

INSTRUCTION MANUAL

REMOTE CONTROLLERS

MODELS RC01-ORC & RC02-ORC

KIKUSUI ELECTRONICS CORPORATION

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Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark)

Input voltage

The input voltage of this product is _____ VAC,
and the voltage range is _____ to _____ VAC. Use the product within this range only.

Input fuse

The rating of this product's input fuse is _____ A, _____ VAC, and _____.

WARNING

- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.

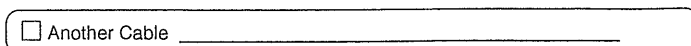
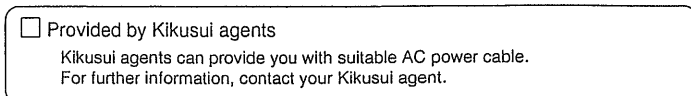
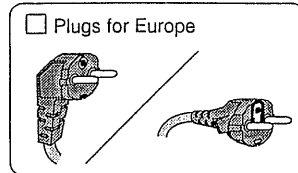
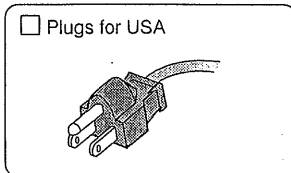
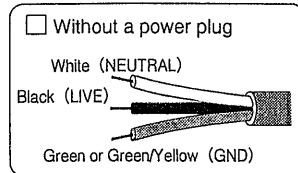
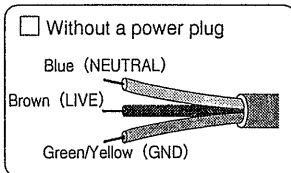


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1. GENERAL

Remote Controller RC01-ORC or RC02-ORC is used in conjunction with AC Voltmeter AVM23R or AVM25R for range selection in 2-channel measurement, or with Programmable Oscillator ORC21 for programmed remote control of frequency address selection and on/off switching of R/L output signals.

Program setting can be made for up to 8 steps. For each step, a 16-position rotary-type code switch is used and programming can be done simply by using a screwdriver. The RC01-ORC is a 2-channel type and RC02-ORC is a 4-channel type, and programming can be done independently for each channel.

The Remote Controllers can operate either in a manual mode or in a scanning mode. For the manual mode of operation, 8-linked-key push switches of soft touch and excellent longevity are used. For the scanning mode of operation, either the SINGLE operation to perform the specified steps only for one cycle or the REPEAT operation to repeat indefinitely the specified steps can be selected.

Since programming can be made on two mutually independent grounds, the performance of AVM23R or other measuring instruments which have two mutually independent input channels can be made full use of.

Facilitating the installation work, the remote control cable can be run through the right, left, or rear side of the instrument case. The case can be mounted on an operation bench or other object by means of the threaded stud holes at the bottom of the case.

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2. SPECIFICATIONS

- 2.1 Name of Instrument: Remote Controller
- 2.2 Model No. of Instrument: RC01-ORC [RC02-ORC]
- 2.3 Manual Operation
- 2.3.1 Step Selection System: Push switch type (8-linked-key type, 2 circuits, 2 mutually independent channels)
- 2.3.2 Programming System: 16-position rotary-type code switches (internal setting).
2 steps per channel, 1 set per channel.
[4 channels per step, 1 set per channel]
- 2.3.3 Output Data Code: Positive logic (4-bit binary for each channel)
- 2.4 Scanning Operation
- 2.4.1 SINGLE Mode: When the START button is pressed, steps advances in the sequence of 1 → 2
..... with the time intervals set by the TIME setting potentiometer. When operation has reached the step* which has been set by the STEPS selector switch, scanning returns to step 1 and stops there.
- 2.4.2 REPEAT Mode: When the START button is pressed, steps advances in the sequence of 1 → 2
..... with the time intervals set by the TIME setting potentiometer. When operation has reached the step* which has been set by the STEPS selector switch, scanning returns to step 1 and repeats indefinitely.
- *: Up to 8 steps

2.12 Weight:

Approx. 1 kg (2.2 lbs)

[Approx. 1.2 kg (2.6 lbs)]

2.13 Accessories:

Instruction manual 1 copy

Blanking caps 8 [7]

3. GENERAL PRECAUTIONS

3.1 Unpacking

Upon receipt of the instrument, immediately unpack and inspect it for any damage which might have been sustained when in transportation. If any damage is found, immediately notify the transportation company and your Kikusui agent.

3.2 Power Source

For this instrument, two channels of power supplies (+5V1 - GND1, and +5V2 - GND2) should be supplied from the controlled equipment.

