

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND

BUILDING PERMIT

This is to certify that BRANT C TAYLOR

Located At 121 ROWE AVE

Job ID: 2011-10-2379-HVAC

CBL: 261- B-013-001

has permission to Install an HVAC system (Single Family).

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

Fire Prevention Officer

Code Enforcement Officer / Plan Reviewer

10/31/2011

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

1. Close-In: Elec./ Plumb./ and Framing
2. Final Inspection

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



PORTLAND MAINE

Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

Director of Planning and Urban Development
Penny St. Louis

Job ID: 2011-10-2379-HVAC

Located At: 121 ROWE AVE

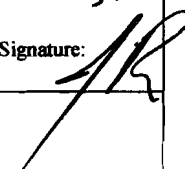
CBL: 261- B-013-001


Conditions of Approval:

1. The installation must comply with UL, the Manufacturers' Listing, and State of Maine Oil Regulations.
2. Separate permits are required for any electrical: plumbing, sprinkler, fire alarm, commercial hood exhaust systems and fuel tanks. Separate plans may need to be submitted for approval as a part of this process.
3. Maintain proper setback(s) from property lines/buildings and proper clearances from vertical openings when direct venting
4. A photoelectric Carbon Monoxide (CO) detector shall be installed in each area within or giving access to bedrooms. That detection must be powered by the electrical service (plug-in or hardwired) in the building and battery.

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No: 2011-10-2379-HVAC	Date Applied: 10/4/2011	CBL: 261- B-013-001	
Location of Construction: 121 ROWE AVE	Owner Name: TAYLOR BRANT	Owner Address: 121 ROWE AVE PORTLAND, 04102 ME - MAINE	Phone:
Business Name:	Contractor Name: DOWNEAST ENERGY CO	Contractor Address: PO BOX 250 BRUNSWICK MAINE 04011	Phone:
Lessee/Buyer's Name:	Phone:	Permit Type: HVAC	Zone: R-3
Past Use: Single Family Dwelling	Proposed Use: Same: Single Family Dwelling - install heating system	Cost of Work: \$8,000.00	CEO District:
		Fire Dept: <input type="checkbox"/> Approved <input type="checkbox"/> Denied <input checked="" type="checkbox"/> N/A	Inspection: Use Group: Type: Home o. l. Regs
		Signature:	Signature: 
Proposed Project Description: INstall a Energy Kinetics System		Pedestrian Activities District (P.A.D.)	
Permit Taken By: Lannie		Zoning Approval	

<p>1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.</p> <p>2. Building Permits do not include plumbing, septic or electrical work.</p> <p>3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.</p>	<p>Special Zone or Reviews</p> <p><input type="checkbox"/> Shoreland</p> <p><input type="checkbox"/> Wetlands</p> <p><input type="checkbox"/> Flood Zone</p> <p><input type="checkbox"/> Subdivision</p> <p><input type="checkbox"/> Site Plan</p> <p><input type="checkbox"/> Maj <input type="checkbox"/> Min <input type="checkbox"/> MM</p> <p>Date: <i>OK - 10/27/11</i></p>	<p>Zoning Appeal</p> <p><input type="checkbox"/> Variance</p> <p><input type="checkbox"/> Miscellaneous</p> <p><input type="checkbox"/> Conditional Use</p> <p><input type="checkbox"/> Interpretation</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Denied</p> <p>Date:</p>	<p>Historic Preservation</p> <p><input checked="" type="checkbox"/> Not in Dist or Landmark</p> <p><input type="checkbox"/> Does not Require Review</p> <p><input type="checkbox"/> Requires Review</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Approved w/Conditions</p> <p><input type="checkbox"/> Denied</p> <p>Date: </p>
	CERTIFICATION		

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE



FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT HEATING OR POWER EQUIPMENT



R-3

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 261-B-B Use of Building Private Date 8/4/11
 Name and address of owner of appliance John Lavelle 121 Pine Ave
Portland 04102
 Installer's name and address Dave East Energy 172 Main St
South Portland Telephone _____

Location of appliance:
 Basement Floor
 Attic Roof

Type of Fuel:
 Gas Oil Solid

Appliance Name: Energy Kinetics system 350
 U.L. Approved Yes No

Will appliance be installed in accordance with the manufacture's installation instructions? Yes No

IF NO Explain: _____

The Type of License of Installer:
 Master Plumber # _____
 Solid Fuel # _____
 Oil # MS30021715
 Gas # _____
 Other _____

Type of Chimney:
 Masonry Lined
 Factory built _____

Metal
 Factory Built U.L. Listing # _____

Direct Vent
 Type _____

Type of Fuel Tank
 Oil
 Gas

Size of Tank 275
Number of Tanks 1

Distance from Tank to Center of Flame 32 feet.

