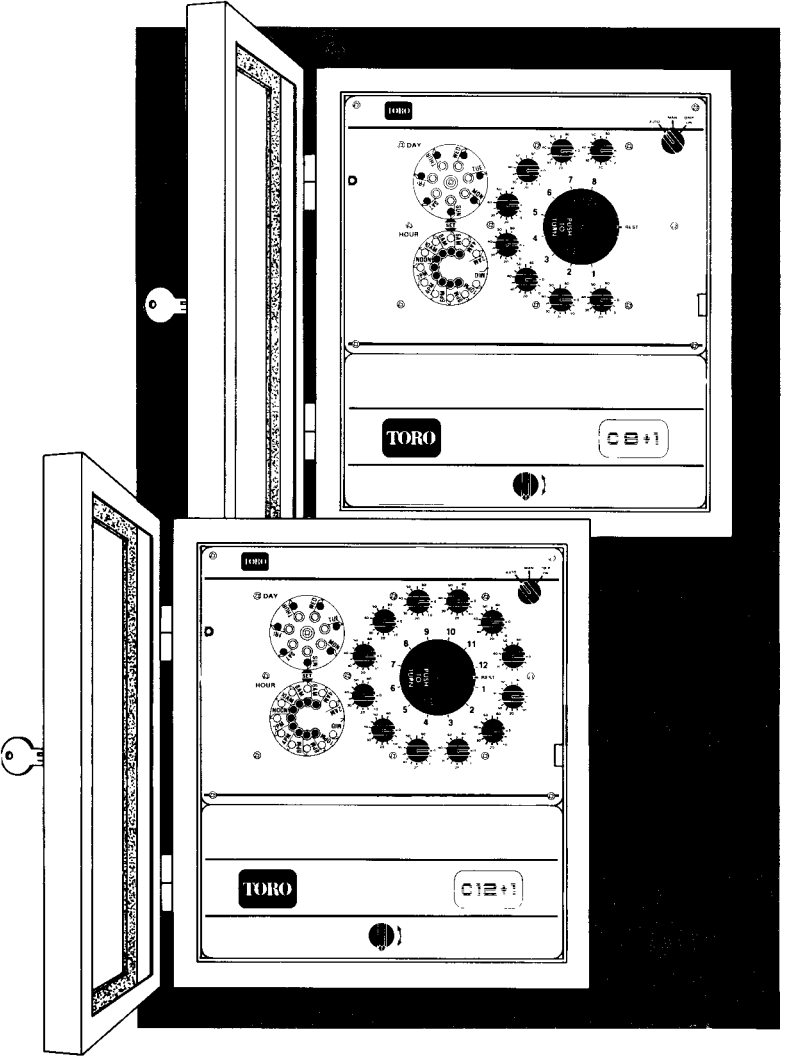
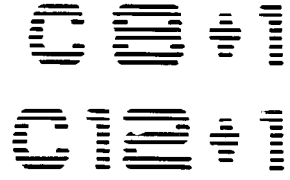


# Owner's manual



Excellence in Irrigation®



# INTRODUCTION

The C8+1™ and C12+1™ commercial controllers are designed for use in automatic watering systems where outdoor location factors, such as vandal and weather resistance must be considered as well as ease of operation and dependability. The controller cabinet is constructed of heavy gauge steel with a locking front cover insulated for protection against moisture and dust. Proven electromechanical timing design provides precision control of 8 or 12 sprinkler stations and 1 independent drip watering station. Control features include:

- 0 to 60 minute timing for sprinkler stations.
- 2 to 18 hours drip station timing.
- 11 watering cycle start times per day.
- Dual programming for separate lawn and shrub watering (electric models only).
- Automatic, semi-automatic, and manual operation

The C8+1 and C12+1 controllers are engineered for easy programming and operation. The operating instructions on the inside controller cover are often all the instruction required for complete controller operation. However, thorough familiarization the controller features and functions is recommended prior to operating the controller for the first time. Reading this manual completely should help eliminate any questions you may have concerning programming and/or operation of the controller.

