TRACEABLE® LAB CONTROLLER INSTRUCTIONS

SPECIFICATIONS

Power:	125 VAC, 50/60 Hz, 3 prong grounded plug.
Switching Capability:	125 VAC, 50/60 Hz, 1875 watts, 15 amps.
Cycle Duration:	Minimum 1 second, Maximum 168 hours.
On/Off Programs:	1568 per week, 224 per day.
Timing Accuracy:	0.01 second
Display:	0.5 inch (1.3 cm) LED.
Rating:	UL Relay
Case:	ABS Plastic.

BEFORE USE

The microprocessor and internal software used in this Lab Controller are the most advanced technology available. The Lab Controller is designed for intuitive use. We are certain you will be pleased with the ease of operation. Please read through these instructions completely and execute all of the examples.

ALARMS

Visual– The visual alarm is a fast flashing light in the channel which is alarming.
Audible– The audible alarm is one beep for the TIMER 1 channel, two beeps for the TIMER 2 channel, and three beeps for the TIMER 3 channel. The OUTLET channel alarms for two seconds when switching from ON to OFF, or OFF to ON.
Note: If two or more timers are alarming at the same time, the unit will sound the highest timer number's alarm. For example, if TIMER 3 and 2 are both alarming, you will hear TIMER 3 (three beeps) until you press C or START/STOP to turn off the alarm, you will then hear TIMER 2 (two beeps) until you turn off the alarm.

ALARM VOLUME

To adjust the alarm volume, turn the alarm volume adjustment screw located on the left side of the case clockwise to decrease the volume, counter-clockwise to increase the volume. The key-click (sound when a key is pressed) is also controlled by this adjustment screw. To completely prevent the alarm from sounding, cover the sound transducer hole located on the bottom of the unit.

DIGITAL DISPLAY AND LIGHTS

On the digital display, the two digits to the left indicate hours, the middle two digits indicate minutes, the two digits to the right indicate seconds.

A slow blinking channel light (TIMER 1,2,3, OUTLET, CALCULATOR, CLOCK) indicates which channel is being displayed. A steady (non-blinking) channel light indicates a channel is actively timing but is not being displayed. A fast blinking channel light indicates the channel is alarming.

S M T W T F S lights indicate the day of the week. PM, when lit, indicates PM. OUTLET ON, when lit, indicates the electrical outlet receptacle is ON, except in the OUTLET channel. In the OUTLET channel, it indicates programmed On/Off times and does not necessarily indicate the actual On/Off status of the electrical outlet receptacle. This feature permits entering outlet time settings without repeatedly turning equipment on and off.

KEYS

CHANNEL SELECT
Each press of this key advances the display to the next channel.
START/STOP (=)
Each press of this key starts or stops timing. It also recalls the last countdown time entered into memory. When the alarm is sounding this key may be used to turn off the alarm. In the CALCULATOR channel this key is equals.
REPEAT (←)
Each press of this key causes the timing to be constantly repeated. In the CALCULATOR channel this key performs metric to U.S. conversions.
OUTLET REVIEW (→)
In the OUTLET channel this key reviews the outlet On/Off times. In the CALCULATOR channel this key performs U.S. to metric conversions.
AM/PM (+)
In the OUTLET and CLOCK channels this key sets the time to AM or PM. In the CALCULATOR channel this key performs addition.
OUTLET SET (—)
In the OUTLET channel this key stores in memory the outlet On/Off time. In the CALCULATOR channel this key performs subtraction.
DAY (X)
In the OUTLET and CLOCK channel this key sets the correct day of the week. In the CALCULATOR channel this key performs multiplication.
OUTLET ON/OFF (/)
This key switches the outlet light to on or off. In the CALCULATOR channel this key performs division.
C (correction)
Each press of this key erases the current entry or turns off a sounding alarm. In the CALCULATOR channel this key sets the decimal place.
0 through 9 & U.S. (←→) Metric Conversions
The numeric keys enter numbers on the display. In the CALCULATOR channel the U.S. (←→) Metric keys perform specific conversions.

OPERATION

CLOCK channel
Plug the Lab Controller into a 125 volt AC, 50/60 Hz. outlet. The display will flash 12:00:00. Press **C** twice. Enter the correct time-of-day on the display using the number keys (example: 5:15 PM would be entered 5,1,5,0,0). Press the AM/PM key until PM is lighted for PM, or not lighted for AM, and enter the correct day-of-the-week by pressing the DAY key until the proper day is lighted. Press the START/STOP key to start the clock running.

