

INSTRUCTION MANUAL

REMOTE CONTROLLER

MODEL RC01-COS

KIKUSUI ELECTRONICS CORPORATION

11/18/14

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## 1. GENERAL

### 1-1. Description

Remote Controller RC01-COS is an auxiliary device of Programmable Oscilloscope COS5030-PG. It has been designed for remote control and programmed control of the oscilloscope. Being used further in conjunction with Step Controller SC01-COS or SC02-COS, a very efficient and labor-economizing programmable oscilloscope systems for manufacturing and inspection lines of video tape recorders, video disks and other electronic equipment can be obtained.

### 1-2. Features

- o Various programmable items:

Most of the oscilloscope knob operations for signal display, including dual-channel display and delayed-sweep display, can be programmed.

- o A large capacity of program steps:

Up to 96 control steps can be programmed. The START and END points of individual sequence of steps can be set with 2-digit digital switches. With these features, the device is ideal for control of an oscilloscope in a production line where various programs are required.

- o Simple program writing and rewriting procedure;

Setting for writing and rewriting of panel knob operation program can be done in a simple one-touch operation. When set in the WRITE mode, the memory circuit is disconnected and the device can be used as a manual remote controller of the oscilloscope.

- o Backup power source for memory:

Memory (C-MOS RAM) is backed-up with a battery so that the stored programs are not lost even when the AC line power is interrupted or failed.

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- o Manual control functions:

The positioning function, gain control function and some other control functions can be manually done by pulling out corresponding red knobs on the front panel of the device, without causing any changes to the stored memory.

- o Step controllers for versatile functions are available:

Step Controllers SC01-COS and SC02-COS are available. SC01-COS can be used being coupled onto this device making up a single unit or can be used apart from this device by using an inter-device connection cable (option). When SC02-COS is used, manual operation can be done with the knobs on the front panel of SC02-COS.

- o Simple inter-device connections:

Connections among devices can be done with a least number of cables, enabling to establish various systems in simple procedures and to make effective use of installation spaces.

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## 2. SPECIFICATIONS

### Programmable Items

Item	Specification	Remarks
Vertical sensitivity	5 mV/DIV - 5 V/DIV	1-2-5 sequence, 10 points
Vertical input coupling	AC, DC, GND	Both CH1 and CH2
Vertical magnification	×5 MAG	Both CH1 and CH2
Vertical positioning	7-point selection, 1-DIV steps	Both CH1 and CH2
Vertical mode	CH1, CH2, DUAL, ADD, X-Y	
Vertical polarity inversion	CH2 only	
Sweep time	Main sweep: 0.2 μsec - 0.5 sec/DIV Delayed sweep: 0.2 μsec - 0.5 msec/DIV	1-2-5 sequence, 20 points 1-2-5 sequence, 11 points
Sweep time variable	CAL'D, 1.5, 2, 2.5	4 points
Sweep mode	AUTO, NORM, SINGLE	
Horizontal magnification	×5 MAG	
Horizontal positioning	7-point selection, 1-DIV steps	
Horizontal display	A, A INTEN, B, B TRIG'D	
Delay time positioning	8-point selection, 1-DIV steps	
Trigger source	INT, EXT, LINE	

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Item	Specification	Remarks
Trigger coupling	DC, AC, HF REJ, TV	
Trigger level	7-point selection, 1-DIV steps	
Intensity	4-point selection	
External selector	A: 4-point selection B: 4-point selection	
CHOP ONLY	Dual-trace operation is in the chopping mode at all sweep ranges.	

#### Manually Controllable Items

Item	Specification	Remarks
Vertical sensitivity variable	Can be attenuated to 1/2.5 of set sensitivity	Both CH1 and CH2, with knobs pulled out
Vertical positioning	Variable by $\pm 4$ DIV or over	Both CH1 and CH2, with knobs pulled out
Sweep time variable	Variable to 1/2.5 of set time	With knob pulled out
Horizontal positioning	Variable by $\pm 5$ DIV or over	With knob pulled out
Trigger level	Variable by $\pm 4$ DIV on screen	With knob pulled out
Delay time positioning	Can be set at 5 - 95% of main sweep	With knob pulled out

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Program Control Functions

Item	Specification	Remarks
START	00 - 95, 96 steps	Must be smaller than END
END	00 - 95, 96 steps	Must be larger than START
READ	Program read status	Pushbutton undepressed
WRITE	Program write ready status	Pushbutton depressed
MEMORY	Program writing	When pushbutton is pressed

Memory Backup Feature

Item	Specification	Remarks
Maintaining time	One year or more	
Backup voltage warning indication	POWER LED blinks when voltage is low.	
Backup power source	SUM-3 × 2	

