SHANGHAI JIANGNAN CHANGXING HEAVY INDUSTRY CO.，LTD.

Hull No.：H2431/2432/2433

5100TEU CONTAINER VESSEL

INSTRUCTION MANUAL FOR GROUP STARTER PANEL, POWER DIST.BOX AND INDIVIDUAL STARTERS

DESIGNED BY		PAGE	18
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TERASAKI *Ensuring Service, Maintaining Quality*		TERASAKI (CHINA) ELECTRIC CO., LTD	

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1. Introduction

This instruction manual covers the maintenance, checks, and parts replacement for Starter Panel to ensure the safe use of this product over a long period of time. Prior to the use, carefully read the instruction manual and well understand the handling and precautions of the Starter Panel.

In addition to the instructions given in this document, strictly observe the instructions indicated on the instruction/warning plates on the main unit of the starter panel.

In this manual, safety notices are divided into “Danger” and “Caution” according to the hazard level:

DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or otherwise property damage only.

Even a situation warned against under “CAUTION” might lead to a serious result.

Be sure to observe the instructions given under either of the above signal words.

2. Maintenance and Checks

2.1 Checks before turning ON

To turn ON the Starter Panel after installing or checking it, perform the following checks in advance:

△CAUTION Inspection Before Turning on the Power Source

(1) Appearance inspection to check deformation or damage.
(2) Cleaning of the positions where dust or foreign substances are adhering.
(3) Checking on the completion of the connection work (bus connection and panel-to-panel connecting line connection).
(4) Checking of correct grounding work.
(5) Insulation resistance test:
Be sure not to conduct the insulation resistance test on the input/output lines of the module card.
(6) Checking of anomaly on the inside of each starter unit.
(7) Check that the molded case circuit breaker or molded case switch is in the OFF position, after closing the unit panel door of each starter unit.

2.2 Daily and periodical checks

To prevent any accident from occurring from the GSP and maintain its proper functions, perform the following maintenance and checks as scheduled:

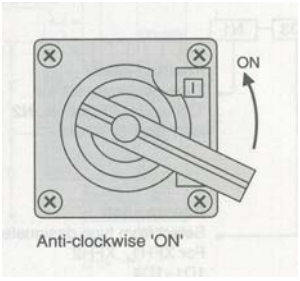
△CAUTION Inspection and Maintenance

(1) Daily inspection
Check appearance for any damage.
Pay special attention for noise, bad odor, and discoloration.
(2) Periodic inspection (to be made at least every 6 or 16 months)
a) Check appearance of each device (molded case circuit breaker, electro magnetic contactor, thermal overload relay, transformer, fuse, module card, etc.) for any missing or damage.
If any failure or damage is found, replace with the spare.
b) Check each device (molded case circuit breaker, magnetic contactor, thermal overload relay, transformer, fuse, module card, etc.) for noise, bad odor or discoloration.
If any noise, bad odor or discoloration is found, replace with the spare parts.
c) Check each bus bar fixing section, device mounting section and wiring section for any looseness.
d) Check the mechanical operating section of each device (molded case circuit breaker, magnetic contactor, thermal overload relay, module card, etc.) for any mechanical malfunction in operation.

3. Using the External Operating Handle for Molded Case Circuit Breaker

3.1 Turning ON/OFF

The external operating handle was set to the OFF position at factory unless otherwise specified. To turn ON the molded case circuit breaker (or disconnecting switch), set this handle to the ON position indicated on the plate.



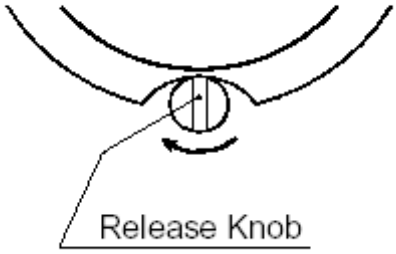
● Opening/closing the door

Set the external operating handle from the OFF position to the RESET/OPEN COVER position and then open the door.

If the molded case circuit breaker (or disconnecting switch) is ON, the door cannot be opened (because the external operating handle is interlocked with the door).

△DANGER
If the door is opened after the molded case circuit breaker (or disconnecting switch) has been turned OFF, the internal terminals may still be live. Therefore, carefully check the wiring diagram before performing the check.

When opening of the unit panel door at the MCCB or molded case switch ON position is necessary. Turn the release knob to the arrowed direction with a flat-bladed screwdriver, and open the unit panel door.



