

TORK[®] nsi INDUSTRIES

INSTRUCTION MANUAL

DTS400B DZS400BP

DIGITAL TIME SWITCH

CLOCK OPERATED SWITCH



**TORK MODELS DTS400B/DZS400BP
4 CHANNEL DIGITAL TIME SWITCH**

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CAPABILITIES:

- 365 Day Advance, Single Day Holiday and Seasonal Scheduling
- ON and OFF (signal or pulse) set points:
 - Combined total for both channels - 99 per week
 - Minimum setting: 1 minute
- Capable of different schedules each day of the week
- Astronomic Option: (DZS400BP only) For Automatic ON at sunset, OFF at sunrise for outdoor lighting
- On-Board Copier: Copies program settings to another Memory Module without the need of an external programmer (DZS400BP only)

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 (can be adjusted).
Leap Year	Automatic compensation.
Display	LCD
Manual Override	Until the next scheduled ON or OFF. Automatic operation then resumes.
Clock Format	AM/PM or 24 Hour.
Look Back	Automatically executes the last command after power failure.
Power Outage	Permanent schedule retention for up to 40 years. Clock maintained for 4 days by supercapacitor (no battery needed).

INSTALLATION INSTRUCTIONS:

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 knockout with pliers and smooth hole edges with the file and knife if necessary. When the 3/4" outer knockout is required, place screwdriver in groove and pound screwdriver handle with hammer. Remove loose knockout 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. 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 amps, #12 AWG if 20 amps, and #14 AWG if 15 amps.

NOTE: Do not use top entry for wiring.

WE SUGGEST YOU MAKE COPIES OF THE SCHEDULE SHEETS LOCATED IN THE 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. When powering up the unit for the first time, allow 1-2 minutes to charge the supercap and the display will show 12 HOUR.



Press HOUR to change to 24 hour (military format) or press ENTER to set 12 hour (AM/PM format).

NOTES:

1. During the RUN mode, the Hour, Minutes, Seconds, Day of the week and flashing colons will be displayed.
2. The unit will not go into run mode unless the clock and date are set. In any other mode, if no entries are made for 5 minutes, the unit will automatically go to run mode.
3. Unit will display "PF" (Power Failure) in the absence of AC power. A minimum of 8 hours is required to fully charge the super cap.
4. When previously programmed unit comes back from a power failure, it will "look back" and update the schedule, executing the last scheduled event. If a signal setting was scheduled, after power failure the unit will execute the last scheduled signal. Settings can be manually updated by pressing the **EVENT** key in the run mode.

After pressing **ENTER** the unit will display:



NOTE: AFTER MAKING ANY CHANGES TO THE PROGRAM, PRESS **MODE** TO GO TO RUN MODE AND THEN PRESS **EVENT** TO UPDATE THE LOAD STATUS.

1.0 TO SET CLOCK

Press **HOUR** and **MIN** to advance to the present hour and mins. Check AM/PM, and press **ENTER**.

1.1 TO MODIFY CLOCK

Press **MODE** until the display shows: CLK. Press **HOUR** and **MIN.** to modify clock and press **ENTER**.

2.0 TO SET DATE

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



Press the **MONTH**, **DATE**, and **YEAR** keys to advance to the desired month, date and year, then press **ENTER**.

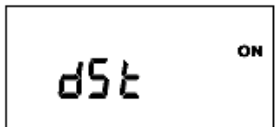
NOTE: The day of the week will be automatically set once the date is set.

2.1 TO MODIFY DATE

Press **MODE** until the display shows **DATE**. Press **MONTH**, **DATE** and **YEAR** to modify present settings and then press **ENTER**.

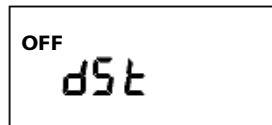
3.0 DAYLIGHT SAVINGS TIME

After setting or modifying the date, the display will show:



- For standard USA daylight savings (DST), press **MODE** and go to step 4.0.
- For dates other than standard USA dates, press **MONTH** and go to step 3.1.

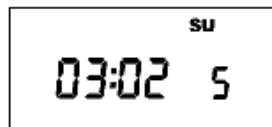
- If daylight savings time (DST) is NOT required, press **DEL** and the display will show:



Press **ENTER** then go to step 4.0.

