

Source Panel Modification Procedure When Replacing 4 kW Power Unit with 8 kW Power Unit (Two Lamps)

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三浦工業株式会社
MIURA CO.,LTD.

1. Overview

This document describes the modification procedure for replacing a two lamps 4 kW power unit mounted in the source panel with an 8 kW power unit.

2. Applicable product

Source panel of ballast water management system equipped with 4 kW power unit (two lamps)

3. Feature of modification

During the initial replacement of the 8 kW power unit, preparation for subsequent replacements will also be carried out simultaneously. This preparation simplifies the modification of the second and subsequent power units.

First time: Replacement of terminal block, Wiring

Addition of switching power unit, Wiring

Replacement of failed 4 kW power unit, Wiring

From the second unit onwards: Replacement of failed 4 kW power unit, Wiring

<Rules for replacing UV power unit>

Regardless of the malfunction location of the 4 kW power unit, install the 8 kW power unit in ascending order of power unit numbers.

Figure 1 illustrates the case where the fourth two lamps 4 kW power unit is malfunctioning.

If the second or subsequent 4 kW power unit fails, install the 8 kW power unit using the same approach.

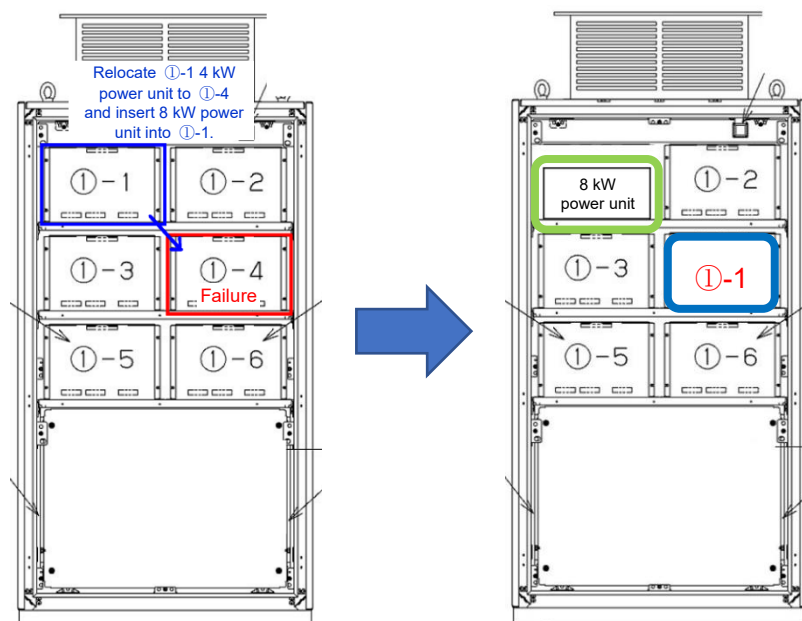


Figure 1 In case of failure of 4 kW power unit in ①-4

4. Tools and parts required

Prepare the following tools and parts for the modification.

Table 1 Tools and parts required

Name	Part code	Specification	Note
Standard tool set			
Screwdriver			
Precision screwdriver			
Initial modification kit	P10000178513-00	Two lamps	Table 2 *Required only the first time
8 kW power unit replacement kit	P10000178517-00	For two lamps source panel with four power units	Table 3
8 kW power unit replacement kit	P10000178519-00	For two lamps source panel with six power units	Table 4
UV power unit cover removal tool	P10000198317-00	For two lamps source panel with four power units	Table 5
Acrylic plate (1)	P10000200000-00	After replacement of one power unit in the upper section	Table 6
Acrylic plate (2)	P10000200001-00	After replacement of two power units in the upper section	Table 6
8 kW power unit	0000-AA8-4967-0	EBLA-8K44DSQ1	

Table 2 Initial modification kit (Two lamps type)

No.	Name	Specification	Quantity
1	Wiring for switching power unit (yellow)	IV 0.9 mm ² yellow×1,500 mm (Three each of M4 and M5)	6
2	Wiring for switching power unit (green)	IV 1.25 mm ² green×1,000 mm	2
3	Wiring for switching power unit (blackish gray)	SCP 4.0 mm ² brackish gray ×2,200 mm	2
4	Output wiring (blackish gray)	MLFC 2.0 mm ² 1500V brackish gray ×2,700 mm	2
5	Output wiring (blackish gray)	MLFC 2.0 mm ² brackish gray×300 mm	20
6	Wiring for contactor (yellow)	IV 0.9 mm ² yellow×2,000 mm	1
7	Wiring for contactor (blue)	IV 0.75 mm ² blue×2,000 mm	1
8	One-touch connector	5P	20
9	Mark tube set for output wiring	V3+ to V9, VA+ to VC+	1
10	Terminal block	TS-A-PTTB4L1000V-12P-1	1
11	DIN rail	500L	1
12	Switching power unit	QUINT4-PS/3AC/24DC/40(2904623)	1

*No.4 to 8 are for extension wiring in case wiring is not reachable.

<Initial modification kit (Two lamps type)>










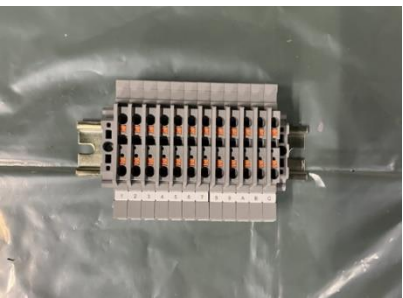


1	2	3
Wiring for switching power unit (yellow)	Wiring for switching power unit (green)	Wiring for switching power unit (blackish gray)
		
4	5	6
Output wiring (blackish gray)	Output wiring (blackish gray)	Wiring for contactor (yellow)
		
7	8	9
Wiring for contactor (blue)	One-touch connector	Mark tube set for output wiring
		
10	11	12
Terminal block	DIN rail	Switching power unit
		

Table 3 8 kW power unit replacement kit (two lamps source panel with four power units)

No.	Name	Specification	Quantity
1	Output wiring (blackish gray)	MLFC 2.0 mm ² 1500V brackish gray×2,650 mm	2
2	DC24V wiring (blackish gray)	SCP 4.0 mm ² brackish gray×1,200 mm	2
3	Ground wiring (green) (with power unit)	IV 2.0 mm ² green×2,650 mm	1
4	Sems screw	SW+W M4×L10	10
5	Bolt (with washer)	SW+W18×1.6 M5×15L	5
6	Mark tube set for output wiring	For output wiring	1
7	Band	T50R 200 mm	10
8	Mount base	ANP-2D	10
9	Stay for fixing UV power unit (left)	Two lamps source panel with four power units	1
10	Stay for fixing UV power unit (right)	Two lamps source panel with four power units	1
11	Nut	M5	5

<8 kW power unit replacement kit (two lamps source panel with four power units)>








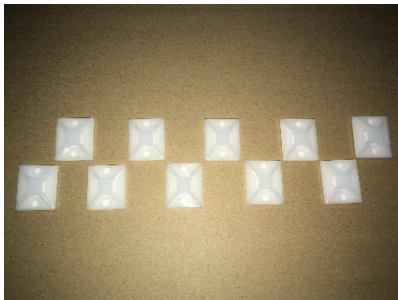

1	2	3
Output wiring (blackish gray) 	DC24V wiring (blackish gray) 	Ground wiring (green) 
4	5	6
Sems screw 	Bolt (with washer) 	Mark tube set for output wiring 
7	8	9,10
Band 	Mount base 	Stay for fixing UV power unit (left, right) 

Table 4 8 kW power unit replacement kit (Two lamps source panel with six power units)

No.	Name	Specification	Quantity
1	Output wiring (brackish gray)	MLFC 2.0 mm ² 1500V brackish gray×2,650 mm	2
2	DC24V wiring(brackish gray)	SCP 4.0 mm ² brackish gray×1,200 mm	2
3	Ground wiring (green)(with power unit)	IV 2.0 mm ² green×2,650 mm	1
4	Sems screw	SW+W M4×L10	10
5	Bolt (with washer)	SW+W18×1.6 M5×15L	5
6	Mark tube set for output wiring	For output wiring	1
7	Band	T50R 200 mm	10
8	Mount base	ANP-2D	10
9	Stay for fixing 8 kW power unit (left)	two lamps source panel with six power units	1
10	Stay for fixing 8 kW power unit (right)	two lamps source panel with six power units	1
11	Nut	M5	5

*No.1 to 8 are the same as the 8 kW power unit replacement kit (two lamps source panel with four power units) shown in Table 3.

