

Step 6

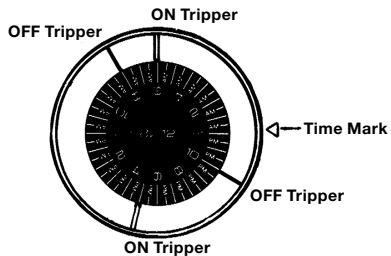
Using pliers, grip folded down hasp on side of case and rotate it upward as shown. Also, install external push button in the inside of cover by inserting plastic button into the rectangular and round holes as shown then pressing round tabs into round hole in cover. Close cover to make sure the holes in cover line up. Adjust, if required.



Step 7

Set the daily program - see operating instructions on page 7. Each individual household should determine a schedule to suit their own needs. Adjustments should be made for family size, hot water needs, appliances, etc. In areas where time-of-day rates are in effect, consult the electric utility company to find when the lowest rates apply. Then set the time switch to operate the water heater when the electric rates are lowest and adjust the schedule accordingly.

In setting the schedule, consider the facts that the temperature and quantity of hot water will decline during the OFF periods depending on amount used and length of OFF time. A typical schedule could be ON at 6 a.m., OFF at 8 a.m. for morning use, and ON again at 5 p.m. and OFF again at 10 p.m.



View of Dial at Midnight
Typical Program

Step 8

Check wiring, time setting (a.m./p.m.) and program. If hard wired, also close Water Heater Terminal Box. Restore electric service (the reverse of Step 2).

Operating Instructions

This Time Switch will repeat a preset schedule daily except when the **EXTERNAL MANUAL PUSH BUTTON** is used. This manual button permits the user to turn the water heater **ON** and **OFF ahead** of the schedule. The Time Switch will resume the **preset** program by the next scheduled **ON** or **OFF** operation. The diagram on the right shows the mechanism and wiring of this Time Switch. The **TIME MARK** is used to line up the correct time of day on the **TIME DIAL**. The **ON** and **OFF TRIPPERS** turn the water heater **ON** and **OFF** at the times indicated by their respective position on the **TIME DIAL**.

To Set Program

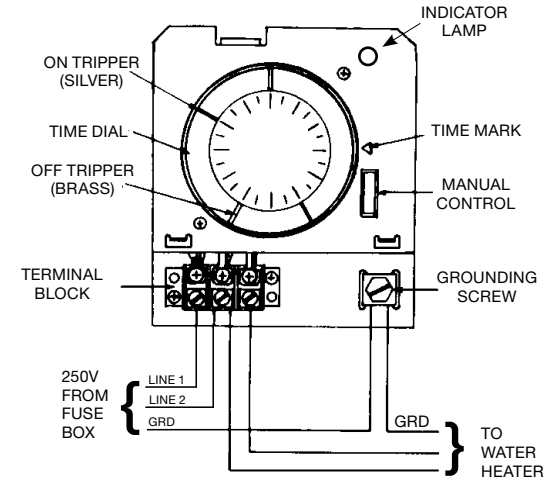
1. Grasp time dial firmly. **PULL** and remove time dial completely from timer.
2. Remove all **ON** trippers (silver) and **OFF** trippers (brass). Use pencil or paper clip if necessary.
3. Insert **OFF** trippers (brass) in slots for desired **OFF** times, but **NOT CLOSER** than 2 hours apart.
4. Insert **ON** trippers (silver) in slots for desired **ON** times, but **NOT CLOSER** than 2 hours apart. **ON** and **OFF** trippers may be spaced 1/2 hour apart from each other.
5. Replace time dial. **PUSH IN FIRMLY**. If any trippers are near the time mark, rotate time dial to avoid interference with mechanism inside.
6. Turn time dial **CLOCKWISE** one or more revolutions until correct time-of-day is opposite time mark.

TO STOP AUTOMATIC OPERATION: (But without stopping timer) **PULL** outward on time dial until it clicks.

TO RESUME AUTOMATIC OPERATION: **PUSH** inward on time dial.

AFTER POWER FAILURE: (or if water heater was disconnected at main panel) time dial must be reset to correct time-of-day.

DISCONNECT POWER AT THE CIRCUIT BREAKER(S) OR DISCONNECT SWITCH(ES) BEFORE INSTALLING OR SERVICING. TURNING THIS SWITCH OFF WILL STILL LEAVE THE POSSIBILITY FOR HAZARDOUS VOLTAGE AT THE WATER HEATER.



To purchase extra trippers: order part no. 156EB1945A for a set of two (2) ON and two (2) OFF trippers.



