OPERATION MANUAL

THREE PHASE DRIVER

MODEL 3P01-PCR

Model 3P01-PCR Three Phase Driver is an optional device for the PCR Series Frequency Converter. The 3P01-PCR cannot be used for other equipment.

This manual covers primarily the method of hooking up the 3P01-PCR to the PCR Series Frequency Converter.

When using the 3P01-PCR, be sure to read also the instruction manual for the PCR Series Frequency Converter.

First Edition

KIKUSUI ELECTRONICS CORPORATION

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3P01-PCR

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1. GENERAL

1.1 Description

The 3P01-PCR is three phase driver is to perform three phase operation using three PCR Series Frequency Converters of the same type.
The instrument consists of three driver boards and two cables. To organize the three phase operation system of the PCR Series Frequency Converters, insert each board into one of the I/O slots (SLOT1 or SLOT2) of each Frequency Converter and connect the boards by cables.
Before using the instrument, carefully read this manual, PCR Series Operation Manual, and manual of the optional instruments to be used at the same time.

1.2 Features

The features of the 3P01-PCR are as follows:

- The three phase operation system can be established easily by inserting the driver boards and connecting them by cables.
- The phase rotation can be changed.
- The power source failure simulation can be done by using the optional remote controller (RC01-PCR) or GP-IB interface (IB01-PCR) with the 3P01-PCR.

2. SPECIFICATIONS

This section describes the specifications of the three phase operation system composed of the 3P01-PCR and PCR Series Frequency Converters. For the specifications of the Frequency Converters themselves, refer to the PCR Series Operation Manual.

2.1 Input/Output Specifications

The input/output specifications of the three phase operation system are as follows:

Input/output power capacity (Sum of three phases)	[Capacity of one PCR Series Frequency Converter] × 3
Input/output current capacity * (Each phase current)	Same as the current capacity of one PCR Series Frequency Converter
Output voltage	Phase voltage: 1 - 140V/2 - 280V (Line voltage: 1.7 - 242V/3.5 - 485V)
Output connection	Three-phase four-wire system with neutral point (Star connection)
Phase difference	120° ±4° (Phase difference between any two phases)

* For the input three phase connection or single phase connection, the input power capacity is three times as much as the capacity of one PCR Series Frequency Converter.

2.2 Functional Specifications

Control	Centralized control by the Frequency Converter designated as U phase (Only the voltage of the U phase is monitored, but the current is displayed on the ammeter of each unit.)
U, V, and W lamps	Green LEDs on the operation/display panel of each PCR Series Frequency Converter They indicate the result of phase selection and the operation status of the instrument.
Individual setting of output voltage	The output voltage of the desired phase can be set individually by the V.LOCAL switch.
Phse rotation change	The phase rotation can be changed by the phase selection switch.
Others*	○ The phase can be changed by the use of GP-IB interface (IB01-PCR). ○ The three phase power source failure simulation can be done by the use of a remote controller (RC01-PCR or IB01-PCR).

* For the method of using the IB01-PCR and RC01-PCR, refer to the operation manuals of the respective instruments.

2.3 Other Specifications

Ambient Operating Temperature and Humidity	0 to +50°C, 10 to 90% RH (Non condensing)
External dimensions	29W × 137H × 124D mm (1.14W × 5.39H × 4.88D in.)
Weight	Approx. 910 g (32 oz) (Driver board = Approx. 130 g (4.6 oz) Connection cable = Approx. 260 g (9.2 oz))
Components	Driver board × 3 Connection cable (1 m) × 2
Accessory	Operation manual (one copy)

2.4 External View

Figure 2-1 Shows the external view of the driver board.

