INSTALLATION & OPERATING INSTRUCTIONS

B6000™

Boiler Management System

Raypak®
A Rheem® Company

Catalog No. 5000.51K Effective: 02-01-08 Replaces: 10-14-05 P/N 240564 Rev. 12

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CONTENTS

B6000 BOILER MANAGEMENT SYSTEM (BMS)

Contents

Equipment	Quantity
B6000 System Control	1
B6000 Boiler Monitor, Installed on Boiler(s)	As Ordered
Outdoor Temperature Sensor Assy. (064140)	1
Water Temperature Sensor Assy. (064139)	1
Optional Equipment	As Ordered

Table A: Contents

Check packaging for damage or missing components.

NOTE: These instructions are intended for the use by qualified personnel only, specifically trained and experienced in the installation of this type of equipment and related system components. Installation and service personnel may be required by some states to be licensed. If your state is such, be sure your contractor bears the appropriate license. Only qualified persons shall attempt to repair this equipment. Repair must be according to these instructions.

WARNING: Improper installation, adjustment, alteration, service or maintenance may damage the equipment, create a hazard resulting in asphyxiation, explosion, fire, electric shock, personal injury or property damage and will void the warranty.

CAUTION: More than one (1) supply source. this control has the potential to be connected to more than one (1) electrical supply source. To reduce the risk of electric shock, disconnect all connections before servicing.

CAUTION: Risk of electric shock. more than one (1) disconnect switch may be required to de-energize the equipment before servicing.

PLEASE REGISTER. Before proceeding any further, please take a moment to complete the enclosed user registration form and mail to Raypak, Inc., 2151 Eastman Avenue, Oxnard, CA 93030.

Thank you for selecting the Raypak B6000 Boiler Management System (BMS). It is our sincere hope that you will enjoy its power, ease of use and energy-saving features.

Getting Started

To learn about the B6000 BMS, simply install it and start using it. The following steps will outline the things you will need for installation and to prepare it for use.

Foreword

The B6000 Boiler Management System is comprised of a Boiler Monitor for each boiler, one System Control for each system, an Outdoor Air Temperature Sensor and a Water Temperature Sensor. The system is a microprocessor-based energy management hot water control system that controls single or multiple boiler installations used for hydronic heating and/or domestic hot water supply.

The B6000 BMS is designed to provide the ultimate in personal comfort, efficiency and operation. The system requires minimal attention after initial setup. The system control can be separated from the boiler(s) by up to 2000 feet. With an optional modem package, it is capable of being monitored from a remote location by a Personal Computer (PC) equipped with a modem.

The Raypak Boiler Management System minimizes boiler operator attendance, and increases both system reliability and cost effectiveness.

The System Control Module has:

- A screen that displays the different operating characteristics of the system.
- A green light, to the left of the screen, that indicates normal system operating conditions.
- A red light, to the right of the screen, that flashes when a fault occurs.
- An alarm buzzer with a silencing switch. If the buzzer is silenced, the red light will continue to flash until the diagnosed fault is corrected.
- Buttons which are used to monitor and program the selectable system features.
- On-board relays designed to control primary system pumps, combustion vent louvers and/or other boiler accessories.

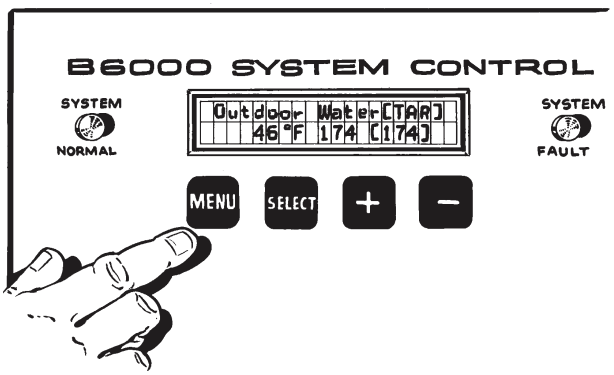


Fig. 1: B6000 System Control

Each Boiler Monitor Module contains:

Numbers correspond to call-outs in Fig. 2.

1. The boiler on-off power switch.
2. The boiler manual override switch, which allows the boiler to operate independently in the event of a system control failure.

Standard Indicator Lights:

3. **POWER** - green, indicates the boiler is powered.
4. **MANUAL OVER RIDE** - red, indicates boiler is in manual override mode.
5. **CALL FOR HEAT** - amber, indicates there is a call for heat.
6. **PUMP** - green, indicates pump circuit is energized.
7. **HIGH LIMIT** - red, indicates boiler is **off** on manual high limit.
8. **AQUA STAT** or **THERMOSTAT** - red, indicates boiler is off on operating control (may not appear on all models).
9. **FLOW** - red, indicates boiler fault - no flow.
10. **IGNITION** - red, indicates ignition failure.
11. **PILOT** - yellow or amber, indicates pilot is lit.
12. **SAFETY FAULT** - red, indicates fault in safety valve or safety circuit.
13. **MAIN GAS** - green, indicates modulating valve is energized.
14. Boiler identification dip switch (not shown).

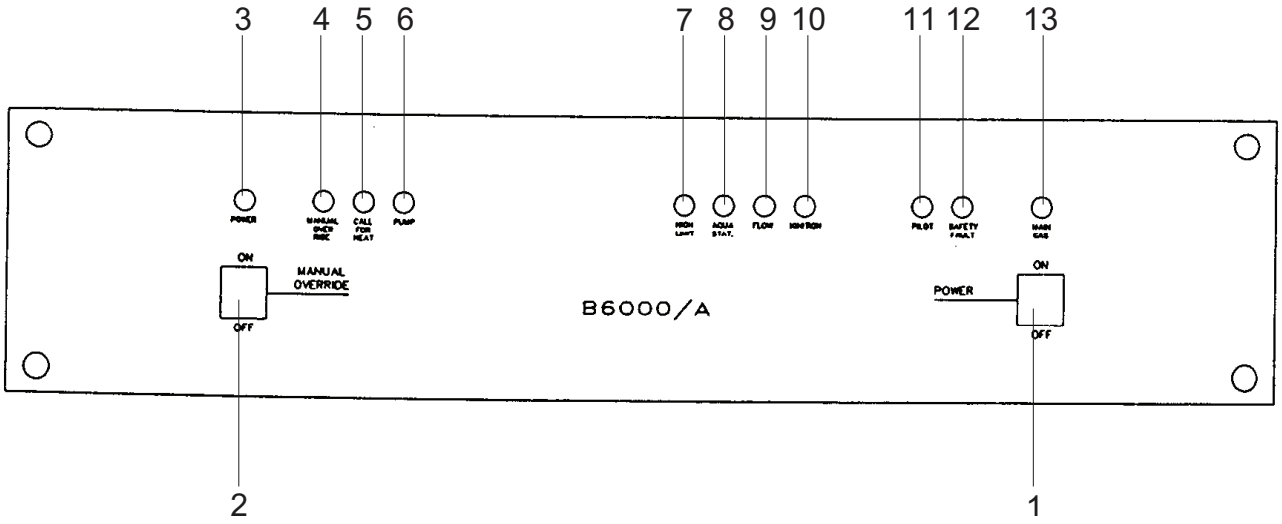


Fig. 2: B6000/A Illustrated

INSTALLATION & MOUNTING

The System Control module should be mounted on a permanent base not subject to vibrations, moisture or dust. It should be mounted with the display screen at a convenient height for reading and for access to the alarm silence button located on the top of the cabinet.

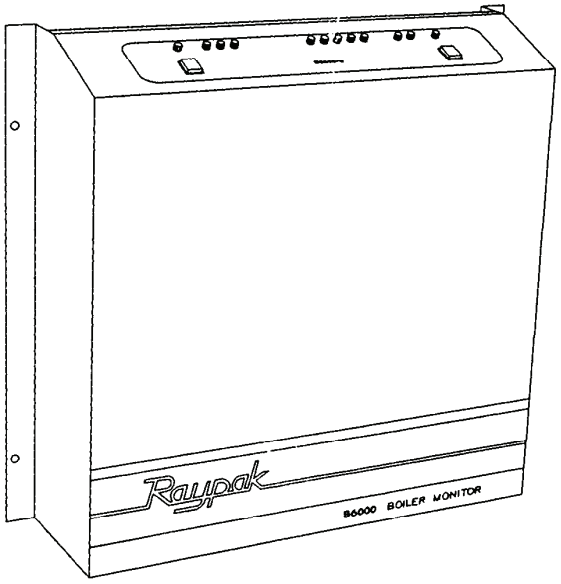


Fig. 3: Boiler Monitor

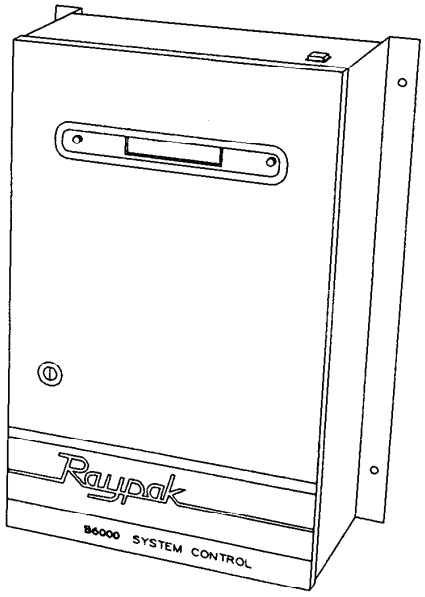


Fig. 4: System Control

Dimensions & Weight

Item	Width (in.)	Depth (in.)	Length (in.)	Weight (lbs.)
Boiler Monitor	18-3/4	5-1/2	17-1/2	21-1/4
System Control	12-1/2	4-3/4	15-3/16	20

Table B: Dimensions and Weight

Mechanical Installation

Install the B6000 System Control Module at a convenient place within 2000 feet of the boiler(s). The B6000 System Control Module must be mounted vertically with conduit holes facing downward. Conduit holes are provided to accommodate standard 1/2" conduit fittings. Additional (or larger) conduit fittings that may be required should be located on the bottom of the module.

Mount the B6000 System Control with 3/8" or 1/4" hardware in four (4) places.

A minimum of six (6) inches clearance on all sides is required. For service access, a minimum of eighteen (18) inches clearance from the front is required. The hinged side of the box is to the right. There must be enough clearance (minimum 3" from bolt hole) on the right side to fully open the cover.

A sub-panel containing the disconnect switches and surge suppressors is required at or near the equipment location(s).

For access to wiring connections, remove the lower interior panel, by removing the four (4) access screws.

Install conduit as appropriate.

NOTE: Shielded cable (Belden #8132 or #9842 or equivalent) must be used to connect the sensors to the System Control Module.

Electrical Installation

Electrical Characteristics

Control Module - 120 VAC 60 Hz, 0.5A
Boiler Monitor Module - 120 VAC 60 Hz, 2.0A

If operating in a 50 Hz environment, special modifications are required.

Feeder Circuits, 120 VAC

Install surge protection device(s) sized appropriately for your installation. Install separate disconnect means for each load. Pull in appropriately -sized wire for equipment as defined by the National Electric Code (NEC) and/or local code. All primary wiring must be at least 125% of minimum rating.

It is strongly recommended that the System Control Module and the Boiler Control Module be supplied from the same source power.

Check Your Power Source

Using a volt-ohm meter, check the following voltages at the circuit breaker:

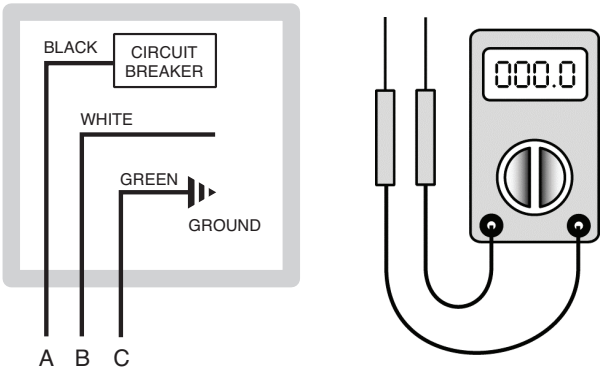


Fig. 5: Check the Power Source

Hot to Ground: AC = 108 Volts AC Minimum, 132 Volts MAX

Hot to Neutral: AB = 108 Volts AC Minimum, 132 Volts MAX

Neutral to Ground: BC = Must be less than 1.0 Volt AC

Air Temperature Sensor

Installation

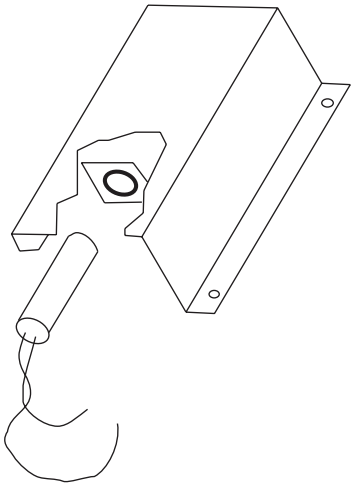


Fig. 6: Air Temperature Sensor

Air Temperature Sensor Installation:

- Locate on coldest side of building, usually North or West side.
- Install the sensor in a shaded area, out of direct sunlight.
- Locate no higher than 2/3 way up side of building, or between 2nd and 3rd floor if building is more than 3 stories tall.
- Shielded cable length not to exceed 4000 feet.
- Do not locate under an overhang, near wall corners, near drafts from stacks, air moving devices, windows, doors, or balconies.
- Ensure cable length does not exceed 4000 ft. Use larger gauge (Belden #9842) cable if run is in excess of 100 ft.
- Install in conduit with no other wiring. Current-carrying conductors in the same conduit will induce false temperature readings and may damage the B6000.
- Observe proper wire colors. Sensor is polarity sensitive.

Water Temperature Sensor Installation

The water sensor should be installed in the system supply.

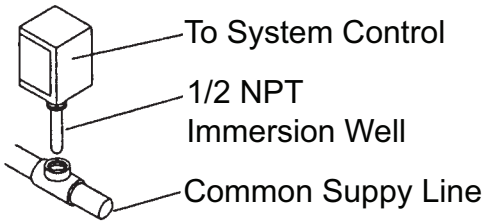


Fig. 7: Typical Water Sensor

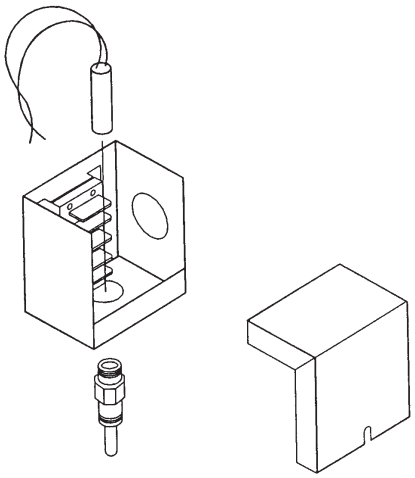


Fig. 8: Water Sensor

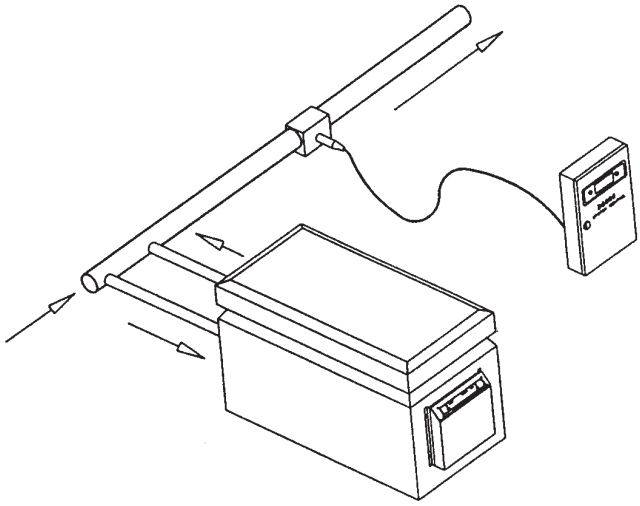


Fig. 9: Single Boiler Installation

Water Temperature Sensor Installation:

- Locate sensor in the system piping at least three (3) feet downstream of the last boiler.
- Ensure cable length does not exceed 4000 ft. Use larger gauge (Belden #9842) wire if run is in excess of 100 ft.
- Install in conduit with no other wiring. Current-carrying conductors in the same conduit will induce false temperature readings and may damage the B6000.
- Observe proper wire colors. Sensor is polarity sensitive.

