INSTRUCTION MANUAL

PCC2K-200 ONE-CONTROL
PARALLEL-OPERATION OPTION

OP - 3

KIKUSUI ELECTRONICS CORPORATION

092-8326-0

1. GENERAL

The OP-3 is an option for Model PCC2K-200 Frequency Converter System. With this option, two or more PCC2K-200 Frequency Converters can be connected in parallel to provide a larger output capacity and can be operated in a one-control mode (master-slave mode). By parallel operation, the output capacity is increased as follows:

(Output Capacity) = 2 kVA × (No. of PCC2K-200 Units)

Up to five units can be connected in parallel. That is, up to 10 kVA of output capacity can be attained.

The number of OP-3 units required is calculated as follows:

(No. of OP-3 Units) = (No. of PCC2K-200 Units) - 1

- Ambient Operating Temperature and Humidity: -10 to +50°C, 10 to 90% RH (Non condensing)

2. Components of OP-3

	Q'ty
o Signal Cable (with Connectors) for Connection Between PCC2K-200 Units	1
o Joint Plate for Simplified Fixing Between PCC2K-200 Units	1
o Open-end Wrench, M12 (M10)	1
o "SLAVE" Mark Plate	1
o Instruction Manual	1

3. Operation Method

This instruction manual covers primarily the parallel operation method of two or more PCC2K-200 Units in the one-control mode (master-slave mode). For operation method of the PCC2K-200 Units, refer to their instruction manual.

3-1. Fixing the Master and Slave Units

- Fix the master and slave units as shown in Figure 3-1 (assuming that three units are operated in parallel).

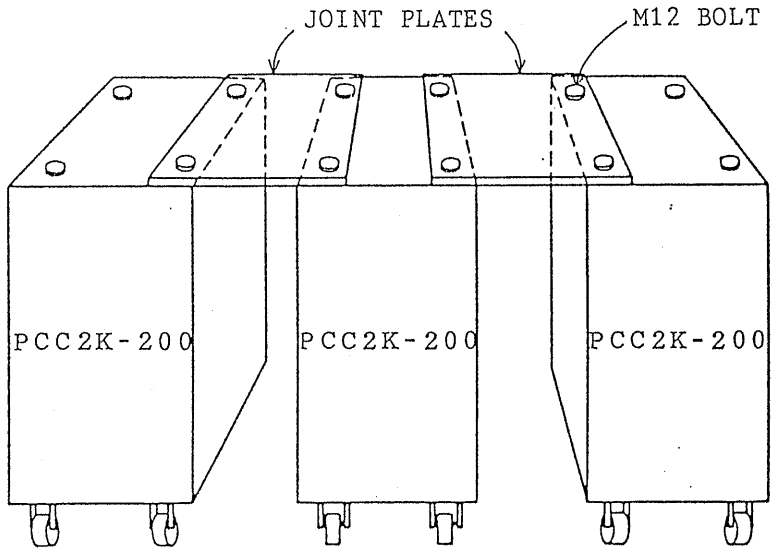

Figure 3-1

- o Remove the M12 bolts on the top of the PCC2K-200 Units with the open-end wrench (using the "19" open end), place the joint plates as shown in Figure 3-1, and then fix the M12 bolts.

  Note: From the viewpoint of the signal cable length, place the master unit at the rightmost or leftmost position. The slave units may be placed in any order.

  Be sure to connect together the PCC2K-200 Units with the joint plates. If they are left mechanically unconnected, tension may be applied to the signal cables and connectors, causing them to be damaged.

  Note, however, that the joint plates are only to maintain positional relationships among the units. Do not move the units connected together by the joint plates. To move the units, be sure to remove the joint plates and disconnect the signal cables.

- o Post the SLAVE mask plate on each slave unit (at the frequency meter section) as shown in Figure 3-2.

