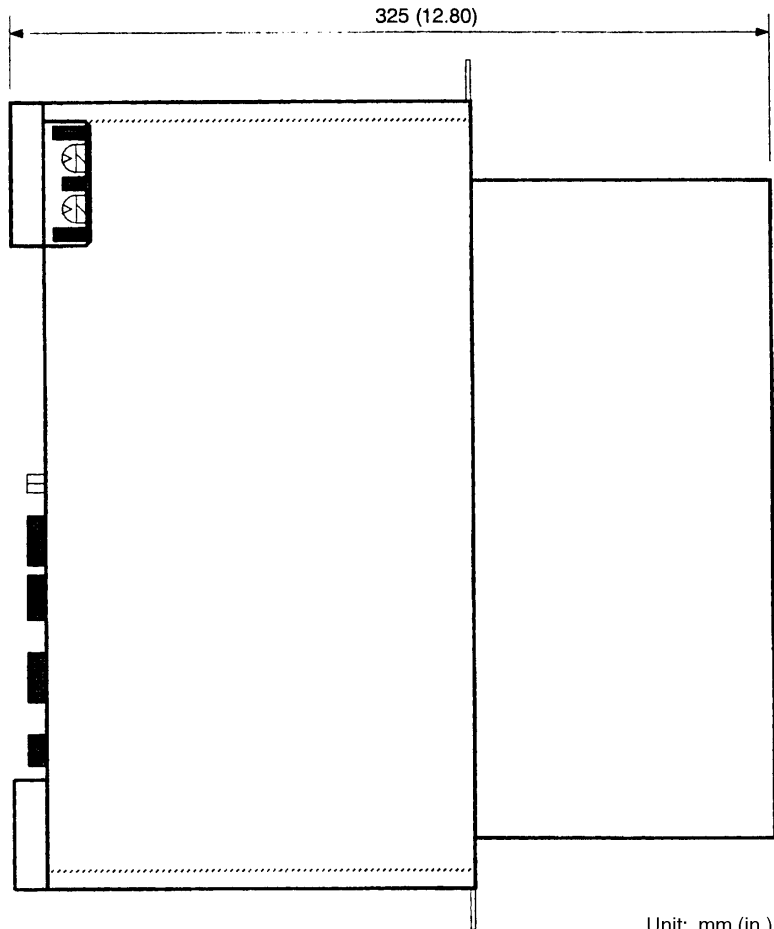
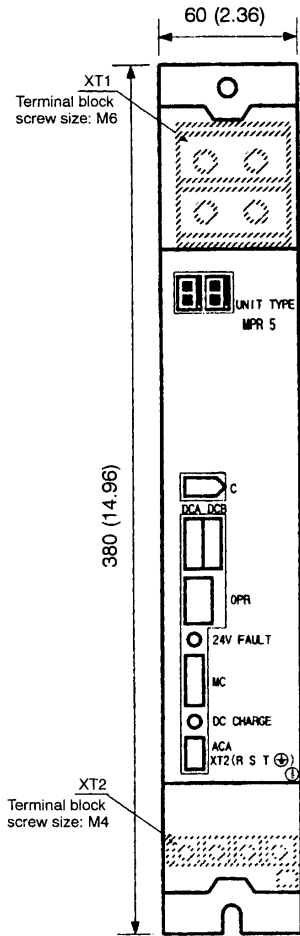
SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)



EIOSPCSA2021R01

MPR Unit: Resistor Regeneration Type
 Unit Type: MPS45 to 60
 Unit Weight: 25 kg (55 lb)

SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)