Cost of Work: \$ 8,000,000
Permit Fee: \$ 100

RECEIVED
 OCT 4 2011
 Dept. of Building Inspections
 City of Portland Maine
 11-5-11

Approved

Approved with Conditions

Fire: _____
 Ele.: _____
 Bldg.: _____

See attached letter or requirement

Signature of Installer Steve Judell Inspector's Signature _____ Date Approved _____

White - Inspection Yellow - File Pink - Applicant's Gold - Assessor's Copy



CITY OF PORTLAND, MAINE

Department of Building Inspections

Original Receipt

2-3

12. 1 20 11

Received from Donna East - 10054-

Location of Work 121 Rowe Ave

Cost of Construction \$ _____ Building Fee: _____

Permit Fee \$ _____ Site Fee: _____

Certificate of Occupancy Fee: _____

Total: _____

(Building (IL) _____ Plumbing (I5) _____ Electrical (I2) _____ Site Plan (U2) _____

Other +1/2 hr

CBL: 261-B 13

Check #: CC Total Collected \$ 100

**No work is to be started until permit issued.
Please keep original receipt for your records.**

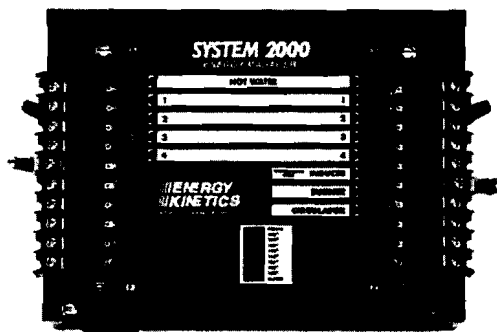
Taken by: J. De

WHITE - Applicant's Copy
YELLOW - Office Copy
PINK - Permit Copy

SYSTEM 2000[®]

/// ENERGY KINETICS

OWNER AND INSTALLATION MANUAL



**DIGITAL ENERGY MANAGER EDITION FOR OIL HEAT
EK-1 / EK-2 ENERGY TESTING LABORATORY OF MAINE LISTING NO. 86-05-01**

MANUFACTURED BY:

**ENERGY KINETICS, INC.
51 Molasses Hill Road
Lebanon, NJ 08833
(908) 735-2066**

www.energykinetics.com or www.system2000.com

INSTALLER:

**ALL INSTALLATIONS MUST BE MADE IN ACCORDANCE WITH ALL STATE AND LOCAL CODES
WHICH MAY DIFFER FROM THIS MANUAL.**

PLEASE POST THIS INSTRUCTION MANUAL AND ACCESSORY INSTRUCTIONS VISIBLY NEAR UNIT.

TWENTYTHIRD EDITION – November 15, 2000

Products

Concept of Operation

Operation

Natural Gas Installation

Venting

Diagnostics

Digital Manager

Classic Manager

Writing-General

System Piping

Dom. Piping & Pool Appl.

Service & M.

SYSTEM 2000® OWNER AND INSTALLATION MANUAL

IMPORTANT MESSAGE TO HOMEOWNER: *These instructions should be carefully read and kept for future reference to gain the best performance from your Energy Converter (boiler) and Digital Energy Manager.*

CONGRATULATIONS ON YOUR PURCHASE OF SYSTEM 2000 with the high efficiency, low mass hydronic heat exchanger, the Energy Converter. It is the product of years of engineering and advanced design, which brings together in a single system, all elements needed to provide efficient home heat and hot water.

This operation and maintenance information has been prepared so that you may better understand and use your **System 2000** heat and hot water system.

PRINCIPLE OF OPERATION

SYSTEM 2000 comprises a heat source, the Energy Converter, a heavily insulated hot water storage tank and five (or more) zones controlled by a solid state computer, the *Digital Energy Manager*.

When you set your thermostats to provide specific heat at specific times, your Digital Energy Manager intercepts those heat calls and turns on the burner. When your thermostat signals that it is satisfied, the Digital Energy Manager turns off the burner. It enters the energy recovery stage to move heat remaining in the boiler to your home or domestic hot water storage tank by continuing to operate the circulator and zone valve or the storage tank circulator.

When energy recovery is complete, the Digital Energy Manager turns off the system and waits for another thermostat (or tank aquastat) to call for heat. **System 2000** heats only when you need heat and only where you need heat.

System 2000 is the product of advanced thermal engineering. It is designed with two separate passageways, nearly 10' long, coiled around each other. Water travels along one passageway from your home toward the center of the unit and heated gases travel from the unit center toward the chimney. This is "forced circulation counterflow" and it provides the most efficient form of heat transfer (see *FIG. 1*). The superior insulation of the boiler prevents heat losses to the surroundings, resulting in directing heat to your home in an efficient and very quiet operation.

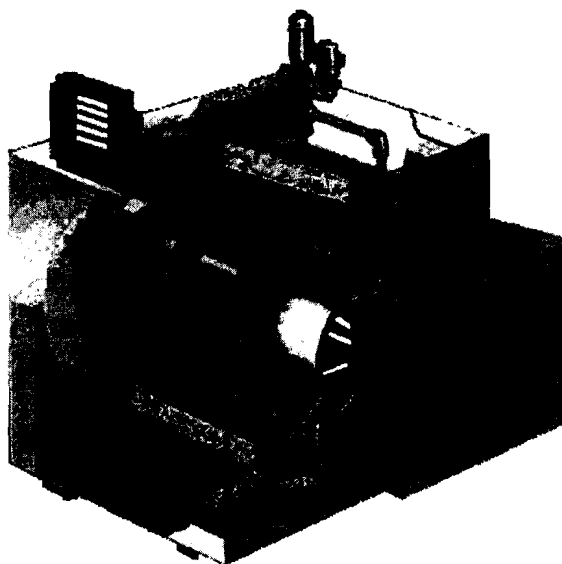


FIG. 1

Your **SYSTEM 2000** has an extremely high annual efficiency (over 99% of steady state) because it runs only when your home or hot water storage tank needs heat and energy recovery is complete at the end of a heat or hot water call, virtually eliminating off cycle losses.

