

### Upgrade of the FR-CC2-P Series Converter Unit

Thank you for your continued patronage of Mitsubishi Electric drive control products. 12-phase rectification will be supported for the FR-CC2-P series converter unit.

#### 1. Products Affected

FR-CC2-P series converter unit

#### 2. Details of the Change

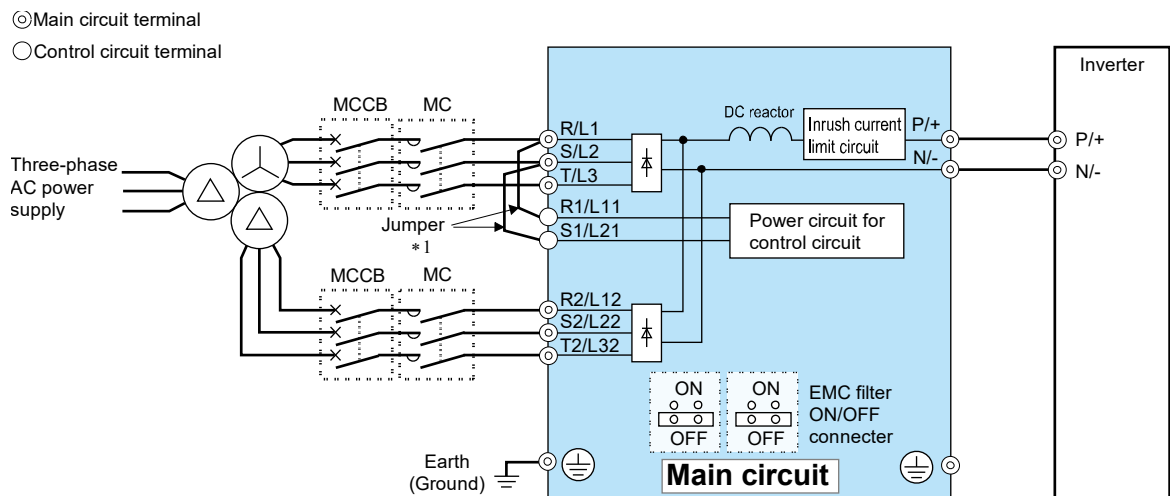
##### (1) Support for 12-phase rectification

12-phase rectification will be supported as a method of suppressing harmonic current. Refer to page 2 for the conversion coefficient and harmonic content for 12-phase rectification.

The converter unit is configured for 6-phase rectification from the factory. To configure the converter unit for 12-phase rectification, remove the jumpers such as the ones connected to terminals R/L1 and R2/L12. For details on wiring, refer to the Instruction Manual.

The converter unit is not certified as compliant with the Radio Waves Act (South Korea), UL or cUL when used with a 12-phase rectification system.

- Schematic diagram of a 12-phase rectifier transformer (when one inverter is connected)\*2



\*1 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.

\*2 Refer to the Instruction Manual for an example of 12-phase rectification when connecting multiple inverters in parallel.

<b>Date of issue</b>	December 2019	<b>Title</b>	Upgrade of the FR-CC2-P Series Converter Unit	Mitsubishi Electric Corp., Nagoya Works 5-1-14 Yada-minami, Higashi-ku, Nagoya 461-8670 Tel.: +81 (52) 721-2111 Main line
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- 12-phase rectifier transformer

For 12-phase rectification, a 12-phase rectifier transformer (3-winding transformer) is required (supplied by customer).

To prevent imbalances in output current from the power transformers, adjust the current as follows:

- Control imbalances in output voltage from the transformers to within the range of  $\pm 0.5\%$ .
- Control an imbalance in power impedance to within the range of  $\pm 10\%$ .

## (2) Harmonic suppression guidelines

Refer to the following tables for the conversion coefficient and harmonic content for 12-phase rectification.

### Conversion coefficient

Classification	Circuit type		Conversion coefficient $K_i$
3	Three-phase bridge (smoothing capacitor)	12-pulse converter With a reactor (on DC side)	$K_{37} = 0.8$

Harmonic content (values that the fundamental wave current is 100% for 12-phase rectification)

Reactor	5th	7th	11th	13th	17th	19th	23rd	25th
Used (on DC side)	1.4	1.5	7.2	4.1	0.8	0.7	1.6	1.4

For further details, refer to the "Harmonic Suppression Guidelines for Consumers Who Receive High Voltage or Special High Voltage".

## 3. Date of Change

Country of origin	Date of change
MADE IN JAPAN	The change will be sequentially applied to the products manufactured in January 2020 or later.
MADE IN CHINA	The change will be sequentially applied to the products manufactured in February 2020 or later.

## 4. Product Identification

The upgraded products will have the following SERIAL or later on their rating plates.

Rating plate example

□ 0 1 ○○○○○○  
Symbol Year Month Control number

SERIAL

The SERIAL consists of one symbol, two characters indicating the production year and month, and six characters indicating the control number.

The last digit of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).