

# Operating Instructions

TimeMaster



GM40E



GM40E42

## GM40E Series General Purpose Electronic Commercial Time Switches

### INSTALLATION - GM40E, GM40E42

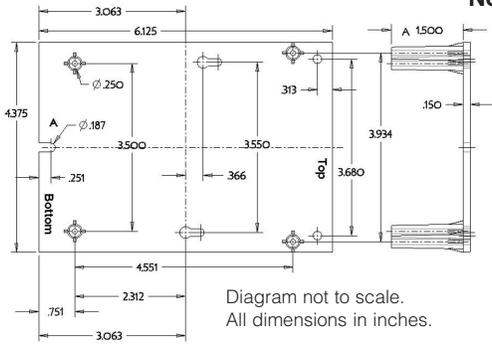
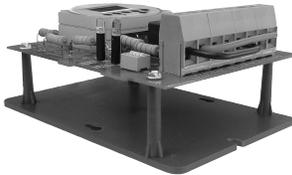
1. Open door and then remove interior protective cover by releasing spring clip on bottom.
2. Remove timer mechanism by releasing spring clip on bottom.
3. Select knockouts to be used. Remove inner 1/2" knockout by inserting a screwdriver in the slot and carefully punch knockout loose. Remove slug. If 3/4" knockout is required, remove the outer ring with pliers after removing the 1/2" knockout. Smooth edges with knife if necessary.
4. Place enclosure in desired mounting location and mark the three mounting holes (refer to diagram). Start by placing set screw on top and attaching enclosure over keyhole; then screw in remaining two screws on bottom.
5. Connect conduit hubs to conduit before connecting the hubs to the enclosure. After inserting hubs into enclosure, carefully tighten hub lock nut. Do not over-torque.
6. Verify input voltage selection. Refer to DIP switch diagram for desired input voltage.
7. Wire in accordance with National and Local Codes (see wiring diagrams).
8. Grounding: Terminate all ground wires to ground lug on bottom of enclosure.
9. Replace interior protective cover.

NEMA 3R Enclosure

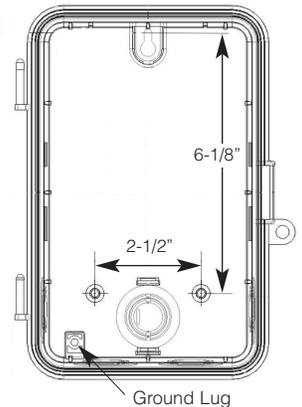
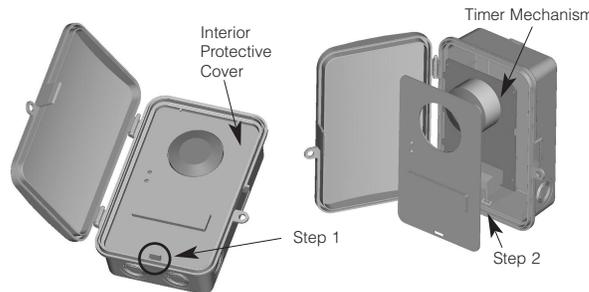


File #E83486  
Covered by U.S. Patent #6,563,2371.

Bracket Mount with Dimensions



**Note:** For outdoor locations, raintight or wet location conduit hubs that comply with requirements of UL 514B (standard for fittings for conduit and outlet boxes) must be used.



#### ELECTRICAL RATINGS:

##### N.O. Contacts:

- 40A Resistive @ 120~277VAC
- 1HP, 16FLA, 90LRA @ 120VAC
- 2HP, 12FLA, 52LRA @ 208~277VAC
- 30A Ballast @ 120VAC
- 20A Ballast @ 277VAC
- 15A Tungsten @ 120VAC
- 300VA Pilot Duty 120~240VAC

##### N.C. Contacts:

- 30A Resistive @ 120~277VAC
- 1HP, 12FLA, 30LRA @ 120VAC
- 2HP, 10FLA, 30LRA @ 240VAC
- 2A Tungsten @ 120VAC
- 10A Ballast @ 277VAC

#### WIRING CONNECTIONS:

Screw box lug terminals

#### ENVIRONMENTAL RATINGS:

Operating Temperature Range:  
-40°F to 131°F (-40°C to 55°C)

Operating Humidity: 0 to 95% non-condensing

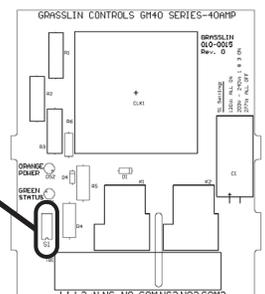
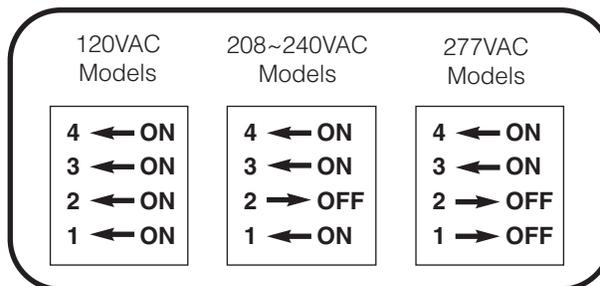
#### ENCLOSURE DIMENSIONS:

8.795" x 6.631" x 2.935" (H x W x D)

SHIPPING WEIGHT: 2 lbs.

