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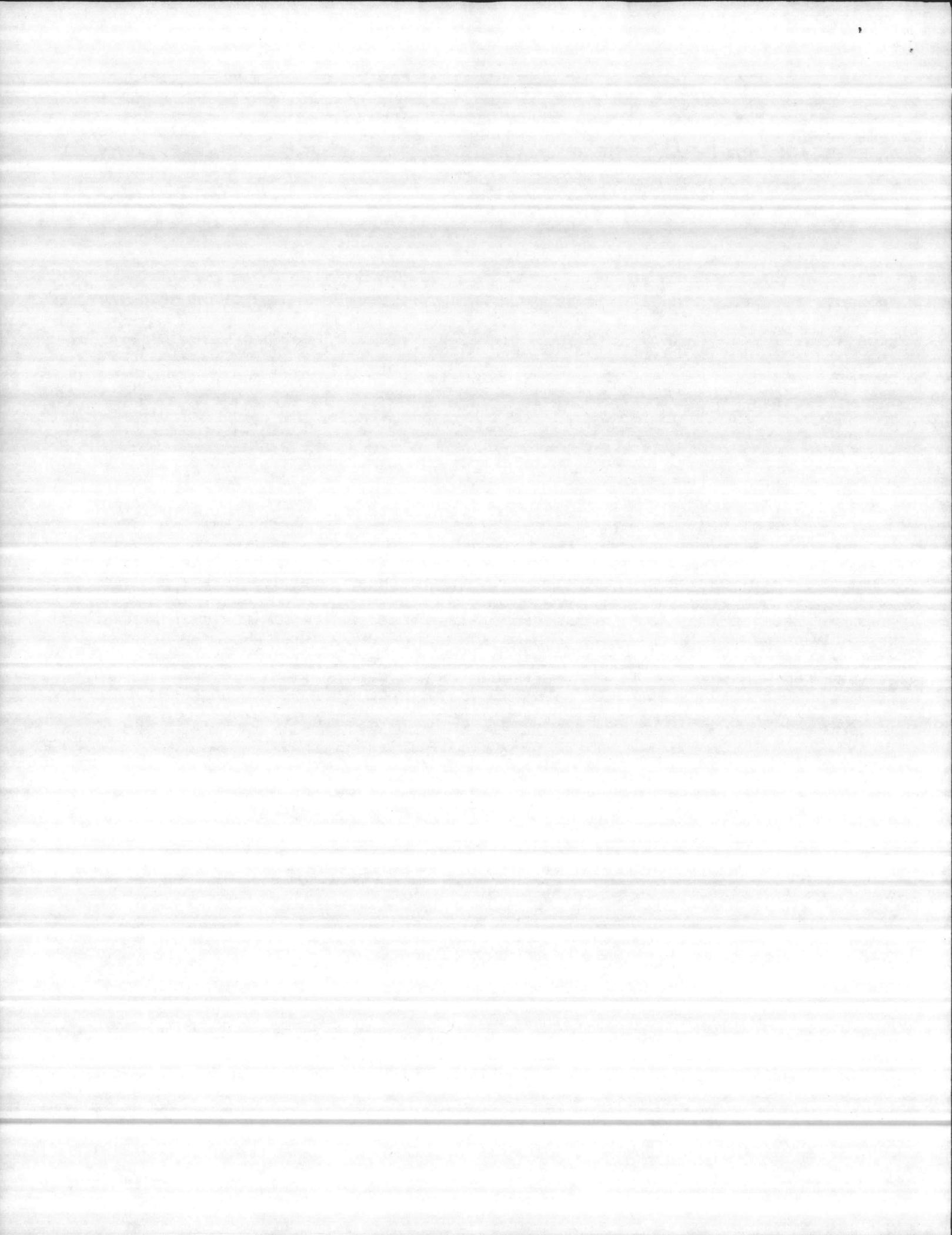
P.O. BOX 29146  
GREENSBORO, N.C. 27408  
(919) 643-6156

DECEMBER 28, 1987

PROJECT.....BEQ'S - BLDG # 721  
LOCATION.....CAMP LEJEUNE, N.C.  
ENGINEER.....J.N. PEASE ASSOCIATES  
MECHANICAL CONTRACTOR.....RAMSEY AIR CO.  
MANUFACTURER.....BURNHAM CORPORATION

1 BURNHAM CAST IRON HOT WATER BOILER WITH OIL FIRED BURNER. BOILER TO BE ASME STAMPED FOR 30 PSI WP; MEETS MIL SPEC. MIL-B-18897; COMPLETE WITH CAST IRON ASSEMBLED SECTIONS, FLUSH INSULATED JACKET, AND DRAFT REGULATOR. HOT WATER TRIM TO INCLUDE: PRESSURE AND TEMPERATURE GAUGES, ASME RELIEF VALVE, DRAIN COCK, CIRCULATOR AND L4081B OPERATING LIMIT, L4006E LIMIT CONTROL WITH MANUAL RESET, McDONNELL & MILLER #47-2 COMBINATION LOW WATER CUT-OFF AND WATER FEEDER. CARLIN FLAME RETENTION BURNER PER MIL-B-18797 FOR #2 OIL; HONEYWELL R8184G PRIMARY CONTROL WITH ON-OFF FIRING SEQUENCE; CAD CELL FLAME DETECTOR, OIL FUEL SYSTEM WITH SAFETY INTERLOCKS, LIMIT SWITCHES, FUEL OIL PUMP, GAUGES AND CONTROL VALVES. MODEL V-37WB

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PA. 3.7.1





CORPORATION  
HYDRONICS DIVISION  
Lancaster, PA 17604

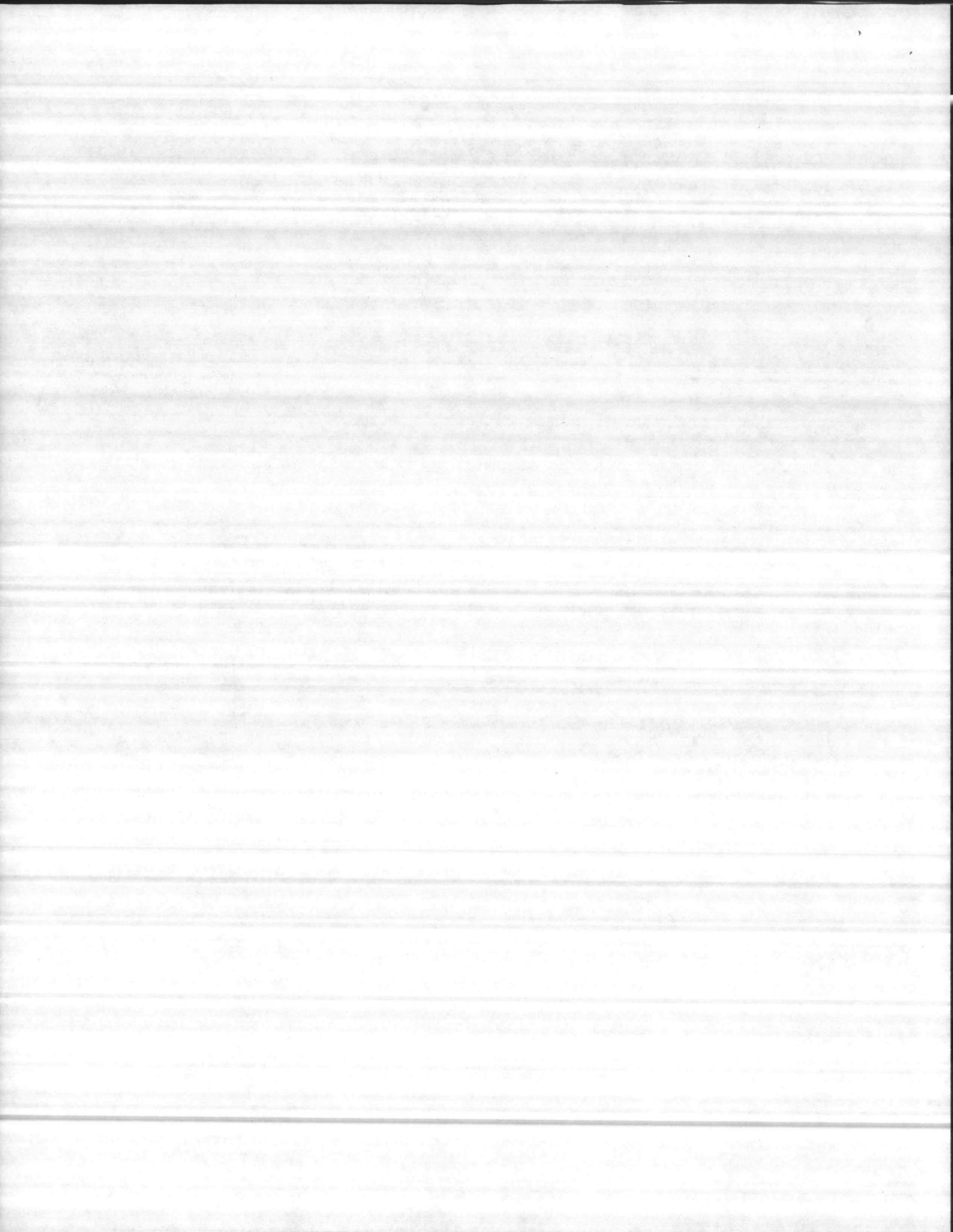
## BOILER SUBMITTAL

BOILER MODEL: V-37WB

JOB NAME: CAMP LEJUNE, N.C.

SUBMITTAL NO.: #1319

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**BOILER SUBMITTAL**

~~BOILER MEETS MIL-B-18897~~

REF: JOB ..... Camp Lejune , N.C. ....