W

Power Requirements

Item	Specification	Remarks
Voltage	100, 115, 215, 230 V, ±10%	Selectable at rear panel
Frequency	50 or 60 Hz	
Power consumption	Approx. 16 VA	

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Dimensions and Weight

Item	Specification	Remarks
Outline dimensions	310 W × 165 H × 205 D mm (12.20 W × 6.50 H × 8.07 D in.)	Maximum dimensions
	310 W × 150 H × 150 D mm (12.20 W × 5.91 H × 5.91 D in.)	Mainframe dimensions
Weight	Approx. 4.5 kg (10 lbs)	

Ambient Temperature and Humidity

	Temperature	Humidity	Remarks
Range to satisfy specification performance	+5°C to 35°C (41°F to 95°F)	Up to 85%	
Maximum operating range	0°C to 40°C (32°F to 104°F)	Up to 90%	

Accessories

Kikusui Code No.

Step Controller cable clamp .....	(D3-917-007) .....	1
Fuse (slow blow, 0.2 A) .....	(99-02-0112) .....	1
Fuse (slow blow, 0.4 A) .....	(99-02-0114) .....	1
Power cord .....	(85-10-0120) .....	1
Instruction manual .....	( ) .....	1



### 3. GENERAL PRECAUTIONS

#### 3-1. Unpacking the Oscilloscope

The Remote Controller RC01-COS is shipped from the manufacturer's factory after full mechanical and electrical inspection to ensure perfect structures and performances. Please unpack the device immediately upon receiving it and check for any signs of damage which might have been caused when in transportation. If any sign of damage is found, please immediately notify the bearer and your Kikusui dealer.

#### 3-2. Checking the AC Line Voltage

The required AC line voltage and fuse for this device are indicated on the rear panel of the device. Before operating the device, make it sure that the AC line voltage setting of the device conforms with the voltage of the AC line on which the device is to be operated. If the device voltage does not conform with the line voltage, the device may not operate normally or may be permanently damaged. If the voltage do not conform, make them conform by changing the voltage setting of the device or changing the line voltage to the device voltage (within a tolerance of  $\pm 10\%$ ) using an autotransformer or other appropriate equipment.

#### 3-3. Environmental Conditions

The device can be operated within an ambient temperature range of  $0^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  and ambient humidity up to 90% RH. Note that malfunctioning may be caused if the device is operated in an ambient condition exceeding any of the above limits, if the device is subjected to rapid temperature and/or humidity change, or if it is subjected to vibration.

Do not use the device in a place where strong magnetic or electric field exists. Such fields may disturb device operation.

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### 3-4. Inter-device Connection Cables

Never connect wrong devices with inter-device connection cables. Never connect or disconnect inter-device connection cables when the powers of devices connected by them are on. Such will cause damage to the devices. Be sure to correctly connect the cables upon insuring that the powers of the devices to be connected are off.

### 3-5. Backup Battery for Memory

This device has two dry cells (SUM-3) as a backup power source for memory. When the dry cells are discharged and the battery source voltage has dropped below a certain level, an indicator lamp (LED) on the panel blinks. The dry cells must be replaced with new ones when the lamp has started blinking. For replacement of the dry cells, contact your Kikusui dealer.

### 3-6. AC Line Voltage Change

The AC line voltage requirement of this device can be changed at the rear panel of the device. When the device is used on an AC line of 125 V or higher, the power cord and fuse must be changed. For the 200-V AC power cord (item name "VM0099-VM0081 AC Cord," item code number 85-10-0140), contact your Kikusui dealer. For the fuse, see the following table.

Selector position	Nominal voltage	Allowable voltage range	Fuse
A	100 V	90 V - 110 V	0.4 A, slow blow
B	115 V	104 V - 126 V	
C	215 V	194 V - 236 V	0.2 A, slow blow
D	230 V	207 V - 253 V	

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### 3-7. AC Outlet

This device has on its rear panel an AC outlet which may be used for Programmable Oscilloscope COS5030-PG, Memory Unit MU01-COS, or Probe Selector PS02-COS. The outlet may be used for other instruments also, provided that the total power does not exceed 100 VA. The outlet provides the AC power irrespective of turning on or off of the power switch of this device.

