TOA

OPERATING INSTRUCTIONS

PROGRAM TIMER TT-104B

WARNING : (For U.S.A. only)

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the operating instructions, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.
Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

FEATURES

- The TT-104B is a program timer having 4 independent output channels.
- Weekly program capacity is 30 steps per channel, and each step can be programed in an increment of 1 minute.
- A channel assignment switch turns B, C and D outputs into A output.
- Programing, its change or cancellation can be performed easily and precisely through individual key operation and display.
- Setting the pause mode allows no program output to be delivered.
- Output is a no-voltage make contact that connects for five seconds at the programed time.
- Built-in buzzer audibly warns the user of key operation error.
- Monthly error is ± 5 seconds at 25 ℃ of ambient temperature.
- Clock and stored programs can be maintained for approximately 100 hours in the event of power outage.

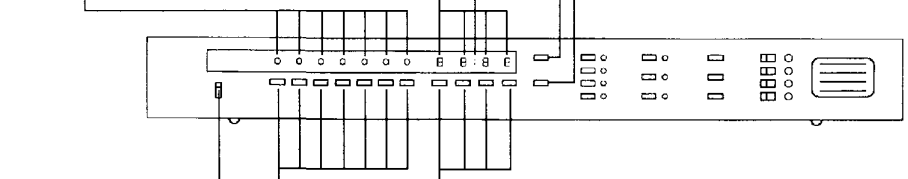
INSTALLATION PRECAUTION

- Do not switch power on and off frequently because this can shorten the power-outage backup time.
- Be sure to set the memory backup switch to ON after installation.
- Do not install unit close to a warm air vent or in locations where the unit is exposed to the sunlight. Installation in high temperature areas like on the amplifier makes a clock inaccurate. Install the unit in the area of which temperature is as close as possible to the room temperature.
- Install the unit as far as possible from a radio tuner or a wireless microphone.
- Be sure to ground the unit.
- Be sure to unplug power cord from the wall outlet when making connections.

TOA Corporation

CONTENTS

FRONT PANEL FACILITIES



FRONT PANEL FACILITIES

CHANNEL key-Use this key to select the program output. Pressing the key causes the corresponding channel indicator on the right side of each key to come on.

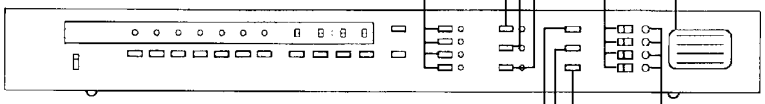
DAY key-This key is used to register a weekly program. Press the key, and the DAY indicators flash, allowing a day of the week to be set with the day setting under each indicator.

TIME key-Press this key to register the clock program, and the clock display flashes. Set hours with the clock settings under the display.

PAUSE key-When it is desirable to stop the clock operation temporarily on a certain day because that day falls on a holiday, this can be accomplished by using this key. After pressing this key (the day indicators flash), press the desired day setting.

AUTO/OFF switch-Each individual output channel can be connected and disconnected with this switch. Setting the switch to ON allows the output channel of that switch to operate at the programed time. When set to OFF, the output operation stops.

Output identification label-This label is supplied with unit. Write the names of programs of or equipment connected to each output channel in the label.



STORE key-Press this key to store the day of the week or hours set under the day, time or pause mode.

Note:

No programs can be stored in a built-in memory unless the memory key is pressed.

CHECK key-This key checks the day of the week or hour for proper registration. The corresponding date indicator comes on when checking the day of the week. Also, each time the CHECK key is pressed, the clock display shows the programed times from the earliest hour to the latest in sequence.

CANCEL key-This key cancels the stored day of the week or hour. To cancel the day of the week, press the CHECK key to call up the day of the week and cancel it with the CANCEL key. Similarly, the stored hour can be cancelled with both the CHECK and CANCEL keys.

