

<b>Supply Characteristic:</b>		
Supply Voltage (V)	110 to 240 VAC	
Supply Variation	-20% to +10% (of V)	
Power Consumption (Max.)	6 VA	
Operating Frequency	50/60 Hz	
Battery Backup	Approx. 6 years running reserve	
LED Indication	Red LED for Relay Status	
<b>Settings:</b>		
Day	Annual clock with calendar up to 31.12.2099	
Hour	00-23	
Minute	00-59	
Clock Format	Either AM/PM (12 h) or 24 h Clock	
Reset	Programs and clock are reset to default	
Modes	Auto/manual switching option	
Programming	Based on: 1) Latitude/Longitude precision to the minute, with time zone 2) Option for both Sunrise/set & Twilight rise/set. 3) DST feature- 1 hour (with indication on the screen). 4) Weekly OFF. 5) Offset facility. 6) OFF Hours	
<b>Relay Output Characteristics:</b>		
Contact Arrangement	1 C/O (SPDT)	
Contact Rating	16 A (NO) and 5 A (NC) @ 240 VAC / 24 VDC	
Incandescent Lamps	1000 W	
Inductive Load (Cos φ = 0.6)	6 A @ 250 VAC	
Contact Material	AgSnO <sub>2</sub>	
Minimum Switching Load	40 mA at 24 VDC	
Mechanical Life	50 X 10 <sup>3</sup>	
Electrical Life	30,000 cycles @ rated load	
Minimum Switching Time	1 min	
Utilization Category AC-15	Ue Rated Voltage (V)	120 / 240
	Ie Rated Current (A)	3.0 / 1.5
Utilization Category DC-13	Ue Rated Voltage (V)	24 / 125 / 250
	Ie Rated Current (A)	2.0 / 0.22 / 0.1
<b>Others:</b>		
Clock Accuracy	+/- 1 s/day @ 25°C.	
LCD Display	3 Lines Text LCD	
Number of keys	6 keys with 1 recessed reset button	
Operating Temperature Range	-10°C to + 55°C	
Storage Temperature Range	-10°C to + 60°C	
Humidity (Non-Condensing)	95% Rh	
Maximum Operating Altitude	2000 m	
Pollution Degree	2	
Degree of Protection	IP-20 for Terminals; IP-40 for Enclosure	
Mounting	Base / Din Rail	
Enclosure	Flame Retardant UL-94V0	
Weight (Unpacked)	110 g max	
<b>EMI/EMC:</b>		
Harmonic Current Emissions	IEC 61000-3-2	Ed. 3.0 (2005-11) Class A
Voltage Flicker & Fluctuation	IEC 61000-3-3	Ed. 2.0 (2008-06) Class A
ESD	IEC 61000-4-2	Ed. 1.2 (2001-04) Level II
Radiated Susceptibility	IEC 61000-4-3	Ed. 3.0 (2006-02) Level III
Electrical Fast Transients	IEC 61000-4-4	Ed. 2.0 (2004-07) Level IV
Surge	IEC 61000-4-5	Ed. 2.0 (2005-11) Level IV
Conducted Susceptibility	IEC 61000-4-6	Ed. 2.2 (2006-05) Level III
Power Frequency Magnetic Field	IEC 61000-4-8	Ed. 1.1 (2001-03)
Voltage Dips and Interruption (AC)	IEC 61000-4-11	Ed. 2.0 (2004-03) Class B
Conducted Emission	CISPR 14-1	Ed. 5.0 (2005-11) Class B
Radiated Emission	CISPR 14-1	Ed. 5.0 (2005-11) Class B
<b>Safety:</b>		
Test Voltage between Input and Output	IEC 60947-5-1	Ed. 3.0 (2003-11) 2 kV
Impulse Voltage between Input and Output	IEC 60947-5-1	Ed. 3.0 (2003-11) Level IV
Single fault	IEC 61010-1	Ed. 2.0 (2001-02)
Insulation Resistance	UL 508	Ed. 17 (1999-01) > 2000 MΩ
Leakage Current	UL 508	Ed. 17 (1999-01) < 3.5 mA
<b>Environmental Testing:</b>		
Cold Heat	IEC 60068-2-1	Ed. 6.0 (2007-03)
Dry Heat	IEC 60068-2-2	Ed. 5.0 (2007-07)
Vibration	IEC 60068-2-6	Ed. 7.0 (2007-12) 5 g
Repetitive Shock	IEC 60068-2-27	Ed. 4.0 (2008-02) 40 g, 6 ms
Non-repetitive Shock	IEC 60068-2-27	Ed. 4.0 (2008-02) 30 g, 15 ms