3.3 Environmental Conditions

Do not expose the instrument to direct sunlight. Do not place it near a heat generating equipment or other source of heat. Avoid operating the instrument in adverse environments (atmosphere with dust, gas or chemicals, or mechanical vibration) lest the longevity of the instrument should be shortened.

3.4 Others

The performance and other specifications of the instrument are subject to change without notice.

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4. OPERATION METHOD

4.1 Explanation of Panel Items

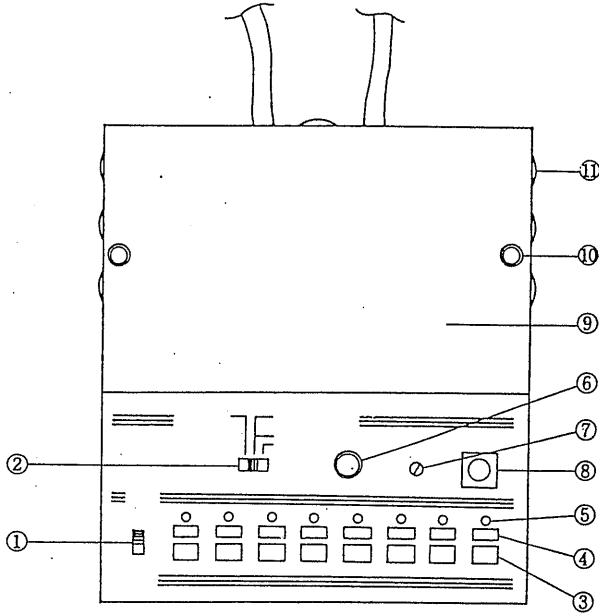


Figure 4-1. Front and Top Panel Items

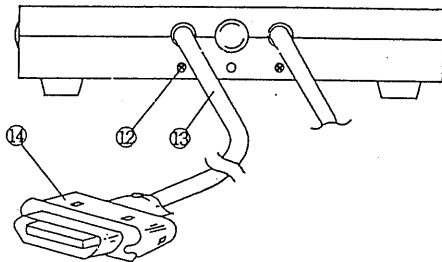


Figure 4-2. Rear Panel Items

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① PANEL/REMOTE selector switch:

This switch selects between the PANEL mode for local control of the controlled equipment itself and the REMOTE mode for remote control. When the switch is set to the PANEL mode, the LED lamps ⑤ go off.

② MANUAL/SCANNING selector switch:

This switch selects step switching operation between the MANUAL mode for switching with push switches ③ and the SCANNING mode for automatic switching. The SCANNING operation can be selected between the SINGLE mode and the REPEAT mode. When switch ① is set to the REMOTE mode, the LED lamp ⑤ of the selected step lights.

③ Step selector switches

④ Step numbers

⑤ Selected step indicator lamps

Switches ③ are 8-key linked switches to select one of 8 steps. For the 8 keys, corresponding step numbers ④ and selected step indicator lamps ⑤ are provided. The corresponding lamp lights when switch ① is set to the REMOTE mode and switch ② to the manual mode. All lamps go off when all of switches ③ are set to off.

⑥ STEPS selector switch:

This rotary switch is used to select a final step when in the SCANNING mode.

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⑦ TIME setting potentiometer:

This potentiometer is used to set the scanning time interval between steps when in the SCANNING mode. The time interval is continuously-variably adjustable from approximately 1 sec (minimum) to approximately 10 sec (maximum).

⑧ START switch:

As this button is pressed, the scanning operation starts.

⑨ Top panel:

⑩ Top panel fixing-buttons:

The top panel can be removed by pulling the two top panel fixing-buttons, to perform programming or to change running directions of the remote control cable. A programming chart is posted on the back surface of top panel ⑨.

⑪ Blanking caps:

These caps are used to close the unused cable holes. Be sure to close the unused holes to prevent ingression of dust and foreign matter.

⑫ Remote control cable clamping-screws:

These screws are used to clamp the remote control cable. The remote control cable can be run in any one of the three directions.

⑬ Remote control cable:

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⑭ Remote control cable plug:

The remote control cable is used to send the control signals between this instrument and the controlled equipment. It is approximately 2 m (6 ft) long. At the end of the cable, the plug ⑭ (Amphenol 57-Series 57-50240 plug) is provided. For remote control, this plug should be connected to the receptacle (Amphenol 57-Series 57-40240 receptacle).

The RC01-ORC has one set of remote control cable and plug; the RC02-ORC has two sets of cables and plugs so that programming can be made for two sets of controlled equipment. The remote plugs are identified with markings of "REMOTE 1" and "REMOTE 2." The layout of the pins of the plug are as shown in Table 4-1.

