Slant/Fin®

EUTECTIC *EC-10DV Series*

DIRECT VENT OIL-FIRED WATER BOILER/NO. 2 OIL

INSTALLATION AND OPERATING INSTRUCTIONS

SAFETY WARNING:

KEEP BOILER AREA CLEAR AND FREE FROM COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS. FAILURE TO ADHERE TO ABOVE SAFETY WARNING, MAY RESULT IN PERSONAL INJURY OR DEATH AND PROPERTY DAMAGE.

CONTENTS . . . . . **PAGE**

THIS BOILER OPERATES WITH POSITIVE PRESSURE IN THE FLUE AND OVER FIRE, ALL SEALS MUST BE IN PLACE WHEN OPERATING THE BOILER. ALL VENTING MUST BE INSTALLED AND SEALED ACCORDING TO THE VENT MANUFACTURER'S INSTRUCTIONS.

CAUTION

The information in this manual must be followed exactly to avoid personal injury, property damage or loss of life.

SEE BACK COVER FOR SERVICE PERSONNEL

IMPORTANT: The installation of this equipment must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the Installation of Oil Burning Equipment, ANSI/NFPA 31, latest edition, and to the National Electrical Code ANSI/NFPA 70, latest edition. The installation must also conform to the additional requirements in this Slant/Fin Instruction Manual. Where there is any difference, the more stringent requirement shall govern.

In addition, where required by the authority having jurisdiction, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, No. CSD-1, latest edition.

THIS MANUAL MUST BE LEFT WITH OWNER AND SHOULD BE HUNG ON OR ADJACENT TO THE BOILER FOR REFERENCE.

IMPORTANT: This boiler must be installed by a trained, experienced, service technician, licensed for the installation and servicing of oil burning equipment or otherwise qualified by the authorities having jurisdiction over the installation.

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Figure 1: Dimensions (inches)

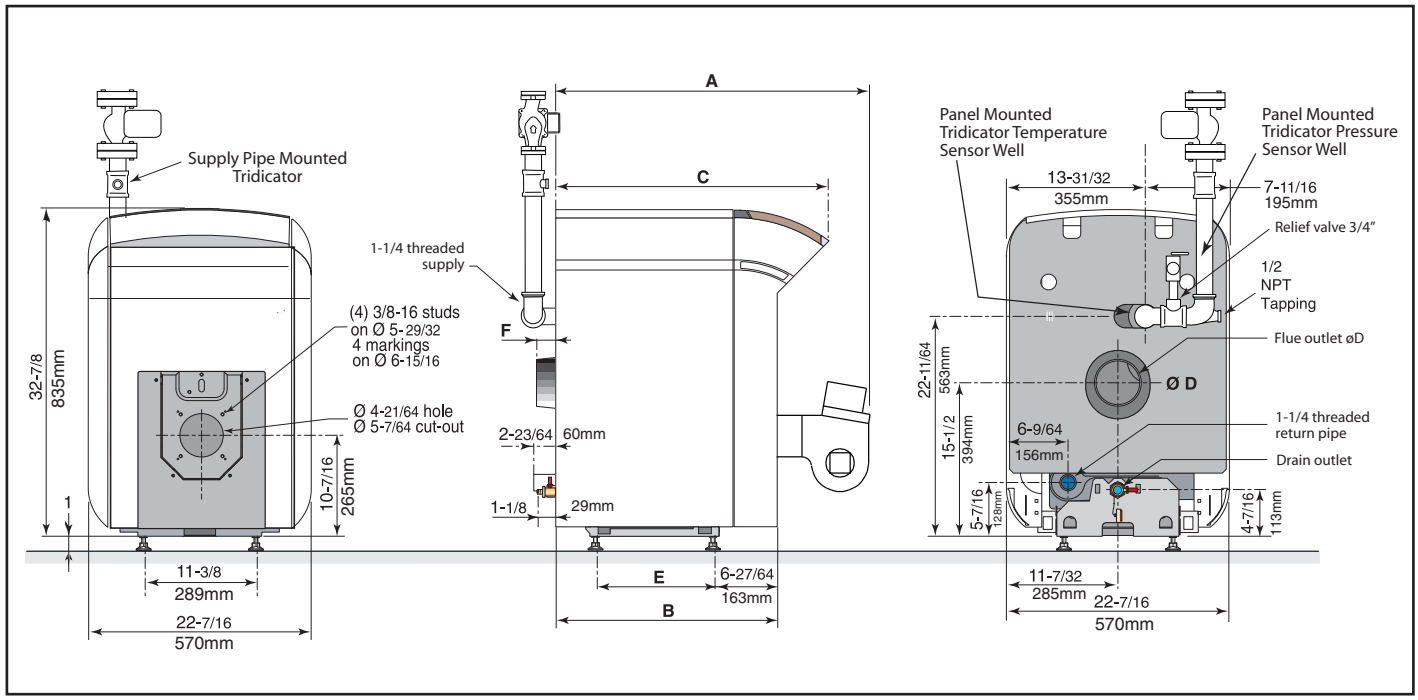


TABLE 1: Ratings and Dimensions

BOILER MODEL NO.	OIL INPUT † §				GROSS OUTPUT*		NET OUTPUT*		AFUE %	DIMENSIONS											
										APPROX. OVERALL LENGTH "A"		BOILER LENGTH "B"		BOILER LENGTH "C"		FLUE DIA "D"		DISTANCE BETWEEN LEGS "E"		FLUE OUTLET LENGTH "F"	
	GPH	mL/s	BTU/H	Watts	MBH	kW	MBH	kW		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
EC-13DV	0.68	0.72	91,000	26,672	79	23	69	20	87	36	914	22-1/4	25	27	686	5	127	11-13/16	300	2	51
EC-14DV	0.80	0.84	112,000	32,837	98	29	85	25	87	41	1041	27-1/4	25	32	813	5	127	16-13/15	300	2	51
EC-15DV	1.00	1.05	140,000	41,034	123	36	107	31	87	46	1168	32-1/4	25	37	940	5	127	21-13/16	427	2	51
EC-16DV	1.21	1.15	161,000	47,189	141	41	123	36	87	51	1295	37-1/4	25	42	1067	6	152	26-13/16	427	4	102

Maximum operating pressure 60 psi (414 kPa).
All boilers hydrostatically tested — A.S.M.E.

* For forced hot water heating systems where the boiler and all piping are located within the area to be heated, the boiler may be selected on the basis of D.O.E. capacity output. The net AHRI output ratings shown are based on an allowance for piping and pickup of 1.15 (water). D.O.E. capacity output is divided by the allowance to obtain net rating. The Slant/Fin Technical Service department should be consulted before selecting a boiler for unusual piping and pickup requirements such as intermittent system operation, extensive piping, etc.

† Ratings apply to the use of light oil at 140,000 Btu per gallon and apply only when burner models listed on pages 8 of this manual are used, and are properly adjusted to produce 13% CO_2.

\# All dimensions subject to normal manufacturing tolerance.
NOTE: All boilers under 300,000 Btuh (87.9 kw) input are tested and rated for capacity under the U.S. Department of Energy (D.O.E.) Test Procedures for Boilers.

INSTALLATION REQUIREMENTS

BOILER LOCATION

CAUTION: NEVER BURN GARBAGE OR PAPER IN THE UNIT, AND NEVER LEAVE COMBUSTIBLE MATERIAL AROUND IT.

Provide a level, solid foundation for the boiler.

A. The foundation must be capable of supporting the weight of the boiler when filled with water:

Boiler Size	Approximate Total Weight of Boiler Assembly*, filled with water
EC-13-DV	353
EC-14-DV	426
EC-15-DV	501
EC-16-DV	575

* Includes burner, circulator and controls

B. These boilers have full wet base sections which surround fire box for maximum heat absorption of burning fuel, and low floor temperature.
C. The boiler can be installed on both combustible and non-combustible floors, but must NOT be installed on or above carpeting.
D. If boiler is to be located over buried conduit containing electric wires or telephone cables, consult local codes or the National Board of Fire Underwriters for specific requirements.

MINIMUM CLEARANCE

Provide accessibility clearance of 24" from surfaces requiring servicing (top and front) and 20" on any side requiring passage. The boiler shall be installed with the following MINIMUM clearances from combustible materials:
BACK-6"
SIDES-2"
NOTE: Except in closets and alcoves, clearances above may be reduced by providing forms of protection as specified in NFPA 31, latest edition.