<8 kW power unit replacement kit (Two lamps source panel with six power units)>








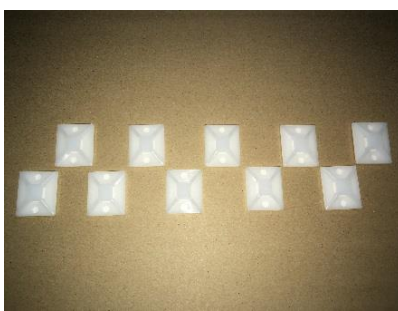

1	2	3
Output wiring (brackish gray) 	DC24V wiring(brackish gray) 	Ground wiring (green) 
4	5	6
Sems screw 	Bolt (with washer) 	Mark tube set for output wiring 
7	8	9,10
Band 	Mount base 	Stay for fixing UV power unit (left, right) 

Table 5 UV power unit cover removal tool

No.	Name	Specification	Quantity
1	UV power unit cover removal tool	two lamps source panel with four power units	1

Required when replacing two lamps source panel with four power units. Not required if ordered in the past and available as a tool.

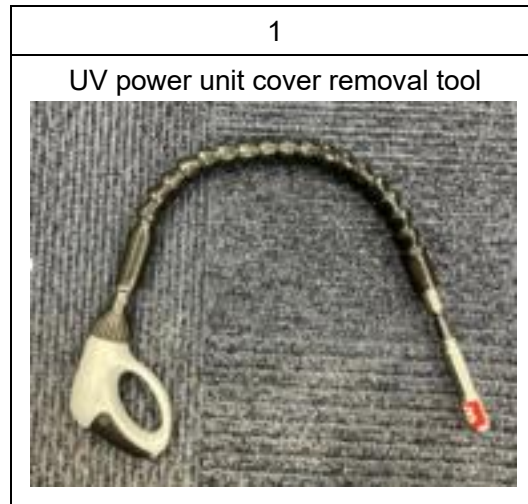
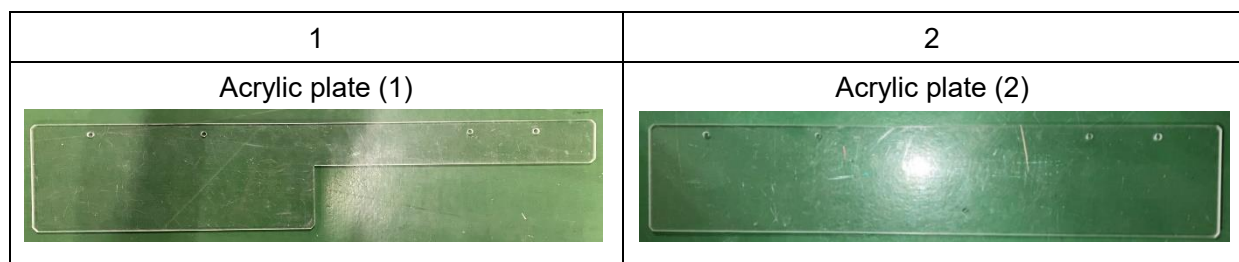


Table 6 Acrylic plate

No.	Name	Specification	Quantity
1	Acrylic plate (1)	After replacement of one power unit in the upper section	1
2	Acrylic plate (2)	After replacement of two power units in the upper section	1

*The acrylic plate is installed in the upper section inside the source panel.



5. Preparation for modification

Make sure that the main breakers of both the source panel and control panel are turned off.
Also, shut off power supply to the source panel.

6. Modification procedure

- (1) Removal of acrylic plate **Only when removing 4 kW power unit from the upper section**

Remove the acrylic plate on the top of the source panel to remove the 4 kW power unit. Discard the removed acrylic plate. Store the bolts that were used to attach the acrylic plate for reuse.

*Depending on the specifications of the source panel, a metal plate may be attached instead of the acrylic plate. In that case, remove and discard it in the same manner.



Figure 2 Acrylic plate on the top of the source panel

- (2) Wiring removal on front of 4 kW power unit

a) Input wiring removal

Disconnect the input wiring of the 4 kW power unit to be replaced.

(Example of wiring numbers: YR, YS, YT)

b) Output wiring removal

Disconnect the output wiring of the 4 kW power unit to be replaced.

(Example of wiring numbers: V1+, V1-)

c) Ground wiring removal

Disconnect the ground wiring of the 4 kW power unit to be replaced.

Store the wiring that will be reused inside the cable duct.

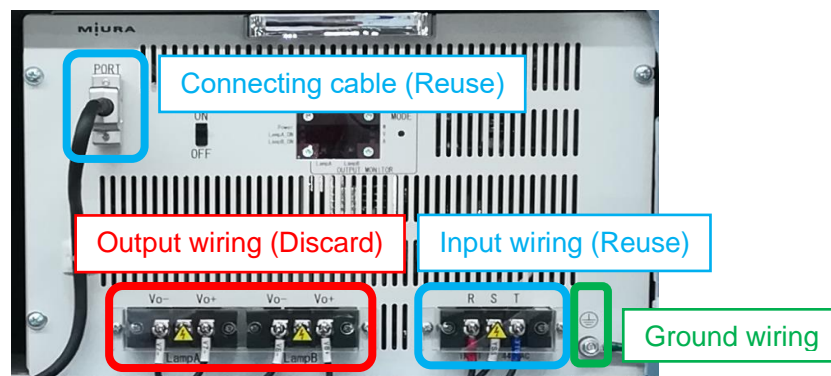


Figure 3 Wiring disconnection points on front of 4 kW power unit

(3) Removal of 4 kW power unit

a) Removal of 4 kW power unit fixing screws

Remove the four screws (M5×10) from the front of the 4 kW power unit. Discard the screws as they will not be used when installing the 8 kW power unit.



Figure 4 Removal of 4 kW power unit fixing screws

b) Removal of 4 kW power unit

Pull out the 4 kW power unit.

*Remove the UV power unit with the assistance of another person as it is a heavy object.



Figure 5 Removal of 4 kW power unit

(4) Removal of 4 kW power unit cover

a) For two lamps source panel with six power units

Can be removed with standard tools.

b) For two lamps source panel with four power units

When removing the two bolts on the front side of the four hexagon bolts that secure the UV power unit cover, there is a possibility that the standard tools may not fit and you cannot access the bolts. In that case, use UV power unit cover removal tool.