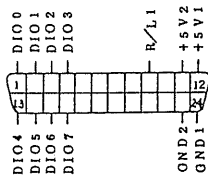


Table 4-1. Layout of Pins of Remote Control Cable Plug

4.2 Operation Method

Connect the remote control cable plug to the receptacle of the equipment controlled.

4.2.1 For MANUAL Operation

Set the PANEL/REMOTE selector switch (1) to the REMOTE state and the MANUAL/SCANNING selector switch to the MANUAL state. As you turn on the power of the controlled equipment, the REMOTE LED lamp of the controlled equipment lights. At the same time, the LED lamp corresponding to the step number selected by the step selector switches (3) lights and the data of the program corresponding to the selected step is delivered.

4.2.2 For SCANNING Operation

Set the PANEL/REMOTE selector switch (1) to the REMOTE state and the MANUAL/SCANNING selector switch to the SINGLE or the REPEAT state. As you turn on the power of the controlled equipment, scanning is initialized to step [1] and remains at this step.

(1) SINGLE mode

When the MANUAL/SCANNING selector switch (2) is set to the SINGLE state and the START switch (8) is pressed, scanning advances in the sequence of [1] + [2] ... to the step selected by the STEPS selector switch (6) and returns to step [1] and stops there.

(2) REPEAT mode

When the MANUAL/SCANNING selector switch (2) is set to the REPEAT state and the START switch (8) is pressed, scanning advances in the sequence of [1] + [2] ... to the step selected by the STEPS selector switch (6), returns from there to step [1], and repeats scanning indefinitely.

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If you return the MANUAL/SCANNING selector switch (2) to the MANUAL position and then set it to the SINGLE or the REPEAT state, scanning is initialized to step 1. To start the scanning operation, press the START switch (8).

4.3 Programming Procedure

For programming of steps, proceed as explained in this section.

4.3.1 Explanation of Programming Chart

Remove the top panel (9) by removing the two top panel fixing-screws (10). A programming chart as shown in Table 4-2 is posted on the back surface of the top panel. The programming procedure is explained referring to the programming chart.

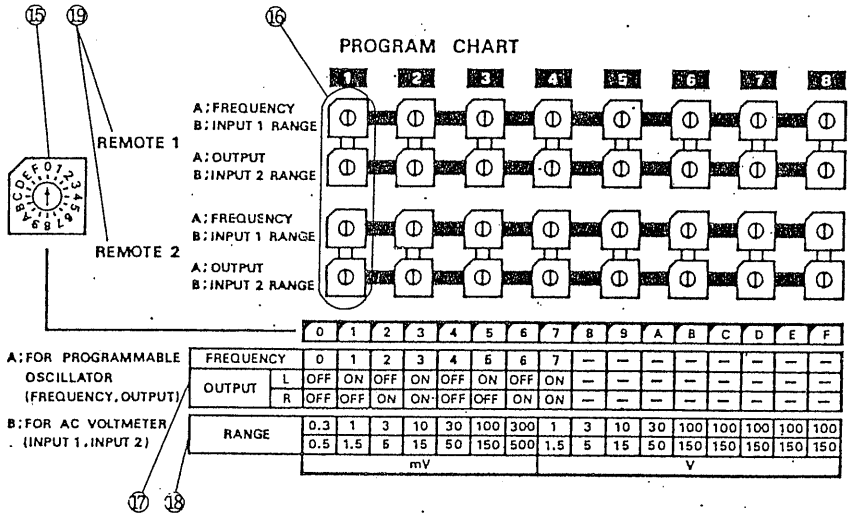


Table 4-2. Programming Chart

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When the top panel is removed, 16-position rotary-type code switches (15) are accessible. The RC01-ORC has total 16 of such switches laid out in the two top rows as shown in Table 4-2; the RC02-ORC has total 32 of such switches laid out in the four rows.

Table (17) shows the items which are used to control Kikusui's Model ORC21 Programmable Controller, such as frequency addresses (0 - 7, 8 types), combinations of ON/OFF states of R/L oscillator outputs (0 - 7, 4 types), and positions corresponding to switch (15).

Table (18) shows the items which are used to control Kikusui's Model AVM23R, AVM25R or other AC Voltmeter. The items are such as ranges (0 - F, 12 types) and positions of switch (15).

Switches (16) correspond to step numbers (4).

Set the REMOTE 1 and REMOTE 2 switches as explained in the following:

(1) RC01-ORC

To control a Programmable Controller or an AC Voltmeter, connect the remote control cable plug to the receptacle of the equipment to be controlled.

A: When controlling a Programmable Controller, the switches of the 1st row are for frequency addresses and those of the 2nd row are for combinations of ON/OFF of R/L oscillator outputs.