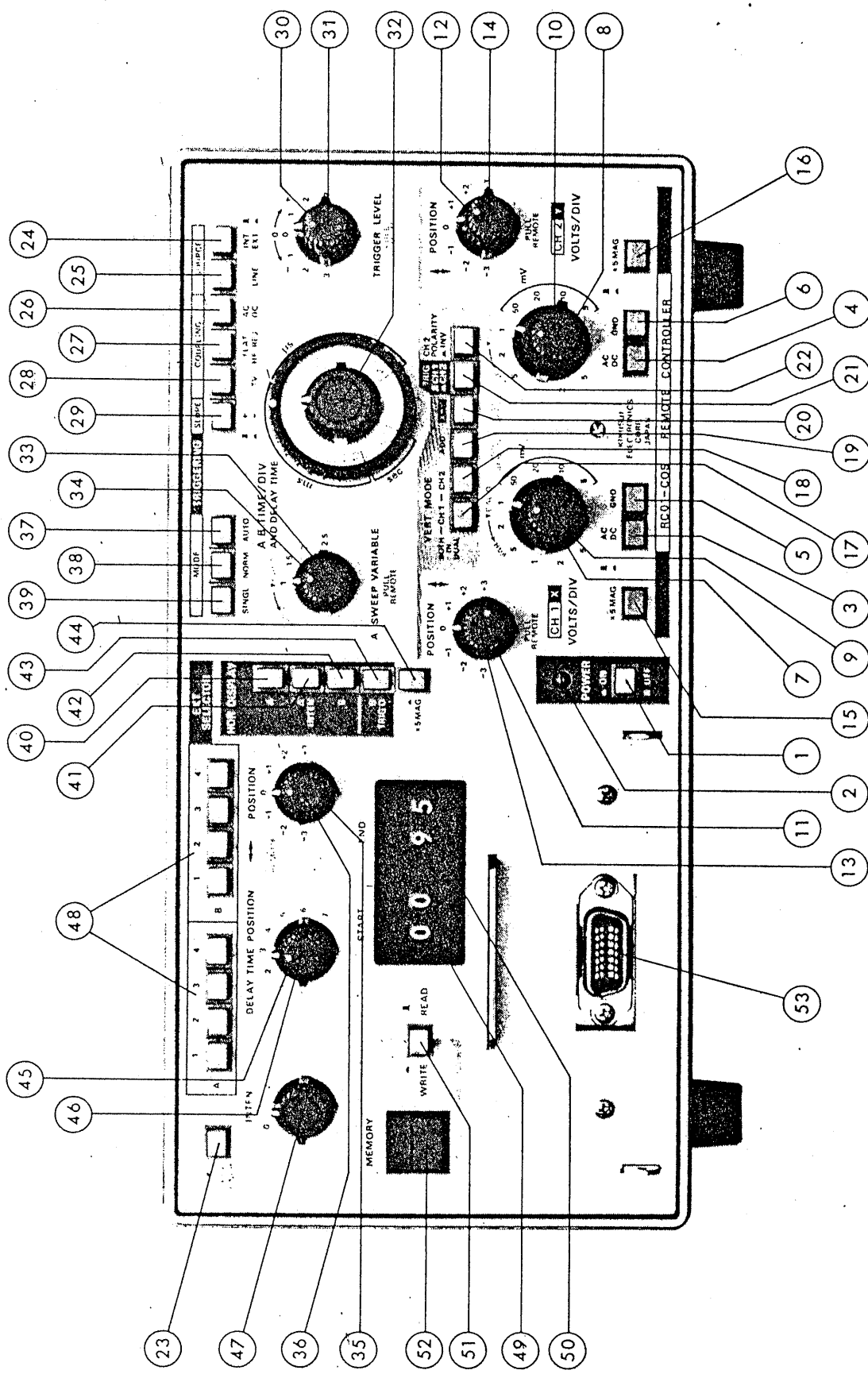


Figure 4-1. Front panel.

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#### 4. DESCRIPTIONS OF PANEL ITEMS

##### 4-1. Descriptions of Front Panel Items

This subsection describes the switches, controls, and terminals on the front panel of the device. Of the double-knob type of switches or controls, the grey knob corresponds to the black letters and the red knob to the red letters written on the panel.

- ① POWER switch: The depressed state is for device power on. As you press this button again, it pops up and the power is turned off.
- ② Power lamp: This lamp (LED) lights when the power is on. It blinks when the backup power source voltage (internal battery voltage) has dropped.

Vertical Deflection Section (The functions of the switches and controls of CH1 and CH2 channels are identical. The descriptions of the CH1 are directly applicable to the CH2 also.)

- ③, ④ AC, DC: These pushbutton switches select the type of input coupling. The depressed state is for DC coupling and the undepressed state is for AC coupling. When in the AC-coupling mode, the DC component of the input signal is cut off and the AC component alone can be displayed. When in the DC-coupling mode, the input signal including its DC component is displayed.
- ⑤, ⑥ GND: When this button is pressed, the vertical input terminal of the oscilloscope is disconnected from the input signal and connected to the ground, thereby enabling to check the zero-volt position on the CRT screen.