## FAQ's (FREQUENTLY ASKED QUESTIONS):

**Q.1:**In the event of power failure, do I lose all settings in the device?

**A.1:**No, the battery has a power reserve of approx 6 years at operating temperature range. In the absence of mains supply, we can program the device as per the requirement. However, during power failure, the relay or LED will not operate but the relay status can be observed on the screen.

**Q.2:**What is Manual switching (override)? When do we use it?  
**A.2:**When it is desired to switch ON/OFF the output before the actual event i.e. (ON/OFF event), manual override can be used. Press the MAN key for 3 s to toggle between ON Auto & Auto mode when relay (output) is OFF and to toggle between Auto OFF or Auto mode when the output is ON.

### 0.3:What should I do to reset all settings and Clock?

**A.3:** Press the Reset (RST) key. All settings will set to default and the clock will be reset to 00:00 & the date will be set to 01/01/2000.

**Q.4:**How should I change clock format from 12 h to 24 h?

**A.4:** Press '⌂' & 'MAN' key to switch from 12 h to 24 h clock format and vice versa.

**Q.5:**How does ON AUTO and AUTO OFF feature help?

**A.5:** ON AUTO / AUTO OFF feature is used to immediately switch the output ON / OFF respectively, overriding the current output condition. If the output ON time is 6:15 p.m. & we want to switch ON the output earlier, at 5:30 p.m. then set the mode as 'ON Auto'. The output will be switched ON immediately. The mode will automatically change to 'Auto' at 6:15 p.m. which is the next auto event. Similarly the output can be switched OFF earlier than the output OFF time using the Auto OFF feature.

**Q.6:** I want to switch OFF the output of Astro for a particular time interval without affecting the main program. Which feature should I use?

**A.6:** You can use 'OFF-Hours' feature to switch OFF the output for a particular time period. To set OFF Hour feature, select 'OTH' menu and then select 'OEHR'

**Q.7:**How can I switch the output 'ON' 30 min after sunset?

**A.7:** Use the Offset feature to change the ON time or OFF time of the output. To set offset, select 'OUT' menu and then select 'OFFSR' to set offset for rise & 'OFFSS' to set offset for set. To switch ON the output 30 min after sunset, set 'OFFSS' as 'POS' (positive) and enter the time as 30 min.

**Q.8:**I'm using Astro for my company's street lights and I want these lights to be switched OFF from Saturday evening to Monday morning. Which feature should I use?

**A.8:**You can use the Weekly-OFF feature for this purpose. To use this feature, select 'OTH' menu and then select 'WOFF'. Then select 'SA' as the start day. Enter the start time in hours and minutes. Similarly, enter 'MO' as the end day and time in hours and minutes. If you have selected same day & time for start as well as end, then 'WOFF' is not applicable.

**NOTE:**

1. If DST is applicable in your region, first set the DST and then set the clock.
2. Due to properties of some lamps, it might take a few minutes for the lamps to illuminate completely even after the output has been switched ON.
3. Product innovation being a continuous process, we reserve the right to alter specifications without prior notice.

**CAUTION:**

1. Always follow instructions stated in this manual.
2. Before installation ensure that the specifications agree with the intended application.
3. Installation should be done by skilled electrician only.
4. Inductive loads should be equipped with interference suppressors like varistors, RC snubbers.
5. Use of contactors is recommended if load exceeds the contact rating.