TIMER 1, 2, and 3 channels
All three channels have identical timing functions of count down, count up, time-out memory and repeat. Timing capacity is 100 hours in I second increments.
After entering or stopping a time, the time displayed will be retained even if you change channels. This means that pre-programmed times may be entered in these channels without starting the countdown sequence.
COUNTDOWN – In the TIMER 1 channel, when the display reaches zero during countdown, the audible alarm sounds one repeating beep and the TIMER 1 light blinks rapidly, both turn off automatically after ten seconds. The TIMER 2 channel (two beeps) and the TIMER 3 channel (three beeps) are identical, but the alarm sounds and the channel light blinks continuously until manually turned off. To turn off an alarm, press the **C** key or the **START/STOP** key regardless of which channel is being displayed.
MEMORY COUNTDOWN – The memory feature recalls the last programmed time. Once the countdown is completed, and the alarm is stopped, a single press of the **START/STOP** key in the appropriate channel will recall the last countdown time. A second press of the **START/STOP** key will begin the next countdown.
REPEAT COUNTDOWN – The repeat feature is the perfect solution when repetitive signals at a constant time interval are required. When zero is reached, the original programmed time is automatically placed in the display, and countdown automatically begins again. This sequence will continue until **START/STOP** is pressed to stop timing or **C** is pressed to clear the display.
COUNT-UP (STOPWATCH) – The stopwatch feature times to 100 hours in one second increments, the display then automatically rolls over to zero and continues timing.
TIME-OUT – The time-out feature for both count-up and countdown is achieve by pressing the **START/STOP** key to stop timing and by pressing the **START/STOP** key again to resume timing.

TIMER, 1,2, AND 3 EXAMPLES
(PLEASE WORK THROUGH ALL THE EXAMPLES)

Example A: Countdown and Countdown Memory.
1. Press the **CHANNEL SELECT** key until the TIMER 1 channel is selected.
2. Press the **8** key to enter 8 seconds on the display.
3. Press the **START/STOP** key to begin the countdown.
4. While the alarm is sounding, press the **C** key or the **START/STOP** key to turn off the alarm.
5. Press the **START/STOP** key to recall the last programmed time (8 seconds).
6. Press the **START/STOP** key to begin counting down.
7. Press **C** to clear the entries in this example and all other examples.

Example B: Repeat Countdown
1. Press the **CHANNEL SELECT** key until the TIMER 1 channel is selected.
2. Press keys **2, 1,** and **7** to enter 2 minutes 17 seconds on the display.
3. Press the **REPEAT** key.
4. Press the **START/STOP** key to begin the countdown.
5. When zero is reached, the alarm will sound for 10 seconds and turn off automatically, or may be turned off with the **C** key or the **START/STOP** key. The timer will automatically return to 2 minutes, 17 seconds and begin counting down again. It will repeat this timing until the **C** key is pressed. Note, if the alarm is sounding the **C** key must be pressed twice, the first time to turn off the alarm, the second time to clear the display.

Example C: Count-up (stopwatch).
1. Press the **CHANNEL SELECT** key until the TIMER 1 channel is selected.
2. Press the C key to delete any programmed times and press the **START/STOP** key to begin counting up.
3. For timeout periods press the **START/STOP** key to stop timing. Press the **START/STOP** key to resume timing. Press the **C** key to clear the display.

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OUTLET Channel
The OUTLET channel On/Off cycle duration is a minimum of 1 second and a maximum of 168 hours. Maximum switching capability is for equipment of 125 VAC, 50/60 Hz. 15 amps, and 1875 watts.
In the Outlet Countdown function, the unit turns equipment On/Off when zero is reached. In the Outlet Countdown Memory function it automatically recalls the last single programmed time. In the Outlet Repeat function it continuously cycles equipment on and off at any one or two different time intervals. In the Outlet Time-of-Day function it performs up to 224 On/Off switchings per day or week. In the Repeat Time-of-Day function it performs up to 1568 On/Off switchings per week.
NOTE: You cannot perform Outlet Countdown and Time-of-Day timing simultaneously. When in the OUTLET channel, the OUTLET ON light is used for programming purposes, and does not always represent the actual OFF or ON status of the electrical outlet. However, the OUTLET ON light does always represent the actual OFF or OFF status of the electrical outlet when in any other channel. This feature permits programming times without repeatedly switching equipment On/Off. Note, for a manual override of the outlet, press the **OUTLET ON/OFF** key to change the outlet status in any change other than the OUTLET or CALCULATOR channel.
For clarity of the above explanation, and for the following examples, please plug a light into the outlet on the back of the Lab Controller. Turn the light on. Press the **CHANNEL SELECT** key until the TIMER 1 Channel is selected, press the **OUTLET ON/OFF** key several times, note how it turns the light on and off. Now press the **CHANNEL SELECT** key until the OUTLET channel is selected, press the OUTLET ON/OFF key several times, note that it has no effect on the light.