- ⑦, ⑧ VOLTS/DIV: The grey knobs are for vertical sensitivity selection for 5 mV/DIV to 5 V/DIV in 10 ranges. The range values are those attained when the red VARIABLE knob is depressed or turned to the clockwise extreme position (CAL'D position).
- ⑨, ⑩ CAL'D:  
VAR  
PULL REMOTE  
These knobs are for continuously-variable adjustment of vertical sensitivity. This function is effective when each knob is pulled out. The sensitivity is reduced to approximately 1/2.5 when the knob is turned to the counterclockwise extreme position. The clockwise extreme position is the CAL'D position where the sensitivity indicated as the range value is attained. Adjustment of these knobs do not affect the programs stored in memory.
- ⑪, ⑫ POSITION:  
↕  
Each of these switches selects vertical position of the displayed spot or trace for 7 points in 1-DIV steps. The 0 dial position is for positioning the spot or trace at the center of the CRT screen. The spot or trace moves upward as its switch is turned clockwise.
- ⑬, ⑭ PULL REMOTE: When in the pulled out state, continuously-variable positioning of the spot or trace can be done with each of these knobs, irrespective of the programs stored in memory. The spot or trace moves upward as its knob is turned clockwise.
- ⑮, ⑯ ×5 MAG: When each of these buttons is pressed, the vertical sensitivity of the corresponding channel is magnified by 5 times.

The functions of the above items are identical for both CH1 and CH2 channels.

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Vertical Mode Selector: The 4-button switches select functions of the CH1 and CH2 vertical amplifier circuits as described in the following.

- (17) CH1: The oscilloscope operates in a single-channel mode with CH1 only.
- (18) CH2: The oscilloscope operates in a single-channel mode with CH2 only.
- (17), (18) BOTH-CH1-CH2 IN DUAL: If you press both CH1 and CH2 buttons at the same time, the oscilloscope operates in a dual-trace mode with both CH1 and CH2 channels. Switching between the two traces is done in the CHOP or ALT mode. Switching between the CHOP mode and ALT mode is automatically done being linked to the CH1 and CH2 vertical amplifier circuits or time base circuit as follows:

CHOP: 0.5 sec/DIV - 1 msec/DIV

ALT: 0.5 msec/DIV - 0.2  $\mu$ sec/DIV

It also is possible to operate all ranges in the CHOP mode by means of (23) CHOP ONLY button.

- (19) ADD: Algebraic sum or difference of CH1 and CH2 signals is displayed on the CRT screen. When (22) CH2 POLARITY knob is depressed, algebraic sum (CH1 + CH2) is displayed; when the knob is pulled out, algebraic difference (CH1 - CH2) is displayed.
- (20) X-Y: The oscilloscope operates as an externally-swept XY-scope with CH1 as X axis (horizontal axis) and CH2 as Y axis (vertical axis). When in this mode, frequency bandwidth of the X-axis becomes DC - 2 MHz, within -3 dB.

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②1 TRIG: This button selects an internal trigger source channel for the DUAL mode or ADD mode operation. When the button is undepressed, the signal being applied to the CH1 input terminal is selected as the internal trigger signal; when the button is depressed, the CH2 signal is used as the internal trigger signal.

CH1

CH2

②2 CH2 POLARITY: When this switch is depressed, polarity of the CH2 input signal is inverted (the phase is changed by 180 degrees).

INV

②3 CHOP ONLY: The dual-trace operation is done only in the CHOP mode at all of the time base ranges.

#### Trigger Circuit

②4  INT: This button selects trigger source signal between internal and external. If the button is in the INT () state, the internal trigger mode is selected: When in the DUAL or the ADD mode, the signal selected by ②1 TRIG switch is used as the trigger signal; when in the single-channel mode with CH1 or CH2, the input signal of own channel is used as the trigger signal. If the button is the EXT () state, an external signal applied to the oscilloscope through its TRIG IN terminal is used as the trigger signal.

EXT

②5 LINE: The AC line frequency signal is used as the trigger signal.

②6  AC: This button selects a coupling mode for the trigger signal. When the button is in the AC () state, the DC component of the trigger signal is cut off and the AC component alone is fed to the trigger circuit. When the button is in the DC () state, the trigger signal without cutting off its DC component is fed to the trigger circuit.