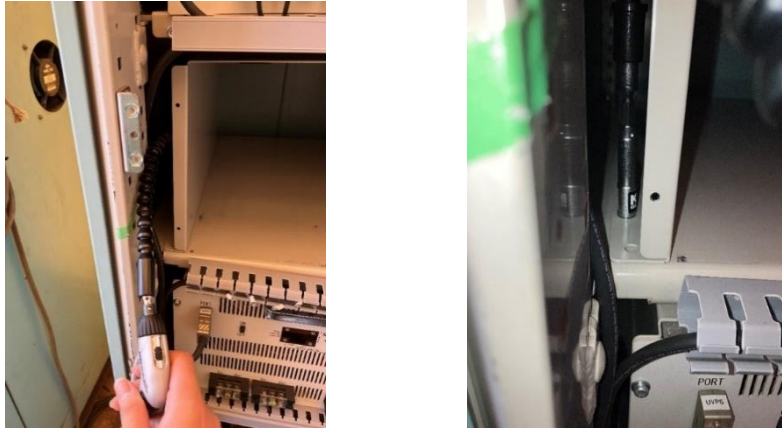


Figure 6 When using tool

*For single-door configuration UV power unit box with two lamps type four power units, there may be instances where the bolt for securing the second and third tiers power unit cover inside the source panel is installed from the bottom. In such cases, remove the bolt from the bottom using a wrench.

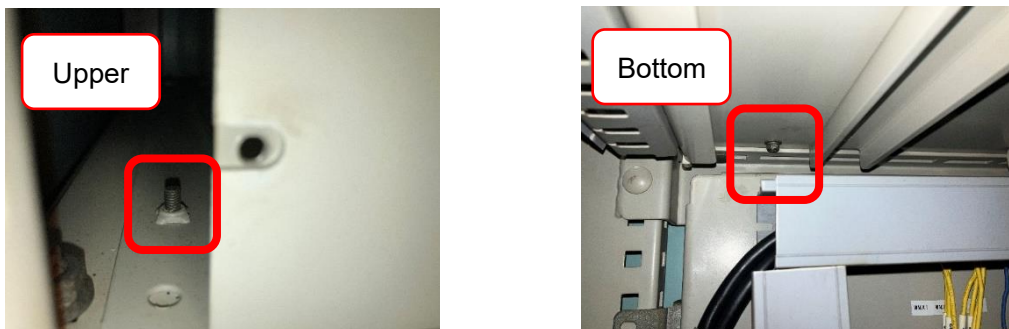


Figure 7 Bolt installation

c) Removal of two bolts on the rear side

Remove the remaining two bolts with a ratchet wrench or similar tool from the space after pulling out the 4 kW power unit. Discard the removed UV power unit cover.



Figure 8 Space after pulling out 4 kW power unit



Figure 9 Removal of two bolts on the rear side

(5) Installation of 8 kW power unit

a) Attachment of stays for fixing 8 kW power unit (left and right)

Attach the stays for fixing UV power unit (left and right) included in the modification kit to the 8 kW power unit. Bolts (SW+W M4×L10) for the attachment are also included in the modification kit.



Figure 10 After attaching stay

b) Temporary fixing of bolts for fixing 8 kW power unit

Screw the bolts (with washers, SW+W18×1.6 5×15) included in the modification kit slightly into the two rear locations. The bolts will serve as guides and help facilitate smooth installation.



Figure 11 After installation of bolts with washers

c) Installation of 8 kW power unit

Install the 8 kW power unit, which has been fitted with the stays for fixing 8 kW power unit (left and right), onto the source panel.

*Install the UV power unit with the assistance of another person as it is a heavy object.

d) Bolt fixation of stays for fixing 8 kW power unit (left and right)

The shape of the stay differs depending on the type of modification kit.

<8 kW power unit replacement kit (two lamps source panel with four power units)>

Fix the left and right stays with four bolts (with washers, SW+W18×1.6 5×15).

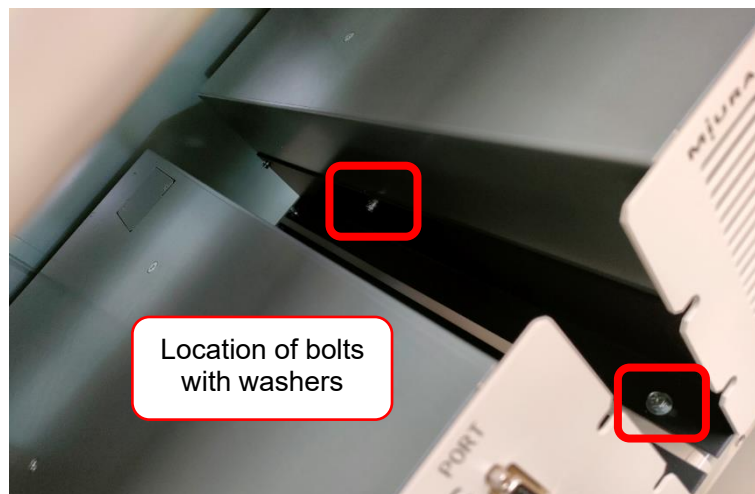


Figure 12 Fixed position of 8 kW power unit replacement kit
(two lamps source panel with four power units)

*For single-door configuration UV power unit box with two lamps type four power units, when securing the 8 kW power unit in the second tier of the source panel, use a bolt (with washer, SW+W18×1.6 5×15) and a nut (M5) to fix it in place.

<8 kW power unit replacement kit (two lamps source panel with six power units)>

Reuse the bolts that were used on the cover to secure the 4 kW power unit.

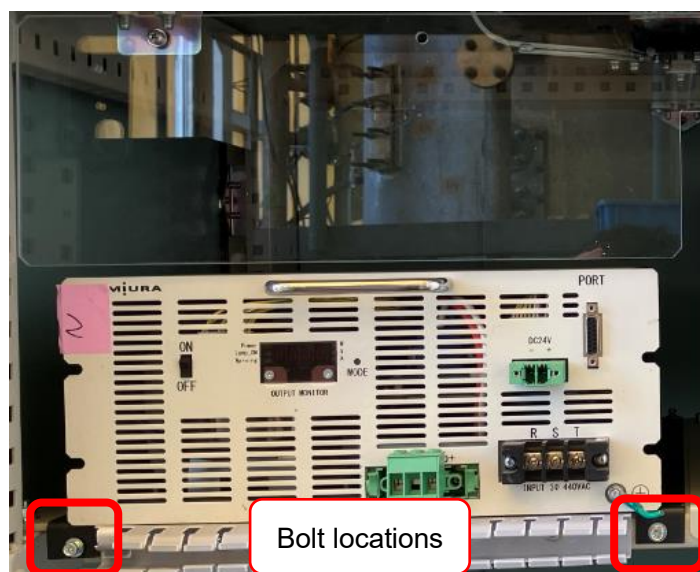


Figure 13 Fixed position of 8 kW power unit replacement kit
(two lamps source panel with six power units)

(6) Attachment of acrylic plate **Only when replacing 4 kW power unit in the upper section**

Since the dimensions of the 8 kW power unit and the 4 kW power unit are different, it is necessary to replace the acrylic plate on the top of the source panel when replacing the first and second 8 kW power unit.

a) When replacing the first power unit

Attach the acrylic plate (1) to the top of the source panel.

When attaching, reuse the bolts that were used to secure the acrylic plate that was removed in “6.

(1) Removal of acrylic plate” on page 6.

