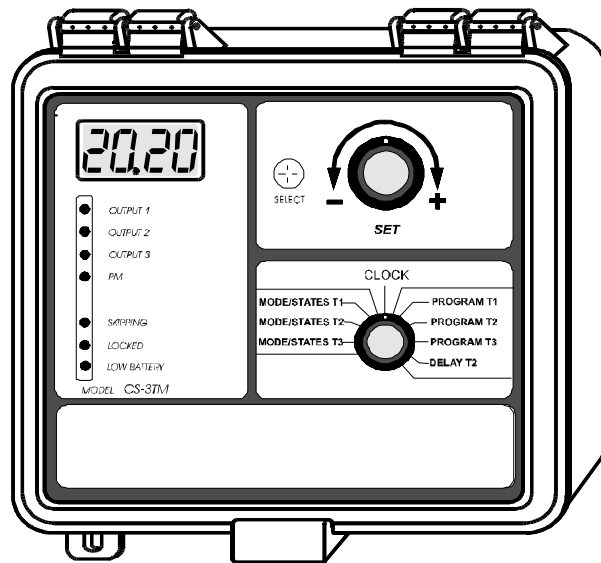


# CS-3TM

## 24-HOUR TIMER CONTROL



# CS-3TM: 24-HOUR TIMER CONTROL

## 1 INTRODUCTION

The CS-3TM is a timer designed to control farm equipment. It uses an internal clock to operate three timers. Each timer contains up to 24 different operation cycles. At each cycle start, the timer activates one of the three dry contacts. A skip-a-day feature is included. A four-digit display and a push-button make programming easy. Additional features include:

- a battery back-up for keeping time in case of a power failure
- overload protection on the output
- a 115/230 VAC - 50/60Hz power supply
- an alarm output
- cycle delay triggered by limit switch input
- the unit can be connected to a computer communications module

## 2 PRECAUTIONS

**Although fuses at the input and outputs of the controller protect its circuits in case of an overload or overvoltage, we recommend installing an additional protection device on the controller's supply circuit.**

**The room temperature where the controller is located MUST ALWAYS REMAIN BETWEEN 32°F AND 104°F (0°C TO 40°C).**

**To avoid exposing the controller to harmful gases or excessive humidity, it is preferable to install it in a corridor.**

**DO NOT SPRAY WATER ON THE CONTROLLER**

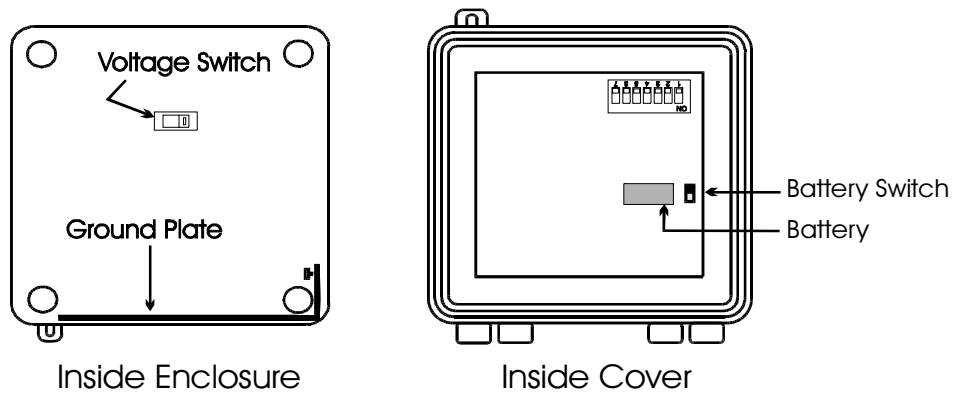
## 3 MOUNTING INSTRUCTIONS

Remove the four screws on the front cover and lift the cover. Mount the enclosure on the wall using three screws. Be sure the electrical knockouts are at the bottom of the enclosure in order to prevent water from entering the controller. Insert the screws in the mounting holes provided in three corners of the enclosure and tighten. Fasten the three black caps provided with the controller onto the three mounting holes.

## 4 CONNECTIONS

To connect the controller, refer to the wiring diagram enclosed with this user's manual.

- ⇒ Set the voltage switch to the appropriate voltage.
- ⇒ Use the electrical knockouts provided at the bottom of the enclosure. Do not make additional holes in the enclosure, particularly on the side of the enclosure when using a computer communications module.