MANUAL switch-Use this switch to manually deliver the output regardless of actual program. Pressing this switch connects a relay contact for five seconds.

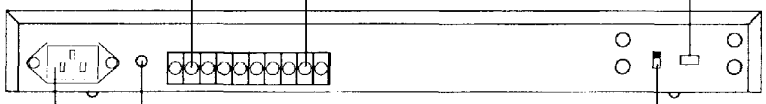
Note:

1. The connected equipment can be manually activated with this switch regardless of program as well as position of the AUTO/OFF switch.
2. This switch cannot be operated during power outage.

REAR PANEL FACILITIES

OUTPUT CHANNEL terminal
- Output capacity : 24 V DC 0.5 A (resistance load)
  Minimum load : 10 mV DC 10μA.
- A relay contact connects for five seconds at the programed time.
- These relays are dry contacts.
- Connect this terminal to start terminals of BGM player or spot announcing machine, etc.

CHANNEL ASSIGNMENT switch-Set each switch to ON when assigning all of B, C and D channels to the A channel. When, for example, the B channel switch is set to ON, the A channel relay contact connects at the time programed for both A and B channel. In this event, the B control output does not work.



AC power inlet

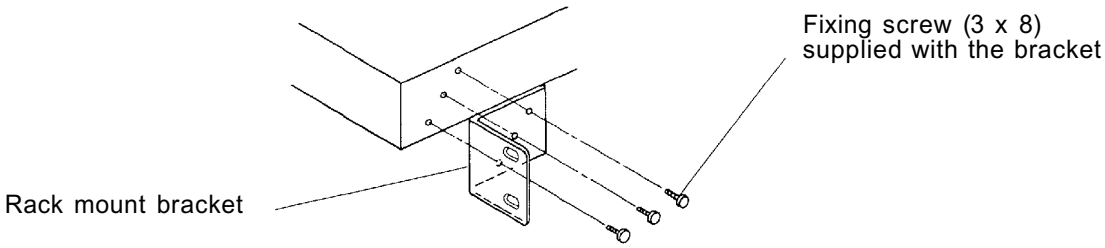
MEMORY BACK UP switch-Be sure to set this switch to ON after installation. This switch protects clock and stored programs for approximately 100 hours during power outage.

Earth terminal-Be sure to ground unit.

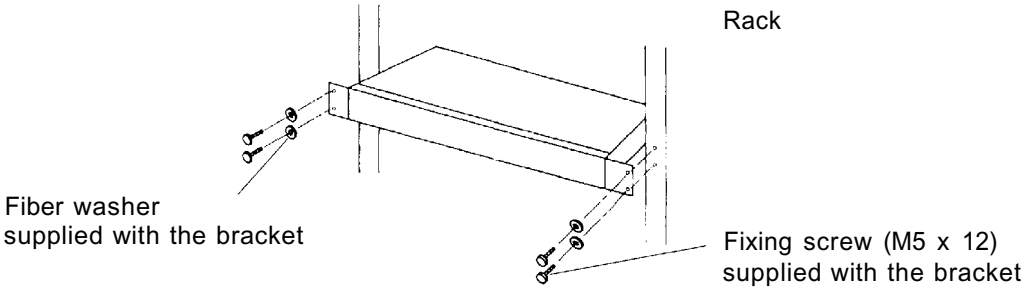
RACK MOUNTING

To mount the TT-104B in an equipment rack, the rack mounting bracket (optional) is required. Follow the procedures below.

1. After removing rubber foot of the TT-104B, attach the bracket to the TT-104B.



2. Fix the TT-104B in the rack using screws supplied with the bracket. See the figure.



REAR PANEL FACILITIES

1 SETTING THE CURRENT TIME

1. Plug power cord in wall outlet. Set the program switch to OPERATION. The clock display flashes to show "0000" and at the same time, a warning tone beeps, indicating that the timer has to be set for current hour.