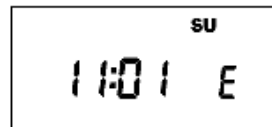
3.1 MODIFY STANDARD DAYLIGHT SAVINGS DATES

NOTE: The first two digits represent the month and the second set of digits represents the week in the month. Choices for the week are 01 (1st), 02 (2nd), 03 (3rd) or L (Last) week of the month. The default day is Sunday (SU). Once the modified date is set, the unit will automatically calculate the correct start dates in the future.



Now press the **MONTH** and **DATE** buttons to modify the starting DST settings. Pressing **DAY** changes the default day. EXAMPLE: A screen showing "04:01 SU S" represents April (04), the first week (01), Sunday (SU), and the Start (S) of daylight savings time.

Press **ENTER** to save and the display will show:



Now press the **MONTH** and **DATE** buttons to modify the ending DST settings. Pressing **DAY** changes the default day. EXAMPLE: A screen showing "10: L SU E" represents October (10), the Last week (L), Sunday (SU), and the End (E) of daylight savings time.

Press **ENTER** to save and the display will show the modified DST starting Date.

Press **MODE** twice to go to step 4.0.

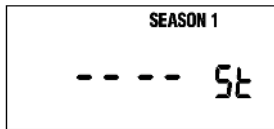
4.0 SEASON DURATION SET

Up to 4 different season durations can be set by entering the START and END dates.

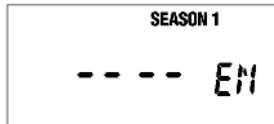
NOTE:

1. If season durations are not set, they will not appear on the schedule or astronomic mode.
2. Each season can be set up to 364 days.
3. Any season can cross the year boundary, i.e. the current year and end the next year.
4. When any two or more seasons overlap, the higher numbered season has priority.

Press **MODE** until display shows:



Press **MONTH** and **DATE** to set the entering period of season 1 and then press **ENTER**. The display will show:

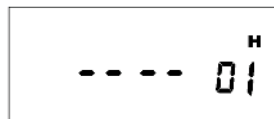


Press **MONTH** and **DATE** to set the ending period of season 1 and then press **ENTER**. Follow the above procedure to set all other 3 seasons, if desired. To delete any entry press **DEL** and **ENTER**.

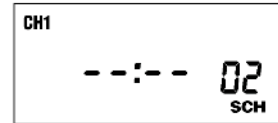
NOTE: For any season to be used, the starting MONTH and DATE and the ending MONTH and DATE must be preset.

5.0 SEASON DURATION SET

Press **MODE** until display shows:



Press **MONTH** and **DATE** to set holiday 1 then press **ENTER**. The display will show:



To delete any holiday press **DEL** then press **ENTER**.

NOTE:

- a. A total of 24 holidays can be set, all following the same schedule.
- b. For any holiday to be used, the **MONTH** and **DATE** must be preset.

6.0 TO SET SIGNAL DURATION FOR EACH CHANNEL

Press **MODE** until the display shows:



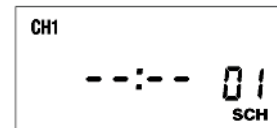
Press **SELCT** to select the desired channel. Press **EVENT/SEC** to set desired signal duration (1 to 99 seconds each), then press **ENTER**.

NOTE:

- a. Use the procedure above to set the signal duration for signal 2 or to set the signal duration for other channels if desired.
- b. Each channel can have two independent durations (sig 1 and sig 2).

7.0 SCHEDULE SET MODE

Press **MODE** until display shows:



Press **SELCT** to select the desired channel.

7.1 SETTING HOURS AND MINUTES

- Press **HOUR** and **MIN** to set desired time.
- Press **EVENT** to set desired event.

7.2 SETTING DAYS, HOLIDAY AND SEASONS

Press **SELCT** to select the flashing desired days, holiday and/or seasons, otherwise press **DAY** to skip and then press **ENTER**. To delete an entry, press **DAY** until previously selected entry flashes, press **SELCT** and then press **ENTER**. The display will show:



Follow the same procedures above to set more schedule entries for channel 1. At the next blank screen press **SELCT** to select the desired channel and proceed with the steps above to set more schedule entries.