VENTING REQUIREMENTS

IMPORTANT: For correct installation of direct vents, see publication # ECDV40-V, "Venting Installation Instructions." Information below summarizes the requirements.

CAUTION: AN OIL-FIRED UNIT SHALL BE CONNECTED TO A VENT HAVING SUFFICIENT DRAFT AT ALL TIMES TO ENSURE SAFE AND PROPER OPERATION OF THE UNIT.

- The terminal shall not be closer than 3 feet above or 10 feet horizontally from any forced air inlet into the building.
- The terminal shall not be closer than 4 feet below, 4 feet horizontally or 1 foot above any door, window or gravity air inlet into the building.
- The terminal shall not be less than 3 ft from an inside corner of an "L" shaped building.
- The terminal shall not be less than 7 ft above grade when located adjacent to public walkways.
- The terminal shall not be less than 2 ft from an adjacent building.
- The terminal shall be located at a height not liable to blockage from leaves, snow or other debris, at least 1 ft above grade or anticipated snow line.
- The terminal shall be positioned so that flue gases are not directed where they can jeopardize people, overheat combustible structures or enter buildings.
- Vent terminal should be away from shrubbery or other obstructions that would prevent free air flow to and from vent terminal. Do not terminate vent under decks, stairways or car ports. When ever possible, locations under windows should be avoided.
- Vent termination should not be mounted directly above or within 3 ft horizontally from an oil tank vent.

BOILER INTERNAL BAFFLES

IMPORTANT: EC-10 series boilers Direct Vent version is different from standard series. Direct Vent version boilers usually have fewer internal cast iron baffles.

	Standard Version	Direct Vent Version
EC-13	(3) Baffle Plates	(2) Baffle Plates center & right side when viewing from front
EC-14 & 15	(2) Baffle Plates center & right side when viewing from front	(0)
EC-16	(0)	(0)

VENT PIPING

A. The vent piping minimum bend radius is 12".
B. Place metal strapping every 36" to support vent pipe and prevent it from sagging.
C. Maximum wall thickness is 14". Contact Slant/Fin Corp. for recommendations in case of thicker wall.
D. Gases will form white plume in winter. Plume could obstruct window view.
E. Prevailing winds could cause freezing of condensate and water/ice buildup on building, plants or roof.
F. Locate or guard vent to prevent accidental contact by people or pets, and condensate from damaging exterior finish.
G. Do not terminate vent in window well, stairwell, alcove, courtyard or other recessed areas.

All venting kits must be double wall construction for the flue gas piping. *Field Controls* is the only approved manufacturer for venting kits. When installing the vent kits the manufacturers instructions must be followed.

INSTALLING WATER TRIM

Notes: Jacket must be installed on boiler units prior to installation of trim.

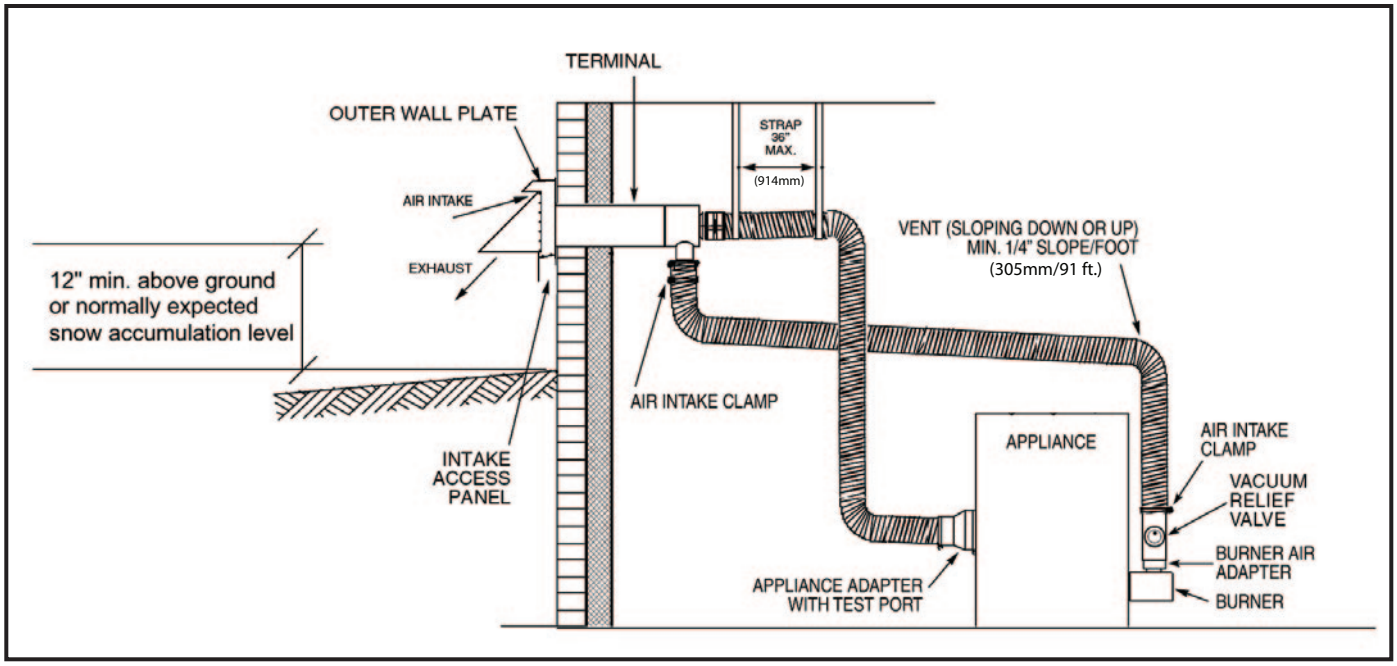
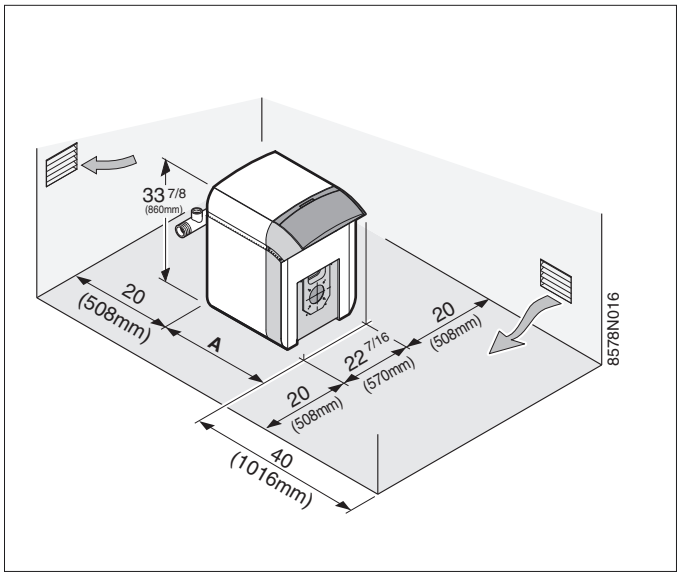


Figure 2. Typical Installation

Sufficient space shall be left clear around the boiler. Do not stack items on or box in the appliance within the required clearances to combustibles.

The figures stated in inches in the drawings below are the minimum recommended dimensions for providing easy access around the boiler.

● EC-10DV



Boiler	A (in)	A (mm)
EC-13DV	22 1/4	565
EC-14DV	27 1/4	692
EC-15DV	32 1/4	819
EC-16DV	37 1/4	946

PIPING

IMPORTANT: Boilers are to be used with closed system. Any application that uses water from system, causes the introduction of a frequent supply of fresh water into the boiler. This will cause damage to the boiler. Use of heat exchangers will prevent this damage.

PIPING FOR WATER UNITS

NOTE: On knock down boiler only, jacket may be installed after return piping connection, but must be installed prior to adding trim & supply piping.

I. CIRCULATING SYSTEM

A. FORCED CIRCULATION hot water heating system: Use the top tapping as supply tapping, and use the rear bottom tappings for the return.

B. A FLOW CONTROL VALVE will prevent gravity circulation.

II. AIR CONTROL SYSTEMS

A. DIAPHRAGM-TYPE COMPRESSION TANKS are used to control system pressure in an AIR ELIMINATING SYSTEM: an automatic air vent is used to REMOVE air from the system water. See figure 3.