WH21 Electric Water Heater Time Switch

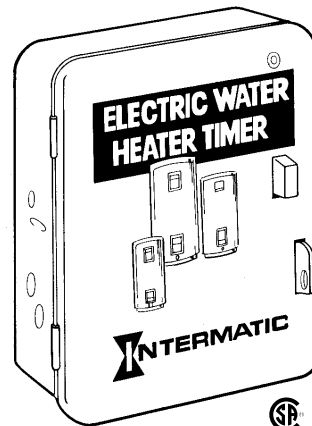
WARNING Risk of Fire or Electric Shock

- Disconnect power at the circuit breaker(s) or disconnect switch(es) before installing or servicing.
- Installation and/or wiring must be in accordance with national and local electrical code requirements.
- Use #14 - #10 AWG wires, rated at least 90° C - COPPER conductors ONLY.
- Do not remove insulator.
- KEEP DOOR CLOSED AT ALL TIMES when not servicing.
- Turning this switch off will still leave the possibility for hazardous voltage at the water heater.
- More than one circuit breaker or disconnect switch may be required to de-energize the equipment before servicing.

NOTICE

- Rotate timer dial clockwise only.
- Do not move the clock hands on the timer. Moving the clock hands can damage the timer.

- » Easy to Install
- » External Manual Override Switch
- » Match Water Heater Off Times to Peak Energy Periods of Utility to Reduce Demand
- » External Load Indicator
- » 25 A (6250 W) Resistive, 208-250 VAC, 60 HZ
- » 1500 W Tungsten, 208-250 VAC, 60 HZ
- » 2 HP, 20 FLA, 80 LRA @ 208-250 VAC, 60 HZ



Step 1

A. Checking:

- » Make sure the Time Switch and the water heater VOLTAGES are the same.
 - » Make sure the water heater rating in WATTS is not over the maximum capacity of this Time Switch.
 - » Make sure the water heater is wired with COPPER wire.
- Do not connect ALUMINUM wires to the terminals of this Time Switch.** Consult an electrician if the existing wires are ALUMINUM.

Disconnect power at the circuit breaker(s) or disconnect switch(es) before installing or servicing.

B. Planning and Measuring:

Here is how the water heater is wired now, **BEFORE** the installation of this Time Switch:

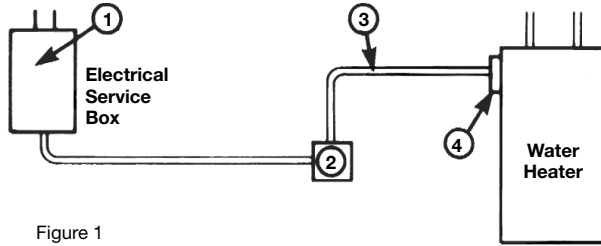


Figure 1

- 1 Service Box** - The water heater should have its own (separate) fuse or circuit breaker in the electrical panel.
- 2 Junction Box** - The wiring may or may not include this convenience box. It may contain a disconnect switch and/or receptacle if water heater is cord connected.
- 3 Water Heater Connection** - This is a rigid or flexible (metallic or plastic) cable containing 2, 3 or 4 insulated wires of different colors.
- 4 Water Heater Terminal Box** - This is part of the water heater where the power supply wires are connected.

Here is the modified wiring, **AFTER** the Time Switch is installed:

Figure 2: Hard Wired

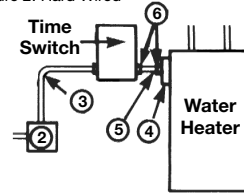
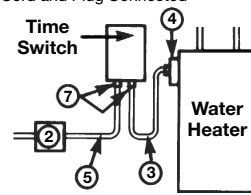


Figure 3: Cord and Plug Connected



- » Plan a convenient location for the Time Switch, preferably eye level (also out of reach of small children), and such that existing cable (Fig. 2, or Fig. 3 Item #3) may be utilized.
- » Measure the distance (Item #5) from the Time Switch to Water Heater Terminal Box (Item #4). Also measure distance (Item #3) from Time Switch to Junction Box if existing cable (Fig. 2, Item #3) is too short. Allow for slack and 6 inches of hook-up leads at each end to facilitate wiring connections.

C. Materials Needed

If the water heater is HARD WIRED: (See Figure 2)

- Obtain a piece of cable, the SAME TYPE (that is, metallic or plastic) and SAME GAUGE with COPPER conductors to make Item #5 connection (and Item #3, if needed) as shown. See also gauge selection chart below.
- Obtain 2 cable connectors (Item #6) to fit the cable above.

