

CHAPTER 29.

Electrical Hook-ups

In this chapter is given a multiplicity of wiring diagrams covering practically all systems of automatic controls and their wiring as applied to burner installations of different types of heating systems.

Both constant and intermittent ignition systems are covered.

Among the many diagrams presented in this chapter are numerous Minneapolis Honeywell hook ups, followed by a number of Mercoid diagrams with explanations under each.

OHM'S LAW	
SYMBOLS	MEANING OF SYMBOLS
$I = \frac{E}{R}$	CURRENT = $\frac{\text{PRESSURE}}{\text{RESISTANCE}}$ THAT IS AMPERES = $\frac{\text{VOLTS}}{\text{OHMS}}$
$R = \frac{E}{I}$	RESISTANCE = $\frac{\text{PRESSURE}}{\text{CURRENT}}$ THAT IS OHMS = $\frac{\text{VOLTS}}{\text{AMPERES}}$
$E = IR$	PRESSURE = CURRENT \times RESISTANCE THAT IS VOLTS = AMPERES \times OHMS

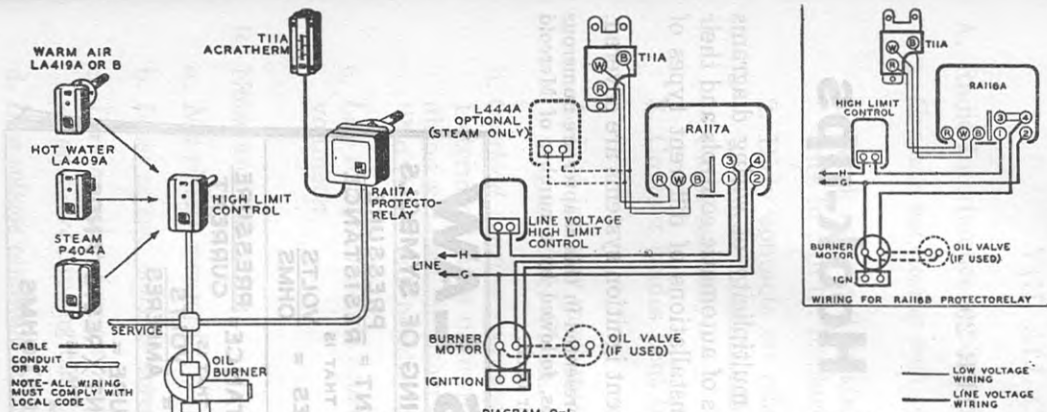


PLATE 1—Domestic control system for gravity warm air, hot water or steam installations.

These diagrams and the following suggestions cover the common household installations using low pressure steam boilers, furnaces without circulating fans, hot water boilers without circulating pumps or summer-winter domestic hot water heaters. The controls used are the same in each case except for the limit control which must be selected according to the type of heating plant.

FEATURES OF THIS SYSTEM:

- 1 Burner operation by the thermostat in response to room temperature requirements.
- 2 Flame failure and ignition failure protection.
- 3 High limit protection to guard against overheating and excessive furnace or boiler temperatures.

SPECIFY THESE CONTROLS:

- 1 A room thermostat (T11 Acratherm shown) See diagram TH-1 for optional thermostats.
- 2 A Protectorelay (RA116 or RA117)
- 3 A high limit control (select from the following)

For Warm Air—LA419 Airstat
For Hot Water—LA409 Aquastat

For Steam—P404 Pressuretrol
For Vapor—L408 Vaporstat (Specify 0-16 or 0-4 lbs).

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the Acratherm, the Protectorelay is actuated to start the burner.
2. The burner continues in operation until the Acratherm is satisfied which then actuates the Protectorelay to stop the burner.
3. In the event that excessively high temperatures are reached in the furnace or boiler the high limit control acts to stop the burner.
4. No operation of the burner is possible until the furnace or boiler has cooled to the "on" point of the high limit control.

YEAR 'ROUND HOT WATER:

Any low pressure steam boiler can be used to automatically supply year-round domestic hot water through the use of an indirect water heater. The only additional control needed is an L444A Immersion Aquastat installed below the water line in the boiler and wired as shown by the dotted lines above.

OPTIONAL THERMOSTATS:

For completely automatic operation to give lowered night temperature and return to daytime temperature use the T11 or T105 Chronotherm. For manual lowered night temperature and automatic return to daytime temperature use the T109 Da-Nite Acratherm. (See Diagram TH-1 for wiring diagram).

© InspectAPedia.com

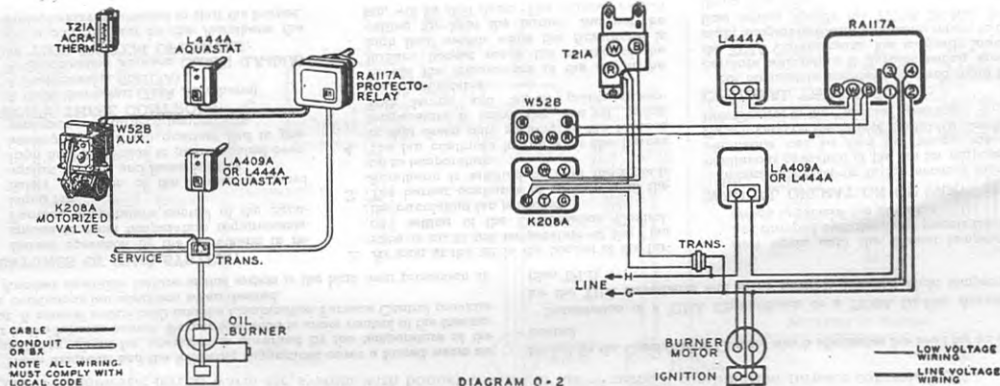


PLATE 2—Single zone summer-winter gravity hot water heating system with tank type domestic hot water heater.

These diagrams and following suggestions cover a single zone, gravity hot water heating system with provision for year 'round domestic hot water. During the winter, when the thermostat calls for heat, the boiler water temperature will rise to whatever level is necessary to maintain satisfactory room temperatures. When the burner is not operating under

FEATURES OF THIS SYSTEM:

- 1 Burner operation together with operation of the motorized valve in response to room temperature requirements.
- 2 Safety operation of the burner to guard against ignition and flame failures.
- 3 High limit protection to guard against room overheating and excessive boiler water temperature.
- 4 Low limit operation to assure year 'round domestic hot water.

SPECIFY THESE CONTROLS:

1. A room thermostat (T21A)
2. A Protectorelay (RA117A)
3. A Motorized Valve (K208A equipped with W52B Auxiliary Switch)
4. A High Limit Control (L444A or LA409A)

5. A Low Limit Control (L444A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the Acratherm the K208A Valve is opened, which on opening closes the circuit through the W52B switch to actuate the Protectorelay and start the burner.
2. The Motorized Valve remains open and the burner continues in operation until the Acratherm is satisfied, when the Valve is closed and the burner is stopped.
3. Should the boiler water temperature become excessive, the High Limit Control will stop the burner, but the Motorized Valve will remain open until the Acratherm is satisfied.
4. The Low Limit Control will operate the

burner between periods of Acratherm operation to maintain a minimum boiler water temperature and thus assure year-round domestic hot water.

ADDITIONAL ZONES:

Additional zones can be controlled through the addition of a T21A Acratherm and a K208A Motorized Valve and W52B Auxiliary Switch, one of each for each additional zone. The controls should be wired so that any one of the Acratherms can operate its associated Motorized Valve and start the burner.

This control system is simple and when installed with a correctly designed boiler and correctly sized indirect heater will maintain a very even house temperature and also supply large quantities of domestic hot water.

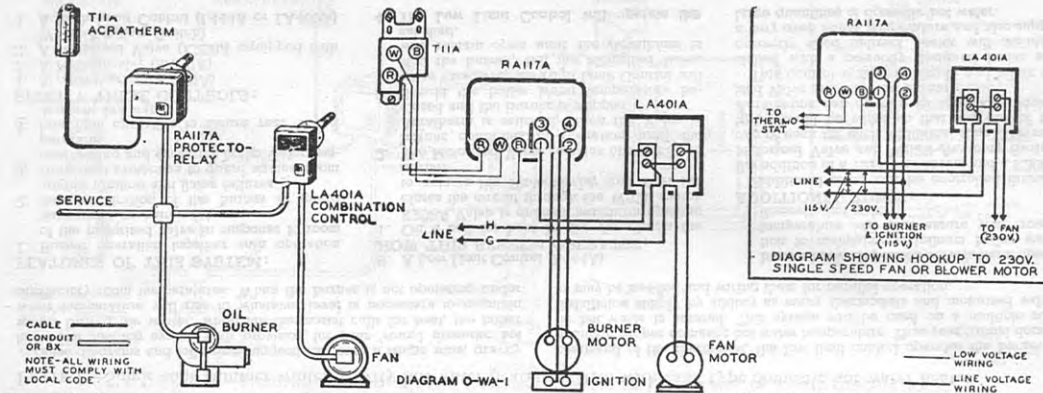


PLATE 3--Domestic forced warm air system with bonnet control of fan — using a combination furnace control.

These diagrams and the following suggestions cover a forced warm air installation where fan operation is governed by the temperature of the air in the furnace bonnet. Burner operation is under control of the thermostat. A manual switch built into the Combination Furnace Control provides for continuous fan operation when desired. Another desirable feature of this system is the high limit protection af-

forded by the Combination Control which eliminates the need for an extra control.

Substitution of a T111A Chronotherm or a T109A Da-Nite Acratherm for the T11A Acratherm will make possible lowered night temperature (See TH-1).

FEATURES OF THIS SYSTEM:

1. Burner operation by the Acratherm in response to room temperature requirements.
2. Furnace temperature control of the circulating fan.
3. Safety operation of the burner to guard against ignition and flame failures
4. High limit protection to guard against overheating of the living quarters and to prevent excessive furnace temperature

SPECIFY THESE CONTROLS:

1. A room thermostat (T11A Acratherm)
2. A Protectorelay (RAI17A)
3. A Combination Furnace Control (LA401A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the Acratherm the Protectorelay is actuated to start the burner.

