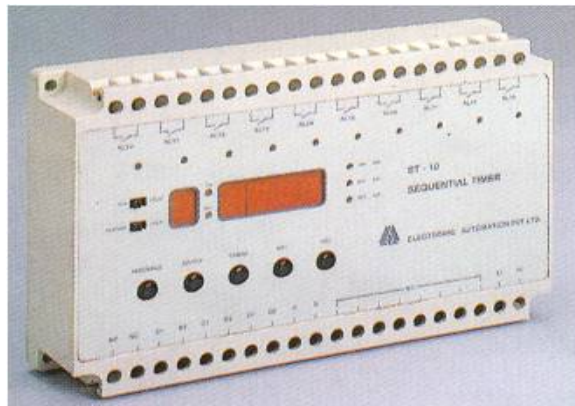# Quick Reference Guide

Sequential Timers
ST-10/ST-10M1/ST-6M1/ST-10M2

ELECTRONIC AUTOMATION (P) LTD

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INTRODUCTION

Thank you for purchasing EAPL'S Sequential Timer. This instruction manual describes every aspect of installation, set-up, and operation of the Sequential Timer. If you run into difficulties and need technical assistance, feel free to call our technical support at (080) 8567561 available between 9 AM – 5:30PM IST or visit our web site at www.eaplindia.com.

EAPL, an ISO 9001 company, leaders in Timer Technology Brings to you a new range of micro controller based programmable timers. High reliability, accuracy, compactness are some of the striking design features.

Uncompromising quality with cost effectiveness has been the watchword at EAPL.

For Customer Use

Enter below the serial Number which is located on the timer cabinet. Retain this information for future reference.

Model No:

Serial No:

Batch No:

Date of Purchase:

Purchase Point:

Accessories

- Sequential Timer - 1 no.

- Quick reference guide

Note: Please acknowledge that we reserve the right to make changes in product performance or specifications without prior notice. Also please note that we bear no responsibility for mistakes, misprints or omissions of the instruction manual Specifications.

Salient Features

- State of the art microcontroller design
- User friendly programming for On/Off time selection up to 99 hrs 59 mins.
- 7 segment display indication for channel & timing operation.
- Multiple units can be cascaded to obtain more channels.
- Program & process value retention incase of power failure.
- External contacts for timing initiation & timing pause.

Ordering Information

* OLP=On line programming

Model	Function	Output	Source Voltage	Time Range
ST-10	Sequential switching with OLP Relay Output	Relay	110V AC 240V AC	0.1 sec to 99 hrs 59 mins
ST-10M1	Sequential switching without OLP Relay Output	Relay	110V AC 240V AC	0.1 sec to 99 hrs 59 mins
ST-6M1	6-channel Sequential switching without OLP Relay Output	Relay	110V AC 240V AC	0.1 sec to 99 hrs 59 mins
ST-10M2	Sequential switching without OLP Triac Output	Triac	110V AC 240V AC	0.01 sec to 99 hrs 59 mins

Special Features

HOLD: When the slide switch on the front panel is kept in the hold position, the Timing data is retained in case of power failure. Upon resumption of power the timing continues from the point where it has stopped.

RESTART: When the slide switch is kept in the restart position, the timer resets in case of power failure and starts from beginning upon power resumption.

EXTERNAL START: By shorting terminals S1 and S2 for minimum period of 120 milliseconds (potential free shorting) or by keeping S1 and S2 permanently shorted, the timer sequence is initiated.

SINGLE CYCLE OPERATION: By keeping the terminals C1 and C2 shorted (potential Free) on the front panel, the sequential switching of output is executed for one Cycle and stops.

CYCLIC OPERATION: By keeping the terminals C1 and C2 on the front panel open, the Sequential switching of outputs keeps repeating after the end of each cycle.

INHIBIT: By shorting terminals I1 and I2 (potential free) on the front panel, status of relays/triac output (ON or OFF) is maintained irrespective of the program timing. By removing the short, the programmed timing continues and relay / triac respond as per the preprogrammed timings.