If the water heater is CORD and PLUG connected: (See Figure 3)

- Obtain the SAME TYPE and GAUGE cordset with plug as presently used on (Item #3) and 2 strain relief grommets (Item #7) to fit THIS cordset.

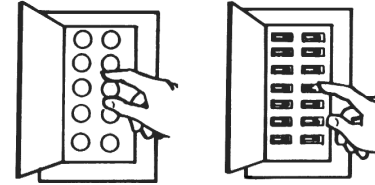
D. Tools Needed

Hammer, 1/4" wide screwdriver, drill, pliers, wire cutter and stripper.

Size of Fuse or Circuit Breaker	Minimum Gauge of Copper Wire	125 or 250 VAC	Water Heater Capacity	
			125 VAC	250 VAC
A	#AWG	A	W	W
15	14	15	1875	3750
20	12	20	2500	5000
25	10	25	3125	6250

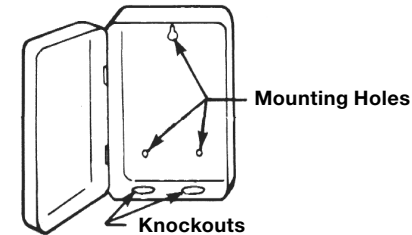
Step 2

Disconnect power at the circuit breaker(s) or disconnect switch(es) before installing or servicing. Pull plug, if cord connected; remove fuse or open circuit breaker if hard wired. More than one circuit breaker or disconnect switch may be required to de-energize the equipment before servicing.



Step 3

Mount timer case on wall as outlined in step 1B. Mark top mounting hole. Drill hole in mounting surface and drive screw into hole. Hang timer on screw. From the inside put screws into two bottom mounting holes. Use anchors if necessary.



Step 4

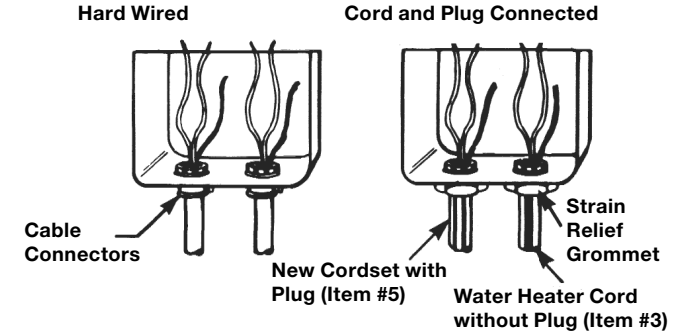
If the water heater is HARD WIRED:

Remove the cover of water heater terminal box (Fig. 1, Item #4). **IS ELECTRICITY TURNED OFF? NOTE COLORS OF WIRES.** Disconnect wires and cable connector. Remove the most convenient knockout of the time switch case and attach cable (Fig. 2, Item #3) and cable connector to case. If a 3/4 inch knockout is needed, remove the 1/2 inch knockout first, then the 3/4 knockout. Prepare another cable (Fig. 2, Item #5) by stripping the ends of wires 1/2 inch. Using cable connector (Fig. 2, Item #6), attach this cable to water heater terminal box and then the wires to water heater terminals.

NOTE: If there were green and/or white wires in the terminal box before, connect the same colors to these same terminals. **TIGHTEN TERMINAL SCREWS FIRMLY** (torque 20-30 Lb In.). Remove another knockout of the time switch case and connect the other end of this cable to the case, using the other cable connector, Item #6.

If the water heater is CORD and PLUG connected:

Remove plug at end of water heater cord (Fig. 1. Item #3). Split cord about six inches and strip wire ends 1/2 inch. Remove the most convenient knockout of the time switch case and attach cable (Fig. 2, Item #3) and cable connector to case. If a 3/4 inch knockout is needed, remove the 1/2 inch knockout first, then the 3/4 knockout. Install strain relief grommet (Fig.3, Item #7) and attach cord to case as shown. Next, install strain relief grommet to the other cordset (Fig. 3, Item #5) and attach cordset to case as shown below.



Step 5

Move insulator out of the way and connect the wires coming from the service box and from the water heater to the terminals of the time switch mechanism. For wiring connections regarding a specific model, refer to diagram inside the time switch door. Attach wire ends to time switch terminals as shown in wiring diagram. Insert only the stripped copper ends of wires **UNDER** the pressure plates of terminal screws as shown. Using 3/16" or larger screwdriver, **TIGHTEN TERMINAL SCREWS FIRMLY** (torque 20-30 Lb In.). Note: Time Switch may not operate if terminal screws are loose. Now replace front insulator cover. See illustration below.