ADDRESS .....

CITY-STATE .....

We hereby submit for approval on the above job, the following Burnham Boiler and Accessory Equipment, to be furnished in accordance with the following specifications: Should any item mentioned be temporarily out of stock or require an excessive lead time, we will supply a comparable item by a leading manufacturer.

Should a specific manufacturer be required the approval copy of this Submittal should indicate those items that cannot be substituted.

Boiler(s) No. ~~V-37-W-B~~ .....

D.O.E Heating Capacity, BTU/Hr. 342,000 or 370,000 .....

Boiler Horsepower, H.P. ....

Net Rating, BTU/Hr. 297,400 or 321,700 .....

Steam Working Pressure .....

Water Working Pressure 30 psi .....

Net Sq. Ft. .... Steam 1985 or 2145 Water .....

Gas Input, BTU/Hr. ....

Minimum Gas Pressure Req'd. W.C. ....

Oil Input, GPH 3.15 or 3.40 .....

**APPROVAL OR CERTIFICATIONS**

I = B = R ..... X ..... , SBI .....

U.L. X (Burner only) ..... , AGA .....

A.S.M.E. .... X ..... OTHERS .....

**EQUIPMENT TO BE FURNISHED PER BOILER:**

Cast iron sections (assembled) .....

Refractory target wall .....

(2) Tapped heater opening cover plates .....

Flush insulated steel jacket .....

Barometric draft regulator, DR-8 .....

Boiler drain cock .....

ASME safety relief valve set at 30 psi, 3/4" x 3/4" .....

Combination pressure & temperature gauge, 2 1/2" diameter .....

Thermostat - 24V, Honeywell T822D .....

Combination circulator & high temperature limit control, Honeywell L4081B .....

Temperature limit control with manual reset, Honeywell L4006E .....

Combination low water cut-off & water feeder, McDonnell & Miller 47-2 .....

Cad cell primary control, Honeywell R8184G .....

~~Carlin flame retention oil burner, Model 201 CRD including: Meets MIL-B-18797~~ .....

Motor, 1/4 HP, 3450 RPM, 115v/60/1 .....

Ignition transformer, 120 volt primary, 10,000 volt secondary .....

Two stage fuel unit, Sundstrand HA2BB-100 .....

Cad cell flame detector, Honeywell C554A .....

Magnetic oil valve - instant opening .....