#### INPUT VOLTAGE DIP SWITCH SETTING:

1. Do not apply power to the GM40E prior to verifying correct Input Voltage DIP switch.
2. All GM40E (Electronic Models) are voltage specific. The DIP switches are preset at factory, verify correct position (see below).



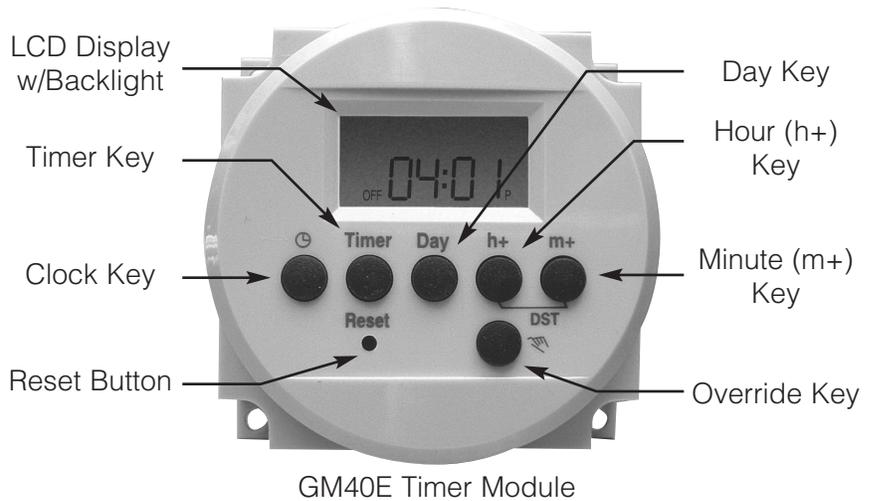
**CAUTION:** Do not check circuits by "sparking" wires to terminals. Damage to the timer may result.

**APPLICATION**

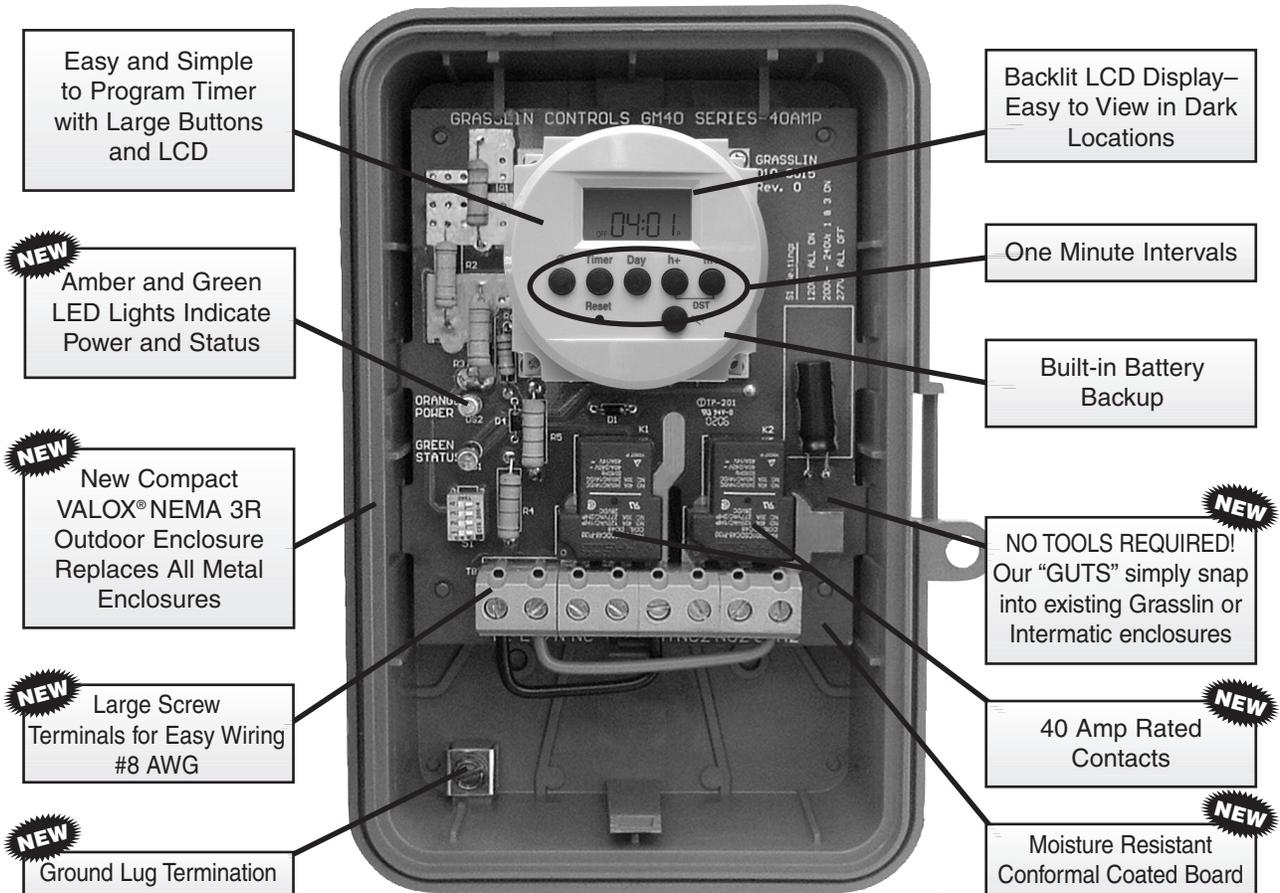
The GM40E Series Time Controls are universal, electronic time switches designed for general purpose commercial applications. Available in 120VAC, 208/240VAC or 277VAC 60/50Hz. The mechanism is mounted in a NEMA 3R outdoor enclosure and has been design for the control of lighting, heating, air conditioning, pumps, motors, or general electrical circuits in residential, commercial, industrial and agricultural facilities. All GM40E models are available as “Mechanism Only” (-M) for installation in other enclosures or control panels or “Bracket Mount” (-B). The GM40E is also available in a NEMA 1 Indoor Metal Enclosure (-IM).