Example D. Outlet Countdown On/Off and Memory *(Perform this timing ONLY if not using the Outlet channel for Time-of-Day programming.)*
1. Press the **CHANNEL SELECT** key until the OUTLET channel is selected.
2. Delete all time-of-day program times by pressing the **C** key and then the **REPEAT** key.
3. Press the **OUTLET ON/OFF** key to **ON** (or **OFF** if desired).
4. Press the 1 key and the 6 key to program in 16 seconds.
5. Press the **START/STOP** key to begin counting down. The outlet will switch from **ON** to **OFF,** or **OFF** to **ON**, at zero and the alarm will sound for two seconds.
6. Press the **START/STOP** key to recall the last time entered (16 seconds).
7. Press the **OUTLET ON/OFF** key to **ON** (or OFF if desired). Press the **START/ STOP** key to begin counting down again.

Example E. The repeat mode permits repeatedly turning equipment on or off at one or two unique time intervals. (Perform repeat On/Off countdown timing only if not using the OUTLET channel for time-of-day programming.)
1. Press the **CHANNEL SELECT** key until the OUTLET channel is selected.
2. Delete all time-of-day program times by pressing the **C** key and then the **REPEAT** key.
3. Press the **OUTLET ON/OFF** key to **ON** (or **OFF** if desired).
4. Press the **2** key and the **3** key to program 23 seconds.
5. Press the **REPEAT** key.
6. Press the **9** key to program **9** seconds.
7. Press the **START/STOP** key to begin counting down.
8. At zero the outlet switches On/Off, the alarm sounds for two seconds, the display automatically returns to the programmed 9 seconds, and the timer begins counting down again. At the next zero it switches, alarms, displays 23 seconds and begins counting down. It will repeat this (23 seconds switch, 9 seconds switch) timing until the **C** key is pressed. Note, if the alarm is sounding, the **C** key must be pressed twice, the first time to turn off the alarm, the second time to clear the display.

Example F. Programming Time-of-Day On/Off times (Perform outlet time of day programming ONLY if not using the OUTLET channel for countdown timing
1. Press the **CHANNEL SELECT** key until the OUTLET channel is selected.
2. Press the **OUTLET ON/OFF** key to **ON** (or **OFF** if desired).
3. Press the **3**,**1**,**5**,**4**,**2** keys to enter 3:15:42 as the time-of-day.
4. Press the **AM/PM** key until "PM" is lit on the display. If AM is desired then press **AM/PM** key until "PM" is not lit.
5. Press the **DAY** key until "W" (Wednesday) is lit. If another day is desired then press the **DAY** key until that day is lit.
6. Press the **OUTLET SET** key to store the above ON or OFF time in memory.
7. Repeat steps 2 through 6 to program additional ON and OFF times (maximum 224 times). Pressing the **C** key will clear the display to permit adding times, the **C** key alone does not delete a time-of-day time. The electrical outlet will switch when the time-of-day equals ~he programmed time.

Note: When making time-of-day entries, you have the ability to enter the On/Off times, and days, in any order you wish, the unit automatically sorts the times, and days, and puts them in the correct order.

UNIQUE FEATURE NOTE: If different times have been programmed for each day, you are able to repeat one day's program on another day. This allows for seven different program days and the use of them on any day desired without any reprogramming. Simply go to the CLOCK channel and change the day to the desired day's program.