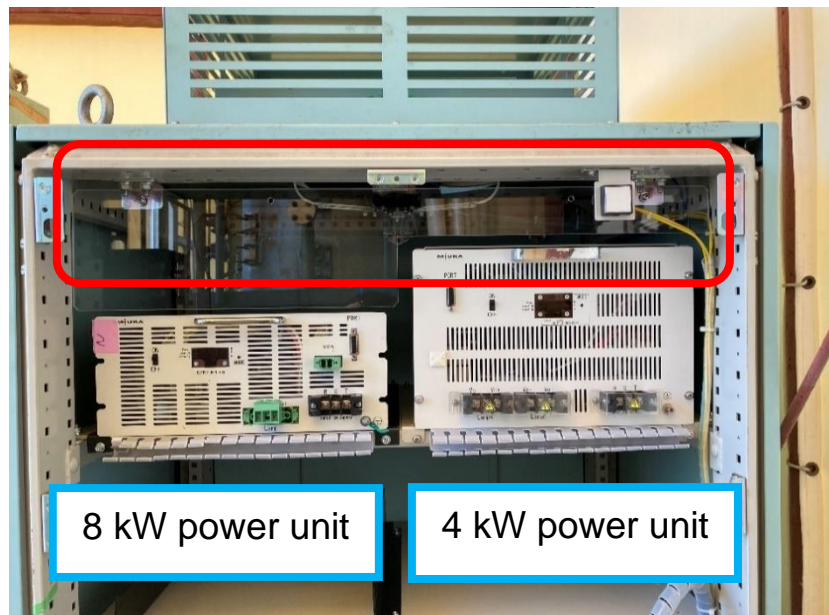


Figure 14 After attaching acrylic plate (1)

b) When replacing two power units in the upper section

When replacing both of the 4 kW power units in the upper section with 8 kW power units, attach the acrylic plate (2).

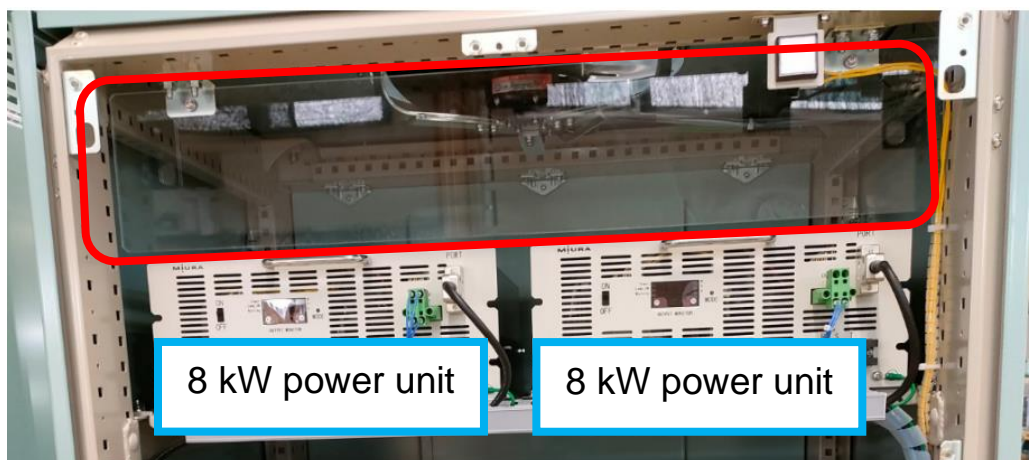


Figure 15 After attaching acrylic plate (2)

(7) Removal of equipment in source panel **First time only**

To install the terminal block or switching power unit for the 8 kW power unit, it is necessary to remove the terminal block for the 4 kW power unit and the contactor that is attached to the equipment mounting plate in the center of the existing 4 kW source panel.

a) Wiring of terminal block for 4 kW power unit

Remove both upper and lower wiring.

b) UV reactor's opposite side terminal block

Remove and store as it will be reused.

c) UV reactor's motor side terminal block

Remove and discard as it will be replaced with one for 8 kW power unit.

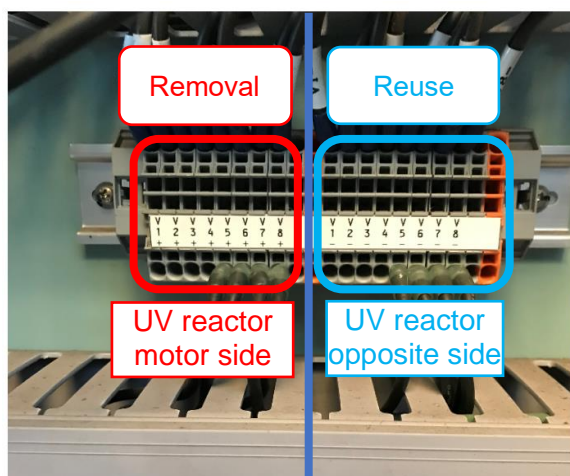


Figure 16 Terminal block for 4 kW power unit

d) Contactor

Remove and keep it as it will be reused. The sub-source panel has no contactor, so remove only the terminal block.

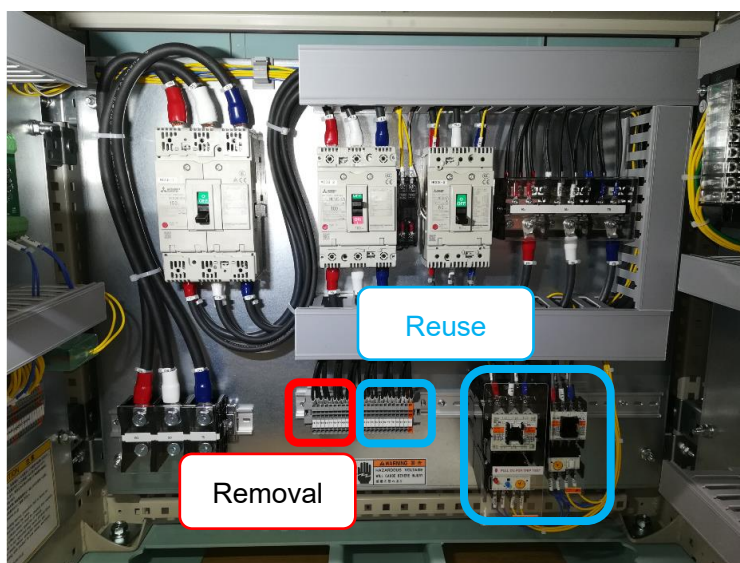


Figure 17 Equipment to be removed in the source panel

e) DIN rail

Remove the two DIN rails to which the terminal block and contactor were attached from the equipment mounting plate. *The purpose of removing the DIN rail is to accommodate the installation of the switching power unit. If it is possible to install the switching power unit without removing the DIN rail, then removing the DIN rail is not necessary. In that case, the DIN rail included in the initial modification kit (two lamps) does not need to be attached.

(8) Attachment of equipment in source panel **First time only**

a) DIN rail

Attach the DIN rail from the modification kit to the location where the previously removed DIN rail was attached.

b) Contactor

Attach the contactor removed in step d) on page 12 on the right side of the terminal block for the UV reactor.

c) Terminal block for 8 kW power unit

Remove the terminal block in the modification kit from the DIN rail and attach it to the red-framed area shown in Figure 18. The modification kit includes a 12-pin terminal block, but only use the number of pins required. For example, if the ballast water management system is designed for eight UV lamps, use eight pins of the terminal block in the modification kit and leave the remaining four pins unused.

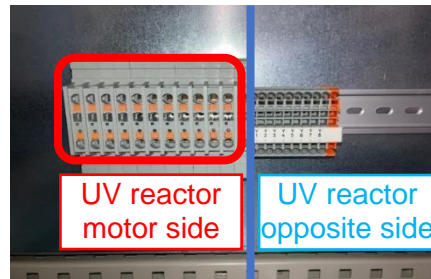


Figure 18 After mounting terminal block for 8 kW power unit

d) Reconnection of wiring

Opposite side: Reconnect both upper and lower wiring.