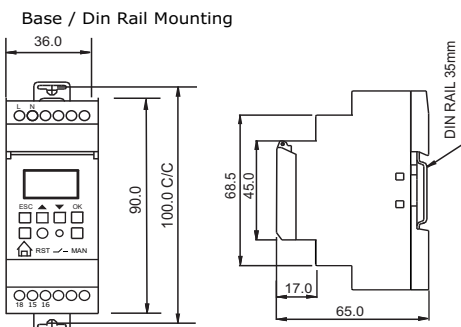
## ASTRONOMICAL TIME SWITCH

*Astro<sup>TM</sup> Mini*

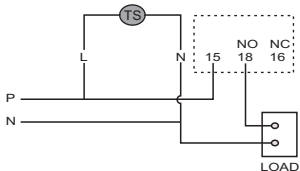
**Cat. No. : T2DDT7  
T2DDT8**





### OVERALL DIMENSIONS:



**CONNECTION DIAGRAM:**



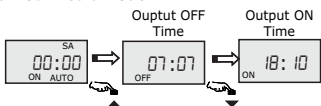
### TERMINAL DETAILS :

 ø3.5 mm	0.54 N.m (5 Lb.in) Terminal screw - M2.5
	1 x 0.2....3.3 mm <sup>2</sup> Solid Wire
AWG	1 x 24 to 12


Use Copper Conductors Only. 60/75° C.

### Viewing the Output ON & OFF Time for the Day

To view OFF & ON time for the day, press '▲' & '▼' respectively. This is possible only when the device is in run mode & not in edit mode.



### Setting AM/PM (12 Hour) or 24 Hour Display

To change the time format from 12 h to 24 h & vice versa, press '' & 'MAN' keys simultaneously.

### CITY CODE CHART\*

To view the city code chart number, press 'ESC' key 4 times.  
In case the city code chart is lost or misplaced, order the city code chart by sending an email to:  
**marketing@gicindia.com** or **sales@gicindia.com** or  
download it from: **www.gicindia.com**

## BASIC FEATURES:

### Trigger Modes:

The output can be programmed to switch OFF/ON either at sunrise/sunset or at twilight rise/set. If the trigger mode 'Twilight' in the 'OUT' menu is set as 'Yes', then the output will be switched OFF/ON at twilight rise/twilight set. If it is set as 'No', then the output will be switched OFF/ON at Sunrise/Sunset.

### Offset:

Offset is used to switch ON the output before or after the sunset or switch OFF the output before or after sunrise. This can be achieved through the 'oFSr' (Offset Rise) and 'oFSS' (Offset Set) parameters in the OUT menu. The range for the Offset is +/- 00 to 99 minutes.

### OFF-Hours:

The OFF-Hours feature is used to switch OFF the output for a particular time period on a daily basis.

For e.g. If the Off Hours programmed are from 23:00 to 02:00, then the output will be switched OFF for these 3 hours everyday.

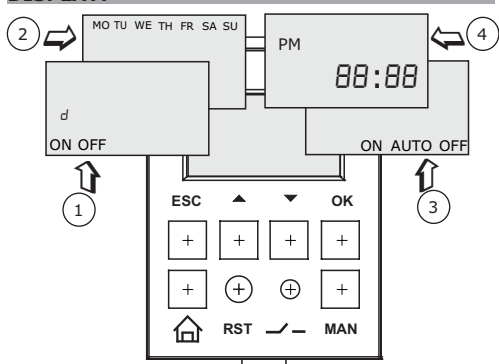
### Weekly OFF:

The Weekly Off feature is used to switch OFF the output during Weekend's or Weekly Off days. This feature allows to define the Weekly OFF days including the start and end time.

### Day-light Saving Time (DST):

ASTRO provides settings to easily define the DST start and end period and DST offset time to effectively manage the shifting of clock, year after year without any manual intervention.