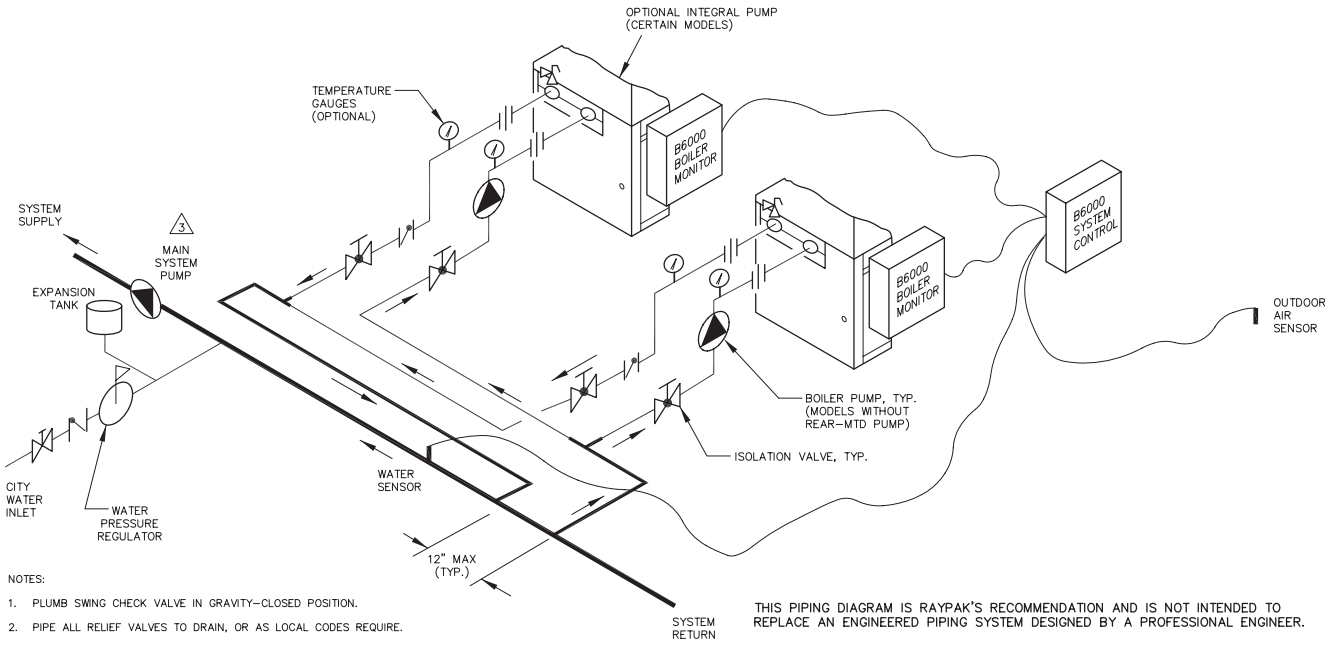


Fig. 10: Multiple Boiler Installation

Water Temperature Sensor Installation (Domestic Hot Water Supply)

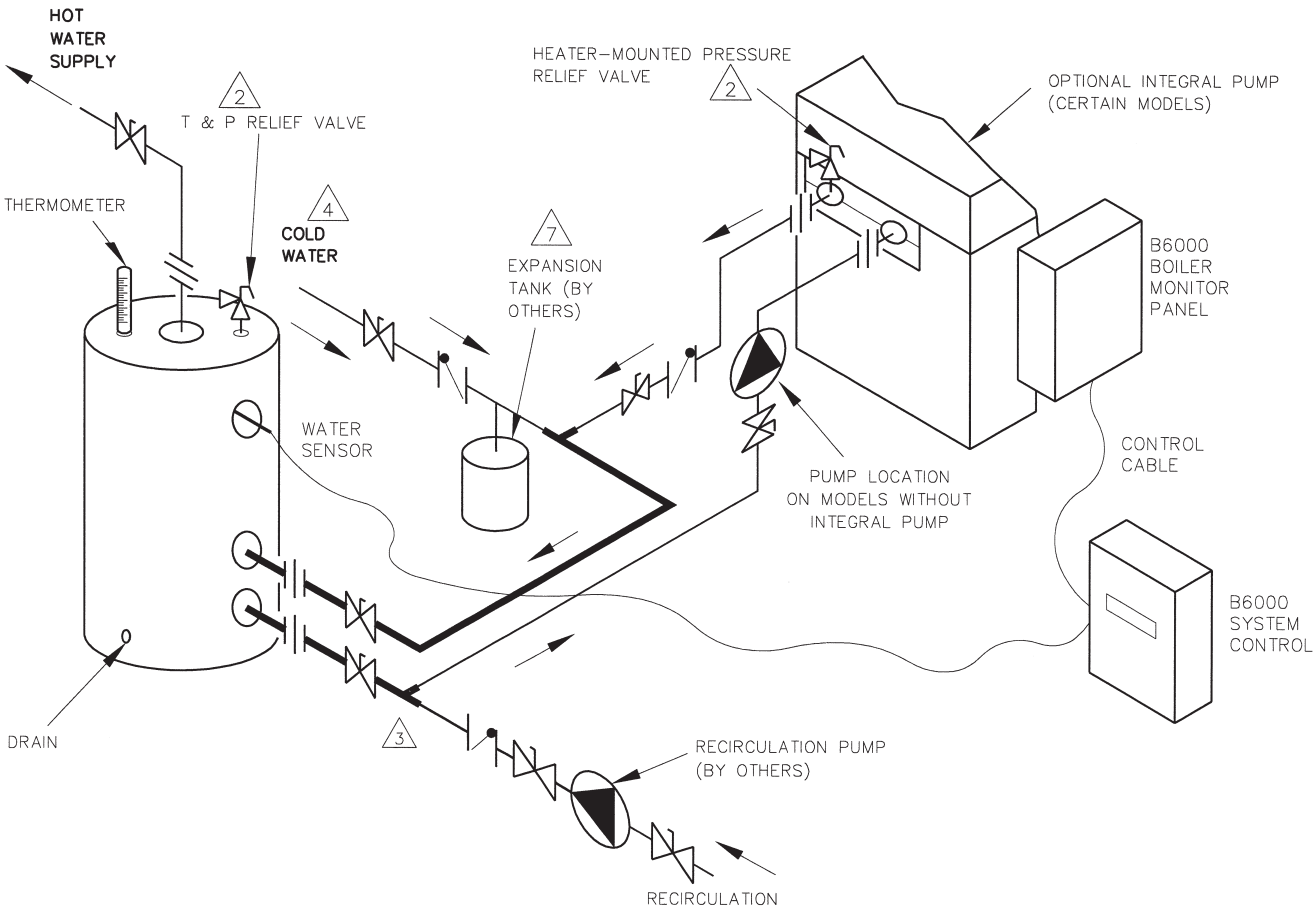


Fig. 11: Typical Piping (Piping Layout May Vary Per Specific Application)

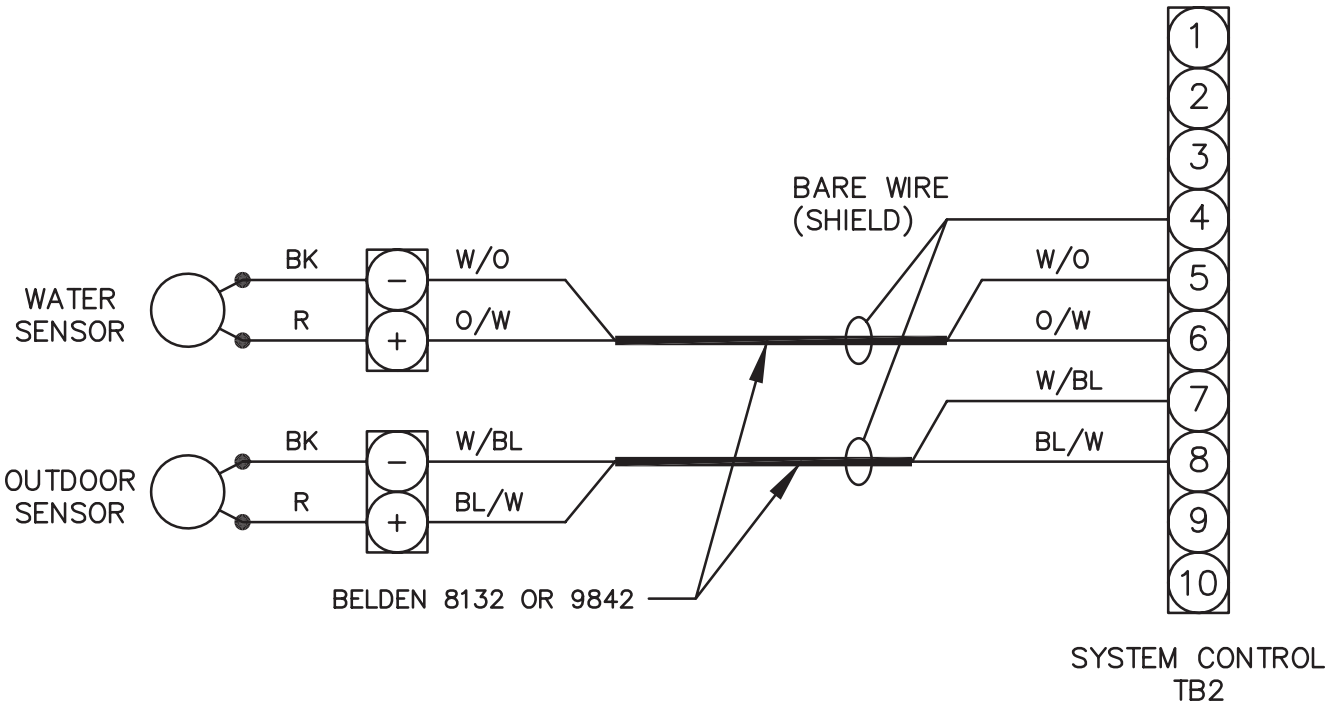
Air temperature sensor must be installed across air temperature sensor contacts. The sensor is not activated and can be left stored in the B6000 enclosure.

Electrical Field Wiring

IMPORTANT: If your System Control Module is supplied with a single field wiring terminal strip use the **Alternate Wiring** instructions beginning on page 18.

Air & Water Sensors

To the System Control Module:

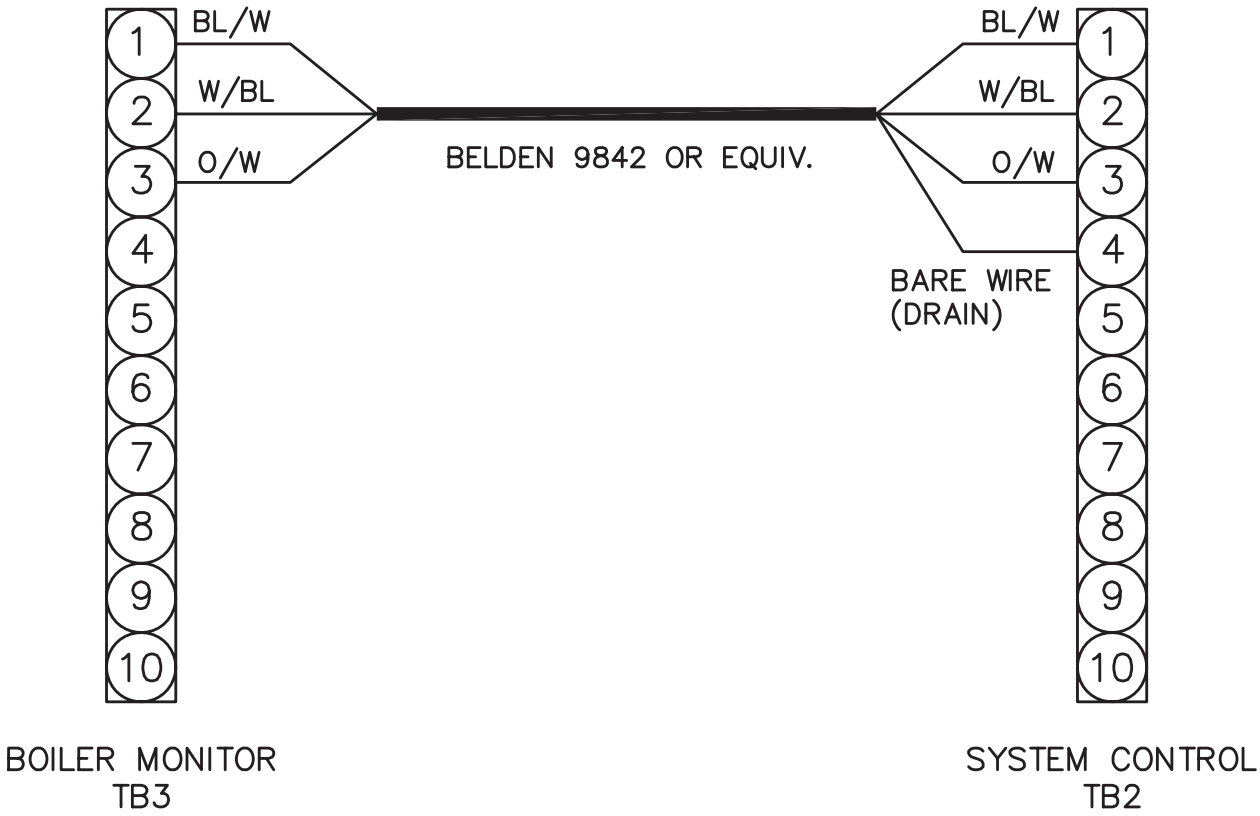


NOTE: Tighten terminal strip clamping screws 20 in-lbs (2.26Nm) Breakage from over-torquing is not covered under warranty.
Use copper conductors only.
For supply connections, use wires sized on the basis of 60°C Ampacity and rated Min. 90°C (194°F).

Fig. 12: Wiring the Air and Water Sensors to the System Control Module

Communication (RS-485) Wiring

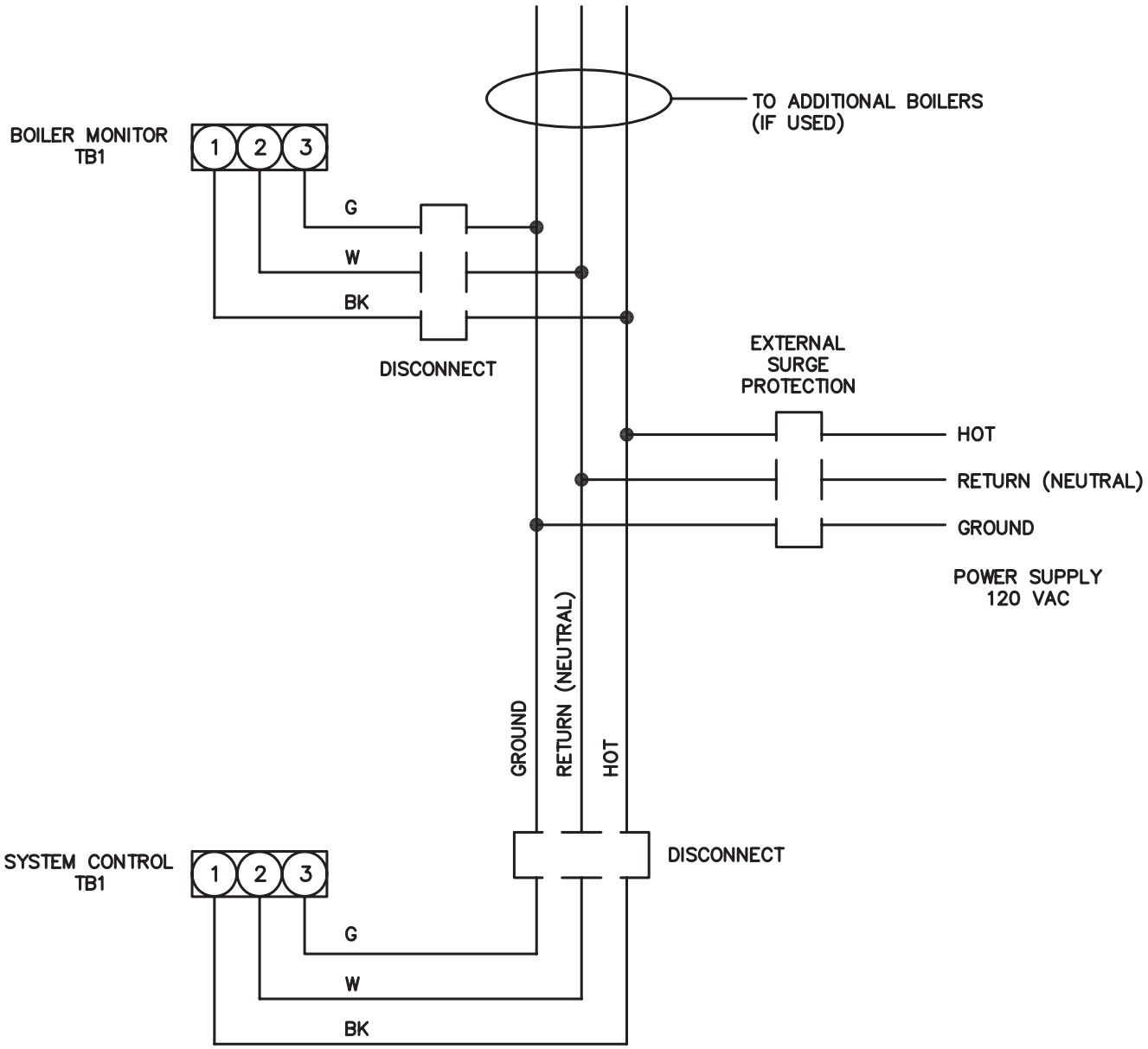
- Use Belden #9842 cable or equivalent (See Note). Polarity must be observed. Make use of wire color coding to ensure proper polarity.
- The shielding foil wrapper - bare wire (drain) - MUST be grounded. Grounding is done at the System Control Module only. DO NOT ground at Boiler Monitor.
- Note: Equivalent shielded cable must be suitable for RS-485 communication applications; must have 100-140 ohm impedance; and less than 30 picofarad per foot capacitance.
- Install in conduit with no other wiring.