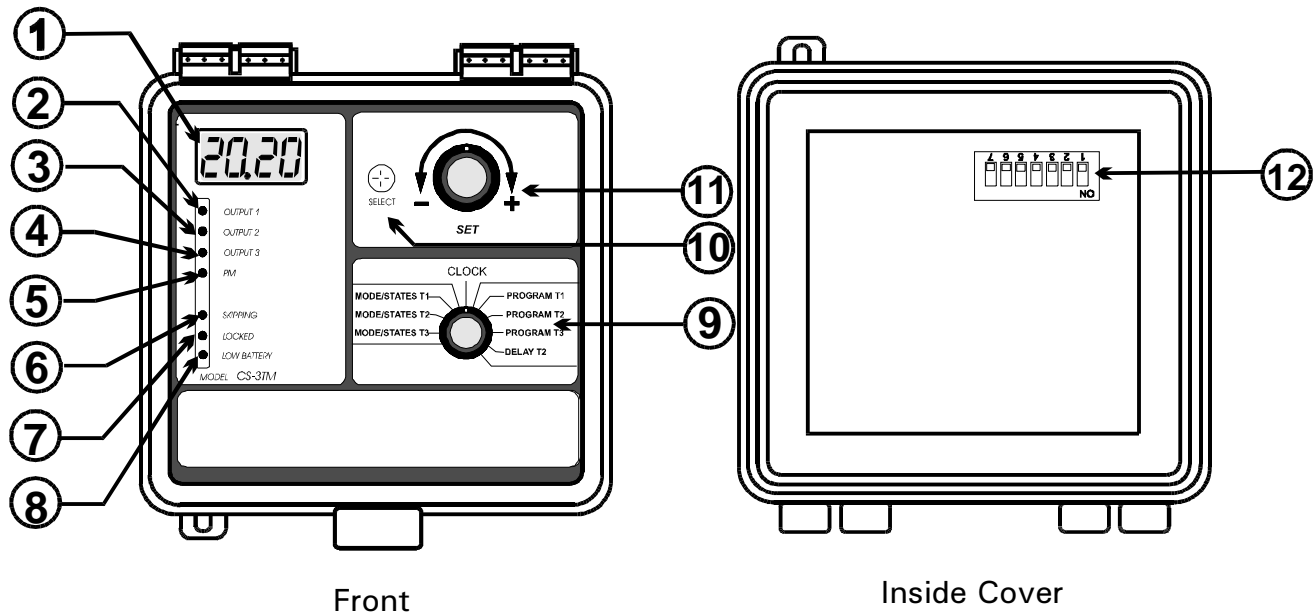


- ⇒ If metallic cable holders are used to secure cables entering the enclosure, use the ground plate provided with the controller. Connect the ground wire to the ground stud on the plate.
- ⇒ The switch near the 1/2AA Lithium battery located inside the cover must be turned on before you plug the timer into a power outlet.
- ⇒ Two types of alarms are currently available on the market. The first type is activated when current is cut off at the source; the other is activated when current is supplied to the input. Use the NO terminal for an alarm of the first type; otherwise use the NC terminal.



**ALL WIRING MUST BE DONE BY AN AUTHORIZED ELECTRICIAN AND MUST COMPLY WITH APPLICABLE CODES, LAWS AND REGULATIONS. BE SURE POWER IS OFF BEFORE DOING ANY WIRING TO AVOID ELECTRICAL SHOCKS AND EQUIPMENT DAMAGE.**

## 5 LOCATION OF THE CONTROLS



- 1 - **Digital Display:** Displays the clock time and other values.
- 2 - **Output 1 Pilot Light:** Turns on when output relay 1 is activated.
- 3 - **Output 2 Pilot Light:** Turns on when output relay 2 is activated.
- 4 - **Output 3 Pilot Light:** Turns on when output relay 3 is activated.
- 5 - **PM Pilot Light:** Turns on when the current time is PM.
- 6 - **Skipping Pilot Light:** Turns on when the current day is being skipped.
- 7 - **Locked Parameter Pilot Light:** Turns on when the parameters are locked.
- 8 - **Low Battery Pilot Light:** Turns on when the battery is low.
- 9 - **Function Selection Knob:** Used to select a function.
- 10 - **Push-button:** Used for programming timer cycles and storing parameters.
- 11 - **Adjustment Knob:** Used to set parameters values.