△DANGER Maintenance of Starter Unit Inside
When opening the unit panel door on the hot-line work, do not touch internal wiring and parts. Otherwise, electric shock may result as they are still alive after the unit panel door is opened.

3.2 When closing the molded case circuit breaker again after it tripped

Bring the external operating handle down to the RESET position, and have a feel of being the latching confirm of the molded case circuit breaker. Then turn the handle to ON position.

△CAUTION Re closing of MCCB
When overload current in the system causes the thermal element type MCCB to trip open, the MCCB may not be able to be reset immediately after it trips, be caused by thermal element heating. Wait for cooling down a while and then reset the MCCB.

4. Replacing of Molded Case Circuit Breaker

4.1 Spare Molded Case Circuit Breaker and Accessories

Replacing a MCCB requires you to size the MCCB connection method and spare MCCBs/accessories on board.

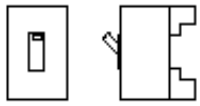
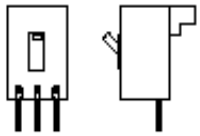
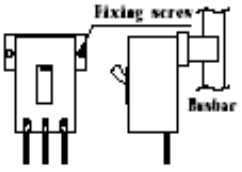
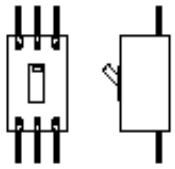
Follow the instructions described below to replace the MCCB.

4.1.1 Molded Case Circuit Breaker Connection Method

As shown in Table 1, the MCCB connection method includes four variations; PM, FPM, PC and FC.

Each starter needs an appropriate method to be applied. Refer to the Table 2:, "FINISHED DRAWING SPECIFICATION LIST" to check the connection method before replacing the MCCB.

Table 1: MCCB Connection Method

Connect Method	Arrangement		Attachment		Mounting Base	Front and side view of MCCB connecte
	Source side	Load side	Source side	Load side		
PM	Plug-in Connect	Plug-in Connect	Plug-in Contactor	Plug-in Contactor	Plug-in base	
FPM	Plug-in Connect	Front Connect	Plug-in Contactor	—	Plug-in base on power source side only	
PC	Plug Contactor Connect	Front Connect	Plug-in Contactor	—	—	
FC	Front Connect	Front Connect	—	—	—	

4.1.2 Connection Method Indication

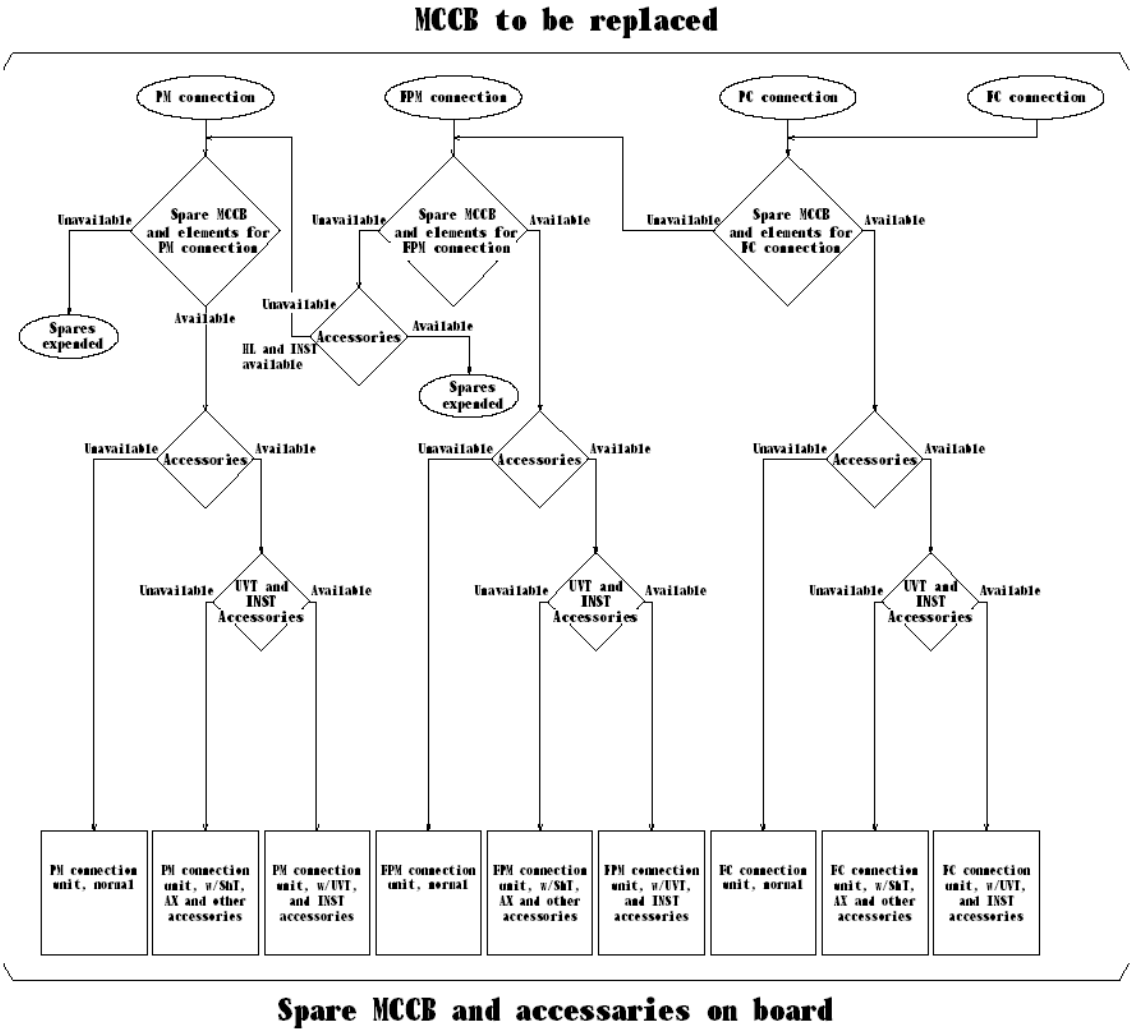
An appropriate connection method is specified on the finished drawing "SPECIFICATION LIST" , exactly included in isolating means.

