Comet 145

OIL FIRED HOT WATER BOILER

Installation, Operation and Maintenance Manual

INSTALLATIONS MUST MEET ALL LOCAL AND FEDERAL
CODES THAT MAY DIFFER FROM THIS MANUAL

Please read this complete manual before beginning installation. These instructions must be kept with the boiler for future reference.

CERTIFIED TO: **CAN/CSA Std. B140.0 & Std. B140.7**
CONFORMS TO: **UL 726**

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Intertek

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10.0 Appendix

Keep this manual in a safe place for future reference.

Follow manual carefully for the correct way to install and operate this appliance.

Do not operate this appliance until operating instructions have been read and fully understood.

SAVE THESE INSTRUCTIONS

1.0 HOMEOWNER INFORMATION

1.1 INTRODUCTION

Please read and understand this manual before installing, operating or maintaining the boiler. To ensure you have a clear understanding of the operating procedures of the appliance please take the time to read section **1.0 HOMEOWNER INFORMATION**.

1.2 REGULAR MAINTENANCE

Have a qualified technician check complete boiler operation **at least once a year**.

1.3 WARNINGS

DISCONNECT POWER SUPPLY AND SHUT OFF OIL BEFORE WORKING ON BOILER.

DO NOT ATTEMPT TO START BURNER WHEN EXCESS OIL HAS ACCUMULATED. WHEN UNIT IS FULL OF VAPOUR OR COMBUSTION ZONE IS VERY HOT.

NEVER BURN GARBAGE OR PAPER IN THE UNIT, AND NEVER STORE COMBUSTIBLE MATERIAL AROUND IT.

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

1.4 DIRECT VENT

It is the responsibility of the homeowner to ensure that the area around the Direct Vent terminal and the air intake is free of snow, ice and debris. The vent terminal should be checked during heavy snowstorms to ensure proper operation.

1.5 SHUTTING BOILER DOWN

POWER OFF Turn off main power.

FUEL OFF Shut off manual fuel supply valve.

Always keep the manual fuel supply valve shut off if the burner is shut down for extended period of time.

1.6 RESTARTING BOILER

Follow this procedure before restarting a unit that has been shut down for an extended period.

INSPECTION Have the boiler/system serviced and inspected by a qualified technician.

FUEL Turn on fuel supply and check that there are no leaks.

POWER Turn on power switch and check that the boiler starts and operates as usual.

OPERATION If the boiler/system fails or operates in an unusual manner call your service technician. If the burner fails to operate at any time, call a qualified burner technician.

2.0 INSTALLATION

2.1 IMPORTANT

Read owner's manual before installing boiler or lighting burner. Consult local authorities if in doubt about local fire safety regulations. Improper installation will result in voiding of warranty.

2.2 CAUTION

INSTALLATION MUST COMPLY WITH REGULATIONS OF AUTHORITIES HAVING JURISDICTION. **DO NOT** START THE BURNER UNTIL ALL FITTINGS, COVERS AND DOORS ARE IN PLACE. **DO NOT** TAMPER WITH THE BOILER OR CONTROLS.

2.3 GENERAL INSTRUCTIONS

Open all boxes, except cabinet or cabinet box. Check contents against the packing slip. In case of shortages or damage, notify the transportation company immediately.

2.4 PLACEMENT & VENTING

Installations should conform to CSA Standard B139 or NFPA31 the Installation Code for Oil-fired Equipment.

FLOOR COMBUSTIBLE or NON-COMBUSTIBLE - Support boiler frame above damp floor using a Granby Appliance Stand if required. 3/8" bolts may be used for leveling (not supplied). Floor must be strong enough to support the weight of the boiler.

CHIMNEY & DRAFT Chimney/vent system must satisfy CSA B139, Installation Code. THE BOILER MUST HAVE SUFFICIENT DRAFT AT ALL TIMES TO ASSURE SAFE AND PROPER OPERATION. Not applicable for Direct Vent.

TYPE "L" VENT Approved for Type "L" vent system. Maximum flue gas temperature of 575°F.

THROUGH-THE-WALL VENTING Approved for use with the Granby Direct Vent and KPV -SS1C.

COMBUSTION & VENTILATION AIR The B139 Installation Code requires the installer to provide sufficient outside air for ventilation. Always provide sufficient air to ensure safe operation. See B139 for make up air requirements (Non-Direct Vent only). Important for KPV-SS1C through-the-wall power vent system.

2.5 BOILER CONFIGURATION

L OR R BREECH To change, remove breech casing and breech. Rotate and replace. Ensure gaskets are tight. See Figure – 4.

L OR R RETURN 1 1/4" x 1 1/4" return/drain Tee supplied in installation kit. May be installed to give L or R return. See Figure – 4.

LEVELING BOLTS Install in base frame as required. This is an optional feature.

2.6 ASSEMBLE BOILER

CABINET See section **5.0 CABINET ASSEMBLY** or Figure – 6.

OIL BURNER See section **2.8 ASSEMBLE & INSTALL BURNER.**

AQUASTAT Honeywell L8124L1029 and White Rogers 8B43A-601 or certified equivalent. For remote bulb, use Honeywell L8151A1052. The Triple Aquastat can be located on the tankless coil or on either side of the boiler. The openings not used for the triple aquastat must be sealed with the pipe plugs provided.

CIRCULATOR As required.

DRAIN 1/2" IPS installs on return Tee.

TRIDICATOR Combination temperature and pressure indicator.

RELIEF VALVE Watts 335, 30 psig, ASME, 3/4" or equivalent.

BLOW DOWN Install 3/4" blow down termination within 6" of floor on relief valve outlet. Blow down must contain no fittings that could prevent proper operation. Must terminate in a SAFE PLACE.

EXPANSION TANK Diaphragm or cylinder as required.

FEED WATER VALVE Watts 1156 or equivalent, 1/2" IPS.

DRAFT CONTROL 5" CSA approved or equivalent. Strong draft may require a larger control. Attach the balanced draft control to the smoke/vent pipe as shown in control instruction sheet. Not applicable for Direct Vent.

WIRING HARNESS Supplied with boiler installation kit, see Figure – 3.

VENT PIPE 5" Keep short with minimum of fittings. For chimney systems allow 1/4" per foot rise to assist gas flow. See B139 Code and section **2.4 PLACEMENT & VENTING**. Must not pass through ceiling.

PIPING 1 1/4" pipe for supply and return unless otherwise specified. Select L or R as required. See Figure - 4.

2.7 DOMESTIC HOT WATER COIL

Use a K25m coil only. For best performance always connect cold water supply to RHS fitting on coil.

ACTUAL FLOW & TEMPERATURE RATES MAY VARY FROM COIL SPECIFICATION

2.8 ASSEMBLE & INSTALL BURNER

ASSEMBLE Follow assembly and mounting instructions supplied by the burner manufacturer.

