

WT-805 Digital Programmable WATER HEATER THERMOSTAT For GAS and ELECTRIC TANK

Water Heating cost is a major part of the households as well as commercial heating bills. WT-805 is a programmable controller that allows the users to preprogram a specific daily time schedule and the water temperature for the hot water needed throughout the hours of 5 days of the week and the weekend separately. This eliminates the waste of energy and dramatically lowers the cost of water heating. This thermostat can be used for Gas Water Tanks as well as Electric Water Tanks.

This microprocessor based controller consists of two units: The Control Panel with large size, backlit LCD screen and the Power Module to control the water heating power and timing.

For both, the Electric and the Gas water tank systems the Control Panel and its installation is the same. The Power Module installation and components however differ between the gas or electric heating.



Front view of the WT-805 Control Panel. Model with Green backlight in black enclosure shown.



Model with Blue backlight in white enclosure.



Red backlight when Special Mode active.

Components required for use with Electric Water Tank:

1. WT-805CP Programmable Thermostat Control Panel
2. WT-805PM Power Module

Components required for use with Gas Water Tank:

1. WT-805CP Programmable Thermostat Control Panel
2. WT-805PM Power Module
- 3* Compatible Temperature Probe (sensor)
- 4** Compatible Gas Ignition Controller
- 5** Compatible Electric Gas Valve
- 6** Compatible Gas Igniter

NOTE: Items marked with " * " may be supplied by others and should be chosen to be compatible with the water tank heating system for installation.

* The Temperature Probe may be either separate or integrated with the Gas Valve assembly as long as the probe connector wiring is compatible with the connector header on the WT-805 Power Module and the required electrical and thermal specifications. For details see the description of the probe and its connector pin-out.

** The Ignition Controller, Gas Valve assembly and the Igniter assembly should be compatible functionally and electrically with each other for the desired functionality and wiring. The WT-805 Thermostat Power Module will only control the supply power to the Ignition Controller.



WT-805PM Power Module.

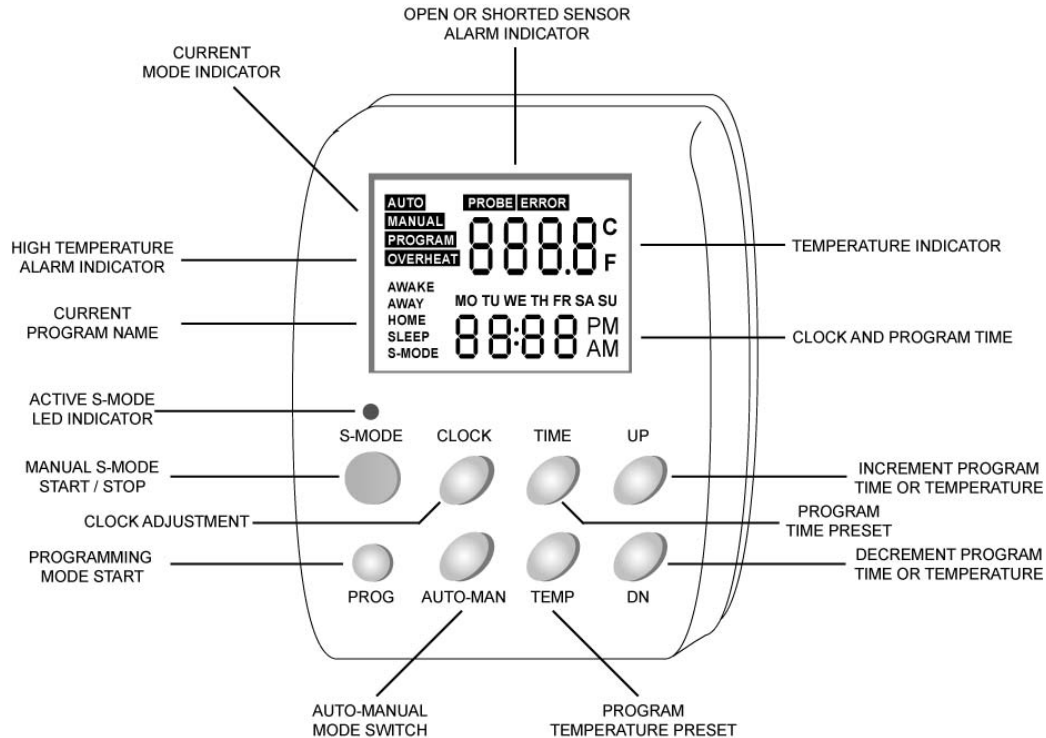
SPECIFICATIONS:

| | |
|-------------------------|---|
| Supply: | Selectable by model: 120VAC, 208-240VAC, 12VAC, 24VAC, 50/60Hz |
| AUTO Programs: | Weekly 5/2 day programs with 4 programs per day and 1 S-Mode special program for any period during the week. |
| MANUAL Modes: | 1 Normal MANUAL mode and 1 Special MANUAL S-Mode. |
| Program Memory: | Nonvolatile. The programs will be retained even without power or without batteries. |
| Clock: | 12 and 24 hour format selectable via keypad. |
| Temperature test range: | +4°C to +143°C (40°F to +290°F) |
| Program setting range: | +40°F to +160°F (+4°C to +70°C) for Normal Modes and +40°F to +120°F (+4°C to +50°C) for Special S-Modes. |
| Temperature sensor: | Standard: Compatible with 10 kohm NTC Thermistor temperature probes. Curve factor B=3950 . Optional: Compatible with 100 kohm NTC Thermistor temperature probes. Curve factor B=4100 . |
| High Temp. protection: | Compatible with internal high temperature protection fuse in the probe assembly, normally closed. |
| Storage temperature: | -20°C to +70°C (-4F to +158°F) |
| Clock Battery backup: | 3 "AAA" size batteries, 1.5V each. |
| Control Output: | For Gas Tank models: 2Amp, 250VAC max. with internal 2 Amp fuse. For Electric Tank models: 30Amp, 250VAC max. with external fuse. |

DIMENSIONS:

Control Panel: 3.25"(H) x 2.5"(W) x 1.2"(D)
Power Module: 4.25"(L) x 2.5"(W) x 1.5"(H)

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HEATING PROGRAMS

- AWAKE:** This is an Automatic program typically for the morning, when you may prefer a warmer temperature.
- AWAY:** This is an energy-saving Automatic program for the time you are away from home. The setting can be adjusted to minimize energy consumption.
- HOME:** This is an Automatic program for the time you return home and want a comfortable temperature, typically warmer settings during winter and cooler settings during summer.
- SLEEP:** This is an Automatic sleep program. You may choose to set temperature for energy savings or comfort as desired.
- S-MODE:** Special Save-Mode program that, when enabled, will override all other programs. S-MODE may be programmed to execute Automatically for any period during the week including the Weekend. S-MODE may be activated Automatically as programmed or Manually by pressing the S-MODE key at any time.
- MANUAL:** This mode is activated by pressing the AUTO-MAN key at any time when in AUTO mode and while the thermostat is not in S-MODE. Manual mode will override the AUTO mode until the key is pressed again.
- MANUAL S-MODE:** This mode is activated by pressing the S-MODE key at any time. MANUAL S-MODE will override any other mode until the key is pressed again. This mode preset temperature CANNOT be altered by pressing UP or DN keys. Instead, it is using the temperature as preset for the Automatic S-MODE.

Note:

- 1) The 4 programs for Weekdays, the 4 programs for Weekends and the S-MODE program are all independent. You may set them to the same or different time/temperature combinations.
- 2) S-MODE temperature preset is limited to 120F (50°C) maximum. All other modes are limited to 160F (70°C) maximum.

TEMPORARY OVERRIDE:

In all modes EXCEPT the S-MODE: To change the temperature temporarily press UP or DN key to set the desired temperature. The thermostat will return to the regular program at the next scheduled program time.

Note: The thermostat has an automatic delay function to protect the heating systems from frequent on/off sequences. Sometimes there may be a delay before the thermostat activates the system.

MANUAL Mode:

- This feature is to hold the thermostat at a constant temperature and disable the set programs.
- Press AUTO-MAN key once while the thermostat is in the AUTO mode. AUTO symbol will disappear from the display. Use UP or DN keys to set the desired hold temperature.

NOTE: In ALL S-MODEs the display color will be RED. In all Normal modes the display will be GREEN (or optional BLUE).

Set CLOCK Time and Day:

- Press CLOCK key to start time setting. Only time will be shown.
- Use UP or DN key to set the current time.
- Press CLOCK again. Weekday will flash.
- Use UP or DN key to set the current day.
- Press CLOCK key again to exit.