## DISPLAY:



- 1 : Relay Status Indication
- d : DST Enabled;
- 2 : Day of week display
- 3 : Mode
- 4 : Hours/minute indication (HH:MM)

## KEYPAD:

- ESC : Previous Menu / Undo Change
- ▲ : Menu scroll up / Increase parameter value / View Output OFF time in Standby mode
- ▼ : Menu scroll down / Decrease parameter value / View Output ON time in Standby mode
- OK : To enter the programming mode, select a particular parameter to edit and apply the changes.
- 🏠 : Exit the programming mode or 12/24 hour clock mode selection
- RST : Reset Key to Reset programs or settings to the default
- : Relay 'ON/OFF' LED indication.
- MAN : Manual Override Key

## MODE DESCRIPTION:

1. **AUTO:** As per set program.
2. **ON AUTO:** Manual ON up to next auto event.
3. **AUTO OFF:** Manual OFF up to next auto event.

To change the mode from 'Auto' to other mode, press 'M' key for 3 seconds & vice-versa. The Auto option at the bottom of the screen will change to 'ON Auto' or 'Auto OFF' depending on the output status.

## MENU:

Following are the four Main Menus & listed below them are the Sub-menus: To Enter in Menu, press OK key & to scroll within menu, press '▲' & '▼'.

- i. **LOC (Location):**
  - a. Code\*
  - b. Lat
  - c. Long
  - d. GMT
- ii. **DTTM (Date - Time):**
  - a. DST
  - b. Date
  - c. Time
- iii. **OUT (Output):**
  - a. TWLT (Twilight Mode)
  - b. OFSR (Rise Offset)
  - c. OFSS (Set Offset)
- iv. **OTH (Other Features):**
  - A. OFHR (Off Hours)
  - B. WOFF (Weekly Off)

## PROGRAMMING PROCEDURE:

### Important:

If DST is applicable at the place of installation of the product, then first enable the DST by selecting 'Yes' option for DST in the 'Clock' menu and then set the DST period.

- 1) Press 'OK' key to enter the Main Menu. Use '▲' & '▼' keys to make selection between 'LOC', 'DT:TM', 'OUT' & 'OTH' and again press OK to select a particular option.
- 2) At the time of dispatch the clock has been set to GMT. So to set the clock to the local time, just change the time zone (GMT) in the 'LOC' menu to the local time zone. For e.g. If you are installing the product in India then just change the GMT to '+5:30'. The clock will be automatically set to the local time.

This feature will not work if the product is reset by pressing the reset key. In such a case the user will have to manually set the clock.

- 3) To set the clock, select 'DT:TM' from the main menu by pressing 'OK' key. Now use '▲' & '▼' to make selection between 'DST', 'Time' & 'Date'. Use 'OK' key for selection & '▲', '▼' keys to change parameter value and again press OK to confirm the changes.

- 4) Set the Latitude & Longitude as per the place of installation. To set these parameters, select 'LOC' from the main menu. Use '▲' & '▼' keys to make selection between North & South for latitude and East or West for Longitude. Set the values by using '▲' & '▼' keys and then press OK key to confirm the values.

- 5) To set Trigger mode & Offset, select 'OUT' from the main menu using 'OK' key and then use '▲' & '▼' keys to select between 'Twilight', 'Rise offset' & 'Set offset'. Use 'OK' key for selection & again '▲', '▼' keys to change parameter value.

- 6) To set other parameters like Weekly OFF & OFF Hours, select 'OTH' menu using 'OK' key.

## KEYPAD LOCK:

To lock the keypad, press the '🏠' and the 'MAN' key simultaneously for 3 seconds.

'bLoC' will appear on the screen indicating that the keypad has been locked.

When the keypad is locked none of the parameters can be edited, only the mode can be changed from 'Auto' to 'ON Auto' and 'Auto OFF'.

To unlock the keypad, repeat the same procedure.

The keypad can be locked only in Run mode and not in Edit mode

## SETTING THE ASTRONOMICAL PARAMETERS (EXAMPLE: NORTH BROOK)

Date: 1 January 2010; Time: 11:30 A.M.  
Latitude: N 42° 08'; Longitude: W 87° 50'  
Time Zone: (GMT - 6:00)

DST: Start - 3rd Sunday to March  
End - 2nd Sunday to November