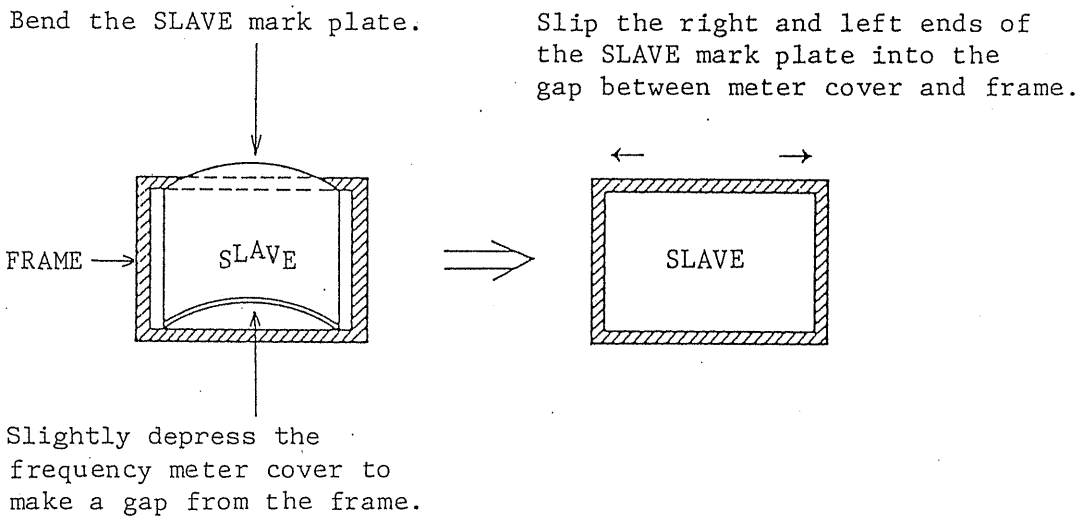

Figure 3-2

3-2. Connections of Master Unit and Slave Units

o Connect the signal cables and load cables as shown in Figure 3-3 (when three units are operated in parallel, for example).

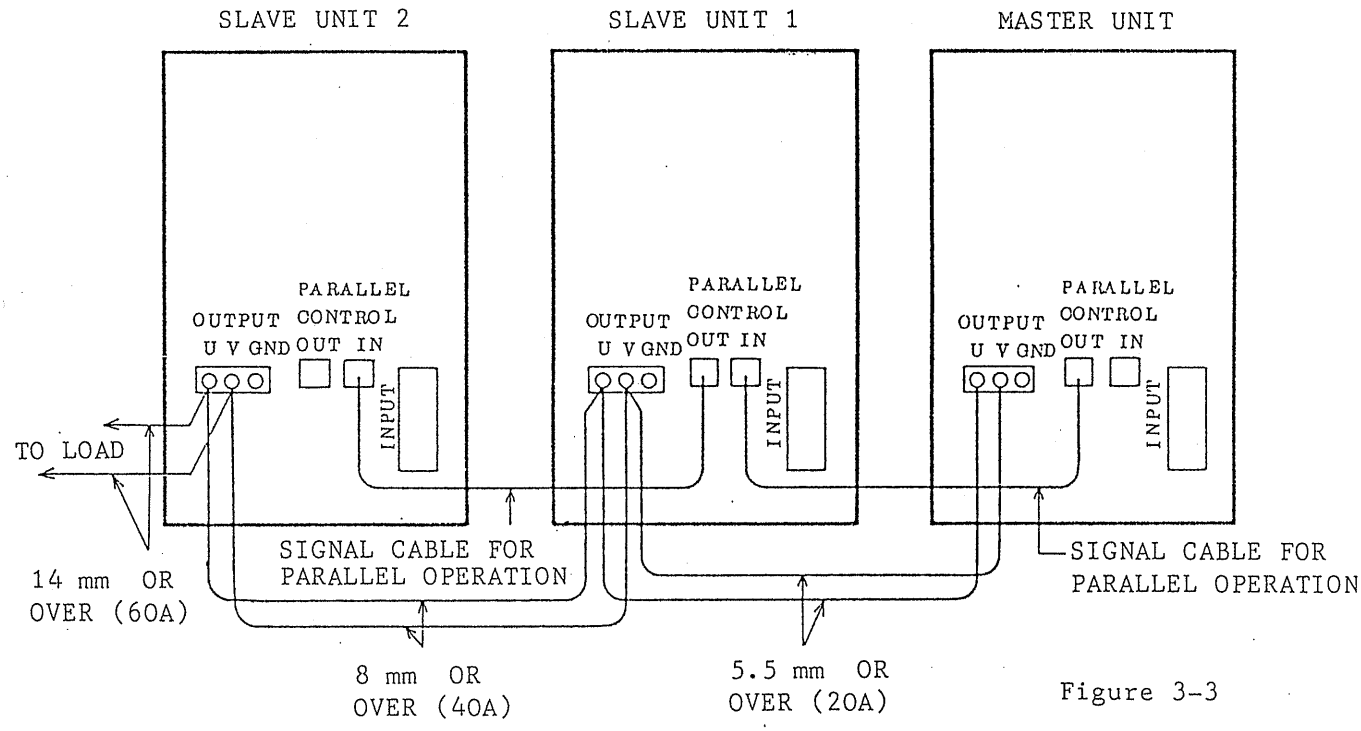

Figure 3-3

Figure 3-3

- When two units are operated in parallel, the cables (8 mm^2) which run from the OUTPUT terminals of Slave Unit 1 are used as load cables. Or, the load cables may be connected to the OUTPUT terminals of the Master Unit.