Your System 2000 holds a minimal quantity of water so it begins to supply heat in about 90 seconds. This rapid response means that your rooms can be heated quickly to temperature. Rapid response also means that domestic hot water is always available in the insulated storage tank and can be replaced almost as quickly as you use it because System 2000 can heat water at 120 gallons an hour with the EK-1 and approximately double that rate with the EK-2 model.

A modern retention head oil burner fires into the center of System 2000 where a high temperature, light weight ceramic chamber provides ideal conditions for "near perfect" efficient, pollution-free combustion. Your System 2000 is tightly sealed so all products of combustion pass only to the chimney or side-wall vent.

RECEIVING & UNPACKING

When unpacking and uncrating, inspect each item for visible damage. Any damage found should immediately be reported to the delivery company before installation. Replacements for parts damaged in shipment are available upon receipt of a signed copy of a claim report (*concealed damage claims should be filed immediately against the freight carrier by the consignee*). The freight carrier is responsible for taking prompt action on all claims. If freight cannot be inspected at the time of delivery, sign the bill of lading "Subject to Inspection" and immediately report to the freight company any damage found.

After unpacking, check each item against the packing list. Immediately report any missing items. It is wise to complete the installation before discarding packing material. Inspect it thoroughly for loose parts, instruction sheets and packing lists. Store all parts where they will not be damaged during installation.

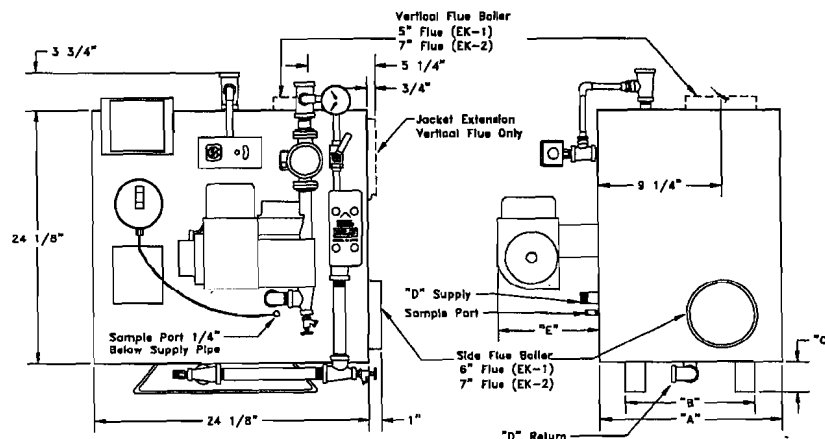
LOCATION

Provide a solid, level, smooth and fireproof foundation for the boiler, as near to the chimney as possible allowing ample clearance for cleaning and service. In most installations, it is desirable to raise the unit off the floor by resting unit on several cement blocks or our prefabricated steel boiler stand. It makes service easier and keeps burner air inlet above floor dust. Set up unit with the front of boiler approx. 1/4" higher (or approx. 1/2 bubble level) to assist in air removal (see FIG. 2 for dimensions). The prefabricated 16" steel stand is available as an option.

Installation Clearances	Clearance to Combustibles	Clearance for Service	
		Minimum	Recommended
FRONT	12"	12"	18"
EK-1 BACK	6"	12"	18" OR MORE
EK-2 BACK	6"	18"	24" OR MORE
RIGHT SIDE W/ FLUE	6"	12"	15"
LEFT SIDE/RIGHT W/OUT FLUE	6"	6"	15"
TOP	6"	6"	12"
FLUE CONNECTION	9"	6"	6"

Clearance from combustible materials should be observed according to local and national codes. Follow national Fire Protection Association Bulletin NFPA Installation of Oil Burning Equipment and all applicable codes.

FIG. 2
Dimension
Drawing



Model	Water Content	A	B	C	D	Wt/Lbs
EK-1	2 1/2 gal.	17 1/2"	13"	2 1/2"	1"	250
EK-2	4 gal.	24 3/4"	20 1/4"	3 1/2"	1 1/4"	350

Burner	E	With Air Box	Fuel
Beckett	11"	13"	Oil
Carlin	14"	15 1/2"	Oil
Riello	13"	13"	Oil