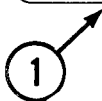
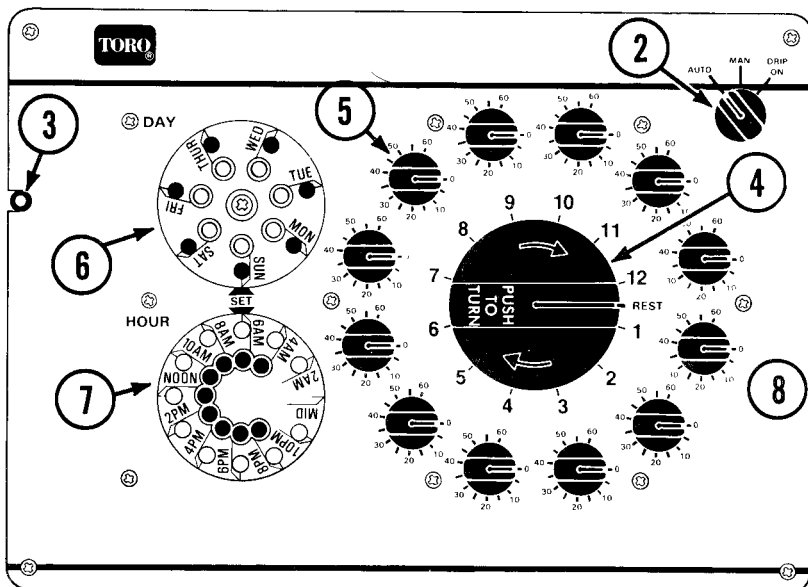
## SPECIFICATIONS

- For 24 VAC Electric Control Valves:
  - C8+1 Model 171-06-01.
  - C12+1 Model 172-06-01.
- For Hydraulic Normally Open Control Valves:
  - C8+1 Model 171-01-01.
  - C12+1 Model 172-01-01.
- Required Power Source: 120 VAC 60 Hz.
- 40 VA Transformer - 24 VAC output, circuit breaker protected.
- Steel Locking Cabinet, U.L. listed for indoor/outdoor installation.
- Cabinet dimensions - 12-1/4" high x 11" wide x 5-1/4" deep (electric) or 7-1/4" deep (hydraulic).
- 1-1/4" conduit access hole for field wire or control tubing.
- 1/2" conduit access hole for AC power wires.
- Supply Line Filter and 3/16" to 1/4" tubing adapters included with hydraulic models.
- 6 Day Wheel option available.

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# CONTROLLER COMPONENTS



## 1. ACCESS PANEL

The large Access Panel removes easily for servicing controller. Non-removable rotating latch knob secures panel in place.

## 2. MODE SELECTOR SWITCH

The Mode Selector Switch sets the required mode of controller operation: AUTO (Automatic), MAN (Manual) or DRIP ON. (See Operation Modes pages 7 - 8 for further information.)

### 3. CIRCUIT BREAKER RESET BUTTON

The 24 VAC side of the controller circuitry is protected by a Circuit Breaker which can be reset in the event of a 24 VAC malfunction. (See Troubleshooting page 9 for more information.)

### 4. STATION SELECTOR

The Station Selector is rotated clockwise automatically or manually to indicate or select the station in operation.

### 5. STATION KNOB

A Station Knob, one for each sprinkler watering station, controls the length of operating time (0 to 60 minutes).

**NOTE:** *Drip watering station operates independently of all sprinkler stations and is not affected by placement of the station selector or station knobs. Drip station operation is controlled exclusively by the **dark color pins** in the Day and Hour wheels and/or the DRIP ON position of the Mode Selector Switch.*

### 6. DAY WHEEL

The Day Wheel serves three functions: 1) indicates current day of week, 2) controls daily operating schedule for sprinkler watering stations (light color pins) and 3) controls daily operating schedule for drip watering station (dark color pins).