**SPECIFIERS GUIDE**

Furnish and install a Grasslin GM40E \_ Electronic Series 24 hour (or 7 day) time switch with microprocessor based CPU. Input voltage shall be 120, 208/240 or 277VAC. All units shall incorporate both SPDT and DPDT contacts that shall be rated at 40A, 2 HP @ 277V. To set the starting time and to provide time indication, the unit shall have a LCD display with user interface buttons to set time, day, and programs. LED indicators shall provide Power and Status feedback. Enclosure shall be NEMA 3R suitable for both indoor or outdoor installation. Time switch shall contain an OFF/ON manual override. For Carry-over: The time switch shall have a battery backup capable of over 7 days reserve carry-over.



The GM40E is the only electronic general purpose time switch that offers SPDT and DPDT contacts, 40Amp rating, indoor and outdoor enclosure — all standard in one model.



UL LISTED 8527 File #E83486 Covered by U.S. Patent #6,563,237

# GM40E PROGRAMMING INSTRUCTIONS

## INITIAL SETUP

Apply power to the unit as illustrated in the wiring diagram. Then push the **Reset** key with a paper clip or pencil tip. The display will flash as shown.



Press and release **Clock** button to start setting the time (display will stop flashing)

## SETTING CURRENT TIME

1. Press and HOLD the **Clock** key during this entire procedure.
2. Press the **h+** key to advance the hours.
3. Press the **m+** key to advance the minutes.
4. Press the **Day** key to advance the day.
5. If any keys are pressed for a prolonged period, the display will advance rapidly.
6. Release the **Clock** key once the time and day have been entered.

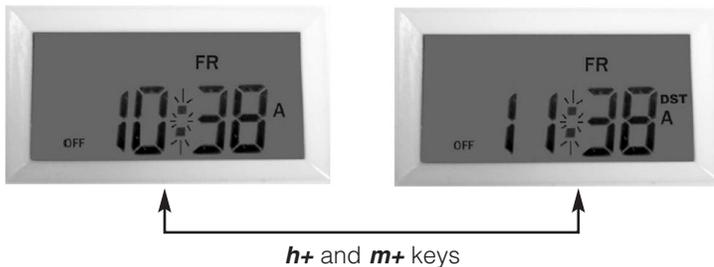


GM40E

Now the timer is in operation and ready to be programmed. The colon ":" after the hours will continuously flash indicating that the time is advancing.

## DAYLIGHT SAVINGS TIME ADJUSTMENT

1. To enter Daylight Savings Time, simply press both the **h+** and **m+** keys simultaneously.
2. The display will indicate "DST" and advance the hour by one.
3. To end Daylight Savings Time, simply press both the **h+** and **m+** keys simultaneously. "DST" will disappear from the display and the hour will be increased by one.



## PROGRAMMING ON/OFF EVENTS

Press the **Timer** key once. The display will change as shown to the right.

TIMER 1 ON -- : -- appears.



1. Using the **h+** and **m+** keys, enter the desired ON time. By default, all days are indicated, thus all 7 days will be programmed. When complete, press the **Timer** key once.

TIMER 1 OFF -- : -- will be displayed.



2. Using the **h+** and **m+** keys, enter the desired OFF time. By default, all days are indicated. When complete, press the **Timer** key once.
3. If complete, press the **Clock** key to return to current time and day.
4. Note that a total of 7 ON and 7 OFF events can be programmed.

## BLOCK PROGRAMMING

To change the day selection, simply keep pressing the **Day** key and the display will change as follows:

Individual Day (MON, TUE, etc.)	MON-WED-FRI
MON~FRI	TUE-THU-SAT
SAT~SUN	MON~WED
MON~SAT	THU~SAT
MON~SUN	

Follow the previous steps to complete programming.

## REVIEWING PROGRAMS

1. To review the programs that have been entered, simply press and release the **Timer** key. Each time you do this, you will be able to scroll thru the programs.
2. Any program can be edited simply by pressing the **h+**, **m+**, and **Day** keys. Then press the **Timer** key in order to accept the changes.
3. When complete, press the **Clock** key to return to current time and day.