Motor side: Reconnect only the lower wiring. The upper output wiring will be connected to the 8 kW cable in the next step. *Refer to the conversion table below as the terminal numbers on the terminal block will change before and after the replacement.

Table 7 Terminal number conversion table

Terminal block	Terminal number											
4 kW	V1+	V2+	V3+	V4+	V5+	V6+	V7+	V8+	V9+	V10+ or VA+	V11+ or VB+	V12+ or VC+
8 kW	1	2	3	4	5	6	7	8	9	A	B	C

(9) Installation of switching power unit **First time only**

To supply DC24V for the 8 kW power unit, it is necessary to add a switching power unit.

a) Installation of switching power unit

Install the switching power unit in the space next to the right side of the contactor. Wiring to the switching power unit in advance will make subsequent work processes smoother.



Figure 19 After attaching terminal block and contactor

b) Wiring extension

If the relocation of the terminal block and contactor results in wiring not reaching, use the one-touch connector and wiring included in the modification kit to extend the wiring.



Figure 20 One-touch connector



Figure 21 After installing switching power unit

(10) Wiring to switching power unit **First time only**

Connect the wiring in the initial modification kit to the switching power unit.

a) Switching power unit: "L1-" "L2" "L3+" ⇔ Connect "YR5", "YS5", and "YT5" in that order.

Use three No.1 IV 0.9 mm² yellow wiring included in the initial modification kit.

b) Switching power unit: "2.5-" "1.1"

Use two No.2 IV 2.0 mm² green wiring included in the initial modification kit.

c) Switching power unit: "2.1+" "2.3-" ⇔ Connect "B24V" and "B0V" in that order. (first 8 kW power unit only)

Use two No.3 SCP 4.0 mm² blackish gray wiring included in the initial modification kit.

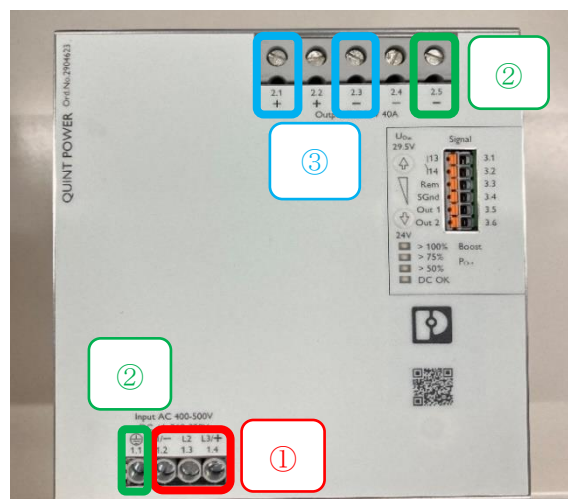


Figure 22 Wiring points and terminal numbers of switching power unit

(11) Wiring to front of 8 kW power unit

a) Input wiring

Reuse the existing wiring. (wiring numbers: YR5, YS5, YT5)

b) Output wiring

Connect the output wiring for the 8 kW power unit (MLFC 2.0 mm² 1500V brackish gray) in the modification kit. (wiring numbers: 1,2)

Use the mark tube provided in accordance with the 8 kW power unit to be replaced.

Wiring connections for the 8 kW power unit differ from those for the 4 kW power unit. Refer to the wiring connection diagram on the next page and thereafter.

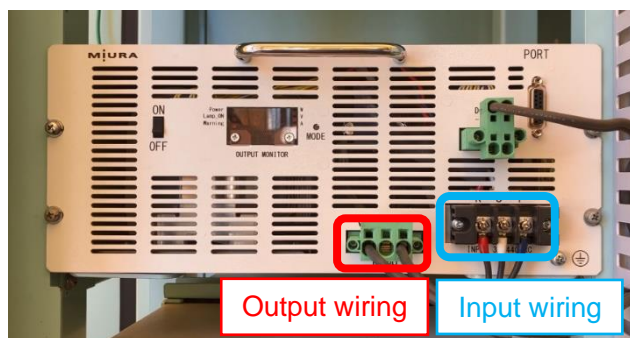


Figure 23 Wiring points on front of 8 kW power unit (input and output wiring)