CYCLE COMPLETE OUTPUT: This feature namely an opto coupled output signal from terminals O1 and O2 is available at the end of one switching sequence. This signal is intended for cascading one or more units to increase the number of output channels.

ONLINE PROGRAMMING: This facility is provided only in model ST10 wherein it permits the user to change the program online by setting the switches in "PROG" position making the required changes in timing and implementing the same, for the cycle in progress.

Specifications

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Operating Voltage Range	- 15% to + 10% of rated voltage
Rated frequency	50 Hz $\pm$ 5%
Power consumption	15V A / 3W ac approx.
Number of channels	10 (RLYO –RLY9) 10(OP0 – OP9) for ST-10M2 6 (RLYO –RLY5) for ST-6M1
ON / OFF time range	0.1 sec to 99hrs 59mins. For each channel 0.01 secs to 99hrs 59mins. In ST 10 M2
Control output	NO relay contacts rated for 10A@ 250V AC/28V DC Resistive for ST 10 M1, ST 6M1 For ST-10M2 10 triac output (OP0 - OP9) rated 500mA @ 250V AC resistive
Setting Accuracy	$\pm$ 0.1% max w.r.t setting $\pm$ 50msecs. $\pm$ 0.2% max w.r.t setting $\pm$ 20msecs for ST-10M2
Repeat Accuracy	$\pm$ 0.05% max$\pm$ 50msecs. $\pm$ 0.3% max.$\pm$ 20msecs for ST-10M2
Recovery Time	2 secs min
Variation due to voltage change	$\pm$1% max $\pm$ 50msecs.
Variation due to temp. change	$\pm$2% max $\pm$ 50msecs.
Variation due to freq. change	$\pm$1% max $\pm$ 50msecs.
Ambient Temperature	Operating: - 10° C to + 55° C Storage : - 25° C to + 80° C
Humidity	Max. 85% RH @ 40° C
Electrical Life	10^5 Operations min. with full load
Rated frequency of operation	1800 $\pm$ 5% operations per hour max.
Insulation resistance	>100M ohms @ 500 VDC
Connections	Screw type terminals with self lifting clamps
Dimensions	200 x 130 x 45 mm [W x H x D]

Operating Instructions

Caution

- Potential free contacts should be used to short terminals C1 & C2 ,I1 & I2, S1&S2.Applying power to these points will damage the timer permanently.

- When more than one unit is used in cascade, output O1 & O2 should be connected to S1 & S2 respectively of next timer.

- Do not connect O1& O2 to S1 & S2 of the same timer. Use C1 & C2 for cyclic or single cycle mode operation.

- Programming is not possible if terminals I1 & I2 are shorted.