12/24 Hour Clock Display Format:

- Press the CLOCK key to initiate the clock preset mode.
- Press both UP and DN keys together at the same time to change the time display from 12-hour format to 24-hour format (e.g. 8:00 pm / 20:00) and vice versa.

NORMAL AUTO SCHEDULE PROGRAMMING (Display color GREEN or optional BLUE)

This thermostat is equipped with separate programming for Weekdays and Weekends, with four programs each.

- Press the PROG key once to begin schedule programming of the currently executed program. The display will indicate symbol: PROGRAM.

The name of the program (AWAKE, AWAY, HOME, SLEEP) will be shown on the left hand side of the display.

To go to another program, press the PROG key repeatedly.

MO to FR symbol indicates the Weekday programs and SA SU indicates the Weekend programs.

The minutes in the time section on the display will start flashing.

To program the scheduled Start Times:

- Program start times can be set in increments of 10 minutes.
- Press TIME key repeatedly to move the time cursor to minutes, hours and AM/PM selection.
- Use UP or DN keys to set the desired start time.

To program the scheduled Temperatures:

- Temperature can be set in increments of 0.5°.
- Press TEMP key to initiate the temperature preset.
- Use UP or DN keys to set the desired temperature.
- To terminate the programming mode press PROG key repeatedly until the symbol PROGRAM disappears from the display, or just wait till the controller exits the programming mode automatically within 15 seconds if no keys are pressed.

TIP: Press and hold the UP or DN key to move the numbers quickly.

To Check the Current Programs:

- Press either UP or DN key ONCE to check the current programmed temperature setting without changing it.

Note: The PROG key can also be used at any time to review all the set programs.

S-MODE AUTO SCHEDULE PROGRAMMING (Display color RED)

This special AUTO mode allows for separate programming for any period from Monday to Sunday.
Only one temperature may be preset for the entire program duration.
Only one Start time and one End time can be programmed.

To program the S-MODE:

- If thermostat is currently in S-MODE, press the PROG key and perform programming like for the Normal Auto modes.
- If thermostat is NOT currently in S-MODE, press the S-MODE key first to initiate the Manual S-MODE and then press the PROG key and perform programming like for the Normal Auto modes. Remember to press the S-MODE key again to end the Manual S-Mode if not required at this time.

ALARMS

The Thermostat is capable of detecting several possible error situations in the system.

- 1) **OVERHEAT ERROR**
This Alarm may occur when the detected temperature exceeds +188F (+87°C) . The display will indicate OVERHEAT flashing for as long as the high temperature is present. This Alarm will cause the output load to be disconnected until the temperature falls below the alarm level. Then the alarm will stop flashing but will remain on the display until it is reset manually by pressing the TIME and TEMP keys at the same time.
- 2) **PROBE ERROR**
This Alarm is initiated when the temperature sensor probe wiring is either shorted or becomes open. If the probe is detected to be shorted, the temperature indication on the display will read very high. If the probe wiring is open, the temperature indication will read very low. In both cases the Alarm will NOT be automatically reset and the load will remain disconnected until the error is repaired AND either the power (including batteries) is disconnected for at least 5 seconds OR the two keys: TIME and TEMP are pressed at the same time.

BACK-UP BATTERIES

The controller uses 3 batteries "AAA" type, 1.5V each, for back-up of the clock in case of the supply power failure. They assure the correct time counting after the power is restored.