END CONE See burner insertion settings in section **7.0 BURNER SPECIFICATIONS** or Figure – 1.

SELECT NOZZLE Select oil input, nozzle required and burner configuration to correspond with boiler settings table shown on operating decal or section **7.0 BURNER SPECIFICATIONS**.

INSTALL NOZZLE Install selected nozzle and make sure it is tight in the nozzle adapter.

ELECTRODES See burner manufacturer's instructions.

INSERTION See operating decal or Figure – 1.

MOUNT BURNER Mount the burner and gasket on the boiler, inserting the burner head through the opening in the front of the boiler. Tighten top nut first to ensure burner tips slightly towards chamber.

WIRING See Figure – 3 or wiring decal.

2.9 SET BURNER FOR EFFICIENT OPERATION

END CONE See settings in section **7.0 BURNER SPECIFICATIONS**.

BURNER AIR See settings in section **7.0 BURNER SPECIFICATIONS**.

PUMP PRESSURE See settings in section **7.0 BURNER SPECIFICATIONS**.

SAMPLING HOLE In vent pipe between boiler breech and draft control punch or drill a 1/4" diameter hole. Not applicable for Direct Vent.

DRAFT 0.04" WC Using an accurate draft meter; adjust the draft control to obtain 0.04" wc of draft at the breech sampling hole. Not applicable for Direct Vent.

SMOKE TEST Adjust air control until a clean and symmetrical flame with "0-1" smoke is obtained and then open to "0" smoke.

CO_2 TEST CO_2 should be 11 – 13% when burner is at "0" to trace smoke. If flame will not clean up, replace nozzle.

TRIM BURNER AIR Always leave burner set at "0" smoke with CO_2 reading about 1% of CO_2 lower than the peak efficiency achieved with a smoke trace (e.g. 12% CO_2 should be set back 1% to 11%). This gives better allowance for fuel and draft variations and maintains a better seasonal efficiency.

3.0 OIL TANKS & PIPING

Tank installation should conform to local requirements.

Install according to the applicable code. Minimize number of connections in suction line and make all connections as tight as possible. Use a pipe joint compound suitable for oil on all pipe threads. To reduce possibility of air leaks, tighten stem packing gland nut on any valves installed in the suction line. Also, be sure the oil filter is tight, as filter gaskets often shrink. Check for kinks in the oil lines as well as for possible air pockets and for loose connections. Two filters as shown in Figure - 2 are recommended. Optional tank gauge protectors and outlet protectors are available at your local dealer.

ONE PIPE SYSTEM Where the tank is above the burner and when the oil flows by gravity to the oil pump, a single-stage fuel unit with a single oil line to the pump may be used.

TWO PIPE SYSTEM When single line is unsuitable, use double line or see your dealer for special oil line fittings.

4.0 BOILER RETURN WATER TEMPERATURE

Steel boilers are very susceptible to corrosion caused by condensation of flue gases. In order to prevent this, the return water temperature must not fall below 140°F. Most hydronic systems are designed for a delta T of 20°F. Therefore, the low limit should be set at no lower than 170°F, which accounts for the -10°F differential of the triple aquastat. Heating systems that require lower temperatures such as cast iron radiators and radiant systems require some form of mixing device to ensure the return water is at or above 140°F.

The warranty will not be valid for steel boilers with return temperatures below 140°F. For more information refer to B214-01 Installation Code for Hydronic Heating Systems (or equivalent).

5.0 CABINET ASSEMBLY See Figure – 6

BOILER WRAP Wrap boiler with insulation, foil side out and secure with foil tape provided. Cut holes for fittings as required.

SIDES & TOP Secure Left, Right and Top with sheet metal screws as shown.

REAR Attach Rear and secure with screws.

UPPER FRONT	Carefully insert Upper Front around Coil and secure with screws.
LOWER FRONT	Place split Lower Front Panel around view port, burner pipe and return and screw as shown.
BREECH	Secure Breech Cover with screws using #8 Tek screws provided (2 per side).

6.0 CLEANING INSTRUCTIONS See Figure – 5

POWER OFF	Turn off main power switch.
FUEL OFF	Shut off manual fuel supply valve.
REMOVE CABINET COVER	Remove smoke/vent pipe from the boiler breeching collar.
REMOVE FRONT BREECH	Remove breeching nuts, carefully loosen boiler breeching and lift off.
REMOVE GAS BAFFLES	Remove the flue gas baffles from the boiler tubes and clean them using a wire brush.
REMOVE BURNER	Make sure power and fuel are off.
CLEAN TUBES	Clean the tubes carefully with a 2" fiber bristle brush. DO NOT DAMAGE TARGET WALL.
VACUUM	Vacuum out lower burner chamber.
REPLACE BURNER	Check insertion is as specified. See Figure – 1.
REPLACE BAFFLES	Replace flue gas baffles in tubes.
REPLACE BREECH	Replace the boiler breeching and reseal against gaskets. New gaskets can be obtained from your dealer. Attach with high temperature silicone sealant. Secure with brass nuts and washers.
PANEL & PIPE	Reinstall cabinet panel and reinstall smoke/vent pipe. Secure with sheet metal screws.
CHECK	Check installation before restoring power and fuel.
CHECK BURNER	Smoke and CO_2 test. Replace nozzle if required. Set burner for efficient operation.
REAR COVER	Do not remove rear cover for cleaning, as it is silicone sealed. If the cover is replaced reseal with silicone.
WIRE BRUSH	Use a wire brush to clean the inside of the vent connector pipe.

7.0 BURNER SPECIFICATIONS

Model	ID #	Burner	Input		Nozzle		Pump (psi)	Air Setting	Turbulator	Output	
			USGPH	L/h						Btu/h	kW
BCF-E2-0125-10(15)	CE3-1	Riello 40 F3	0.61	2.31	0.50	80B	150	2.70	0.5	74,000	22
	CE3-2		0.73	2.76	0.60	60W		3.50	1.5	88,000	26
	CE3-3		0.80	3.03	0.65	60W		3.70	2.0	96,000	28
	CE3-4		0.92	3.48	0.75	60W		4.20	3.0	111,000	33
	CE3-5		1.04	3.94	0.85	60W		5.00	3.0	125,000	37
BCF-E4-0145-10(15)	CE5-1	Riello 40 F5	1.04	3.94	0.85	60W	150	3.20	2.0	125,000	37
	CE5-2		1.22	4.62	1.00	60W		3.40	2.5	146,000	43
BCF-B3-0095-10(15)	CB3-1	Beckett AFII – 85 -90*	0.67	2.54	0.50	70B	180	4.00	pin 3	82,000	24
	CB3-2		0.77	2.91	0.65	60A	140	4.75	pin 5	94,000	28
BCF-B2-0140-10(15)	CB5-1	Beckett AFII – 150 -90**	0.89	3.37	0.75	60A	140	4.75	pin 0	107,000	31
	CB5-2		1.00	3.79	0.85	60B		7.00	pin 0	118,000	35
	CB5-3		1.18	4.47	1.00	60B		7.50	pin 0	140,000	41