2. Set the rear-mounted MEMORY BACKUP switch to ON. The switch allows a clock to work and protects stored programs during power outage, but no timer output is delivered.

3. Press the DAY setting key (from Monday to Sunday) with the ADJUST key continuously pressed to set a day of the week. The corresponding date indicator comes on, while a colon (second indicator) in indication "00:00" that appears in the clock display begins to flash at time intervals of one second, indicating that a clock is working. The beep stops.

4. Pressing the ADJUST key continuously, press the clock settings (HOUR and MIN. keys) to set a clock for current hour. The number increases by one each time the setting is pressed. If the unreal hour is set which is not in a range from zero hour (00:00) to 23 hundred 59 hours (23:59), both the date indicator and clock display flash and at the same time, a warning tone beeps. In such a case, correct the hour.

5. Press the 00 SEC. key, while pressing the ADJUST key continuously. This resets the second of a clock to "00". Pressing the 00 SEC. key when a clock second accounting is between 30 and 59 seconds increases the minute indication by one. The minute indication does not change when the second is between 0 and 29 seconds. (The clock display shows no second, but the clock is working in second.)

2 HOUR CORRECTION

Check to confirm that the program switch is set to OPERATION. Pressing the ADJUST key continuously, press the clock reset key the moment the radio time signal tells zero second. This allows the clock to be timed to the moment if variation is within ± 30 seconds. If the clock varies more than 30 seconds, use the time adjustment as well as clock settings so that the clock display indicates the correct hour.

Note:

The second of the clock is not reset to zero second even when a day of the week and the current hour are set.

OPERATION

3 PROGRAM REGISTRATION

Note:

The output of the TT-104B is a relay contact that makes for five seconds at the programed time. The relay contact cannot be kept connected or disconnected by programs. Take care that equipment to accept the pulse output are connected to the timer.

1. Enter programs in the program table supplied with unit. Lump the programs together per equipment connected and assign the output channel to each equipment. If the same equipment are used but their programs are not the same, assign different output channels.

Example.

If it is so programed as to sound a chime both in the morning and in the afternoon of Monday through Friday, and in the morning of Saturday, and to play a piano accompaniment to the morning announcement every morning from Monday through Saturday, write on the table as follows:

PROGRAM TABLE

	Output channel	A					B					C				
	Equipment	Chime					Spot announcing machine									
Program	Day	(Mon Tue Wed Thu Fri) Sat Sun					Mon Tue Wed Thu Fri (Sat) Sun					(Mon Tue Wed Thu Fri Sat) Sun				
	Time	Hour		Minute		Note	Hour		Minute		Note	Hour		Minute		Note
	1	0	9	0	0	Start of work	0	9	0	0	Start of work	0	8	4	0	Morning announcement
	2	1	2	0	0	Lunch break	1	2	0	0	Close of work					
	3	1	2	4	5	Close of lunch break										
	4	1	5	0	0	Afternoon tea break										
	5	1	5	0	5	Close of tea break										
	6	1	7	3	0	Close of work										
	7															
	8															
	9															

OPERATION

2. Program registration

Register the programs according to the contents written in the program table.

① Set the program switch to PROGRAM.

The output channel indicators (A,B,C,D) and Pause indicator flash.

② Press the A channel key.

A ▭

This causes the A channel indicator to come on and both the date and clock made indicators to flash.

③ Press the DAY made key.

DAY ▭

The day made indicator comes on. At the same time, the day indicators from Moday to Sunday flash.

④ Designate a day(s) of the week.

MON	▭	Press the MON setting. Its indicator comes on.
TUE	▭	Press the TUE setting. Its indicator comes on.
WED	▭	Press the WED setting. Its indicator comes on.
THU	▭	Press the THU setting. Its indicator comes on.
FRI	▭	Press the FRI setting. Its indicator comes on.

When the wrong day setting has been pressed, press the same setting again, and the corresponding day indicator goes out. Then press the correct setting.