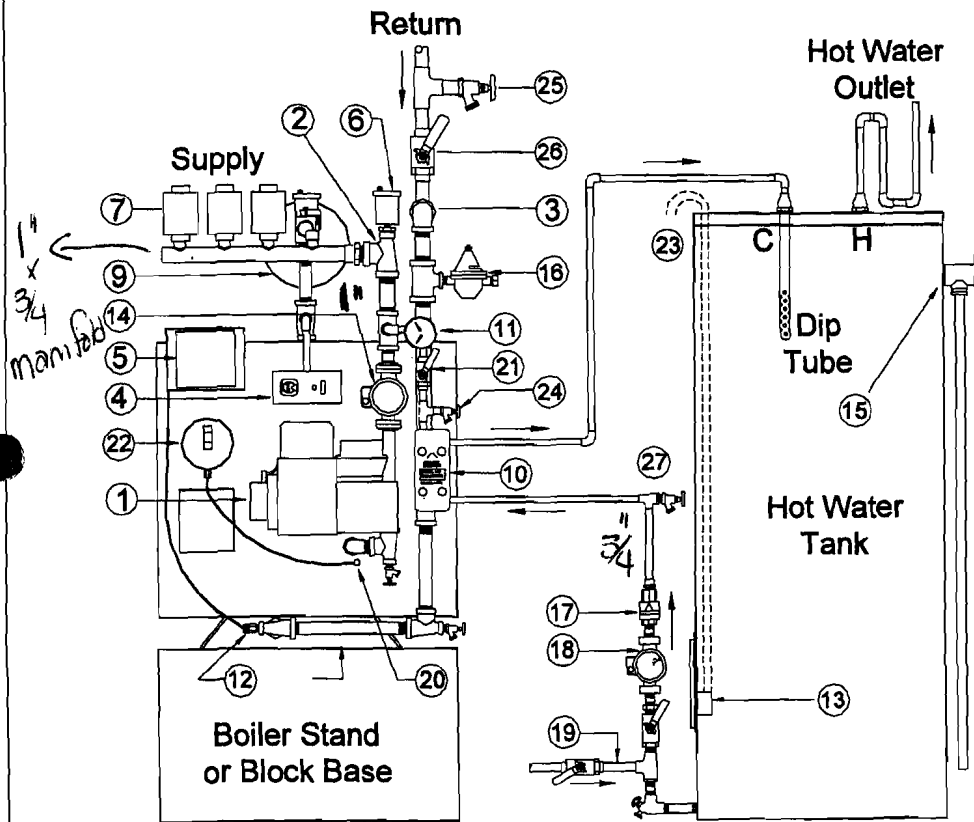
COMBUSTION AIR

The Energy Converter (boiler) must be installed in an area where adequate fresh air is available to support combustion.

Appliances Located in Confined Spaces: The confined space shall be provided with two permanent openings, one near the top of the enclosure and one near the bottom. Each opening shall have a free area of not less than one square inch per 1,000 BTU per hour of the total input rating of all appliances in the enclosure, freely communicating with interior areas *having adequate infiltration from the outside.*

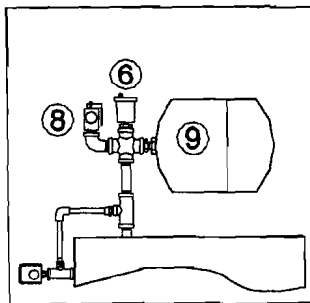
Modern buildings of tight construction, as well as the operation of attic and exhaust fans, kitchen ventilation systems, clothes dryers or fireplaces may create conditions of unsatisfactory combustion or venting. Special provisions should be made to use *air for combustion that communicates with a well ventilated attic or with the outdoors* (such as using a louver or grate). The opening should have a free area of not less than one (1) square inch per 4,000 BTU per hour of the total input rating.

Energy Kinetics Air Box Option: In modern houses with tight construction and chimneyless systems with sidewall venting, the use of an air inlet box option to provide combustion air from outside the structure is highly recommended. The Air Box option also greatly reduces operating sound level of the boiler.



* does not read draft regulator *

order by # of zones for manifold
Fig. 3



Side View
(Top of Boiler)

- | | |
|-------------------------------------|--------------------------------------|
| 1. Burner (Beckett burner pictured) | 14. Main Circulator |
| 2. Supply 1" (EK-1); 1-1/4" (EK-2) | 15. Hot Water T&P Relief Valve |
| 3. Return 1" (EK-1); 1-1/4" (EK-2) | 16. Boiler Feeder (Premier pkg only) |
| 4. High Limit Aquastat | 17. Check Valve |
| 5. Digital Energy Manager | 18. Domestic Hot Water Circulator |
| 6. Air Vent (on boiler and supply) | 19. Cold Water Makeup |
| 7. Zone Valves | 20. Combustion Test Port |
| 8. Boiler Relief Valve | 21. Bypass valve |
| 9. Expansion Tank (NOT supplied) | 22. Puff Switch |
| 10. Heat Exchanger | 23. Aquastat Leads |
| 11. Tridicator Gauge | 24. Boiler Side Backflush (optional) |
| 12. Digital Temperature Sensor | 25. Purge Valve (Premier pkg only) |
| 13. Tank Aquastat (covered) | 26. Ball Valve (Premier pkg only) |
| | 27. Backflush Valve, Domestic side |

10-0417DS

Products
 "A" Concept of Operation
 "B" Overall Installation
 "B-2" Natural Gas Installation
 "C" Venting
 "D" Diagnostics
 "E" Digital Manager
 "F" Classic Manager
 "G" Wiring-General
 "H" System Piping
 "J" Dem. Piping & Pool Appl.
 "K" Service & Maint