## 12 - Internal Switches:

1 - Locked / Unlocked parameters: When this switch is ON, the timer parameters are locked and can only be displayed (except clock time).

2 - 24HR / 12HR time: When this switch is ON, the display shows 24-hour time. Otherwise, the display shows 12 hour time (AM / PM).

3 - ON: Start/Stop Time; OFF: Start/Running Time for Timer T1

4 - ON: Start/Stop Time; OFF: Start/Running Time for Timer T2

5 - ON: Start/Stop Time; OFF: Start/Running Time for Timer T3

## ⑥ USING THE CONTROLLER

### THE DISPLAY

A flashing value on the display means that the value can be modified using the adjustment knob. If the locked parameter switch (Dipswitch # 1) is in the ON position, no parameters can be modified except the clock time. If after 10 seconds, no action is taken to modify a flashing value, the display stops flashing and the timer returns to a display mode. If any changes were made within this time period, they will be recorded in permanent memory.

### THE CLOCK

The CS-3TM has an internal clock used for programming the timer cycles. To display the current time, turn the selection knob to the **CLOCK** position. If the internal switch #2 is OFF, the time is displayed in 12-hour format. In this case, the PM LED turns on to show PM time.

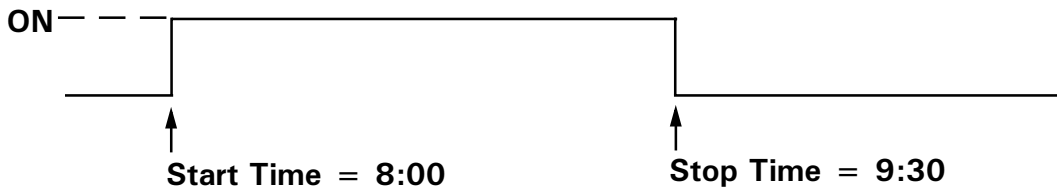
#### SETTING THE CLOCK

- Set the selection knob to the **CLOCK** position. The current time is displayed. When you first turn the unit on, this value is flashing and continues to flash until both the hours and the minutes have been correctly entered.
- Press the push-button. The hours start flashing.
- Use the adjustment knob to set the hours. If you are using 12-hour time, make sure the PM LED is properly set.
- Press the push-button. The minutes start flashing.
- Use the adjustment knob to set the minutes.
- Press the push-button to save the new time setting. The seconds are reset to zero.

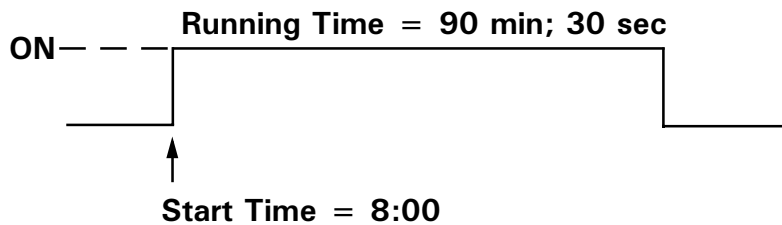
## TIMER OPERATION

The CS-3TM operates three independent timers with 24 different cycles or channels each. Each timer is connected to an output relay. A cycle is defined by specifying a Start Time along with either a Stop Time or a Running Time. The Start and Stop Times are clock times whereas the Running Time is the length of the cycle (in minutes and seconds). Dipswitches inside the cover of the unit control which method is used to activate cycles for each timer. When the clock reaches the Start Time for a cycle, the appropriate timer output is activated until the Stop Time is reached or until the Running Time has elapsed. Each timer can be turned on or off, activating or deactivating the output for that timer. Each cycle can be enabled or disabled individually. In addition, the Skip-a-day feature allows you to activate the cycles every other day for a given timer.

### Start Time / Stop Time Definition:



### Start Time / Running Time Definition:



### Programming Example:

	<u>PROGRAM T1</u>	<u>PROGRAM T2</u>	<u>PROGRAM T3</u>
Cycle 1	8:00 - 9:30	8:00 - 8:05	10:00 - 50 min
Cycle 2	10:00 - 11:00	10:30 - 10:35	12:00 - 10 min
Cycle 3	17:00 - 17:35		14:00 - 60 min
Cycle 4	20:00 - 20:30		18:00 - 5 min 20 sec