## DELETING PROGRAMS

1. To delete a particular program, simply press the **Timer** key until the desired program is displayed.
2. Then press the **h+** and **m+** keys until -- : -- is displayed. Then press the **Timer** key in order to delete this particular program.
3. When complete, press the **Clock** key to return to current time and day.

## MANUAL OVERRIDE

Pressing the manual override key will alternate the unit ON or OFF.

## INITIAL STARTUP

When you initially program the unit, it may be necessary to press the manual override key as the unit will not look back to determine if it should be ON. For example, if the current time is 2:00PM and you just programmed the unit to turn ON at 1:00PM, you will need to press the manual override key to turn it ON. Thereafter, the unit will resume normal operation (automatic).

# GM40E42 PROGRAMMING INSTRUCTIONS

## ■ KEYPAD DESCRIPTION

- Setting the Time/Automatic Run Mode
- Prog.** Program Mode
- Res.\*** Reset: Clears all programs and time
- Select ON or OFF in Prog. Mode, Manual Override Run Mode
- ±1h\*** Manual Daylight Change Key
- h** Setting the Hour (12:-- – AM)
- m** Setting the Minute (12:01 AM)
- Day** Set Day and Select Days to be Omitted
- Sel.** Omit Day Selected w/Day key
- Holiday Key

\*Recessed keys; use a pen point to press



GM40E42

## ■ LCD DISPLAY ELEMENTS

Days of the Week		Holiday Indicator
Daylight Time Symbol	+1h	
AM and PM Symbol	AM	Time of Day or Switching Time
Channel Indication	CH1	
Run Mode Symbol		
		Manual Override ON
	ON/OFF Symbol	

Under normal operation the clock symbol should always appear.

		Auto ON Symbol indicates output is ON based on program. Terminals 3&4 make while 3&5 break.
		Auto OFF Symbol indicates output is OFF based on program. Terminals 3&4 break while 3&5 make.
		Continuous ON Symbol indicates output is permanently ON. Terminals 3&4 make while 3&5 break.
		Continuous OFF Symbol indicates output is permanently OFF. Terminals 3&4 break while 3&5 make.
		Temporary ON Symbol indicates output is temporarily ON. Terminals 3&4 make while 3&5 break. It will resume Auto operation at the next program event.
		Temporary OFF Symbol indicates output is temporarily OFF. Terminals 3&4 break while 3&5 make. It will resume Auto operation at the next program event.

## ■ PROGRAMS

The Digi 42 will accept up to 42 programs

A program consists of:

1. An ON or OFF command
2. Time of day (Hour and Minute)
3. Single day or multiple days

A program is required for each ON event, and a program is required for each OFF event.

**NOTE:** MULTIPLE ON OR OFF EVENTS MAY BE PROGRAMMED.

For example, Program 1 may turn the office air conditioner ON at 8AM Mon.-Fri. Program 2 may turn the air conditioner OFF at 5PM Mon.-Fri.

If someone is working late, they may press the override key to turn ON the air conditioner. If they forget to press the override key again when they leave, the air conditioner will stay on all night (or all weekend).

To prevent this from occurring, **additional OFF times may be programmed.**

- Program 3 can turn the air conditioning OFF at 6PM.
- Program 4 can turn the air conditioning OFF at 7PM.
- Program 5 can turn the air conditioning OFF at 8PM., etc.

**IMPORTANT:** BEFORE PROCEEDING WITH SETTING THE TIME AND PROGRAMMING THE UNIT, PRESS THE RESET.

## ■ SELECTING AM/PM OR MILITARY TIME

After pressing reset, the display may show AM (right). The numbered day symbols will be flashing on and off.

If the display does not show AM, it is in military time mode (24:00 hr.) To change to AM/PM mode, press and hold the **h** key and press the **±1h** key once. AM will appear in display.

If display is in AM mode and military mode is desired, press and hold the **h** key, press the **±1h** key once.



## ■ SETTING THE TIME

**NOTE:** If the **h** and **m** keys are held down longer than 2 seconds, the numbers will advance rapidly.

Press and hold the key during the following:

(If Daylight Savings Time is in effect, press **±1h** first)

1. Press **h** to advance to the current hour (while holding down the key)
2. Press **m** to advance to the current minute (while holding down the key)
3. Press **Day** repeatedly to advance to current day (while holding down the key)

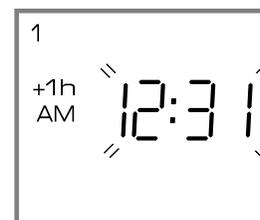
**NOTE:** If the days are flashing, it indicates the day of the week was not set when setting the time. The timer cannot be programmed unless the day of the week is entered.

## ■ MANUAL DAYLIGHT TIME CHANGEOVER

Each year, in the Spring, press **±1h** to advance the time an hour. In the Fall, press **±1h** to set back an hour.

## ■ SETTING AUTOMATIC DAYLIGHT TIME CHANGEOVER (OPTIONAL)

**NOTE:** It is only necessary to program the changeover dates once. The timer will then automatically change the time at 2:00AM on the first Sunday in April and the last Sunday in October until the year 2079.