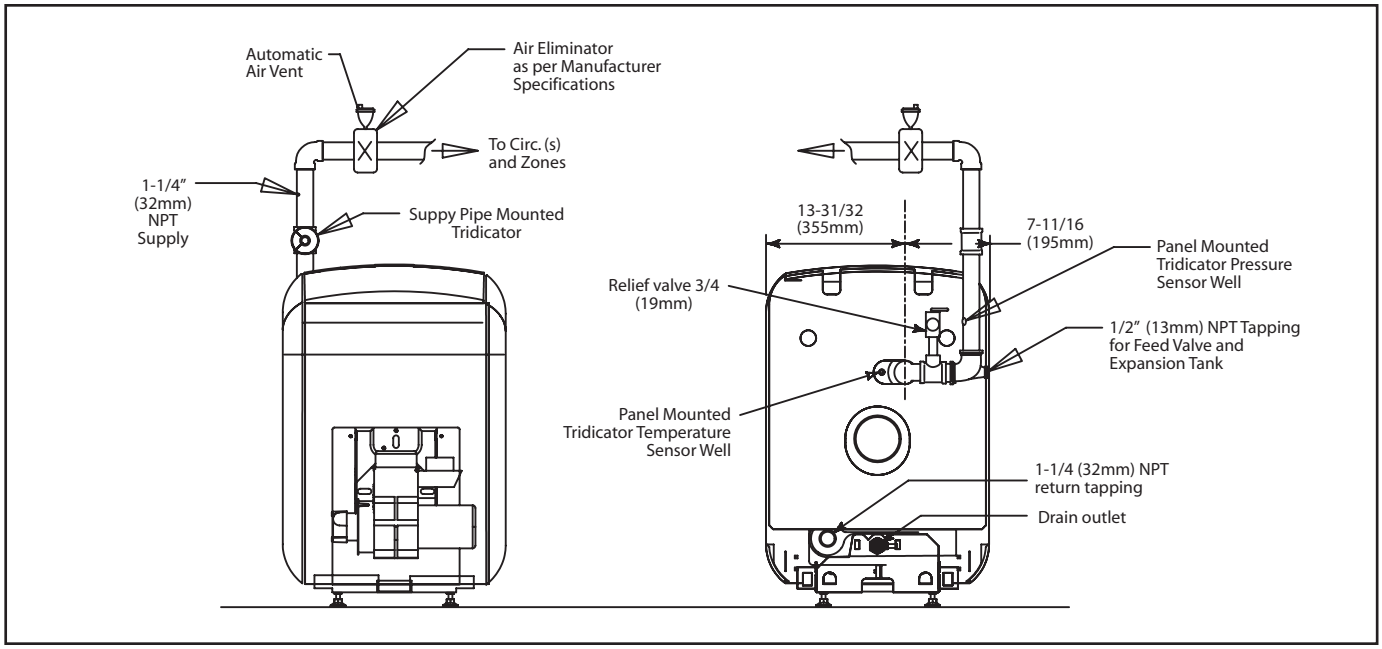


Figure 3. *Air Eliminating System or Alternating Collecting System. Pipe off to a safe place the relief valve and drain outlet.*

If system pressure needs further control, add an additional tank or install a larger capacity tank. The automatic air vent should be installed in the top of the boiler, as in figure 3.

B. CONVENTIONAL COMPRESSION TANKS (non-diaphragm type) are used to control system pressure in an AIR COLLECTING SYSTEM. Within the system, after initial start-up and venting, air is collected in the tank and acts in contact with the water to control pressure. Air is not vented from this system. If system pressure needs further control, add another tank in parallel with the original tank or install a large capacity tank. Locate the tank at the inlet end of the pump near the boiler. (See figure 3)

C. HOT WATER RADIATION VENTING - Manual air vents should be installed at the top of all "drops" (where piping goes downward). Air must be vented or purged from all zone lines to permit proper system heating.

D. PUMP LOCATION - Locating low-head pump(s) on return to boiler is acceptable for smaller boiler sizes in residences of one or two stories. The pump location shown in figure 3 is required in large, multi-story building installations, especially when high-head pumps are used.

IMPORTANT: Hot water heating systems containing high water volume, such as would occur with cast iron radiation, require special care with air elimination. The circulator pump should be located on the boiler supply pipe and the expansion tank and air scoop should be located near the pump suction.

INSTALLING THE BURNER

See Burner Data, pages 12-13, and Burner Manual supplied with burner. If burner is not mounted as received, mount to boiler, placing flange over mounting studs. Use gasket between flange and boiler. Distance between flange and nose of burner must be as shown in table on page 12 (Burner Insertion Depth). Check to see that nozzle and settings are as given in burner data tables, pages 12-13.

VOLUME OF WATER IN STANDARD PIPE OR TUBE

Nominal pipe Dia.	Standard Steel Pipe			Copper Pipe	
	Pipe Schedule	Pipe ID Inch	Gal. per Lin.Ft.	Pipe ID Inch	Gal. per Lin. Ft.
⅜	–	–	–	0.430	0.0075
½	40	0.622	0.0157	0.545	0.0121
⅝	–	–	–	0.666	0.0181
¾	40	0.824	0.0277	0.785	0.0251
1	40	1.049	0.0449	1.025	0.0429
1¼	40	1.380	0.0779	1.265	0.0653
1½	40	1.610	0.106	1.505	0.0924
2	40	2.067	0.174	1.985	0.161
2½	40	2.469	0.249	2.465	0.248
3	40	3.068	0.384	2.945	0.354

BURNER INSERTION DEPTH

WATER CONTENT OF BOILER (GALLONS)			
EC-13	EC-14	EC-15	EC-16
5	6.5	8	8.5

CAUTION: DO NOT USE GASOLINE, CRANKCASE DRAININGS, OR ANY OIL CONTAINING GASOLINE.

OIL SUPPLY PIPING

Install the oil tank or tanks and piping from tank to burner. Follow local codes and practices, NFPA No. 31, INSTALLATION OF OIL BURNING EQUIPMENT and the instruction sheet attached to the oil burner pump. A one-pipe system should be used for gravity fed fuel systems and for lift systems, where the total lift is less than 8 ft. Where the total lift is greater than 8 ft., a two-pipe system must be used. In some instances, local codes may require a two-pipe system for below grade fuel oil tanks. Be sure to set-up the fuel oil pump for the piping system used; follow the instructions attached to the pump. Be sure to include a good quality, low pressure drop fuel oil filter in the supply line from the tank. This is necessary, especially at low fuel oil flow rates (small nozzle sizes), to prevent nozzle plugging.

WIRING THE BOILER

- The wiring diagrams for the burner and boiler may be found on pages 7-10.
- 24 volt control wiring should be approved Safety Circuit wire, protected as needed.
- Power supply wiring to the burner must be 14 gauge or heavier, as required, and should have a properly fused disconnect switch. 120 volt wiring to pumps and safety controls must also be 14 gauge or heavier. Wire must be enclosed in approved conduit.
- All wiring must be installed in compliance with the National Electric Code, or any local or insurance codes having jurisdiction.

Wiring to the boiler must come through an emergency power isolation switch with a clearly marked red switch plate. This switch should be located so that it is apparent to the homeowner when entering the basement or other boiler area. The homeowner should be made familiar with operating the toggle to provide or stop the power to the boiler.

OPERATING INSTRUCTIONS

PRECAUTIONS BEFORE STARTING OIL BURNER

Make a positive check of A through I before starting burner:

A. Boiler and system are full of water. All air is vented from system. See below.
B. All wiring is completed. See pages 7-10.
C. Oil supply is connected to the burner; nozzle is installed correctly; oil valve is open at tank.
D. All combustible materials are cleared away.
E. All vent piping is properly installed and sealed.
F. Burner settings are adjusted as per pages 12-13 and as shown on boiler jacket label.
G. Main cast iron door on which burner is mounted is bolted shut and fiberglass rope seal is making good contact.
H. Make sure boiler has correct quantity of baffles (see top of page 3).
I. Make sure vent pipe, vent terminal and air supply pipe are properly installed and clear of obstruction.