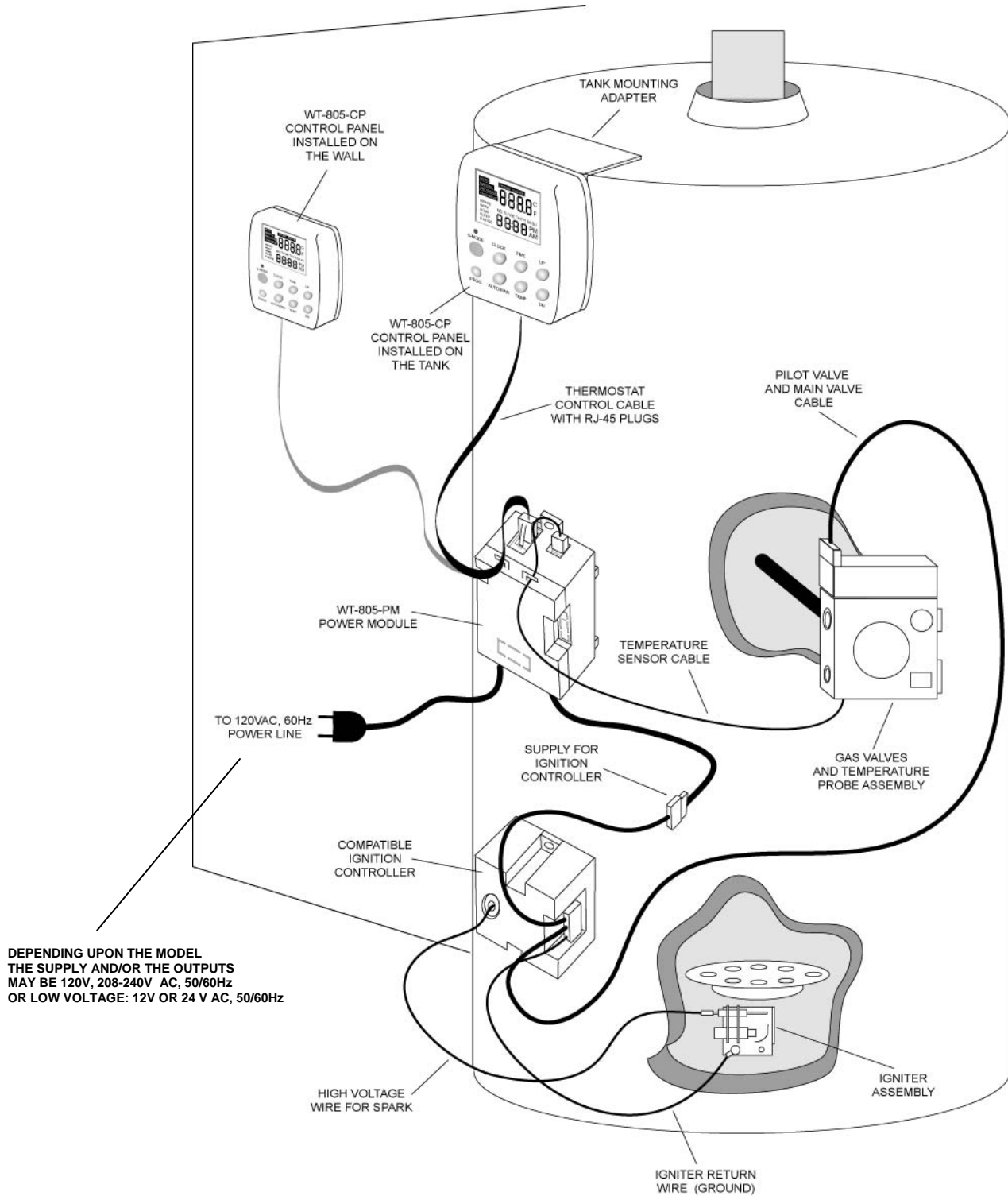
The system will work correctly even without batteries installed, however when power fails it will lose the current time and will NOT automatically resume its heating program until the clock is set manually.

To Install or Change the Batteries

It is recommended for the batteries to be replaced at least once every year even if there was no power failure in the meantime.