NOTE: Tighten terminal strip clamping screws 20 in-lbs (2.26Nm). Breakage from over torquing is not covered under warranty.
Use copper conductors only.
For supply connections, use wires sized on the basis of 60°C Ampacity and rated Min. 90°C (194°F).

Fig. 13: RS-485 Communications Cable Schematic

Power Source to System Control & Boiler Modules



NOTE: Tighten terminal strip clamping screws 20 in-lbs (2.26Nm). Breakage from over torquing is not covered under warranty.
Use copper conductors only.
For supply connections, use wires sized on the basis of 60°C Ampacity and rated Min. 90°C (194°F).

Fig. 14: Power Source to System Control and Boiler Modules

- Observe proper Polarity.
- Observe proper wire colors.
- Provide external surge suppressor capable of maintaining system integrity.
- Provide overload protection and disconnect means as required by code and for equipment serviceability.
- Conduit can not be used as the ground. **(Must be WIRED ground).**
- **VERY IMPORTANT:** Grounding electrode conductor shall be used to connect the equipment grounding conductors, the equipment enclosures, and where the system is grounded, the grounded service conductor to the grounding electrode.

Power Test

Check Power

Utilizing a Volt-Ohm-Meter (VOM), monitor the following on the System Control Module and Boiler Monitor(s) for proper voltage levels.

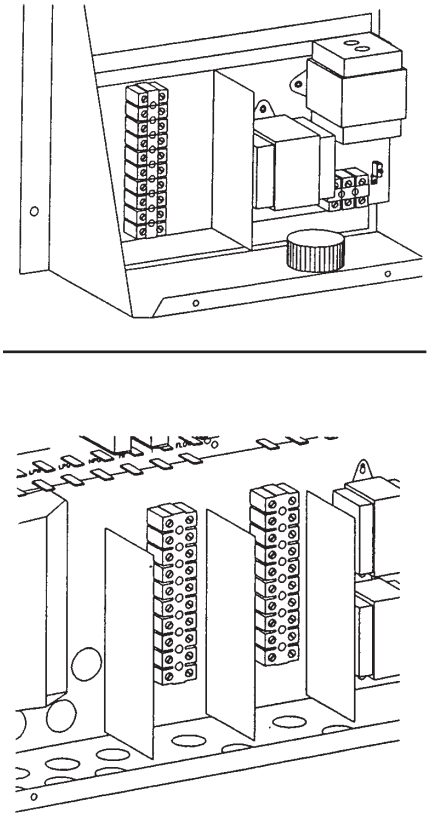


Fig. 15: System Control and Boiler Monitor Terminal Strip Locations

Module	Test Points	Indication
System Control	TB1-1 to TB1-2	108 VAC to 132 VAC
System Control	TB1-1 to TB1-3	108 VAC to 132 VAC
System Control	TB1-2 to TB1-3	LESS THAN 1 VAC
System Control	TB1-1 to Ground	108 VAC to 132 VAC
System Control	TB1-2 to Ground	LESS THAN 1 VAC
System Control	TB1-3 to Ground	LESS THAN 0.5 VAC
Boiler Monitor	TB1-1 to TB1-2	108 VAC to 132 VAC
Boiler Monitor	TB1-1 to TB1-3	108 VAC to 132 VAC
Boiler Monitor	TB2-2 to TB2-3	LESS THAN 1 VAC
Boiler Monitor	TB1-1 to Ground	108 VAC to 132 VAC
Boiler Monitor	TB1-2 to Ground	LESS THAN 1 VAC
Boiler Monitor	TB1-3 to Ground	LESS THAN 0.5 VAC

Table C: Power Test Information

Test Points	Indication
Boiler Monitor TB1-1 to System Control TB1-1	LESS THAN 0.5 VAC
Boiler Monitor TB1-2 to System Control TB1-2	LESS THAN 0.5 VAC
Boiler Monitor TB1-3 to System Control TB1-3	LESS THAN 0.5 VAC
Boiler Monitor TB1-2 to System Control TB1-3	LESS THAN 0.5 VAC

Table D: Boiler Monitor to System Control Power Test Information

IMPORTANT: The Boiler Monitor control board has a series of dip switches which identify the boiler(s) (SW2). It is required that the switches be set as shown in the switch position table below.

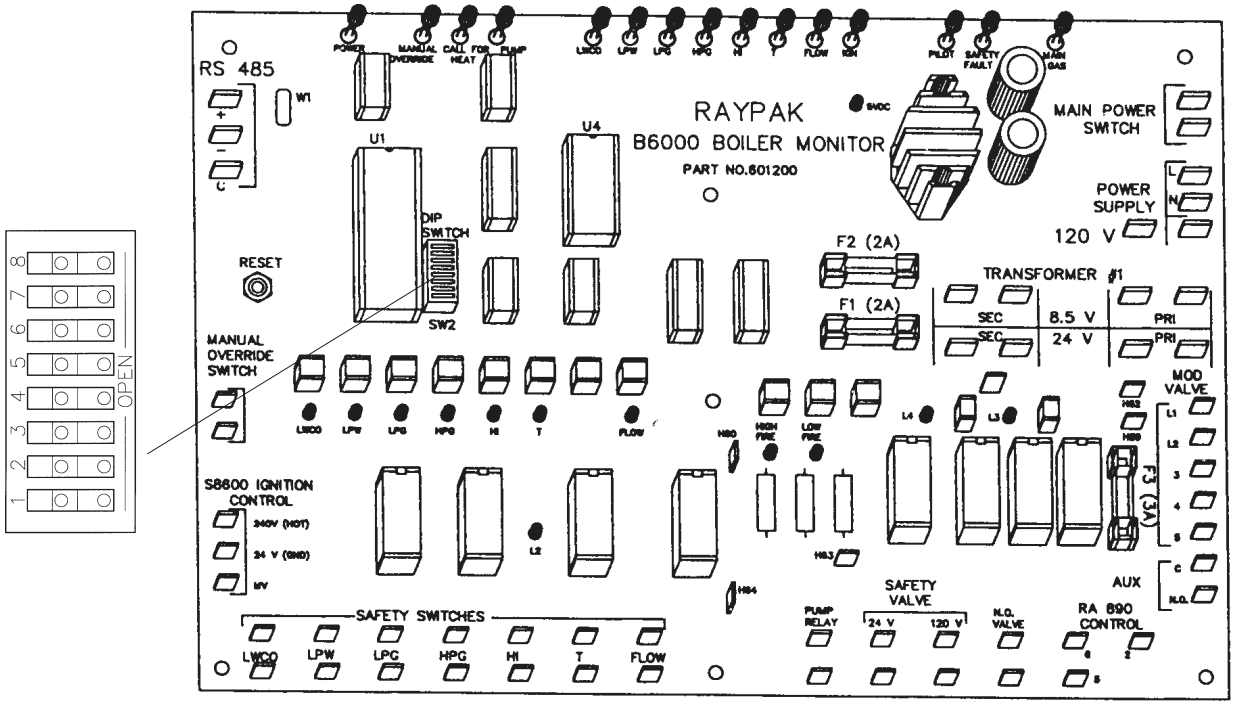


Fig. 16: Boiler Monitor Board

Boiler Monitor Select Switch

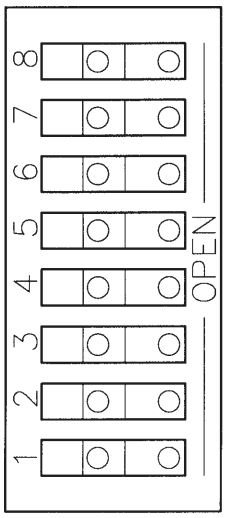


Fig. 17: Switch SW2

Switch	Boiler Number							
	1	2	**3**	**4**	**5**	**6**	**7**	**8**
8	O	O	O	O	O	O	O	O
7	O	O	O	O	O	O	O	O
6	O	O	O	O	O	O	O	O
5	O	O	O	O	O	O	O	O
4	O	O	O	O	O	O	O	O
3	O	O	O	O	X	X	X	X
2	O	O	X	X	O	O	X	X
1	O	X	O	X	O	X	O	X

O = Open
X = Closed

Table E: Switch Positions

Boiler Monitor Communications Jumper W1

- Located in the upper left hand corner of the "LAST" Boiler Monitor board.
- NOTE: The jumper indicates to the System Controller logic that the "Last" wired boiler has been communicated with over the RS485 BUSS Link.
- Definition: The "LAST" wired boiler is physically wired with the greatest wire length from the "System Control", or is the last wired boiler for a single or multiple boiler installation.
- On a single boiler make sure the W1 Jumper has been installed.

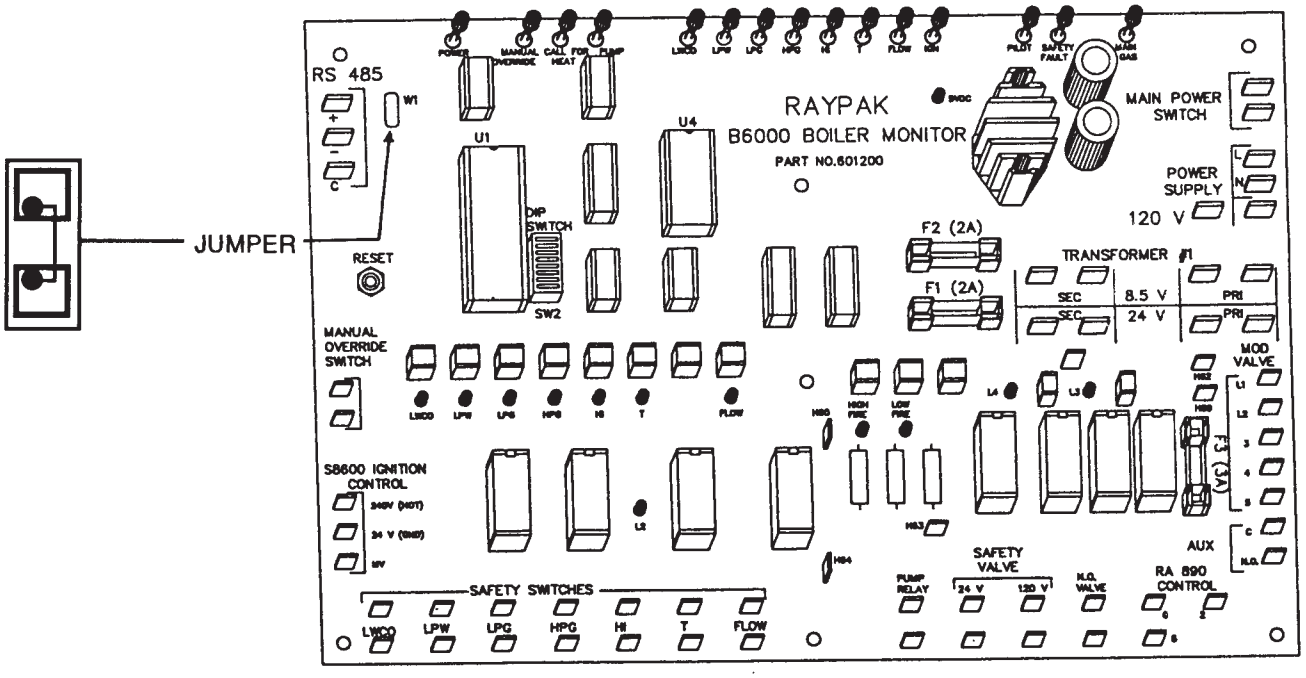


Fig. 18: Boiler Monitor Card

On boiler systems the jumper (W1) MUST BE installed on the "Last" wired boiler. This is located on the Boiler Monitor board in the upper left hand corner, adjacent to the RS485 terminals.

On Multiple boiler systems the W1 jumper must be removed from all Boiler Monitor boards except on the "Last" wired boiler.

For normal boiler operation the dip switch settings can be utilized to define any of the boilers as #1 thru # (maximum), independent of the "Last" wired boiler position.

Optional Boiler Monitor

• Contact Authorized Raypak representative for other wiring options

NOTE: Tighten terminal strip clamping screws 20 in-lbs (2.26Nm). Breakage from over torquing is not covered under warranty.
Use copper conductors only.
For supply connections, use wires sized on the basis of 60°C Ampacity and rated Min. 90°C (194°F).