Note: Neither overfire nor flue draft should exceed 0.35" WC during burner operation

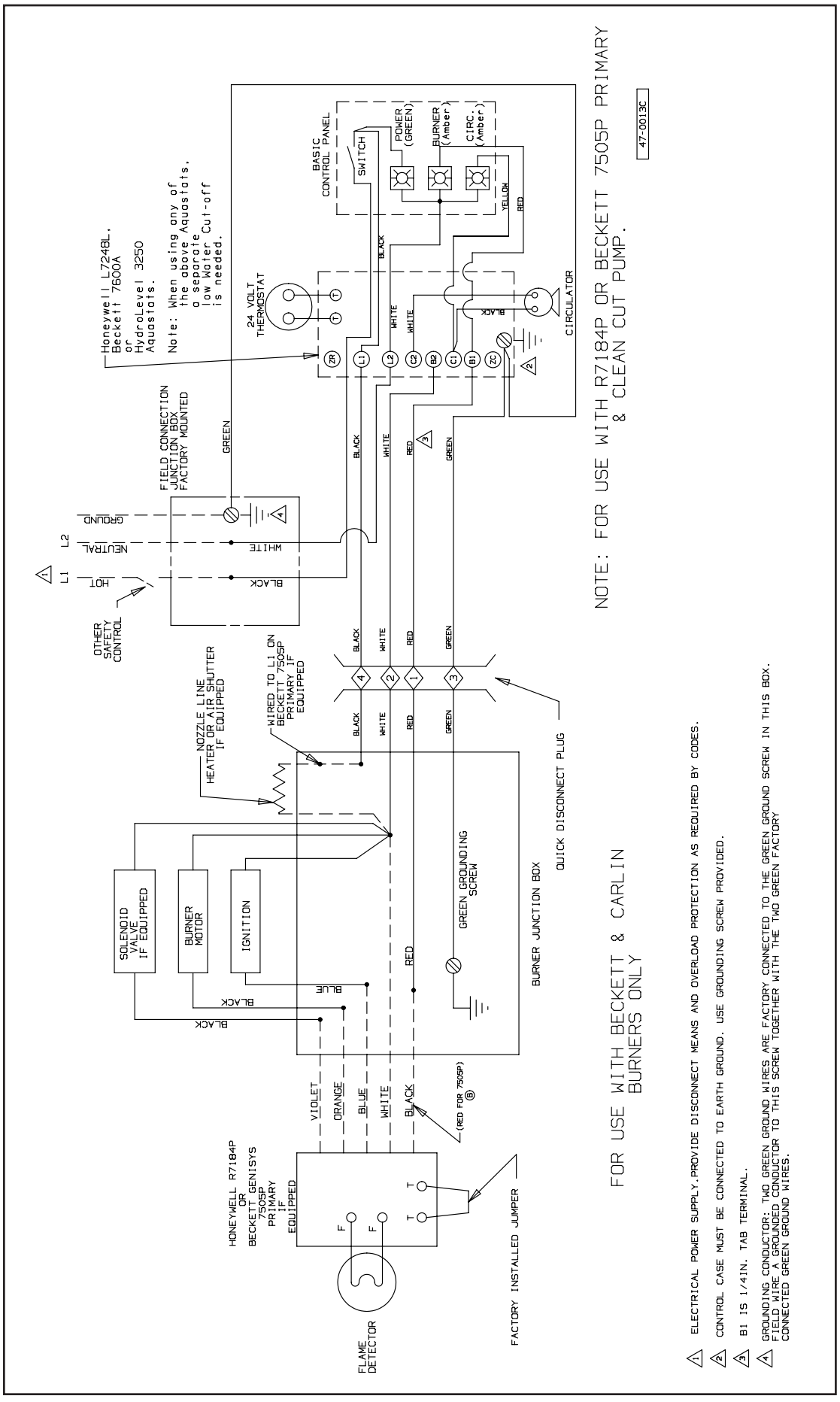
THE FLUE IS UNDER POSITIVE PRESSURE DURING OPERATION. ALL VENTING MUST BE SEALED AND CHECKED ON A REGULAR INTERVAL.

CLEANING AND FILLING A NEW WATER BOILER

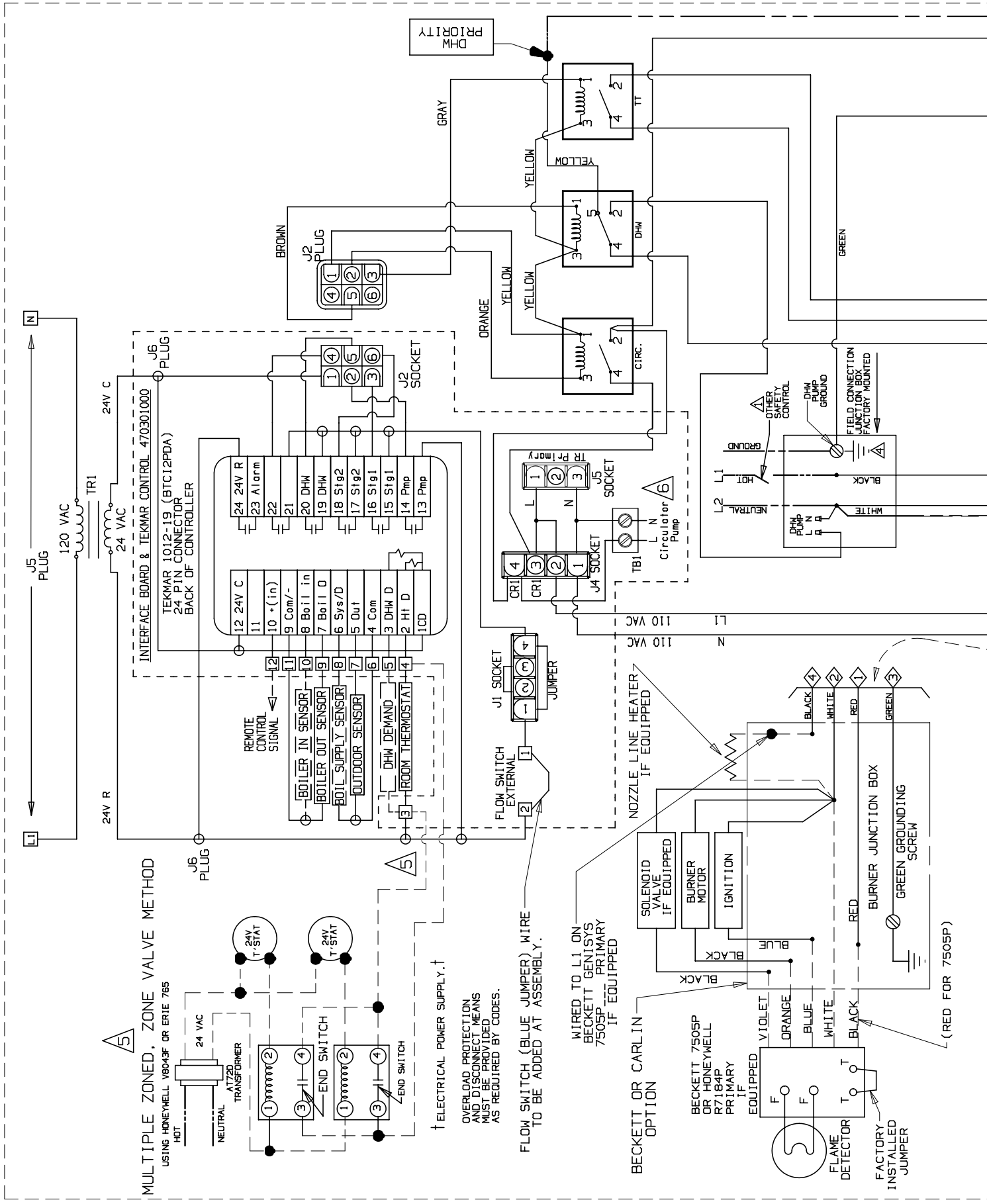
I. BEFORE FILLING WATER BOILER
   A. Check burner to be certain it is ready for firing. DO NOT FIRE into an empty boiler.
   B. Be prepared to heat raw water to at least 180°F. as soon as it is introduced into the boiler. This procedure will remove dissolved, corrosive gases.
   C. Provide drain line, with valve, from boiler. Use a bottom tapping. Line and drain must be suitable for handling caustic solution.
II. CLEANING WATER BOILER SYSTEM
   A. Use a commercial cleaning solution, such as *Rhomar Hydro-Solv 9100 Cleaner* as directed in product instructions.
   B. Use a commercial treatment solution, such as *Rhomar Pro-Tek 922 Treatment* as directed in product instructions.
III. FILLING AND VENTING THE WATER BOILER
   A. Refill the system with fresh water.
   B. Bring water temperature to at least 180° F. promptly.
   C. Circulate water through entire system.
   D. Vent the system, including the radiation.
   E. The boiler is now ready to be put into service or on standby.
   F. If brand-name air-control devices are used, venting instructions furnished with the devices should be followed.
IV. SAFETY CHECK FOR CONTROL SYSTEM
   High limit control test: Set thermostat high enough for boiler water temperature to reach high limit control setting. When this temperature is reached, the high limit switch should open, and the burner should shut off automatically. If the high limit does not operate to shut off the burner, the high limit or the wiring is faulty. Repair or replace immediately.