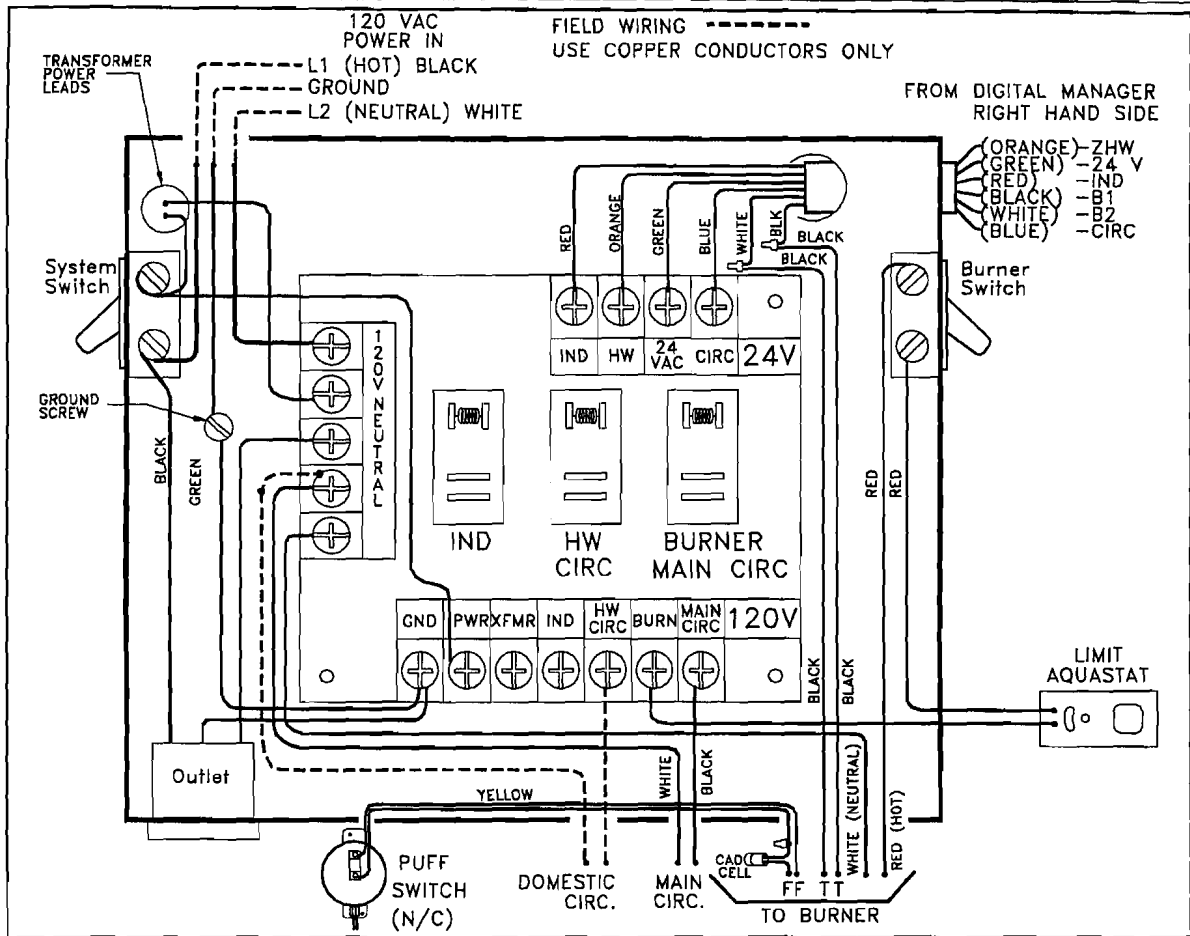


FIG. 4A

ELECTRICAL

POWER SUPPLY: 120 VOLT 60 HZ 7.5 AMPS

Make All Connections With Power Off

FIG. 4B (left diagram) indicates line voltage wiring. Use flexible metal conduit provided, rigid metal conduit or 3rd wire grounding for proper bond between all electrical accessories.

FIG. 4A (top diagram) indicates internal wire harness connections to the junction box. Install power from a separate 15 AMP fused circuit. A switch is included so power can be shut off at the unit for servicing.

“Hot” lead is connected to bottom lug of System Emergency Switch as shown in FIG. 4A. *Pigtails* are now provided and can be used to simplify the primary power connection. Ground the equipment using the ground screw provided in the unit junction box.

Note: *The Service Outlet is wired as Always On.* To have the outlet controlled by the System Emergency Switch, move the outlet black lead to top lug of switch, while bringing 120 volt into lower lug. A low water cut-off is not standard, but may be required by some local codes and is available from Energy Kinetics.