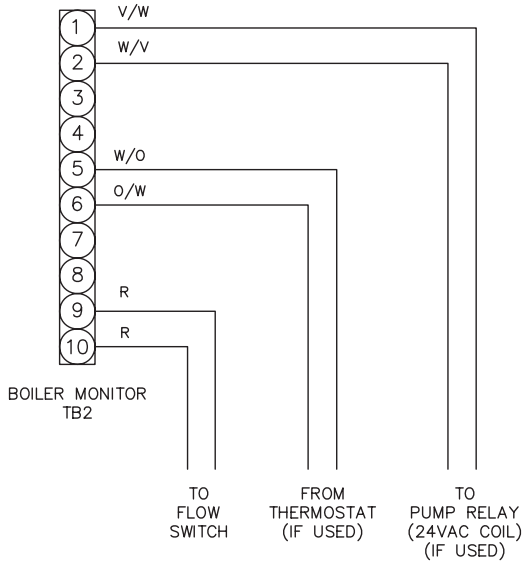


Fig. 18: Boiler Monitor Card

Field Wiring—Single Boiler

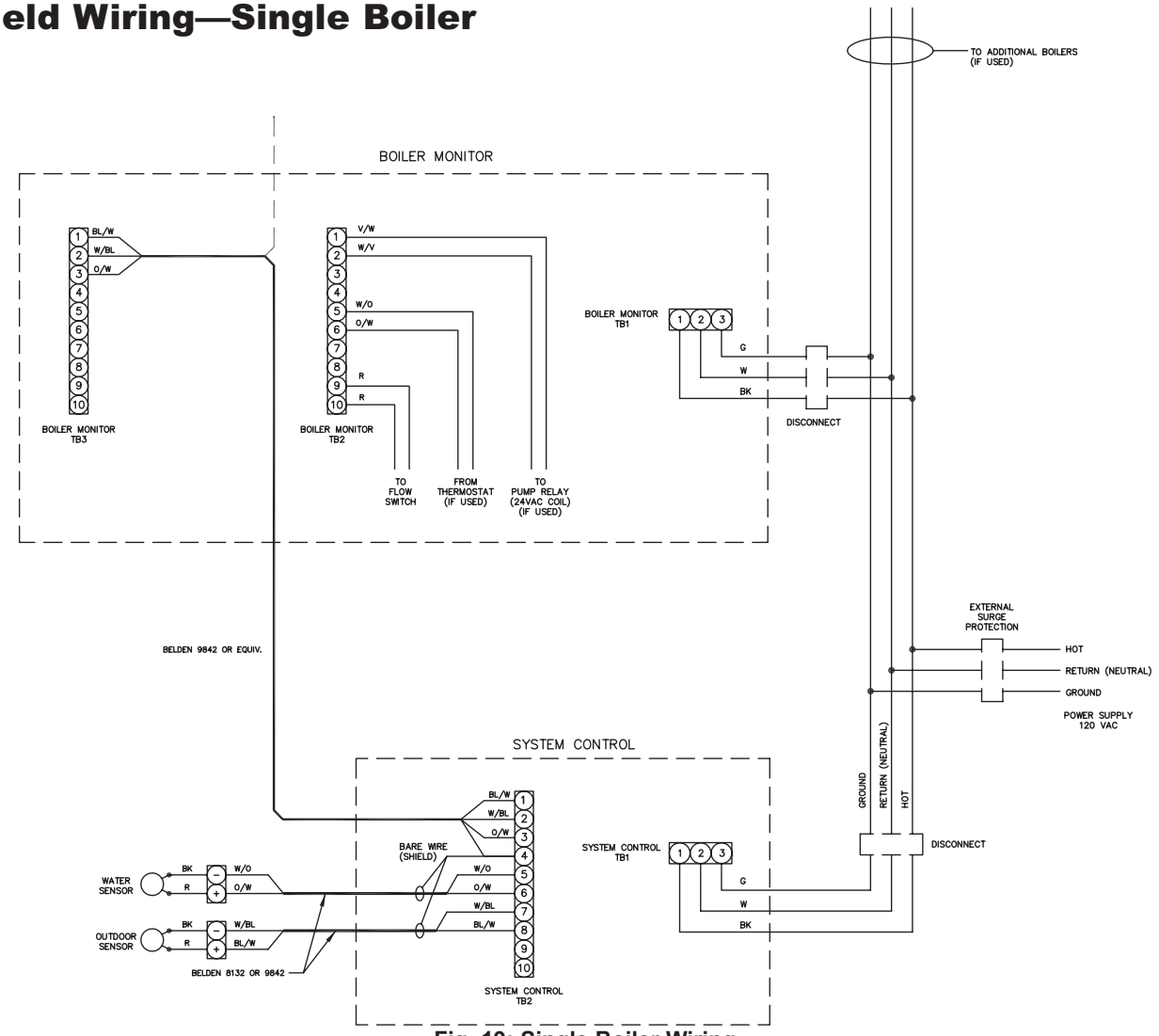


Fig. 19: Single Boiler Wiring

Field Wiring—Multiple Boilers

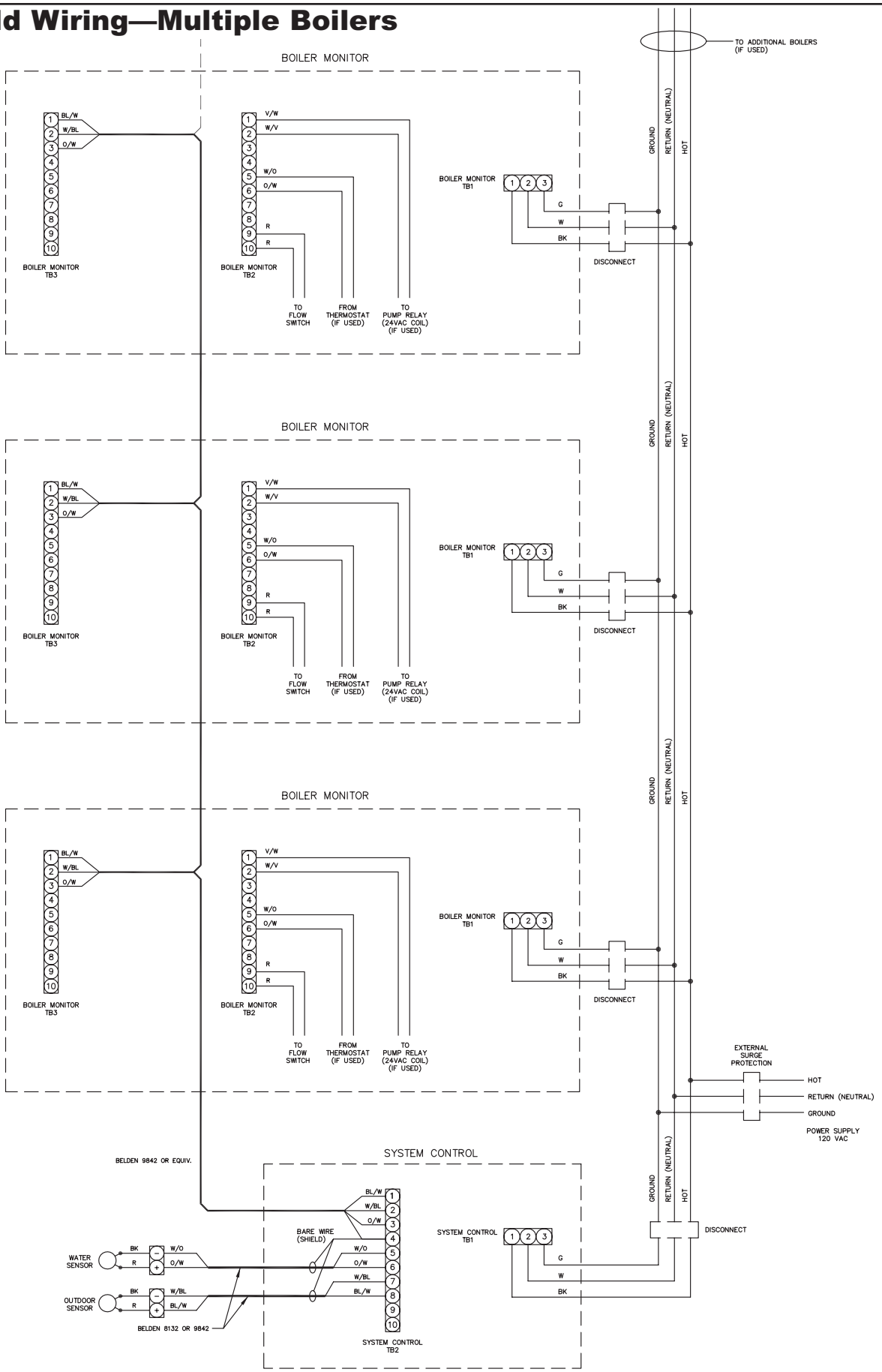


Fig. 20: Multiple Boiler Wiring

ALTERNATE WIRING

IMPORTANT: If your system module(s) are supplied with a **single** Field Wiring Terminal Strip, use the following method for wiring.

Air & Water Sensors

To the System Control Module:

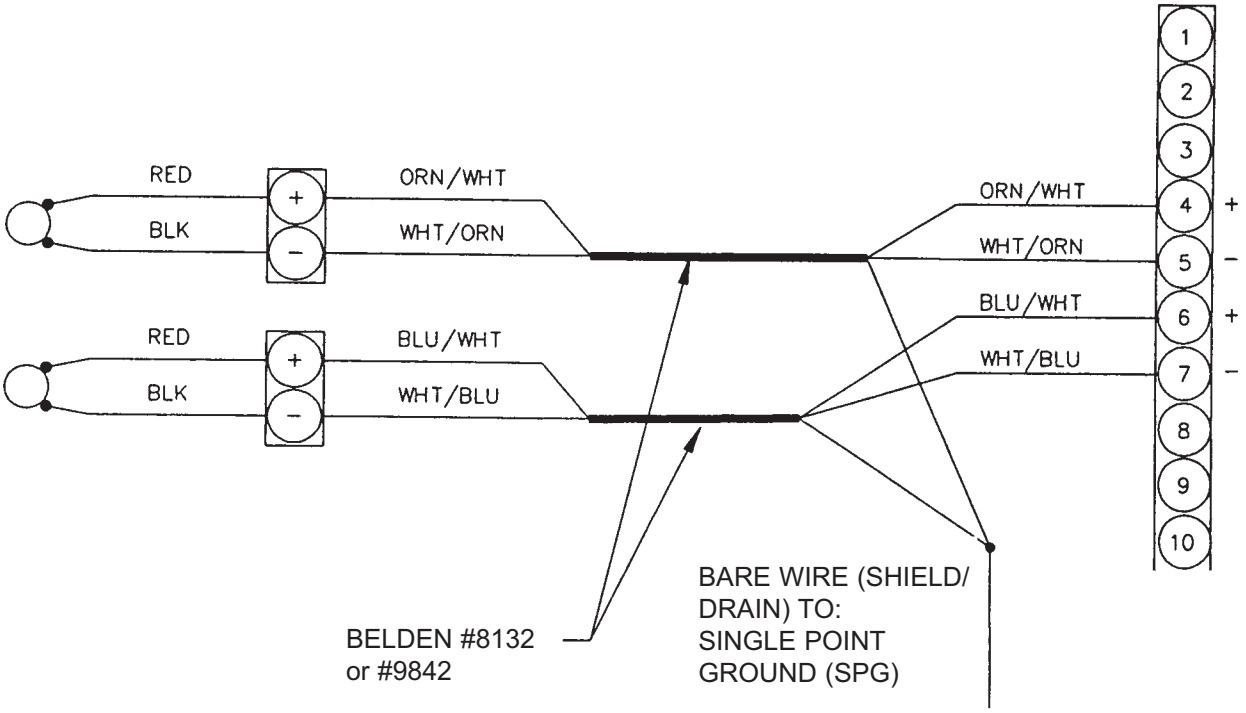


Fig. 21: Wiring the Air and Water Sensors to the System Control Module

Communication (RS-485) Wiring

From the System Control Module to the Boiler Module:

- Shielded communications cable - Belden #9842 must be used. Polarity must be observed. Make use of wire color coding to ensure polarity.
- The shielding [foil wrapper - bare wire (drain)] **MUST** be grounded. Grounding is done at the System Control only. **DO NOT** ground at Boiler Monitor.
- Note: Equivalent shielded cable must be suitable for RS-485 communication applications; must have 100-140 ohm impedance; and less than 30 picofarad per foot capacitance.
- Install in conduit with no other wiring.

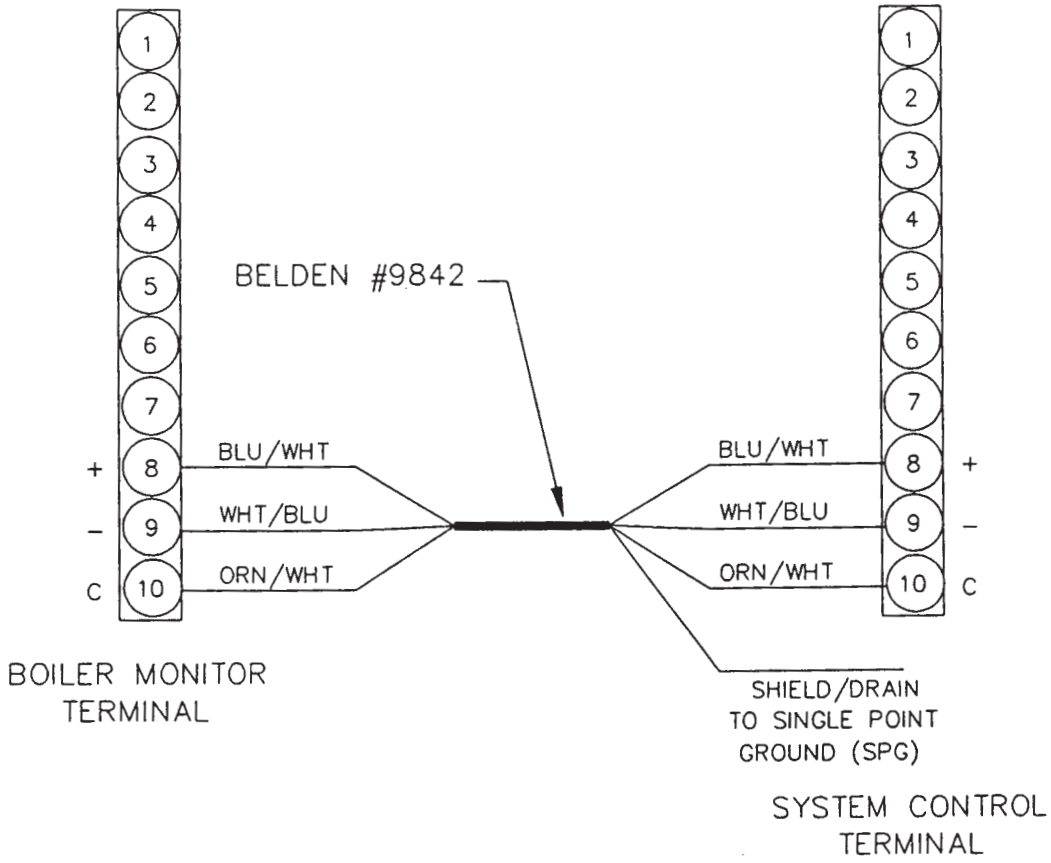


Fig. 22: RS-485 Communications Cable

From the Power Source to the Control and Boiler Modules:

• Observe Polarity , this is very important.

• Observe wire colors.

• Provide external surge suppressor capable of maintaining system integrity.

• Provide overload protection and disconnect means as required by code and for equipment serviceability.

• Conduit CANNOT be used as ground.

• Must be "WIRED" Ground.

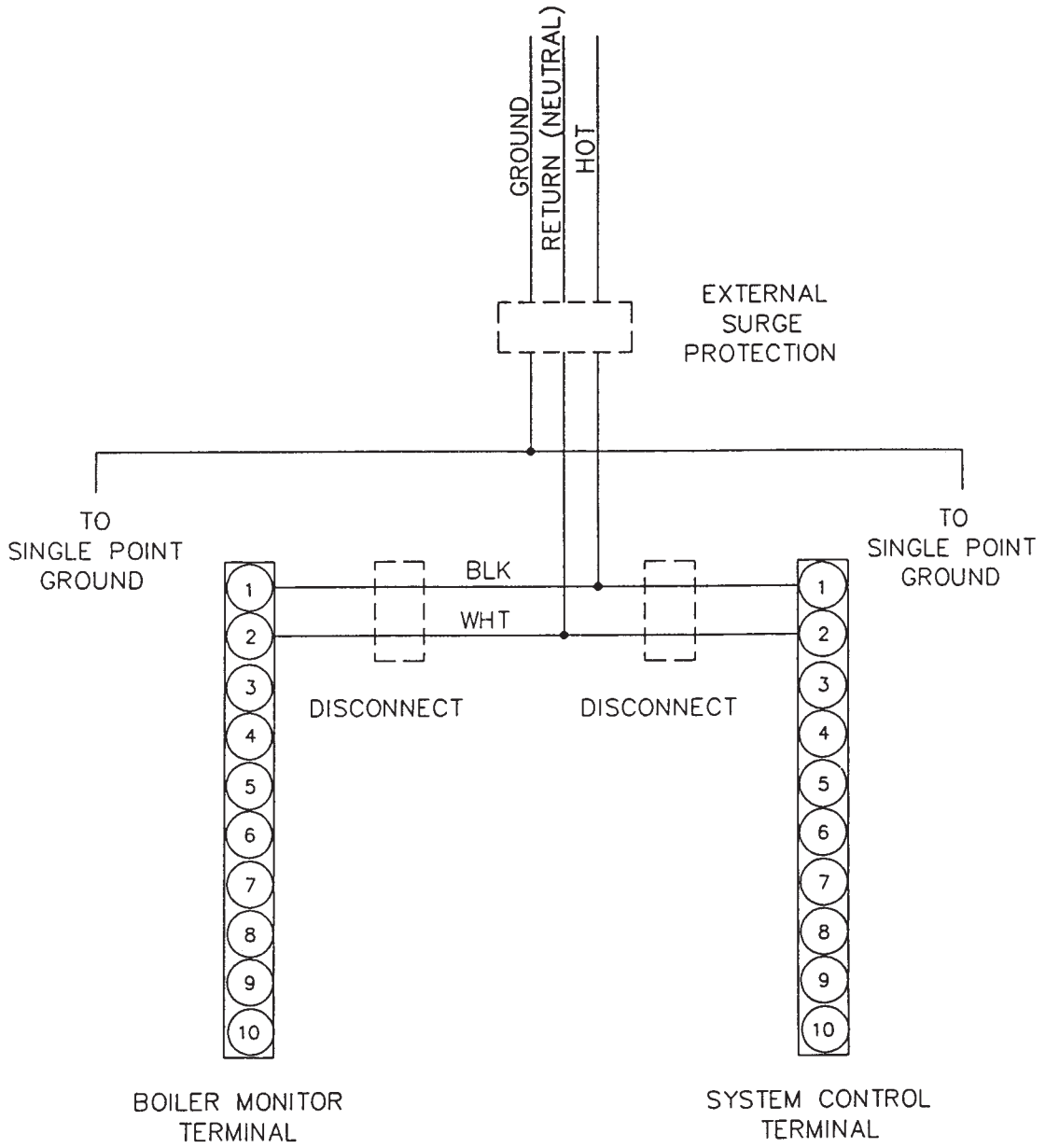


Fig. 23: Power Source to Control and Boiler Modules

Power Test

Check Power

Utilizing a Volt-Ohm-Meter (VOM), monitor the following on the System Control and Boiler Monitor(s) for proper voltage levels. Check at the Terminal Block (TB).