### **NOTES:**

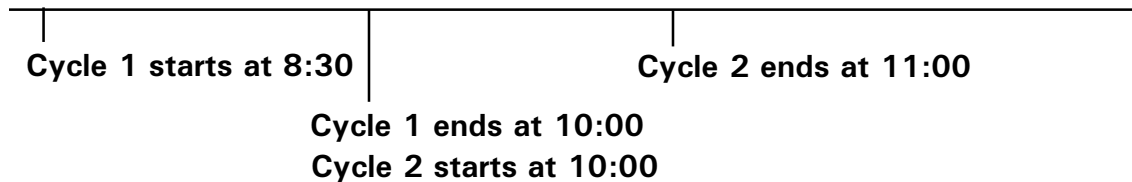
- (i) If two cycles have identical start times for a given timer, only one is activated.
- (ii) If a cycle is completely contained within another cycle for the same timer, it will not be executed.
- (iii) If a cycle is defined to start while another cycle is already activated, the second cycle will start once the first one is completed and will be activated for the entire duration of the Running Time (if this is the definition used) or for the time remaining until the Stop Time (if this is the definition used).

### Example of Overlapping Cycles on the Same Timer:

Cycle 1 – Start Time: 8:30; Running Time: 90 min

Cycle 2 – Start Time: 9:30; Running Time: 60 min

### Actual Execution:



## MODE OPERATION

Each timer operates independently from the others in one of four modes: AUTO-MATIC mode, SKIP-A-DAY mode, ON mode and OFF mode. In automatic mode, the timer activates the output automatically according to the cycle settings. In skip-a-day mode, the timer operates every other day (see below). In On mode, the timer output is forced into an active state. In Off mode, the timer output is forced into an inactive state: all programming is stopped even if cycles for that timer are currently enabled.

### SELECTING THE MODE

- Set the selection knob to **MODE / STATES T1**, **MODE / STATES T2** or **MODE / STATES T3** depending on the timer you are setting. The display shows the current mode setting for the timer .
- Using the adjustment knob, select the mode: — **Auto** for automatic mode — **PASS** for skip-a-day mode — **On** for manual on mode — **OFF** for manual off mode.
- Wait 2.5 seconds until the display stops flashing. If you turn the selection knob to another position before the display stops flashing, the change will not be saved.
- If you have selected automatic mode, you can press the push-button once to display the cycles that are currently enabled for the selected timer. If you have selected skip-a-day mode, you can press the push-button to choose when to start skipping. When the Skipping LED is on, the current day is being skipped for all three timers. When the Skipping LED is off, the next day will be skipped for all three timers.

## AUTOMATIC MODE

### DEFINING THE START TIME AND RUNNING TIME

- Set the selection knob to **PROGRAM T1**, **PROGRAM T2** or **PROGRAM T3** depending on the timer you are setting. The display shows "**tn.1**" where n is the timer number and "1" is the cycle number. The number "1" is flashing.
- Using the adjustment knob, select the cycle (or channel) number.
- Press the push-button once. The current On/Off status of the selected cycle is displayed and flashes.
- Use the adjustment knob to enable or disable the selected cycle. Turn the knob to the right to enable, or to the left to disable.
- Press the push-button once again. The current start time is displayed with the hours flashing, alternating with the letters **Strt** (start).
- Use the adjustment knob to set the hours.
- Press the push-button. Now the minutes of the start time begin flashing, alternating with the letters **Strt** (start).
- Use the adjustment knob to set the minutes.
- Press the push-button. The currently defined running time is displayed with the minutes flashing, alternating with the letters **runn** (running).
- Use the adjustment knob to set the minutes. The maximum value is 99 minutes.
- Press the push-button. Now the seconds of the running time begin flashing, alternating with the letters **runn**.
- Use the adjustment knob to set the seconds.
- Press the push-button to store the new parameters and select another cycle.