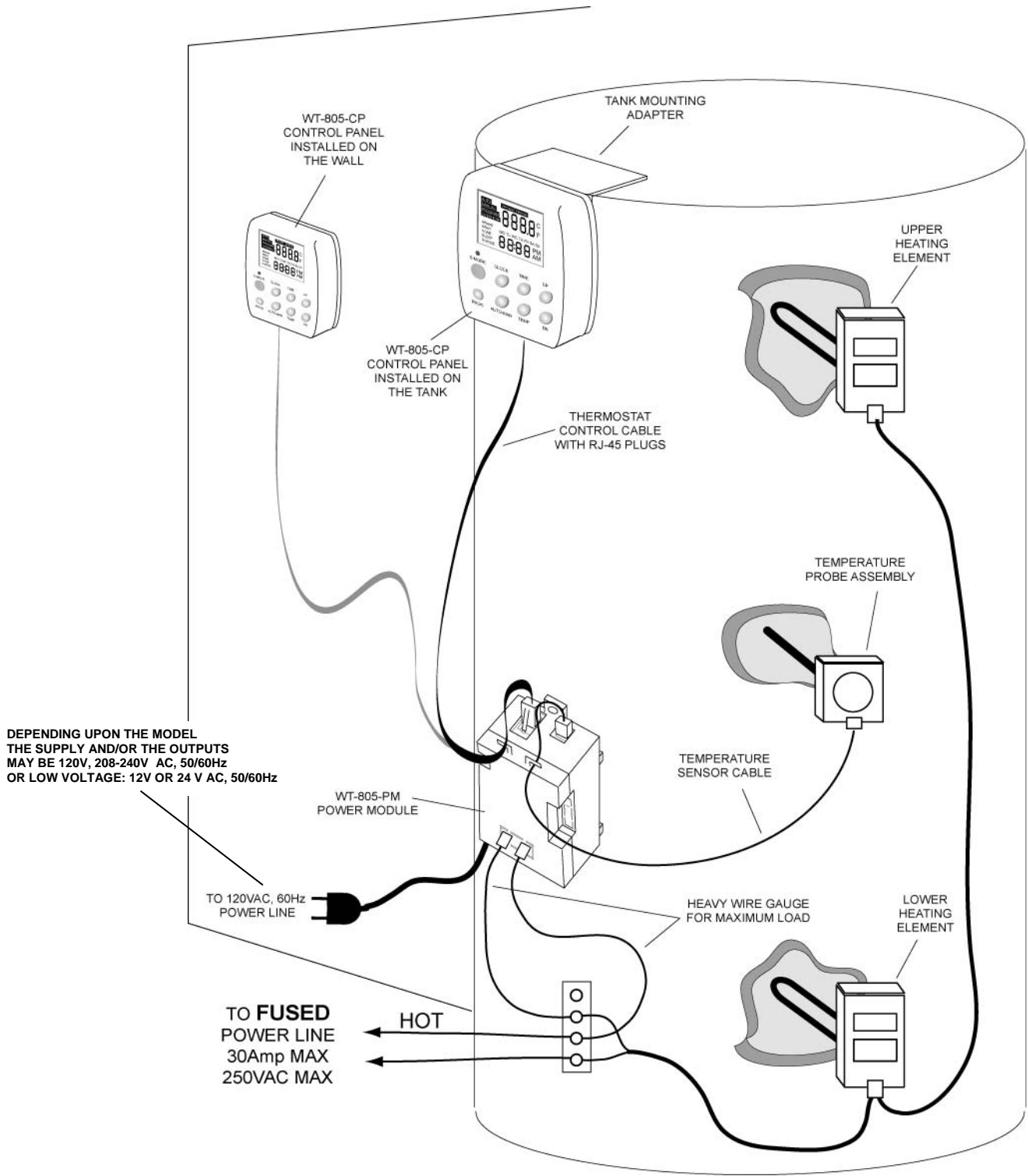
- Open the thermostat Control Panel by pressing on the left hand side of the enclosure near the 2 latching tabs in the back panel (or press the 2 tabs with a finger or a small screwdriver) and then pull that side of the box until the latches disengage. Then carefully disengage the box from the other 2 tabs on the opposite side of the box.
- Remove the old batteries and install new ones quickly.
- Close the

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THERMOSTAT INSTALLATION ON THE GAS WATER TANK

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THERMOSTAT INSTALLATION ON THE ELECTRIC WATER TANK

INSTALLATION

This thermostat is designed for use with most Gas and Electric Water Tanks.

The complete system requires the following components:

- WT-805-CP series Control Panel.
- WT-805-PM series Power Module.
- WTCC-11 series Control Cable or any RJ-45 compatible cable with straight connection (no cross-connection).
- Compatible Temperature Probe Assembly (see specifications for compatible types). Can be external or internal (immersed).
- For Gas Tanks only: Compatible Gas Ignition Controller. Most Ignition Controllers can be used if satisfactory for the heating system used.
- For Gas Tanks only: Compatible Gas Valve. Must be selected to be satisfactory for the heating system and the Ignition Controller used.
- For Gas Tanks only: Compatible Gas Igniter. Most electric igniters can be used. Assure its compatibility with the selected Ignition Controller.