Module	Test Points	Indication
System Control	TB-1 to TB-2	108 VAC to 132 VAC
System Control	TB-1 to SPG	108 VAC to 132 VAC
System Control	TB-2 to SPG	LESS THAN 1 VAC
Boiler Monitor	TB-1 to TB-2	108 VAC to 132 VAC
Boiler Monitor	TB-1 to SPG	108 VAC to 132 VAC
Boiler Monitor	TB-2 to SPG	LESS THAN 1 VAC

Table F: Power Test Information

Test Points	Indication
Boiler Monitor TB-1 to System Control TB-1	LESS THAN 0.5 VAC
Boiler Monitor TB-2 to System Control TB-2	LESS THAN 0.5 VAC
Boiler Monitor SPG to System Control SPG	LESS THAN 0.5 VAC
Boiler Monitor TB-2 to System Control SPG	LESS THAN 0.5 VAC

Table G: Boiler Monitor to System Control Power Test Information

INSTALLATION VERIFICATION PROCEDURE

Register

Before proceeding any further, please verify that the user registration form has been completed and mailed (see Registration Card).

Mechanical Installation

Verify installation has been completed (see page 6).

Air Temperature Sensor

Verify installation parameters have been met (see page 7).

Water Temperature Sensor

- Verify installation parameters have been met (see page 8 and 9).
- Verify System Control/Boiler Monitor power wiring connections.
- Verify Torque Requirements.
- Verify Air Temperature Sensor wiring, must be Belden #8132, #9842 or equivalent.
- Verify Water Temperature Sensor wiring, must be Belden #8132, #9842 or equivalent.
- Verify Power Test has been completed successfully.
- Verify RS485 Communications Cable, must be Belden #9842 or equivalent.
- Verify Boiler Monitor Select Switch (SW2) settings.
- Verify Installation/Removal of Boiler Monitor Communications Jumper(s) [W1].
- Verify Optional Boiler Monitor Control Wiring.

Modem (Optional)

Perform and/or verify modem installation and hook-up per Raypak Add/On Options P/N 240596 and B6000 BMS Optional Modem Software Documentation P/N 240595.

SYSTEM CONTROL & DISPLAY FAMILIARIZATION

The System is set up by using the selector buttons and the displays on the System Control module.

There are ten or more displays. Each display provides information regarding the system operating parameters and system component status. Some displays provide information only, such as current outdoor temperature, system temperature, etc.

Selectable data is identified by flashing characters.

The selector buttons are:

MENU - Changes displays.
SELECT - Moves the cursor - flashing character - to the next selection in a display.
+ - Moves a value to a higher reading (e.g. If the display shows flashing boiler #1, pushing **+** will change display to boiler #2).
– - Moves a value to a lower position (e.g. If the display shows flashing boiler #2, pushing **–** will change display to boiler #1).

Editing B6000 Displays Location

The B6000 BMS has a forty (40) character screen that displays status and memory contents.

Selectable Parameters on the B6000 Monitor Screen are shown in Table H below.

Selectable Parameters	Range Change to Fahrenheit (F) or Celsius (C)	Value, Default (After Initialization)
Maximum Water Temp	70–235°F	Degrees, 180°F
Set	40–220°F	Degrees, 100°F
Day Temperature	40–220°F	Degrees, 100°F
Nite	40–220°F	Degrees, 90°F
Ratio	None–20:1	Numeric, 1.0:1
°Rise	1–99	Degrees, 20°F
Step	1s, 2s, 5–100	Percentile, 20%
O/C Outdoor Cutoff	35–199°F	Degrees, 65°F
O/Cdb (O/C dead band)	1–9°F	Degrees, 4°F
Cband (Control Band)	1–9°F	Degrees, 3°F
Lead	1–8°F	Numeric, 1
Change Hours	0–225	Numeric, 100
Pump Delay*	0–20	Minutes, 3
IGN Time*	15–100	Seconds, 30

*Indicates multiple entries

Table H: Selectable Parameters on the B6000 Monitor Screen

When the B6000 BMS is equipped with a night setback feature, WHEN INITIALIZED, NITE SETBACK defaults to OFF.

NOTE: Night setback feature must be set at the B6000 BMS Control Panel to **ON**. This results in display change that shows NITE rather than DAY. The BMS can change **SETBACK TIMES** up to six selections for each of the seven days.

WARNING: When the initialize control selection is set to **Y** and the **SELECT** button is pushed, the B6000 BMS resets all of the SELECTABLE PARAMETERS on this screen to DEFAULT values. Nite Setback (NSB), Lead Lag is set to **OFF** (If option installed).

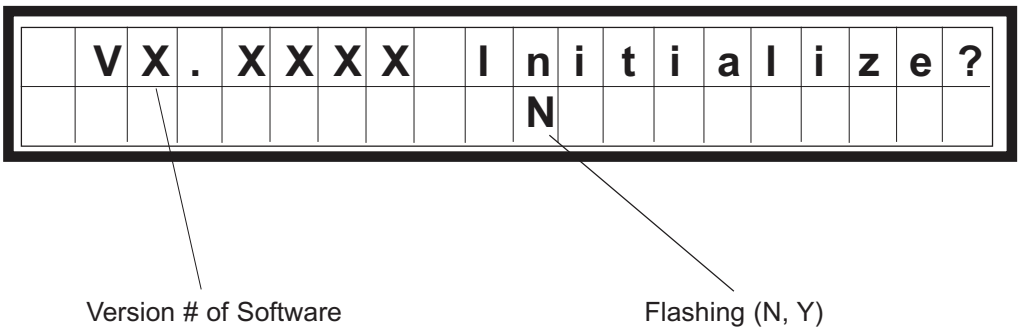
Power-Up

Boiler Monitor

1. Energize by pushing Power Switch to **ON** position. The following indicator lights will be lit: - POWER
   The following indicator lights will be lit if the boiler is performing the valve calibration cycle:
   - CALL FOR HEAT
   - PUMP
   - PILOT

2. Boiler will start provided there are no faults after the System Control module has been energized.

System Control Module



1. Energize the system control module.
   - The screen should show the System Temperature (Display #1)

2. Press the **MENU** button until the screen shows the Initialize screen.

3. Press **+** or **–** button to change the cursor to **Y**.

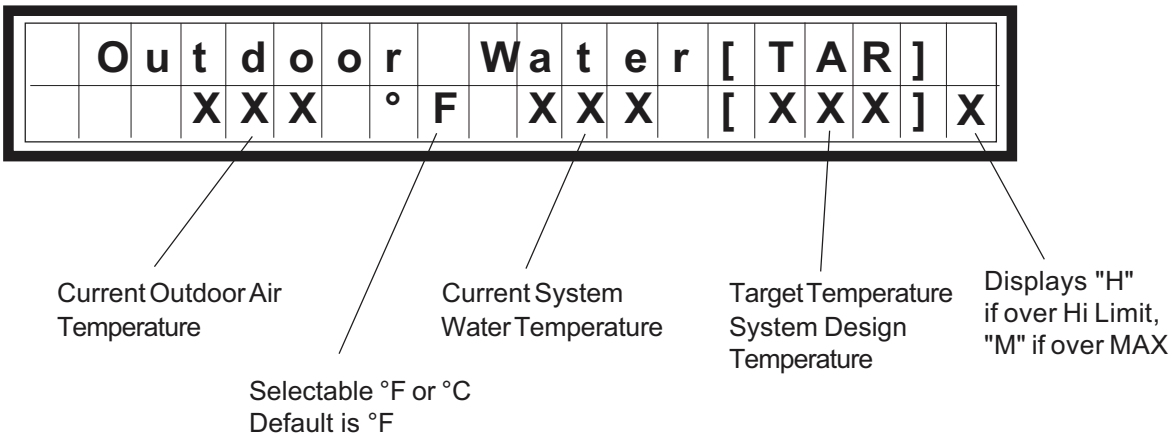
4. Press the **SELECT** button.
   - This will initialize the control memory to the default values.

Displays

System Temperatures

* Indicates selectable item

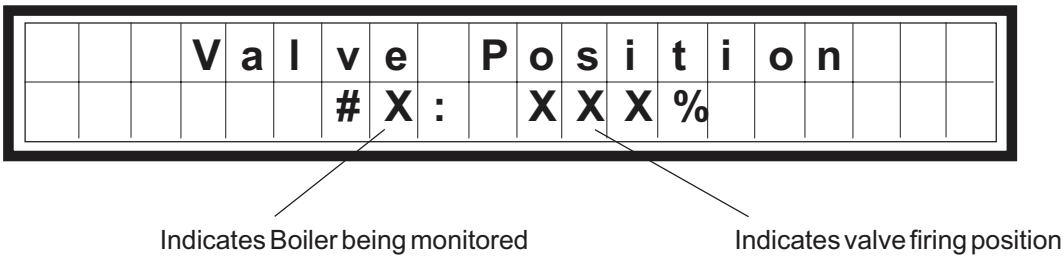
Program the System Control Module to meet the design conditions of the installation. Return to System Temperature Display by pressing the **MENU** button until screen appears as below.



INFORMATION ONLY
This is the first screen displayed when system is energized. After system is set up this display should be used. °F or °C is selectable by pressing **+** or **–** key.
Provides:
- Outdoor temperature – actual
- System Water temperature – actual
- Target Temperature, which is the desired system temperature.

Press the **MENU** button

Boiler Valve Firing Rates

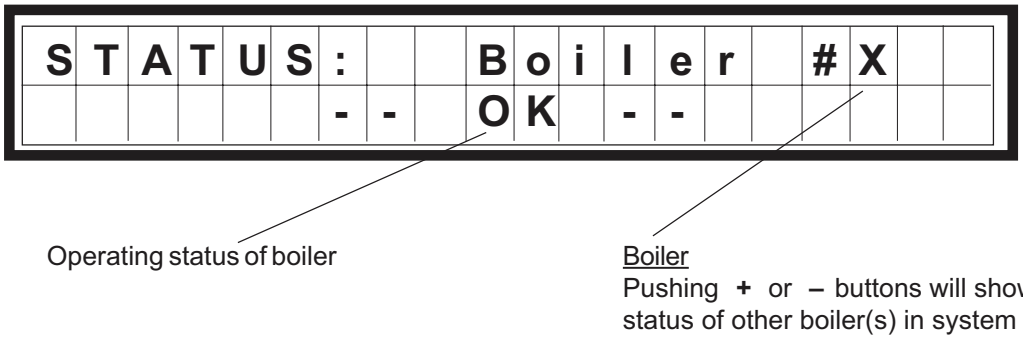


On multiple boiler installations, press the **+** or **–** key to view position of other boiler firing rates.

INFORMATION ONLY
- Provides firing valve position for each boiler.
- Multiple boilers - press SELECT button to determine status of each boiler.

Press the **MENU** button

Boiler Status



Description of Display Readouts:

OK - Boiler operation normal.

THERMOSTAT OFF - Aqua Stat light illuminates on the Boiler Monitor. Water temperature has exceeded the Auto Hi Limit and will automatically reset when the water temperature has returned to normal range.

MANUAL OVERRIDE ON - Boiler in manual or emergency operation.

FAULT: MAX TEMP - Occurs when the SET (target) temperature has been programmed above the programmed MAX WATER TEMP setting. This is a programming error and will not initiate the alarm or red fault light.

FAULT: FLOW SWITCH - Insufficient water flow.

FAULT: NO PILOT - Cannot sense a pilot flame.

Optional Safeties (when supplied)

FAULT: LWCO - Low Water Cutoff.

FAULT: LO PRES WATER - Low water pressure.

FAULT: LO PRES GAS - Low gas pressure.

FAULT: HIGH PRES GAS - Inlet gas pressure is too high for operation.

FAULT: HIGH LIMIT - Water temperature exceeds limit setting.

When a fault is indicated, the red light, to the right of the display, flashes and the alarm buzzer sounds. The light continues to flash after the alarm is silenced and until the fault is corrected.

When the fault is corrected, the display will read **OK**.

Should communication between the system control module and the boiler monitor module(s) be disrupted, the display will show **BOILER NOT ON-LINE**.

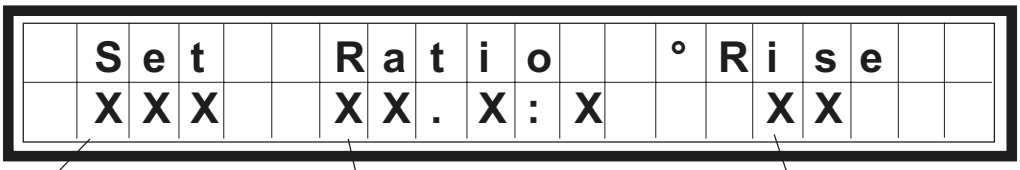
To display the status of other boilers, press the **+** or **–** button on multiple boiler installations.

System Control Display	Boiler Monitor															System Control	
	GREEN Power On	RED Manual Over-ride	AMBER Call for Heat	GREEN Pump On*	RED Low Water Cutoff	RED Low Press Water	RED Low Press Gas	RED High Press Gas	RED High Limit	RED Aqua Stat	RED Flow Switch	RED Ignition Off	AMBER Pilot On	RED Safety Fault	GREEN Main Gas	GREEN System Normal	RED System Fault
OK System operating normally	X		X	X									X		X	X	
LWCO (optional) Low water in boiler	X		X	X	X												X
LO PRES WATER (optional) Water pressure too low	X		X	X		X											X
LO PRES GAS (optional) Gas pressure below setting	X		X	X			X										X
HIGH PRES GAS (optional) Gas pressure on manifold too high	X		X	X				X									X
HIGH LIMIT (optional) Boiler temp. excess high limit	X		X	X					X								X
THERMOSTAT OFF Boiler off on auto hi limit	X		X	X						X						X	
FLOW SWITCH Insufficient water flow	X		X	X							X			X			X
NO PILOT Pilot flame failed to start	X		X	X								X		X			X
BOILER NOT ON-LINE Communication lost	X		X	X									X		X		X

X = Light On
* PUMP light used only when pump control is programmed.
If a boiler should lose communication with the System Control, BOILER NOT ON-LINE will be displayed and the boiler number will be indicated.

Table I: Boiler Monitor B6000 Diagnostic Annunciator

Primary Control Parameters (Standard Chip Set Only)

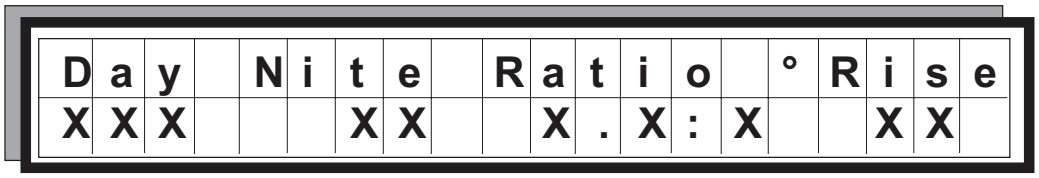


Set - The desired system water temperature depends upon the outdoor temperature setting.
Range: 40°F to 200°F
Default value: 100°F

Ratio - Adjusts the system temperature (target setpoint) as outdoor temperature changes.
Range: 0.1:1 to 20:1
None=Constant water temperature
Default value: 1.0:1

°Rise - The ΔT of the system. The rise in the system temperature when all boilers are at full rate.
Range: 1°F to 99°F
Default value: 20°F
Note: Divide by the number of boilers in the system. 20°F for one boiler, 10°F: two boilers, 5°F: four boilers.

Primary Control Parameters: Lead/Lag, Night Set Back (N, NM or NMn Chip Set)



Day - Value is used as the set point when set back is OFF.

Nite - Value is used as the set point when set back is ON.

Sets up boiler and system.

Set - Sets desired water temperature at 70°F outdoor temperature.
Range: 40°F to 220°F (Day), 40°F to 220°F (Nite).
Default value: 100°F (Day), 90°F (Nite).
To increase, push the + button to required temperature.
Suggested day setting is 110°F and suggested night setting is 105°F.

Push the **SELECT** button.

Ratio - Sets the desired change in system water temperature increases as the outdoor temperature decreases.
The reset ratio is expressed as follows:
2:1 for every 2 degree change in outdoor temperature the system temperature will change 1 degree.

For example, if **Set** = 135°F: Refer to Table J on the following page.

Ratio	Temperature °F	
	Outdoor	System
2:1	60	140
	40	150
	20	160

Table J: Outdoor to System Temperature Ratio

Radiation	Typical		Reset Ratio Setpoint at Design Temperature			
	Temp. at Design Cond.	Temp. at 70°F	40°F	20°F	0°F	-20°F
Standing	190	105	0.3:1	0.6:1	0.8:1	1.1:1
Convection or Baseboard	200	105	0.3:1	0.5:1	0.7:1	0.9:1
Fan Coil—Heating	190	105	0.3:1	0.6:1	0.8:1	1.1:1
Fan Coil—Heat & Cool	140	105	0.9:1	1.4:1	2.0:1	2.6:1
Radiant Floor	120	105	2.0:1	3.3:1	4.7:1	6.0:1
Radiant Ceiling	120	105	2.0:1	3.3:1	4.7:1	6.0:1

Table K: Suggested Guidelines for Temperature Ratio

SUGGESTED GUIDELINES

The selection of the correct ratio depends on the initial temperature and the desired system water temperature setpoint and the design temperature conditions.