DC

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- (27)  FLAT: This button selects a condition of coupling for the trigger signal. When the button is in the FLAT () state, the CH1 or CH2 EXT trigger signal is applied without any conditioning to the trigger circuit. When in the HF REJ () state, the trigger circuit is applied to the sweep circuit via a high-cut filter of approximately 50 kHz in order to reject the signal components and noise components higher than this frequency.
- HF REJ
- (28) TV: Triggering is done in synchronization with the output signal (TV.V or TV.H) of the TV sync separation circuit, being linked to (32) A TIME/DIV selector switch.
- TV.V: 0.5 sec/DIV - 0.1 msec/DIV  
 TV.H: 50  $\mu$ sec/DIV - 0.1  $\mu$ sec/DIV
- (29) SLOPE: This button selects a slope of the trigger signal at the triggering point. When the button is in the "+" () state, triggering is effected with a positive-going slope; when the button is set in the "-" () state, triggering is effected with a negative-going slope.
- +  
 -
- (30) TRIGGER LEVEL: This switch selects a triggering level. Level selection can be done from 7 points in 1-DIV steps. The triggering level is raised in the "+" direction as this switch is turned clockwise.
- (31) PULL REMOTE: With this knob pulled out, the triggering level is continuously-variably adjustable irrespective of the programs stored in memory. The triggering level is raised in the "+" direction as this knob is turned clockwise.

Sweep Circuit

- ③② A TIME/DIV, B TIME/DIV, and DELAY TIME: The larger knob is for A TIME/DIV and DELAY TIME, and the smaller knob is for B TIME/DIV. When in the A sweep mode, the larger knob indicates the sweep time of 0.5 sec/DIV - 0.2  $\mu$ sec/DIV in 20 ranges; when in the A INTEN mode, the larger knob indicates the A sweep time and the delay time from the start of the A sweep to that of the B sweep. The smaller knob, when in the B sweep mode, indicates a sweep time of 0.5 msec/DIV - 0.2  $\mu$ sec/DIV in 11 ranges. Note that the smaller knob is ineffective for the ranges of 0.5 sec/DIV - 1 msec/DIV.
- ③③ A SWEEP VARIABLE: This switch is for fine selection of the A sweep time. The sweep time selected by ③② A TIME/DIV switch can be made slower by three factors of 1.5, 2, and 2.5 times. When this switch is set in position 1, the sweep time is calibrated to that selected by ③② A TIME/DIV switch.
- ③④ CAL'D:  
VAR  
PULL REMOTE
- With this switch in the pulled out state, the sweep time selected by ③② A TIME/DIV switch is continuously variable (can be made slower) to a factor of 2.5 or over, regardless of stored memory. When this switch is in the depressed state (CAL'D state), the sweep time is calibrated at the value indicated by ③③ A SWEEP VARIABLE switch.
- ③⑤ ↔ POSITION: This switch selects a horizontal position of the spot or trace from 7 positions in 1-DIV steps. The 0 position is for the screen center position for the spot or trace. The spot or trace moves upward as this switch is turned clockwise.

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- ③⑥ PULL REMOTE: When this knob is in the pulled out state, continuously-variable horizontal positioning of the spot or trace can be done irrespective of the stored programs. The spot or trace moves rightward as this knob is turned clockwise.
- ③⑦ AUTO: This button is for an AUTO sweep (free-running sweep) that recurs without being triggered and is not synchronized by any applied signal. If an input signal of 20 Hz or higher frequency and 0.5 DIV or larger amplitude is applied to the input signal, the sweep can be synchronized by the input signal.
- ③⑧ NORM: The sweep is triggered only when the triggering level is within the amplitude range of the measured signal. If the triggering level is not within this range, the sweep is in the standby state. This mode primarily is used for measurement of signals of 20 Hz or lower.
- ③⑨ SINGLE: This button is for the single-sweep mode of operation for measurement of one-shot signal and for trace photography. The RESET switch for resetting the oscilloscope ready for the next single sweep is settled on the oscilloscope itself. So, no reset operations can be programmed and stored in memory.


#### Horizontal Display

- ④⑩ A: This button is for the main sweep (A sweep) mode for display of regular signals.
- ④⑪ A INTEN: This button is for a delayed sweep mode. It is used to select a portion to be magnified of the A-sweep waveform. The magnified portion corresponding to the B sweep is intensified.

④② B: This button is for the delayed sweep (B sweep).

④③ B:  
TRIG'D This button selects a sweep between continuous sweep and delayed sweep. When the button is in the undepressed state (the continuous sweep mode), the B sweep starts at the instant the delay time set by ③② A TIME/DIV, DELAY TIME switch and ④⑤ DELAY TIME POSITION switch has determined.

When the button is in the depressed state (the triggered delay state), the B sweep starts at the instant the sweep delay time set by ③② DELAY TIME switch and ④⑤ DELAY TIME POSITION switch has determined and the trigger level has crossed the signal and a trigger pulse is generated. If no trigger pulse is generated, the B sweep does not start and the sweep operation terminates when the A sweep is over.

④④  ×5 MAG: When this button is depressed, the sweep time becomes faster by 5 times and the displayed signal waveform is magnified horizontally by 5 times.

④⑤ DELAY TIME POSITION: This switch selects a delay time from 8-divided ones of the delay time selected by ③② A TIME/DIV switch in order to select the starting point of the portion to be horizontally magnified.