**NOTE:** *An optional 6 Day Wheel (P/N 35-2292) can be installed to accommodate every third day watering schedules. See page 7 for more information.*

### 7. HOUR WHEEL

The Hour Wheel serves three functions: 1) indicates current time of day, 2) controls watering cycle start time(s) for sprinkler watering stations (light color pins) and 3) controls start time(s) and length of operating time for drip watering station (dark color pins).

### 8. SHRUB WHEEL (Not Shown)

The Shrub Wheel, located within the controller housing (electric models only) can be programmed to separate shrub sprinkler stations from lawn sprinkler stations when dual programming feature is utilized.

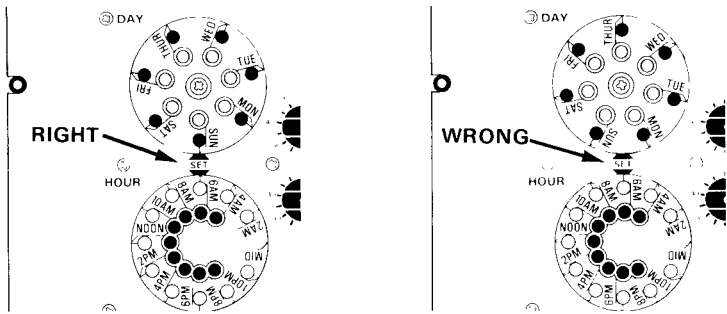
# CONTROLLER PROGRAMMING

## SET CURRENT TIME OF DAY

Rotate Hour Wheel clockwise until current time of day aligns with Set Indicator. **NOTE:** Pins represent hours shown on Hour Wheel. Locate current time by estimating its position on Hour Wheel and set accordingly.

## SET CURRENT DAY OF WEEK

Rotate Day Wheel clockwise to align current day **PIN** with **SET INDICATOR**. If optional 6 Day Wheel is installed align any pin with set indicator. **NOTE:** Controller malfunction will occur if Day Wheel is set **between** pins.



## SET DAY WHEEL FOR SPRINKLER WATERING SCHEDULE

Position all light color pins accordingly:

**Out** - (Pulled outward until pin stops) No watering required.

**Middle** - (Pushed in half way - a slightly detent can be felt) Operate lawn sprinkler stations only - **NOTE:** This pin position applies to electric control models only.

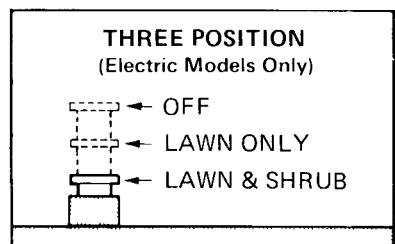
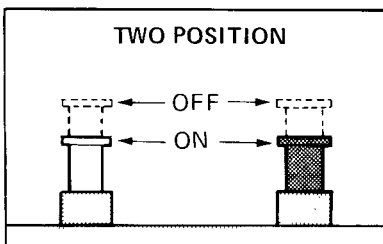
**In** - (Pushed in until pin stops) Operate lawn and shrub sprinkler stations.

## SET DAY WHEEL FOR DRIP WATERING SCHEDULE

Position all dark color pins accordingly:

**Out** - (Pulled outward until pin stops.) No drip watering required.

**In** - (Pushed in until pin stops.) Operate drip station.



## SET HOUR WHEEL FOR SPRINKLER WATERING CYCLE START TIME(S)

Position all light color pins accordingly:

**Out** - (*Pulled outward until pin stops*) **No watering required at indicated time.**

**In** - (*Pushed in until pin stops*) **Sprinkler watering cycle starts at indicated time.**

***NOTE:** The watering cycle can be started eleven (11) times per day. When setting more than one start time, first consider the total length of time required to complete one watering cycle (add all station operating time together) and space start times accordingly. Any start time which occurs during a watering cycle in progress will be bypassed.*

## SET HOUR WHEEL FOR DRIP WATERING SCHEDULE

Each dark color pin serves two functions for drip station operation: 1) to establish start time(s) and 2) to provide approximately two hours of operating time.