The reset ratio and setpoint must be selected so that the controller will raise the system water temperature from the initial setpoint – suggested 110°F – to the maximum temperature required when the outdoor temperature drops from 70°F to the design temperature.

Push the **SELECT** button.

Design temperature rise of the system related to the boiler. Default value 20°F.

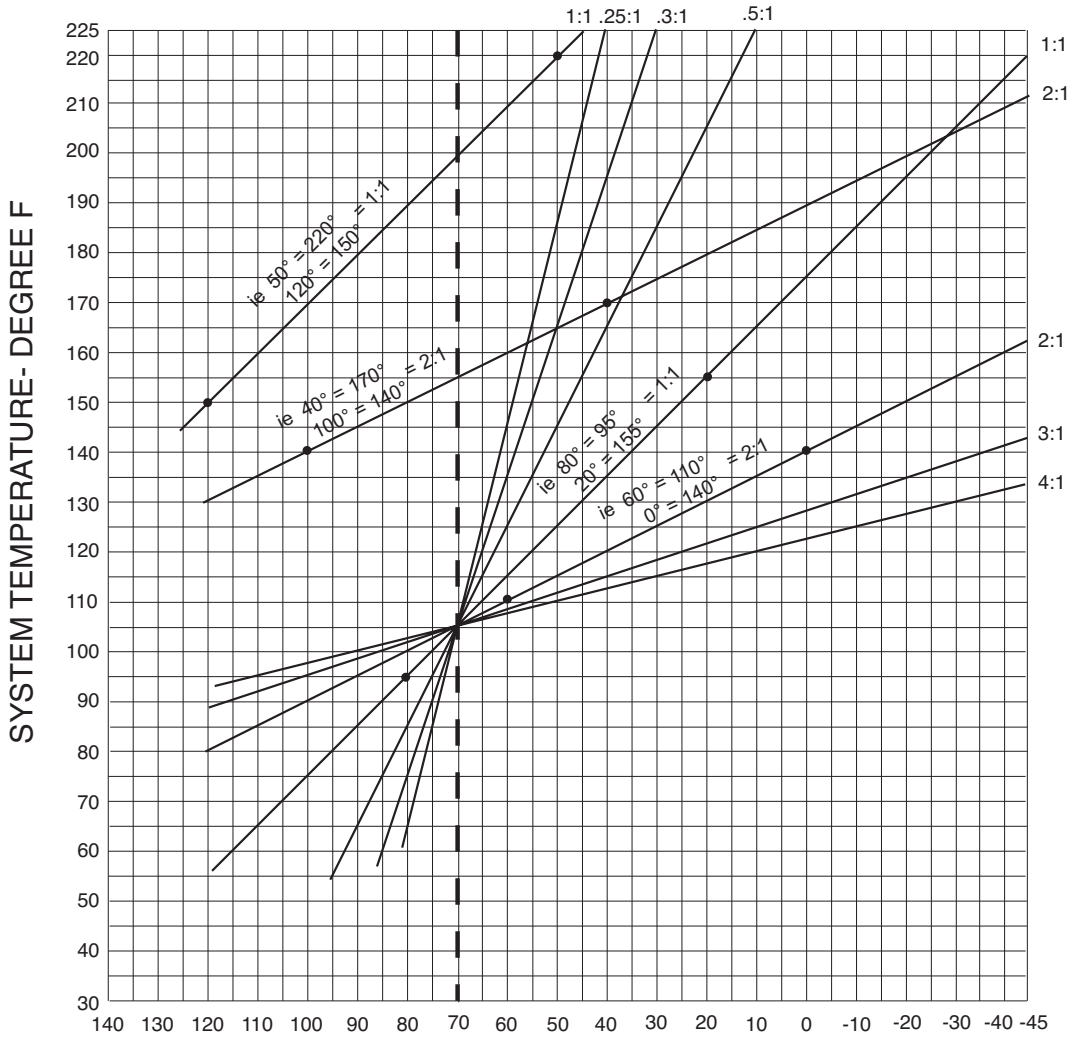


Fig. 24: Outdoor Design Temperature—Degree F

Secondary Control Parameters

Step	O/C	O/Cdb	Cband
XX%	XXX	X°F	X

Step - Increment of firing valve opening.
Staging: Boiler.
Range: 1S or 2S (S=Stage).

Modulating boiler
Range: 5% to 100%.
Default: 20%.

O/C - Maximum outdoor cutoff temperature that heat is desired when set at 70°F.
Range: 35°F to 199°F.
Default value: 65°F.

O/Cdb - Outdoor cutoff dead band is the the number of degrees below O/C at which the O/C will reset.
Range: 1°F to 9°F.
Default value: 4°F.

Cband - The range of temperature above and below target temperature.
Range: 1°F to 9°F.
Default value: 3°F.

The O/C (outdoor cutoff) control parameter sets the maximum outdoor temperature at which heat is desired. If the outdoor temperature rises above this setting, the boiler system is disabled. There is no call for heat and the pump turn off delay becomes active. If the outdoor temperature falls below the outdoor cutoff minus the O/Cdb (outdoor cutoff dead band), the O/C will reset, a CFH will initiate and the boiler system will be enabled.

Step - Enter desired valve firing increments. Recommended setting is between 5% and 20% for Modulating Boiler.

Or
Enter 1S If Gas Valve is an On-Off or Single-Stage
Or
Enter 2S If Gas Valve is 2-Stage Firing
Or
Enter 20% If the control boilers include modulating and 2-stage or single-stage boilers under control of a single system control module.

O/C - Enter the desired outdoor cutoff temperature setting. Recommended setting is 70°F (Depending upon geographical location). When outdoor temperature exceeds the programmed setting: The boiler will stop heating and the target temperature display will show O/C.

NOTE: Boiler will automatically restart when the outdoor temperature drops below O/C temperature minus O/Cdb.

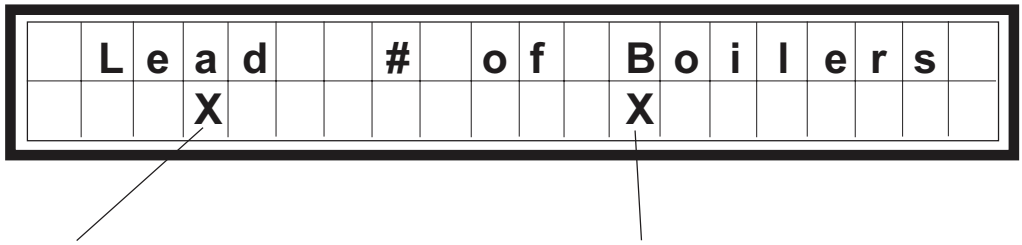
O/Cdb - Enter the desired outdoor cutoff dead band setting. This is the number of degrees below the outdoor cutoff (O/C) where the boiler will restart.

Cband - Enter the desired Control Band setting. This determines when the boiler will fire below the target temperature and shut off above the target temperature.

NOTE: The above settings are recommended at initial installation. For maximum performance and system efficiency these settings should be modified, as required, to meet such parameters as system capacity, location and usage.

NOTE: Contact factory for recommended settings if this is a special application, i.e. heat pump applications.

Lead Boiler Select



Lead - Indicates boiler designated as “Lead”.

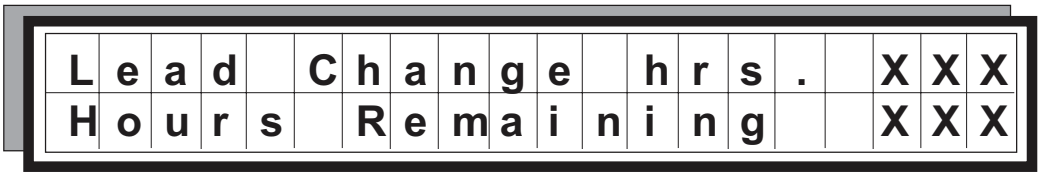
# of Boilers - Indicates number of boilers being used.

Used when there are multiple boilers. Set number (#) of boilers to match actual installation. The readout lists lead boiler. To change the lead boiler, press the **+** or **–** button until the desired boiler is displayed. In the event of a fault in the designated lead boiler, the next boiler numerically becomes the lead boiler.

The boiler being monitored is displayed. If there are multiple boilers, push the **+** or **–** button to select the desired boiler.

Automatic Lead/Lag

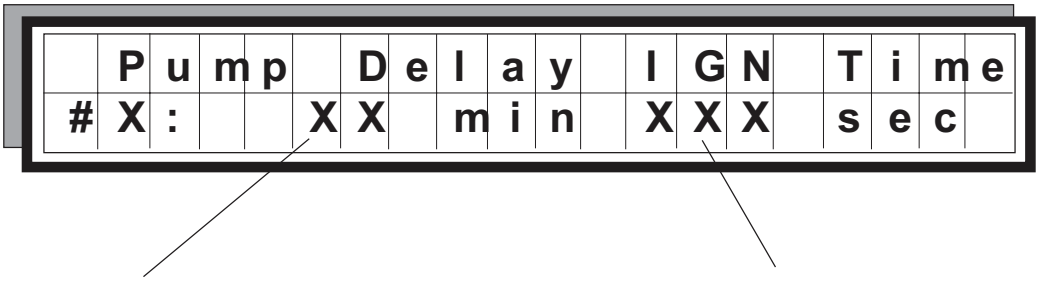
Automatic lead/lag programming can only be set with optional chip sets 10.0N, 10.0NM or 10.0NMn.



Lead Change hrs. - Designated lead boiler will change when remaining run time hours reaches 0.
Range: 0 to 225 hrs.
Default value: 100 hrs.
If set at 0 hours lead will not change.
Run time hours remaining will automatically total.

Enter the desired number of hours of lead boiler operation before change. Number of run time hours remaining is automatically calculated. If set at 0 hours, lead will not change.

Standard Boiler Parameters (All Chip Sets)



Pump Delay - Selectable from 0 to 20 minutes. Pump will operate during this time AFTER system target temperature has been met.
Default value: 3 minutes.

IGN Time - Sets the time the system will monitor for pilot flame to prove.
Range: 15 to 100 seconds.
Default value: 30 seconds.

Push the **SELECT** button.

Pump Delay - Enter time desired for boiler pump operation, if one is installed and wired to boiler monitor. If there is no pump or a continuous running pump, ignore.

Push the **SELECT** button.

IGN Time - Display shows the time the system will monitor ignition of the pilot flame prior to main flame. If the pilot does not prove within the IGN Time, the system will **FAULT: NO PILOT**. Default time is 30 seconds.

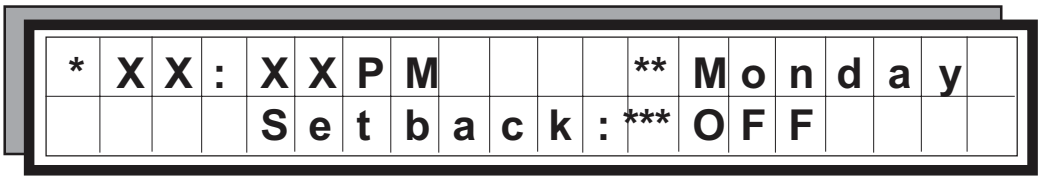
NOTE: On multiple boiler installations, an IGN Time must be entered for each boiler.

Night Setback

OFF indicates the system is in the normal or design operating mode. **ON** indicates the system is operating in a programmed night setback mode.

Automatic Lead/Lag
(Only with Optional Chip Sets N, NM or NMn)

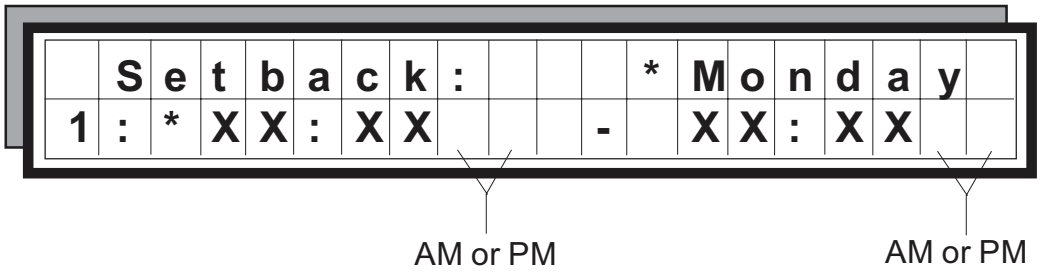
Programming the automatic lead/lag feature.



* **Time** of day
** **Day** of Week
*** **ON** or **OFF**
This screen shows the time and day of the week.
Default values: Monday for the **Day**, and **OFF** for Setback.

Enter the current time.
Push the **SELECT** button until day flashes.
Enter the day of the week.
Setback status can be manually changed from **OFF** to **ON**. When manually changing status from **ON** to **OFF**, the setback times must be cleared, otherwise the timer will override the manually selected status of setback. Push the **+** or **–** button to setback mode to **ON** or **OFF**.

Lead/Lag Setback Time
(Only with Optional Chip Sets N, NM or NMn)



This screen shows the Setback **ON** and **OFF** times for each day.
There are six (6) **ON** and six (6) **OFF** times per day, indicated by the number on the left.

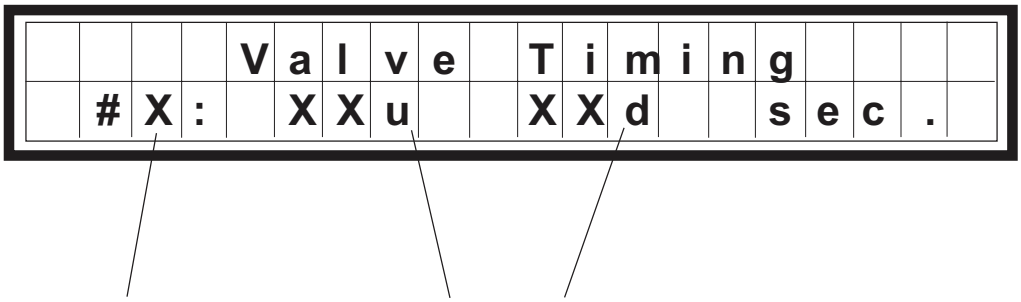
Period	Setback ON	Setback OFF	Day
1 2	XX:XX 10:00 pm	05:00 am XX:XX	Monday Monday
1 2	XX:XX 10:00 pm	05:00 am XX:XX	Tuesday Tuesday
1 2	XX:XX 10:00 pm	05:00 am XX:XX	Wednesday Wednesday
1 2	XX:XX 10:00 pm	05:00 am XX:XX	Thursday Thursday
1 2	XX:XX 10:00 pm	05:00 am XX:XX	Friday Friday
1 2	XX:XX XX:XX	XX:XX XX:XX	Saturday Saturday
1 2	XX:XX XX:XX	XX:XX XX:XX	Sunday Sunday

Table L: Setback Example

The example shown in Table L above will provide setback temperatures on weekends and from 10:00 pm to 5:00 am on weekdays. Each day can be programmed for up to six (6) separate setbacks.

When no time is entered (as indicated by XX:XX) the setback time in effect from the previous time period will continue into the next period. More specifically, when the night setback is **ON** the system water temperature will be maintained until the next **OFF** entry is reached.

Boiler Valve Timing (Information Only)



Boiler number

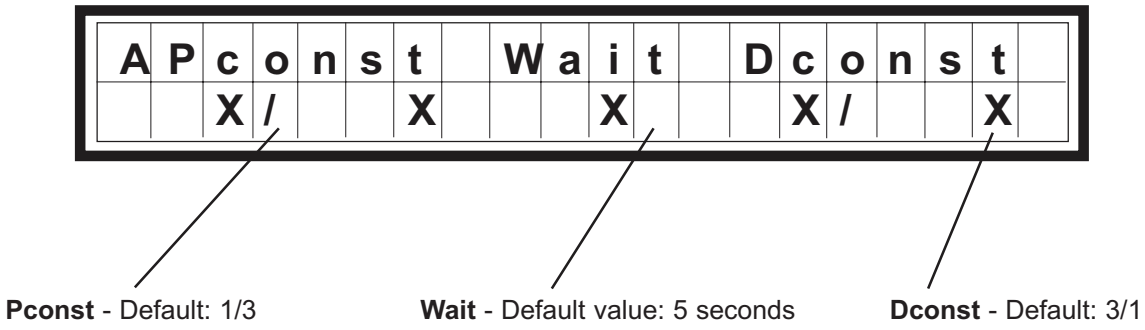
Displays in seconds real time opening and closing of modulating gas valve from closed (0%) to full open (100%)

u - Up
d - Down

This display shows the time (seconds) required for the gas valve to open and close. If the **u** display is from 12 to 26 and **d** is less than **u** and between 4 and 18, the gas valve requires no adjustment. This timing is not operator selectable on the screen display.