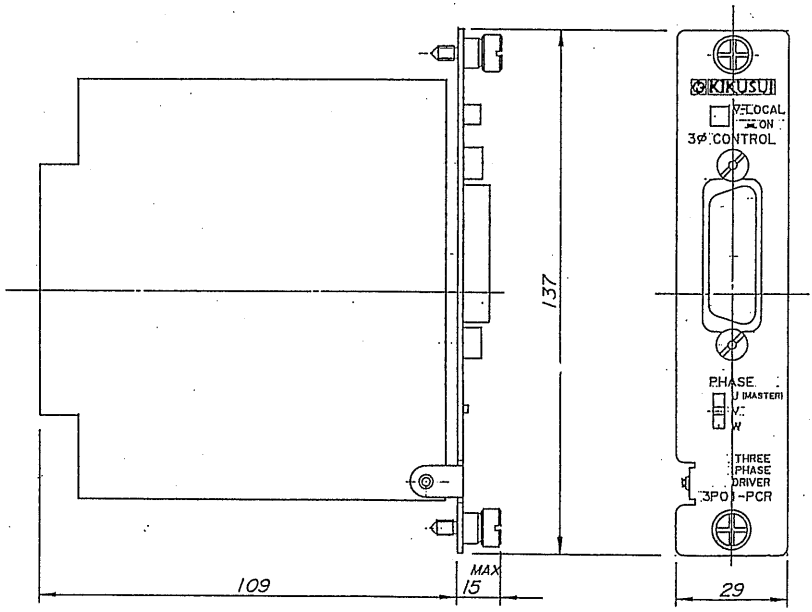
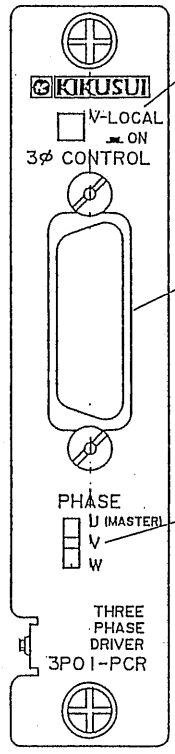


Figure 2-1

3. OPERATION

This chapter explains how to use the 3P01-PCR. Before using the instrument, read this chapter thoroughly from the beginning.

3.1 Panel Features



V. LOCAL switch

- This switch enables the output voltage to be changed by the operation in the operation/display panel.

Three phase control connector

- Use this connector for connecting the other two driver boards by the supplied connection cables.

Phase selection switch

- This switch designates the PCR Series Frequency Converter having this driver board as U phase, V phase, or W phase.
- The Frequency Converter designated as U phase controls the other two Frequency Converters.

Figure 3-1

3.2 Points to be Noted Before Use

- Only one driver board may be inserted in the I/O slot (SLOT1 or SLOT2) of one PCR Series Frequency Converter.
  If two driver boards are used in one Frequency Converter, the instrument will be damaged.

- The 3P01-PCR is designed to prevent noise, but do not use it near any objects that generate noise. Such objects will cause erroneous operation of the instrument.

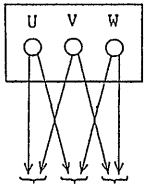
- The PCR Series Frequency Converter into which the 3P01-PCR driver board is inserted can be used for the three phase operation only; that is, it cannot be used independently. When the Frequency Converter is to be used independently, take out the driver board from the I/O slot and keep it in the carton in which it was delivered.
  Be careful not to expose the instrument to static electricity.

3.3 Connection Method

3.3.1 PCR Series input connection

Connect each PCR Series Frequency Converter to the input power source line (switchboard, etc.) using the input power source cable supplied with the Frequency Converter.
Refer to the PCR Series Operation Manual for details.
When a three-phase power source is used, the input power source cables of the Frequency Converters must be distributed to the three phases.
See Figure 3-2.

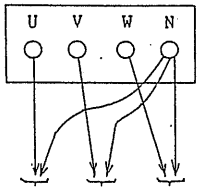
Three-phase three-wire system



(Switchboard, etc.)

To the INPUT terminal boards of Frequency Converters

Three-phase four-wire system



(Switchboard, etc.)

To the INPUT terminal boards of Frequency Converters

Figure 3-2

Explanation on the grounding is omitted in the above figure, but be sure to connect the GND terminal of each PCR Series Frequency Converter to the earth.

3.3.2 PCR Series output connection

The three-phase four-wire system with neutral point (star connection) should be adopted to the output connection. See Figure 3-3.

Note: If the neutral point is omitted, the rated output may not be obtained. If delta connection is adopted to the PCR Series Frequency Converters, erroneous operation or failure may occur.