4.2 Selecting the Spare Molded Case Circuit Breaker and Accessories on Board

After checking the MCCB connection method, select the MCCB and accessories suited to the connection method according to Table 3:.

△CAUTION Selecting the Right Spare
(1) Be sure to replace the breaker with a spare of the same type and rated current. a) MCCB's with under voltage trip (UVT) cannot be used in circuits, which are not wired for UVT operation. b) MCCB's with shunt trip (SHT), an auxiliary switch (AUX) and alarm switch (ALT) can be used in circuits, which are not wired for use with such internally mounted accessories. c) MCCB's using UVT and SHT must be replaced with breakers of the same rated voltage. (2) In the case of electronic type over current protection MCCB's to be used in switch boards, do the following in addition to (1) above: Set the rated current value of the spare to the same value as that of the original breaker. The setting value can be found in the "MCCB SETTING TABLE MS" section of the complete drawings for the switchboard.

Table 3: Selection Procedure



Some kinds of accessories are common to different connection methods.
For details of applicable accessories refer to Table 4:.

Table 4: List of Applicable Accessories

[List 1]

Unit Currently used \ Spare parts			PM Accessory										
			NORMAL	HL	SHT	UVT	INST	AX	INST SHT	UVT AX	HL SHT	HL UVT	HL AX
PM	Accessory	NORMAL	↑	↑	↑			↑			↑		↑
		HL	※	↑							↑		↑
		SHT			↑						↑		
		UVT				↑						↑	
		INST					↑		↑				
		AX						↑					↑
		INST SHT							↑				
		UVT AX								↑			
		HL SHT									↑		
		HL UVT										↑	
		HL AX											↑
FPM FC		NORMAL	↑	↑									
		HL	※	↑									
		INST					↑						

[List 2]

Unit Currently used \ Spare parts			FPM Accessory										
			NORMAL	HL	SHT	UVT	INST	AX	INST SHT	UVT AX	HL SHT	HL UVT	HL AX
FPM FC	Accessory	NORMAL	↑	↑	↑			↑			↑		↑
		HL	※	↑							↑		↑
		SHT			↑						↑		
		UVT				↑				↑		↑	
		INST					↑		↑				
		AX						↑					↑
		INST SHT							↑				
		UVT AX								↑			
		HL SHT									↑		
		HL UVT										↑	
		HL AX											↑

《Remarks 》

(1) Accessories marks

HL :Handle Lock AX :Auxiliary switch

SHT :Shunt Trip device INST :Instantaneous trip device

UVT :Under Volt Trip device

(2) mark: The following types of MCCBs can be replaced with a normal MCCB.