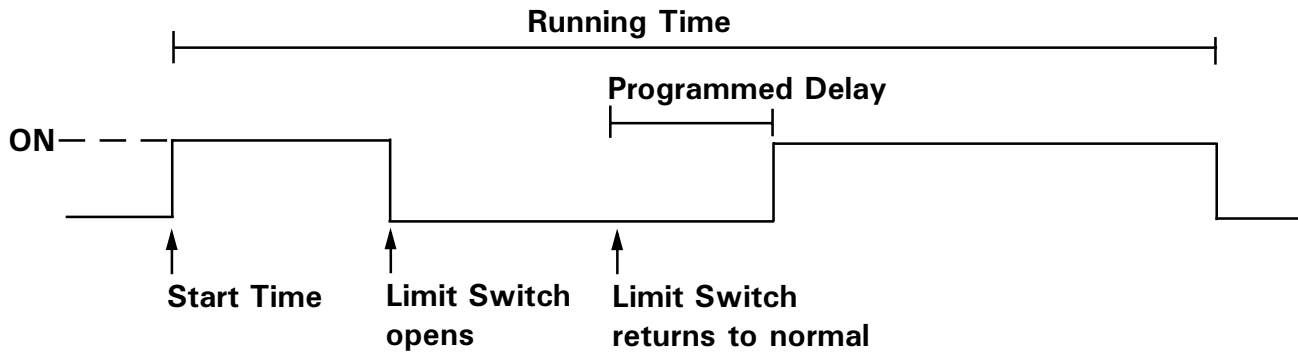
## DEFINING THE START AND STOP TIMES

- Set the selection knob to **PROGRAM T1**, **PROGRAM T2** or **PROGRAM T3** depending on the timer you are setting. The display shows “**tn.1**” where n is the timer number. The number “1” (representing the cycle number) is flashing.
- Using the adjustment knob, select the cycle (or channel) number.
- Press the push-button once. The current On/Off status of the selected cycle is displayed and flashes.
- Use the adjustment knob to enable or disable the selected cycle. Turn the knob to the right to enable, or to the left to disable.
- Press the push-button once again. The current start time is displayed with the hours flashing, alternating with the letters **Strt** (start).
- Use the adjustment knob to set the hours.
- Press the push-button. Now the minutes of the start time begin flashing, alternating with the letters **Strt**.
- Use the adjustment knob to set the minutes.
- Press the push-button. The currently defined stop time is displayed with the hours flashing, alternating with the letters **stop**.
- Use the adjustment knob to set the hours.
- Press the push-button. Now the minutes of the stop time begin flashing, alternating with the letters **stop**.
- Use the adjustment knob to set the minutes.
- Press the push-button to store the new parameters and select another cycle.

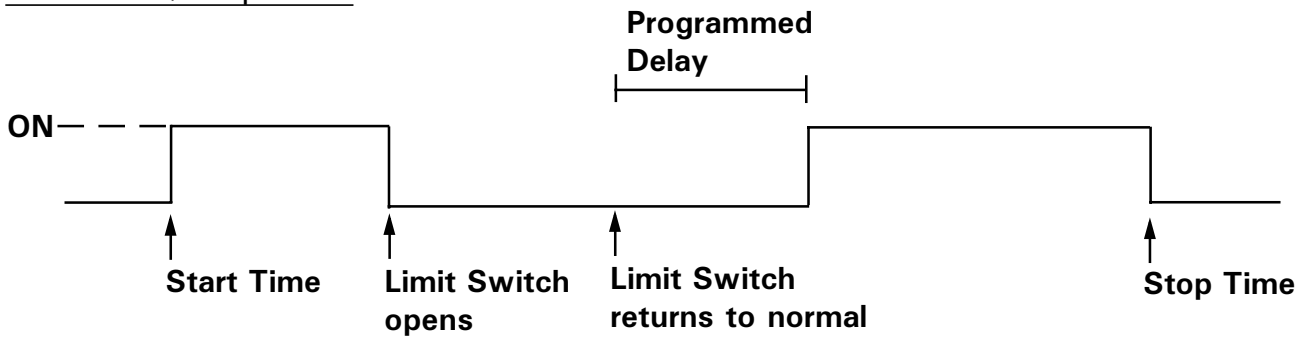
## CYCLE DELAY

Timer T2 can be used with a limit switch to temporarily stop a cycle that is currently activated. When the limit switch is triggered and a cycle is currently operating, the cycle output is deactivated until the limit switch returns to its normal state. The cycle resumes operation after a user-defined delay has elapsed. If a Running Time is defined for the cycle, the Running Time continues to elapse even if the timer output is temporarily deactivated. The diagrams below sum up the operation of the cycle delay for both Start/Stop Time and Start/Running Time cycle definitions.