- When four or five units of PCC2K-200 are operated in parallel, the current capacity of the OUTPUT terminals becomes insufficient for the total current. In this case, therefore, connect the OUTPUT terminals with cables of 5.5 mm^2 or over to a junction terminal board* (a terminal board of 80A or over of rated current when four units are operated in parallel or that of 100A or over when five units are operated in parallel) and run the load cables from the junction terminal board. Instead of the above, you may run the output cables of individual units directly to the load.

  Note: In the above case, make the output cables which run from the PCC2K-200 OUTPUT terminals to the junction terminal board or to the load as short as possible (not longer than 2 meters when cables of 5.5 mm^2 are used). Note that the output voltage may oscillate if the cables are too long.

  *: The below-mentioned types of junction terminal boards can be installed by means of the holes drilled at the rear of the PCC2K-200.

  Type TH-100 (Kowa Terminal Board Mfg. Co.)

  Type 1005 (Fujicon Co.)

  Type ET103 (Morimatsu Electronic Ind. Co.)

- Insert securely (until the plug is locked) the INPUT side plug of the parallel operation signal cable into the INPUT side of the PARALLEL CONTROL INPUT/OUTPUT connector at the rear of the PCC2K-200 and the OUTPUT side plug of the cable into the INPUT side of the connector.

  Note: Each PCC2K-200 can act either as a master or a slave according to whether the plug is inserted or not inserted in the INPUT side of the connector.

o Connect together the OUTPUT "U" terminals and together the OUTPUT "V" terminals of all PCC2K-200 units, using cables which have a sufficient current rating for the output current. (See Figure 3.3.)

Instead of the above, the output cables of individual PCC2K-200 units may be connected to a junction terminal board and the current may be fed via the junction terminal board to the load.

Note: Be sure to connect the output terminals ("U" terminals and "V" terminals) in the correct phase. Note that the input circuit breaker (POWER switch) will trip if they are connected in the wrong polarity or if a cable is disconnected.

Provide the input current for each of the units, separately.

Be sure to ground the GND terminals.

3-3. Operation Method

(1) To turn on the powers of the units, turn on the powers of the slave units first and the power of the master unit last, or turn on all powers at the same time.

To turn off the powers of the units, turn off the power of the master unit first and the powers of the slave units last, or turn off all powers at the same time.

Note: Note that, if the powers are turned on in the reverse of the above order, the units will operate in the current-limited state and the rated current will not be attained until the slave units becomes the steady state (for several seconds after turning on the powers).

(2) Be sure to turn off the powers before changing the output voltage modes (between 100V and 200V).

If the master unit is in the 100V mode and the slave units are in the 200V mode, the output current of each slave unit becomes a half of that of the master units and the slave units operate only with a half of their output rating.

If the master unit is in the 200V mode and the slave units are in the 100V mode, the output current of each slave unit becomes the double of that of the master unit. If the output voltage of the master unit is 120V or over, the slave units becomes the overvoltage state and their overvoltage protector circuits trip and the POWER switches are turned off.

(3) The setup is for one-control parallel operation (master-slave operation). Control all units with the master unit.

The output current of the setup is the sum of the individual units. The output voltage is as indicated identically by the voltmeters of all units.

When in this state of setup, the VOLT ADJ, REGULATION ADJ, FREQUENCY ADJ, INT/EXT selector switch, and the frequency meter of each slave unit remain idle.

Note: Be sure to set the OUTPUT switch of each slave unit to the ON state. If it is set to the OFF state, the slave unit is not successfully controlled and its POWER switch trips.

The POWER switch trips also when the OUTPUT switch has tripped due to shorting of the load circuit or other cause. When this has occurred, immediately turn off the POWER switches of all units, remedy the cause of the trouble, turn on the OUTPUT switches, and then turn on the POWER switches.

The total rated current of the two 3P output receptacles on the front panel of each unit is 15A. Do not draw current larger than this.