XS100NS, XS225NS, XS400CS, XS400NS, XS400NE,

XH50NS, XH100NS, XH225NS, XH225NE, XH400NE

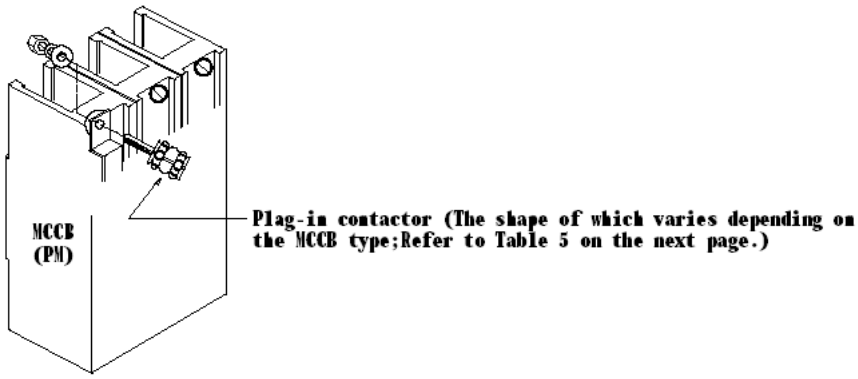
(3) Always replace the SHT, UVT, AX and INST with those having the same ratings as currently used.

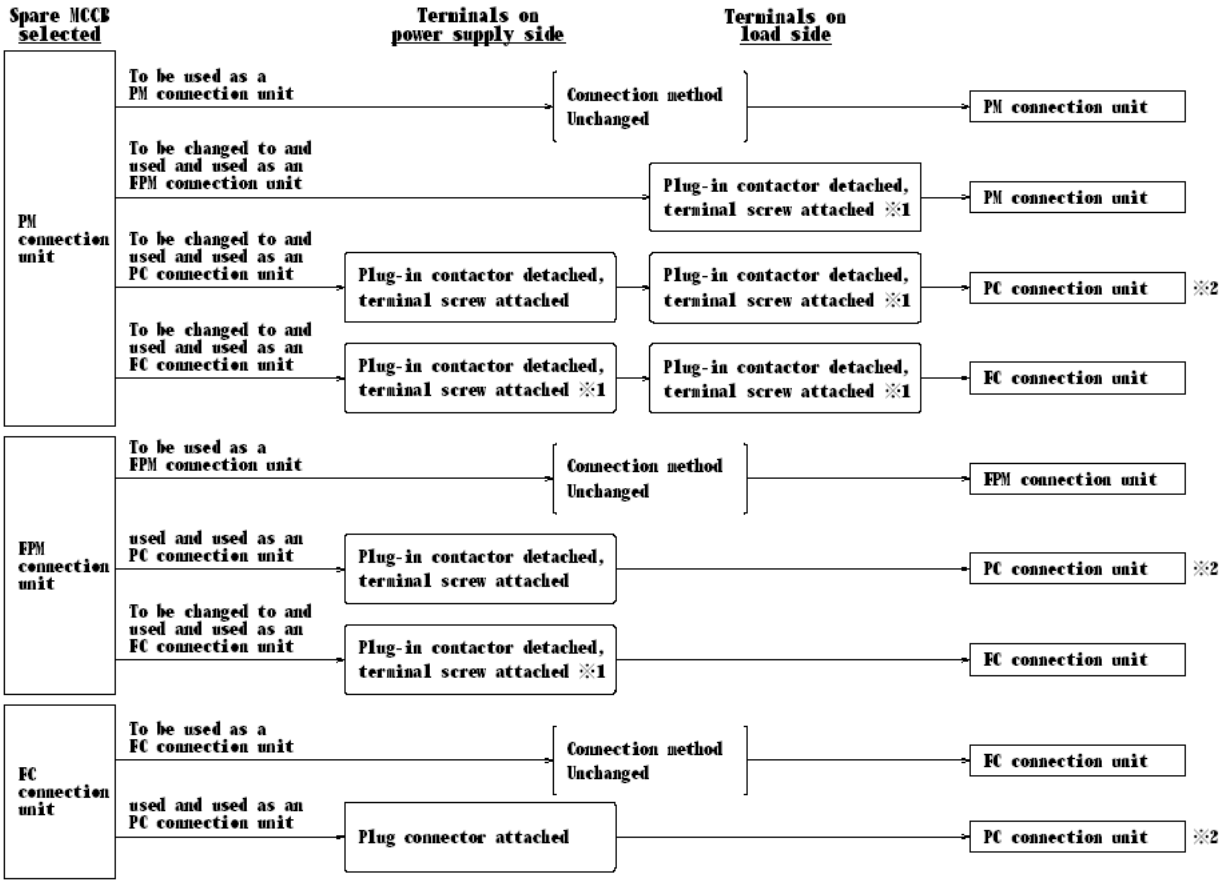
(4) ↑ mark: Indicates applicable accessories.

