Supply Characteristics:		
Supply Voltage (⏚)		110 to 240 VAC
Supply Variation		-20% to +10% (of ⏚)
Power Consumption (Max.)		6 VA
Operating Frequency		50/60 Hz
Battery Backup		Approx. 6 years running reserve
LED Indication		Red LED for Relay Status
Settings:		
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
Relay Output Characteristics:		
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 ø = 0.6)		6 A @ 250 VAC
Contact Material		$AgSnO_2$
Minimum Switching Load		40 mA at 24 VDC
Mechanical Life		50 X 10^3
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
Others:		
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
EMI/EMC:		
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
Safety:		
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
Environmental Testing:		
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.

Q.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 'OFHR'.

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 'OFSR' to set offset for rise & 'OFSS' to set offset for set. To switch ON the output 30 min after sunset, set 'OFSS' 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 supressors like varistors, RC snubbers.
5. Use of contactors is recommended if load exceeds the contact rating.

ASTRONOMICAL TIME SWITCH

Astro™ Mini

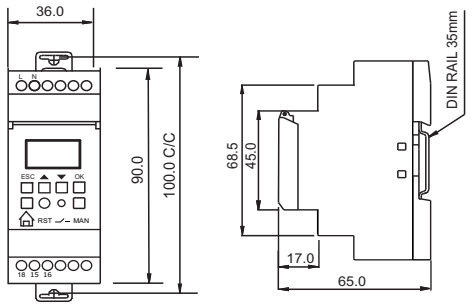
CE

Cat. No. : T2DDT7
T2DDT8

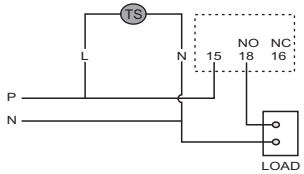
RoHS ☑

OVERALL DIMENSIONS:

Base / Din Rail Mounting



CONNECTION DIAGRAM:



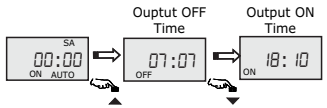
TERMINAL DETAILS :

Ø3.5 mm	0.54 N.m (5 Lb.in) Terminal screw - M2.5
	1 x 0.2....3.3 mm^2 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.

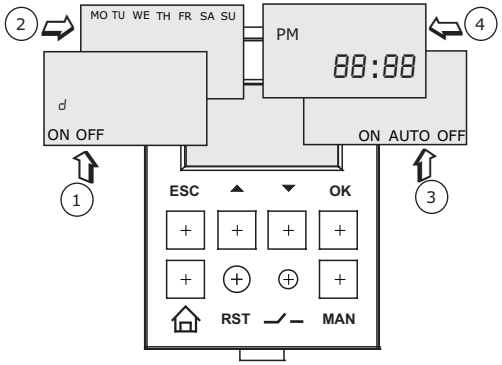
Offset:
Offset is used to switch ON the output before or after the sunset or switch OFF the output before or after sunrise. This can be achieved through the 'oFSr' (Offset Rise) and 'oFSS' (Offset Set) parameters in the OUT menu. The range for the Offset is +/- 00 to 99 minutes.

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 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 **OR**
To lock / unlock keypad alongwith ⌂ key

▲ : Menu scroll up / Increase parameter value **OR**
To view output OFF time in Standby mode

▼ : Menu scroll down / Decrease parameter value **OR**
To 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 alongwith MAN key

RST : Reset Key to Reset programs or settings to the default

⎍ : Relay 'ON/OFF' LED indication.

MAN : Manual Override Key **OR**
12/24 clock mode selection alongwith ⌂ 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 modes & vice-versa, press 'MAN' key for 3 seconds.
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 wok if the product is reset by pressing the reset key. In such a case the user will have to manually set the clock as well as GMT.

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.

Note:
1) If user edits the clock within DST end ambiguous period (2:00AM to 2:59AM), on DST end day, say at 2:30AM, DST will become OFF immediately.
2) In case, when user goes ahead from Non-DST to DST period by changing Date; clock is moved one hour ahead (DST offset -1 hour).
Similarly, clock is moved come back by 1 hour when user come back form DST to Non-DST period by changing Date.