Position all dark color pins accordingly:

**Out** - (*Pulled outward until pin stops*) **No drip watering required.**

**In** - (*Pushed in until pin stops*) **Drip watering starts at time indicated next to pin and operates for two hours.**

***NOTE:** Drip station operation will be suspended for approximately 20 minutes when an automatic sprinkler watering cycle is started.*

## SET SPRINKLER STATION OPERATING TIME

Rotate station knob of each active station to desired operating time (5 to 60 minutes). **CAUTION: Do not force station knob past 60 minute setting or severe controller damage may result.**

Set all unused stations to zero (0) operating time. **CAUTION: For systems using Pump Start Relay - Pump Start Relay will activate simultaneously with any watering start (sprinkler or drip) in any mode (AUTO, MAN, or DRIP ON). To prevent possible pump damage due to excessive back pressure, assure all unused stations are set for zero (0) operating time.**


***NOTE:** An unscheduled repeat watering cycle may occur immediately following an automatic water cycle if total operating time is less than 30 minutes. To prevent a repeat cycle simply add enough operating time to active stations to exceed 30 minutes total operating time. If pump start is not used on your system, extra time can be added to any unused stations as well.*

# PROGRAMMING THE SHRUB WHEEL (Electric Models Only)

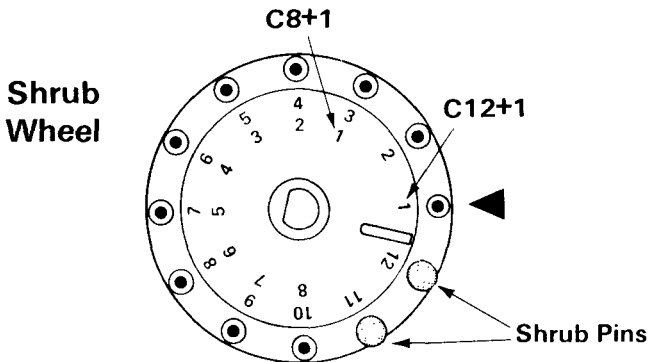
Shrub plants normally require watering less frequently than lawns for proper growth and maintenance. Therefore, watering may be scheduled on selected days for lawn stations only.

To separate lawn from shrub stations, a Shrub Wheel, located inside the controller, must be programmed according to which stations operate shrub stations. Program the Shrub Wheel as follows:

**WARNING**

 **TO AVOID THE POSSIBILITY OF ELECTRICAL SHOCK, DISCONNECT 120 VAC POWER AT SOURCE PRIOR TO REMOVING CONTROLLER FRONT PANEL.**

1. Turn latch knob on Access Panel to remove panel.
2. Remove Timing Mechanism corner screws and lift Timing Mechanism out. Detach wiring harness at quick disconnect plug and carefully set Timing Mechanism aside.
3. Insert Shrub Pin(s) provided into numbered hole(s) in shrub wheel corresponding to shrub station connection(s) on terminal block. Example: Two control valves operate shrub sprinklers and have been connected to terminals 11 and 12 on terminal block. Shrub Pins must be inserted in holes numbered 11 and 12 in Shrub Wheel. Example shown is C12+1 controller.



4. Rotate Shrub Wheel to align Station 1 with arrow as indicated above.

5. Reconnect Timing Mechanism Wiring Harness Plug. Position Timing Mechanism into cabinet and secure with four (4) corner screws.
6. Push in and rotate Station Selector Knob clockwise one revolution to REST position.
7. Install Access Panel and secure by turning latch knob.
8. Apply 120 VAC power to controller. Controller is now operational.