PCR Series rear view

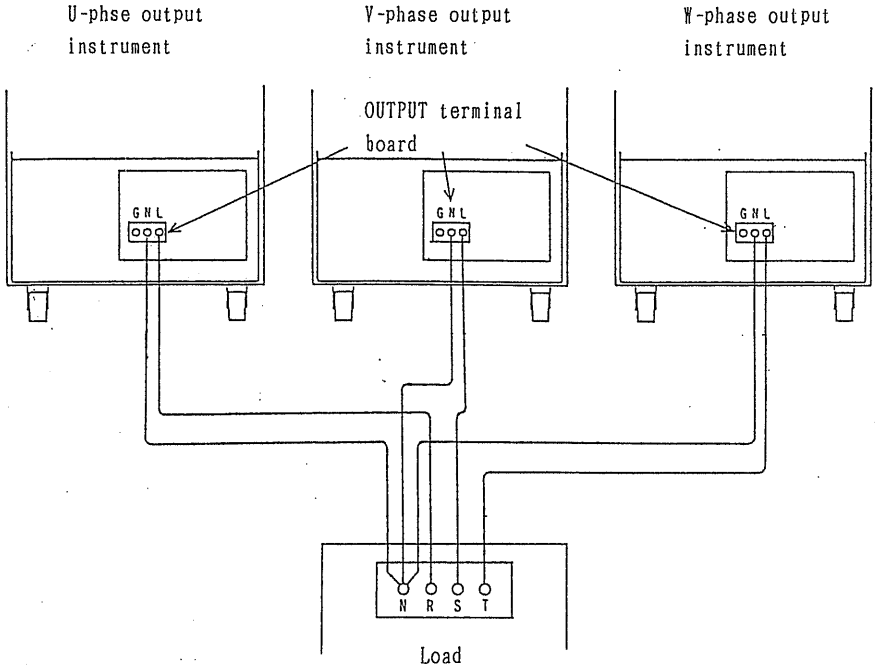


Figure 3-3

Note:	If the three-phase four-wire connection with neutral point cannot be done on the load instrument, use an additional terminal board.

3.3.3 Connecting 3P01-PCR to PCR Series

> Note: Before executing the operations explained in this section, be sure to turn off the POWER switches of the PCR Series Frequency Converters.

(1) The 3P01-PCR consists of three driver boards and two connection cables (GP-IB cables).

> Note: Since the PCBs on the driver boards are not shielded, be careful not to damage them by static electricity when taking them out of the carton or inserting them into the Frequency Converters. Do not touch any parts of the dreiver boards except their panels.

(2) Insert each driver board into SLOT1 or SLOT2 on the rear panel of PCR Series Frequency Converter as shown in Figure 3-5. Fix the screws by a screwdriver tightly.

(3) Connect the cables to the three phase control connectors as shown in Figure 3-4. Fix the screws of the connectors tightly by a screwdriver.