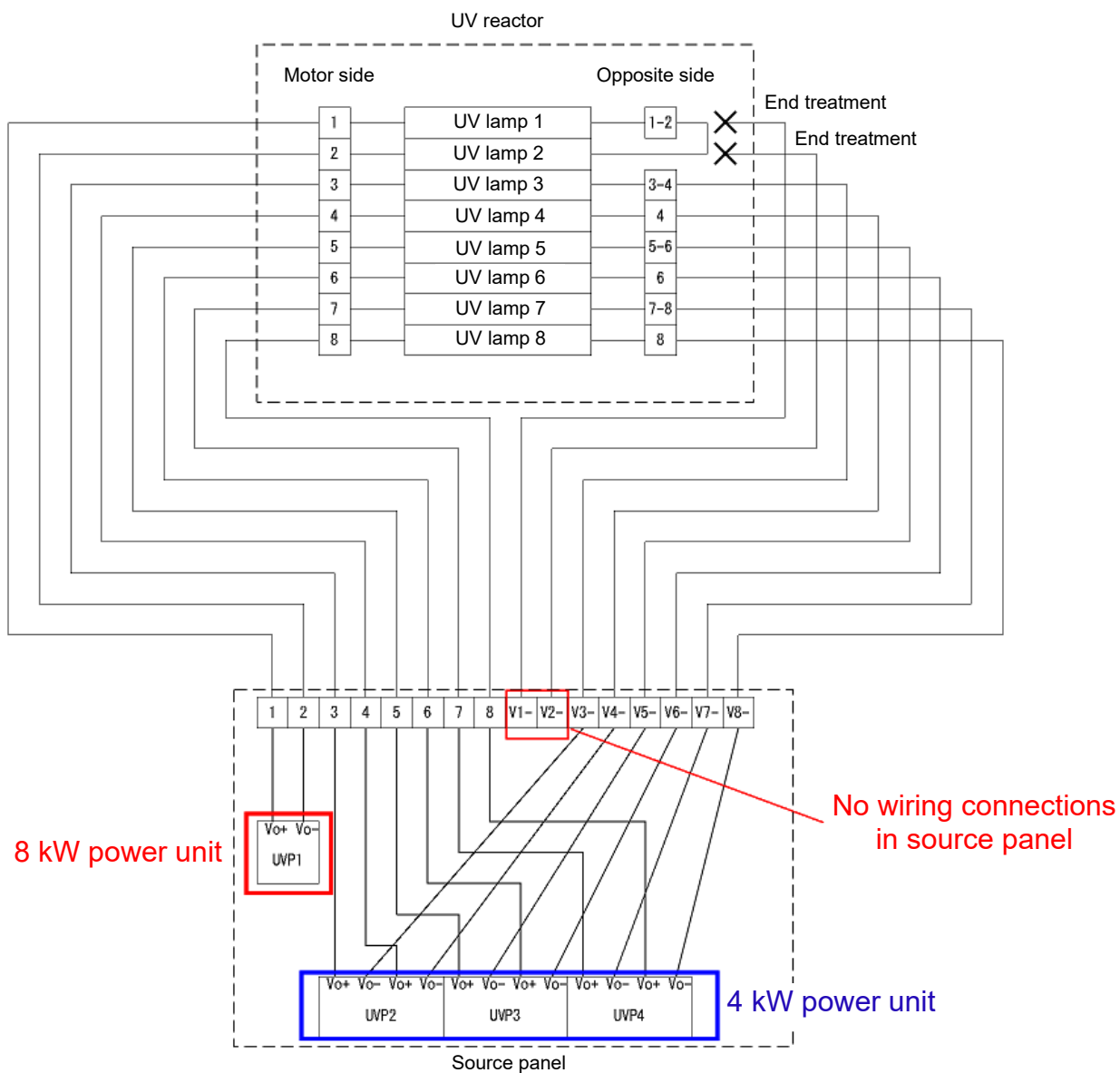


Figure 24 Wiring connection diagram for replacement of the first 4 kW power unit

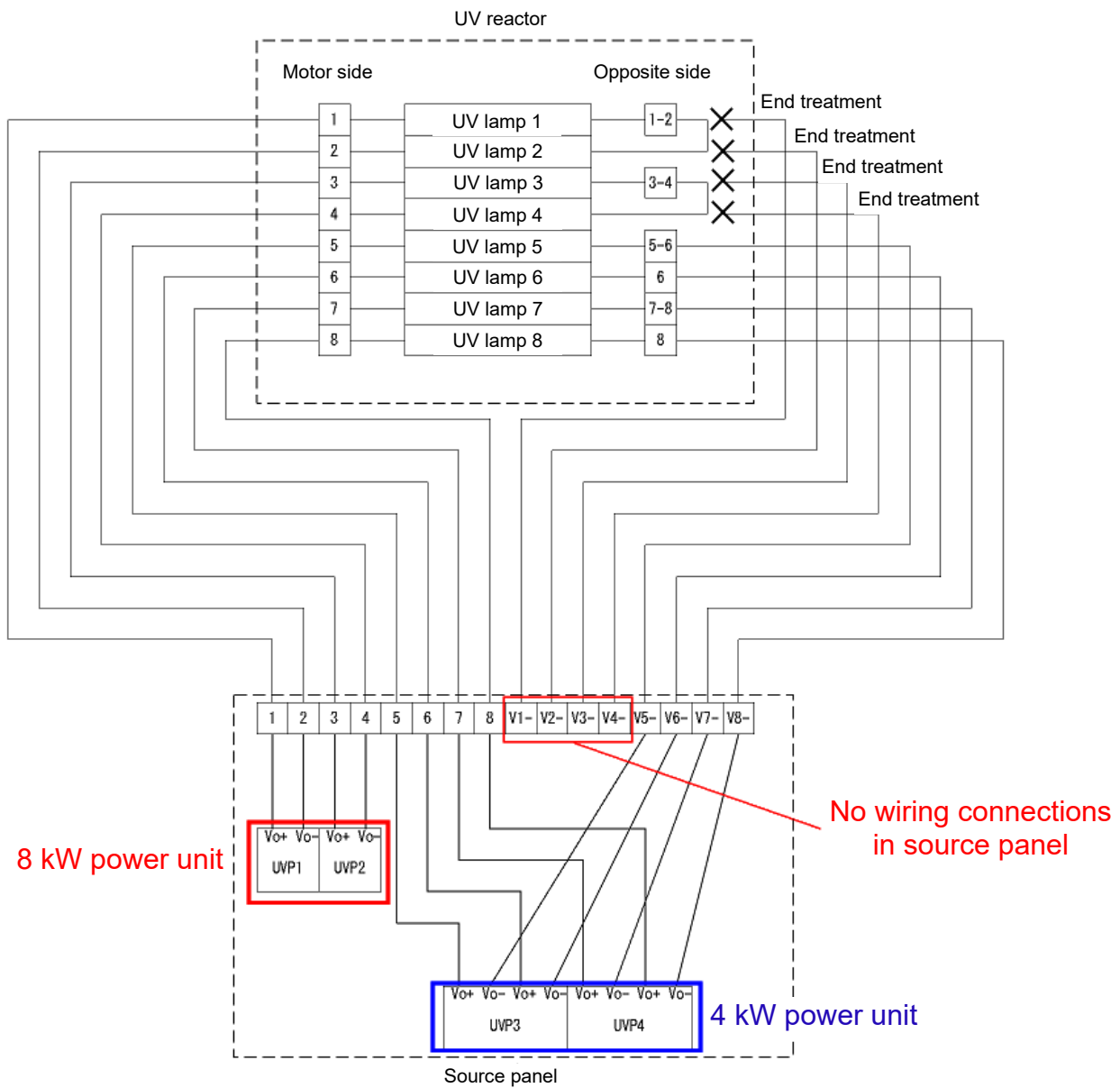


Figure 25 Wiring connection diagram for replacement of the second 4 kW power unit