2. As soon as the air in the bonnet of the furnace is up to the temperature of the "fan on" setting of the Combination Control, the circulating fan is started.
3. The burner continues to operate until the Acratherm is satisfied or until the room is up to temperature.
4. The fan continues to run after the burner is shut down only so long as the furnace temperature is above the "fan off" point. Both "fan on" and "fan off" points are separably adjustable.
5. Should the temperature of the air in the furnace bonnet reach the setting of the high limit switch while the Acratherm is calling for heat the burner, but not the fan, will be shut down. The burner cannot

start again until the bonnet temperature has dropped sufficiently to permit the limit switch to remake the circuit.

MANUAL OPERATION OF FAN:

When desirable, or in the summer months, continuous operation of the fan for purposes of ventilation can be had by turning the Fan Switch knob on the face of the LA401 Combination Control to the "manual" position.

OPTIONAL THERMOSTATS:

For completely automatic lowered night temperature with return to daytime setting, specify the T111A Chronotherm. For manually lowered night temperature with automatic return to daytime setting specify the T109A Da-Nite Acratherm (See TH-1).

© InspectAPedia.com

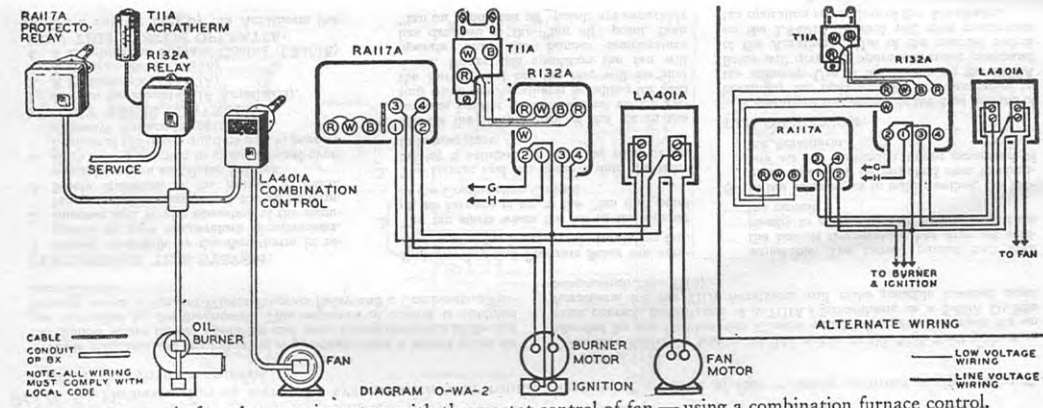


PLATE 4--Domestic forced warm air system with thermostat control of fan — using a combination furnace control.

These diagrams and the following suggestions cover a forced warm air installation where both burner and fan operation are controlled by the thermostat. A manual switch built into the Combination Furnace Control provides for continuous fan operation when desired. Another desirable feature of this system is the high limit protection afforded by the Com-

bination Control which eliminates the need for an extra control.

An alternate hook-up of the controls specified for this system is shown in the upper right corner of the wiring diagram. The choice of hook-up is left to the installer to determine on the basis of local conditions. The same sequence of control will be obtained from either hook-up.

FEATURES OF THIS SYSTEM:

1. Burner operation by the Acratherm in response to room temperature requirements.
2. Thermostat control of the circulating fan.
3. Safety operation of the burner to guard against ignition and flame failures
4. High limit protection to guard against overheating of the living quarters and to prevent excessive furnace temperature.

SPECIFY THESE CONTROLS:

1. A room thermostat (T11A Acratherm)
2. A Protectorelay (RAI17A)
3. A switching relay (R132A)
4. A Combination Furnace Control (LA401A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the Acratherm the Protectorelay is actuated through the R132A

- switching relay to start the burner.
2. At the same time the power circuit to the fan is established so that the fan can start as soon as the air in the furnace bonnet reaches the "fan on" point. Both "fan on" and "fan off" points are separably adjustable.
3. Burner and fan continue to operate until the Acratherm is satisfied or until the room is up to temperature.
4. Should the temperature of the air in the furnace bonnet reach the setting of the high limit switch while the Acratherm is calling for heat the burner, but not the fan, will be shut down. Under this condition, the fan will run until the bonnet temperature has dropped to the "fan off" point on the Fur-

nace Control.

MANUAL OPERATION OF FAN:

When desirable, or in the summer months, continuous operation of the fan for purposes of ventilation can be had by turning the Fan Switch knob on the face of the LA401 Combination Control to the "manual" position.

OPTIONAL THERMOSTATS:

For completely automatic lowered night temperature with return to daytime setting, specify the T111A Chronotherm. For manually lowered night temperature with automatic return to daytime setting Specify the T109A Da-Nite Acratherm (See TH-1).

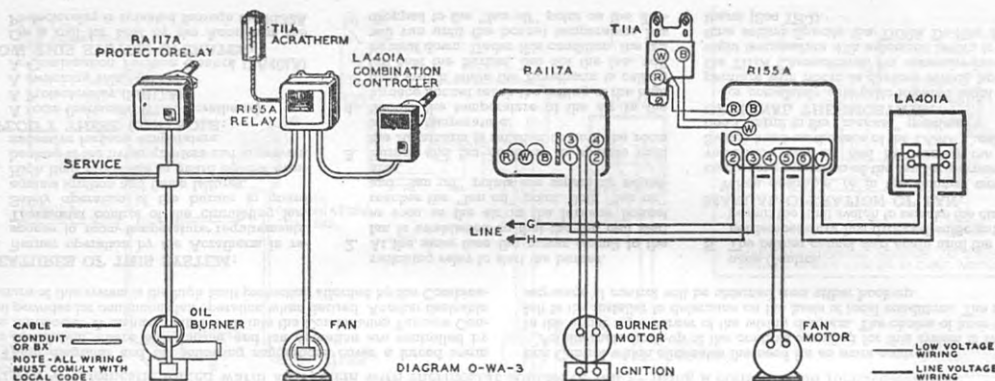


PLATE 5—Domestic forced warm air system with year round thermostat control of fan — using summer-winter relay and combination furnace control.

These diagrams and the following suggestions cover a forced warm air installation where burner operation and year round operation of the fan are controlled by the thermostat. This sequence of control is obtained through use of a Summer-Winter Program Relay and a Combination Furnace Control.

FEATURES OF THIS SYSTEM:

1. Burner operation by the AcraTherm in response to room temperature requirements.
2. Summer and Winter operation of the circulating fan under control of the AcraTherm.
3. Safety operation of the burner to guard against ignition and flame failures.
4. High limit protection to guard against overheating of the living quarters and to prevent excessive furnace temperature.

SPECIFY THESE CONTROLS:

1. A room thermostat (T11A AcraTherm).
 2. A Protectorelay (R117A)
 3. A Program Relay (R155A)
 4. A Combination Furnace Control (LA401A)
- HOW THIS SYSTEM OPERATES:**
1. On a call for heat by the AcraTherm the

Protectorelay and Program Relay are actuated to start the burner and circulating fan.

2. The fan starts when the air in the bonnet of the furnace is up to the "fan on" point of the Combination Control.
3. The burner and fan operate until the thermostat is satisfied or until the room is up to temperature.
4. Should the temperature of the air in the furnace bonnet reach the limit switch setting while the AcraTherm is calling for heat the burner, but not the fan, will be shut down. Under this condition the fan will operate until the bonnet temperature has dropped to the "fan off" point. Both "fan on" and "fan off" points are separately

adjustable. The burner cannot start until the bonnet temperature has dropped sufficiently to allow the limit switch to remake the circuit.

5. In the summer, or in mild weather, the Program Relay can be switched over to circulate air for ventilation under command of the AcraTherm.

FAN OPERATION:

A feature of this system is the dual method of obtaining fan operation for air circulation in the summer. Use of the switch on the R155A Relay will give fan operation under command of the AcraTherm. Use of the manual switch on the LA401A Control will give continuous fan operation regardless of the AcraTherm.

© InspectAPedia.com

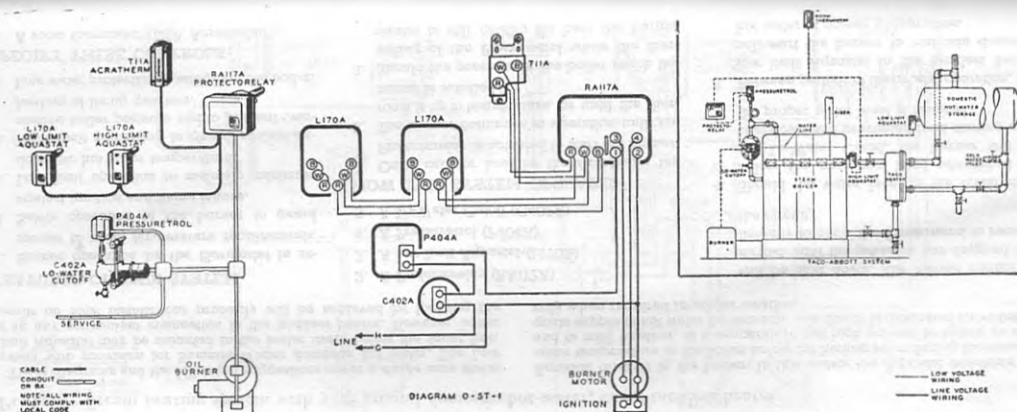


PLATE 6—Steam heating system with summer-winter domestic hot water, using tank type heater.

These diagrams and the following suggestions cover a single zone steam system with provision for Summer-Winter domestic hot water. The low Limit Aquastat is located in the storage tank and will start the burner whenever necessary to maintain domestic hot water of proper temperature.

FEATURES OF THIS SYSTEM:

1. Burner operation by the thermostat in response to room temperature requirements.
2. Safety operation of the burner to guard against ignition and flame failures.
3. Low limit operation to maintain minimum domestic hot water temperature coupled with high limit operation to prevent steaming.
4. High limit protection to guard against excessive boiler pressure and prevent overheating of living quarters.
5. Low water protection to safeguard the boiler.