- Apply Rated voltage to the timer to avoid permanent damage

## F r o n t   P a n e l
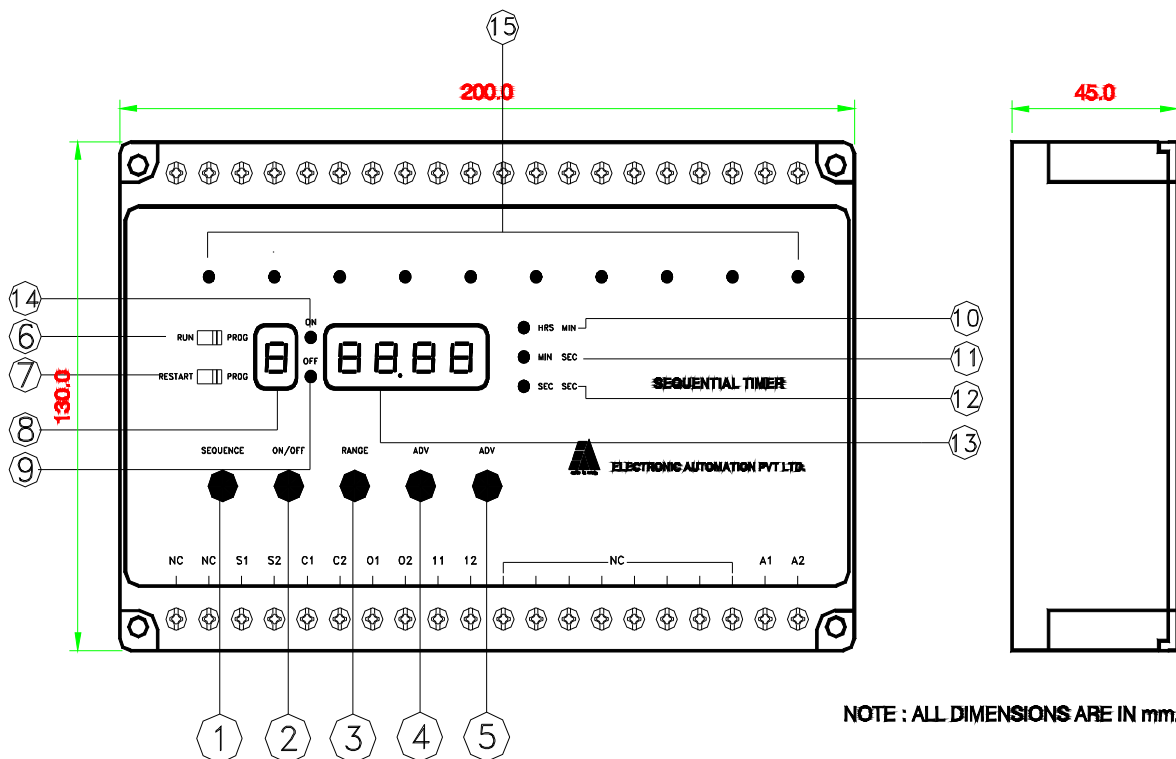
NOTE : ALL DIMENSIONS ARE IN mm.

1   SEQUENCE
This button is used to select the required output / channel to program the timing.

2   ON / OFF

This button is used to select the ON time and OFF time for particular output / channel

3   RANGE
This button is used to select the desired time range (SEC/SEC, MIN/SEC, and HRS/MIN)

4, 5   ADV
This buttons is used to increment the time range digits

6   PROG/RUN
This switch is used to select the mode of operation (for programming PROG mode& for running timer RUN mode)

7   RESTART/HOLD
This switch is used to select the RESTART or HOLD mode.

8   DISPLAY
It displays the relay number which is in function.

9, 14   INDICATOR
It is the indicator for ON time and OFF time.

10, 11 & 12 INDICATORS
It indicates the different time combinations

13   DISPLAYS
It displays the time combination.

15   INDICATORS
It indicates the relay on function.

Terminal Details

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A1, A2	: Power
S1, S2	: External Start
C1, C2	: Single Cycle or Cyclic operation selection terminal (SHORT single cycle, OPEN for Cyclic operation)
O1, O2	: Output for cascade mode operation
I1, I2	: Inhibit terminals
RLY0 TO RLY9	: Normally open relay contacts (for ST10, ST10- M1)
RLY0 TO RLY5	: Normally open relays contacts (for ST6-M1)
OP0 TO OP9	: Triac outputs (for ST10-M2)
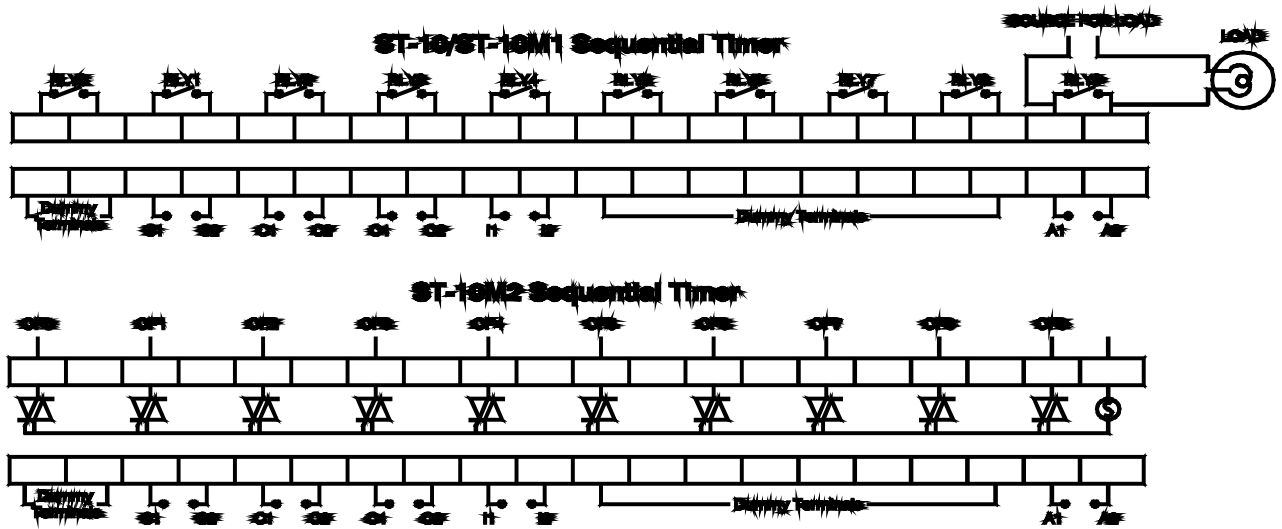
NOTE: In the above figure relay 9 is connected to the load, similarly other relays can be connected to load.
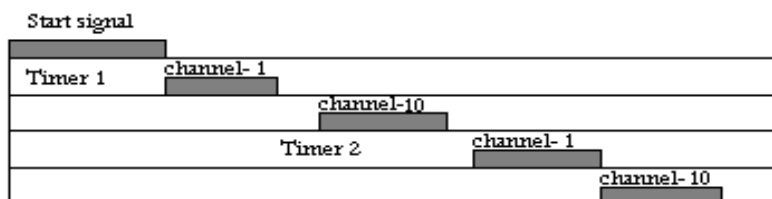
Timing Diagram

