

TORK MODEL DTS400A / DZS400A

4 CHANNEL DIGITAL TIME SWITCH

INSTALLATION & OPERATION

CAPABILITIES

365 Day Advance Single Holiday and Seasonal Scheduling.

ON and OFF (signal or pulse) set points.

Combined total for all channels - 99 per week

Minimum setting - 1 minute

Capable of different schedules each day of the week.

Astronomic Option (**DZS400A only**). For Automatic ON at sunset, OFF at sunrise of outdoor lighting.

FEATURES

Holidays	1 to 24 individual dates.
Seasons	1 to 4 with different daily schedules which wrap around into the new year.
Signal Durations	1 to 99 seconds. (2 different durations per channel)
Daylight Saving	Automatic adjustment (can be omitted).
Leap Year	Automatic compensation.
Display	LCD
Manual Override	Until the next regularly scheduled ON or OFF. Automatic operation then resumes.
Clock Format	AM/PM only (although 24HR may flash, it is not available at present).
Power Outage	Permanent schedule retention for up to 40 years. Snap-in lithium battery maintains real time.
Operating Temperature	4° to 140°F (-20° to 60° C).

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INSTRUCTIONS FOR INSTALLATION

1. Remove unit from enclosure by pushing the inside tab (located near the outside hasp) to the right. Swing unit to left and remove.
2. Five combination 1/2" and 3/4" knockouts are provided on this enclosure. Remove the 1/2" (inner) knockout by inserting a screwdriver in the slot provided and pound screwdriver handle with a hammer. Remove knock-out with pliers and smooth hole edges with file or knife if necessary. When the 3/4" outer knockout is required, place screwdriver in groove and pound screwdriver handle with hammer. Remove loose knock-out with pliers and smooth hole edges with file or knife if necessary.

Disconnect power at main panel prior to installing or servicing this time switch or the equipment connected to it.

Connect in accordance with national and local electrical codes.

Installation by a licensed electrical contractor is recommended.

3. When attaching conduit to enclosure, exercise care to align and support conduit in order to prevent unnecessary stress on enclosure.
4. Install 9V lithium battery supplied with the unit. *Note:* Unit should be connected to AC power within 24 hours of battery installation in order to prolong battery life which has 30 day cumulative backup for real time and 7-10 year shelf life. **REPLACE WITH ANOTHER 9V NON-RECHARGEABLE BATTERY ONLY.**
5. Reinstall unit by reversing step 1 above and connect wires according to wiring diagram on inside case label.

GROUNDING

National Electrical Code requires that grounding must be continuous and in proper electrical contact in all grounding conductors, metallic conduits and grounding terminals. When using metal conduits, install the proper size approved grounding bushings. The minimum size copper grounding conductors must be #10 AWG if the circuit breaker or fuse is 30 or 40 amp, #12AWG if 20 amps, and #14 AWG if 15 amp.

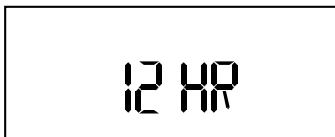
NOTE: Do not use top entry for wiring.

WE SUGGEST YOU MAKE COPIES OF THE SCHEDULE SHEETS LOCATED IN BACK OF THIS BOOKLET AND COMPLETE THEM PRIOR TO SETTING THE UNIT.

INSTRUCTIONS FOR SETTING THE UNIT

Connect unit to main power source prior to entering the settings.

First time power up - display shows 12HR



Press **ENTER**.

Note: If screen shows 24HR, press hour key so that 12H appears instead. Then press **ENTER**. This unit will *not* accept 24 hour military format although it may appear on the screen.

After you press **ENTER** unit display shows



NOTE:

1. If 24HR format is entered in error, it can only be changed by clearing all memory. See note 4 on page 13.
2. Unit will not go to run mode unless it has clock and calendar information.
3. In any of the other setting modes, if no entry is made for 5 minutes, unit will go to run mode (time and day are displayed - colons are flashing).

1.0 TO SET THE CLOCK (Time of day and day of the week.)

Press **HOUR** to advance the time in hours to desired setting. Check AM/PM.

Press **MIN** to advance the time in minutes to desired setting.

Press **DAY** key to advance to today's day.

When present hour, minute and day are shown, press **ENTER**.