8.0 TO SET ASTRONOMIC SCHEDULE (FOR DZS MODELS ONLY)

Press **MODE** until display shows:



Press **SELCT** to select channel 1 or 2. Press the **LAT** key to advance to the desired degree of latitude, from 0° to 60° north or 0° to 60° south. Press **ENTER**

8.1 SELECTING ASTRO DAYS

Press **SELCT** to select desired days, holiday and/or seasons in which you want the indicated channel to turn on at sunset, then press **ENTER**.

Display will show:



NOTE: Sunset Time will be based on DATE and LATITUDE entered. Press **ENTER**. The display will show:



If an offset to sunset time is required, press **HOUR** and **MIN**. Offset can be set to 4 hours and 59 minutes max. Press **EVENT** to select + or - then press **ENTER**.

NOTE: A + sign will turn load ON that many hours and/or minutes after sunset. A - sign will turn load ON that many hours and/or minutes before sunset. The display will show:



Press **SELCT** and then **ENTER** to activate sunrise time.

NOTE: To turn load OFF at a preset OFF time, leave this field blank. Press **ENTER**. The display will show:



If an offset to sunrise time is required, press **HOUR** and **MIN**. Offset can be set to 4 hours and 59 minutes max. Press **EVENT** to select + or - and then press **ENTER**.

NOTE: A + sign will turn load OFF that many hours and/or minutes after sunrise. A - sign will turn load OFF that many hours and/or minutes before sunrise.

8.2 ASTRONOMIC ON AND TIME OFF

Set astronomic ON per sections 8.0 and 8.1.

TIME OFF: Press **MODE** until "SCH01" appears. Press **ENTER** until a blank schedule appears then press **SELCT** to select desired channel. Press **HOUR** and **MIN** to set desired OFF time. Press **SELCT** to select desired days, holiday and/or seasons and then press **ENTER**.

8.3 TIME ON AND ASTRONOMIC OFF

Press **MODE** until "SCH01" appears. Press **ENTER** until a blank schedule appears then press **SELCT** to select the desired channel. Press **HOUR**, **MIN**, and **EVENT** to set desired ON time. Press **SELCT** to select desired days, holiday and/or seasons and then press **ENTER**.

ASTRO OFF: Set astronomic OFF per section 8.0 and 8.1.

9.0 REVIEW, MODIFY AND DELETE

Press **MODE** to advance to any of the following MODES:

1. **CLOCK MODE:** Press **HOUR** and **MIN** to modify existing settings. Press **ENTER**.
2. **DATE MODE:** Press **MONTH**, **DATE**, and **YEAR** to modify existing settings. Press **ENTER**. DAY is automatically adjusted.
3. **DST Daylight Saving Time:** To review press **ENTER**. Press **MONTH**, **DATE**, and **DAY** to modify existing settings. Press **ENTER**.
4. **SEASON MODE:** Press **ENTER** to advance to desired season. Press **MONTH** and **DATE** to modify, and **DEL** to delete. Press **ENTER** to confirm.
5. **HOLIDAY MODE:** Press **ENTER** to advance to desired Holiday. Press **MONTH** and **DATE** to modify, **DEL** to delete. Press **ENTER**.
6. **SIGNAL MODE:** Press **ENTER** to advance to desired channel. Press **SIG/SEC** to modify, **DEL** to delete. Press **ENTER**.
7. **SCHEDULE MODE:** Press **ENTER** to advance to desired channel. Press **HOUR**, **MIN**, **EVENT (SIG1/SIG2)** to modify time settings. Press **SELCT** and **DAY** to modify days, holiday and/or seasons, **DEL** to delete. Press **ENTER** after each modification.

8. **ASTRO MODE:** Press **SELCT** to select desired channel. Press **LAT** to change latitude. Press **ENTER**. Press **DAY** and **SELCT** to add or delete days in the sunset mode. Press **ENTER**. Press **HOUR** and/or **MIN** to change offset time for sunset. Press **EVENT** to change offset from + to -. Press **ENTER** and follow the same procedure above to modify or review sunrise settings.
9. **RUN MODE:** Time, day and seconds are displayed. If today is a programmed holiday, and H (Holiday) will be displayed steady. If today falls within a programmed season that season # will be displayed.

10.0 OVERRIDE

OVRDE1 to **OVRDE4** (override keys) are effective only in the **run mode**. If a channel is scheduled for ON/OFF (non-signal timer), then the channel will change the present load status until the next scheduled event. CH# will flash when the load is overridden from scheduled event.