Direct Vent

BCF-V2-0110-10(15)	CV3-1	Riello 40 BF3	0.61	3.48	0.50	80B	150	4.10	1.00	74,000	22
	CV3-2		0.73	2.76	0.60	60W		5.00	1.50	88,000	26
	CV3-3		0.80	3.03	0.65	60W		5.60	2.00	96,000	28
BCF-V4-0145-10(15)	CV5-1	Riello 40 BF5	0.92	3.48	0.75	60W	150	4.00	1.50	111,000	33
	CV5-2		1.04	3.94	0.85	60W		4.50	2.00	125,000	37
	CV5-3		1.22	4.62	1.00	60W		5.50	2.50	146,000	43
BCF-D8-0140-10(15)	CB1-1	Beckett AFII – 100***	0.77	2.91	0.65	60B	140	6.60	pin 0	90,000	26
	CB1-2		0.89	3.37	0.75	60B		3.30	pin 5	107,000	31
	CB1-3		1.00	3.79	0.85	60B		5.80	pin 6	118,000	35
	CB1-4		1.18	3.94	1.00	60B		9.00	pin 8	140,000	41

* Beckett AFII-85 – Air Tube HLX90HD (PA701)
** Beckett AFII-150 – Air Tube HLX90HC (PA601)
*** Beckett AFII-100 – Air Tube HLX90HB (PA901) post purge preset to 2 min.

The information provided by the manufacturer of this furnace supersedes any information provided by any other party including the manufacturer of the burner.

8.0 BLOCKED VENT SWITCH

Oil-fired appliances installed in Canada require a blocked vent shut-off system when installed on a chimney. A safety switch is included with the furnace to perform this function. It is the installer's responsibility to install the switch in accordance with the instructions provided. Not applicable for Direct Vent or Power Vent systems.

Field Controls Model: WMO-1 (Manual Reset)

Switch Operation

Blocked vent switches are flue gas safety devices for detecting spillage of flue gases due to a blocked flue or inadequate draft. After detecting a problem, the switch de-energizes the system's burner control.

NEVER reset the switch unless the cause of the blockage has been corrected.

Installation

1) Pierce a 5/8" hole in to the flue vent pipe near the appliance breech connection.
2) This hole must be at least 10" before the draft regulator, vertically or horizontally.
3) Remove one of the securing nuts from the threaded tube of the safety switch.
4) Tighten the other securing nut onto the pipe as far as possible.
5) Insert the threaded tube end into the pierced hole of the flue vent pipe.
6) Install the securing nut on the safety switch tube, which protrudes into the flue vent pipe. Tighten the nut securely.

Wiring Instructions

Caution: Disconnect the electrical power when wiring the unit.

Wire the Blocked Vent Switch in accordance with The National Electrical Code and applicable local codes. Wire the safety switch in series with the burner limit control or aquastat. Route the wiring with an accepted wiring enclosure in accordance with the National Electrical code and applicable local codes. Refer to wiring decal or Figure - 3.

System Test Procedure

1) With the power re-established, block the chimney or vent pipe downstream of the switch.
2) Adjust the thermostat to call for heat.
3) Once the heating system has started the blocked vent switch should shut down the burner within 10 minutes or sooner.
4) Once the system has cooled, the blocked vent switch can manually be reset.
5) This procedure should be tested a second time.
6) After testing the blocked vent switch the chimney should be cleared of obstruction and the heating system tested on a long run cycle.

If the block vent switch shuts down the system, check to ensure there is enough draft in the chimney and venting pipes.

9.0 GENERAL SPECIFICATIONS

CLEARANCE TO COMBUSTIBLES

Top	6"	(152 mm)
Front	24"	(610 mm)
Rear - includes access	18"	(457 mm)
Side (access)	2"	(51 mm)
Side (access)	24"	(610 mm)
Flue Pipe	9"	(229 mm)
Floor	Combustible or non-combustible	

SMOKE/VENT See Code B139

Smoke/Vent	5" vent pipe, Type "L"
Chimney/Vent	See B139 Code
Vent Systems	KPV-SS1C Venter
	Direct Vent

KPV-SS1C Settings
Certified for use with Type "L" Vent. Maximum flue temperature is 575°F.

DRAFT (non-Direct Vent only)

Breech Pressure	-0.04" wc

CONTROLS

AQUASTAT	Honeywell L8124L1029
	L8124G1020
	White Rodgers 8B43A-601
	Erie Boss 2400 Series
Optional Remote	Honeywell L8151A1052
RELIEF VALVE	Watts 335, 30 psig ASME or equivalent
TRIDICATOR	70 psi/320°F or equivalent
BAROMETRIC	5" CSA Approved or greater

CLEANOUTS
Breech, burner opening

OIL INPUT
0.61 – 1.22 USGPH
2.31 – 4.62 L/h

FUEL No heavier than No. 2 furnace oil

DIMENSIONS

Overall depth, less burner	28 1/4"	(1118 mm)
Cabinet depth	28 1/4"	(1118 mm)
Cabinet height	32 1/2"	(940 mm)
Cabinet width	21"	(660 mm)

OPENING HEIGHTS

Burner center line	9 1/4"	(235 mm)
Smoke pipe center line	20 1/4"	(514 mm)

BURNER INSERTION

Beckett	7 5/8"	(194 mm)
Riello	5 1/2"	(140 mm)
Beckett DV	5 1/4"	(133 mm)

WATER VOLUME

US gallons	19.55
IMP gallons	16.28
Liters	73.89

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

FOR MOST RECENT UPDATES PLEASE VISIT www.GranbyIndustries.com.

The following form **MUST** be completed for the warranty to be valid.