1.1 TO MODIFY THE CLOCK

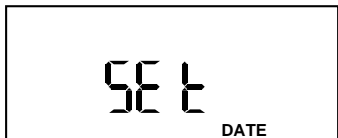
(If the unit was already running the program, then unit will show the day of the week, hours, minutes).

Press **MODE** key. Display shows current time and day with colon *NOT* flashing and CLK symbol at the bottom.

Use **HOUR**, **MIN**, and **DAY** key to modify or alter the information. You must press **ENTER** to make the changes effective.

2.0 TO SET DATE

If you are setting for the first time, display will show



Press **MONTH** key. Display will show 010194

Advance month to desired setting.

Press **DATE** key to advance date.

Press **YEAR** key to advance to correct year.

When desired MONTH, DAY and YEAR are on the display, press **ENTER**.

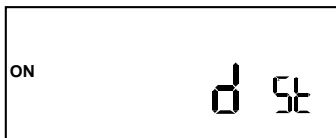
2.1 TO MODIFY OR CHANGE DATE

Press **MODE** key until display shows DATE. Use **MONTH**, **DATE** and **YEAR** key to modify MONTH, DATE, YEAR. Press **ENTER**.

3.0 DAYLIGHT SAVING TIME

This unit is already set for automatic DAYLIGHT SAVING adjustment. If this is desired, you can proceed to section 4.0 by pressing mode key.

Display will show



To eliminate daylight saving adjustment, press **ON/OFF** key.

Display should show



Press **ENTER**. Daylight saving correction is deleted or turned off.

4.0 SEASON DURATION SET

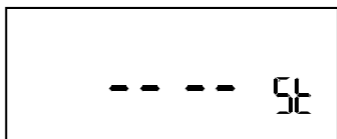
You can set up to four different seasons. If this is *NOT* needed, you can proceed to section 5.0 by pressing mode key.

Season durations are set by starting MONTH/DATE and ending MONTH/DATE:

NOTE:

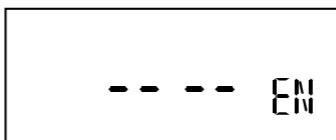
1. Each season can be set for up to 364 days.
2. Any season can cross the year boundary, i.e., season can start in the current year and end in the next year.
3. When any two or more seasons overlap, the higher numbered season has priority.

Press **MODE** key till display shows



Unit is ready to be programmed for starting MONTH and DATE for season 1.

Press **MONTH** and **DATE** keys to set MONTH and DATE for starting of season 1. Press **ENTER**. Display now shows



Use MONTH and DATE key to set ending MONTH and DATE for season 1. Press **ENTER**.

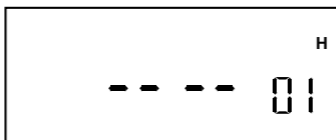
Set the start and end for other 3 seasons if desired.

To delete an entry, press **DELETE** key.

NOTE: If for any reason you set starting MONTH and DATE and forget to set ending MONTH and DATE, that season becomes invalid. Unit will erase the starting date.

5.0 SET INDIVIDUAL HOLIDAY DATES

Press **MODE** key until display shows



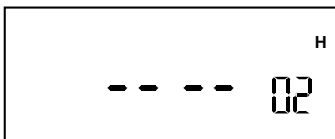
NOTE:

A total of 24 individual holiday dates can be set. Each holiday is set by MONTH and DATE. The same schedule will repeat on every holiday date.

Press **MONTH** key to advance to desired month.

Press **DATE** key to advance to desired date.

Press **ENTER**. Now display shows



This means unit is ready to accept 2nd holiday date.

Use same procedure to set more holidays.

To delete a holiday date press the **DLETE** key.

Press **ENTER**.

6.0 TO SET SIGNAL DURATIONS FOR EACH CHANNEL

If you do not require any signal settings proceed to section 7.0 by pressing mode key.

Press **MODE** key till display shows



This means unit is ready to accept signal duration (in SEC). for CH1, SIG1. (SIG1 or SIG2 can be set from 1 sec. to 99 sec.).

If you do not want CH1 as a signal timer, then select channel 2, 3, or 4 by pressing **SELCT** key. Or, you can set all channels for signal durations.