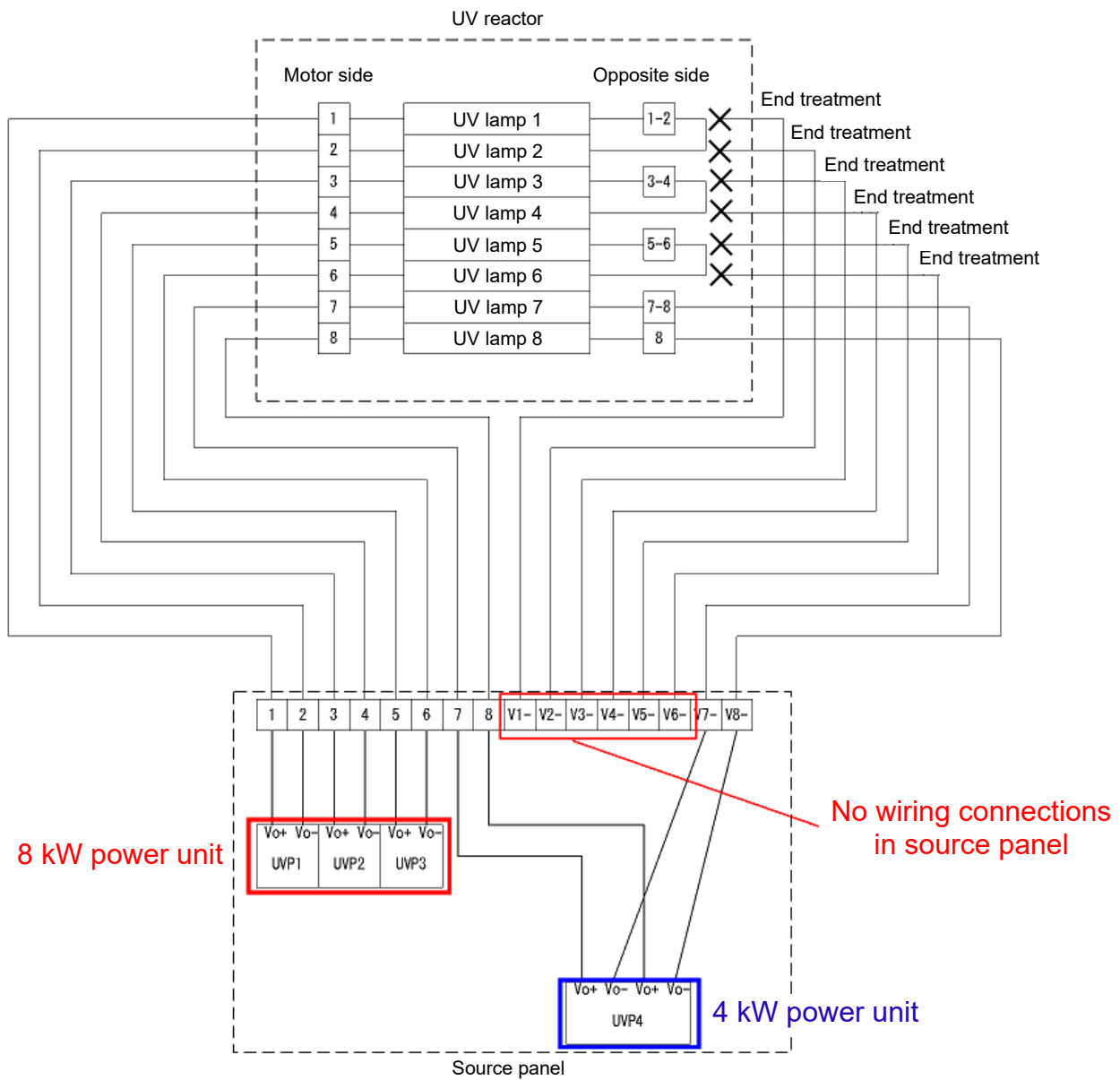


Figure 26 Wiring connection diagram for replacement of the third 4 kW power unit

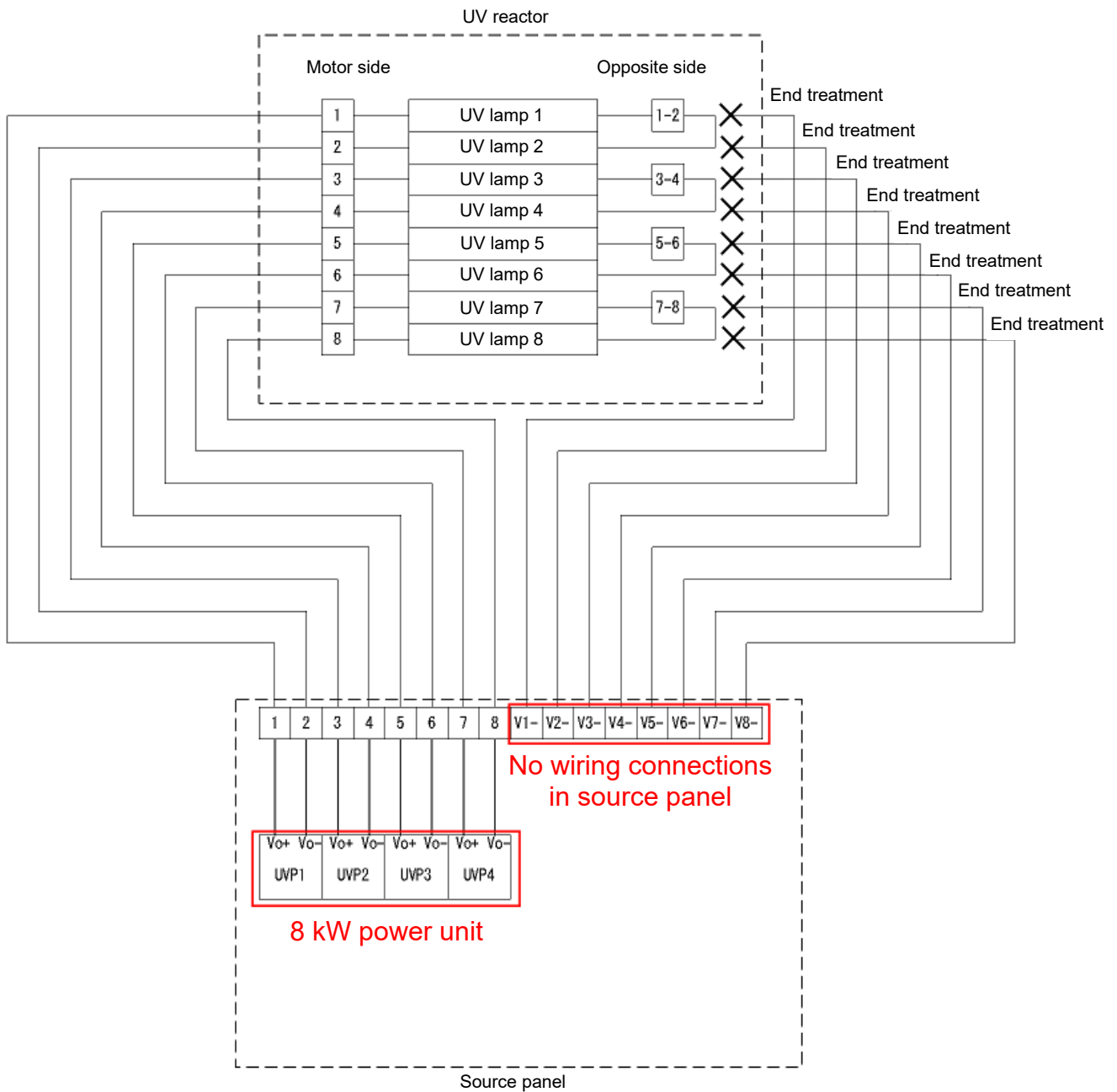


Figure 27 Wiring connection diagram for replacement of the fourth 4 kW power unit

c) Ground wiring

Connect the ground wiring for the 8 kW power unit.



Figure 28 Wiring point on front of 8 kW power unit (ground wiring)

(12) Wiring from switching power unit

- a) Switching power unit “L1-” “L2” “L3+” \Leftrightarrow “R” “S” “T” of the branch terminal block
- b) Switching power unit “2.5-” “1.1” \Leftrightarrow Ground bolts at the bottom of the source panel
- c) Switching power unit “2.1+” “2.3-” \Leftrightarrow DC24V “+” and “-” of 8 kW power unit (first 8 kW power unit only)