120v/60 H3

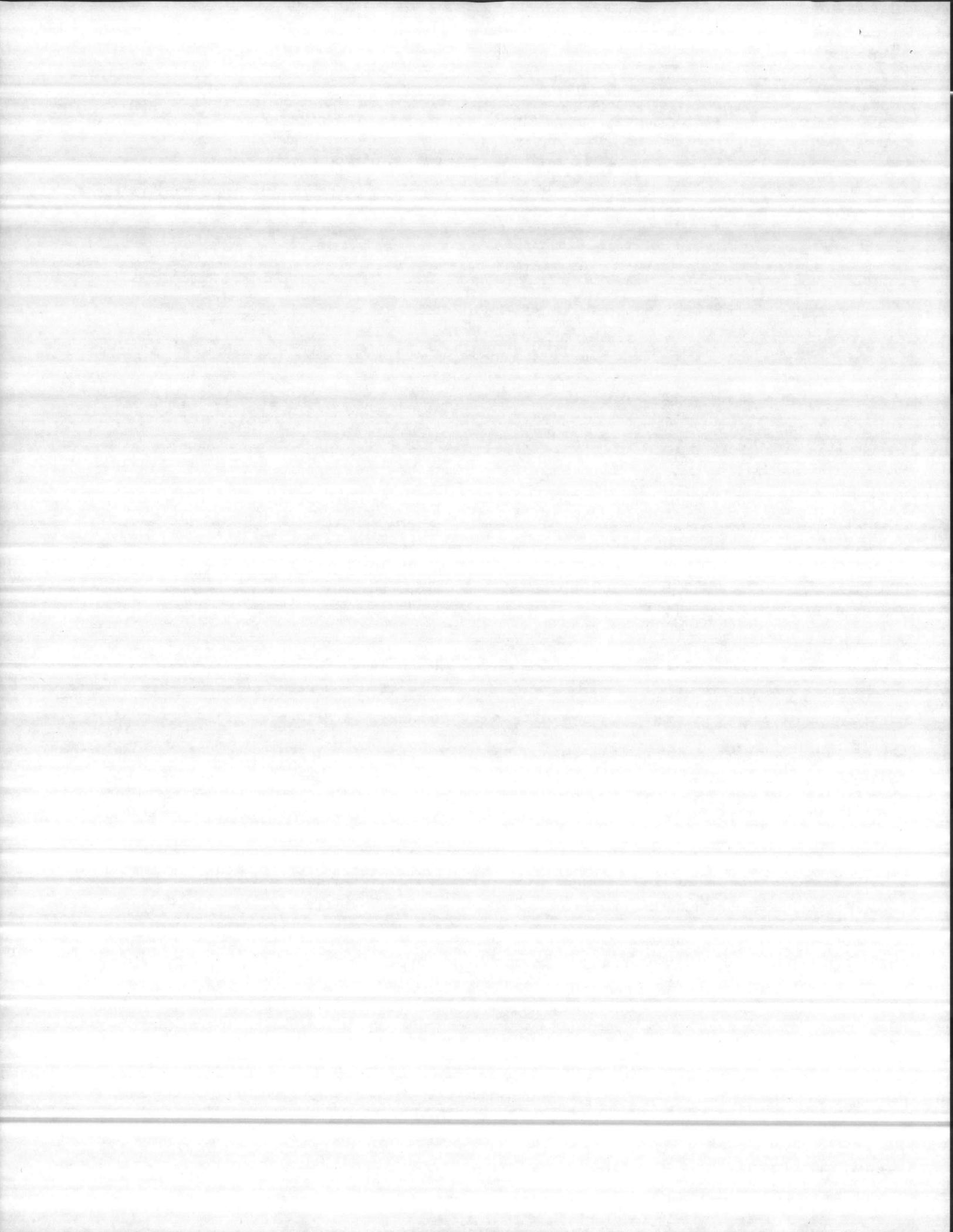
Prepared By: *Frank D. Spittale*

Certified By: *Frank D. Spittale*

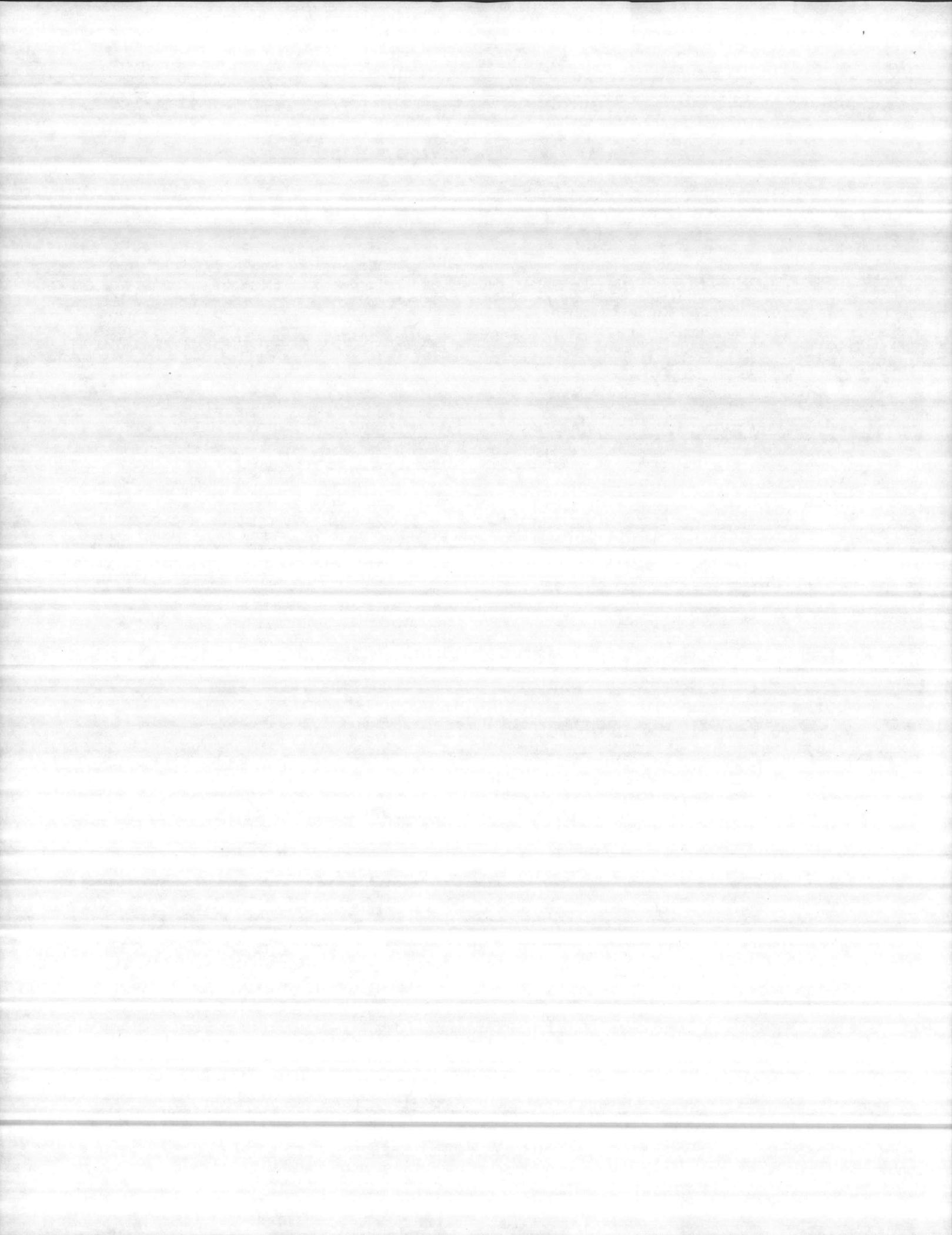
Date December 18, 1987 Page 1 of 2

Approving Authority

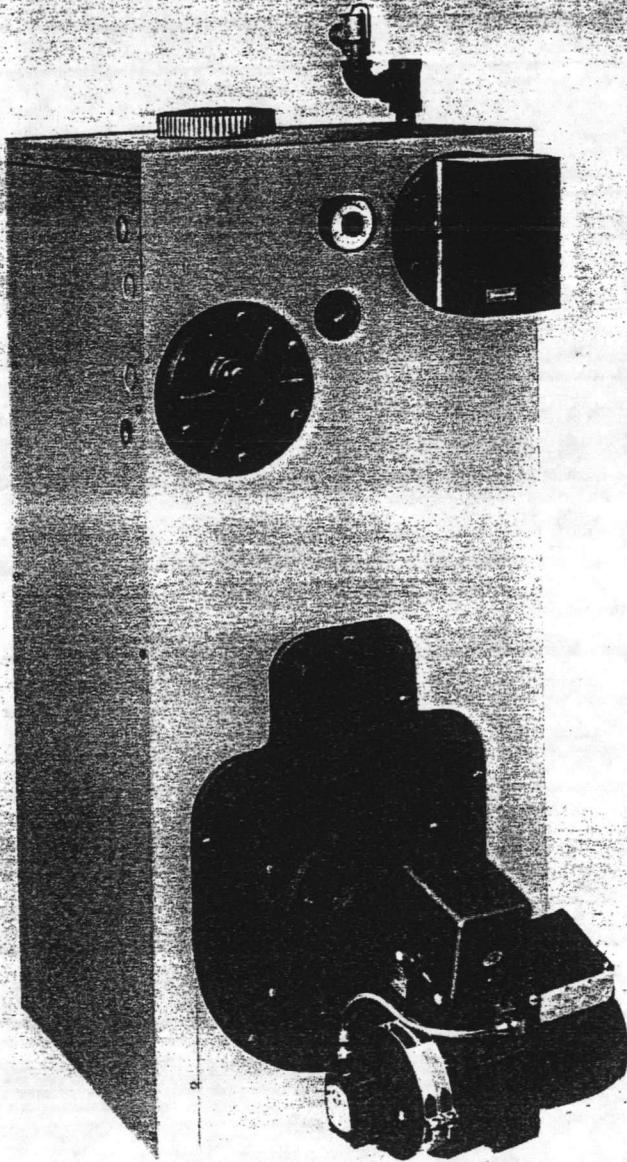
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# V3 Series



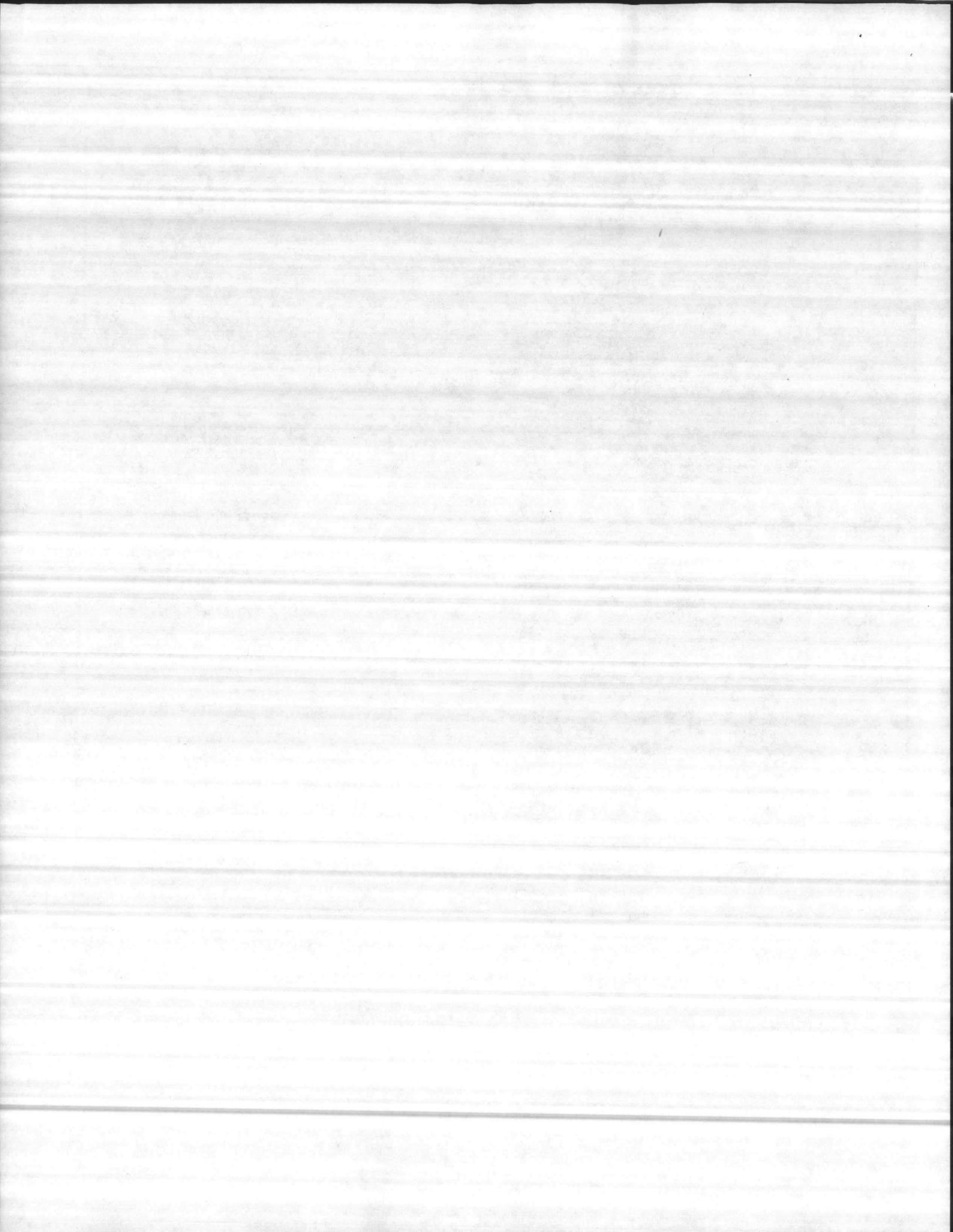
## HYDRONIC CAST IRON OIL UNIT

Steam or Hot Water  
Capacities  
122 to 438 MBH

 **Burnham**

AMERICA'S BOILER COMPANY

22.1h  
DA. 3.7.1



# Burnham / V3 Series

When versatility, performance, and quality are required, specify V-3. With rugged, large water volume cast iron sections; convenient side cleanout; upper and lower nipple ports for domestic hot water heaters (for both steam and forced hot water; and energy efficient wet base design, the V-3 Series boiler is unique in the industry.

## STANDARD EQUIPMENT

### All Boilers:

Boiler section assembly with pre-cast refractory combustion target wall and cleanout cover installed • Insulated blue tone flush jacket • Tankless heater #222 (boilers with "WBT" or "SBT" suffix only) • Boiler drain cock • Heating cover plate(s) for unused heater opening • Flame retention burner, 3450 RPM flange mounted, cad cell and junction box • Two oil burner nozzles (one installed, one loose) • Low-voltage thermostat.

### Steam Boilers:

A.S.M.E. Safety valve • Pressure and vacuum gauge • Gauge glass and fittings • Pressure limit control • Operating control (boilers with "SBT" suffix only).

### Water Boilers:

A.S.M.E. Safety relief valve • Temperature and pressure gauge • Protectorelay and hydronic control for forced circulation boilers or temperature limit control and light sensing primary control with cad cell relay for gravity boilers.

## OPTIONAL EQUIPMENT

Two stage fuel unit • Low water cut off for water or steam boilers • Vent damper • For optional tankless heater data — See page 4.

DRAFT FAN SPECIFIED  
NONE SHOWN.  
SUBMIT ELECTRICAL DATA FOR  
DRAFT FAN.

See page 2 of Burner information

← See page 2 of Burner information



Net Ratings are approved by the Hydronics Institute.

Built in accordance with the requirements of the ASME Boiler and Pressure Vessel Code.