After selecting proper channel, press **SIG/SEC** key to set signal 1 duration to desired number of seconds. Press **ENTER**.

Now display automatically advances to SIG2. If you are not using SIG2, then leave 00 SEC. Press **ENTER**.

NOTE:

If you do not set SIG2 duration (leaving it 00 SEC), then make sure you never assign SIG2 in the scheduling as it will act as a constant "ON" event for that channel.

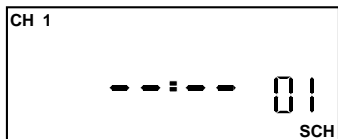
Use same procedure to set signal durations for the other channels if desired.

NOTE:

Each channel can have two independent durations.

7.0 SCHEDULE SET MODE

Press **MODE** key till display shows



In the SCHEDULE mode, the following information is set:

1. CHANNEL selection (CH1, CH2, CH3, CH4)
2. TIME: HOUR and MIN.
3. EVENT: ON or OFF (SIG1 or SIG2 for signal channel.)
4. DAY: DAY or DAYS combination.
5. HOLIDAY
6. SEASON: Use **SEASON** key to advance or **SELCT** to select SEASON in which this particular TIME, EVENT and DAYS combination is to occur.

NOTE: Duration for each season should have been already established.

Now you are ready to begin setting the schedules. There are a total of 99 ON/OFF events.

7.1 CHANNEL SELECTION

Press **SELECT** key to choose channel 1, 2, 3, or 4. When desired channel flashes, begin setting hours and minutes.

7.2 SETTING HOURS AND MINUTES

Press **HOUR** and **MIN** keys to desired setting.

- a. If channel selected is being used for time ON or time OFF, press **ON/OFF** key to desired setting.
or
- b. If channel selected is being used as a signal timer (you must have already set the signal durations) press **SIG/SEC** key to set for signal 1 or signal 2.

7.3 SETTING DAYS, HOLIDAY, SEASONS

MO (Monday) is flashing - If Monday is desired, press **SELECT** key. If Monday is *not* desired, press **DAY** key to pass Monday and advance to Tuesday.

- a. Press **SELECT** key to select the flashing day, holiday, or season.
- b. Press **DAY** key to pass the flashing day and advance to other days, holiday, and seasons.

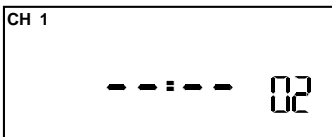
The same schedule will repeat on every holiday date.

Each season can have a different daily schedule.

NOTE: **SELECT** key can also be used to *delete* a day, holiday, or season *previously selected* when the aforementioned is flashing.

When you have desired time, event, steady days and season, press **ENTER**. This completes the first schedule entry.

Now display shows that SCH 02 appears on the display.



This means unit is ready to accept 2nd schedule entry.

Use same procedure to set more SCHEDULES for channel 1.

When you are finished setting schedules for channel 1, press **SELECT** key at the next blank schedule screen and CH2 will flash. You can now begin setting schedules for channel 2, followed by channels 3 and 4.

8.0 TO SET ASTRONOMIC SCHEDULE (Model DZS400A only) .

IF YOU ARE SETTING MODEL DTS400A, SKIP TO SECTION 9.0.

Press **MODE** key until display shows



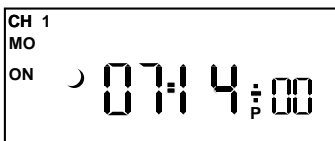
Press **SELECT** key to choose channel 1, channel 2, channel 3, or channel 4.

By default, latitude north 10° will appear on the display.

The latitude of your location can be set in this mode.

Press **LAT** key to advance to the desired # from 10° to 60° north or 10° to 60° south. Press **ENTER**. (Unit can not be used for latitudes greater than 60°).

Now display shows



8.1 SELECTING ASTRO DAYS/SEASON(S) (Model DZS400A only)

NOTE: Entering your latitude does not assign the astronomic function. You must enter DAYS/SEASONS while in the astro mode in order to enable this function.

Select the day(s) and/or season(s) in which you want the indicated channel to turn ON at sunset. This is done in the same way as section 7.3 "a." and 7.3 "b." using **DAY** key and **SELCT** key.