SPECIFY THESE CONTROLS:

1. A room thermostat (T11A AcraTherm)
2. A Protectorelay (R117A)
3. A low limit Aquastat (L170A)

4. A high limit Aquastat (L170A)
5. A Pressuretrol (P404A)
6. A Lo-Water Cutoff (C402A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the AcraTherm the Protectorelay is actuated to start the burner.
2. The burner continues in operation until the room is up to temperature or until the thermostat is satisfied.
3. Should the pressure in the boiler reach the setting of the Pressuretrol while the thermostat is calling for heat the burner will be shut down. The burner cannot be started until the pressure has dropped sufficiently to allow the Pressuretrol to remake the circuit.

The High Limit Aquastat with its element in the boiler water will prevent the boiler water from steaming v en the burner is operated by the Low Limit Aquastat in the tank. In the summer the boiler water is not heated except when domestic hot water is required. A Pressuretrol combined with a Lo-Water Cutoff on the boiler provide for safety of operation.

4. Should the water level in the boiler drop below the operating level established by the Lo-Water Cutoff, the burner will be shut down and prevented from starting until the proper water level is restored.
5. Between periods of thermostat operation, the low limit Aquastat in the tank will start the burner to maintain domestic hot water of proper temperature.
6. When heat for radiation is not required the high limit Aquastat in the boiler will operate to prevent boiler water steaming when the burner is under command of the low limit Aquastat.

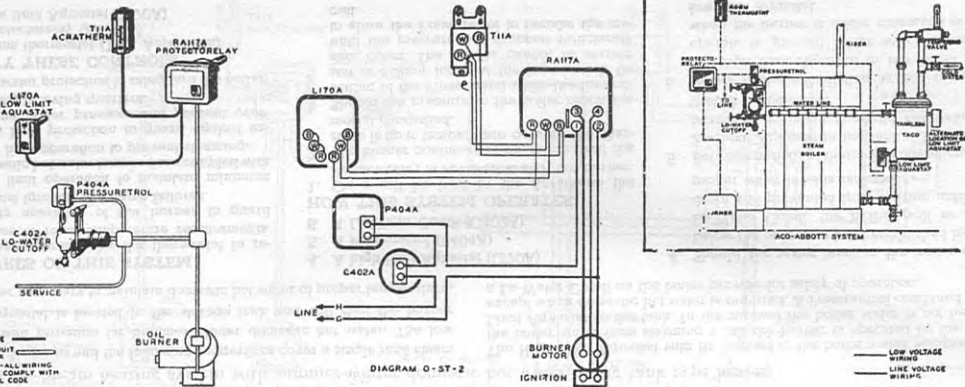


PLATE 7—Steam heating system with year around domestic hot water, using tankless heater.

These diagrams and the following suggestions cover a single zone steam system with provision for Summer-Winter domestic hot water. The Low Limit Aquastat may be mounted in the boiler itself, below the water line, or in any convenient connection to the tankless heater. However, better results on most installations probably will be achieved by locating the

Aquastat directly in the heater. In this system the Aquastat maintains the water temperature in the boiler below the boiling point during the summer and in mild weather, at a temperature just high enough to insure an adequate supply of hot water for domestic use. Steam is generated for radiation only when required in colder weather.

FEATURES OF THIS SYSTEM:

1. Burner operation by the thermostat in response to room temperature requirements.
2. Safety operation of the burner to guard against ignition and flame failure.
3. Low limit operation to maintain minimum domestic hot water temperature.
4. High limit protection to guard against excessive boiler pressure and to prevent overheating of living quarters.
5. Low water protection to safeguard the boiler.

SPECIFY THESE CONTROLS:

1. A room thermostat (TI1A Acratherm)

2. A Protectorelay (RA117A)
3. A low limit Aquastat (LI70A)
4. A Pressuretrol (P404A)
5. A Lo-Water Cutoff (C402A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the Acratherm the Protectorelay is actuated to start the burner.
2. The burner continues in operation until the room is up to temperature, or until the thermostat is satisfied.
3. Should the pressure in the boiler reach the setting of the Pressuretrol while the thermostat is still calling for heat the burner

will be shut down. The burner cannot be started until the pressure has dropped sufficiently to allow the Pressuretrol to remake the circuit.

4. Should the water level in the boiler drop below the operating level established by the Lo-Water Cutoff, the burner will be shut down and prevented from starting until the proper water level is restored.
5. Between periods of thermostat operation, the low limit Aquastat in the tankless heater will start the burner to maintain domestic hot water of proper temperature.

© InspectAPedia.com

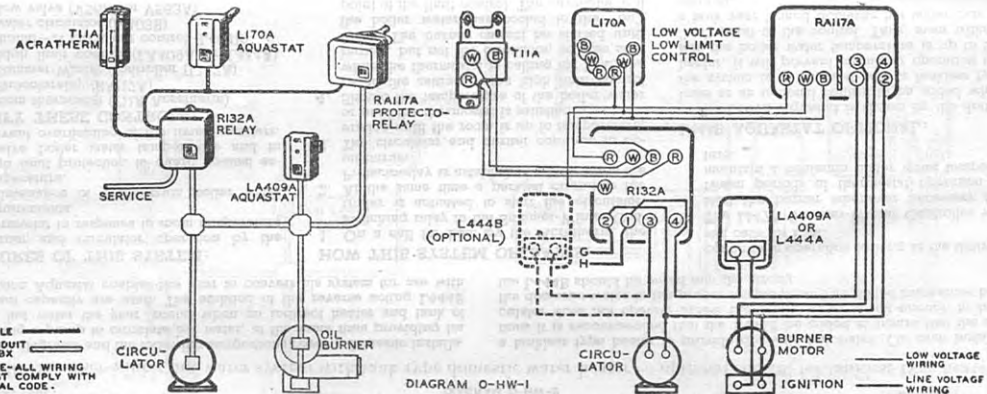


PLATE 8—Forced hot water system with low voltage low limit to give year around domestic hot water, using tank type heater — tankless type optional.

These diagrams and the following suggestions cover a domestic installation using a pump to circulate hot water, at the same time providing for plenty hot water the year 'round when a tank and indirect heater of sufficient capacity are used. The addition of the reverse acting L444B Immersion Aquastat enables the user to convert his system for use with a

tankless type heater to provide domestic hot water. On such installations it is recommended that the L444B be added to insure that the circulator does not operate unless the boiler water is hot enough to heat the domestic water to the proper temperature. The dotted lines show how the L444B should be wired into the circuit.

FEATURES OF THIS SYSTEM:

1. Burner and circulator operation by the thermostat in response to room temperature requirements.
2. Minimum boiler water temperature maintained at all times.
3. High limit protection to guard against excessive boiler water temperature and to prevent overheating of the living quarters.
4. Circulator control optional to prevent circulator operation unless boiler water temperature is high enough to insure domestic hot water of proper temperature.

SPECIFY THESE CONTROLS:

1. A room thermostat (TI1A Acratherm)
2. A Protectorelay (RA117A)
3. A switching relay (R132A)
4. A high limit control (LA409A or L444A)

5. A low limit control (LI70A)
6. Optional—A circulator control (L444B)
7. A water circulator (M403B)
8. A flow valve (V561A or V563A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the Acratherm, the switching relay is actuated to start the circulator.
2. At the same time a parallel circuit is established to the Protectorelay which starts the oil burner.
3. The circulator and burner continue in operation until the room is up to temperature, or until the thermostat is satisfied.
4. Should the temperature of the boiler water reach the setting of the high limit control while the thermostat is calling for heat the burner, but not the circulator, will be shut

down. The burner cannot be started until the boiler water has cooled to the "on" point of the limit control. The circulator will continue in operation as long as the thermostat calls for heat.

The low limit control will start the burner whenever necessary between periods of thermostat operation to maintain a minimum boiler water temperature.
L444B AQUASTAT OPTIONAL:
The L444B Aquastat is shown by the dotted lines as an optional control to be added when the system is to be used with a tankless type heater. It will prevent circulator operation unless the boiler water temperature is up to the "on" point of the control. Thus, even without a tank, year 'round domestic hot water can be assured.

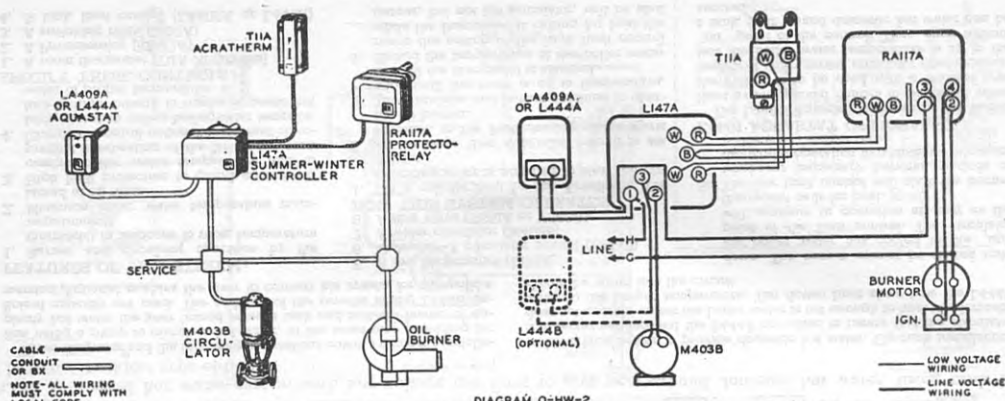


PLATE 9—Summer-winter hot water system with tank type domestic water heater — optional control for tankless type heater.

These diagrams and the following suggestions cover a domestic installation using a pump to circulate hot water, at the same time providing for plenty hot water the year 'round when an indirect heater and tank of sufficient capacity are used. The addition of the reverse acting L444B Immersion Aquastat enables the user to convert his system for use with

a tankless type heater to provide domestic hot water. On such installations it is recommended that the L444B be added to insure that the circulator does not operate unless the boiler water is hot enough to heat the domestic water to the proper temperature. The dotted lines show how the L444B should be wired into the circuit.