Installed by: _____

Address: _____

Telephone: _____ **Date:** _____

START UP TEST RESULTS

Nozzle: _____ **Pressure:** _____

Air: _____ **Turbulator:** _____

CO_2: _____ **Smoke Number:** _____

Breech Draft: _____ **Stack Temperature:** _____

Test Performed By: _____

Staple Printout Here: **Staple Smoke Spot Here:**

BURNER INSERTION (I)

	in	mm
BECKETT	7 5/8	194
RIELLO	5 1/2	140
BECKETT DV	5 1/4	133

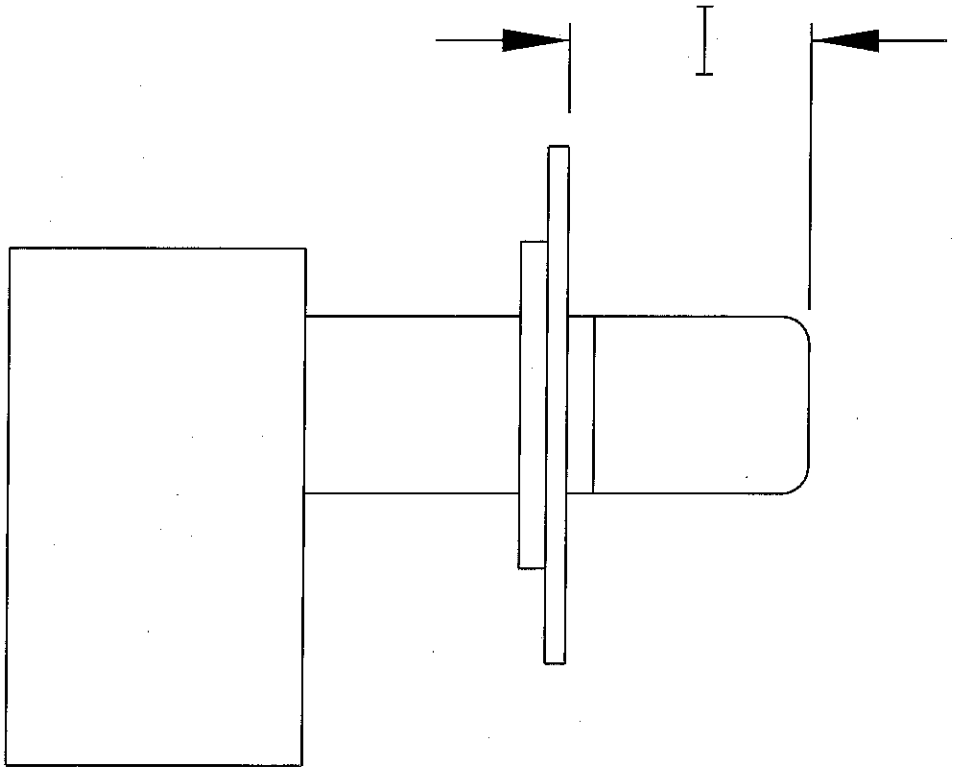

FIGURE - 1

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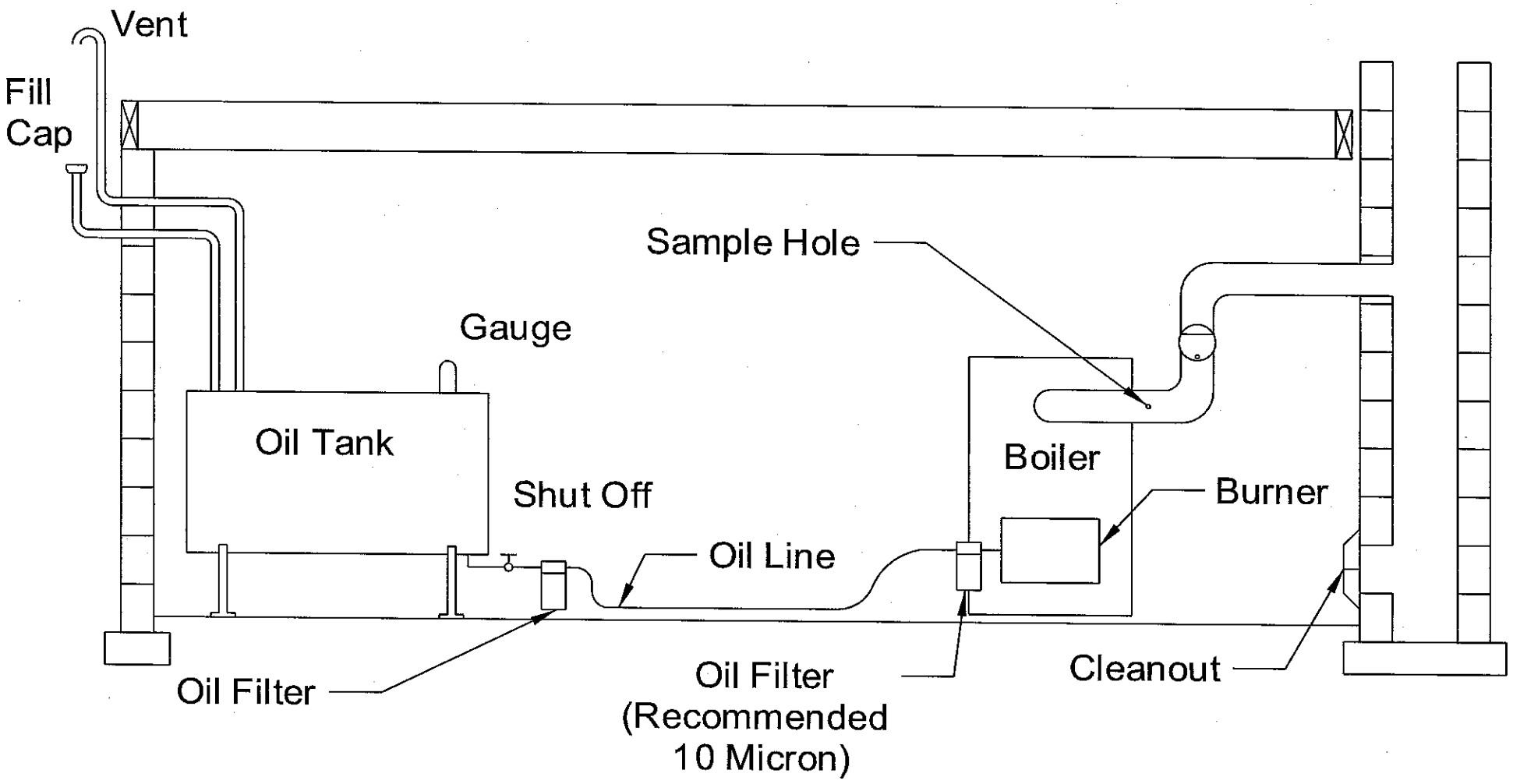