4.3 Changing the Molded Case Circuit Breaker Connection Method

A change in connection method of a selected spare MCCB is permitted by a change in combination of attachments (Plug-in contactor and plug connector).

(1) To change the MCCB connection method, proceed as follows:



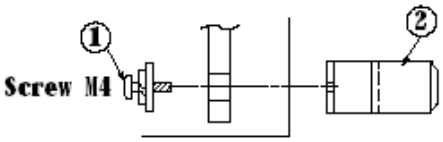
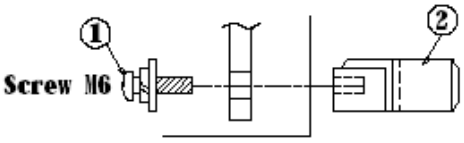
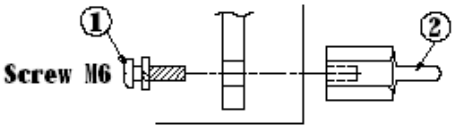
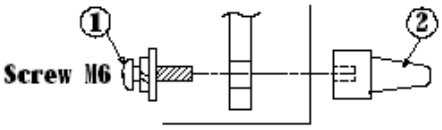
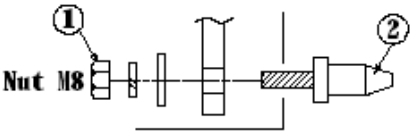
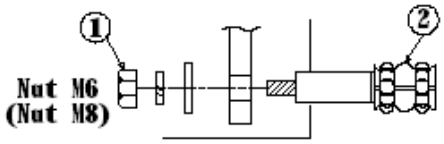
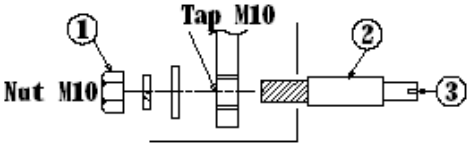
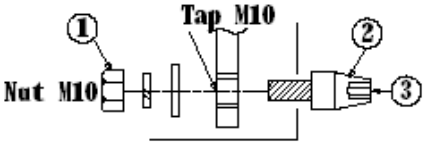


※1: Use the terminal screw removed from a MCCB currently used.

※2: Applicable to XS100NS, XS225NS, XH100NS, XH225NS, TL-100F and TL-100C

(2) Table 5: shows how to detach the plug-in contactor.
Remove the fixing screw or nut ① form a spare MCCB to detach the plug-in contactor ②.

Table 5:Shapes and Detaching Procedure of MCCB Plug-in Contactors

MCCB	SIDE VIEW OF MCCB TERMINAL	REMARKS
XS50NS		
XE100NS		
XH50NS XS100NS XH100NS		
XS225NS XH225NS		
XS400CS XS400NS XS400NE XH225NE XH400NE		
TL-100C TL-100F TL-225F		TL-225F used Nut M8 ① in parentheses.
TL-225B		After removing Nut M10 ① detach the contactor with a flathead screw-driver ③.
TL-400E		After removing Nut M10 ① detach the contactor with an Allen wrench ③.

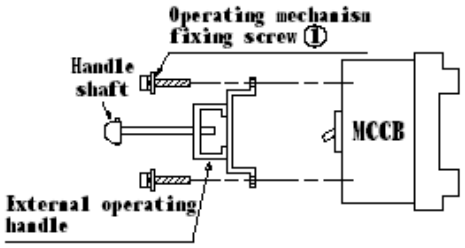
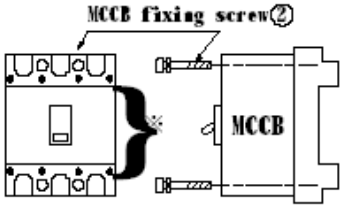
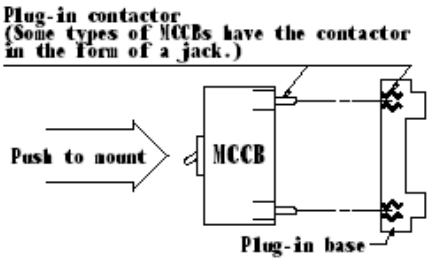
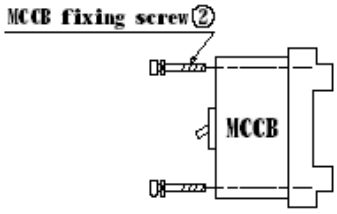
4.4 Dismounting and Mounting the Molded Case Circuit Breaker