FEATURES OF THIS SYSTEM:

1. Burner and circulator operation by the thermostat in response to room temperature requirements.
2. Maintenance of a minimum boiler water temperature.
3. High limit protection to guard against excessive boiler water temperature and to prevent overheating of the living quarters.

SPECIFY THESE CONTROLS:

1. A room thermostat (T11A AcraTherm)
2. A Protector-Relay (RAI17A)
3. A Summer-Winter Controller (L147A)
4. A high limit control (LA409A or L444A)
5. Optional—A circulator control (L444B)
6. A water circulator (M403B)
7. A flow valve (V561A or V563A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the AcraTherm, the switching relay in the Summer-Winter Controller is actuated to start the circulator.
2. At the same time a parallel circuit to the Protector-Relay is established which starts the oil burner.
3. The circulator and burner continue in operation until the room is up to temperature, or until the thermostat is satisfied.
4. Should the temperature of the boiler water reach the setting of the high limit control while the thermostat is calling for heat, the burner, but not the circulator, will be shut down. The burner cannot be started until the boiler water has cooled to the "on" point of the limit control. The circulator will

continue in operation as long as the thermostat calls for heat.

5. The L147A Summer-Winter Controller will start the burner whenever necessary between periods of thermostat operation to maintain a minimum boiler water temperature.

L444B AQUASTAT OPTIONAL:

The L444B Aquastat is shown by the dotted lines as an optional control to be added when the system is to be used with a tankless type heater. It will prevent circulator operation unless the boiler water temperature is up to the "on" point of the control. Thus, even without a tank year 'round domestic hot water can be assured.

© InspectAPedia.com

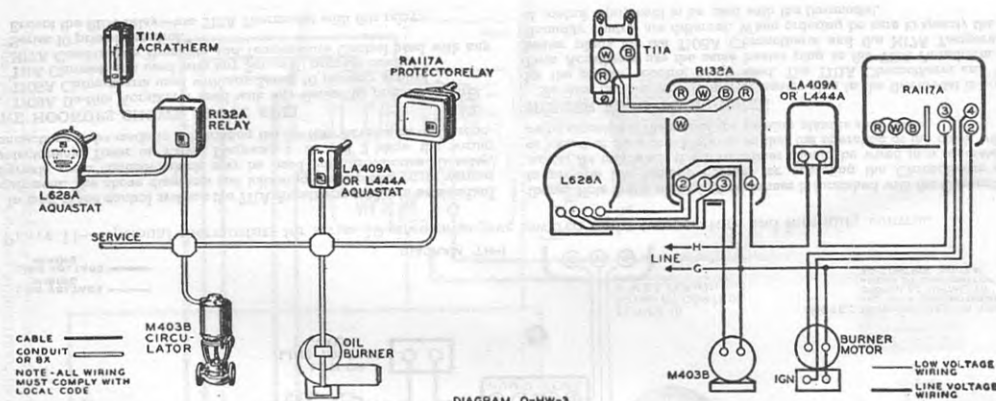


PLATE 10—Forced circulation summer-winter hot water system with tankless type domestic water heater.

These diagrams and the following suggestions cover a domestic installation using a pump to circulate hot water, at the same time providing for plenty hot water the year 'round when a tankless heater of sufficient capacity is used. The use of the L628 Combination Aquastat insures the maintenance of a minimum boiler water temperature at all times and pre-

vents operation of the circulator unless the boiler water is hot enough to provide radiation without interfering with the domestic hot water supply. Thus, with reasonable attention to the scale setting of the L628A, both adequate radiation and domestic hot water can be assured.

FEATURES OF THIS SYSTEM:

1. Burner and circulator operation by the thermostat in response to room temperature requirements.
2. Maintenance of a minimum boiler water temperature.
3. High limit protection to guard against excessive boiler water temperature and to prevent overheating of the living quarters.
4. Circulator control to prevent circulator operation—unless boiler water temperature is high enough to insure domestic hot water of proper temperature.

SPECIFY THESE CONTROLS:

1. A room thermostat (T11A AcraTherm)
2. A Protector-Relay (RAI17A)
3. A switching relay (R132A)

4. A high limit control (LA409A or L444A)
5. A combination low limit and circulator control (L628A)
6. A water circulator (M403B)
7. A flow valve (V561A or V563A)

HOW THIS SYSTEM OPERATES:

1. On a call for heat by the AcraTherm, the switching relay is actuated to start the circulator.
2. At the same time a parallel circuit is established to the Protector-Relay which starts the oil burner.
3. The circulator and burner continue in operation until the room is up to temperature, or until the thermostat is satisfied.
4. Should the temperature of the boiler water reach the setting of the high limit control

while the thermostat is calling for heat the burner, but not the circulator, will be shut down. The burner cannot be started until the boiler water has cooled to the "on" point of the limit control. The circulator will continue in operation as long as the thermostat calls for heat.

5. The L628A Aquastat will start the burner whenever necessary between periods of thermostat operation to maintain a minimum boiler water temperature.

6. The circulator control switch in the L628A Aquastat will prevent circulator operation unless the boiler water temperature is up to the "on" point of the control. Thus on a tankless installation, year 'round domestic hot water in sufficient quantity can be assured.

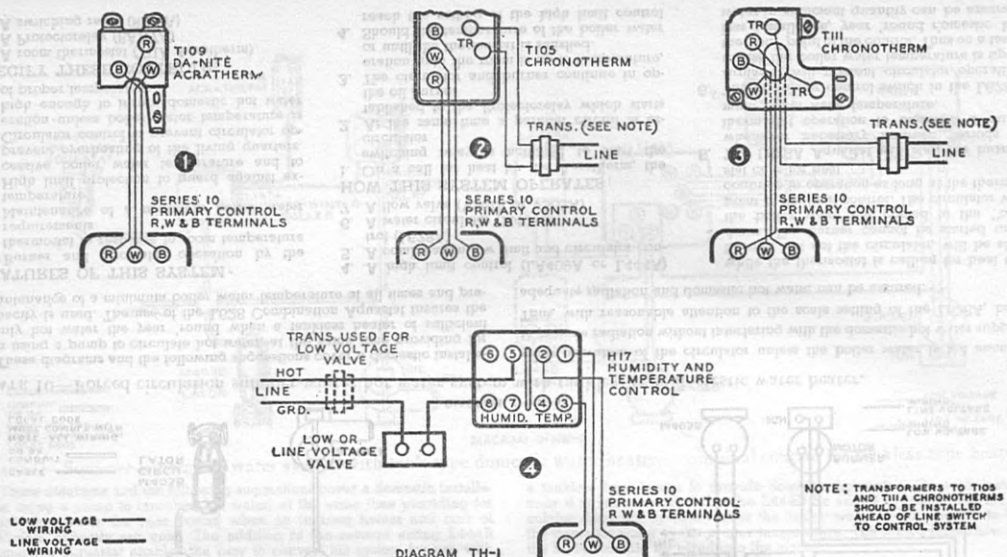


DIAGRAM TH-1

PLATE 11—Optional thermostats for series 10 circuits to give lowered night temperature and humidity control.

In most of the control systems the T11A Acratherm is shown as standard equipment. The above diagrams and following descriptions cover various alternate room controls which may be used with any Series 10 relay, Protectorelay, Timer or Valve. Diagrams 1, 2, and 3 show the wiring connections to be made in substituting the Da-Nite Acratherm or Chrono-

THE HOOKUPS SHOWN ABOVE ARE:

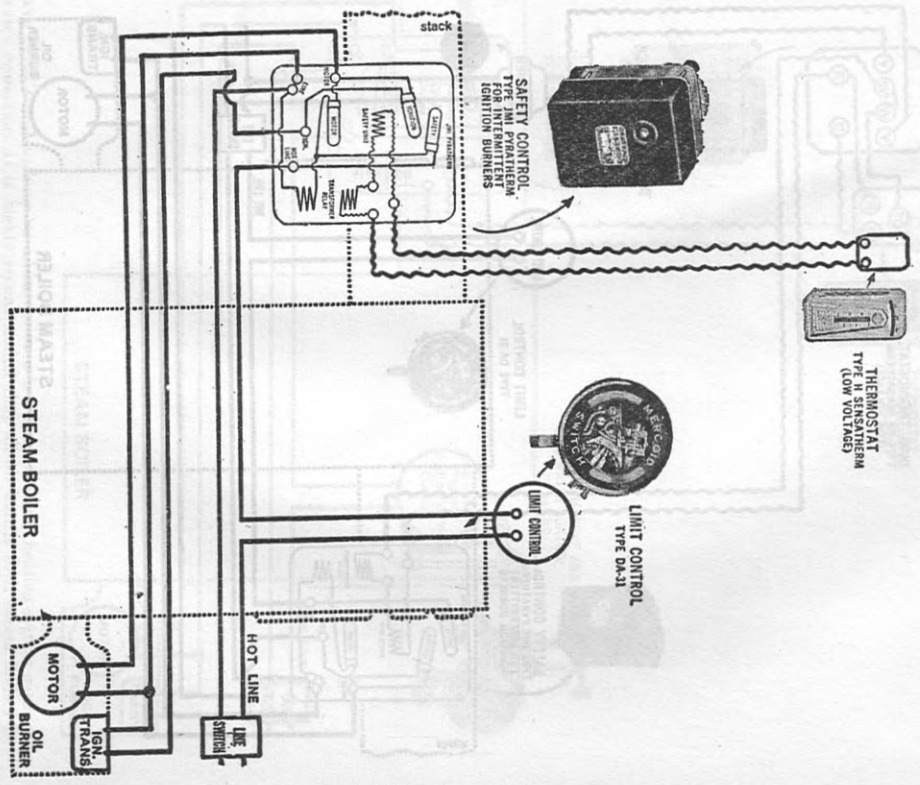
1. T109A Da-Nite Acratherm used with any Series 10 primary control.*
 2. T105A Chronotherm used with any Series 10 primary control.*
 3. T11A Chronotherm used with any Series 10 primary control.*
 4. H17A Combination Humidity and Temperature Control used with any Series 10 primary control.*
- * Except the R154 relay—use T19A Thermostat with this relay.

therm. Note that a separate transformer is furnished with the Chronotherm to provide low voltage current for operating the Chronotherm clock motor. As indicated, this transformer should be wired in a separate line or ahead of the control system so that the operation of the clock will not be interrupted if the rest of the heating plant is shut down.