1. Press and hold the **±1h** key and press the **Day** key once. If in AM/PM mode, "12:31" (Dec. 31) will be flashing. If in military time mode, "31:12" will be flashing.
2. Enter the current (today's) date. **Example: June 15, 1997.** Press **m** key (for date) to **15** first and then press **h** key (for month) to **06** (If in military time, h is date and m is month)
3. Press **±1h** once, a **2** under Tu and **1995** appears in display
4. Enter the current year. **Example: 1997.** Press **m** key twice to **1997** (If you overshoot, hold down the m key – the years will scroll to 2079 and back to 1995)
5. Press **±1h** once, a **3** under We and **AU** appears in display, which indicates preset European dates.
6. Press **m** key once so display shows **cHA** (If m key is inadvertently pressed twice and **HA** shows in display, press m key two more times until **cHA** shows)
7. Press **±1h** once, a **4** under Fr and **03:30** (for 1997) appears in display, which indicates March 30 (30:03 in military)
8. Enter the date for spring time change. **Example: April 6, 1997.** Press **h** key (for month) to **04**. Press **m** key (for date) to **06** (If in military time, h is date and m is month)

# GM40E42 PROGRAMMING INSTRUCTIONS

9. Press **±h** once, a **5** under Sa and the fall time change date appears in display. **Example: 10:26 for 1997**

10. Press **⌚** key to enter Run Mode

## Daylight Time Changeover Dates

1997 April 6 - October 26	2002 April 7 - October 27
1998 April 5 - October 25	2003 April 6 - October 26
1999 April 4 - October 31	2004 April 4 - October 31
2000 April 2 - October 29	2005 April 3 - October 30
2001 April 1 - October 28	2006 April 2 - October 29

## PROGRAMMING 24 HOUR OR 7 DAY SCHEDULES

It is helpful to write out the program schedules *before* beginning. See last page.

**IMPORTANT:** THE CURRENT TIME OF DAY AND DAY OF WEEK MUST BE SET PRIOR TO PROGRAMMING. SEE "SETTING THE TIME"

**NOTE:** The **Day** and **Sel.** keys are used to *omit* days of the week for which the OFF or ON time is not to be implemented. For 24 hour schedules (same program *every* day of the week), ignore **Day** and **Sel.** keys.

If an ON or OFF symbol is not entered, the ON symbol will flash, and program will not be accepted.

### Example

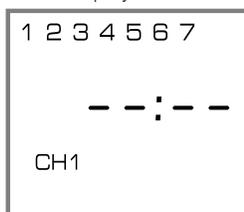
**Program 1:** ON at 7:00AM Monday thru Friday

**Program 2:** OFF at 6:00PM Monday and Friday only

**Program 3:** OFF at 5:00PM Tuesday, Wednesday and Thursday

Three programs need to be entered.

Press **Prog.** key only once. Display shows:



### Program 1 (ON at 7:00AM Monday thru Friday)

Press <b>⏏</b> key once	ON symbol <b>⏏</b> appears
Press <b>h</b> key	to 07AM
Press <b>m</b> key once	to 00
Press <b>Day</b> key 6 times	flashing line appears under 6
Press <b>Sel.</b> key once to omit	6 in display flashes
Press <b>Day</b> key once	flashing line appears under 7
Press <b>Sel.</b> key once to omit	7 in display flashes
Press <b>Prog.</b> key to enter	

### Program 2 (OFF at 6:00PM Monday and Friday)

Press <b>⏏</b> key twice	OFF symbol <b>⏏</b> appears
Press <b>h</b> key	to 06PM
Press <b>m</b> key once	to 00
Press <b>Day</b> key twice	flashing line appears under 2
Press <b>Sel.</b> key once to omit	2 in display flashes
Press <b>Day</b> key once	flashing line appears under 3
Press <b>Sel.</b> key once to omit	3 in display flashes
Repeat <b>Day</b> and <b>Sel.</b> keys for days 4, 6, and 7	
Press <b>Prog.</b> key to enter	

### Program 3 (OFF at 5:00PM Tuesday, Wednesday and Thursday)

Press <b>⏏</b> key twice	OFF symbol <b>⏏</b> appears
Press <b>h</b> key	to 05PM
Press <b>m</b> key once	to 00
Press <b>Day</b> key once	flashing line appears under 1
Press <b>Sel.</b> key once to omit	1 in display flashes
Press <b>Day</b> key 4 times	flashing line appears under 5
Press <b>Sel.</b> key once to omit	5 in display flashes
Repeat <b>Day</b> and <b>Sel.</b> keys for days 6 and 7	
Press <b>Prog.</b> key to enter	
Press <b>⌚</b> key to enter Run Mode	

**IMPORTANT:** IF AN "ON" TIME WAS PROGRAMMED THAT IS EARLIER IN THE DAY THAN THE CURRENT TIME, PRESS **⏏** ONCE TO TURN THE TIMER "ON". (IT DOES NOT "LOOK BACK" TO DETERMINE IF IT SHOULD BE ON OR OFF AFTER PROGRAMMING)

## MANUAL OVERRIDE

**TEMPORARY:** While in the Run Mode, pressing the **⏏** key once will reverse the output; ON to OFF or OFF to ON. The **⏏** symbol appears in the display to indicate a temporary override. At the next scheduled switching time, automatic control resumes, eliminating the override.