④⑥ PULL REMOTE: With this knob pulled out, the above delay time can be adjusted continuously variably.

Others

④⑦ INTEN: This switch selects a spot or trace intensity from 4 levels of intensity.

- ④⑧ A, B EXT SELECTOR: These buttons are used for selecting four items of each of A and B devices externally connected to the oscilloscope, other than for setting of oscilloscope panel items. When Probe Selector PS01-COS is connected, the A and B buttons can be used for selection of the probes of CH1 and CH2, respectively.

#### Program Control Section

- ④⑨ START: These digital switches are for setting the start point of program steps. Setting can be done at one of 96 steps of 00 - 95. No step change is effected, however, unless setting is done at a step of a smaller number than that set by ⑤⑩ END switches. Setting at 96 - 99 is the same in effect with setting at 95. When steps are counted down and passed the one set by these digital switches, the step becomes the one set by ⑤⑩ END switches.


- ⑤⑩ END: These digital switches are for setting the end point of program steps. Setting can be done at one of 96 steps of 00 - 95. No step change is effected, however, unless setting is done at a step of a larger number than that set by ④⑨ START switches. Setting at 96 - 99 is the same in effect with setting at 95. When steps are counted up and passed the one set by ④⑨ START switches, the step becomes the one set by ④⑨ START switches.

- ⑤①  READ: This button selects memory operation between read and write.  
 WRITE

When the button is in the READ () state, the program stored in memory is read and called out by operation of the step controller. When

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in this state, the switches and controls on the panel remain idle except red ones which are for manual operation.

When the button is in the WRITE (  ) state, if ⑤2 MEMORY button is in the depressed state, settings of panel switches and controls are stored in memory. When in this state, as the oscilloscope operates in conformity with settings of panel switches and controls, the setup of the devices can be used as a remote-controlled oscilloscope system.

- ⑤2 MEMORY: This button is for writing panel item setting data onto memory when in the WRITE mode. As writing is done, a pip sound is generated to confirm writing of data.
- ⑤3 14-pin connector: This connector is for connecting Step Controller SC01-COS. Connection can be done either by direct coupling or remotely by using an inter-device connection cable.