INSTALLATION PROCEDURE**CAUTION ! TO AVOID FIRE, SHOCK, OR DEATH, SHUT OFF GAS SUPPLY AND ELECTRICAL POWER SUPPLY AT THE CIRCUIT BREAKER OR FUSE AND TEST THAT THE POWER IS OFF BEFORE WIRING.**

- Step 1. Install compatible Gas Valve assembly with the Temperature Probe and the compatible Gas Ignition Controller with the Pilot Igniter in the Water Tank.
- Step 2. Connect the wiring harness between the Ignition Controller, the Pilot Igniter and the Gas Valve assembly. **DO NOT** connect the Power Supply wires of the Ignition Controller.
- Step 3. Install the Control Panel back cover securely on the top of the water tank, on the wall of the water tank or on the wall nearby the tank. When installing on the top of the Water Tank, **FIRST** attach the plastic adapter to the Control Panel back cover by using the two self-tapping screws. Then use the attached plastic Adapter with adhesive tape to stick it on the flat, clean area on the top of the tank close to its edge (or in other location) . . Alternately, the back cover may be installed on the side of the tank by securing it with two screws (included) or the plastic Adapter can be drilled to accept a few screws for mounting to the top of the tank (or other surface). Keep the distance to the location of the Power Module short enough to avoid excessive strain on the Control Cable between the Control Panel and the Power Module.
CAUTION ! Make sure that the water tank vessel is not damaged or stressed during installation !
- Step 4. Install the Power Module on the side of the tank or inside the tank installation space. Keep in mind that the distance from the Power Module to the Gas Valve Assembly and to the Control Panel should be short enough to avoid stress on the wiring and the control cable and so that the high voltage wire for the Igniter can reach it.
- Step 5. Connect the 4-pin Temperature Sensor plug of the Gas Valve Assembly (or other compatible temperature probe) with the corresponding socket in the Power Module.
- Step 6. Wire up the output cord of the Power Module (the cord without the plug) to the supply wires of the Gas Ignition Controller. Observe the correct polarity of the wiring. The Hot wire has the darker color (usually black or brown) while the Neutral wire has a lighter color (usually white or yellow). The Hot wire should go to the wire with the Inline Fuse that is going to the Ignition Controller. Make sure that this is a secure connection as it usually carries High power line voltage. Secure the connection with wire nuts or crimp connectors and wrap them up with the electrical tape for safety.
- Step 7. Insert 3 pcs of "AAA" type batteries, 1.5 V each, in the battery holder on the back cover of the Control Panel. Observe the correct polarity.
- Step 8. Connect the RJ-45 Control Cable plug to the socket inside the Control Panel and snap the Control Panel box securely onto its back cover.
- Step 9. Connect the other end of the Control Cable to the corresponding socket in the Power Module and thread the cable through the strain relief on the module.
- Step 10. **MAKE SURE THAT THE WATER TANK IS FILLED UP WITH WATER !**
- Step 11. Plug-in the power line plug of the Power Cord from the Power Module to the Supply power line. **Make sure that the Supply is compatible with the thermostat model.** The Control Panel display should light up and the display should show the clock time flashing the minutes, ready to setup the current clock time.
- Step 12. Proceed with the setup of the Thermostat clock and programs.

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CHOOSING LOCATION FOR THE THERMOSTAT

Thermostat Control Panel can be mounted:

- On top of the water tank using the attached adapter with adhesive tape. Make sure that there is no condensing moisture or water present in the area.
- On a wall or panel where the distance to the Power Module is short enough to prevent the Control Cable from being under too much tension.

The Power Module can be mounted:

- On the side or inside electrical space of the water tank. Make sure that there is no condensing moisture or water present in the area.
- On a wall or panel where the distance to the Control Panel is short enough to prevent the Control Cable from being under too much tension.

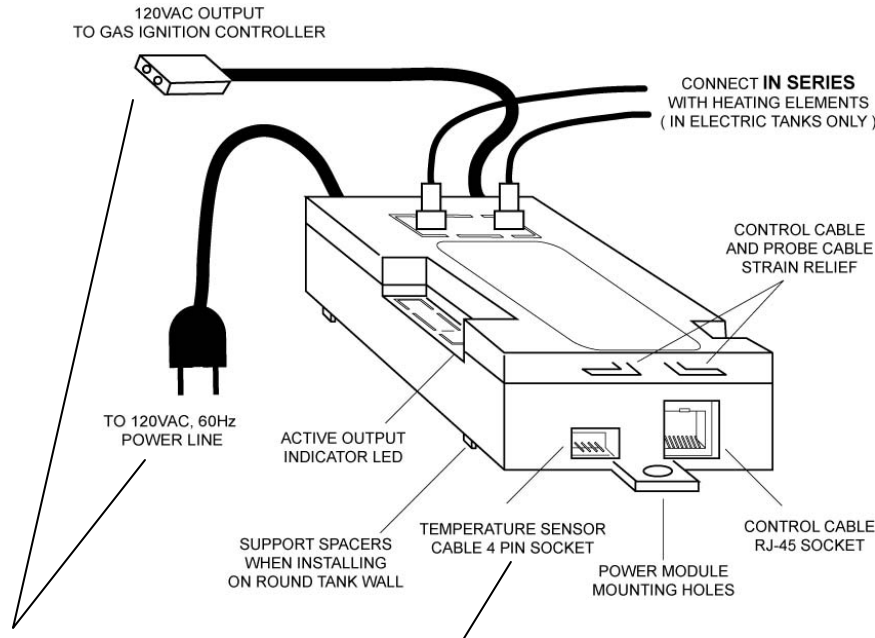
Thermostat Control Panel or Power Module should NOT be mounted:

- Outside, where exposed to the elements like rain, snow, direct sunlight or excessively strong wind.
- Exposed to direct light or heat from a lamp, sun, fireplace, or other temperature-radiating objects which may cause damage or malfunction.
- Near or in direct airflow from supply registers and return-air grilles.
- In areas with excessive moisture.

After choosing a location for the new thermostat, you may arrange to have a heating contractor install the control wiring for you.

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POWER MODULE



DEPENDENT UPON THE MODEL
THE SUPPLY AND/OR THE OUTPUTS
MAY BE 120V, 208-240V AC, 50/60Hz
OR LOW VOLTAGE: 12V OR 24 V AC, 50/60Hz

TEMPERATURE PROBE HEADER PIN-OUT:
Pin 1 & 4: High Limit fuse link. Normally shorted - opens at high temperature > +200F (+93 C)
Pin 2 & 3: NTC Thermistor probe 10kohm , B=3950 (or optional 100kohm , B=4100).

POWER MODULE INSTALLATION NOTES:

- 1) The spacers on the bottom side of the Power Module are designed for ease of installation on a curved surface like on the side of the Water Tank. When installing on a flat surface, these spacers may not be needed, They can be removed by cutting them off flat from the base of the enclosure.
- 2) The Power Module mounting tabs have holes big enough to accept up to #8 bolts. Make sure that the mounting is not stressed beyond the plastic limit while tightening. Use flat washers when needed.
- 3A) For Gas Heating: The Power Module has a Fuse inside to protect the thermostat supply as well as the output load. To change the fuse, **FIRST DISCONNECT ALL POWER and ONLY** then undo the 4 screws in the bottom of the Power Module to gain access to the fuse holder. Use only 2 Amp max., slow blow glass fuse 20mm x 5 mm type.
- 3B) For Electric Heating: The Power Module internal Fuse is only to protect the thermostat supply. To change the fuse, **FIRST DISCONNECT ALL POWER and ONLY** then undo the 4 screws in the bottom of the Power Module to gain access to the fuse holder. Use only 0.1 Amp max., slow blow glass fuse 20mm x 5 mm type.
- 4) While inserting the RJ-45 Control Cable connector and the 4 pin Temperature Probe connector in their respective sockets, make sure that the contact is made properly and secure the connection by threading the cables through their respective strain relief on the enclosure box to prevent them from accidental disengaging.
- 5) The LED on the Power Module will come ON whenever the internal relay is energized and the Output power cable will have high line voltage present on its leads. NEVER run the system with the Output power cable leads exposed. This may cause the internal fuse to blow prematurely.
- 6) FOR ELECTRIC HEATER models ONLY: A high power Normally Open, Single Pole internal relay is installed inside the module. It should be connected **IN SERIES** with the supply to all or one of the heating elements of the tank. The maximum contact current is 30Amp and max. voltage is 250VAC. This circuit **DOES NOT** have any fuse. The heating elements supply **MUST BE fused separately** at a rating **LOWER than 30Amp** or an external boosting contactor may be used when the heating current is higher.

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LIMITED 1-YEAR REPAIR WARRANTY

This product carries a one (1) year repair warranty (from the date of purchase) against defects in workmanship and materials. At its discretion, the manufacturer agrees to have any defective part(s) repaired or replaced free of charge, within the stated warranty period, when returned by the original purchaser with proof of purchase. This product is not guaranteed against wear or breakage due to misuse and/or abuse.