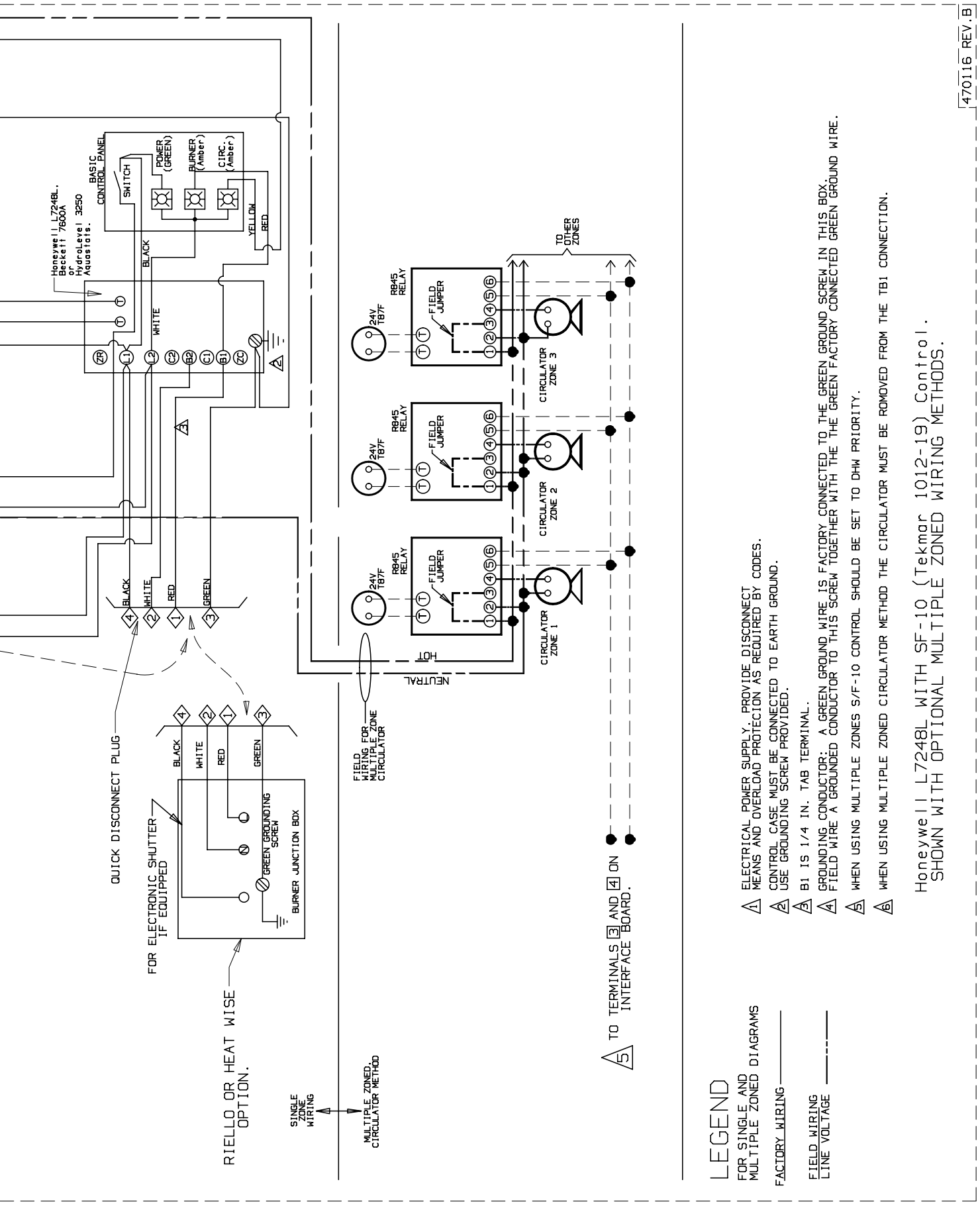
START-UP (COMBUSTION TEST INSTRUMENTS MUST BE USED) **THIS BOILER IS A POSITIVE PRESSURE BOILER**.

A. Make sure the boiler is installed and wired properly and is full of water.
B. The observation port cover is mounted on the hinged burner mounting door. NEVER touch the port cover or any surrounding surfaces with hands. They may be HOT. Use tools. Loosen the screw and swing cover to be able to insert probe through slot, when necessary. See the burner instructions for bleeding air, etc.
C. Take a smoke reading soon after starting burner. If smoke is not zero or trace, open air to clear smoke and let burner fire.
D. DO NOT ATTEMPT TO SET FIRE BY EYE. A smoke gun and a combustion analyzer must be used. Adjust the air to get approximately 12% CO_2 with a zero or trace smoke. Then check and record draft and flue temperature.
E. Make sure that the observation port cover is closed tight, the burner is secure. Turn burner on and off at least 3 times to check ignition.



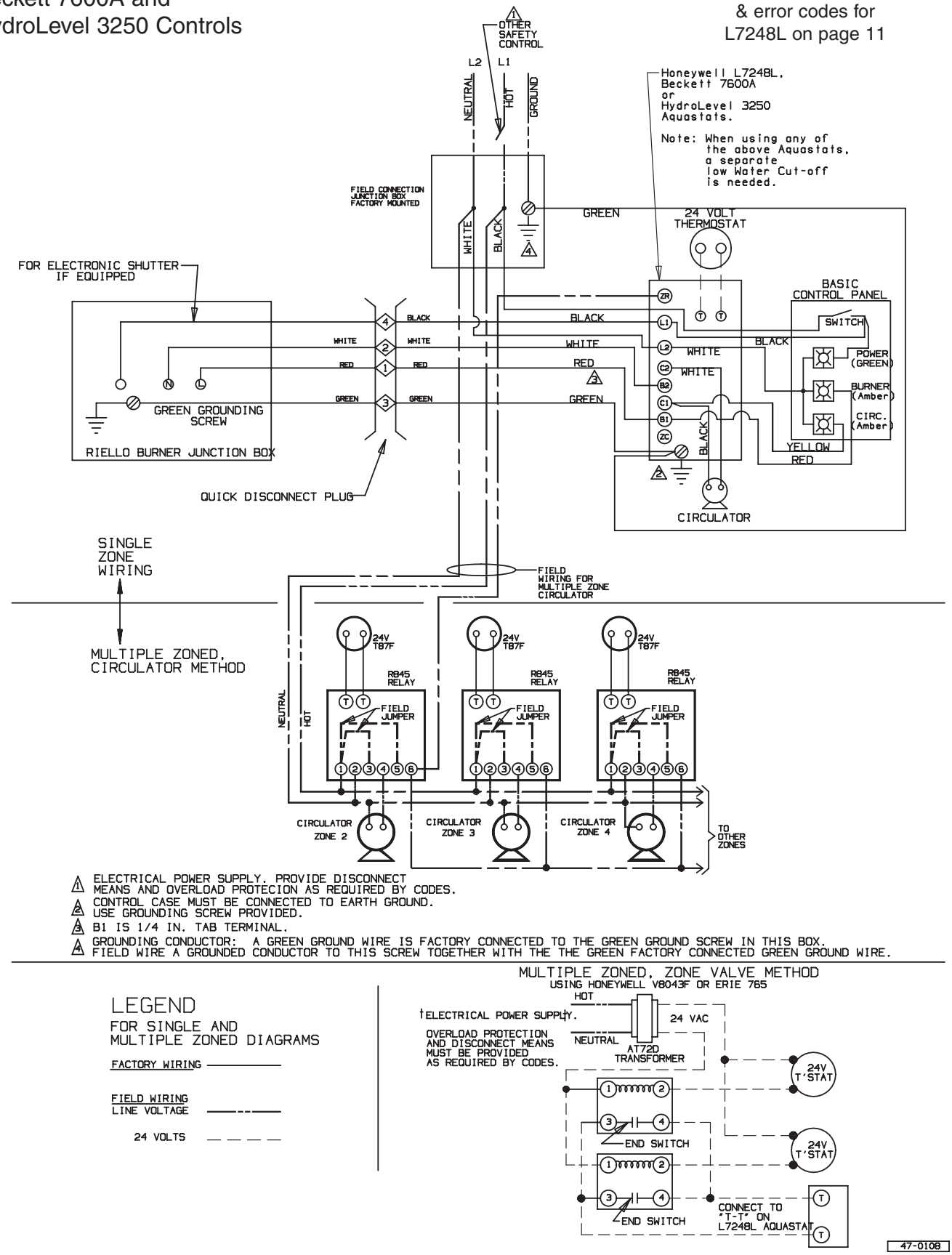
Aquastat Control and Honeywell R7184P Primary Single Zone Wiring for Beckett & Carlin Burners Only.