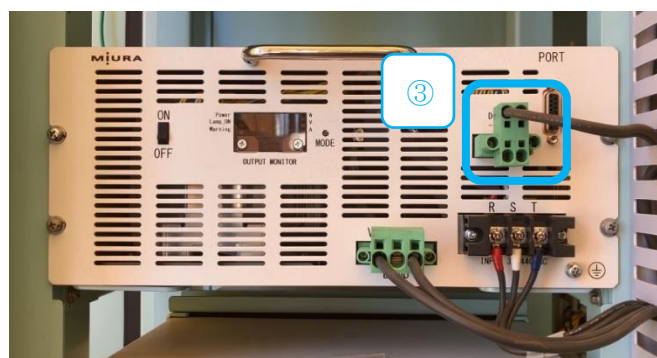
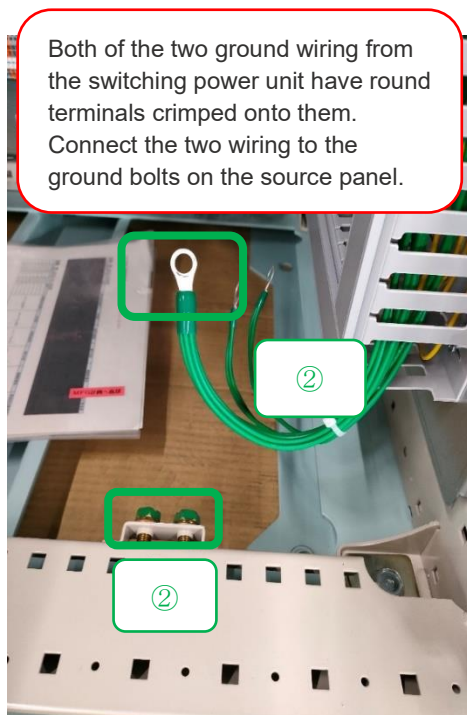
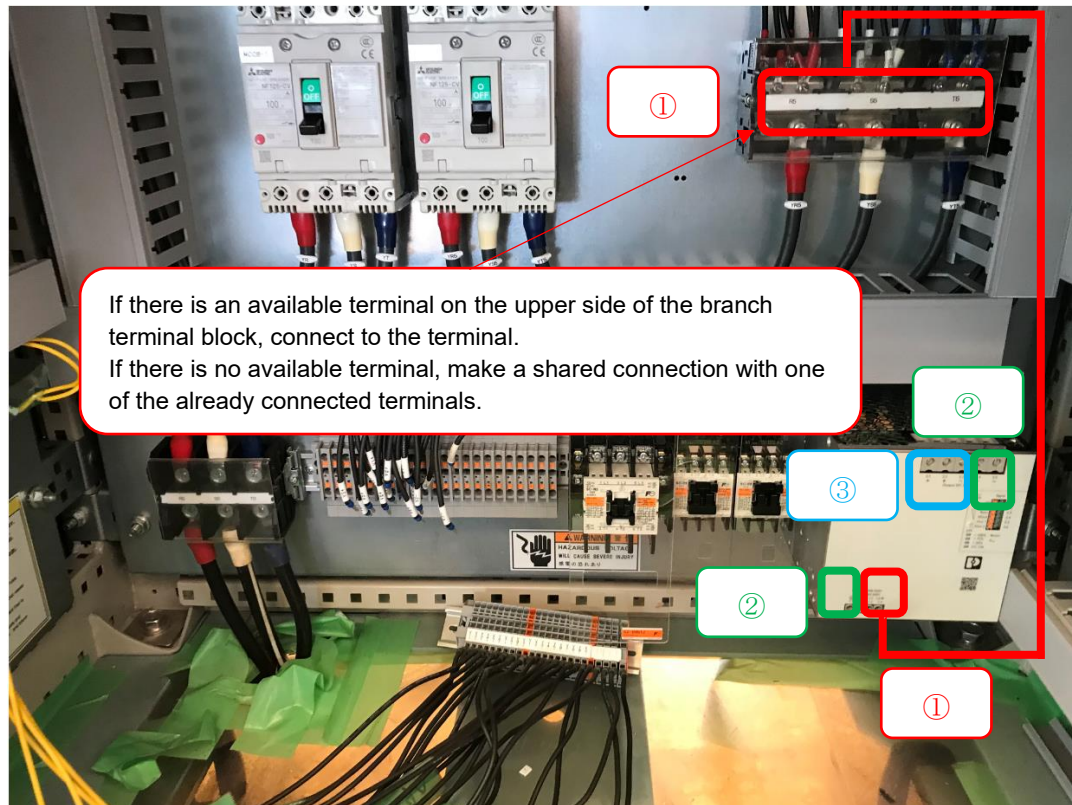


Figure 29 Wiring from switching power unit

(13) DC24V wiring connection for second and subsequent 8 kW power units

When replacing the second and subsequent 8 kW power units, route the DC24V wiring sequentially from the first 8 kW power unit. For the wiring of the DC24V connector, use the No.2 DC24V SCP 4.0 mm² brackish gray wiring included in the 8 kW power unit replacement kit. Rod terminals are attached at both ends for connection to the terminals of the DC24V connector. The right side of the connector is positive (+), and the left side is negative (-).

First unit ————— :Switching power unit⇔8 kW power unit①

Second unit ————— :8 kW power unit①⇔8 kW power unit②

Third unit ————— :8 kW power unit②⇔8 kW power unit③

Fourth unit ————— :8 kW power unit③⇔8 kW power unit④

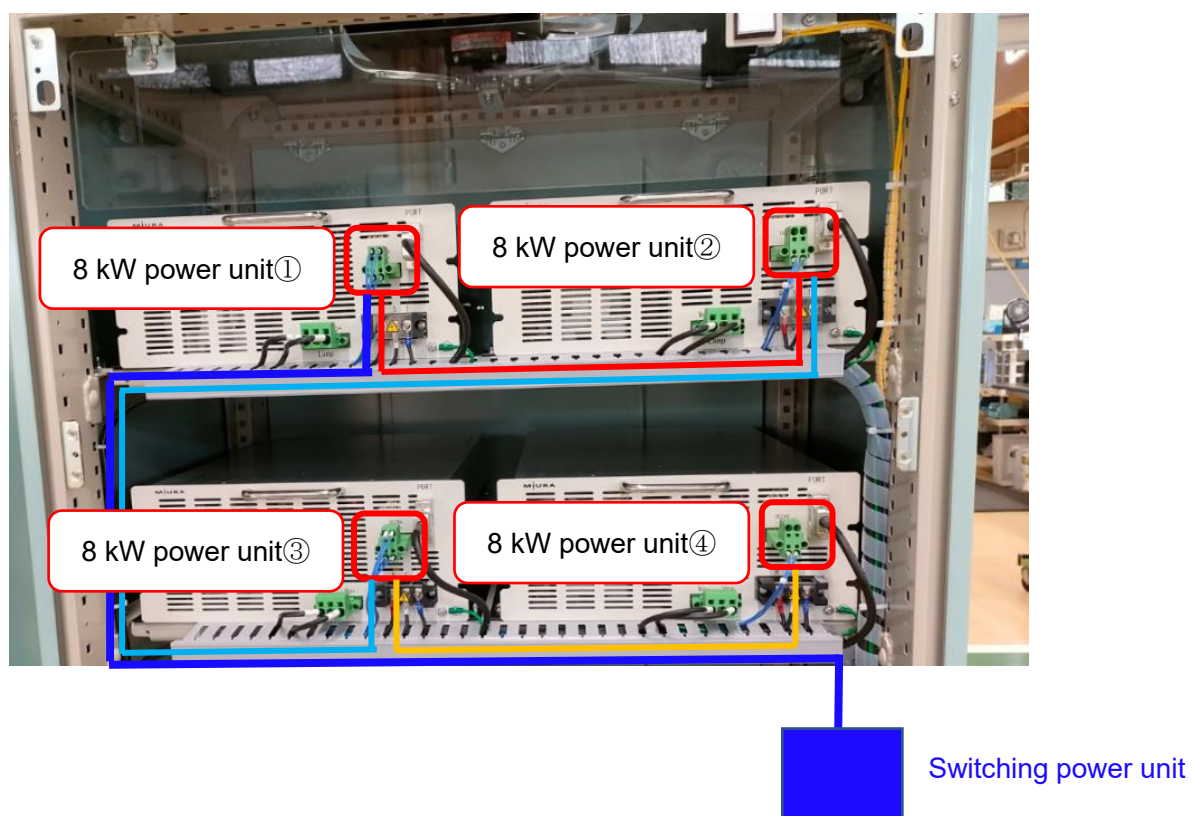


Figure 30 DC24V wiring connection diagram

(14) Attachment of connecting cable

Attach the removed connecting cable to the PORT section.



Figure 31 Connecting cable to 8 kW power unit

7. Operation check after replacement

After completing the replacement work, use a tester to check the continuity of the wiring of the terminal block and the 8 kW power unit. Also, if there are multiple UV reactors, check the continuity of the modified source panel and the modified UV reactor to make sure they match.

Turn on the main breakers of both the source panel and control panel and supply power to the source panel. Then, perform automatic ballasting or deballasting operation and confirm that the UV lamps are lighting up properly.

If the replaced two lamps 4 kW power unit includes a normal product, pack it in a cardboard box or similar packaging for storage as a spare in case of emergencies.