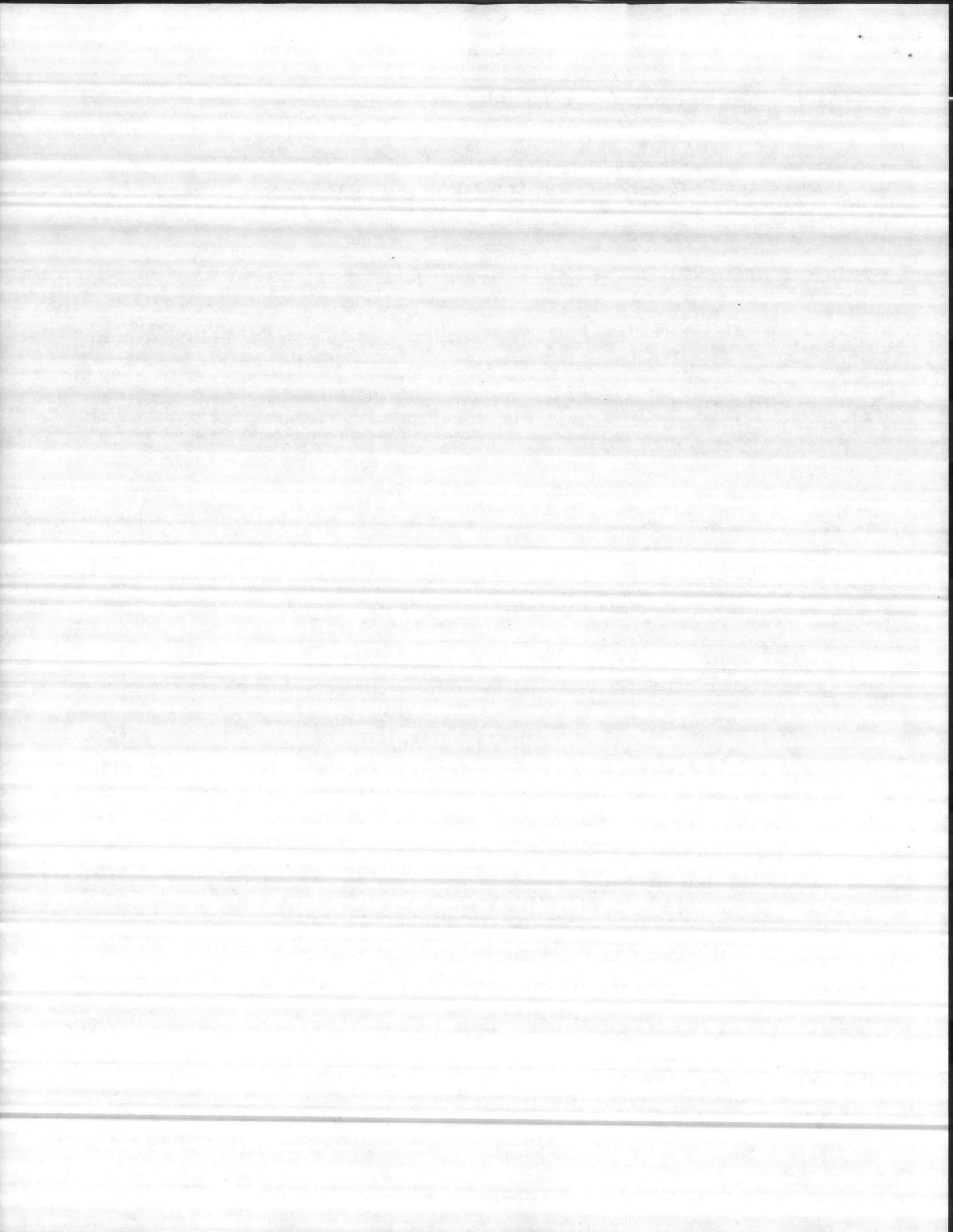
## RATINGS (Steam and Water)

NO. OF SECTIONS	MODEL NUMBER 1	BURNER MODEL AND RATING NUMBER	NOZZLE GPH ANGLE TYPE	BURNER CAPACITY GPH	DOE HEATING CAPACITY MBH	I=B=R RATINGS 2			NET WATER RATING SQ. FT.	I=B=R NOMINAL CHIMNEY SIZE IN. x IN. x FT. 3	DOE ANNUAL EFFICIENCY %	
						NET WATER MBH	NET STEAM MBH	NET STEAM SQ. FT.				
3	V-33	FC-134	1.00-70°-B* 1.10-70°-B	1.05 1.15	122 132	106.1 114.8	91.5 99.0	381 413	707 765	8 x 8 x 15	82.5 81.9	
4	V-34	FC-234	1.50-60°-ES* 1.65-60°-ES	1.55 1.70	179 195	155.7 169.6	134.3 146.3	560 610	1038 1131	8 x 8 x 15	81.9 81.3	
5	V-35	FC-234	2.00-45°-P*	2.10	241	209.6	180.8	753	1397	8 x 8 x 15	81.3	
						I=B=R						
				BURNER CAPACITY GPH	GROSS OUTPUT MBH							
5	V-35	FC-234	2.25-45°-P	2.25	244	212.2	183.1	763	1415	8 x 12 x 15	* *	
6	V-36	FC-234	2.50-30°-P* 2.75-45°-P	2.60 2.80	284 302	247.0 262.6	213.1 226.6	888 944	1645 1750	8 x 12 x 15	* *	
7	V-37	201-CRD	3.00-45°-P* 3.25-45°-P	3.15 3.40	342 370	297.4 321.7	256.6 277.6	1069 1157	1985 2145	8 x 12 x 15	* *	
8	V-38	201-CRD	3.50-45°-P* 4.00-45°-P	3.65 4.00	398 438	346.1 380.9	298.6 328.6	1244 1369	2310 2540	12 x 12 x 15	* *	

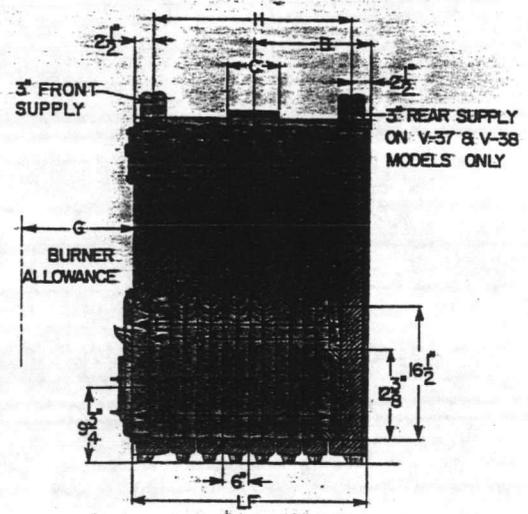
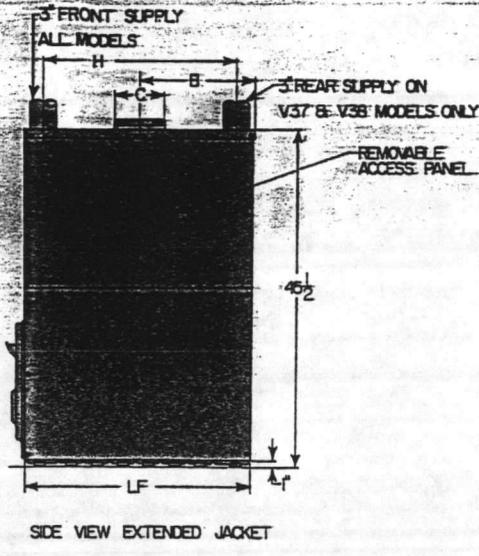
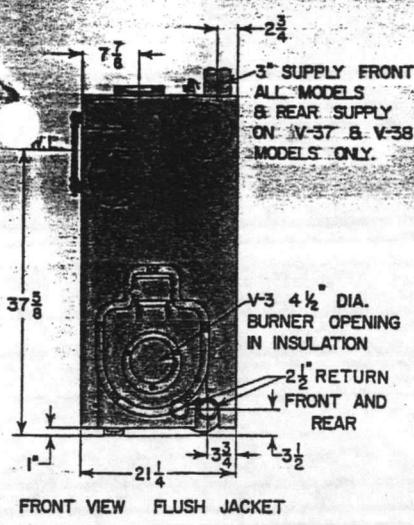
\* Denotes Nozzle installed in Burner, B Designates Delavan Solid Type Nozzle, ES Designates Hago Extra Solid Type Nozzle, P Designates Hago Extra Solid Type Nozzle  
\*\* Not rated for D.O.E. Efficiency since input exceeds 300,000 BTU/HR

1 "SB" suffix denotes Steam boiler without Tankless heater.  
"SBT" suffix denotes Steam boiler with Tankless heater.  
"WB" suffix denotes forced circulation water boiler without Tankless heater.  
"WBT" suffix denotes water boiler with Tankless heater.  
"WBG" suffix denotes gravity boiler.  
2 I=B=R Net Ratings shown are based on a piping and pickup allowance of 1.333 for steam, and 1.15 for water. Consult manufacturer for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc. Net Ratings for water, square feet, are based on 170° F average water temperature in radiators.

For higher water temperatures, select boiler on basis of I=B=R Net Rating MBH.  
The Burner Capacity in GPH is based on oil having a heat value of 140,000 BTU per gallon.  
V-3 Boiler Ratings are based on 12 1/2% CO<sub>2</sub>, #1 Smoke.  
3 Chimney sizes and heights shown are selected in accordance with the Hydronics Institute Testing and Rating Standard for cast iron and steel heating boilers. Such chimneys will produce sufficient draft under normal conditions and are based on using short, direct breeching into chimney. When necessary to use more than one elbow in breeching, five (5) feet of chimney should be added to the catalogued chimney height for each additional 90° elbow used.