KEYPAD LOCK:

To lock the keypad, press the '⌂' and the 'ESC' 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'.

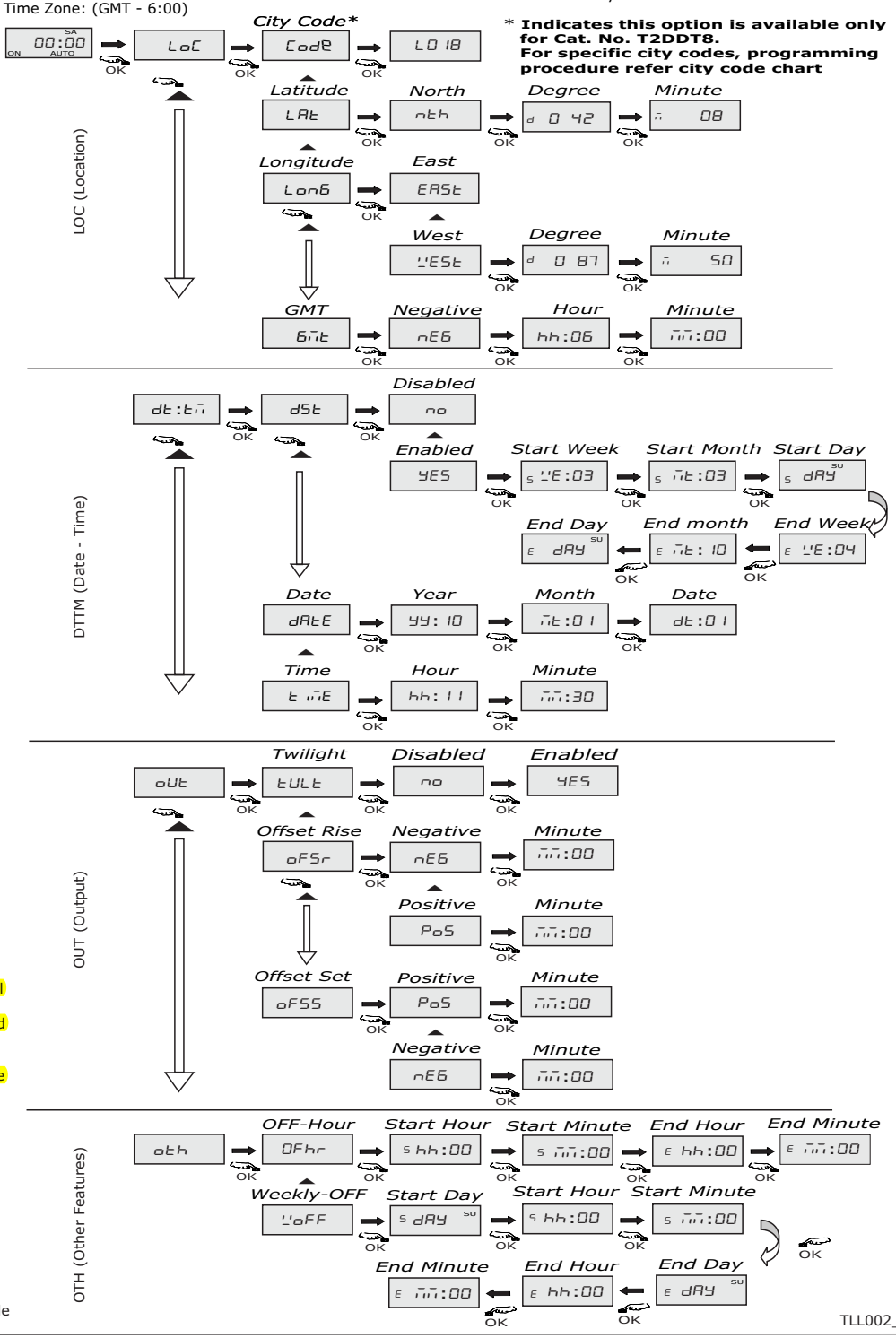
To unlock the keypad, repeat the same procedure.

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 of March
End - 4th Sunday of October



* **Indicates this option is available only for Cat. No. T2DDT8. For specific city codes, programming procedure refer city code chart**

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