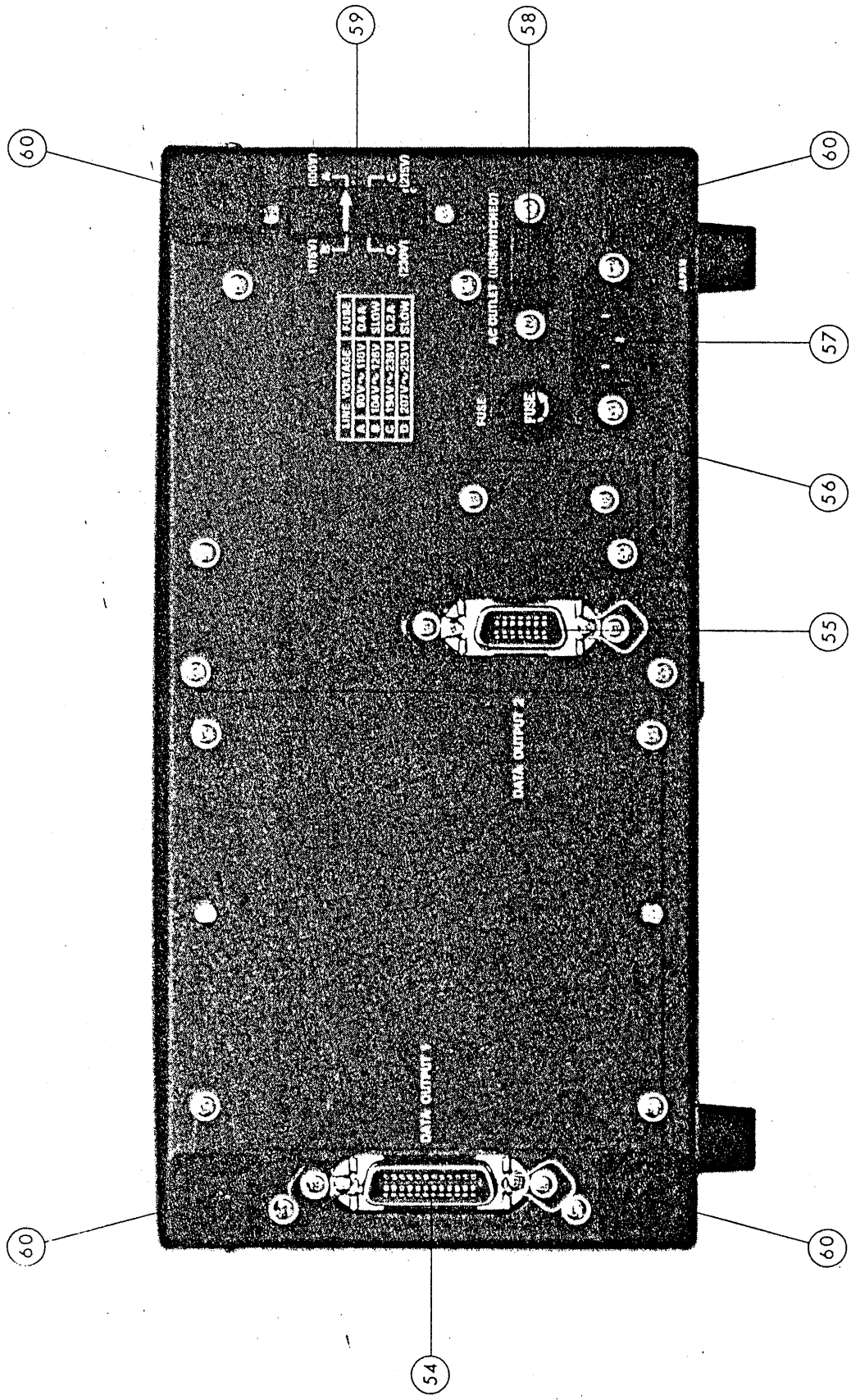


Figure 4-2. Rear panel

4-2. Descriptions of Rear Panel Items

- ⑤4 DATA OUTPUT 1: This 24-pin connector is used to send control signals to the oscilloscope to control it with the stored programs. It also is used for data transfer to Memory Unit MU01-COS.
- ⑤5 DATA OUTPUT 2: The 14-pin connector is used to send manual control signals to the oscilloscope. The red manual control knobs remain idle unless this connector is connected to the oscilloscope, although the disconnected connector does not affect operation of the oscilloscope.
- ⑤6 FUSE: The power fuse holder. A slow-blow type fuse must be used. The holder cap can be removed by turning it counterclockwise.
- ⑤7 AC line power inlet: To connect this device to an AC power line receptacle.
- ⑤8 AC OUTLET: Provides an AC power, being connected in parallel with ⑤7 AC line power inlet.
- ⑤9 AC line voltage selector plug: This plug selects an AC line voltage on which this device operates. Be sure to correctly set the plug to conform with the line voltage, referring to the voltage table at the left-hand side of this plug and observing the direction of the arrowhead mark.
- ⑥0 Cord hooks: Used to wind up the power cord.



5. OPERATION METHOD

5-1. Inter-device Connections

Connect this device to the oscilloscope as shown in Figure 5-1, using the cable which accompanies the oscilloscope. Or connect step Controller as shown in Figure 5-2 or 5-3.

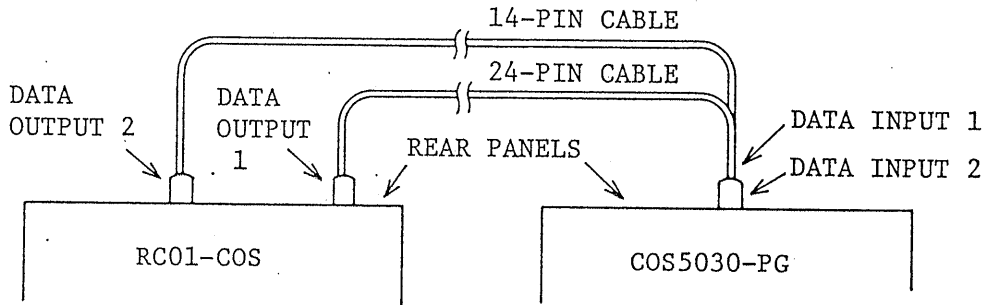
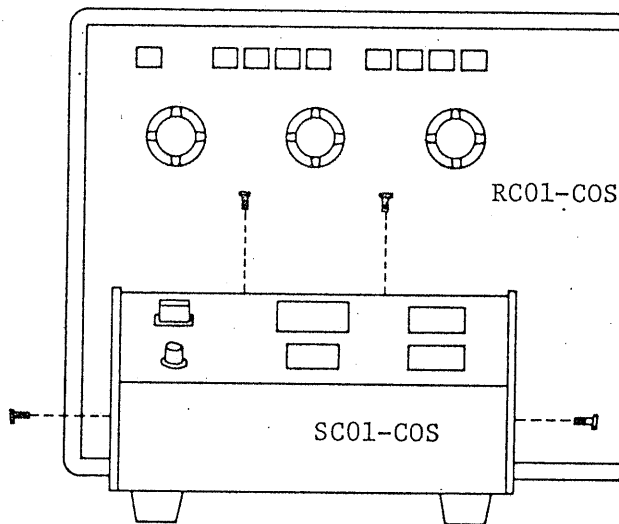
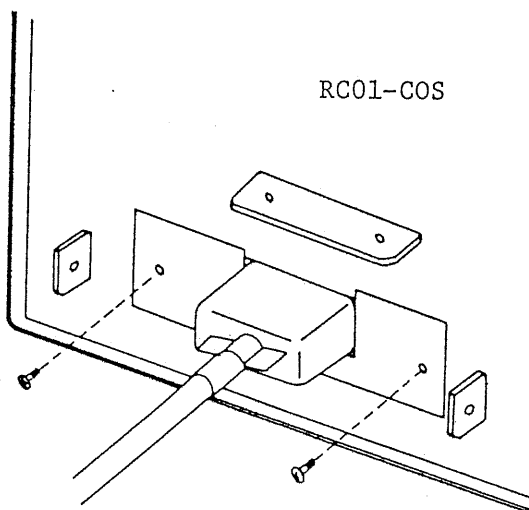