OIL TANK AND PIPING

FIGURE - 2

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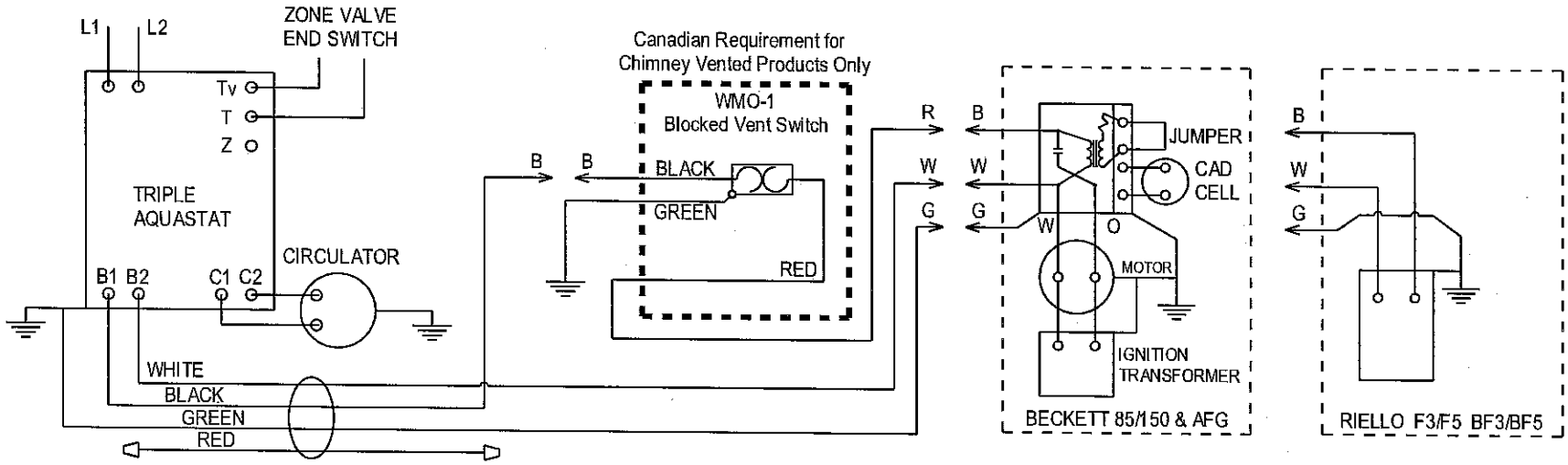
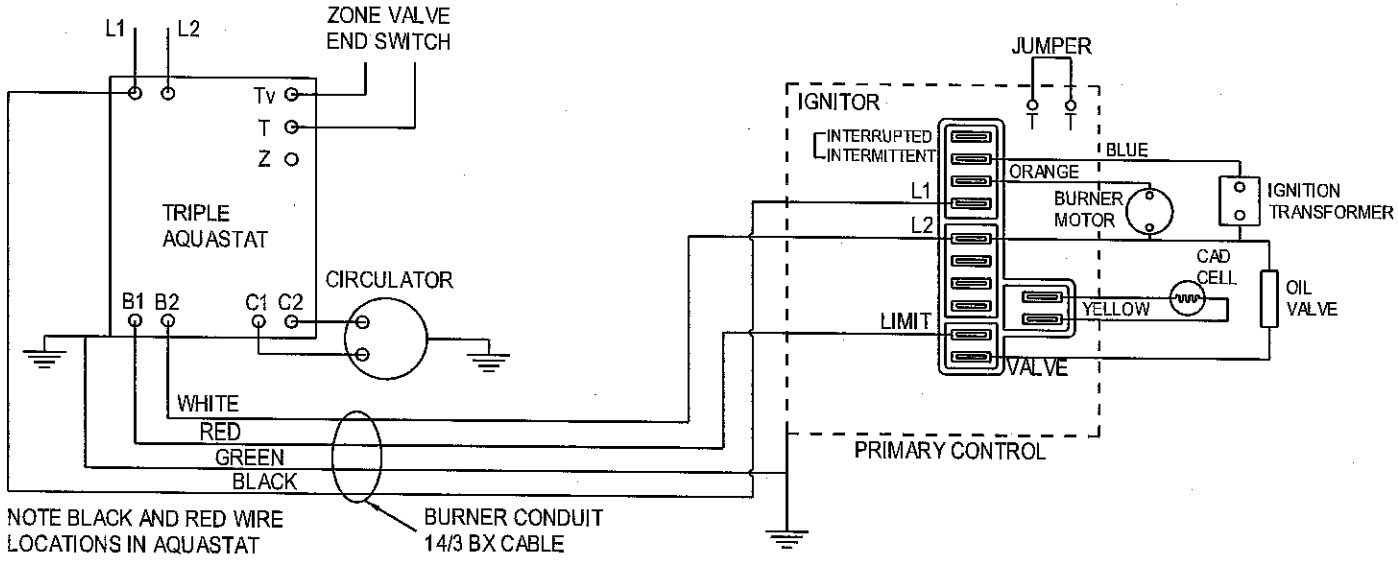
RIELLO, BECKETT AFII 85/150 AND AFG BURNERS