A—Proportional Integral Derivative (PID)

Operator manual action as target temperature increases.



Pconst - Default: 1/3 **Wait** - Default value: 5 seconds **Dconst** - Default: 3/1

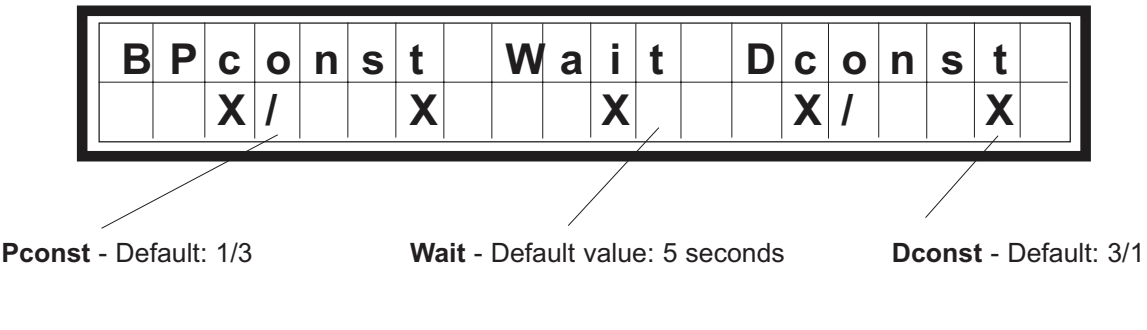
Pconst - Proportional ratio which causes the boiler to step up or down.

Wait - Wait as time controller hesitates before acting on a temperature change.

Dconst - Derivative ratio speeds or slows boiler response compensating for overshoot and undershoot.

B—Proportional Integral Derivative (PID)

Operator manual action as target temperature decreases.



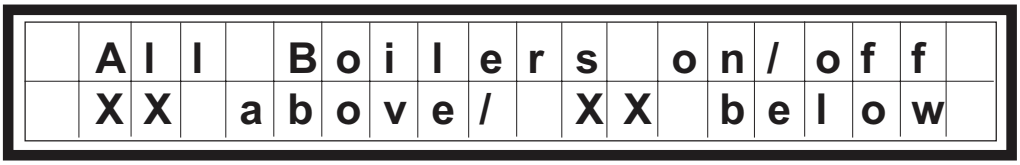
Pconst - Default: 1/3 **Wait** - Default value: 5 seconds **Dconst** - Default: 3/1

Pconst - Proportional ratio which causes the boiler to step up or down.

Wait - Wait as time controller hesitates before acting on a temperature change.

Dconst - Derivative ratio speeds or slows boiler response compensating for overshoot and undershoot.

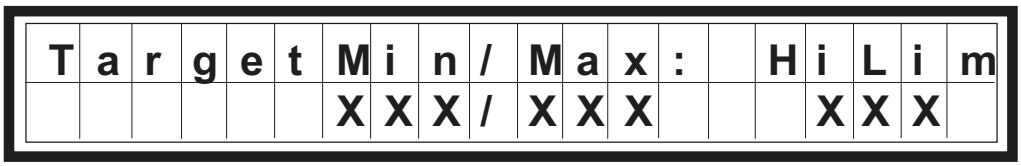
All Boilers On/Off



Range: 1 to 99
Default value: 20°F

This display indicates the temperature above or below target at which the control will turn all the boilers off or on.

Target Min/Max and Hi Lim



Min - Default: 105°F
Range: 0°F to 220°F

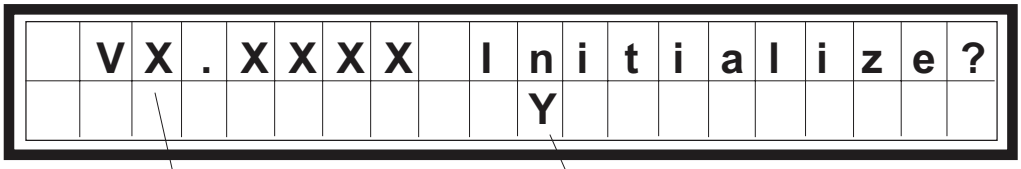
Max - Default: 180°F
Range: 0°F to 220°F

Hi Lim - Default: 200°F
Range: 0°F to 220°F

Hi Lim shows the maximum obtainable water temperature and cannot be lower than the target **Max**.

NOTE: All of the values interact and are dependent upon each other.

Standard Initialize (All Chip Sets)



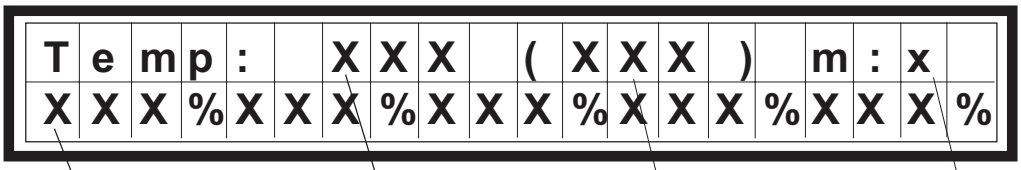
Version # of software.

Yes/No

This will initialize all selectable values to default values. **Should not be used unless operator wants to reprogram new values.**

Should be used at Start-up to clear the control memory.

Standard Utility Service (All Chip Sets)



Displays Firing Rate of each Boiler

Displays Actual System Temperature

Displays System Target Temperature

Displays controller operating mode, changes continuously from 1 to 5. (Not user selectable)

INFORMATION ONLY
Displays the system operating conditions and the firing rate of each boiler up to total of five (5).

TROUBLESHOOTING GUIDE

The procedures outlined below assume that the initial installation / turn on / power up procedures have been completed and that the B6000 was operational. This guide is a basic instruction to determine if an authorized Raypak representative should be contacted.

If you follow the instructions in this manual and have difficulty operating the B6000, locate the **SYMPTOM** in the left column below. Check the corresponding **POSSIBLE CAUSE** and **CORRECTIVE ACTION** Column to locate and remedy the problem.

Symptom	Possible Cause	Corrective Action
No Display.	No Primary power.	Check power connections to units. Check surge protection devices. Check disconnects, check grounds. Check power switches.
* Nite set-back time display no longer correct.	Time display accidentally Re-Programmed.	Initialize system. Program Nite set-back feature.
* Nite set-back not working properly.	Nite set-back turned off. Clock times not set.	Initialize system.
* Time display does not maintain proper time.	System ground not adequate. Line noise. Internal battery weak. Prolonged power outage.	Initialize system and / or contact authorized Raypak Representative for further instructions.
System not working automatically.	Boiler monitor has Manual Mode selected.	Select Automatic mode on Boiler Monitor.
Display shows incorrect number of boilers.	Inadequate grounds. Line noise. Power outages.	Check primary power - check wired ground. Rework as necessary. Initialize system.
Scrambled control display.	Power outages.	Initialize system.
Boiler does not function properly after power outage.	Internal battery weak. Line noise. System ground not adequate.	Initialize system.
Boiler "Not on Line" displayed.	Primary power at boiler not connected.	Initialize system.
Outdoor and water temp. readings Incorrect (-35°F).	Inadequate ground. Line noise. Power outage.	Initialize system.
Displayed parameters do not make sense.	Power outage.	Initialize system.
System Faults indicators do not make sense.	Power outage.	Initialize system.

* With Nite Set-Back option only.

TROUBLESHOOTING GUIDE—CONTINUED

Symptom	Possible Cause	Corrective Action
Boiler # x "Not on Line" Displayed.	Boiler not powered.	Check primary power. Correct as necessary. Check communication cable, check (surge) ground. Remove / Replace (R/R) as necessary. Initialize system.
Outdoor Temp. Sensor readings are high.	Outdoor sensor not mounted correctly.	Refer to installation manual mounting instructions. Possible relocation for sensor.
Sensor reading 220°F.	Sensor wiring shorted.	Check sensor wiring for damage. R/R as necessary. Initialize system.
Sensor reading - 35°F.	Sensor wiring open.	R/R as necessary. Initialize system.
Low water cut-off alarm.	Excessive circuit loading of pump contacts by user supplied system pump. Low water level in boiler.	Check power. Check pump contactor / relay. R/R as necessary. Replace F1 fusing. Check main water supply.
Power lamp off on Boiler Monitor.	Fuse F1 blown. Excessive circuit loading of pump contacts by user-supplied system pump. Circuit breaker tripped.	Replace F1 fusing. Remove Relay-K1 to isolate circuit loading. R/R as necessary. Reset circuit breaker.
Pump not running.	Excessive circuit loading of pump contacts by user supplied system pump. Pump going off on thermal over-load circuit breaker tripped.	Replace F1 fusing. Check pump. Reset circuit breaker
Off at flow switch.	Paddle damaged or missing. Pump off on thermal overload.	Check paddle on flow switch. Check pump, contact or relay. Replace F1 fusing.
Off on High Limit.	Low limit settings. Intermittent power or pump failure.	Check and correct settings. Meter amperage on pump. R/R as needed.

B6000 BOILER MANAGEMENT SYSTEM START-UP DATA

SYSTEM SETTINGS ENTERED ON DATE:_____

Temperature Scale °F or °C

Standard

Set _____ Deg.	Ratio _____ : 1	Rise _____ Deg.
System Water Temp. @ Oc	Reset Ratio-Outdoor:	System Design Temp. Diff.
Default Value 100°F (38°C)	Default Value: 1.0:1	Default Value: 20°F (7°C)

SelectSet™ (with Chip Set XX.XN or XX.XNMn)

Day _____ Deg.	Nite_____ Deg.	Ratio _____:1	Rise _____ Deg.
System Temps @ Oc		Reset Ratio	System Design Temp. Rise
Default Value	Default Value:	Default Value:	Default Value:
100°F (38°C)	90°F (32°C)	1 .0:1	20°F (7°C)

Universal

Step _____ %	O/C_____Deg.	O/Cdb _____Deg.	C Band _____ Deg.
Valve Opening	Outdorr Cutoff	Outdoor Cutoff	Control Band
Default Value:	Default Value:	Deadband	Default Value:
5%	65 degs.	Default Value: 4 Deg	3 Deg.
Lead	_____	# of Boilers	_____
Indicates Lead Boiler		Number of Boilers in system.	

SelectSet™ (with Chip Set XX.XN or XX.XNMn)

Lead Change hrs. _____

Lead boiler will change after selected no. of hours.

Universal

Pump Delay _____ Min.	Ign Time _____ Sec.
Delay off pump timing.	Ignition lockout timing.
Default Value: 3 min.	Default value: 15 seconds.

SelectSet™ (with Chip Set XX.XN or XX.XNMn)

_____	_____	_____	_____
Time of Day	AM or PM	Day of Week	Set-back- Off or On
		Default Value: Monday	Default Value: Off

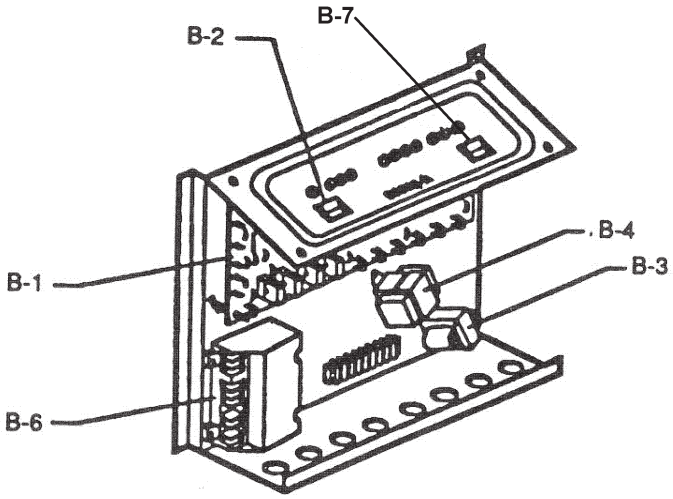
Period Set-Back	1 On	Off	2 On	Off	3 On	Off	4 On	Off	5 On	Off	6 On	Off
Monday	___	___	___	___	___	___	___	___	___	___	___	___
Tuesday	___	___	___	___	___	___	___	___	___	___	___	___
Wednesday	___	___	___	___	___	___	___	___	___	___	___	___
Thursday	___	___	___	___	___	___	___	___	___	___	___	___
Friday	___	___	___	___	___	___	___	___	___	___	___	___
Saturday	___	___	___	___	___	___	___	___	___	___	___	___
Sunday	___	___	___	___	___	___	___	___	___	___	___	___

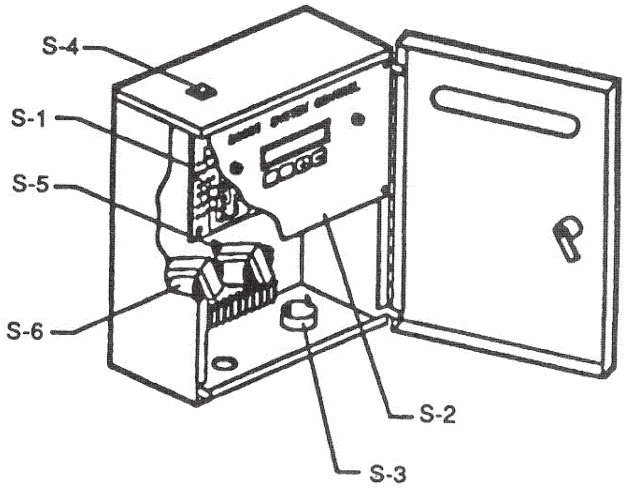
Proportional Integral Derivative

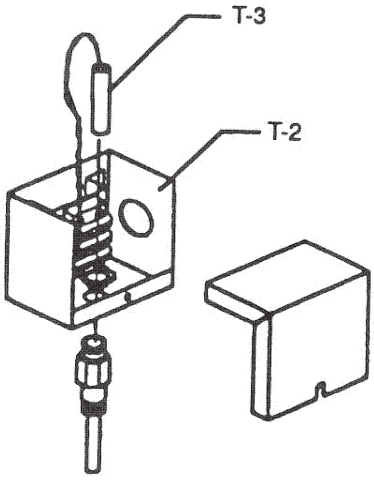
_____	_____	_____
A—Pconst	Wait (Integral)	Derivative
_____	_____	_____
B—Pconst	Wait (Integral)	Derivative