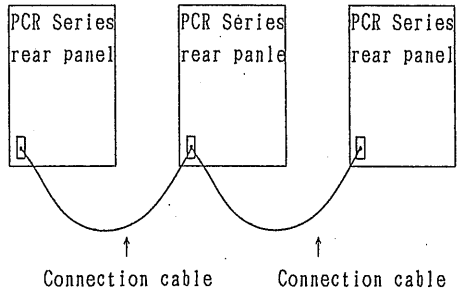
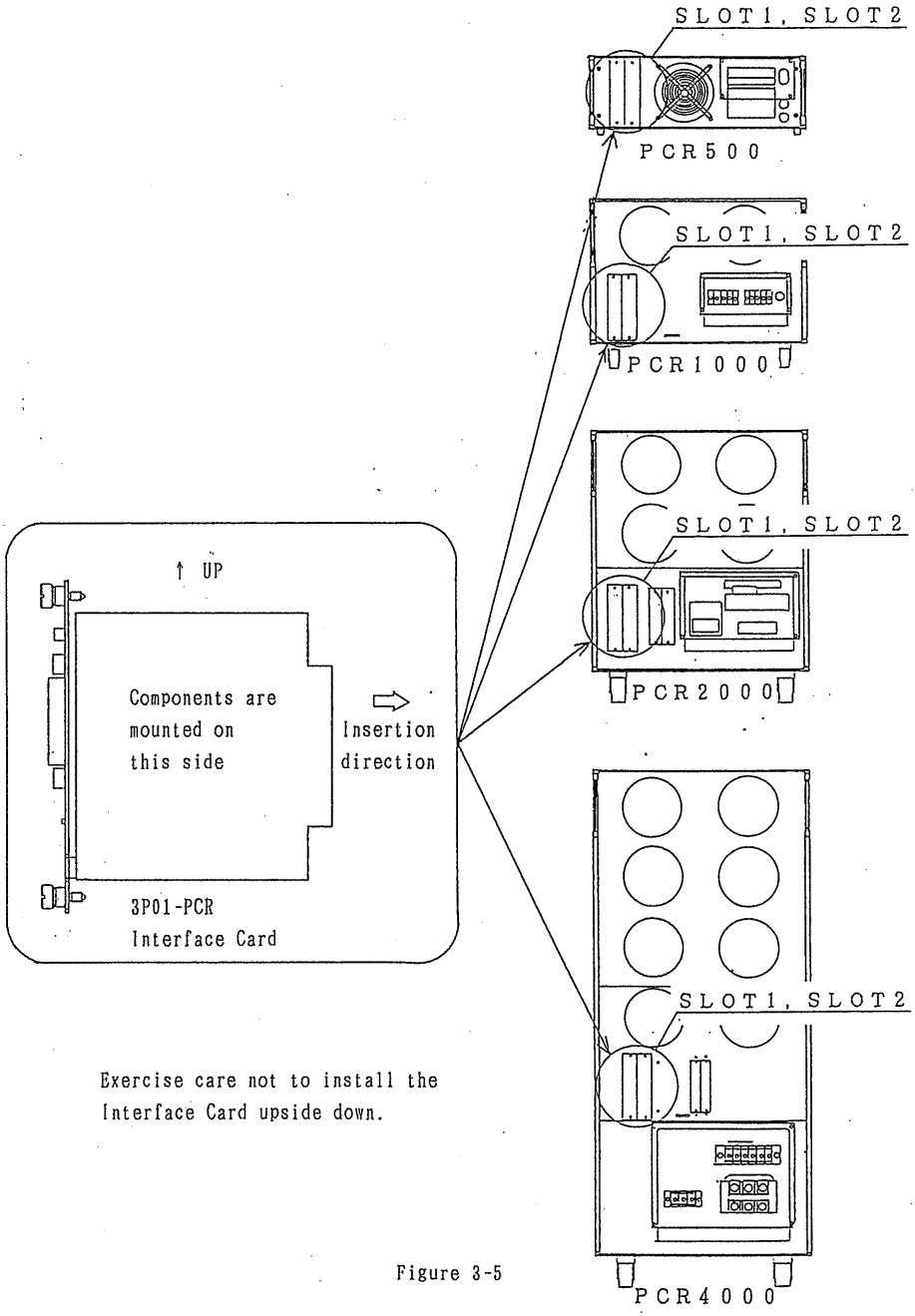


Figure 3-4

> Note: GP-IB cables are used as the connection cables of the 3P01-PCR. Therefore, when the 3P01-PCR is used with the IB01-PCR, be careful not to confuse their connectors.



Exercise care not to install the Interface Card upside down.

Figure 3-5

3.4 How to Use 3P01-PCR

3.4.1 Phase setting and changing

Before turning on the power switch, determine the phase of each one of the three PCR Series Frequency Converters by the phase selection switch on the panel of the 3P01-PCR.

Be sure to set the three Frequency Converters to different phases (U, V, and W phases). If any two of them are set to the same phase, three phase operation cannot be done.

Examples

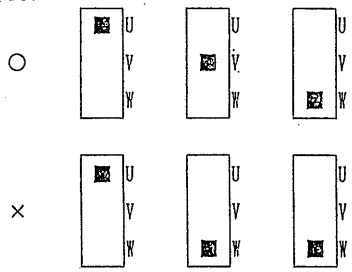


Figure 3-6

The phase rotation can be changed by selecting other phases by these switches.

Example

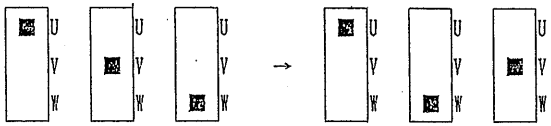


Figure 3-7

3.4.2 Operation

(1) Activation

When the settings explained in the preceding sections are completds, turn on the POWER switch of each PCR Series Frequency Converter.

- The POWER switches may be turned on in any desired order, but be sure to turn on the POWER switches of all the three Frequency Converters.

When the POWER switches are turned on, the U, V, or W lamp on the operation/display panel of each Frequency Converter flickers indicating that the Frequency Converters are preparing for activation.
Approximately 10 seconds later, the lamps stop flickering and are turned on. At this stage, the activation is completed.