HYDRONIC CONTROL SETTINGS

Control	Model No.	Normal Setting
LIMIT AQUASTAT (Located above Burner)	White Rodgers Model 1145-42	215° Maximum 10° Differential: 215°- 205° F.
HOT WATER TANK AQUASTAT (59T) (Located on domestic storage tank)		120° Normal (To suit individual installation)

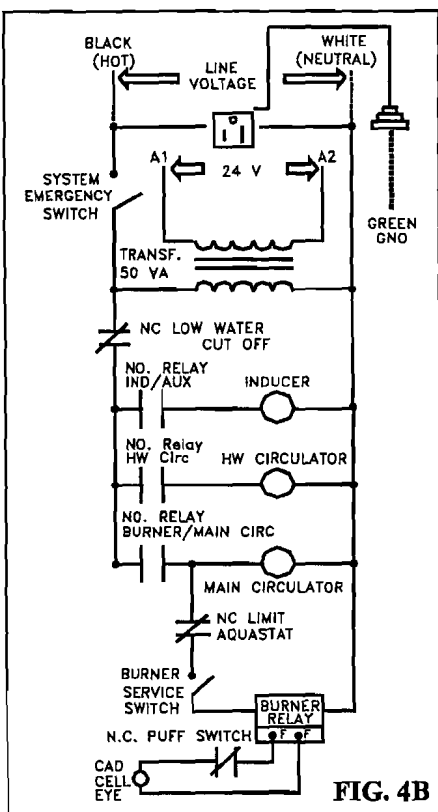


FIG. 4B

Products
Concept of Operation
"A"
"B-1"
Natural Gas Installation
"B-2"
Venting
"C"
Diagnostics
"D"
Digital Manager
"E"
Classic Manager
"F"
Wiring-General
"G"
System Piping
"H"
Dom. Piping & Pool App.
"J"
Service & M.
"K"

GENERAL ASSEMBLY

Assembly of various packaged units is illustrated throughout this manual. The use of non-Energy Kinetics supplied pump, controls and accessories should follow good practices. The diagrams and locations presented in the manual are recommended.

CONTROLS AND ACCESSORIES

Packaged boilers are furnished with controls and basic accessories illustrated and described in this manual. See FIG. 3 for basic accessory location. Control, burner and accessory instruction sheets and system wiring diagrams used should be attached to this manual for future reference. *All Wiring Must Comply with the National Electric and any Local Codes.*

PIPING

All piping and accessory connections should follow good practice using approved joint sealants. FIG. 3 indicates general system piping arrangement and options. Each system will vary according to job location. *The Bypass is required with or without heat exchanger for proper boiler operation.*

ZONE CONNECTIONS

ZONE VALVE CONTROL: System 2000 is normally arranged to provide multi-zone control of the heating system and domestic hot water. A 24-volt zone valve will control each heating zone. *A single heating zone system requires a zone valve to provide control for preheat of unit and to maintain minimum temperature during operation.*

CIRCULATOR ZONE CONTROL: Zone control by circulators requires a flow valve, circulator and 24-volt relay (fan type such as Honeywell R8225B) for each zone. The main circulator, domestic heat exchanger and bypass line are still used in these cases. A tee must be installed into the supply on the inlet side of the main circulator. This tee is the inlet for zone supply side circulators with returns for these zones into normal return location (Request "Zoning with Circulators" diagram).

ZONE PURGING: Proper valves to isolate and purge individual zones should be installed according to good piping practices.

EXPANSION TANK SIZING: The type and size of expansion tank depends on the total system water volume. The Energy Converter contains a small quantity of water (see table for FIG. 2). Selection must consider *cold start hookup* due to system concepts of post purging and rapid heat up.

HOT WATER STORAGE TANK

FIG. 3 indicates typical arrangement of the domestic hot water system. The tank may be located adjacent to the Energy Converter or in any other convenient location. If greater than 20 feet, use ¾" lines and an air vent on high return. Insulation of water lines between the storage tank and Energy Converter and on the hot water tap is recommended for best fuel efficiency. When supplied, the standard storage tank comes complete with high-density foam insulation, a properly located aquastat and a temperature and pressure relief valve. A mixing valve is available as an option.

NOTE: IF THERE IS A CONCERN OR CODES PLACE LIMITS ON MAXIMUM DELIVERED WATER TEMPERATURE, AN ANTI-SCALD OR TEMPERING VALVE MUST BE INSTALLED AS TANK AQUASTAT CANNOT GUARANTEE A MAXIMUM SUPPLY TEMPERATURE.

HOT WATER HEAT EXCHANGER AND BYPASS

THE PARALLEL FLOW PLATE HEAT EXCHANGER MUST BE MOUNTED WITH THE LONG SIDE VERTICAL. The heat exchanger is normally mounted in the ½" bypass line for EK-1 (¾" for the EK-2) at the boiler with an adjusting valve. Pipe to connections as marked on the plate heat exchanger. **The bypass line must still be installed on systems not using the heat exchanger in the bypass.**

WARNING:

The single wall plate heat exchanger complies with 1990 N.S.P.C. provided that both of the following are true:

- A) The boiler water (including additives) is practically non-toxic, having a toxicity rating or class of 1 as listed in Clinical Toxicology of Commercial Products, 5th Edition; and
- B) The pressure of the boiler water is limited to a max of 30 psig by an approved safety or relief valve.