△DANGER Replacing the MCCB
(1)Make sure that the MCCB is opened (OFF or TRIP position state) before dismounting or mounting it. Do not work with the operating handle in the ON position. (2)Do not touch the MCCB power source terminals and plug-in base inner terminals as they are changed on hot-line works, even if MCCB is open condition. Otherwise, electric shock could result. (3)When removing an MCCB, do not mistakenly loosen power source terminal screw. Be sure to used the MCCB mounting screw. Otherwise, electric shock or damage to the MCCB could result. (4)Do not lose screws, nuts and washers remove from the MCCB as they are to be reused later.

4.4.1 PM Connection Unit

For dismounting and mounting the PM connection unit, proceed as shown in Table 6 below:

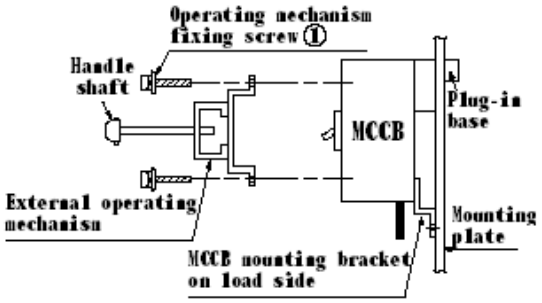
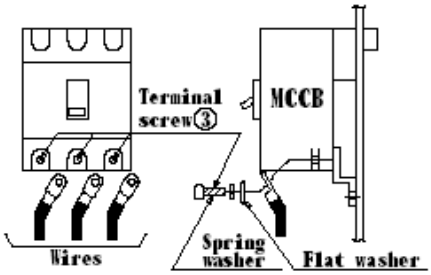
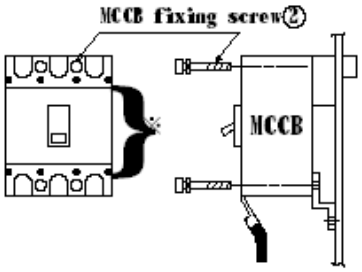
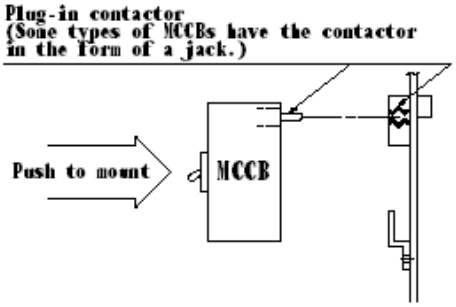
Table 6: Replacing the PM Connection Unit

	PROCEDURE	SCHEMATIC
1	When using the external operating handle Remove four fixing screws ① of the external operating handle mechanism. Detach the mechanism along with the handle shaft from the MCCB.	
2	Remove the MCCB fixing screws Remove four or two MCCB fixing screws ②. ※:Do not remove MCCB case cover fixing screws marked with ● .	
3	Replace the MCCB Withdraw the MCCB from the plug-in base. Aligning the plug-in contactors of a spare MCCB to those of the mounting base, push to mount the spare MCCB on the base.	
4	Remounting the MCCB Install four or two MCCB fixing screws ② removed at step 2, then fasten the MCCB to the mounting base.	
5	When using the external operating handle Attach the external operating handle mechanism to the MCCB with four or two fixing screws ①.	—

4.4.2 FPM Connection Unit

For dismounting and mounting the FPM connection unit, proceed as shown in Table 7 below:

Table 7: Replacing the FPM Connection Unit

	PROCEDURE	SCHEMATIC
1	When using the external operating handle Remove four fixing screws ① of the external operating handle mechanism. Detach the mechanism along with the handle shaft from the MCCB.	
2	Remove the wiring Remove terminal fixing screws ③ and disconnect wires. (When connecting the wires again, observe the phase sequence; R, S, T).	
3	Remove the MCCB fixing screws Remove four or two MCCB fixing screws ②. ※:Do not remove MCCB case cover fixing screws marked with ● .	
4	Replace the MCCB Withdraw the MCCB from the plug-in base. Aligning the plug-in contactors of a spare MCCB to those of the mounting base, push to mount the spare MCCB on the base.	
5	Remounting the MCCB Replace the MCCB and restore in the reverse order of dismounting (Steps 1 to 3).	—

4.4.3 PC Connection Unit

For dismounting and mounting the PC connection unit, proceed as shown in Table 8 below:

Table 8: Replacing the PC Connection Unit

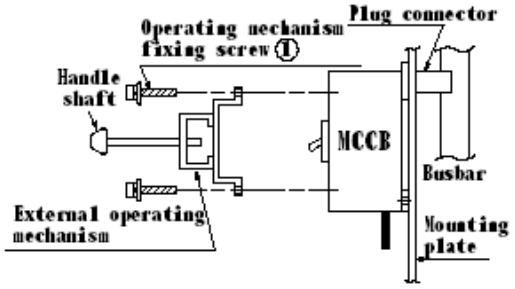
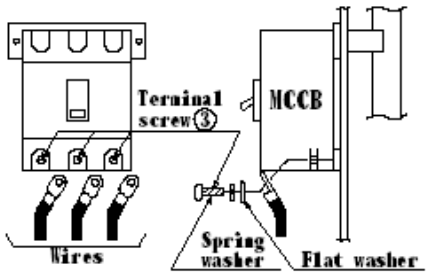
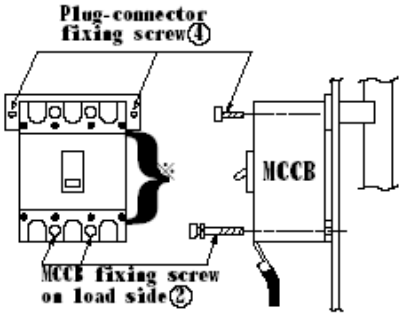
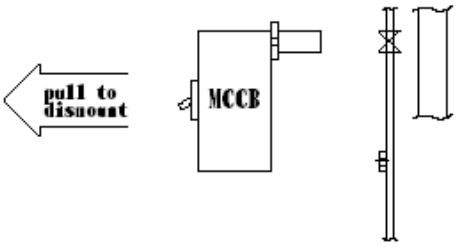
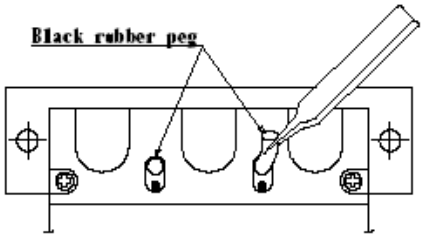
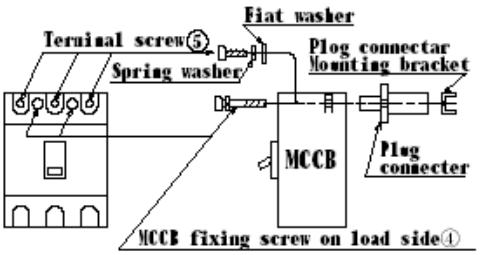
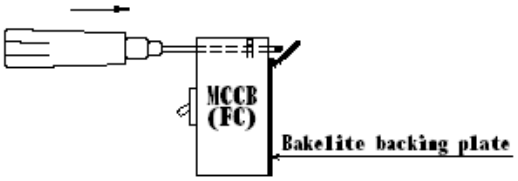
	PROCEDURE	SCHEMATIC
1	When using the external operating handle Remove four fixing screws ① of the external operating handle mechanism. Detach the mechanism along with the handle shaft from the MCCB.	
2	Remove the wiring Remove terminal screws ③ and disconnect wires. (When connecting the wires again, observe the phase sequence; R, S, T).	
3	Remove the MCCB fixing screws Remove plug-connector fixing screws ④ fastening the connector to the mounting plate, and MCCB fixing screws ②. ※:Do not remove MCCB case cover fixing screws marked with ● .	
4	Replace the MCCB Withdraw the MCCB along with the plug-connector. (When restring the MCCB, ensure connection between the plug connector and the bus bar.)	