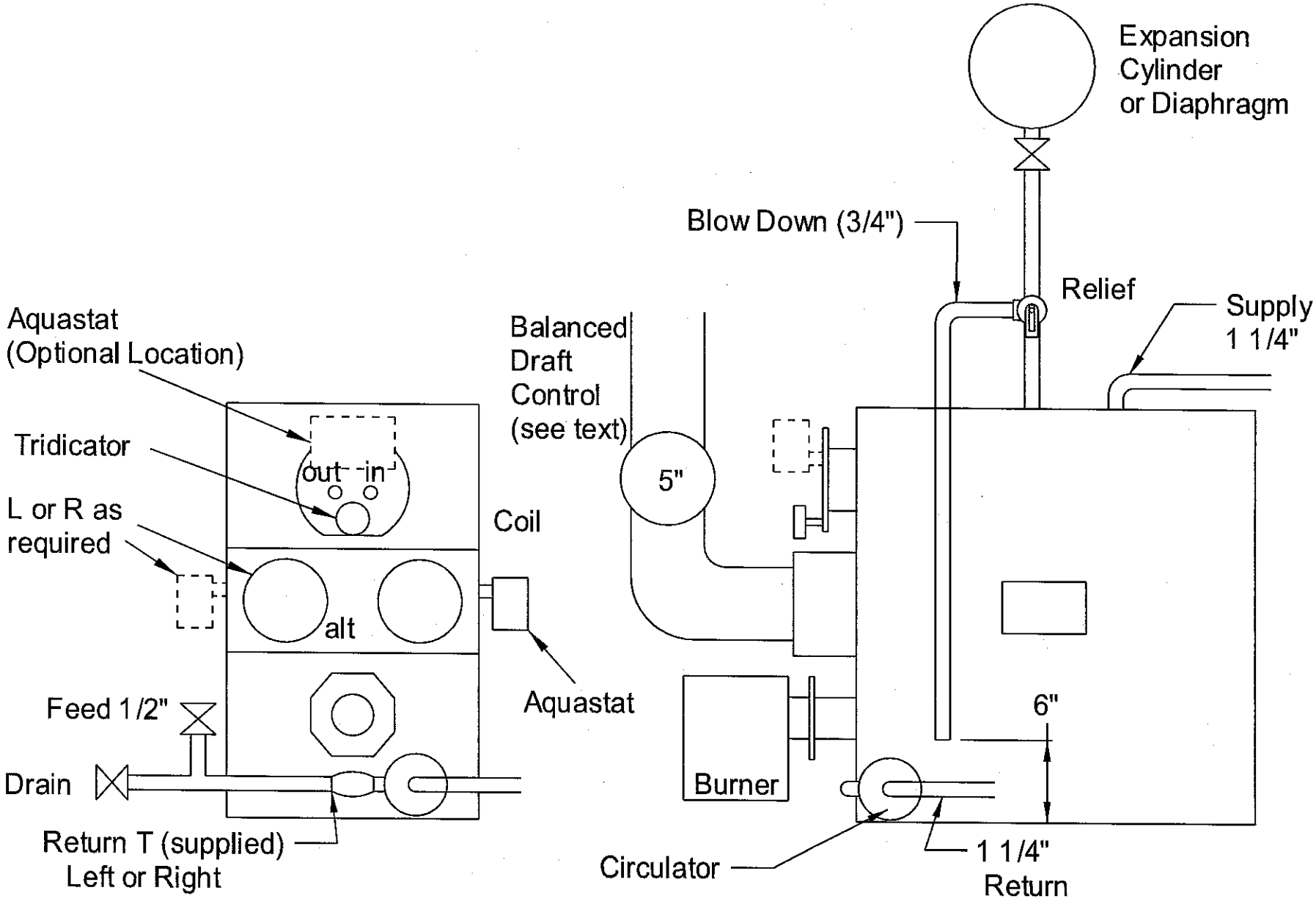
BECKETT AFII 100 BURNERS

COMET 145 DIRECT VENT ONLY



WIRING DIAGRAMS

Figure - 3



INSTALLATION

FIGURE - 4

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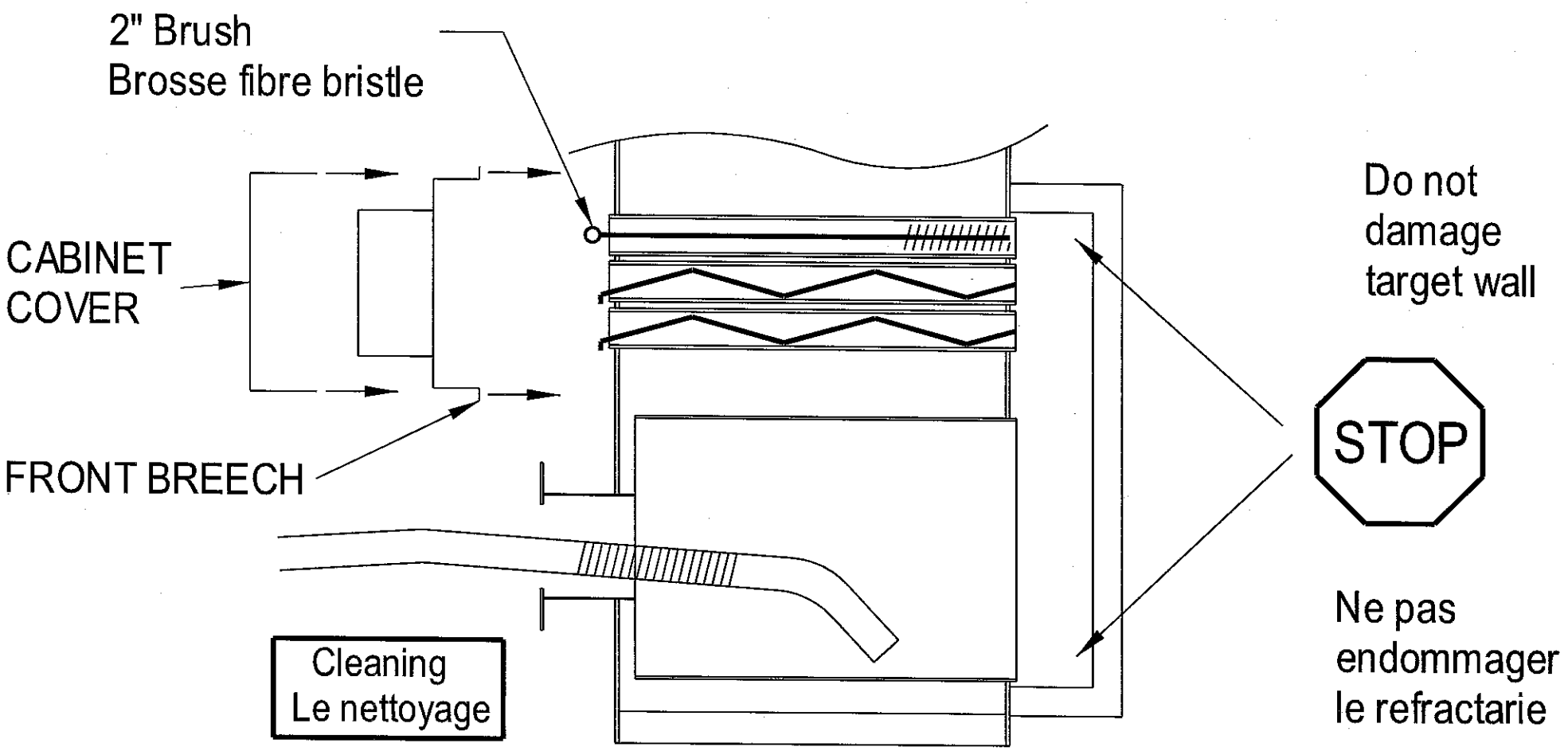