If you want the load to come on after or before sunset, you use the **OFFSET** key. A \div sign before the last 2 digits means the load comes ON that many minutes **after** sunset. A $-$ sign means the load comes ON that many minutes **before** sunset.

Once desired DAYS/SEASON and OFFSET is set
press **ENTER**.

Now display shows SUNRISE time along with all days and seasons displayed.



ALL DAYS TURN OFF AT SUNRISE whether or not those days were astro selected.

In this mode you can only set OFFSET for sunrise. If you want the load to turn OFF before or after sunrise, you use the **OFFSET** key. A \div sign before the last 2 digits means the load turns OFF that many minutes after sunrise. A $-$ sign means the load turns OFF that many minutes before sunrise.

Unit displays CH and ASTRO along with LATITUDE.

If channel 2 is to be astronomic, press **SELCT** key to advance to CH2. Press **ENTER**. Repeat section 8.1. If the latitude was set in CH1, it will appear again and need *NOT* be changed. The same applies if you want channel 3 and/or 4 to be astronomic.

8.2 ASTRONOMIC ON, TIME OFF AND/OR TIME ON, ASTRONOMIC OFF

(Model DZS400A only)

Set astronomic ON/OFF per section 8.0 and 8.1

To set a time OFF during the night and/or a time ON before sunrise, proceed as follows:

Press **MODE** key until schedule 01 appears



Press **ENTER** key repeatedly until the next blank schedule screen appears. Use **SELCT** key to select Channel 1, 2, 3, or 4 (whichever one is to be set for time ON or OFF during the night). Repeat for other channels if required.

Set the hours, minutes, and days per sections 7.2 “a.” and 7.3. You can first set an OFF during the night and use the next blank schedule screen to set an ON before dawn.

9.0 REVIEW MODIFY AND DELETE

Use **MODE** key to advance to any of the following MODES:

1. **CLOCK MODE**: Use **HOUR**, **MIN**, and **DAY** keys to modify existing settings. Press **ENTER**.
2. **DATE MODE**: Use **MONTH**, **DATE**, and **YEAR** keys to modify existing settings. Press **ENTER**.
3. **DST** → Daylight Saving is automatic. You do not have to enter start and stop dates. Unit calculates 1st Sunday of April and last Sunday of October. You do not have to remember to change every year. To eliminate, press **ON/OFF** key to OFF. Press **ENTER**.

4. SEASON MODE: Seasons duration can be changed or deleted. Press **MONTH** and **DATE** keys or **DLETE** key. Press **ENTER** to confirm.
5. HOLIDAY MODE: Similar procedure as above can be used for the holidays. Press **ENTER**.
6. SIGNAL MODE: You can review previously entered information. Use **DLETE** key to delete or use SIG/SEC key to alter the duration. Press **ENTER** to confirm.

To eliminate a signal time or all signal times, you must eliminate those set points. By only setting SIG duration to 00, it will act as SIG2 ON and SIG1 OFF.

7. SCHEDULE MODE: Schedule review, modify, delete. You can modify the schedule entry using **HOUR, MIN, ON/OFF (SIG/SEC)** key and **SELCT** key. Press **ENTER** after each modification.

To delete, simply press the **DLETE** key when unwanted information is on display. This will blank the entry. Press **ENTER** to confirm. Do not leave the MODE without pressing **ENTER**.

8. ASTRO MODE: (Model DZS400A). Press **LAT** key to change latitude. Press **ENTER**. Press **DAY** key and **SELCT** key to add or delete days in the sunset mode. Press **OFFSET** key to change offset time for sunset or sunrise. Press **ENTER** after each.
9. RUN MODE: Time and day is displayed. If today is a programmed holiday, the **H** will be displayed steady. If today falls within a programmed season, that season # will be displayed.

10.0 OVERRIDE

OVR1, OVR2, OVR3, and OVR4 (override keys) are effective only in the **run mode**.

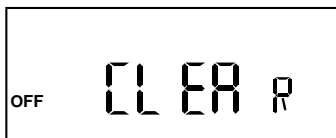
If a channel is scheduled for ON/OFF (non-signal timer), then that channel will change the present load

status until the next scheduled event. CH# will flash when the load is overridden from scheduled event.