# V3 Dimensions and Tappings

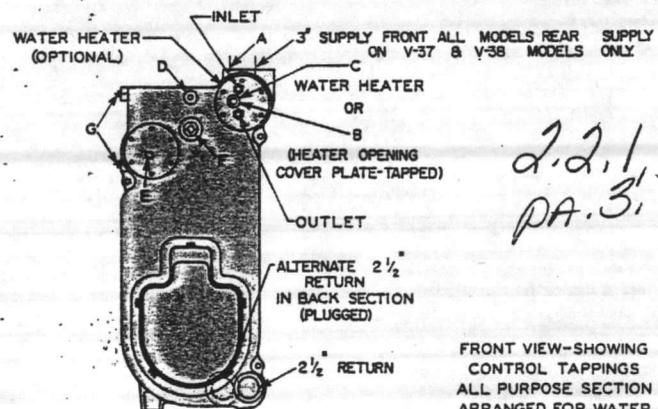
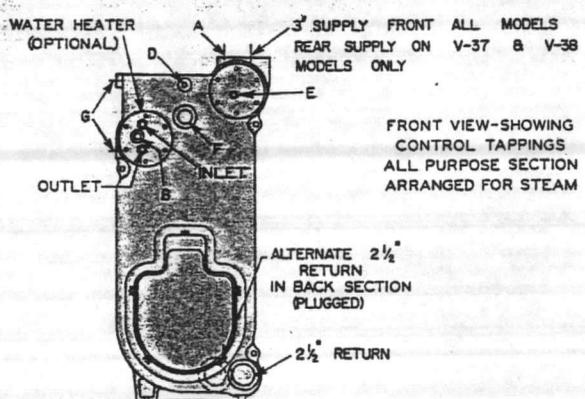


## DIMENSIONAL DATA (In inches)

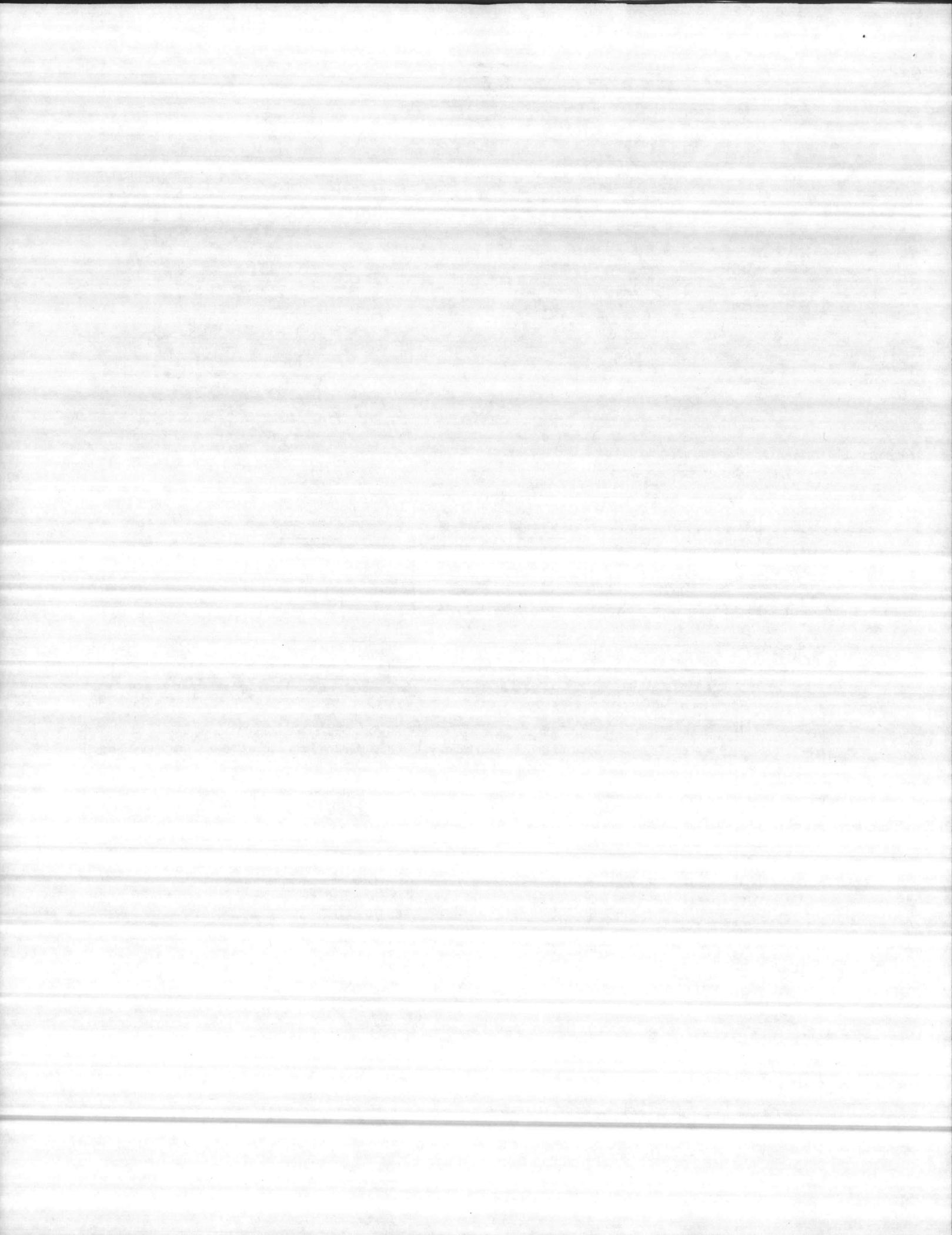
NO. OF SECTIONS	A	B	C	D	E	F	G	H
3	10%	8 1/2	6	11%	12%	16 1/2	15	—
4	16%	11 1/2	7	17%	18%	22 1/2	15	—
5	22%	14 1/2	8	23%	24%	28 1/2	15	—
6	28%	17 1/2	9	29%	30%	34 1/2	15	—
7	34%	23 1/2	9	35%	36%	40 1/2	17	35 1/2
8	40%	29 1/2	9	41%	42%	46 1/2	17	41 1/2

## CONTROL TAPPING—All Purpose Boiler

LOCATION ON BOILER	SIZE (INCHES)	STEAM CONTROL USED	
A	3/4	Safety Valve	Safety Relief Valve
B	3/4	Operating Control (for installations with tankless heater)—or Optional Controls (requires additional tapped heater opening cover plate for installations without tankless heater)	Limit Control or Combination High Limit, Circulator Control and Cad Cell Relay (for installations without tankless heater)
C	3/4		Combination High Limit, Low Limit, Circulator Control and Cad Cell Relay (for installations with tankless water heater)
D	1/4	Steam Pressure Gauge	Combination Pressure Gauge and Thermometer
E	3/4	Bush to 1/4"—Pressuretrol—or Optional Controls	Auxiliary Limit Control (when needed—requires additional tapped heater opening cover plate for installations without tankless heater)
F	1 1/2	Blowoff	Not Used
G	1/2	Gauge Glass and Low Water Cut-off	Not Used



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# V3 Series

## BOILER-BURNER FEATURES

HONEYWELL CONTROLS

TANKLESS WATER HEATER

CAST IRON BOILER SECTIONS

CONVENIENT SIDE CLEANOUT

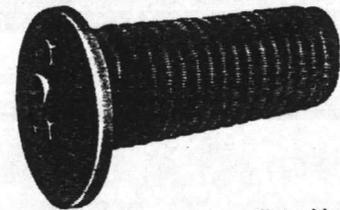
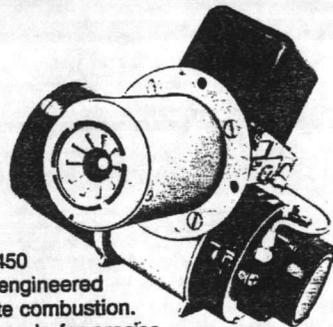
OPTIONAL SECOND WATER HEATER ON WATER BOILERS

COMBUSTION TARGET WALL

FLAME RETENTION BURNER

WET BASE DESIGN

CAST IRON NIPPLES JOIN ALL SECTIONS



**FLAME RETENTION OIL BURNER**—flame mounted 3450 RPM flame retention burner engineered to provide clean and complete combustion. Twin air bands and an index scale for precise air adjustment and setting. Rugged steel housing maintains alignment of fan motor and fuel unit. Built in air-flow damper.

**DUAL FIRING RATES**—each boiler comes with two nozzles. Install the one that meets immediate needs. Change capacity later when and if required just by switching to other nozzle. Maximum combustion efficiency is achieved when nozzle is sized to meet the immediate heat loss of the installation.

**WET BASE DESIGN**—for durability, heat transfer, and combustion efficiency. These sections are pressure tested twice—individual sections at 2 times maximum working pressure of boiler; and as an assembled boiler at 1½ times maximum working pressure.

**ALL-PURPOSE**—steam or water, non-packaged for complete versatility.

**EFFICIENT**—flame retention burner designed to operate at 12½% CO<sub>2</sub>, #1 smoke, with DOE Annual Efficiency of over 81%.

**CONTROLS**—all controls are front mounted for ease of service and adjustment. Primary control features light-sensing detector for fast response to ignition and shutdown.

**TANKLESS HEATER**—large capacity, copper coil tankless type. Inserts into upper nipple port (and lower if desired) on water boiler, lower nipple port on steam boiler.