⑤ Register the day of the week by pressing the STORE key.

STORE ▭ The clock display indicates "PASS". At this point, all days from Monday to Friday have been registered into the A channel.

Note:
(The contents of the programs are not stored without pressing the STORE key.)

⑥ Press the TIME mode key.

TIME ▭ The time mode indicator comes on. At the same time, a dotted line "— — — —" flashes in the clock display.

⑦ Set a clock for 08:55.

HOUR ▭	(one hour's digit)	Press the HOUR key (one hour's digit) 8 times. The clock display shows "0800".
MIN. ▭	(Ten minute's digit)	Press the MIN. key (ten minute's digit) 5 times. The clock display shows "0850".
MIN. ▭	(one minute's digit)	Press the MIN. key (one minute's digit) 5 times. The clock display shows "0855".

⑧ Register the hour 08:55.
Press the STORE key.

STORE ▭ The word "PASS" appears in the clock display, indicating the hour 08:55 has been registered into the A output channel.

Note:

(The content of the program is not stored without pressing the STORE key.)

⑨ Repeat steps ⑦ and ⑧ to register all the hours from 09:00 to 17:30.

Note:

- Pressing the STORE key to register the unreal hour other than one from 00:00 to 23:59 causes characters "Err" to appear in the clock display and the attempt of its registration is refused. Correct the hour and register it again.
- When one same hour is registered twice, characters "Err" are indicated in the clock display.
- If a registration attempt is made in excess of the program capacity (30), the word "End" appears in the clock display, refusing the registration.

⑩ Repeat steps ② through ⑨ to register days of the week and hours into both B and C channels.

4 PROGRAM CHECK, CORRECTION AND CANCELLATION

After finishing program registrations, check the program contents.

① Shift the program switch back to PROGRAM.

OPERATION

PROGRAM

The output indicators of A, B, C and D channels as well as the pause indicator comes on.

OPERATION

② Press the A channel key to select the A channel.

A ▭ The A channel indicator comes on, while both the date and clock mode indicators flash.

③ Put the timer in the day mode by pressing the DAY mode key.

DAY ▭ The day mode indicator comes on and at the same time, day indicators from Monday to Sunday flash.

④ Press the CHECK key.

CHECK ▭ The indicator of the registered day of the week comes on.

..... To step (9) to change the day of the week.

..... To step (10) to cancel the day of the week.

⑤ Press the TIME mode key.

TIME ▭ The time mode indicator comes on and at the same time, a dotted line " – – – – " flashes in the clock display.

⑥ Check the hour.

CHECK ▭ Each time the CHECK key is pressed, the registered hour is shown in the clock display starting first with the earliest hour to the latest in sequence. Pressing the check key when the last hour is indicated causes the word "End" to appear in the clock display, returning the indication to the first hour.

..... To step (8) to correct hour.

Move to the next step to cancel the registered hour.

⑦ When you wish to cancel the registered hour, press the CHECK key to get that hour in the clock display.

CANCEL ▭ Pressing the CANCEL key indicates the word "PASS" in the display and cancels that hour. In this event, that cancelled hour remains indicated in the display. Further cancellations can be achieved in a similar manner by using both the CHECK and CANCEL keys.

Note:

Pressing the CHECK key when no hour is registered results in "End" being indicated in the display, with "Err" indicated when the CANCEL key is pressed.

⑧ Correction of the hour.

CANCEL	▭	Press the CHECK key till that hour appears in the display.
HOUR	▭	Press the CANCEL key for cancelling the indicated
MIN.	▭	hour and then set the new hour using the clock settings.
STORE	▭	Register the new hour with the STORE key.

Note:

(Be sure to cancel the previous hour when correcting it.)

⑨ Correction of the day of the week.

STORE ▭ Press the CHECK key, and the day indicator of the registered day of the week comes on. After pressing the desired date setting, press the STORE key.