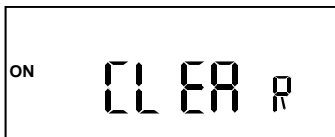
If the channel is a signal timer, then load will turn on each time the override key is pressed for the length of SIG1 duration. CH# will flash while the load is on. While the signal is in progress, it can be terminated by using override key.

NOTES:

1. Unit will go to RUN MODE automatically if no key is pressed for five minutes.
2. Units do not have look back feature. If you have just finished setting the unit and an output is to be presently ON, press the **OVR** key to turn it On. Unit will automatically pick up the regular schedule thereafter.
3. Units do not have stagger start.
4. Clear all memory. All memory can be cleared using the following procedure: while in the RUN mode, press **Enter** key, display shows:



Use ON/OFF key to display:



Now press ENTER briefly and everything in the timer memory is wiped off including real time and date.

Season			
#	Start Date	End Date	Description
1			
2			
3			
4			

Holiday (H)		
#	Date	Description
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

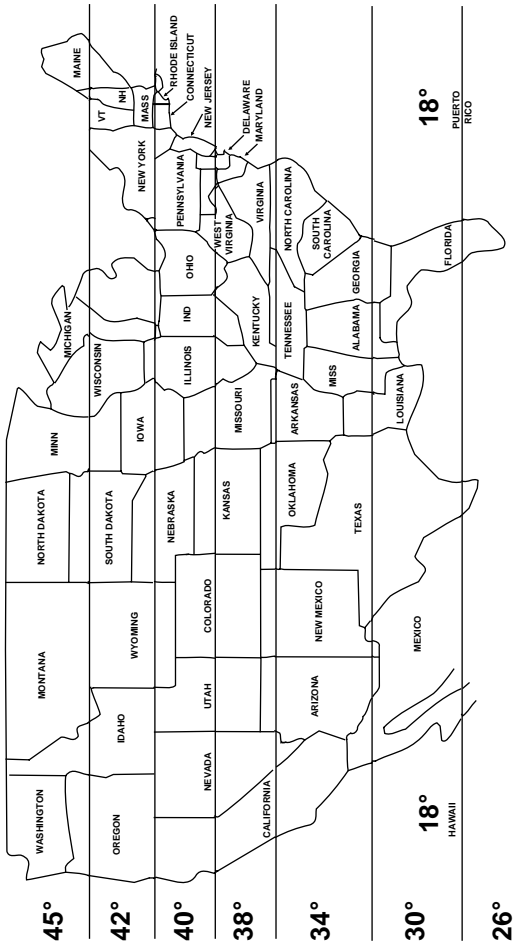
Signal Durations (seconds)		
	Sig. 1	Sig. 2
Channel 1		
Channel 2		
Channel 3		
Channel 4		

ASTRONOMIC SCHEDULE (Model DZS 400A Only)

Latitude _____										SEASON				Sunset	Sunrise
Sch. #	Ch. #	MO	TU	WE	TH	FR	SA	SU	H	1	2	3	4	Offset	Offset

TORK[®]

ASTRONOMIC LATITUDE ZONES



DTS400A / DZS400A PROGRAMMING GUIDE

MODE
KEY ↓

Screen	Description	SETTING KEYS
SET CLK	Set Clock	HOUR > MIN > DAY > ENTER
SET DATE	Set Date	MONTH > DATE > YEAR > ENTER
DST	Daylight Saving	ON OFF > ENTER
S1	Season 1 Begins	MONTH > DATE > ENTER
E1	Season 1 Ends	MONTH > DATE > ENTER
Seasons 2, 3, 4		
H	Holiday Dates	MONTH > DATE > ENTER
Holidays 2-24		
CH 1 SIG 1	Signal Durations	SIG/SEC > ENTER
Channel 1, Signal 2 through Channel 4, Signal 2		
SCH	Schedule Set	HOUR > MIN > SIG/SEC ON/OFF > DAY > SELCT > ENTER
All channels and Schedules		
LATEN (DZS400A only)	Astronomic Schedule	LAT > ENTER > DAY > SELCT > OFFSET
* DAY TIME	Run Mode	OVR CH1 > OVR CH2 > OVR CH3 > OVR CH4

*After initial settings are made, unit will remain in run mode until mode key is pressed.

TORK®

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