DHW PRIORITY
GRAY
YELLOW
BROWN
ORANGE
GREEN
J2 PLUG
J2 SOCKET
J6 PLUG
J5 PLUG
120 VAC
24 VAC
24V C
24V R
TR1
INTERFACE BOARD & TEKMAR CONTROL 470301000
TEKMAR 1012-19 (BTC12PDA)
24 PIN CONNECTOR
BACK OF CONTROLLER
24 24V R
23 Alarm
22
21
20 DHW
19 DHW
18 Stg2
17 Stg2
16 Stg1
15 Stg1
14 Pmp
13 Pmp
12 24V C
11
10 +(in)
9 Com/-
8 Boil in
7 Boil O
6 Sys/D
5 Out
4 Com
3 DHW D
2 Ht D
1CD
REMOTE CONTROL SIGNAL
BOILER IN SENSOR
BOILER OUT SENSOR
BOIL SUPPLY SENSOR
OUTDOOR SENSOR
DHW DEMAND
ROOM THERMOSTAT
J1 SOCKET
JUMPER
FLOW SWITCH EXTERNAL
CIRC.
DHW
TT
TR Primary
J5 SOCKET
J4 SOCKET
CR1
TB1
Circulator Pump
OTHER SAFETY CONTROL
DHW PUMP GROUND
FIELD CONNECTION JUNCTION BOX FACTORY MOUNTED
GROUND
HOT
NEUTRAL
L1
L2
BLACK
WHITE
DHW PUMP
110 VAC
NOZZLE LINE HEATER IF EQUIPPED
BLACK
WHITE
RED
GREEN
BURNER JUNCTION BOX
GREEN GROUNDING SCREW
SOLENOID VALVE IF EQUIPPED
BURNER MOTOR
IGNITION
BLUE
BLACK
RED
(RED FOR 7505P)
WIRED TO L1 ON BECKETT GENISYS 7505P PRIMARY IF EQUIPPED
BECKETT OR CARLIN OPTION
BECKETT 7505P OR HONEYWELL R7184P PRIMARY IF EQUIPPED
VIOLET
ORANGE
BLUE
WHITE
BLACK
FLAME DETECTOR
FACTORY INSTALLED JUMPER
5
MULTIPLE ZONED, ZONE VALVE METHOD
USING HONEYWELL V8043F OR ERIE 765
HOT
NEUTRAL
24 VAC
AT72D TRANSFORMER
24V T'STAT
END SWITCH
†ELECTRICAL POWER SUPPLY.
OVERLOAD PROTECTION AND DISCONNECT MEANS MUST BE PROVIDED AS REQUIRED BY CODES.
FLOW SWITCH (BLUE JUMPER) WIRE TO BE ADDED AT ASSEMBLY.


Honeywell L7248L.
Beckett 7600A
or
HydroLevel 3250
Aquastats.
BASIC
CONTROL PANEL
SWITCH
POWER
(GREEN)
BURNER
(Amber)
CIRC.
(Amber)
YELLOW
RED
BLACK
WHITE
ZR
L1
L2
C2
B2
C1
B1
ZO
BLACK
WHITE
RED
GREEN
4
2
1
3
QUICK DISCONNECT PLUG
FOR ELECTRONIC SHUTTER
IF EQUIPPED
GREEN GROUNDING
SCREW
BURNER JUNCTION BOX
RIELLO OR HEAT WISE
OPTION.
SINGLE
ZONE
WIRING
MULTIPLE ZONED,
CIRCULATOR METHOD
FIELD
WIRING FOR
MULTIPLE ZONE
CIRCULATOR
HOT
NEUTRAL
24V
T87F
R845
RELAY
FIELD
JUMPER
CIRCULATOR
ZONE 1
CIRCULATOR
ZONE 2
CIRCULATOR
ZONE 3
TO
OTHER
ZONES
5 TO TERMINALS 3 AND 4 ON
INTERFACE BOARD.
LEGEND
FOR SINGLE AND
MULTIPLE ZONED DIAGRAMS
FACTORY WIRING
FIELD WIRING
LINE VOLTAGE
1 ELECTRICAL POWER SUPPLY. PROVIDE DISCONNECT
MEANS AND OVERLOAD PROTECION AS REQUIRED BY CODES.
2 CONTROL CASE MUST BE CONNECTED TO EARTH GROUND.
USE GROUNDING SCREW PROVIDED.
3 B1 IS 1/4 IN. TAB TERMINAL.
4 GROUNDING CONDUCTOR: A GREEN GROUND WIRE IS FACTORY CONNECTED TO THE GREEN GROUND SCREW IN THIS BOX.
FIELD WIRE A GROUNDED CONDUCTOR TO THIS SCREW TOGETHER WITH THE THE GREEN FACTORY CONNECTED GREEN GROUND WIRE.
5 WHEN USING MULTIPLE ZONES S/F-10 CONTROL SHOULD BE SET TO DHW PRIORITY.
6 WHEN USING MULTIPLE ZONED CIRCULATOR METHOD THE CIRCULATOR MUST BE REMOVED FROM THE TB1 CONNECTION.
Honeywell L7248L WITH SF-10 (Tekmar 1012-19) Control.
SHOWN WITH OPTIONAL MULTIPLE ZONED WIRING METHODS.
470116 REV.B

Honeywell L7248L, Beckett 7600A and HydroLevel 3250 Controls

See “Adjusting Settings” & error codes for L7248L on page 11



FOR L7248L

ADJUSTING SETTINGS

To discourage unauthorized changing of Aquastat settings, a procedure to enter the ADJUSTMENT mode is required. To enter the ADJUSTMENT mode, press the UP, DOWN, and I buttons simultaneously for three seconds. Press the I button until the feature requiring adjustment is displayed:

. HL_ . High Limit.
. LL_ . Low Limit. (L7224 only)
. Ldf . Low Limit Differential. (L7224 only)
. °F . °C.
.ELL_ External Low Limit (L7248L only)

Then press the UP and/or DOWN buttons to move the set point to the desired value, to change between ˚F and C˚, or to enable (On) or disable (Off) the External Low Limit. After 60 seconds without any button inputs, the control will automatically return to the RUN mode.

DISPLAY

In the RUN mode, the Aquastat will flash .bt. (boiler temp) followed by the temperature (i.e., 220), followed by °F or °C.

To read boiler settings, press the I key to read the parameter of interest. For example, press I High Limit
(HL) is displayed, followed by a three-digit number, i.e., 220, followed by °F or °C. Pressing the I button again (on L7224 models) will display the Low Limit (LL) followed by a three-digit number and the corresponding degree designator.

After approximately 60 seconds without any key presses, the display will enter a dim display mode. To return to the bright display mode, simply press any key.