**CONTINUOUS:** While in the Run Mode...

- Pressing the **⏏** key twice will turn the output to ON permanently. **⏏** symbol appears in display.
- Pressing the **⏏** key three times will turn the output OFF permanently. **⏏** symbol appears in display.
- To terminate a continuous override, press the **⏏** key until **⌚** appears in the display.

## REVIEWING PROGRAMS

To review the programs at any time, press **Prog.** key. Programs will appear in the order they were entered with repeated presses of the **Prog.** key. After all programs have been reviewed, the blank display will appear to allow entering another program. Another press of the **Prog.** key will display the number of free programs available, such as **Fr 38** if 4 programs have been entered.

## CHANGING A PROGRAM

Select the program to be changed with the **Prog.** key. New days may be omitted or omitted days may be returned by using the **Day** and **Sel.** keys just as in initial programming. Hour and minute can be changed with the **h** and **m** keys.

Press **Prog.** key to store the new program.

## DELETING A PROGRAM

Press **Prog.** key until the desired program is displayed.  
 Press **m** key to **:59** and press once more to blank out.  
 Press **h** key to **11PM** and press once more to blank out.  
 Press **⌚** key, display will flash for several seconds and then enter the Run Mode.  
 Using the reset key will delete ALL programs, the time of day, and daylight change dates.

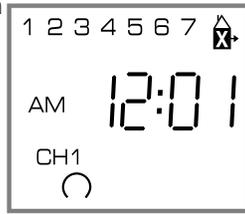
# GM40E42 PROGRAMMING INSTRUCTIONS

## ■ HOLIDAY PROGRAM

An "8th day", or Holiday program schedule may be entered for use on holidays or vacation periods. More than one ON or OFF time may be entered for the Holiday program.

**A typical Holiday schedule may be to turn OFF at 12:01AM during the holiday period.**

1. Press **Prog.** key to first free program
2. Press key twice; OFF symbol appears
3. Press **h** key once to 12AM
4. Press **m** key twice to 01
5. Press key once



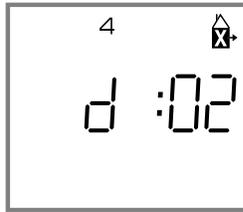
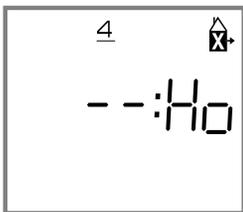
Enter additional ON or OFF schedules as above, followed by the key.

## ■ IMPLEMENTING HOLIDAY PROGRAM

Up to 6 days in advance of the Holiday, the "8th day" or Holiday schedule may be selected to begin on a certain day of the week, and continue from 1 to 99 days.

**Example: Thursday and Friday will be Holidays**

1. Press key once
2. Press **Day** key to 4 (Th)
3. Press **Sel.** key twice to 02



4. Press key to enter Run Mode

Display will show symbol above current time

8th day schedule will be implemented on Thursday and run for 2 days and then timer will revert back to normal programs.

**NOTE:** If **Sel.** key is held down, it will scroll rapidly to 99 and back to 01

To review the implementation scheduled, press key once. Display shows day of implementation and number of days holiday program will be active. Press key.

To delete the implementation scheduled, press key twice. symbol disappears from display.

On the day the Holiday Program is selected to begin, the 8th day program will be implemented. The display will show the Holiday symbol and number of days remaining in the holiday period. To cancel at this point, press once.

## ■ TROUBLESHOOTING

**PROBLEM:** Days are flashing, pressing any key does nothing except key turns output ON and OFF.

**SOLUTION:** **Time of Day** and **Day of Week** have not been set. See "SETTING THE TIME"

**NOTE:** This is the condition after a reset. If the timer is found in this condition after it has been installed, programmed and operating for a while, it may indicate that electrical noise or voltage transients have disrupted the microprocessor causing a loss of program information. Call 1-800-272-1115 and request that a no-charge "Snubber Filter" be sent to you to place across the input to the timer, which may solve the problem.

A second, but very unlikely cause of loss of program is a power failure with the backup battery low or dead. Check by disconnecting power and monitoring how long the battery keeps the time of day in the display.

**PROBLEM:** Time of day was set while holding the key down, but days are still flashing.

**SOLUTION:** Current day of week was not set **while holding down the key.** See "SETTING THE TIME"

**PROBLEM:** It is 10AM and a ON program for 8AM was entered, but the output is not ON. Display shows the and symbols.

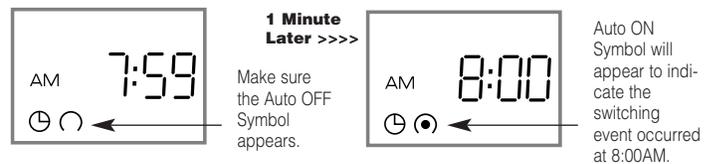
**SOLUTION:** After programming, the timer does not "look back" to determine if it should be ON. Press the key (temporary override) to turn the output ON; appears in display. The timer will resume automatic operation at the next programmed event.