Example G: Outlet time-of-day review, delete, and manual override.
1. Press the **CHANNEL SELECT** key until the OUTLET channel is selected.
2. Press the **OUTLET REVIEW** key and note the On/Off time, continue to press it until you have noted all the times. The first time displayed is the next outlet time to be activated. When the last program time is reached the display will read .00. You may review times again by continuing to press the **OUTLET REVIEW** key. To review a specific day's times, press the DAY key to the desired day, then press the **OUTLET REVIEW** key At any time you may add additional times per **example F**.
3. To delete an outlet time-of-day time, press the **OUTLET REVIEW** key until the time to be deleted is on the display. Press the **C** key and then the **OUTLET SET** key to delete the specific time. To delete all outlet time-of-day times, press the **C** key and then the **REPEAT** key. Pressing only the **C** key clears the display to permit adding times, the **C** key alone does not delete a time-of-day time.
4. Note, when in the OUTLET channel, the OUTLET ON light does not necessarily display the actual status of the electrical outlet. To view the actual On/Off status of the electrical outlet, press the **CHANNEL SELECT** key to place the unit in any channel other than the OUTLET channel.
5. To manually override, manually switch the outlet to ON or OFF, press the **OUTLET ON/OFF** key while in any channel other than the OUTLET or CALCULATOR channel.

Example J: (Sophisticated time setting example)
Any time-of-day switching may be repeated on one or more days by using the repeat days feature. This feature reduces key strokes and expands available memory. As an example you can set 224 On/Off times in one day and repeat them on selected days, or every day if desired, for a maximum of 1568 On/Off times in a week. This feature may also be combined with single time-of-day settings. To set identical times on several days do the following:
1. Press the **CHANNEL SELECT** key until the OUTLET channel is selected.
2. Press the **OUTLET ON/OFF** key to ON (or OFF if desired).
3. Press **1,0,5,3,0** key to enter 1:05:30 (five minutes and thirty seconds after one o'clock AM).
4. Press the **AM/PM** key until "PM" is not lit, thus indicating AM time.
5. Press the **DAY** key until M (Monday) is lit.
6. Press the **REPEAT** key to place Monday's time in memory.
7. Press the **DAY** key until "W" (Wednesday) is blinking.
8. Press the **REPEAT** key to place the same time in Wednesday's memory. Note that both "M" (Monday) and "W" (Wednesday) are lit. This indicates that the identical times are placed in Monday and Wednesday.
9. Press the **OUTLET SET** key to store the above times in memory.
10. Repeat steps 2 through 9 to set additional times on repetitive days. Non-repetitive times may also be set per **example F**.
11. Note, press the **OUTLET REVIEW** key to review times. When reviewing times note that all days for which an identical time is programmed will be lit simultaneously. The blinking light indicates the day you are reviewing.
12. Note, to delete an outlet time, press the **OUTLET REVIEW** key until the time to be deleted is on the display. Press the **C** key and then the **OUTLET SET** key to delete the displayed time-of-day. If the time to be deleted has been repeated to other days, then deleting this time will also delete the identical (repeated days) time simultaneously. To instantly delete all outlet time-of-day times, press the C key and then the **REPEAT** key.

CALCULATOR
All calculator functions are identical to normal calculator functions. The first press of the **C** key clears the display's current entry to permit changing an entry. Press the **C** key twice to clear the entire memory and all entries. Note, negative numbers may only be entered after the **C** key is pressed twice.
Example I:
1. Press the **CHANNEL SELECT** key until the CALCULATOR channel is selected.
2. 3 x 2 + 7 – 3 = 10. Press the following keys **3** x **2** + **7** **3** = read the answer 10 on the display.
3. Negative number usage 3 x 12 = -36. Press **C** twice. Press the following keys **– 3 x 1 2 =** read the answer –36 on the display.
4. Convert U.S. to Metric. 98.6 degrees Fahrenheit equals 37 degrees Celsius. Press the following keys **9 8 . 6** **3 F/C** read the answer 37.
5. Convert Metric to U.S. 0.3048 meters equals 1 foot. Press the following keys. **3 0 4 8 4** **FT/M** read the answer 1.

ERROR MESSAGES
EEEEEE on the display means error. In the CALCULATOR channel, it indicates that the answer is too large to be properly displayed. Move the decimal point shown six places to the right to arrive at the correct answer. In the OUTLET channel, EEEEEE indicates an incorrect time (such as 14 PM) has been entered or that the maximum number of On/Off program times has been stored. Press the C key to restore operation.

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WARRANTY, SERVICE, OR RECALIBRATION

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