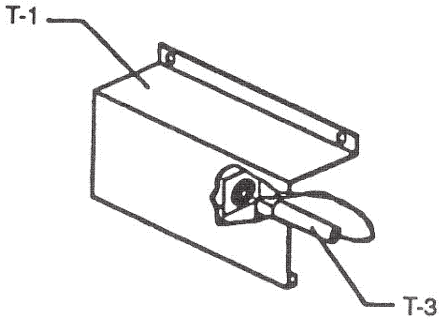
V_____ Version # of Software

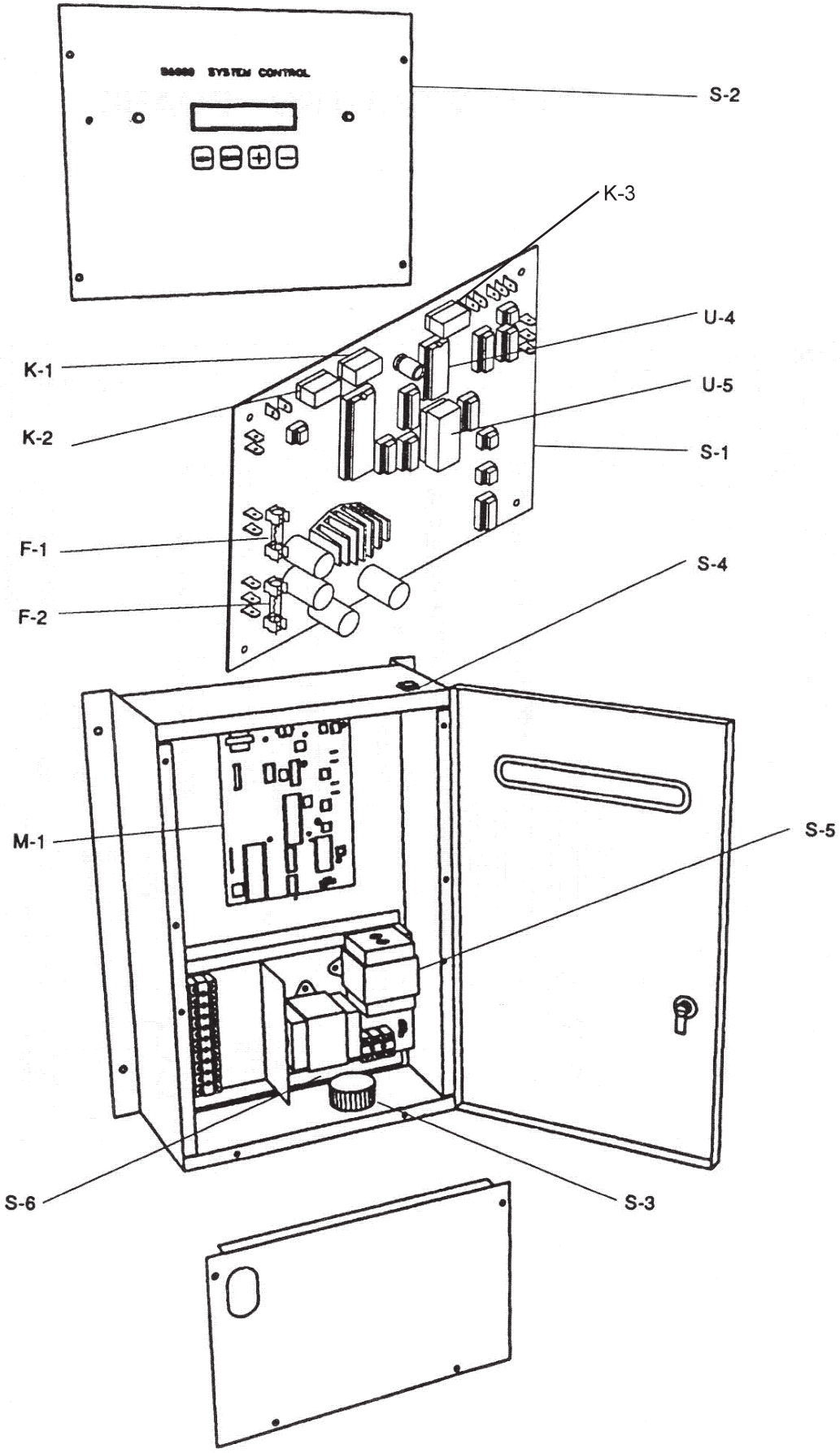
ILLUSTRATED PARTS LIST



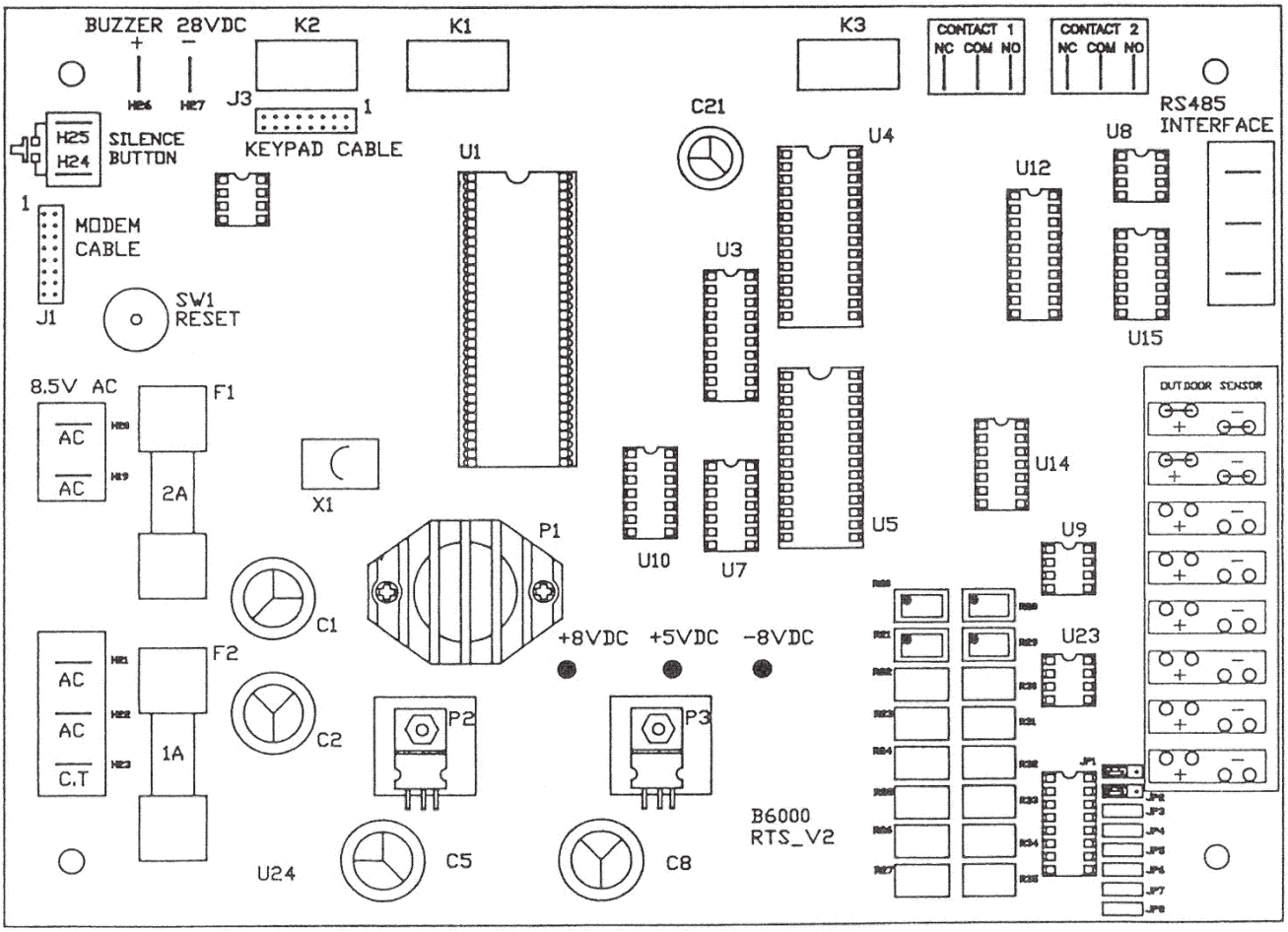







SYSTEM CONTROL
S-2
K-3
U-4
K-1
U-5
K-2
S-1
F-1
S-4
F-2
M-1
S-5
S-6
S-3

System Control Board



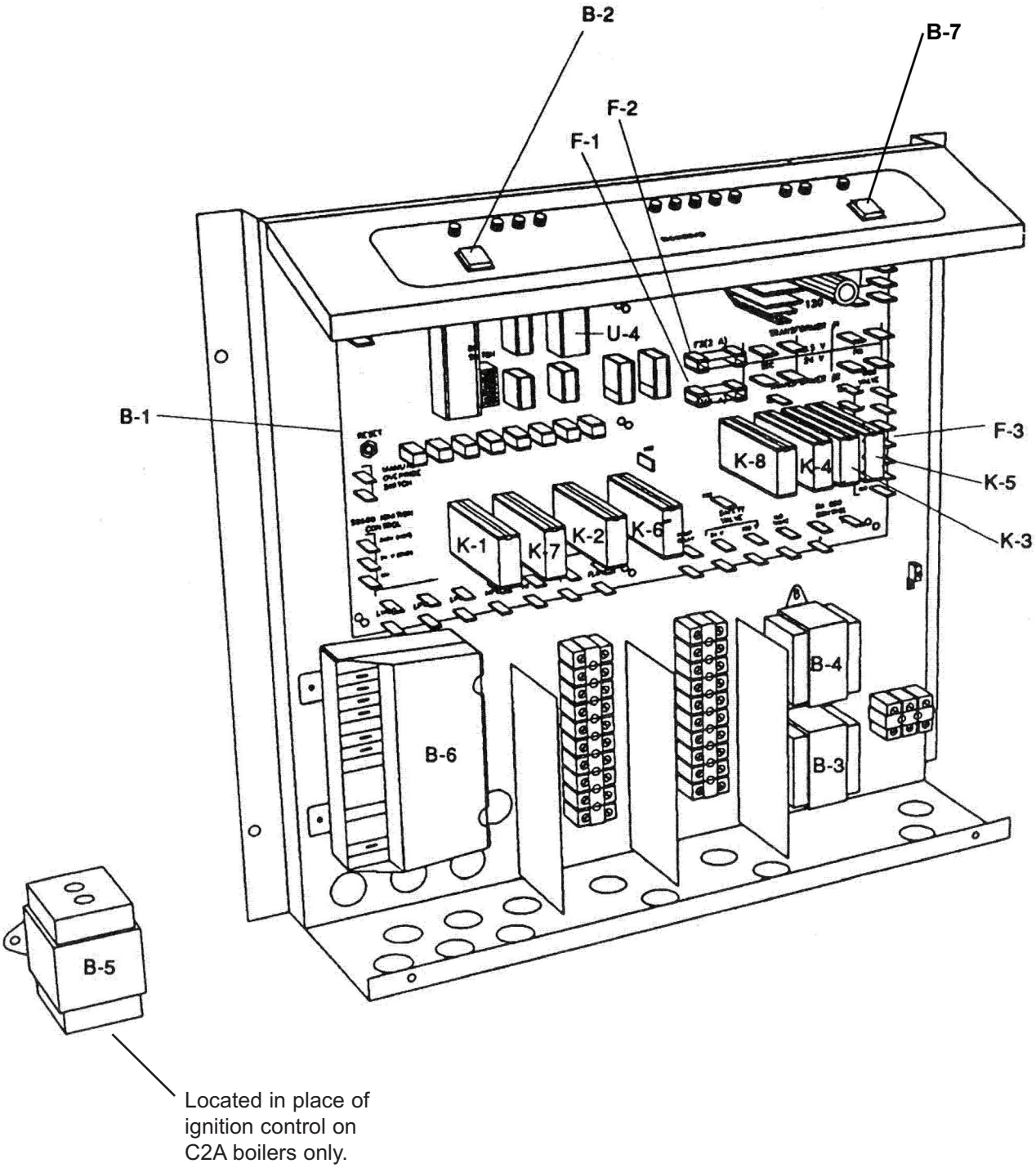
Call Out	B6000 System Control Box	Part Number
S-1	Control PC Board w/Display, No MIN Sensor Fault/Max Temp Delay Includes Chip Set CP10.0 _ _ _ Kit # 007093F	006971F
	Control PC Board w/Display, Night Setback (NSB) Sensor Fault/Max Temp Delay Includes Chip Set CP10.0 N _ _ Kit # 007094F	006972F
	Control PC Board w/Display, NSB + Modem + No MIN Sensor Fault/Max Temp Delay Includes Chip Set CP10.0 NMn Kit # 007096F	006974F
S-2	Display Selector Panel	004798F
S-3	Alarm Buzzer (Piezo electric horn)	005640F
S-4	Alarm Reset Switch	006048F
S-5	Transformer, 120/24/12 VAC C.T.	064922
S-6	Transformer, 120/8.5 VAC C.T.	064921
K-1, K-3	Relay, 5 VDC, DPDT	005961F
K-2	Relay, 24 VDC DPDT	005962F
F-1	Fuse, 250V, 2A	650896F
F-2	Fuse, 250V, 1A	650522F

Call Out	Nomenclature	Checksum	Description	Part Number
U-4	CP10.0 _ _ _	90F1	System Control Std/Max Temp, Sensor Fault, Delay	007093F
	CP10.0 N _ _	90E1	System Control W/NSB/Max Temp, Sensor Fault, Delay	007094F
	CP10.0 NMn	900D	System Control W/NSB & Modem/Max Temp, Sensor Fault, Delay	007096F

Call Out	Description	Part Number
U-5	Chip, RAM – Socket with Timer	007081F
	Chip, RAM – with Lithium Battery	007082F

Call Out	Description	Part Number
T-1	Outdoor Temperature Sensor Assy.	064140
T-2	Water Temperature Sensor Assy.	064139
T-3	Temperature Sensor	004799F
T-4	Sensor Well w/Adapter	004821F
M-1	Modem PC Board	005076F
U-9	EPROM	007085F
SS	Surge Suppression Device (125V) with Light, Screw Terminals	005098
FRT-2	FRT 93086, Field Repair Test Kit, with Disposable Grounding Wrist Strap	850267

Boiler Monitor Control Box



Call Out	B6000 System Boiler Monitor Control Box	Part Number
B-1	Control PC Board	004795F
B-2	Manual Override Switch	006047F
B-3	Transformer, 120/8.5 VAC C.T.	064921
B-4	Transformer, 120/24 VAC C.T.	006533F
B-5	Transformer, 120/24 VAC (C2A Units only)	006533F
B-6	Ignition Control with Lockout	004818B
B-7	Power Switch	006046F
F1 & F2	Fuse, AGC 2, 250V, 2A	650896F
F3	Fuse, AGC3, 250V, 3A	650523
K-1, K-2, K-3, K-4	Relay, 5 VDC, SPDT	007076F
K-7, K-8	Relay, 24 VAC, DPDT	007077F
K-6	Relay, 120 VAC, SPDT	007078F
K-5	Relay, 24 VAC, SPDT	007079F
K-1, K-2, K-3, K-4, K-5, K-6	Relay, Socket SPDT	650851F
K-7, K-8	Relay, Socket DPDT	650850F
U-4	EPROM BVx.x	007086F

LIMITED WARRANTY
B6000, Y-Series, E-4 & Accessories

SCOPE OF WARRANTY :

Raypak, Inc. ("Raypak") warrants to the original owner the Control System to be free from defects in materials and workmanship under normal use and service for the applicable warranty period. In accordance with the terms of this Limited Warranty, RAYPAK will furnish a replacement or repair, at our option, any defective part which fails in normal use and service during the applicable warranty period. The replacement or repair will be warranted for only the unexpired portion of the original Warranty Period.

APPLICABLE WARRANTY PERIOD

The effective date of warranty coverage is the date of original installation, of the Control System, by a qualified electrician or by a RAYPAK authorized service technician. The Applicable Warranty Period is one (1) year from the effective date.

WARRANTY EXCLUSIONS

This Limited Warranty does not apply:

1. if the control system is not properly installed by a qualified technician in accordance with manufacture's installation instructions, applicable codes, ordinances and good trade practices,
2. to damage or malfunctions resulting from failure to properly install, operate or maintain the system in accordance with the manufacture's instructions;
3. if the rating plate(s) or serial number(s) are altered, defaced or removed;
4. if the System is modified in any way or used with any non-factory authorized accessories or components;
5. to damage or failure from abuse, accident, act of nature, fire, flood, freezing or the like;
6. to accessories, rubber or plastic parts, light bulbs or glass parts;
7. if the System is moved from its original installation site; or if the original owner no longer owns the site or the System.

LABOR AND SHIPPING COSTS

This Limited Warranty does not cover labor costs for service, removal or reinstallation of any part nor shipping charges to or from RAYPAK'S designated repair center or to or from the installation site. All such costs are your responsibility.

HOW TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly ship (postage prepaid) or carry the defective part to a designated RAYPAK Service Dealer or Service Station in the United States, supplying proof of purchase and date of installation and the model and serial numbers. If you cannot locate a dealer, contact RAYPAK'S Service Department at the address/telephone listed below. Raypak reserves the right at all times to inspect the claimed defect and verify warranty coverage at its factory.

EXCLUSIVE WARRANTY - LIMITATION OF LIABILITY

This is the only warranty given by RAYPAK. No one is authorized to make any other warranties on Raypak's behalf. **ANY IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE APPLICABLE WARRANTY PERIOD SPECIFIED ABOVE. RAYPAK'S SOLE LIABILITY WITH RESPECT TO ANY DEFECT SHALL BE AS SET FORTH IN THIS LIMITED WARRANTY. ANY CLAIMS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGE FROM WATER LEAKAGE) ARE EXCLUDED.** Some states do not allow limitations on how long an implied warranty lasts, or for the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

We suggest you immediately complete the information below and retain this Limited Warranty Certificate in case warranty service is needed.

RAYPAK, INC. SERVICE DEPARTMENT
2151 Eastman Avenue, Oxnard, California 93030
Telephone: (805) 278-5300 FAX (805) 278-5468

The following information must be provided when you write or call:

Original Owner	Daytime Telephone Number
Complete Mailing Address	
City State Zip Code	Installation Site
Model Number	Contractor/Installer
Date of Installation	Serial Number

Raypak, Inc., 2151 Eastman Ave, Oxnard, CA 93030 (805) 278-5300 FAX (805) 278-5468 Litho in U.S.A.

www.raypak.com

Raypak, Inc., 2151 Eastman Avenue, Oxnard, CA 93030 (805) 278-5300 Fax (805) 278-5468
Litho in U.S.A.