Table 8: Replacing the PC Connection Unit (Continue)

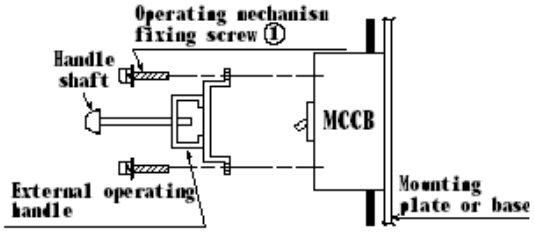
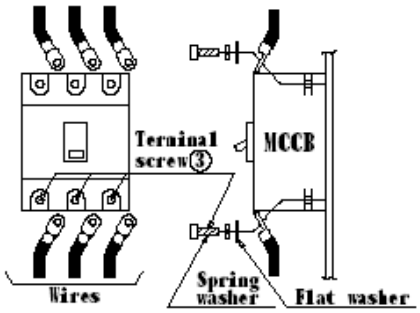
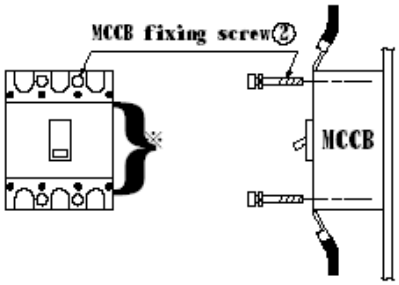
	PROCEDURE	SCHEMATIC
5	Using the pinsetter, remove black rubber pegs for the MCCB fixing screws on the power source supply side (The screws which fasten the plug connector to the MCCB). Some types of MCCBs have a single peg.	
6	Remove MCCB terminal screws ⑤ on the power source side and MCCB fixing screws ④, then detach the plug-connector. A plug connector mounting bracket is used to fasten the connector.	
7	<u>Replace the MCCB</u> Remove all terminal screws from a spare MCCB. If the spare is an FC connection unit, fold back the bakelite backing plate behind the power source terminals with a flathead screwdriver or the like.	
8	<u>Remounting the MCCB</u> Replace the MCCB and restore in the reverse order of dismounting (Steps 1 to 6).	—

4.4.4 FC Connection Unit

For dismounting and mounting the FC connection unit, proceed as shown in Table 9 below:

△DANGER Cut-off the Starter Supply Source
(1) Isolate the starter from the power source before replacing the FC connection unit. Otherwise, electric shock could result. (2) Open the molded case circuit breaker for the switchboard or power distribution panel board which contains the starter power source, and attach to the molded case circuit breaker a tag which denotes "Do not close". Never close the molded case circuit breaker until replacement and restoration is complete.

Table 9: Replacing the FC Connection Unit

	PROCEDURE	SCHEMATIC
1	When using the external operating handle Remove four fixing screws ① of the external operating handle mechanism. Detach the mechanism along with the handle shaft from the MCCB.	
2	Remove the wiring Remove terminal fixing screws ③ on both the power source supply and load side and disconnect wires. (When connecting the wires again, observe the phase sequence; R, S, T).	
3	Remove the MCCB fixing screws Remove four or two MCCB fixing screws ②. ※:Do not remove MCCB case cover fixing screws marked with ● .	
4	Remounting the MCCB Replace the MCCB and restore in the reverse order of dismounting (Steps 1 to 3).	—

5. Precautions for Changing Electromagnetic Contactors

△CAUTION Replacing of Electromagnetic Contactors
(1) Changing the electromagnetic contactor a) Set the MCCB for the circuit containing the electromagnetic contactor to OFF in order to cut off the voltage to the circuit. b) Change the electromagnetic contactor. (2) Replacing with a spare For some electromagnetic contactors, the entire unit is changed. For others, all parts (contacts, spring, and voltage coil) of the unit are changed separately. Check the spare parts table to confirm the type of electromagnetic contactor, the correct part name, etc,and follow the instructions in "Operating manual for the Magnetic contactor" for proper installation.

6. Precautions for Changing Thermal Overload Relays

△CAUTION Replacing of Thermal Overload Relays
(1) Changing the thermal overload relay a) Cut off the power to the circuit containing the thermal overload relay. (no voltage) b) Change the thermal overload relay (2) Selecting the right thermal overload relay a) Use the spare parts table to select a thermal overload relay of the same type and rated current as the previously used thermal overload relay. b) Set the dial of the relay before using. See "Operating manual for the Thermal overload relays" for setting method.