OPTIONAL HEATER DATA (Intermittent Draw)						
BOILER NO	NO.	NPT CONN.	RATING			
			STEAM		WATER	
			GPM	ΔP	GPM	ΔP
V-33	222 <sup>3</sup>	½	4¼	36.0	4¼	42.5
V-34	226	½	5¼	17.5	5¼	20.5
V-35	232	½	6¼	22.5	7	27.5
V-36	445	¾	7¼	19.5	8¼	23.5
V-37	445	¾	7¼	19.5	8¼	23.5
V-38	445	¾	7¼	19.5	8¼	23.5

1 Based on 200°F Blr. Water Temp. & 40°-140° Rise

2 Pressure Drop — psi

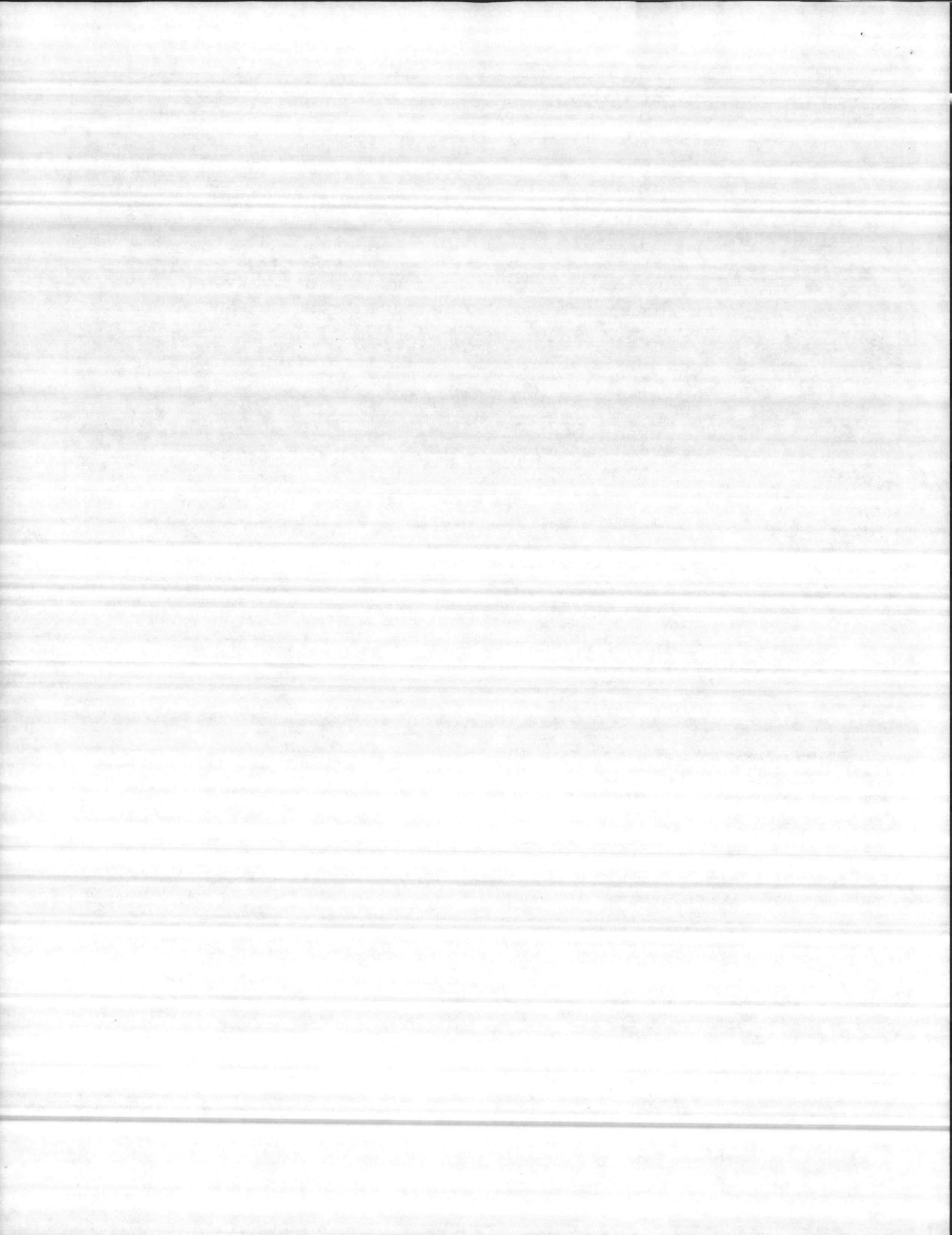
3 #222 Tankless heater standard on all boiler sizes at 4¼ gpm.

On forced hot water systems, a second tankless heater can be installed in the lower nipple opening for increased domestic hot water capacity.

BEFORE PURCHASING THIS APPLIANCE, READ IMPORTANT ENERGY COST AND EFFICIENCY INFORMATION AVAILABLE FROM YOUR CONTRACTOR.

**Burnham**  
HYDRONICS DIVISION  
Lancaster, PA 17604

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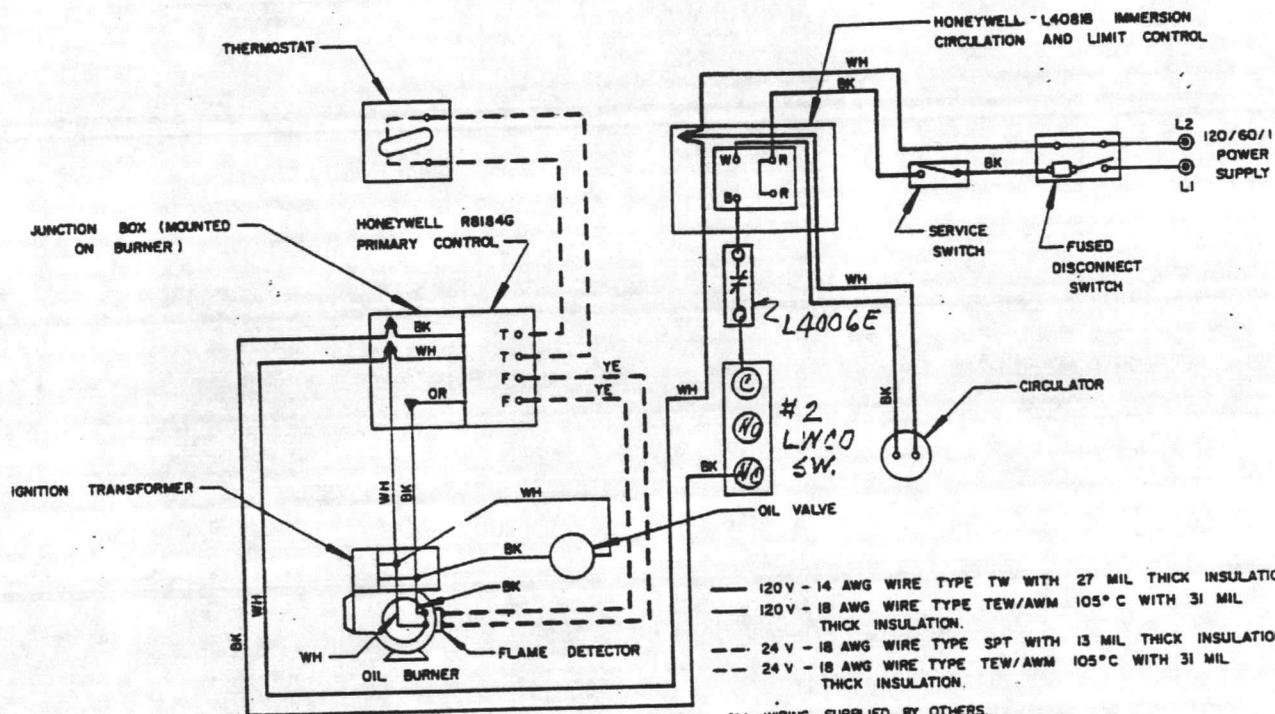


Fig. 22

### 0.3 Amp Thermostat Setting

### SEQUENCE OF OPERATION

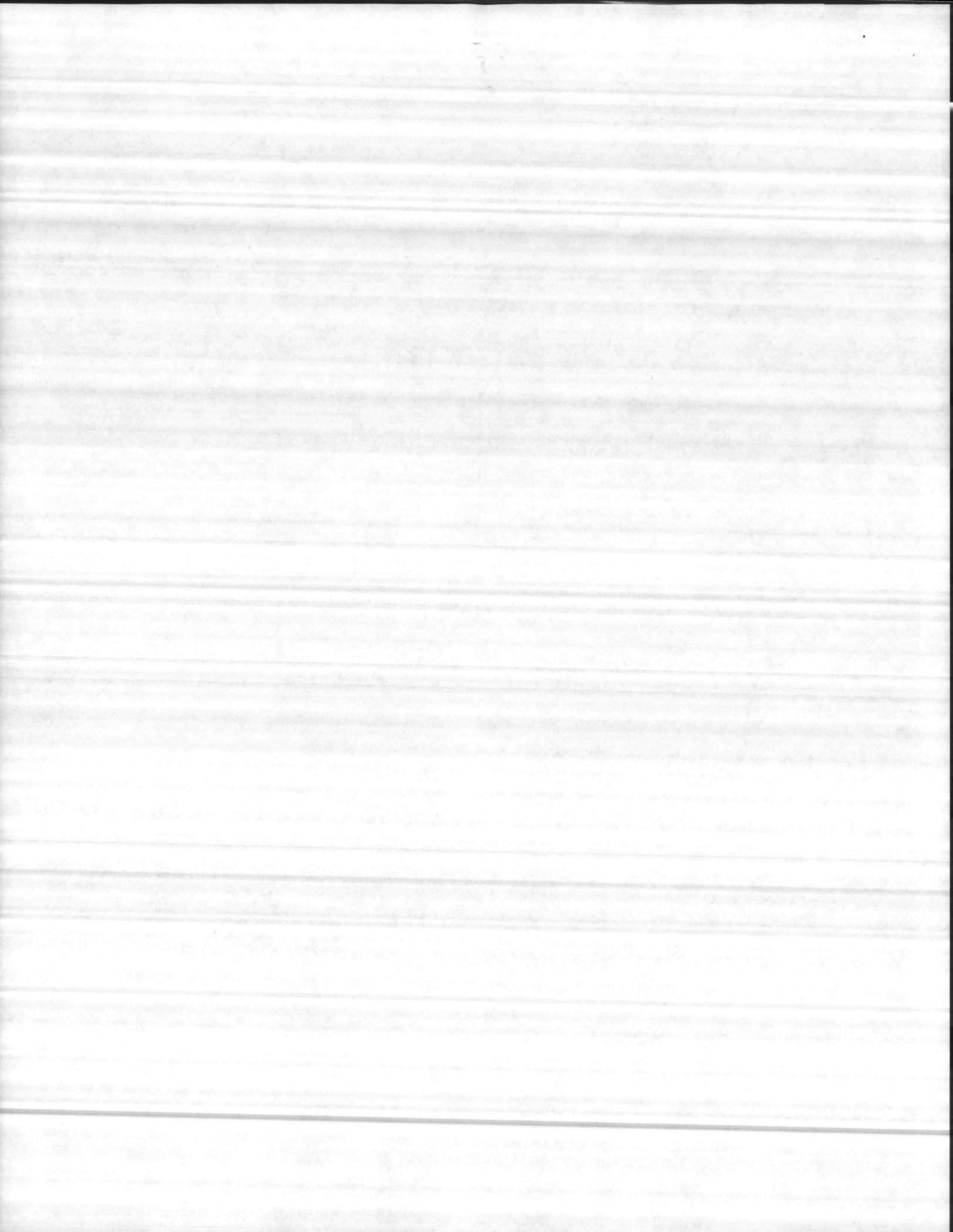
A call for heat by the thermostat energizes the R8184 control to bring on the burner. If burner ignites within approximately 15 seconds (safety switch timing), cad cell sees flame and burner continues to operate until call for heat is satisfied.