a) Single Cycle Mode ($C_1 - C_2$ Shorted)
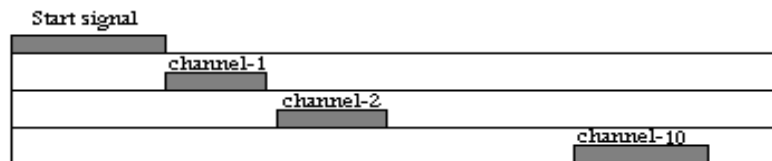
b) Cyclic Mode($C_1 - C_2$ Open)
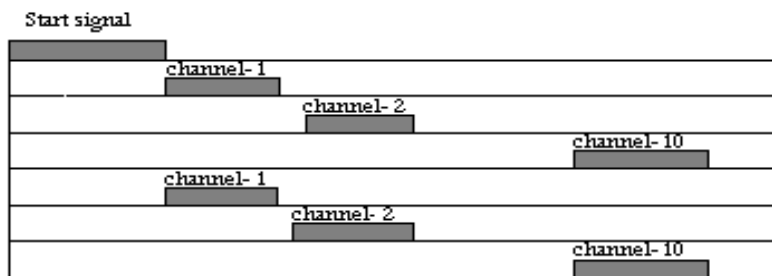
c) Cascade Mode

Programming the Timer

- Keep the PROG/RUN slide switch in the "PROG" position.
- Apply rated voltage across A1 and A2.
- By using the "SEQUENCE" button, select the required output, to program the timer.
- By using the "ON / OFF" button, select the "ON "and "OFF" time for particular output.
- By using the "RANGE "button, select the desired time range (sec/sec or min/sec or hrs/min) as per requirement.
- Set the required time by using "ADV" button.
- After programming the timer, keep the "RUN/PROG" slide switch in "RUN" position and the unit is ready for operation.

Initiating a Sequence

- By shorting the S1 and S2 terminals on the front panel for a minimum period of 150 milliseconds, the timing is initiated.
- The sequence starts with closure of "RLY0/OP1"as the case may be.
- S1 and S2 can be kept permanently shorted to start the sequence when in HOLD mode.
- In case of restart mode start signal is required every time a sequence has to be initiated.

Timer Cascading

- Short C1 and C2 of all the timers to be cascaded.
- Connect O1 and O2 of the first timer to S1 and S2 respectively of the second timer and so on. (O1S1 – O2S2 and so on….)