⑩ For cancellation of the day of the week, press the CANCEL key.

CANCEL ▭ The word "PASS" is indicated in the display and all date indicators go out, achieving the cancellation.

5 ENTIRE PROGRAM CANCELLATION

It is impossible to simultaneously cancel all the programs registered into all channels. Cancellation is only possible for each channel (A, B, C and D). Follow the procedures below to cancel the A channel time program.

① Set the program switch to PROGRAM.

OPERATION

PROGRAM

The A, B, C, and D output indicators and pause indicator flash.

OPERATION

② Press the A channel selector.

A ▭ This causes the A channel indicator to come on and both the DAY and TIME mode keys to flash.

③ Press the TIME mode key.

TIME ▭ The TIME mode indicator comes on and a flashing dotted line "— — — —" is indicated in the display.

④ Press the CANCEL key with the A channel selector continuously pressed.

A ▭
↓
CANCEL ▭ The word "PASS" appears in the display, indicating that the whole time program registered into the A channel has been cancelled.

Similarly, the whole time program registered into each of the B, C and D channel can be cancelled. For the day of the week, perform individual cancellations as instructed in the section 4 under the heading of PROGRAM CHECK, CORRECTION and CANCELLATION.

6 PROGRAM OPERATION

OPERATION

PROGRAM

Be sure to set the program switch to OPERATION after programming is finished. The timer does not work if the switch is set to PROGRAM.

7 PAUSE MODE

- The PAUSE key is used to temporarily make the timer not to function on particular days. This is possible for up to the 7th day from the day of registration.
- No output is delivered from the timer on a day set for pause.
- After the pause day is over, the timer automatically returns to the normal state.

Use the pause function in such a case as the following example.

Example. Today is Friday and we want to stop the timer operation on Monday through Wednesday of next week since our office is closed on these three days due to holidays.

Note:

(When it is on Monday that Monday is registered for pause mode, the pause day is a Monday of the following week.)

Follow the procedures below to make Monday through Wednesday the pause days as in the example.

OPERATION

① Set the program switch to PROGRAM.

The channel indicators (A, B, C and D) and pause mode indicator flash.

② Press the PAUSE key.

PAUSE ▭

Its indicator comes on, while the date indicators from Monday to Sunday flash.

③ Designate a day(s) of the week.

MON ▭
TUE ▭
WED ▭

Press the day settings of Monday, Tuesday and Wednesday, and each corresponding day indicator comes on.
When the wrong day setting has been pressed, press that setting again. The date indicator goes out.

④ Press the STORE key.

STORE ▭

The word "PASS" appears in the clock display, indicating that the three days have been registered for pause.

Note:

(The contents of the program are not registered unless the STORE key is pressed.)

When the current day is set after the pause registration, perform the new pause registration.
Set the program switch to OPERATION after finishing programing.

8 USING FRONT-MOUNTED AUTO/OFF

This switch is used to stop actions of an output relay regardless of the timer program. When the switch is set to AUTO, the relay functions as programed. Setting the switch to OFF does not activate the relay. The switchover is possible per channel.

OPERATION

9 USING MANUAL SWITCH

Use this switch to activate the output relay regardless of the timer program. Pressing the switch causes the output relay to connect for five seconds. This is possible for each individual output. Use this switch when performing a test at time of equipment installation or for other purposes that necessitate the manual relay activation regardless of the timer program.

Note:

- The switch does not work during power outage.
- The switch works regardless of the front-mounted output AUTO/OFF switch.

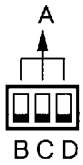
10 USING REAR-MOUNTED CHANNEL ASSIGNMENT

This switch is used to switch over from the B, C or D channel to the A channel. When the B channel switch is set to ON, the B program output is delivered from the A channel, with the A program output delivered from the A channel. In this event, no output is delivered from the B channel.