NOTE: If a channel is a signal timer, then the 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 the override key.

EVENT (in the RUN mode) key is used to update the load status. It will execute the last scheduled event for all channels.

The display will only show the last scheduled event for CH1. To view the last scheduled event for other channels, simply press the **EVENT** key again. If there is no schedule programmed for a specific channel, the display will show --:

10.1 NOTES

1. Unit will go to RUN MODE automatically if no key is pressed for 5 minutes.
2. Unit has a look back feature. If you have just finished setting the unit and an output is to be updated, press the EVENT key. Unit will automatically pick up the last schedule.
3. Clear all memory. To clear all memory, while in the RUN mode, press ENTER, and display will show:



OFF CLEAR P

Press **EVENT**, the display will show:



ON CLEAR P

Press **ENTER** briefly and everything in the timer memory is wiped off including real time and date. 12HOUR will flash.

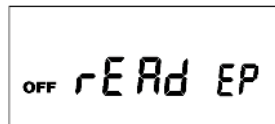
11.0 COPY PROGRAM SETTINGS TO ANOTHER MEMORY MODULE (FOR BP MODELS ONLY)

WARNING: DO NOT USE UNIT AS COPIER WHILE PROGRAM SETTINGS ARE ACTIVE. DOING SO WILL TURN OFF ANY CONNECTED LOADS.

Follow steps below:

- Take unit out of enclosure
- Locate the copy switch (red switch labeled BP01).
- Put the switch on the ON position.
- Place unit back in enclosure.
- Connect power cord.
- Put back insulator that covers the terminal block. Make sure no terminals are exposed to the operator.
- Apply AC power to the unit.
- Insert the pin in the small pinhole (located in the upper right hand corner) to reset the unit.


- The unit will display the model # and the revision #, followed by:



OFF rEAd EP

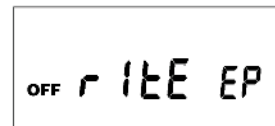
NOTE: Make sure Memory Module with program is inserted in the unit.

This will prepare the unit to read schedule settings from the inserted Memory Module. Press **EVENT**, display will show:



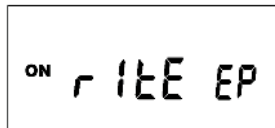
ON rEAd EP

This will read the schedule settings from the inserted Memory Module. Press **ENTER**. Display will show:



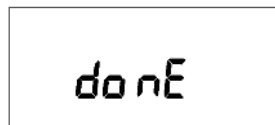
OFF r 1tE EP

This will prepare the schedule settings to be copied to the next Memory Module. Remove inserted Memory Module and insert Memory Module to be copied. Press **EVENT**, the display will show:



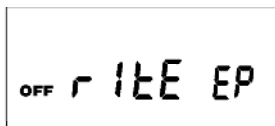
ON r 1tE EP

Press **ENTER**. Schedule settings will be copied to the current Memory Module, and the display will show:



done

Press **ENTER**. The display will show:



To copy another Memory Module, take the existing one out, insert the next module to be copied, and press **EVENT**. This will turn ON the write function. Press **ENTER** and the second module should be copied. Repeat this procedure to copy more modules.

After completing all copies:

- Insert original Memory Module.
- Turn OFF AC power to the unit.
- Remove unit from enclosure.
- Locate the copy switch and set it to OFF (red switch labeled BP01).
- Put unit back in enclosure.
- Put back insulator that covers the terminal block.
- Make sure no terminals are exposed to the operator.
- Apply AC power to unit.
- Insert the pin in the small pinhole (located in the upper right hand corner) to reset the unit.
- Set the time and date.

CAUTION: DO NOT REMOVE MEMORY MODULE WHILE UNIT IS ACTIVE. THE UNIT MUST BE RESET; TIME AND DATE MUST BE RE-ENTERED TO MAKE SCHEDULE SETTINGS EFFECTIVE ON THE MEMORY MODULE.

NOTE: AFTER MAKING ANY CHANGES TO THE PROGRAM, PRESS **MODE** TO GO TO RUN MODE AND THEN PRESS **EVENT** TO UPDATE THE LOAD STATUS.

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		

TORK®

ASTRONOMIC LATITUDE ZONES