CLEANING

FIGURE - 5

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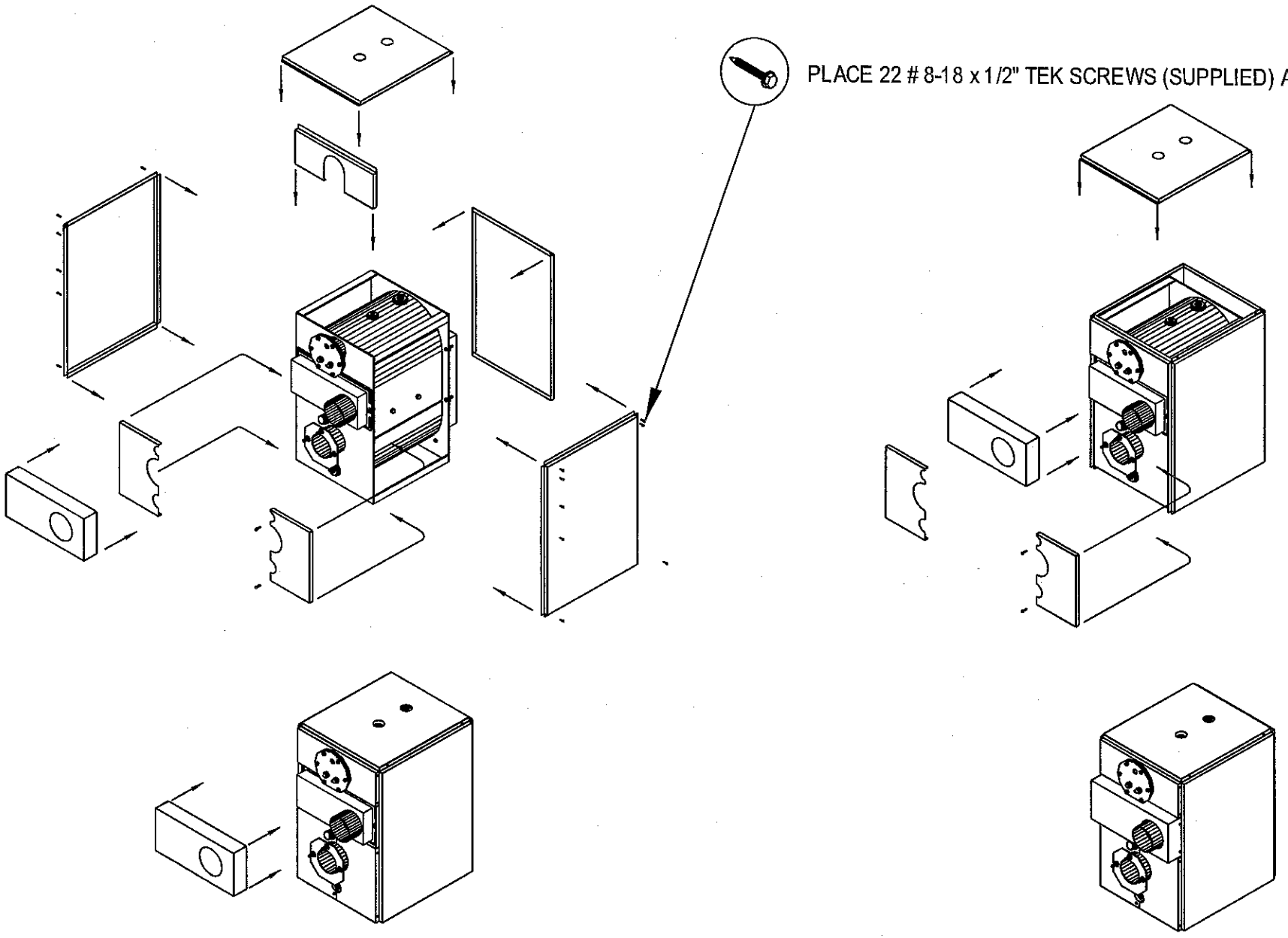

CABINET ASSEMBLY

FIGURE - 6

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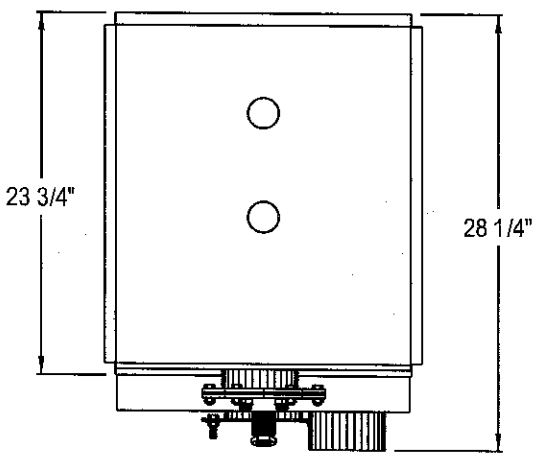