HEATER PLUG TO BE USED:

Be sure that the Accelerator or heater plug in the thermostat is correct for the primary control being used. The T11A Chronotherm and T19A Twin Acratherm use the same heater plug as the T11A Acratherm. The heater plugs for the T105A Chronotherm and the H17A Temperature-Humidity control are different. When ordering be sure to specify the type of control equipment to be used with the thermostat.

PLATE 12—Control hook-up for oil burner fired steam heating system. This hook-up covers the most simplified control application, in connection with oil burner fired boilers, where steam is generated for heating purposes only.



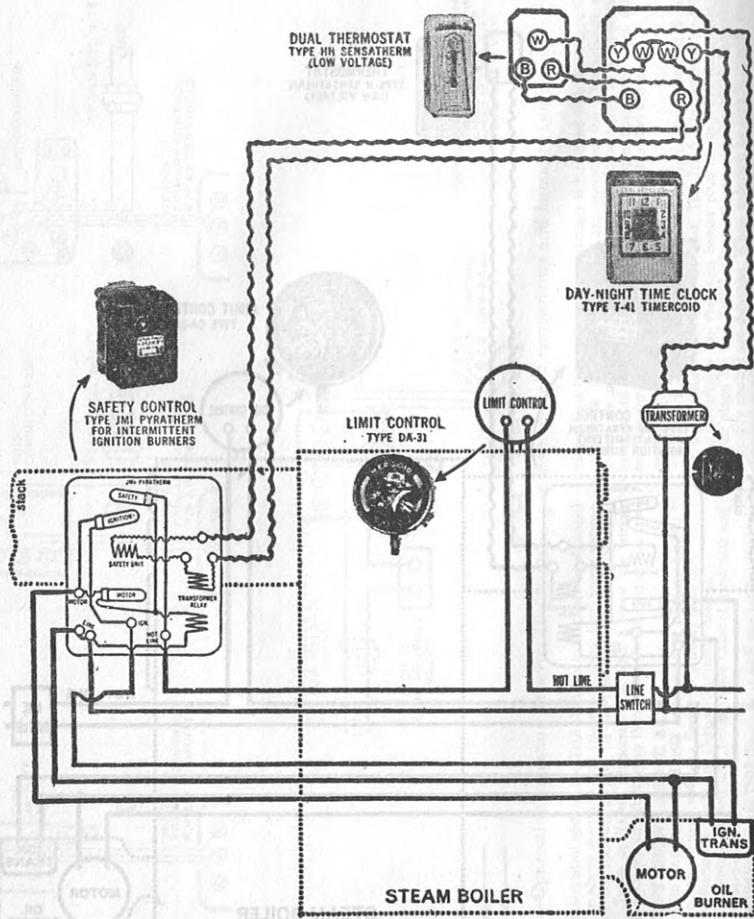


PLATE 13—Control hook-up for oil burner fired steam heating system with fully automatic day-night thermostatic control. This control hook-up quite generally employed in the field, covers an oil burner fired system where steam is generated for heating purposes only, and where the room temperature is automatically lowered at night in order to conserve fuel.

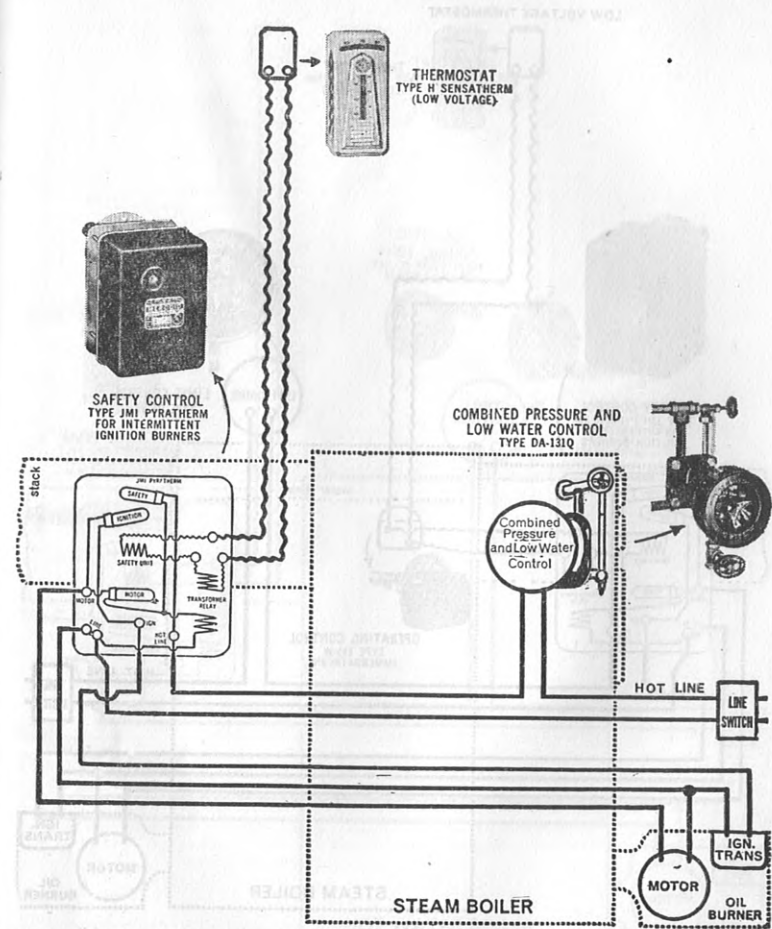


PLATE 14—Control hook-up for oil burner fired low pressure steam heating system with low water protection. It is highly recommended that all oil burner fired steam boilers be equipped with low water controls to prevent burning up the boiler in the event the water line becomes low. This simplified control hook-up, in general use in the field, provides fully automatic regulation as well as low water protection to low pressure systems where steam is generated for heating purposes only.

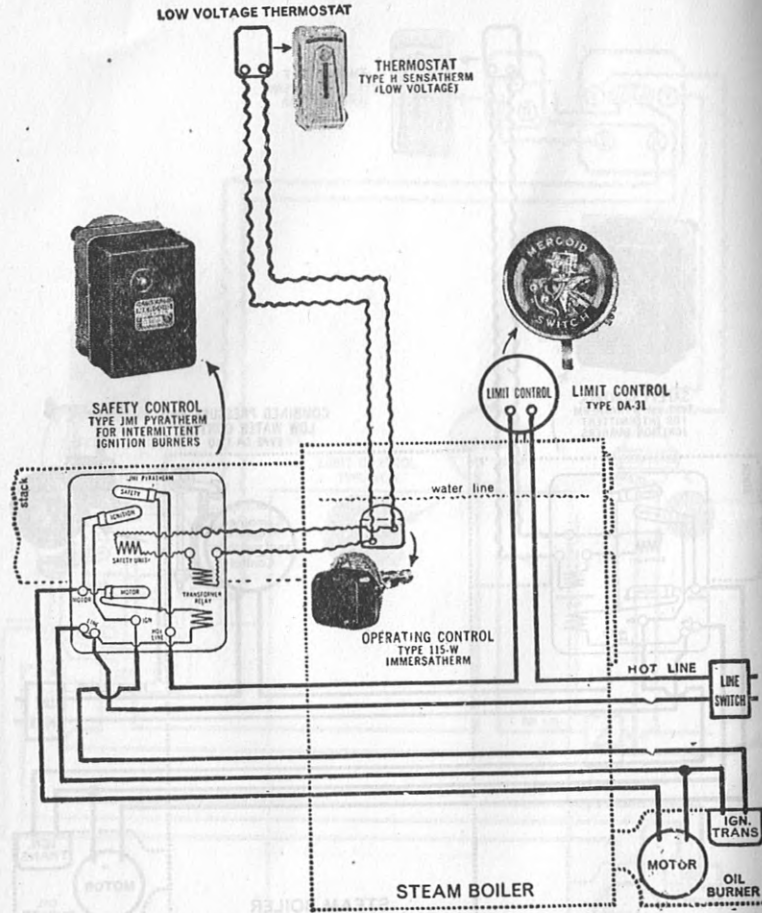


PLATE 15—Control hook-up for oil burner fired steam heating system, providing year around domestic hot water through indirect heater. This hook-up covers a system in general use where the steam heating boiler is equipped with an indirect Taco heater (Taco heater not shown) for supplying year around domestic hot water. During the normal heating season steam must be furnished to the radiators, and in addition domestic hot water must be generated. During mild or summer weather, when no heat is required in the building, domestic hot water alone must be generated without raising steam.