**PROBLEM:** A program for 8AM Monday thru Friday was entered, but it will not accept it and CH1 is flashing.

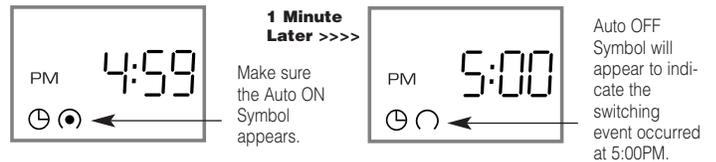
**SOLUTION:** The ON or OFF was not entered as part of the program. ON or OFF **must be selected.**

## ■ TESTING UNIT

After the unit has been programmed you may want to check if it will perform ON/OFF switching at the correct times. To accomplish this test simply change the current time to 1 minute before the actual programmed switching event time. For example if the ON time programmed is at 8:00AM (MON-SUN) and the OFF time programmed is at 5:00PM (MON-SUN) then first check the ON event by changing the current time to 7:59AM. The unit will display as follows (see setting the time section):

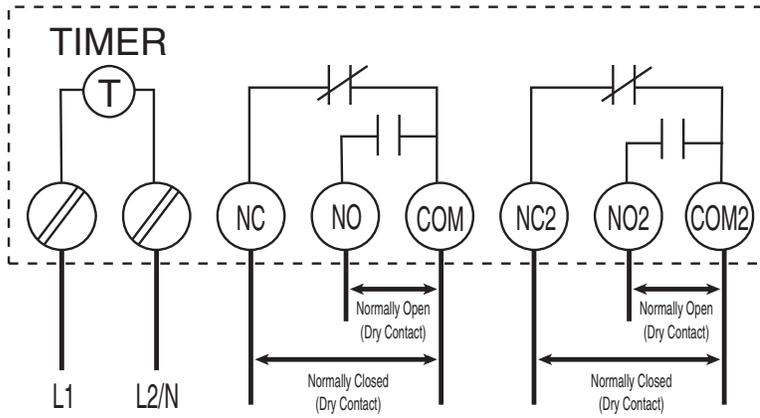


To check the OFF event change the current time to 4:59PM. The unit will display as follows (see setting the time section):



This process verifies that the unit will switch at the proper programmed times. Now simply change the time to the actual current time.

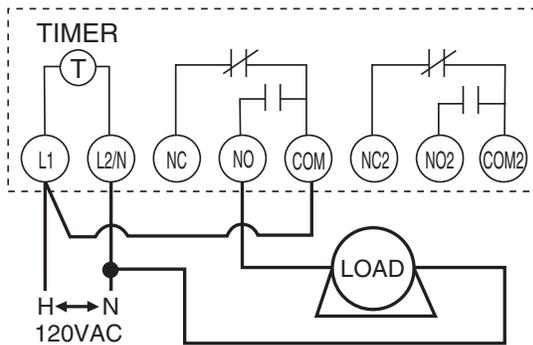
# GM40 TERMINAL DESIGNATIONS



**Note:** GM40 is shipped with pre-installed jumper wires (L1 to COM and L2/N to COM2). In applications requiring a "DRY" non energized contact, remove jumpers as shown.

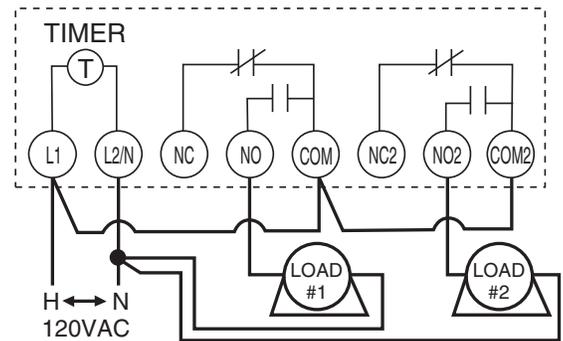
## GM40 TYPICAL WIRING DIAGRAMS

Typical Wiring Diagram (120VAC Application)  
Controlling One 120VAC Load



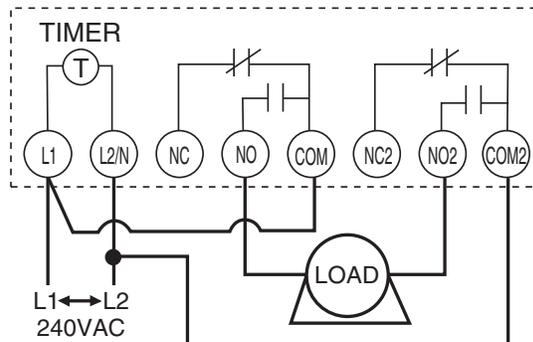
If GM40 is used to control a single 120VAC load, remove jumper wire (L2/N to COM2) and keep jumper wire (L1 to COM).

Typical Wiring Diagram (120VAC Application)  
Controlling Two 120VAC Loads



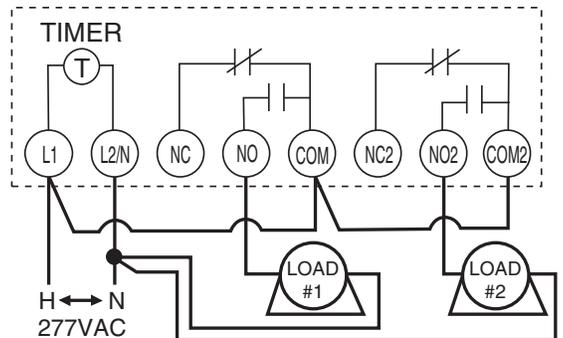
If GM40 is used to control two 120VAC loads, remove jumper wire (L2/N to COM2) and reposition it to (COM to COM2).