DESCRIPTION

Boiler Temperature – 
High Limit – 
Low Limit – 
Low Limit Differential – 
Local Thermostat Status – 
Enviracom Thermostat Status – 
Error Code – 
Degrees Fahrenheit – 
Degrees Celsius – 

Aquastat Error Code	Cause/Action	EnviraCOM Alarm
Err1	Aquastat sensor fault; check water sensor.	18
Err2	ECOM fault; check EnviraCOM™ wiring.	18
Err3	Excessive electrical noise or frequency out of range. Hardware fault; replace controller. 18, 58	
Err4	B1 fault; check B1 wiring/voltage.	64
Err5	Low Line; check L1-L2, 110 Vac.	59
Err6 [a]	Warning: Fuse; check ECOM wires, replace fuse.	92
Err7	Warning: EEPROM, HL, LL, Hdf, Ldf; reset to default values.	N/A
Err 8 [b]	Repeated B1 fault (voltage present at B1 when output is turned off); check B1 wiring/voltage. 25	
Err9 [a]	Warning: Outdoor Reset System failure; communication to Outdoor Reset Module lost, Outdoor Reset Module failure, multiple outdoor temperature sensors detected on the bus, or outdoor temperature sensor failure. Check EnviraCOM wiring (1, 2, 3), check sensor wiring.	50, 53, 149
Err 10 [a]	Warning: Boost Failure; Boost Mode active at least once per cycle for the last 60 consecutive cycles. Check Outdoor Reset curve settings.	150
Err 11 [a]	DHW Module/Sensor failure; communication to DHW Module lost, DHW Module failure, or temperature sensor failure. Check EnviraCOM wiring (1, 2, 3), check sensor wiring.	146, 147, 148

[a] Warnings are generated to enunciate the system is not operating optimally, but the Aquastat is still operating and maintaining boiler temperature. In the instance where an Outdoor Reset Module is used, the warnings may indicate a reset curve setting error one or more features is not running optimally, and the Aquastat is reverting to default settings or has stopped running the Outdoor Reset algorithms. The warnings are cleared when the issue(s) is resolved.

[b] To clear Err 8 condition, depress and hold all three user keys simultaneously for 60 seconds. Err 8 condition clears and display returns to normal. Err 8 condition is designed to catch welded relays on the Aquastat and will normally only occur near end of life for the control. If Err 8 condition has occurred early in the controls life, be sure to check for voltage feedback to B1 when B1 should be off and check current draw on b terminal to be sure oil burner is not drawing excessive current. Err 8 condition will keep repeating if B1 fault is not cleared.

IMPORTANT

This boiler is equipped with a feature that saves energy by reducing the boiler water temperature as the heating load decreases. This feature is equipped with an override which is provided primarily to permit the use of an external energy management system that serves the same function. THIS OVERRIDE MUST NOT BE USED UNLESS AT LEAST ONE OF THE FOLLOWING CONDITIONS IS TRUE:

- An external energy management system is installed that reduces the boiler water temperature as the heating load decreases.
- This boiler is not used for any space heating
- This boiler is part of a modular or multiple boiler system having a total input of 300,000 BTU/hr or greater.
- This boiler is equipped with a tankless coil.

RIELLO BURNER DATA

Boiler Model	Riello Burner Model	Blast Tube	Firing Rate GPH	Nozzles			Oil Pump (PSIG)	Approx. Head Setting	Approx. Air Setting	Boiler Flue Baffle	Burner Insertion Depth
				Size (GPH)	Angle & Type	Mfg.					
EC-13DV	BF-3	Long	0.65	0.55	80*A	Delavan	133	0	4.5	2	7"
EC-14DV	BF-3	Long	0.8	0.7	80*B	Delavan	130	3	5.5	none	7"
EC-15DV	BF-5	Short	1	0.75	60*A	Delavan	178	1	4.4	none	4-1/4"
EC-16DV	BF-5	Short	1.15	0.85	60*W	Delavan	182	2	4.2	none	4-1/4"

Models BF-3 & BF-5 Electrode Setting

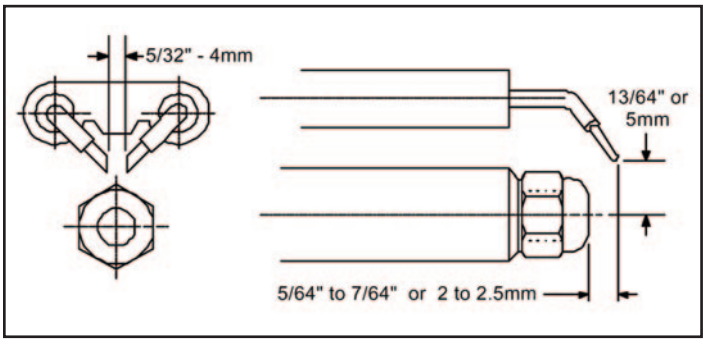
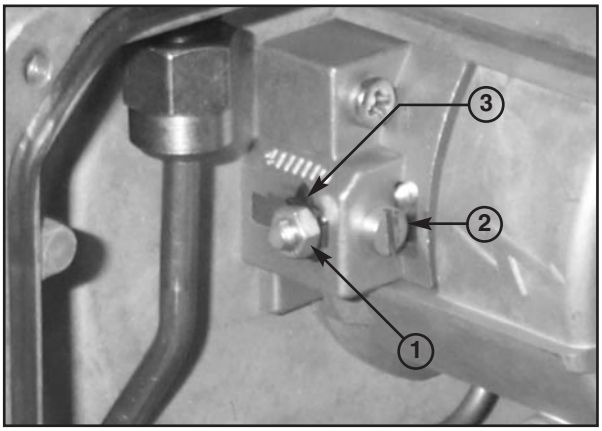


Figure 4.

Turbulator location



Picture 1.

TURBULATOR SETTING

1. Loosen nut, 1, then turn the screw, 2, until the index marker, 3, is aligned with the correct index number.

2. Retighten the retaining nut, 1.

   The numbers on the casting are there to denote the high and low end of the scale – For Model BF-5, zero and four are scale indicators only. From left to right, the first line is 4 and the last line is 0.

   The air/oil ratio depends on accurate setting of the turbulator disc and air damper.

   Be careful when making this adjustment as an incorrect setting will result in an unsatisfactory operation.
   See figure 5 & 6.

Figure 5. *Model F-5*

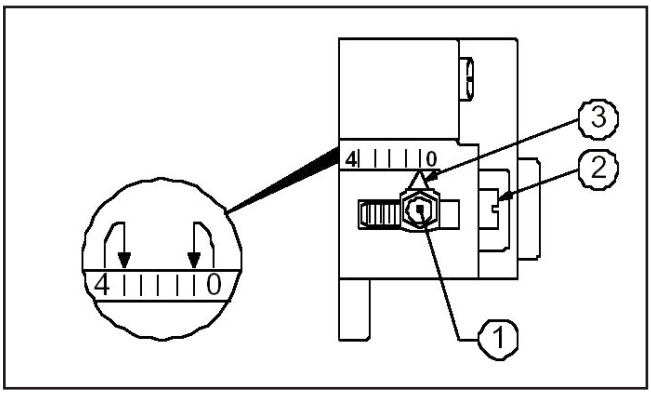
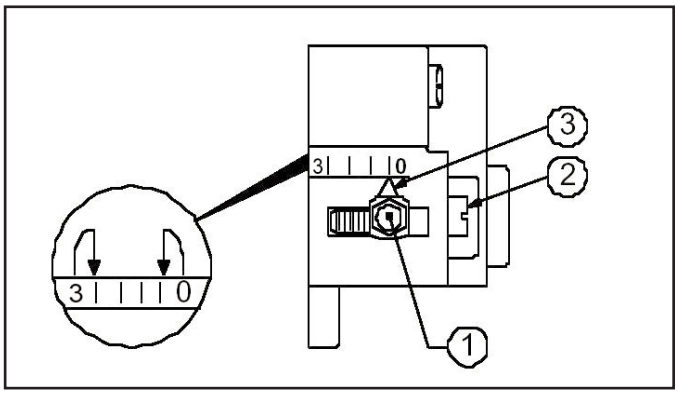


Figure 6. *Model F-3*



SETTING THE AIR DAMPER ADJUSTMENT (see figure 7 & picture 2)

1. The initial air damper setting is made by turning screw (2) until the top edge of the air damper (3) is aligned with the number according to the burner setup chart.

2. Further adjustments can be made with the burner cover in place by removing plastic plug on the top right hand side of the cover. Turn the screw counter clockwise (+ indicator) to increase combustion air, turn the screw clockwise (- indicator) to decrease combustion air.

3. The final position of the air damper will vary on each installation. Use instruments to establish the proper settings for maximum CO2 and a smoke reading of trace to zero.