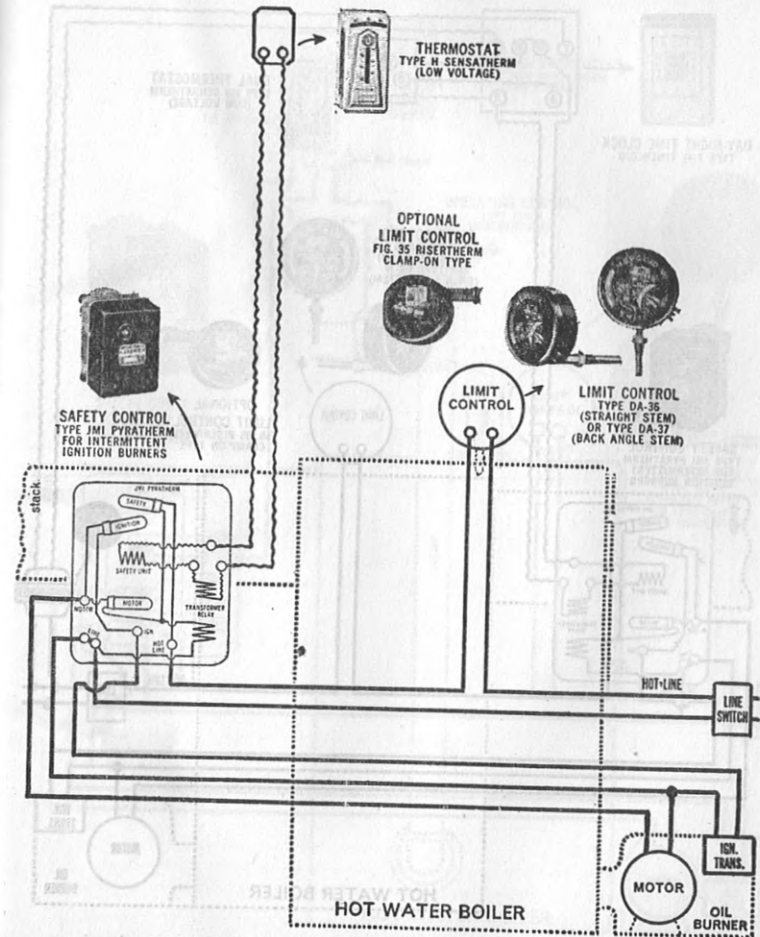


PLATE 16—Control hook-up for oil burner-fired hot water heating system—gravity circulation. This simplified control hook-up, in general use in the field, covers an oil burner fired hot water heating system wherein the water circulates by gravity (no circulating pump employed).

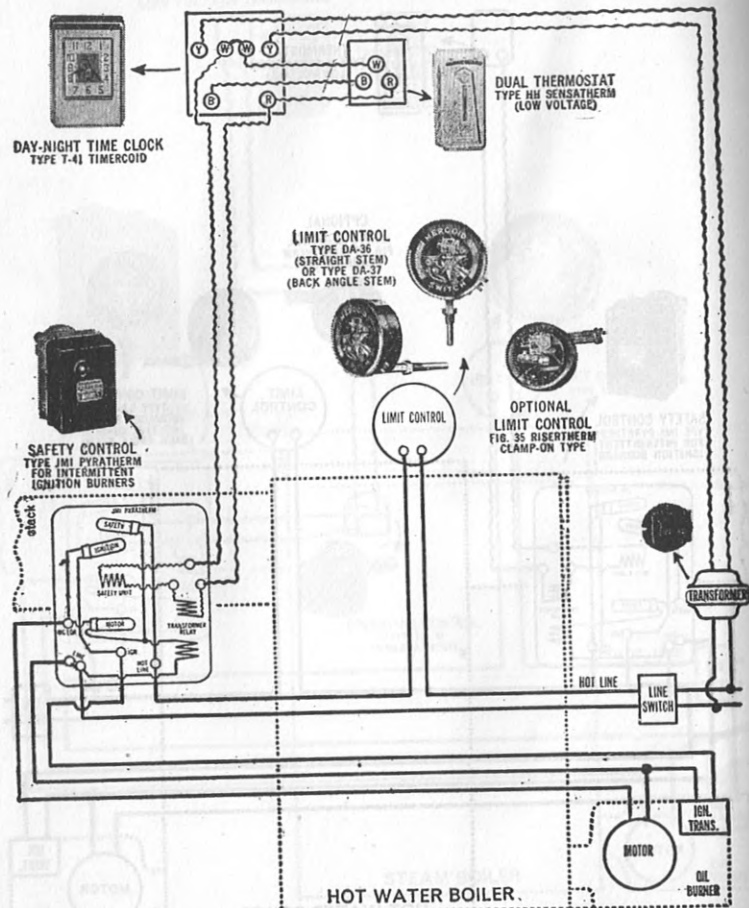


PLATE 17—Control hook-up for oil burner fired gravity circulation hot water heating system — with fully automatic day-night thermostatic control. This control hook-up, quite frequently employed in the field, covers an oil burner fired hot water heating system, wherein the water circulates by gravity (no circulating pump employed) and where the room temperature is automatically lowered at night in order to conserve fuel.

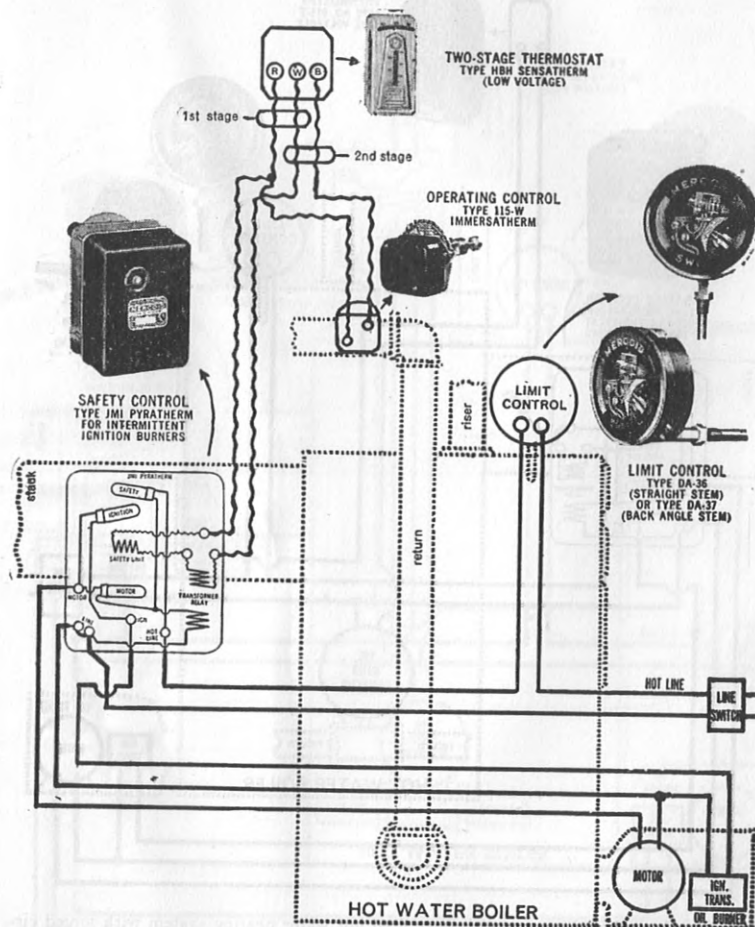


PLATE 18—Control hook-up for oil burner fired, gravity circulation hot water heating system — two stage thermostat minimizes cold air stratification. This hook-up is highly recommended in connection with gravity circulation hot water heating systems as cold air stratification is reduced to a minimum resulting in greater heating comfort.

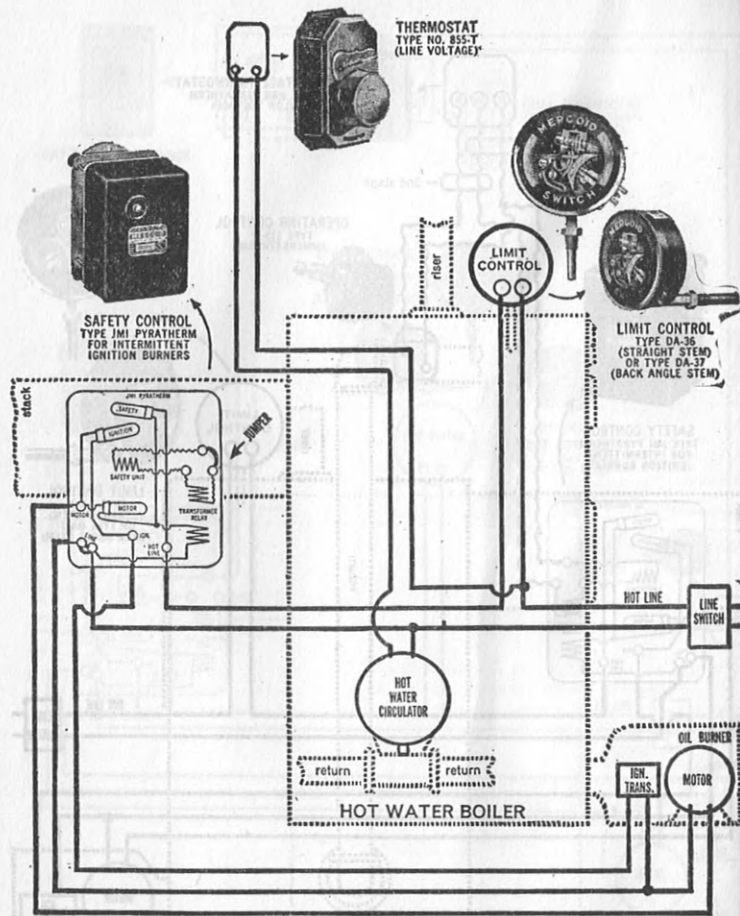


PLATE 19—Control hook-up for oil burner fired hot water heating system with forced circulation pump controlled by line voltage thermostat — provides year around domestic hot water through indirect or tankless heater. This hook-up is quite generally employed in the field in connection with oil burner fired, forced circulation hot water heating systems which are equipped with indirect or tankless heaters (heaters not shown) for supplying year around domestic hot water.