Typical Wiring Diagram (240VAC Application)  
Controlling One 240VAC (Dual Phase) Load



If GM40 is used to control a single 240VAC load, do not remove jumper wires (L1 to COM and L2/N to COM2).

Typical Wiring Diagram (277VAC Application)  
Controlling Two 277VAC Loads



If GM40 is used to control two 277VAC loads, remove jumper wire (L2/N to COM2) and reposition it to (COM to COM2).

Note: Refer to page 1 for proper Input Voltage DIP Switch selection.

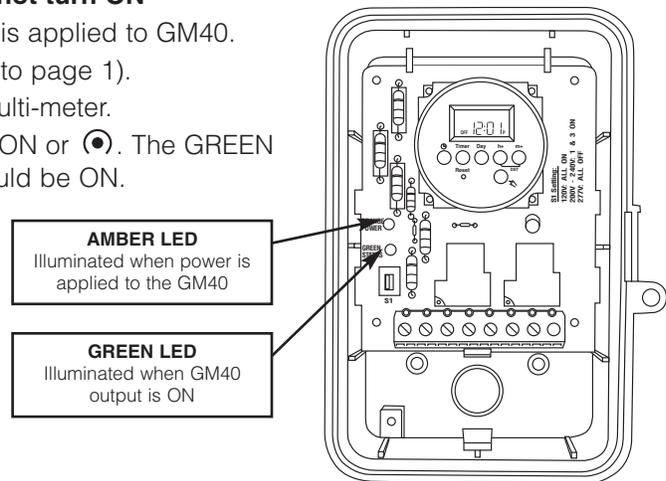
## GM40 TROUBLESHOOTING GUIDE

### PROBLEM: LOAD (Lights/Pumps/Motor, etc.) does not turn ON

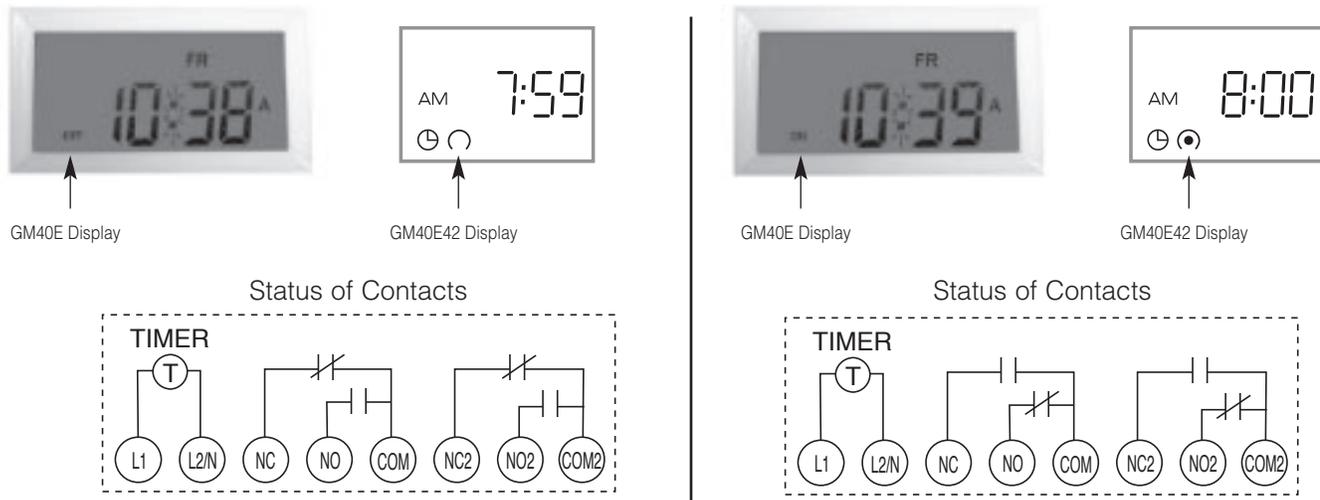
1. Check AMBER Power LED, if ON it indicates power is applied to GM40.
2. Verify correct input voltage DIP switch setting (refer to page 1).
3. Check voltage across terminals L1 and L2/N with Multi-meter.
4. Press the manual override button until unit displays ON or . The GREEN LED should illuminate indicating that the output should be ON.
5. Check wiring (refer to page 3).

### PROBLEM: LOAD (Lights/Pumps/Motor, etc.) does not turn OFF

1. Press the manual override button until unit displays OFF or .
3. The GREEN LED should turn OFF indicating that the output should be OFF.



## GM40 CONTACT TERMINALS TRANSITION



## GM40 MOUNTING INTO INTERMATIC ENCLOSURE

### Mounting GM40 Mechanism into existing Intermatic Metal Enclosure

The GM40 Series printed circuit board assembly will fit into all Intermatic enclosures except the T7000 and T5000 Series. Install GM40-M into Intermatic enclosure in the same manner as the Intermatic mechanism was previously installed.