Figure 5-1



When Step Controller SC01-COS is directly coupled

Figure 5-2



When Step Controller SC01-COS is connected using cable

Figure 5-3

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5-2. Initial Procedure

Before connecting the power cord to an AC line receptacle, make it sure that the line voltage selector plug on the rear panel of this device is set correctly. Next, set the switches and controls as indicated in the following table.

Item	No.	Setting
POWER	(1)	OFF
INTEN	(47)	1
DUAL-CH1-CH2	(17) (18)	CH1
↑ POSITION	(11) (12)	0 (both CH1 and CH2)
VOLTS/DIV	(7) (8)	20 mV (both CH1 and CH2)
AC-DC-GND	(3) (4) (5) (6)	DC, GND (both CH1 and CH2)
×5 MAG	(15) (16)	<input type="checkbox"/> (NORM)
CH2 POLARITY	(22)	<input type="checkbox"/> (NORM)
SOURCE	(24) (25)	INT (LINE-OFF)
COUPLING	(26) (27) (28)	AC, FLAT (TV-OFF)
SLOPE	(29)	+
TRIGGER LEVEL	(30)	0
MODE	(37) (38) (39)	AUTO
HORIZ DISPLAY	(40) (41) (42)	A
B TRIG'D	(43)	<input type="checkbox"/> OFF
×5 MAG	(44)	<input type="checkbox"/> OFF
TIME/DIV	(32)	0.5 mS (both A and B)
A SWEEP VARIABLE	(33)	1
↔ POSITION	(35)	0
DELAY TIME POSITION	(45)	0
EXT SELECTOR	(48)	1 (both A and B)

Item	No.	Setting
START	(49)	00
END	(50)	95
READ/WRITE	(51)	<input type="checkbox"/> WRITE
PULL REMOTE	(9) (10) - (13) (14) (31) (34) (36) (46)	Knobs in the depressed state

After setting the switches and controls as above, connect the power cord to the AC line receptacle. Then, proceed as explained below. For the Step Controllers (SC01-COS and SC02-COS), refer to the instruction manuals of respective devices.

- (1) Turn on the POWER switch and check that the power pilot lamp (LED) above the switch is turned on.
- (2) Change the input GND switch to the OFF state so that the input signal is displayed on the oscilloscope screen.
- (3) Adjust the displayed signal to an appropriate waveform for easy viewing by adjusting switches and controls as required.

#### 5-2. Write Procedure

This procedure is to store data of settings of switches and controls in memory. To write data in memory, proceed as follows.

- (1) Set (51) READ/WRITE button in the WRITE () state.
- (2) Set (49) START switches and (50) END switches at the start step and end step, respectively, of the steps to be programmed.
- (3) Adjust the step number to that of the step where data is to be written, by operating the Step Controller.
- (4) Adjust the switches and controls so that the signal to be measured is displayed with an appropriate waveform on the oscilloscope screen.

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- (5) Press (52) MEMORY switch.

By the above procedure, data of setting done in (4) is stored for the step which has been selected in (3). When this procedure is done, if the AUTO/MANUAL switch of the Step Controller is in the AUTO state, the step number is automatically counted up by 1.

### 5-3. Read Procedure

This procedure is to operate the oscilloscope with the program stored in memory. For this operation, proceed as follows.

- (1) Set (51) READ/WRITE switch in the READ (I) state.
- (2) Set (49) START switches and (50) END switches at the start step and end step, respectively, of the steps of the program to be read.
- (3) Adjust the step number to the one to be read, by operating the Step Controller.

By the above procedure, the oscilloscope can be operated with the stored program. Since the start step and end step can be changed with the procedure of (2), different programs can be read without changing the data stored in memory.

If the AUTO/MANUAL switch of Step Controller is set in the AUTO state, the step number is automatically counted up at each preset time interval.

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