Start Time / Running Time:



Start Time / Stop Time:



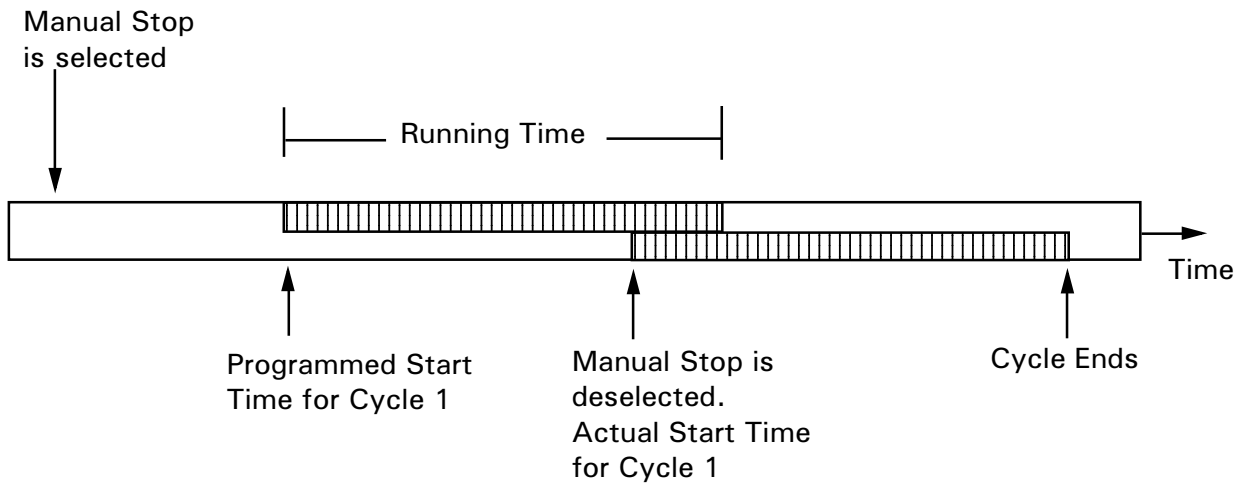
If timer T2 uses Start Time / Running Time cycle definitions, the cycle will operate for the remainder of the running time. If Start / Stop Times are used, the cycle will stop at the appointed stop time.

**MANUAL MODE**

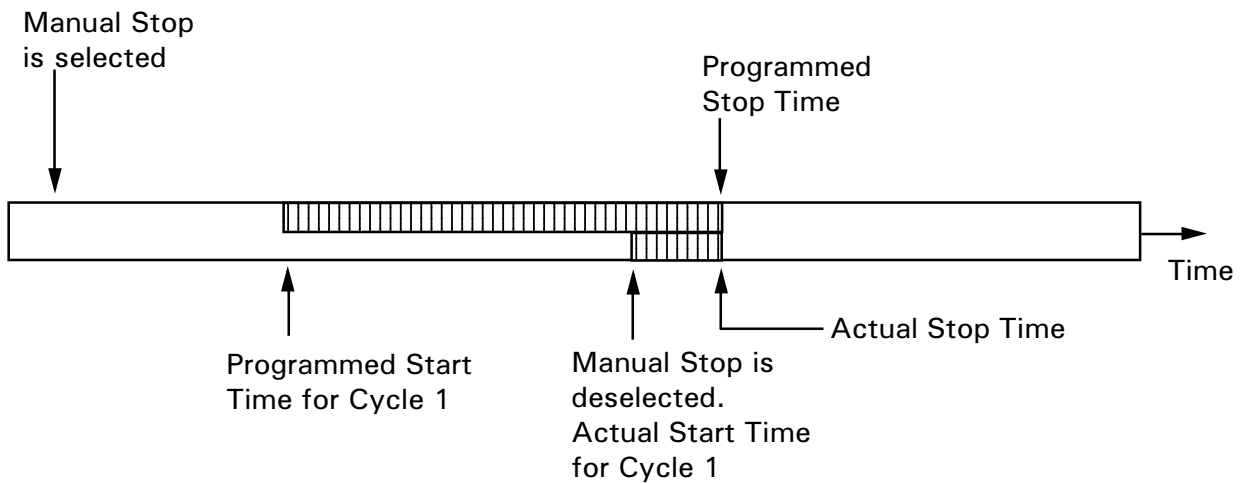
You can manually activate an output at any time by selecting the On mode for that timer. After a 2.5 second delay, the output is activated. The output remains activated as long as the timer is in On mode.