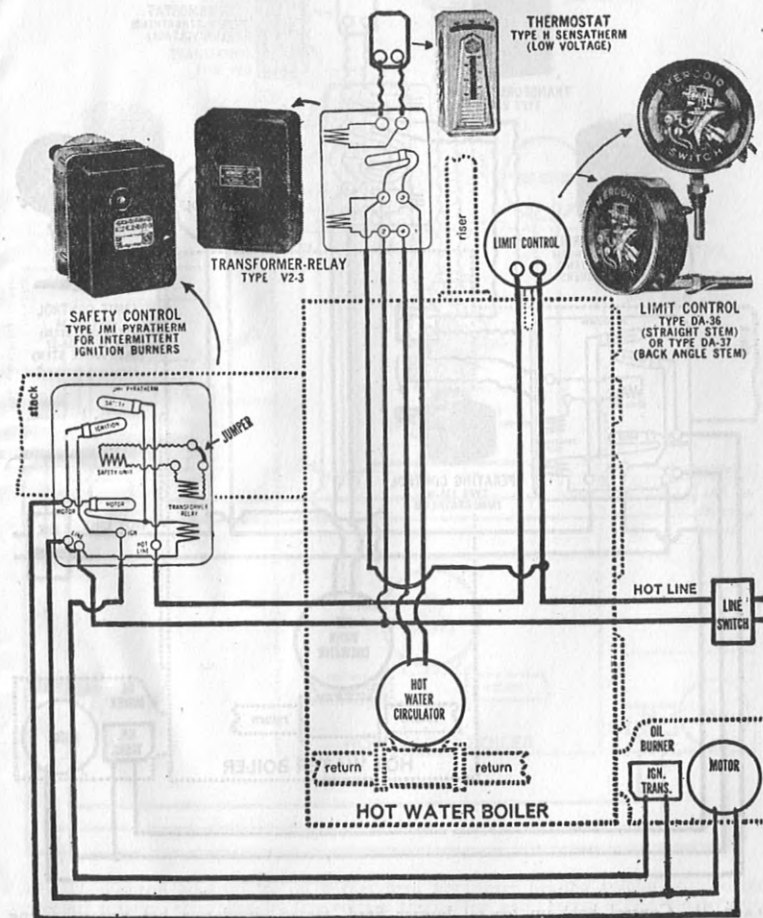


PLATE 20—Control hook-up for oil burner fired hot water heating system with forced circulation pump controlled by low voltage thermostat — provides year around domestic hot water through indirect or tankless heater.

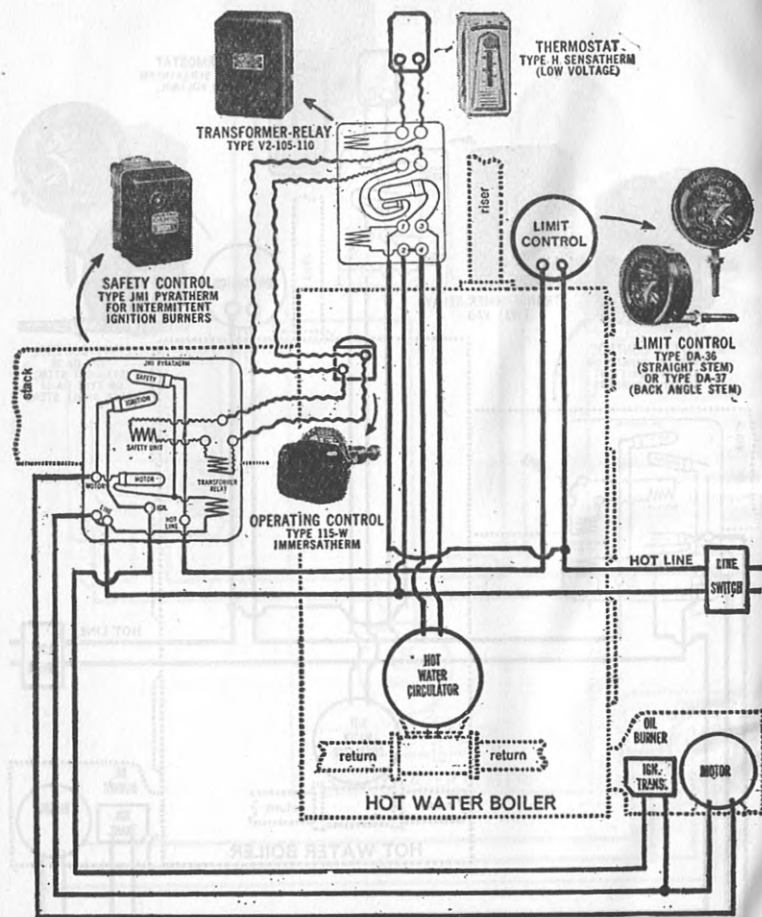


PLATE 21—Control hook-up for oil burner fired, forced circulation hot water heating system — providing year around domestic hot water through indirect or tankless heaters. Very satisfactory results are obtained when this hook-up is employed in connection with oil burner fired, forced circulation hot water systems which are equipped with indirect or tankless heaters (heaters not shown) for year around domestic hot water.

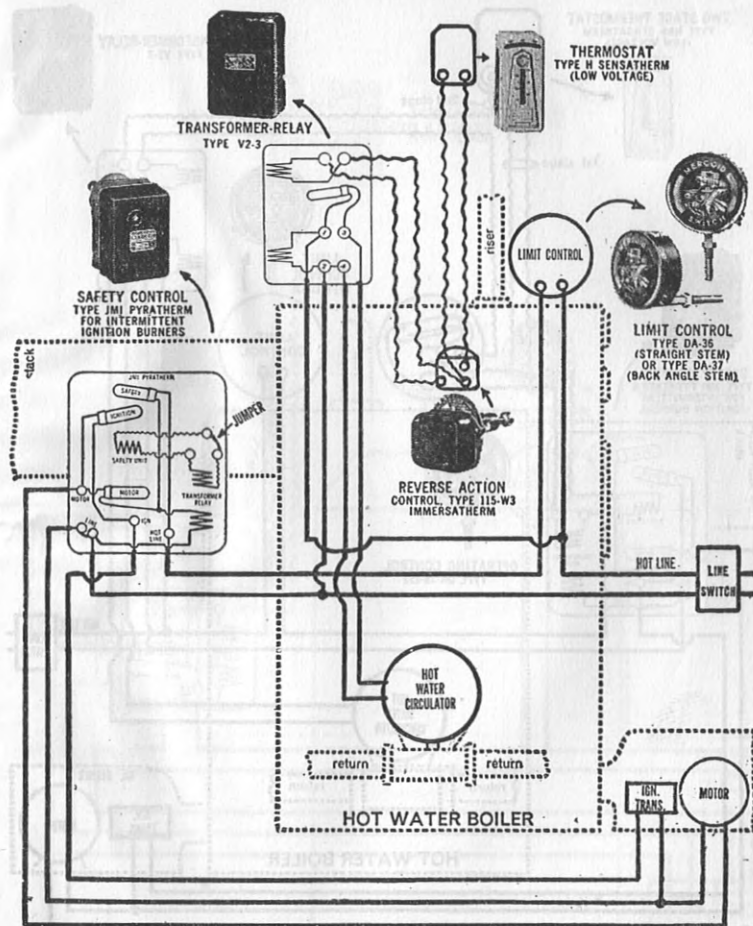


PLATE 22—Control hook-up for oil burner fired hot water heating system with forced circulation pump controlled by low voltage thermostat and reverse action temperature control — provides year around domestic hot water through indirect or tankless heater. Oil burner fired hot water heating systems with forced circulation are quite generally controlled as shown in this hook-up and very satisfactory results as well as economical operation, are obtained.

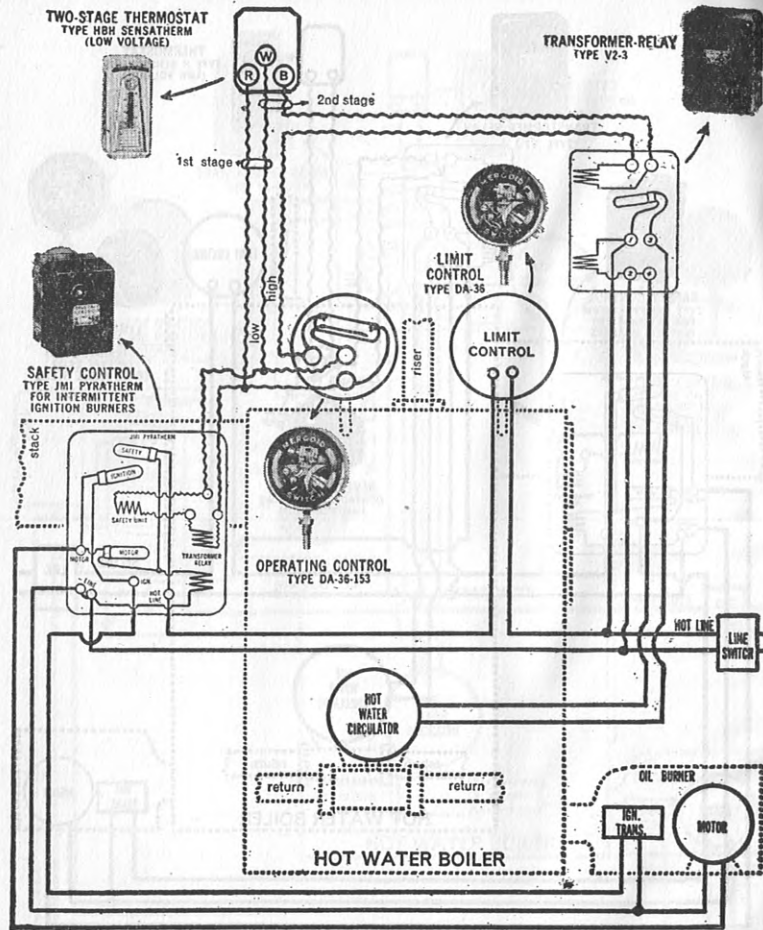


PLATE 23—Control hook-up for oil burner fired, forced circulation hot water system, with two stage thermostatic control, also providing year around domestic hot water through indirect or tankless heaters. Distinct advantages are realized when this hook-up is employed in connection with oil burner fired, forced circulation hot water systems which are equipped with indirect or tankless heaters (heaters not shown) for year around domestic hot water.