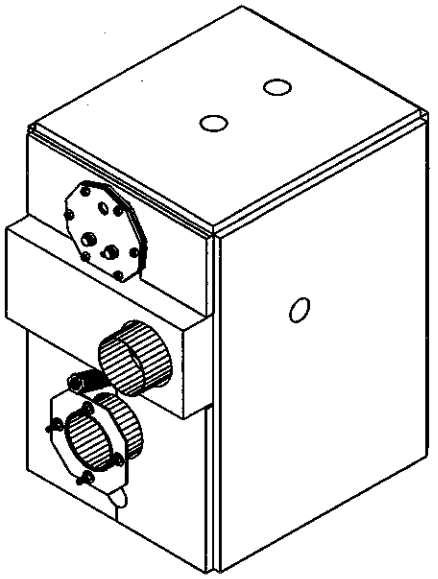

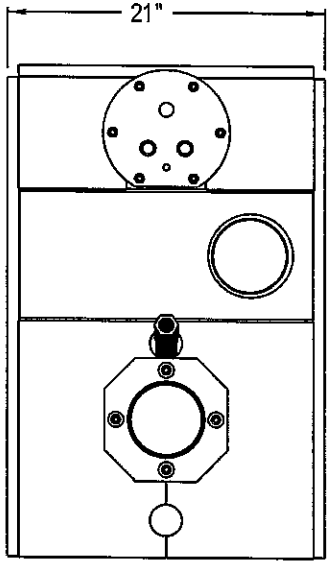

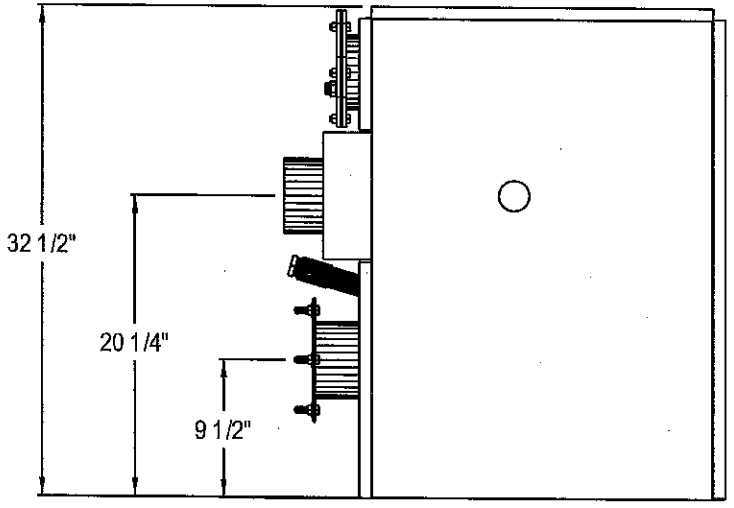

COMET 145 DIMENSIONS

FIGURE - 7

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COMET 145 EXPLODED PARTS

Figure - 8

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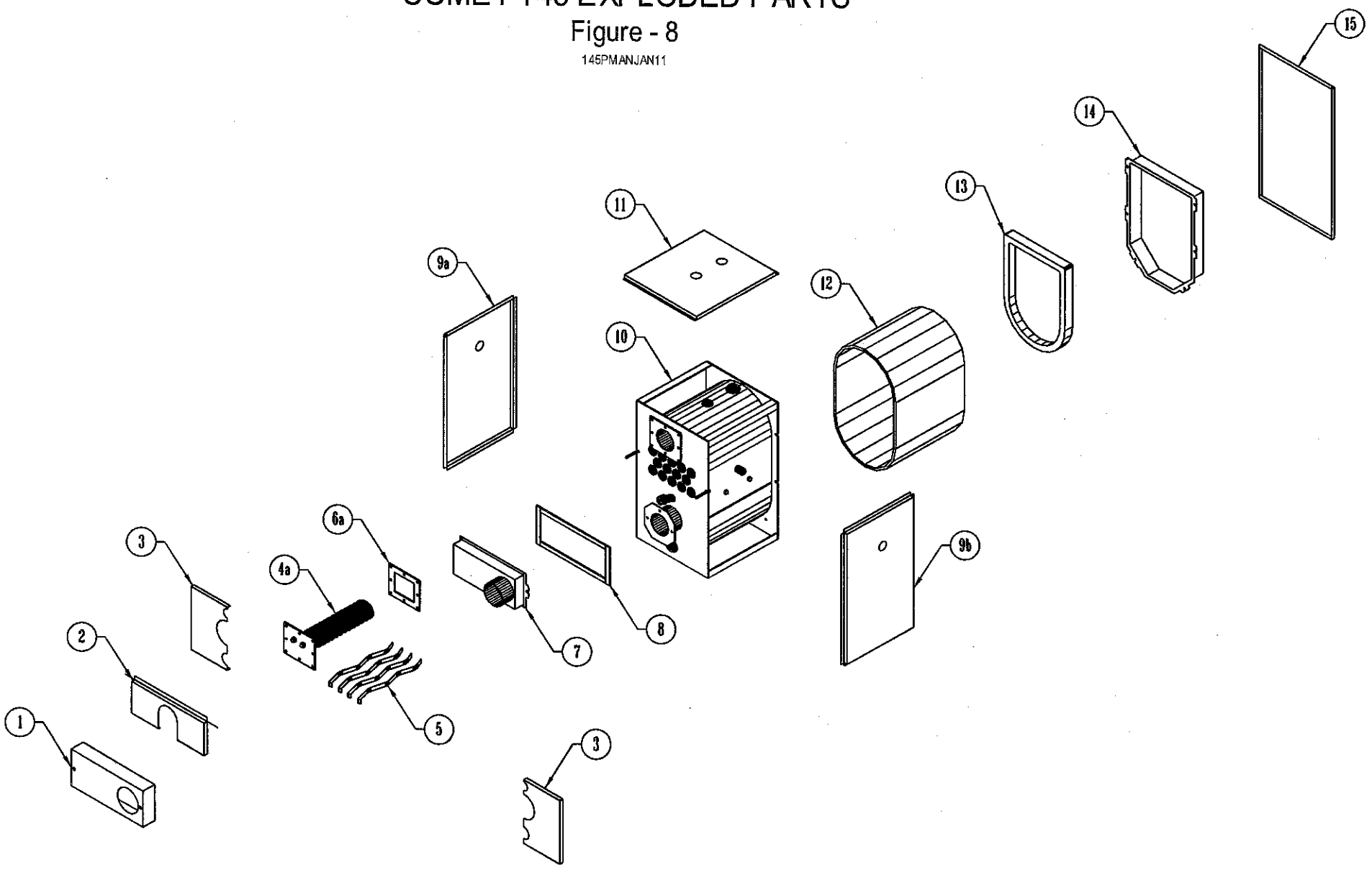

Table - 1

Comet 145 Oil-Fired Boiler		
Order No.	Item No.	Part Description
BC0-CB-0044-00	COMET 145-1	Cabinet Cleanout Cover
BC0-CB-0043-00	COMET 145-2	Cabinet Coil Cover
BC0-CB-0046-00	COMET 145-3	Cabinet Lower Front Cover (L/R)
3TC-05-K260-00	COMET 145-4A	K26 Tankless Coil
3TC-05-K25M-00	COMET 145-4B	K25m Tankless Coil (Round -Not Shown)
B00-PV-0424-00	COMET 145-5	Flue Gas Baffles
3GK-00-COIL-00	COMET 145-6A	Coil Gasket for K26
3GK-00-COIL-01	COMET 145-6B	Coil Gasket for K25m (Round -Not Shown)
BCF-PV-0020-00	COMET 145-7	Collector Cover
BC0-PV-0081-00	COMET 145-8	Collector Cover Gasket Set
BC0-CB-040A-00	COMET 145-9A	Cabinet Side Panels (Left)
BC0-CB-040B-00	COMET 145-9B	Cabinet Side Panels (Right)
BCF-PV-0010-00	COMET 145-10A	Pressure Vessel Assembly
BCA-PV-0010-00	COMET 145-10B	Pressure Vessel Assembly
BCF-CB-0110-00	COMET 145-11A	Cabinet Top
BCA-CB-0110-00	COMET 145-11B	Cabinet Top
BCF-CB-0010-00	COMET 145-12	Boiler Jacket
3CC-00-WALL-03	COMET 145-13	Target Wall
BCF-PV-0022-00	COMET 145-14	Rear Cover
BCF-CB-0130-00	COMET 145-15	Cabinet Rear Panel
4TD-00-PG75-00	COMET 145-16	Tridicator (Not Shown)
4AQ-00-L102-9B	COMET 145-17	Aquastat L8124L1029B (Not Shown)
3BN-0F-3LBT-00	COMET 145-18	40F3 Riello (Long Tube)
3BN-0F-5LBT-00	COMET 145-19	40F5 Riello (Long Tube)
3BN-BF-3LBT-00	COMET 145-20	BF3 Riello Direct Vent (Long Tube)
3BN-BF-5LBT-00	COMET 145-21	BF5 Riello Direct Vent (Long Tube)
3BN-00-PA70-10	COMET 145-22	AFII-85-90 Beckett Burner PA #701
3BN-00-PA90-10	COMET 145-23	AFII-100 Beckett Burner DV PA #901
3BN-00-PA60-10	COMET 145-24	AFII-150-90- Beckett Burner PA #601

Please have serial number & date of manufacture ready when ordering parts