NOTE: Variations in flue gas, smoke, CO2 and temperature readings may be experienced when the burner cover is put in place. Therefore, the burner cover MUST be in place when making the final combustion instrument readings, to ensure proper test results.

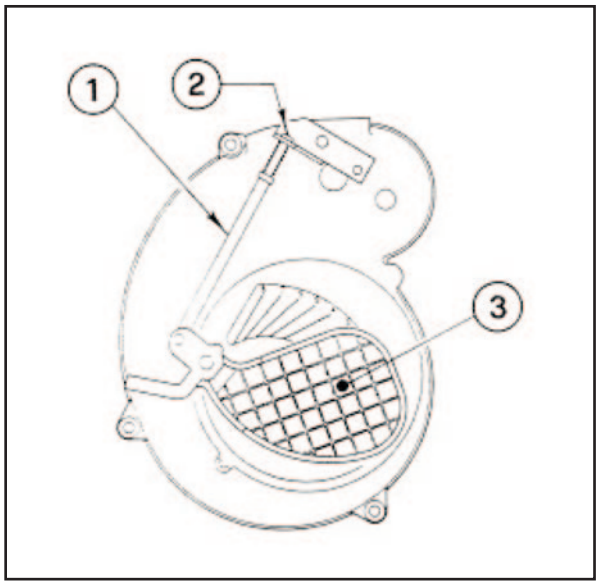
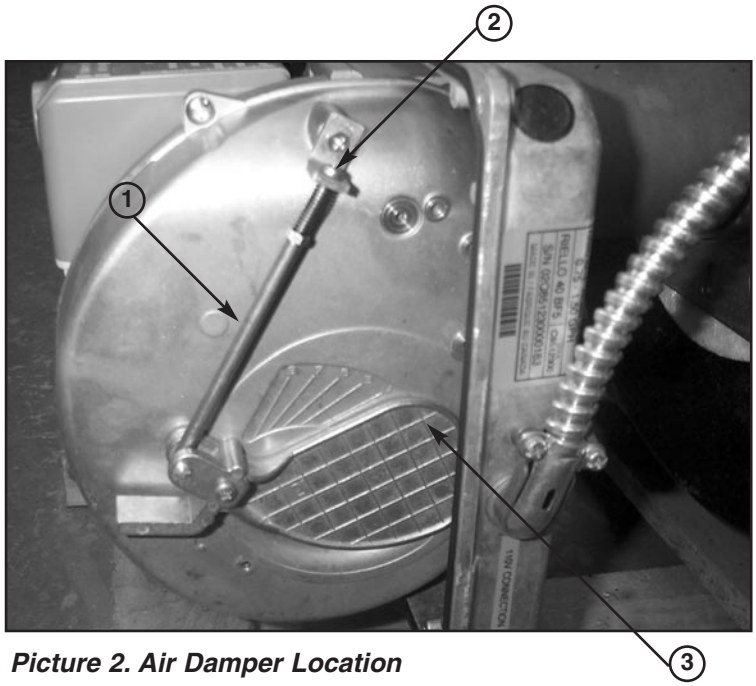


Figure 7. Air Damper Setting



Picture 2. Air Damper Location

CARE AND MAINTENANCE

I. EXTENDED SHUTDOWN, CLEANING OR REMOVAL OF BOILER FROM SERVICE.

DANGER: Use CAUTION when handling chemicals and draining hot water from a boiler. Scalding water and/or chemicals can cause permanent injury to the skin, eyes and respiratory system.

A. Shut down burner by disconnecting all electrical power to the burner by turning OFF the BURNER EMERGENCY SWITCH of this boiler. After shutting down burner, while the boiler is still hot (180°F to 200°F), drain water from the bottom of the boiler until it runs clear.

B. Provide corrosion protection conditioning to the boiler water in the heating system. There are a number of commercial heating system preparations available from your distributor. Follow the preparation manufacturer's instructions.

C. To clean the fireside boiler surfaces, first shut down burner by disconnecting all electrical power to the burner by turning OFF the OIL BURNER EMERGENCY SWITCH of this boiler in order to perform the following work in (1) through (10) below.

1. Remove the flue pipe from the boiler flue collar and clean thoroughly.
2. Inspect the entire vent connector back to the chimney and clean if necessary.
3. Inspect the chimney for soot, debris and other unsafe conditions of the chimney and take the necessary action.
4. The burner mounting door must be fully open to clean the flue passages and the combustion chamber. If the oil line is not flexible enough it should be disconnected from the burner during the cleaning process. The flexible electric conduit connected from the junction box on the boiler to the burner via a plastic connector must be disconnected from the burner by grasping the plastic half of the connector closest to the flexible conduit and gently pulling it in the direction of the conduit until it is disconnected. Remove all four 13 mm hex head screws on the sides of the swinging door. You will need a 13 mm open end or box wrench. Open the door to completely expose the combustion chamber for thorough cleaning and for inspection of main cast iron burner door insulation and burner door fiberglass sealing rope.
5. Use the flue brush to clean the flueways. Remove cast iron baffle plates for cleaning [(2) baffle plates in EC-13, (0) baffle plates in EC-14, 15, and EC-16.]† A wire brush may be used to remove any carbon accumulation that may have developed in the combustion chamber. Vacuum the loose soot and debris from the boiler. Replace baffle plates.
6. Inspect the burner combustion head. Clean if necessary and make sure all the adjustments are correct. (See burner data pages for the burner installed.) Replace oil nozzle with new one and readjust electrodes. To insure proper burner operation ONLY THE NOZZLES SPECIFIED IN THIS MANUAL OR ON THE BURNER LABEL SHOULD BE USED FOR REPLACEMENT.
7. Protect all of the fireside surfaces by swabbing with neutral mineral oil.
8. Close main cast iron burner door (door on which burner is mounted). Make sure that the entire seal (fiberglass rope) is making good contact with the boiler casting when replacing four 13 mm hex head screws and tightening.

D. If boiler room is damp, provide ventilation.

† A flue brush (triangular shape) is supplied with boiler.

CAUTION: ALWAYS KEEP THE OIL SUPPLY VALVE SHUT OFF IF THE BURNER IS SHUT DOWN FOR AN EXTENDED PERIOD OF TIME

II. PROVIDING PROTECTION FOR FREEZING

Anti-freeze is sometimes used in hydronic heating systems to protect against freeze-up in the event of power failure, or safety control shutdown when the building is unoccupied. It should be recognized that unless the building is kept above freezing temperature by some means, the plumbing system is not protected.

PROPYLENE GLYCOL is used in the quick-freeze food industry; it is practically non-toxic. Its use may be permitted when indirect water heaters are used. When anti-freeze must be used, inhibited propylene glycol is recommended. Useful information on the characteristics, mixing proportions, etc. of glycol in heating systems is given in Technical Topics No. 2A, available from the Slant/Fin website, go to http://slantfin.com. Go to library, select current literature, select boiler model. See related topics and select antifreeze and hydronic systems. Consult glycol manufacturers for sources of propylene glycol.

DO NOT USE ETHYLENE GLYCOL BECAUSE IT IS TOXIC.

III. OIL BURNER

All service to the oil burner, oil filter, oil strainer, etc., should be performed by a professionally trained service person. Inspect and clean annually and following any period of improper operation. Recheck and adjust settings as specified for burner model and nozzle size. Set burner air using test instruments to obtain recommended CO_2 and draft without smoke. See the Burner Data page in this manual that corresponds to the burner installed.

IV. GENERAL MAINTENANCE

These operations are recommended to be performed at regular intervals:

A. BOILER HEATING SURFACES: clean off all coatings found. Reseal covers.

B. BOILER CONTROLS: check settings, correct functioning.

C. PIPING: check piping and accessories for leaks.

D. STUB VENT and BREECHING: check for obstructions and leaks.

E. COMBUSTION AIR TO BURNER: check for continued POSITIVE supply of air as required. Air needs are greatest in coldest weather. Refer to AIR SUPPLY, page 3.

F. WATER SYSTEM: check

1. System to be full of water and pressure to remain stable (between 12 psi and 25 psi).
2. Air-control system: noise and air binding in radiation should not occur.
3. Water lines: slightest leaks should be corrected.

G. BOILER ROOM AIR SUPPLY: air vents should be open and free of obstruction.

SERVICE COMPANY

Name _____

Address _____

_____

Telephone _____

Model # _____

Serial # _____

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