- If all the U, V, and W lamps of a Frequency Converter are on, it means a three phase connection error. In this case, check the cable connection and the setting of phase selection switches again.
Table 3-1 lists the ON/OFF states of the U, V, and W lamps and their meanings.

	U	V	W	Explanation
1	ON	ON	ON	∘ Cable connection error ＊ ∘ Phase selection switch setting error
2	Either U, V, or W lamp is flickering			The Frequency Converter is preparing for activation
3	ON	OFF	OFF	∘ The Frequency Converter has been activated as U phase
4	OFF	ON	OFF	∘ The Ferquency Converter has been activated as V phase
5	OFF	OFF	ON	∘ The Frequency Converter has been activated as W phase

＊ These two errors are called three phase connection error.

Table 3-1

- When the phase selection switches are manipulated to select different phases during three phase operaion, the Frequency Converters enter the preparation-for-activation state. Later, they are activated again if the new setting of the phase selection switches is corrent.

(2) Normal operation

The entire three phase operation system is controlled by the PCR Series Frequency Converter selected as U phase. Therefore, when the system is activated, some of the switches and indicatiors on the Frequency Converters designated as V and W phases are not effective. See Table 3-2.

	U-phase Frequency Converter	V/W-phase Frequency Converter
Operation	o All switches are effective	o All switches are not effective
Display	o All indicators are effective	Only the following indicators are effective: o Ammeter o V or W lamp of the phase indicator lamps o ALARM lamp o MASTER/SLAVE lamp o LISTEN lamp o OVERLOAD lamp o REMOTE lamp o TALK lamp o SRQ lamp

Table 3-2

(3) Individual setting of output voltage

When the V. LOCAL switch is turned on for V or W phase, the output voltage of that phase can be set independently of other phases.

Table 3-3 lists the switches and indicators of the V or W phase Frequency Converter effective when the V. LOCAL switch is turned on.

This function can be used for a phase lack test.

Operation	The following switches are effective: o VOLTAGE switch (o OUTPUT switch) Remarks o PRESET switch o RANGE switch o SET switch o LIMIT switch o STORE switch o MEMORY ENT switch o A, B, and C switches
Display	The following indicators are effective: o Voltmeter o Ammeter o V or W lamp of the phase indicator lamps o 100V/200V lamp o OVERLOAD lamp o ALARM lamp o MASTER/SLAVE lamp o REMOTE lamp o TALK lamp o LISTEN lamp o STORE lamp o LIMIT lamp o PRESET lamp (o OUTPUT lamp) Remarks o A, B, and C lamps

Table 3-3

If the V. LOCAL switch is turned on/off during three phase operation, the OUTPUT switches of all the three Frequency Converters are turned off and the Frequency Converters enter the preparation-for-activation state. After that, they are activated.

Precaution:	If the OUTPUT switch of each unit is independently turned on/off while the neutral line of the output wiring left disconnected, the PCR-series equipment may be damaged. Never use (never turn on) the V. LOCAL switch if the load is a type that it does not allow connection of neutral line.
Remarks:	The new versions of this equipment and PCR-series equipment are incorporated with a safety provision such that the OUTPUT switch of the U-phase unit alone is enabled regardless of the on/off state of the V. LOCAL switch.

3.4.3 Others

If the IB01-PCR is used with the 3P01-PCR, the phase of the PCR Series Frequency Converter can be changed.

Refer to the IB01-PCR Operation Manual for the method of using the IB01-PCR.

If the RC01-PCR of IB01-PCR is used with the 3P01-PCR, the three phase power source failure simulation can be done.

Refer to the RC01-PCR and IB01-PCR operation Manuals for the methods of using the respective instruments.

PCR series with the version numbers listed here are equipped with following functions.

* Version: 1-6 or higher version

* The version number of the PCR series can be checked by the operator.
  Please refer page 15.

The protection circuit of the PCR-series may trips the output switch to off the PCR's used in three phase application is over loaded.
All three PCR's output switches turned to off-state when this happened, then PCR's are kept in "preparation-for activation" state. After that, they are activated.

The output switches can not be turned on when in "preparation-for-activation" state.

Ver 2.14

Version number of PCR series

The version number of the PCR series can be checked with following procedure.

(1) Turn on the POWER switch of the PCR series while MEMORY A and B switches are pressed.

(2) The version number is shown on the Ammeter on the operation/display panel.

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