BURNER MOUNTING

Non-Energy Kinetics supplied oil burners should be installed in accordance with burner instructions and with consultation with Energy Kinetics for any special considerations or adjustments. Check nozzle and electrode position per manufacturer's specifications prior to assembly to unit. **PLEASE NOTE: Burner head should extend 2-3/8" beyond the mounting flange and have an amulet (ceramic sleeve which fits over the burner head).**

The **EK-1** is shipped with Beckett AFG burner, cad cell relay with oil valve delay, interrupted ignition and .75 Delavan nozzle with 130 psi pump pressure. The **EK-2** is shipped with Carlin FRD99 burner, cad cell relay with oil valve delay, interrupted ignition, and 1.25 Delavan nozzle with 125 psi pump pressure. Optional burners for EK-1 and EK-2 are Carlin and Riello.

MODEL	INPUT (GPH)	NOZZLES (Delevan)	BECKETT	CARLIN FRD99	RIELLO 40F5
EK-1	.85	.75/130 PSI	.75 70° A (Best) 70° B, 80° A, 80° B Air: 7	.75 60° A Head: 1.5 Air: 50%	.75 60° B Head: 2.0 Air: 2.6
	1.0	.85/136 PSI	.85 70° A (Best) 70° B, 80° A, 80° B Air: 9	.85 60° A Head: 2, Air: 50%	.85 60° B Head: 2.5, Air: 3.6
EK-2	1.40	1.25/125PSI	<i>Not Applicable</i>	1.25 60° B Head: 3, Air: 45%	1.25 60° A Head: 3.5 Air: 4.0
	1.50	1.25/145PSI	<i>Not Applicable</i>	1.25 60° B Head: 3 1/2, Air: 50%	1.25 60° A Head: 4.0, Air: 5.0
	1.60	1.35/140PSI	<i>Not Applicable</i>	1.35 60° B Head: 4, Air: 60%	1.35 60° A Head: 4.0, Air: 5.5
	1.75	1.50/135PSI	<i>Not Applicable</i>	1.5 60° B Head: 4 1/2, Air: 75%	<i>Not Applicable</i>

To provide a tight seal at the burner flange, seal the air tube flange joint with a good grade retort cement. The burner is supplied with a protective ceramic head (*amulet*). The chamber end must clear head opening by approx. 1/8". Trim with a 45° chamfer. Align drain hole and grooves with burner head. Slide sleeve over head. If too tight, moisten inside of amulet slightly. If outside diameter of amulet is too large, sand chamber opening and/or amulet outside diameter with grit cloth. The ceramic head must be pressed with a flat object for complete contact with the burner retention head. Installed in this way, the sleeve protects the burner head and provides a tight seal of the air tube in the Energy Converter (boiler).

FUEL SYSTEM

All piping systems should conform with pump manufacturer's specifications that are attached to each new pump. The burner is capable of burning No. 1 or No. 2 heating oil. A firematic valve should be installed on the supply line. Oil lines should not be smaller than 3/8" O.D. copper tubing. Oil lines must be absolutely airtight. Use only flared joints and use dope suitable for oil on all threaded joints. **Do not use teflon tape on fuel system joints.** Check all joints and connections for leaks. A two-stage pump is required if lift exceeds approximately ten (10) feet. Follow instructions provided by pump manufacturer on single and two pipe connections for bypass plug usage and other specific installation requirements. **A HIGH QUALITY FUEL FILTER IS RECOMMENDED AND SHOULD BE MOUNTED NEAR BURNER.** (Energy Kinetics' "Smart Filter" or equivalent 10-micron filter is recommended.)

FILLING WITH WATER, VENTING, PURGING

When piping is completed and all accessories installed, the Converter and piping should be filled with water. The Converter purges itself of air when properly installed. **NOTE: AIR VENT CAP MUST BE OPEN.** Vent cap should be removed and kept in a safe location. Each zone should be purged until a steady stream of water without air passes out of purge hose. Vent all radiation. **DO NOT START BURNER UNTIL CONVERTER AND SYSTEM ARE FULL OF WATER.** Fill to normal "cold fill" pressure, usually 12 psi on pressure gauge. Before placing system in operation, carefully check for leaks throughout the system. Tighten gaskets, pipe joints, etc., to eliminate all leaks.

USING ANTI-FREEZE

Only non-toxic antifreeze (such as Propylene Glycol) should be used if adding antifreeze to a system that produces domestic hot water. *Hard water should not be used in combination with antifreeze.* If adding antifreeze, be sure to thoroughly clean system first. Once system is flushed, then add only enough antifreeze to obtain approx. a 30% mixture of antifreeze to water. Contact Energy Kinetics for details.

Products
 Concept of Operation
 B-1
 Natural Gas Installation
 B-2
 Venting
 C
 Diagnostics
 D
 Digital Manager
 E
 Classic Manager
 F
 Wiring-General
 G
 System Piping
 H
 Dom. Piping & Pool Appl.
 J
 Service & Maintenance
 K

CHIMNEY CONNECTIONS

PROPERLY CONSTRUCTED MASONRY CHIMNEYS MUST HAVE ACID RESISTANT TILE LINERS. THE LINER MUST EXTEND ABOVE THE MASONRY AND SHOULD INCLUDE A PROPER CAP. TILE LINERS MUST BE SEALED AT EACH JOINT TO PREVENT CONDENSATION WHICH MAY OCCUR FROM PASSING LINER INTO BRICK AND MOTOR.