## INSTALLING OPTIONAL 6 DAY WHEEL

The optional 6 Day Wheel is available to accommodate a watering schedule which requires every third day watering. Install the 6 Day Wheel in the following manner:

1. Remove phillips screw from center of day wheel.
2. Pull 7 Day Wheel from controller.
3. Insert 6 Day Wheel into controller turning wheel to engage ratchet mechanism. (Day Wheel will be flush with faceplate when fully inserted.)
4. Secure with phillips screw. (Do Not Overtighten.)
5. Set day wheel to desired number (1 - 6).
6. Position Day Wheel Pins as required. (See page 4.)

## OPERATION MODES

### AUTOMATIC OPERATION

Set Mode Selector Switch to AUTO. An automatic watering cycle will start when an active day and active start time (determined by pin placement in Day and Hour Wheels) is reached. The Station Selector will rotate (clockwise) automatically to the first station set with a minimum of 5 minutes running time and will operate this station until its set running time has elapsed. The Station Selector will continue this procedure with all remaining stations and complete the cycle by stopping at the REST position.

**NOTE:** *If only Drip Station is programmed to operate, the Station Selector will not rotate during operation.*

## **SEMI-AUTOMATIC OPERATION**

Set Mode Selector Switch to AUTO. Push Station Selector IN and rotate clockwise to Station 1 or first station in cycle required to operate. This station will operate until set running time has elapsed. The Station Selector will advance to next station and continue this procedure through complete watering cycle.

***NOTE:** Watering will occur only if Day Wheel is scheduled to water on current day.*

## **MANUAL SPRINKLER STATION OPERATION**

Set Mode Selector Switch to AUTO. Push Station Selector IN and rotate clockwise to the station requiring operation. Set Mode Selector Switch to MAN. This station will remain on until Station Selector is manually rotated to another station or REST position.

***NOTE:** Drip watering station will not be operational when Mode Selector Switch is set in MAN (Manual) position.*

## **MANUAL DRIP STATION OPERATION**

Assure Station Selector is in REST position. Set Mode Selector Switch to DRIP ON. Drip station will operate until Mode Selector Switch is set to MAN or AUTO.

***NOTE:** Neither automatic or manual operation of sprinkler stations can occur while controller is in DRIP ON mode.*

## **SUSPEND AUTOMATIC OPERATION**

To suspend automatic operation for any reason (i.e., rain or winterizing) set Mode Selector Switch to MAN position. Assure Station Selector is in REST position. Controller will continue to keep current time and day, however, all watering operations will be suspended.

To resume automatic operation, set Mode Selector Switch to AUTO position.

# TROUBLESHOOTING

If you are experiencing a problem with your controller, check the list of possible problems and solutions below before calling your irrigation contractor or local TORO distributor.

**PROBLEM:** Controller keeps correct time and day but will not start watering cycle automatically.

*SOLUTION:* Mode Selector not in AUTO position. Day Wheel not correctly aligned with Set Indicator (See page 4). Watering program pins not set correctly (See pages 4 & 5).

**PROBLEM:** Watering cycle starts again immediately upon completion of scheduled watering cycle.

*SOLUTION:* Check total sprinkler watering time. It must exceed 30 minutes.

**PROBLEM:** Shrub sprinkler stations operate when controller is programmed to water lawn sprinkler stations only.

*SOLUTION:* Check Shrub Wheel for proper programming (See page 6).

**PROBLEM:** Controller does not operate.

*SOLUTION:* Check power source for possible blown fuse or "tripped" circuit breaker.

*Check controller Circuit Breaker for tripped position.*

**NOTE:** The controller Circuit Breaker provides protection to the 24 VAC circuitry from a short circuit or overload condition (usually due to an exposed field wire or defective valve solenoid). If the Circuit Breaker is "tripped" open, all controller operation will stop. Prior to resetting Circuit Breaker try to determine the cause of failure and make corrections as needed.

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