You can manually stop all cycle activity by selecting the Off mode for that timer. After a 2.5 second delay, the output is deactivated. The output remains in this state as long as the timer is in Off mode. If you return to automatic mode inside a cycle window, and if that cycle was not already activated previous to the manual stop, the cycle will be executed for the entire running time (if a Stop Time is defined, the cycle will resume until the appointed Stop Time). This feature also applies to the Skip-a-day function (see diagram below).

### Start Time / Running Time Definition:



### Start Time / Stop Time Definition:



### SKIP-A-DAY MODE

This feature allows you to operate the cycles only every other day. You can choose to start skipping immediately or on the following day (at midnight). If you choose to start skipping immediately and a cycle is currently activated, the skipping feature will take effect after the running time of the current cycle has elapsed or the stop time is reached. If you disable the Skip-a-day function inside a cycle window, the cycle will be activated for the entire duration of the Running Time or until the stop time is reached (see the diagram above where this is applied to the Manual Stop function). Note that the skip-a-day mode applies to all three timers at once.

## 7 ALARM CONDITIONS

An alarm is set off when one of the following situations occurs:

- (i) the battery is low
- (ii) the permanent memory chip is not working properly
- (iii) a power failure occurs
- (iv) the microprocessor is defective.

## 8 BACK-UP BATTERY

A 1/2AA lithium battery is included with the timer. It is used to power the internal clock in the event of a power failure. None of the other timer functions will operate if this happens. When power is restored, the timer will resume activation of the cycles exactly where it left off when the power failed. For example, a cycle that was already activated will be resumed for the remainder of the Running Time (if a Stop Time is defined, the cycle will resume until the appointed Stop Time).

To continue operating the timer when a power failure occurs, a 12VDC input is included (see wiring diagram for hookup). If you use a rechargeable battery, **NEVER RECHARGE WHEN THE BATTERY IS CONNECTED TO THE UNIT.**

## 9 TECHNICAL SPECIFICATIONS

**Supply:** 115/230 VAC, 50/60 Hz, overload and overvoltage protection fuse F6-1A fast blow.

12 VDC for AC back-up supply; can activate outputs and alarm if supplied with DC back up voltage.

**Output 1:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A motor output, 10A RES, fuse F7-10A slow blow.

**Output 2:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A motor output, 10A RES, fuse F2-10A slow blow.

**Output 3:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A motor output, 10A RES, fuse F3-10A slow blow.

**Alarm:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 3A, fuse F5-3A slow blow.

**Enclosure:** ABS, moisture and dust-tight.

**The room temperature where the controller is located  
MUST ALWAYS REMAIN BETWEEN 32° AND 104°F (0° AND 40°C).**

## 10 TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
The display doesn't work.	<p>The circuit breaker at the service panel is off or tripped.</p> <p>The wiring is incorrect.</p> <p>The F6 input fuse is blown.</p> <p>The voltage selector switch is in the wrong position.</p> <p>The display board interconnect cable is unplugged from the power supply board.</p>	<p>Reset the circuit breaker.</p> <p>Correct the wiring.</p> <p>Replace the fuse.</p> <p>Set the switch to the correct position.</p> <p>Plug the cable in firmly.</p>
The timer seems to be working but the equipment is not running.	<p>The wiring is incorrect or loose.</p> <p>The F7, F2 or F3 output fuse is blown.</p>	<p>Check the wiring.</p> <p>Replace the appropriate fuse.</p>
The Low Battery pilot light turns on.	<p>The on-board battery is low.</p> <p>Battery has been turned off.</p>	<p>Unplug the unit. Turn off the battery. Wait 15 seconds then turn the battery on and plug the unit in. Note that the clock time may be lost. If the pilot light is still on, return the unit to your dealer.</p> <p>Unplug the unit. Turn the battery on and plug the unit in. Note that the clock time may be lost.</p> <p>If the LOW BATTERY pilot light turns on when you first turn the unit on, turn power off, turn the battery switch off. Wait 15 seconds then turn the switch on again and restore power to the unit. Note that the clock time may be lost. If the pilot light is still on, return the unit to your dealer.</p>
The display is steady and shows the letters "EEPR". When this happens, all cycle activity is stopped.	The permanent memory is not functioning properly.	Unplug the unit. Turn off the battery and turn it back on. Plug the unit in. If the problem persists, contact your dealer. Note that this may erase your programming.
The display flashes the letters "EEPR". When this happens, all cycle activity is stopped.	The permanent memory is not functioning properly.	Try resetting the system by holding the push-button down for 5 seconds. Note that this may erase your programming.