B: When controlling an AC Voltmeter, the switches of the 1st row are for INPUT 1 range setting and those of the 2nd row are for INPUT 2 range setting.

Two channels of power supplies and GND lines are provided.
(See Section 2.9.)

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(2) RC02-ORC .

The remote control cable plugs are identified with markings "REMOTE 1" and "REMOTE 2". They can be connected to Programmable Controllers or AC Voltmeters. The switches of the 1st and 2nd rows are for the controlled equipment connected to REMOTE 1; those of the 2nd and 4th rows are for that connected to REMOTE 2.

A: When controlling a Programmable Controller, the switches of the 1st or 3rd rows are for frequency addresses and those of the 2nd and 4th rows are for combinations of ON/OFF of R/L oscillator outputs.

B: When controlling an AC voltmeter, the switches of the 1st and 3rd rows are for the INPUT 1 range setting and those of the 2nd and 4th rows are for the INPUT 2 range setting.

Two channels of power supplies and GND lines are provided.
(See Section 2.9.)

4.3.2 Example of Programming

An example of programming is introduced here for a case that Model RC02-ORC Remote Controller is used to control Kikusui's Model ORC21 Programmable Controller and Model AVM23R AC Voltmeter at the same time.

Connect the REMOTE 1 of the remote control cable plug (14) to the Programmable Controller and the REMOTE 2 to the AC Voltmeter.. (The REMOTE 1 plug may be connected to the AC Voltmeter and the REMOTE 2 plug to the Programmable Oscillator. The above connections are only for the sake of explanation.)

Assume that, for step 5 of the Remote Controller, the Programmable Oscillator is to be programmed for the frequency and level set for [2] (A) from the frequency addresses, and both [R] and [L] outputs are to be set to [ON] (B). Also assume that the AC Voltmeter is to be programmed at the [0.3 mV] (C) range for the [INPUT 1] and at the [1 V] (D) range for the [INPUT 2].

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Set the code switches as shown in Table 4-3. Turn on the powers of the Programmable Oscillator and AC Voltmeter. Set the PANEL/REMOTE selector switch (1) to the REMOTE state and the MANUAL/SCANNING selector switch (2) to the MANUAL state. Press [5] of step selector switch (3) so that the instrument is set to the programmed mode.

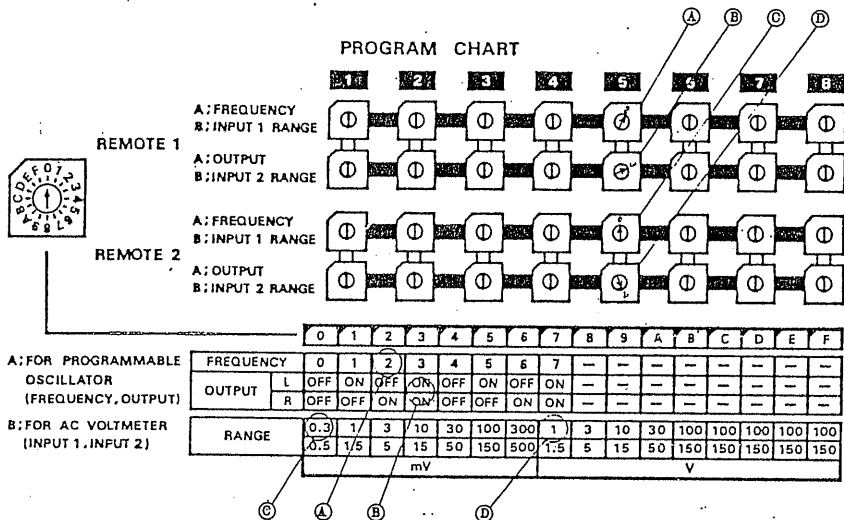


Table 4-3. Example of Programming

4.4 Notes for Noise and Longevity

(1) Noise may be picked up when a remote-control setup is made. In such a case, move apart the Remote Controller, remote control cable and controlled equipment from equipment which probably is the source of noise, and provide separate power supplies.

(2) The life expectancies of the switches and potentiometers of the Remote Controller are as follows:

- | | | |
|---|---|--|
| ① | REMOTE/PANEL selector switches: | 10^4 repetitions |
| ② | MANUAL/SCANNING selector switches: | 10^4 repetitions |
| ③ | Step selector switches: | 3×10^4 repetitions
or over |
| ⑥ | STEPS selector switches: | 10^4 repetitions or over |
| ⑦ | TIME setting potentiometer: | 2×10^4 rotations or over |
| ⑧ | START switch: | 10^5 times or over |
| ⑩ | Rotary-type code switches
for programming: | 2×10^4 steps or over |