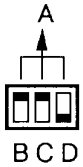
Example 1

A	B	C
8:30 9:30 10:30	9:00 10:00 11:00	12:00

Given that each of the output channels is programed as Example 1, the output is delivered from each channel as follows.

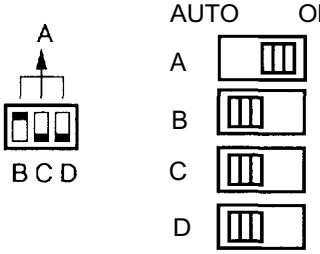


If all the switches are set to OFF.
A channel: Output is delivered at 8:30, 9:30 and 10:30.
B channel: Output is delivered at 9:00,10:00 and 11:00.
C channel: Output is delivered at 12:00.



If both the B and C switches are set to ON.
A channel: Output is delivered at 8:30, 9:00, 9:30,10:00, 10:30,11:00, and 12:00.
No output is delivered from both the B and C channels.

1. Rear-mounted CHANNEL ASSIGNMENT switch vs. front-mounted AUTO/OFF switch. The AUTO/OFF switch is effective for the program registered into each output.



If the CHANNEL ASSIGNMENT switch of B channel is set to ON and the AUTO/OFF switch of A channel to OFF in Example 1.

A channel delivers output at 9:00, 10:00 and 11:00.
B channel delivers no output.
C channel delivers output at 12:00.

- * Since the A AUTO/OFF switch is set to OFF, the output is not delivered from the A channel at 8:30, 9:30 and 10:30 as programed.
- * Since the B channel is switched over to the A channel, the A channel delivers output at 9:00, 10:00 and 11:00, the hours programed into the B channel.

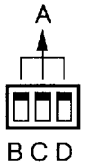
If the A channel MANUAL switch is pressed under these conditions, the A output relay makes for five seconds. Pressing the B channel MANUAL switch causes the A channel relay to make for five seconds because the B output is switched over to the A channel.

2. Use the rear-mounted output assignment switch in such cases as shown below:

① To allow one single equipment to process four different programs through combined use of the output assignment switch and the front-mounted output ON/OFF switch:
When, for example, the school has the Westminster chime and they want to utilize it for the following four different programs

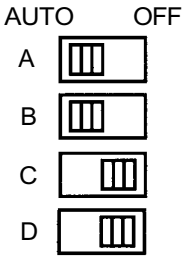
1) Ordinary school hour program (Monday to Friday)
2) Saturday program
3) Temporary shorter school hour program
4) Examination day program

1) register the ordinary school hour program into the A channel. (Register Monday through Friday.)
2) register the Saturday program into the B channel. (Register Saturday.)
3) register the temporary shorter school hour program into the C channel. (Register Monday through Saturday.)
4) register the examination day program into the D channel. (Register Monday through Saturday.)

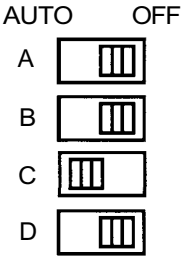


Set the CHANNEL ASSIGNMENT switches (B, C and D) to ON.

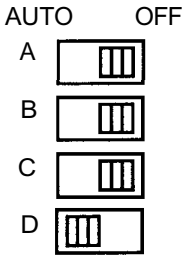
1) To operate the ordinary school hour program and Saturday program, set the AUTO/OFF switch to AUTO for A and B channels, and to OFF for C and D channels. This allows the ordinary school hour program to be operated on Monday through Friday, and the Saturday program on Saturday.



2) To operate the shorter school hour program, set the AUTO/OFF switch of the C channel to AUTO, while setting it to OFF for all the other channels.

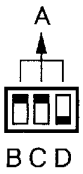


3) To operate the examination day program, set the AUTO/OFF switch of the D channel to AUTO, and those of other channels to OFF.

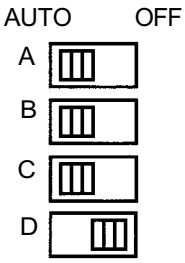


Thus, by shifting the AUTO/OFF switches different programs can be readily operated.