Circulator will run as long as boiler water temperature is up to the low limit setting of the L4081B controller. (terminals R-W).

If boiler water temperature reaches setting of the high limit control (part of the L4081B controller) burner operation will be discontinued but circulator will continue to operate as long as boiler water temperature is up to the setting of the low limit side of the L4081B controller. When the high limit side of the L4081B restores the circuit (terminals R-W) on a drop in boiler water temperature the burner will resume operation if the thermostat is still calling for heat.

Wiring Diagram for Forced Hot Water Boilers Less Heater (V-37 & 38 Only)

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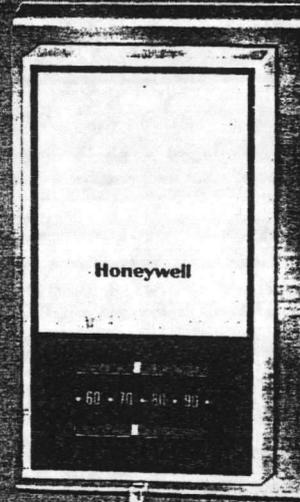


# Honeywell

## HEATING, COOLING THERMOSTATS

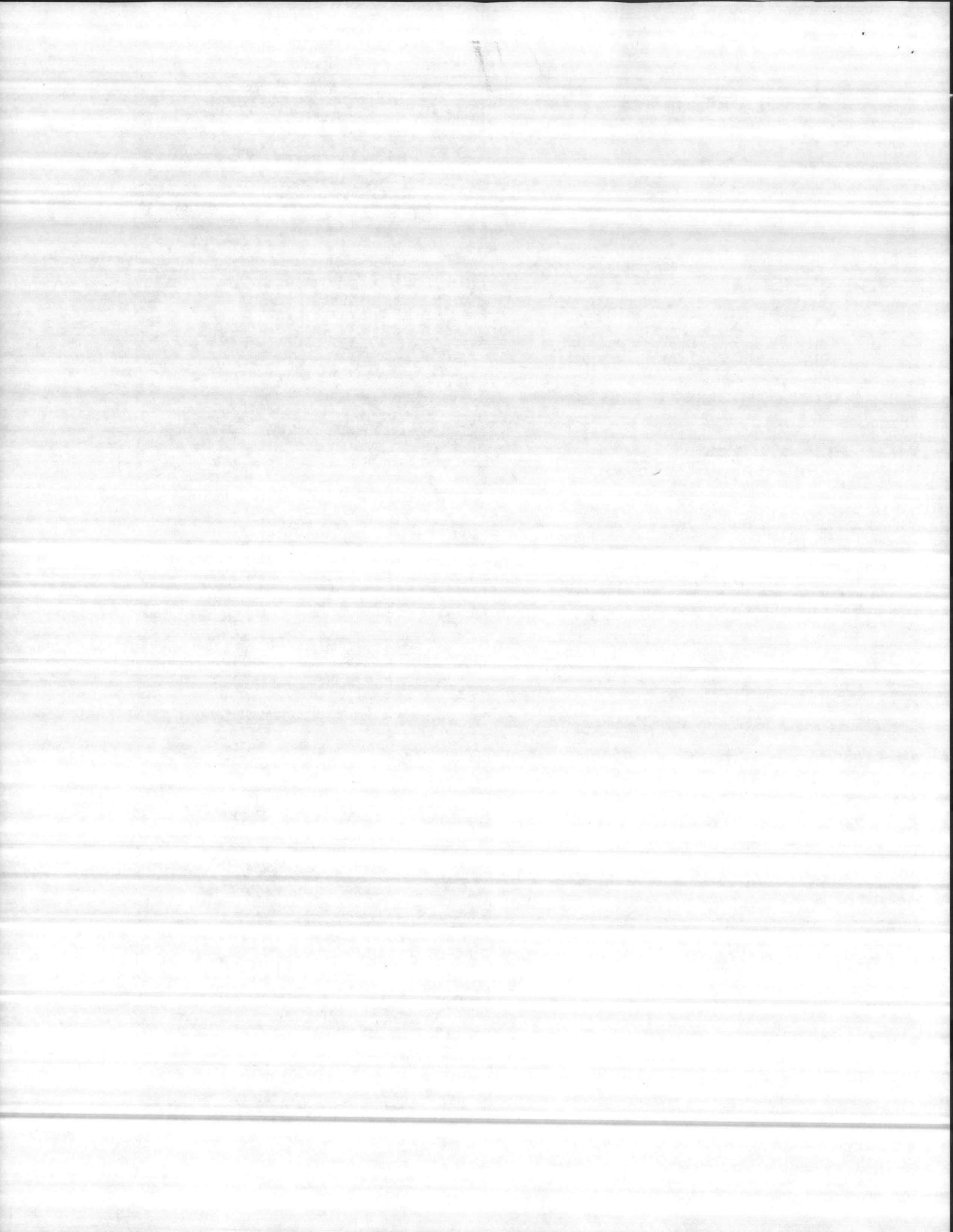
T822 AND TS822 THERMOSTATS ARE SERIES 80 DEVICES FOR HEATING OR COOLING APPLICATIONS. T822 MODELS PROVIDE CONTROL IN LOW VOLTAGE SYSTEMS; TS822 MODELS ARE FOR MILLIVOLT PILOT GENERATOR SYSTEMS.

- T822A,D control heating systems.
- T822C,E control cooling systems.
- T822E provides integral fan and system switching.
- Coiled bimetal operates quiet, dust-free mercury switch.
- Setting lever and thermometer scale on thermostat face.
- Adjustable heat anticipator on T822D. Heating anticipator on T822A and TS822A are nonadjustable.
- Cooling anticipators on T822C,E are nonadjustable.
- Thermostats mount directly on wall or on standard vertical outlet box.
- Positive OFF available on all models.



## T822, TS822

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# SPECIFICATIONS

## IMPORTANT

THE SPECIFICATIONS GIVEN IN THIS PUBLICATION DO NOT INCLUDE NORMAL MANUFACTURING TOLERANCES. THEREFORE THIS UNIT MAY NOT MATCH THE LISTED SPECIFICATIONS EXACTLY. ALSO, THIS PRODUCT IS TESTED AND CALIBRATED UNDER CLOSELY CONTROLLED CONDITIONS, AND SOME MINOR DIFFERENCES IN PERFORMANCE CAN BE EXPECTED IF THOSE CONDITIONS ARE CHANGED.

## TRADELINE MODELS

TRADELINE models are selected and packaged for ease of handling, ease of stocking, and maximum replacement value. TRADELINE specifications are the same as those of standard models except those as noted below.

### TRADELINE MODELS AVAILABLE:

T822D for low voltage heating applications with adjustable heat anticipator.

TS822A for 250/500, and 750 mV pilot generator systems without heat anticipator.

### ADDITIONAL FEATURES:

- Models available with positive OFF.
- T822D models available with heat anticipation factory-set at 0.2 A for electric heat applications.
- TRADELINE pack with cross reference label and special TRADELINE instructions.

## STANDARD MODELS

### MODELS:

T822A Low Voltage Heating Thermostat—nonadjustable heat anticipator.

T822C Low Voltage Cooling Thermostat—nonadjustable cooling anticipator.

T822D Low Voltage Heating Thermostat—adjustable heat anticipator.

T822E Low Voltage Cooling Thermostat—provides integral ON-AUTO fan switching and OFF-AUTO SYSTEM SWITCHING.

TS822A Heating Thermostat—250/500 and 750 mV application.

### ELECTRICAL RATINGS:

T822A—0 to 1.2 A at 30 Vac; 1.5 A at 24 Vac.

T822C,E—1.0 A running, 5.0 A inrush.

T822D—0.18 to 0.8 A or 0.32 to 1.2 A at 30 Vac.

TS822A—0.1 A at 250/500 and 750 mV.

### ANTICIPATOR RATINGS:

T822A—nonadjustable, 0 to 0.4 A.

T822C,E—nonadjustable, 0 to 1.0 A.

T822D—adjustable, 0.18 to 0.8 A or 0.32 to 1.2 A.

DIMENSIONS: 4-3/4 in. [120.7 mm] high, 2-7/8 in. [73 mm] wide, 1-1/8 in. [28.6 mm] deep.

MOUNTING MEANS: Two screws through base to wall or standard vertical outlet box.

### TEMPERATURE SETTING RANGE:

Standard heating models—55 F to 95 F [13 C to 35 C].