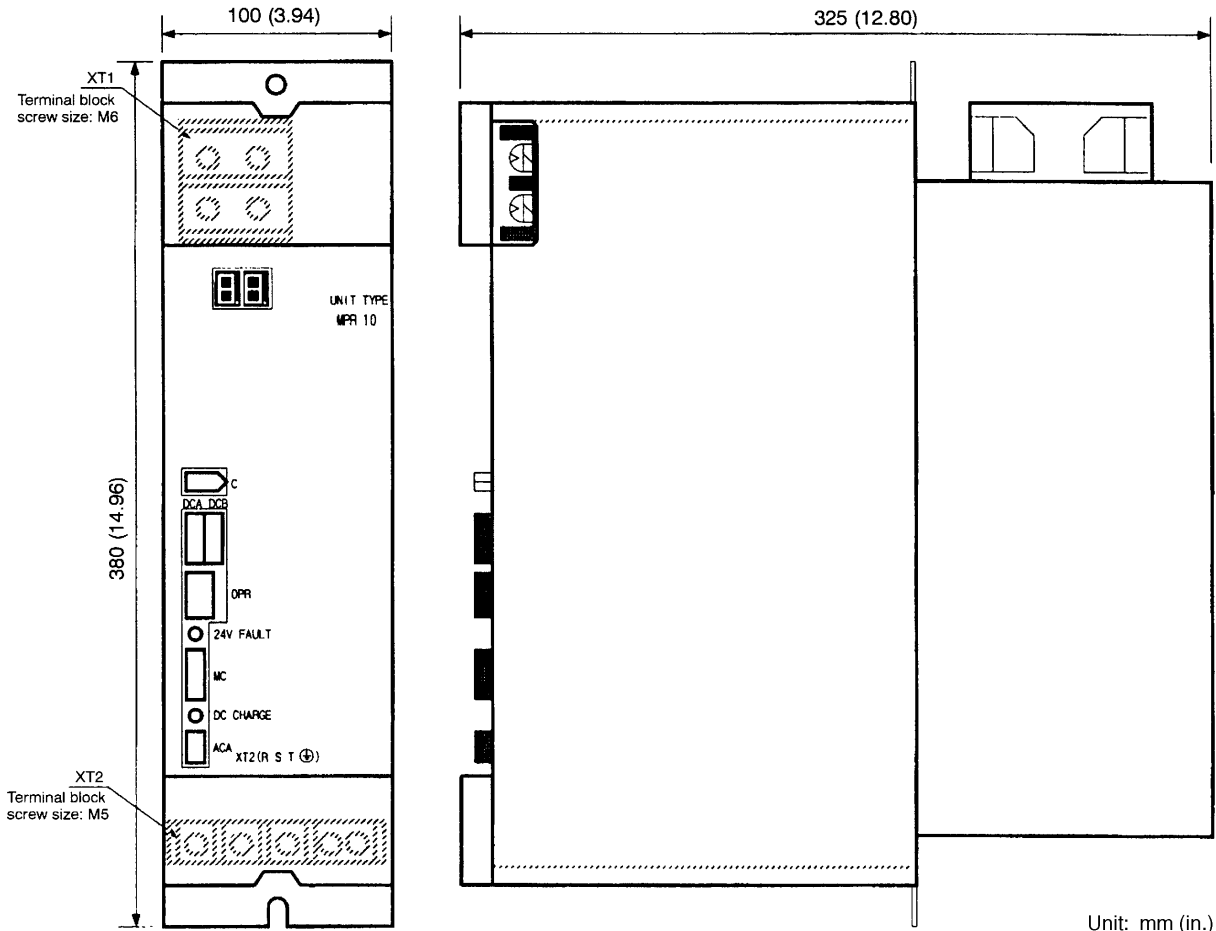


Unit: mm (in.)

EI/OSPCSA2022R01

MPR Unit: Resistor Regeneration Type
 Unit Type: MPR5
 Unit Weight: 5.4 kg (11.9 lb)

SECTION 2 DC POWER SUPPLY UNIT (MPS, MPR UNIT)



Unit: mm (in.)

EIOSPCSA2023R01

MPR Unit: Resistor Regeneration Type
 Unit Type: MPR10
 Unit Weight: 8.0 kg (17.6 lb)