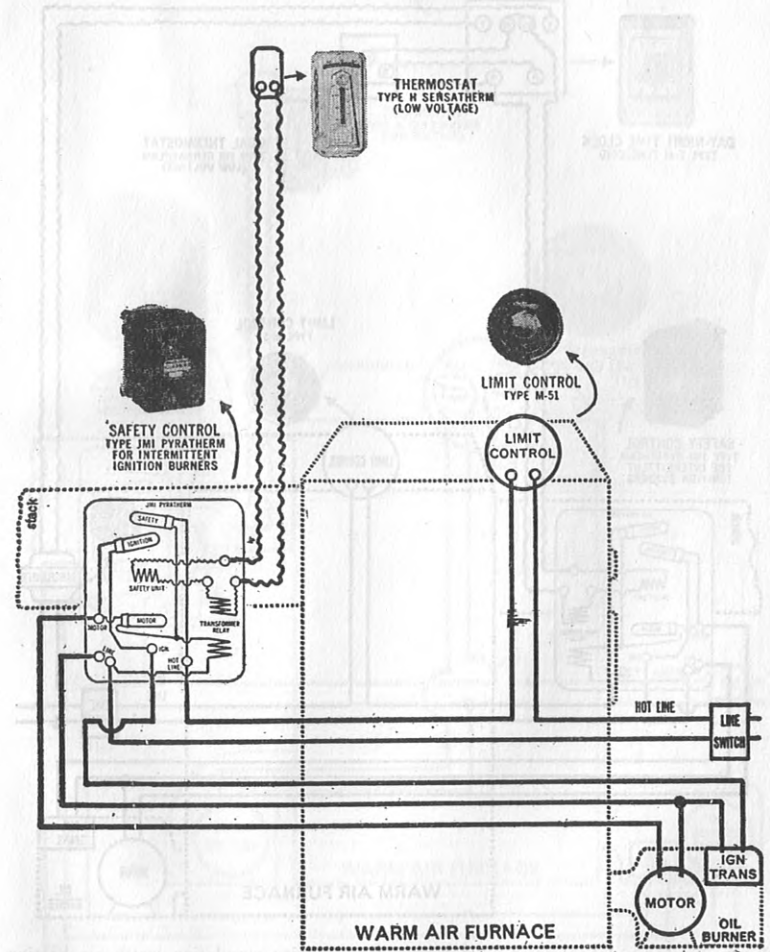


PLATE 24—Control hook-up for oil burner fired warm air heating system — gravity circulation. This simplified control hook-up, in general use in the field, covers an oil burner fired warm air system wherein the air circulates by gravity (no blower employed).

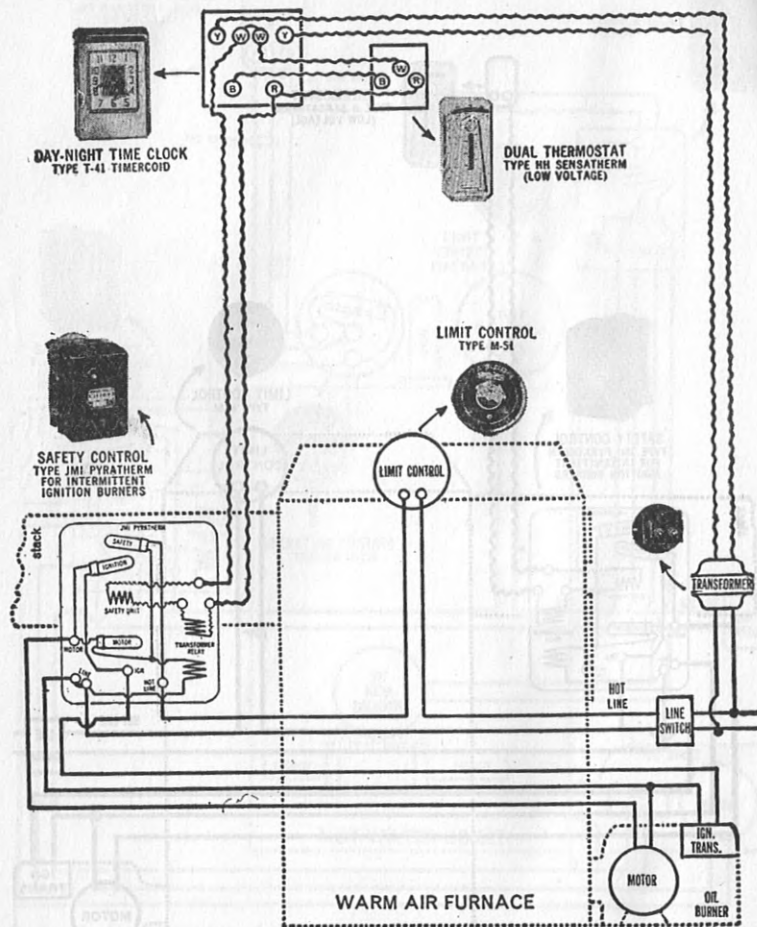


PLATE 25—Control hook-up for oil burner fired gravity circulation warm air heating system, with fully automatic day-night thermostatic control. This control hook-up, quite frequently employed in the field, covers an oil burner fired warm air system wherein the air circulates by gravity (no blower employed) and where the room temperature is automatically lowered at night in order to conserve fuel.

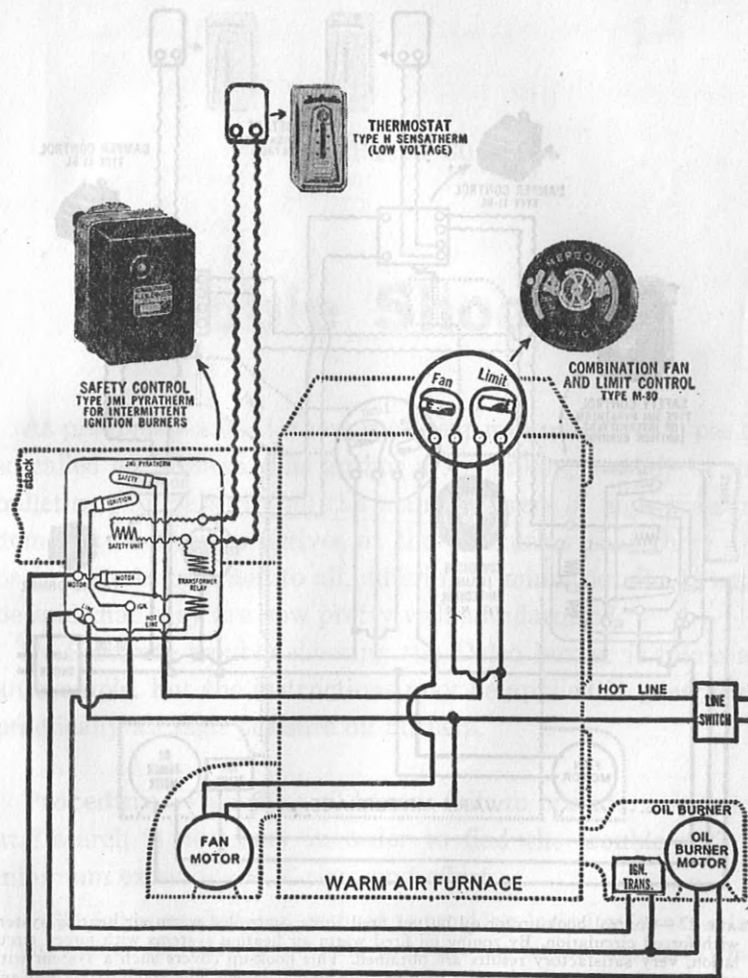


PLATE 26—Control hook-up for oil burner-fired warm air heating system equipped with forced circulation fan. Warm air heating systems equipped with oil burners and forced air circulating fans are most generally controlled as shown in this simplified hook-up.

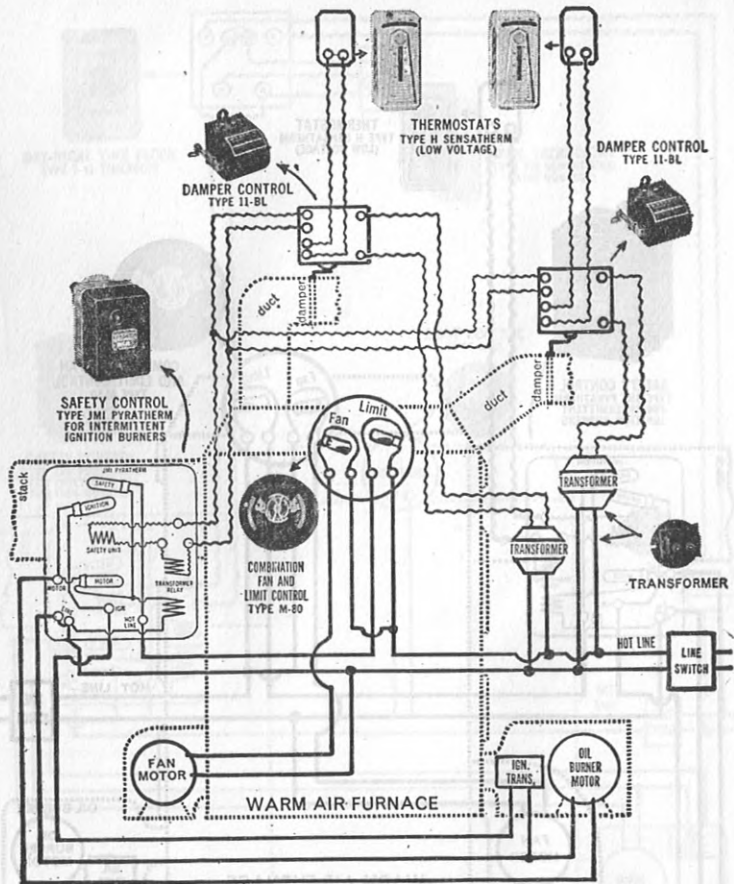


PLATE 27—Control hook-up for oil burner fired, zone controlled warm air heating system with forced circulation. By zoning oil fired warm air heating systems with forced circulation, very satisfactory results are obtained. This hook-up covers such a system with two zones, however, any number of zones can be employed. The combination fan and limit control (Type M-80) is provided with four simple adjustments for independently setting the cut-in and cut-out temperatures of both the fan and limit switches. The fan switch, which is open when the furnace is cold, prevents the fan operating and circulating cold air.