Standard cooling models—55 F to 95 F [13 C to 35 C].

Positive OFF heating models—60 F to 95 F [16 C to 35 C].

Positive OFF cooling models—55 F to 85 F [13 C to 29 C].

(continued on page 3)

## ORDERING INFORMATION

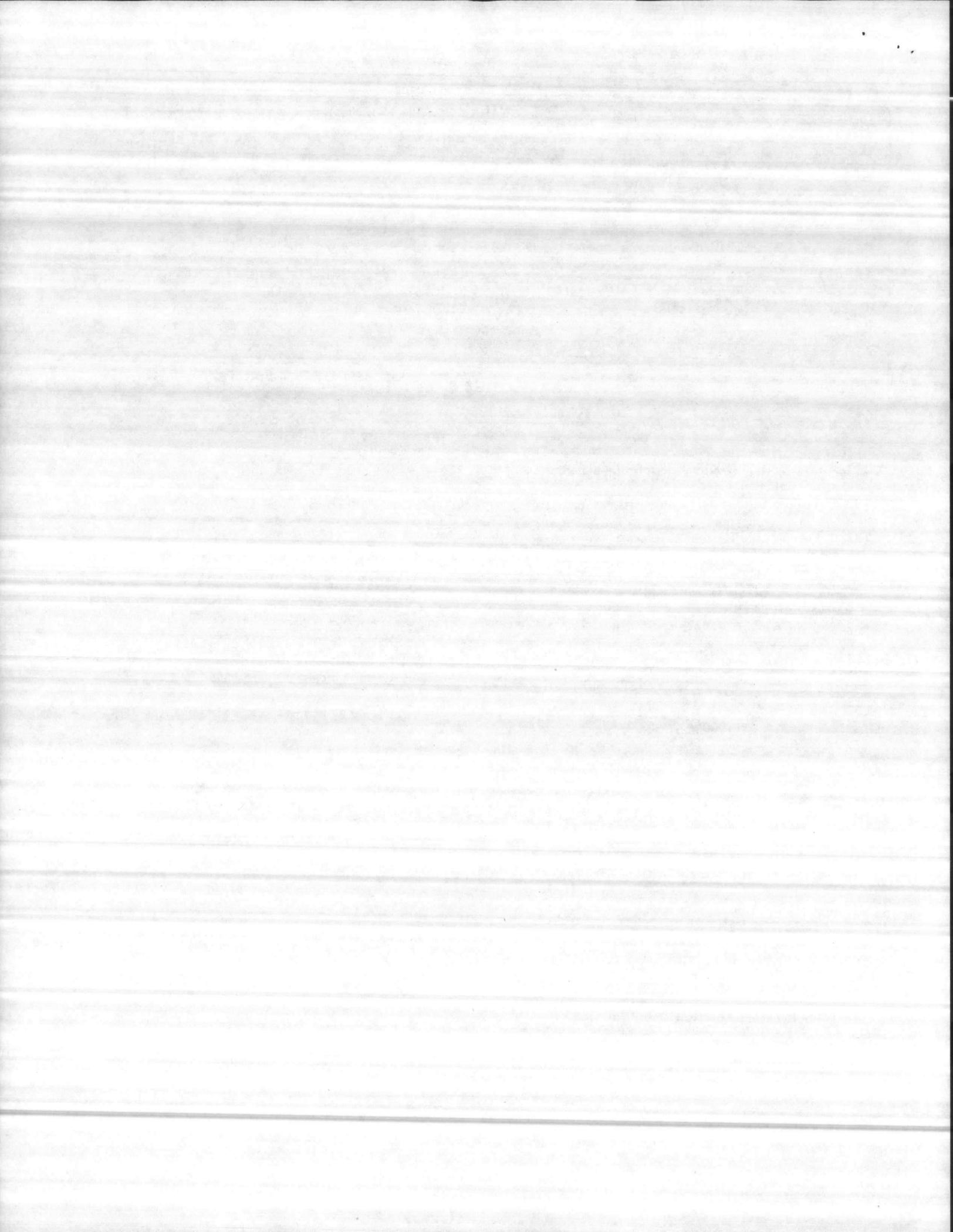
WHEN PURCHASING REPLACEMENT AND MODERNIZATION PRODUCTS FROM YOUR TRADELINE WHOLESALE OR YOUR DISTRIBUTOR, REFER TO THE TRADELINE CATALOG OR PRICE SHEETS FOR COMPLETE ORDERING NUMBER, OR SPECIFY—

1. Order number.
2. Optional specifications, if desired.
3. Accessories, if desired.

IF YOU HAVE ADDITIONAL QUESTIONS, NEED FURTHER INFORMATION, OR WOULD LIKE TO COMMENT ON OUR PRODUCTS OR SERVICES, PLEASE WRITE OR PHONE:

1. YOUR LOCAL HONEYWELL RESIDENTIAL SALES OFFICE (CHECK WHITE PAGES OF YOUR PHONE DIRECTORY).
2. RESIDENTIAL GROUP CUSTOMER SERVICE  
HONEYWELL INC., 1885 DOUGLAS DRIVE NORTH  
MINNEAPOLIS, MINNESOTA 55422 (612) 542-7500

(IN CANADA—HONEYWELL CONTROLS LIMITED, 740 ELLESMERE ROAD, SCARBOROUGH, ONTARIO)  
INTERNATIONAL SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD.



Low range heating models—35 F to 65 F [2 C to 18 C, 45 F to 75 F [7 C to 24 C], (with 58 F marking).

Celsius scale heating models—8 C to 32 C [46 F to 90 F] or 10 C to 35 C [50 F to 95 F].

FINISH:

Base—tan.

Cover—ivory.  
Scaleplate—champagne satin gold.

OPTIONAL SPECIFICATIONS:

1. Positive OFF switch.
2. Range stops, adjustable: to limit set point range.

ACCESSORIES:

1. 104994 Calibration Wrench.

## INSTALLATION

### WHEN INSTALLING THIS PRODUCT

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

### CAUTION

Disconnect power supply before beginning installation to prevent electrical shock and equipment damage.

### LOCATION

Locate the thermostat about 5 ft [1.5 m] above the floor in an area with good air circulation at average temperature.

In millivolt (Powerpile) applications, keep the thermostat location as close to the furnace as possible.

Do not mount the thermostat where it may be affected by—

- drafts, or dead spots behind doors and in corners.
- hot or cold air from ducts.
- radiant heat from the sun or appliances.
- concealed pipes and chimneys.
- unheated (uncooled) areas such as outside walls behind the thermostat.

### WIRING

All wiring must conform to local electrical codes, ordinances and regulations. See Figs. 2-4 for internal schematics and Figs. 5-9 for typical hookups.

When installing the TS822A, connect the R and Y terminals in 250/500 mV systems and the R and W terminals for 750 mV systems.

In 250/500 millivolt installations, use No. 14 wire and keep the wiring run as short as possible. Keep this in mind when selecting the thermostat location. In 750 millivolt applications, see the table below to determine the maximum wiring run.

WIRE SIZE	MAX. LENGTH 2-WIRE CABLE		MAX. COMBINED LENGTH 2-SINGLE WIRES	
	ft	m	ft	m
No. 18	30	9.0	60	18.0
No. 16	50	15.0	100	30.0
No. 14	80	24.5	160	49.0

### IMPORTANT

DO NOT connect the TS822A to any power source other than a mV pilot generator.

For a new installation run low voltage thermostat wire to the chosen location. For replacement applications, check the old thermostat wires for frayed or broken insulation. Replace any wires in poor condition.

### MOUNTING

The T822/TS822 thermostat is designed to be mounted on a wall or vertical outlet box.

1. Grasp the thermostat at the top and bottom with one hand. Pull outward on the top of the thermostat cover until it snaps free of the base. Remove the red plastic shipping pin from the thermostat.

2. Pull about 4 in. [101.6 mm] of wire through the wall or into the outlet box. Attach the thermostat wires to the appropriate terminals on the back of the thermostat base (Fig. 1). Set the heat anticipator (T822D) according to instructions under Heat Anticipator Setting in the SETTING AND CHECKOUT section. Push excess wiring through hole and plug any opening to prevent drafts that may affect thermostat performance.

3. Fasten the thermostat to the wall or outlet box with a screw through the top mounting hole (Figs. 2 and 3).

NOTE: It may be necessary to move the set point lever to uncover the mounting hole.

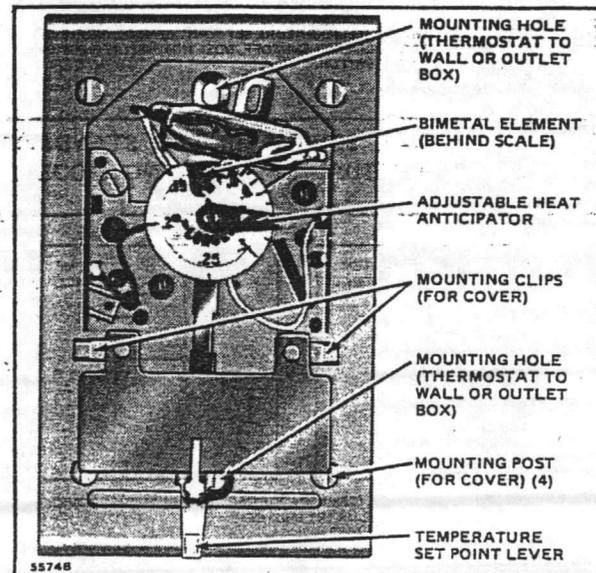


FIG. 1—INTERNAL VIEW OF THE T822 WITH ADJUSTABLE HEAT ANTICIPATOR.

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PA. 3.7.1