② If exceeding per-channel program capacity of 30. When, for example, a frequently-used spot announcing machine needs to be activated 80 times a day.



Set the rear-mounted CHANNEL ASSIGNMENT switches of both B and C channels to ON.



Set the front-mounted AUTO/OFF switches of A, B, and C channels to AUTO and that of D channel to OFF.

This expands a program capacity to 80, with 30 being programmable into A channel, another 30 into B channel and 20 into C channel.

11 POINTS TO REMEMBER

1) All the indications go out at time of power outage. However, a clock works normally and stored programs are protected. No relay output is produced. After power restoration, the timer works normally and indicates the current hour.
2) A clock and stored programs are maintained for about 100 hours during power outage. If the clock display flashes to indicate "0000" with beep after power restoration, this indicates that the battery has run down. In such a case, set a clock for the current hour and register the program again.
3) The 100-hour power outage protection is subject to the battery being kept fully charged. It takes about 200 hours to fully charge the battery. Frequent occurrence of power outage shortens the 100-hour protection time.

12 OUTPUT RELAY

- Output is a no-voltage (dry) make contact.
- The relay makes for five seconds at preset time (pulse output system).
- Output relay contact capacity :

  Maximum: 24 V DC 0.5 A (resistance load)

  Minimum : 10 mV DC 10 µA

SPECIFICATIONS

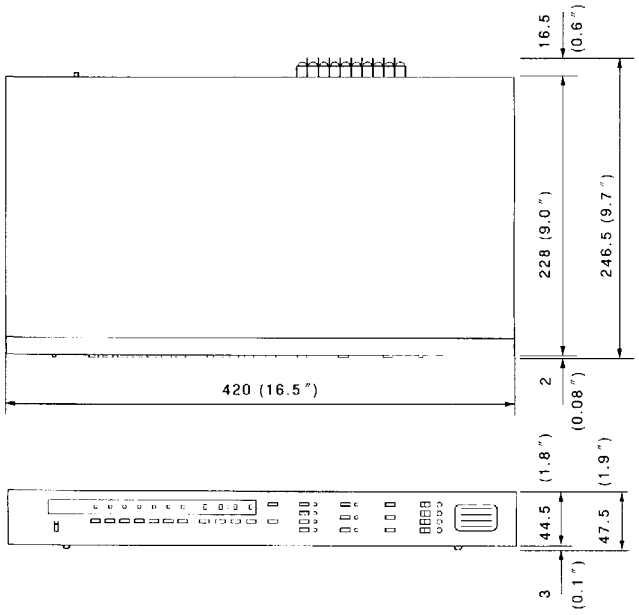
Power requirements :	TT-104B L 110~120 V AC 50/60 Hz TT-104B H 220~240 V AC 50/60 Hz
Power consumption :	3 watts
Power outage protection period :	100 hours
Program capacity :	30 steps per channel
Programmable items :	Day of the week, hour, minute, output channel
Number of channels :	4 channels (A,B,C,D)
Output system :	No-voltage (dry) make contact (5 seconds make output)
Contact capacity :	24 V DC, 0.5 A
Clock accuracy :	± 5 seconds per month (25 °C)
Items indicated in display :	Day of the week, hour & minute
Special functions :	• Entire program cancellation • Output switchover • Pause mode • Warnings by tone and indication
Dimensions :	420 (W) X 228 (D) X 44.5 (H) mm (16.5" X 9.0" x 1.8") inch
Weight :	Approx. 2.5 kg (5.5 lbs)
Ambient temperature :	0°C-50°C (32°F -122°F)

* Specifications are subject to change without notice.

Accessories:

Power cord
Operating Instructions
Program table
Output identification label

DIMENSIONAL DIAGRAM



mm (inch)

TOA Corporation

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