THE BASE OF THE CHIMNEY MUST ALWAYS HAVE A DROP LEG BELOW THE FLUE CONNECTOR TO ALLOW FOR SCALE AND CONDENSATION TO ACCUMULATE WITHOUT BLOCKING THE FLUE PIPE. IN NEW CHIMNEYS IT IS DESIRABLE TO PROVIDE A DRAINAGE OPENING THROUGH FOOTING AT BASE OF THE CHIMNEY.

EXTERIOR CLEAN OUT DOORS MUST BE AVOIDED OR SEALED TO PREVENT COLD AIR ENTRY TO CHIMNEYS. IF LINER IS NOT SOUND, IT MAY BE NECESSARY TO INSTALL REDUCED SIZE METAL LINERS IF EXISTING CHIMNEY INDICATES FAILURE OF THE TILE LINER TO CONTAIN INTERMITTENT CONDENSATION.

IN RETROFIT INSTALLATIONS CAREFULLY INSPECT BASE OF CHIMNEY AND LINER PRIOR TO INSTALLATION. HAVE CHIMNEY THOROUGHLY CLEANED. IF EXCESSIVE DEBRIS IS FOUND AT THE BASE OF THE CHIMNEY, OR CONDENSATION IS INDICATED, RELINING OF THE CHIMNEY SHOULD BE CONSIDERED.

Use a flue pipe that is the full size of the boiler flue outlet (*see FIG. 2, pg. 2*). Pitch horizontal flue pipe up toward chimney approximately $\frac{1}{4}$ " per foot. Under normal circumstances, there is no need for a draft regulator (and one should not be installed unless mandated by local codes). Burner may fire at a slight positive pressure on start up. Chimney connectors should be positioned to effect the shortest possible run of flue pipe to the chimney.

The overall horizontal length of flue piping should not exceed 30 feet. Longer runs may be permissible if adequate chimney draft is available. Use only high quality lock-seam flue pipe. Securely fasten each joint with sheet metal screws. Long runs in cool spaces may require insulated connectors to keep temperature at base of chimney adequate for draft and to prevent corrosion of piping and connectors. The Energy Converter is tightly constructed and it is designed to operate at a slight positive pressure. Since the flue pipe may experience slight pressure on start up, it is recommended that all pipe joints be sealed with high temperature tape or silicone to ensure passage of all combustion products to the chimney.

NOTE: Inspect Chimney and Chimney base after initial three months of heating season.

No solid fuel appliance or fireplace should be installed in a flue common with this heating appliance. The flue gas exit of the venting system should be at least three (3) feet above the point at which it passes through the roof and at least two (2) feet higher than any portion of a building within 10 feet of its location.

L-VENT APPLICATION

1. L-Vent must be U.L. Listed to U.L. 641;
2. L-Vent to be installed in accordance with the vent manufacturer's instructions;
3. System 2000 and the L-Vent must be installed in strict compliance with all State and Local Codes and with the regulations of the authorities having jurisdiction, which may differ from and which take precedence over these instructions or the vent manufacturer's instructions.

SIDEWALL VENTING

1. When installing a sidewall venting system from another manufacturer, ensure that the manufacturer's installation instructions are followed. Vent manufacturer should confirm that the equipment is suitable for use with System 2000.
2. Set the draft at the breech of the boiler to between $-.10$ " w.c. and $-.12$ " w.c. with the burner running, allowing time for sufficient warm-up. Check CO₂ and readjust if necessary. Recheck the draft at breech, adjust if necessary.
3. To provide power to the sidewall vent, the Digital Manager Option Switch #2 must be "ON" (down) position. (*Refer to page 6 for option switch details.*)

WINTERIZING

Because the Energy Converter contains a small quantity of water, the addition of antifreeze is a practical solution for winterizing vacation homes or where intermittent operation may permit freezing temperatures to occur. If the system is to be drained for freeze protection, the Energy Converter requires a small quantity of antifreeze, approx. two (2) quarts, to be added to the Converter after draining through the relief valve opening to protect the innermost passage. Drain domestic hot water system and plate heat exchanger.

OPERATION

Make Certain The Following Requirements Have Been Satisfied Before Start Up:

1. The Converter and piping are completely filled with water.
2. Recheck wiring to ensure that it is correct and in accordance with wiring diagrams and codes.
3. Oil supply is connected to burner. Oil supply lines and shut-off valves are open.
4. Fuel pump is purged. Oil pressure gauge, if used, should have a range of at least 150 psi.
5. Proper nozzle is installed correctly.
6. Check the burner air shutter opening (see Table pg. 9 under "Burner Mounting").
7. Adjust water bypass valve on boiler side to heat exchanger ½ way open. (see #10 under "Start Up" below)
8. Flue pipe properly connected from unit to chimney. All joints are secured and sealed.
9. Combustion air supply is available and sufficient. (see pg. 3 "Air Box Option")
10. Adjust valve in domestic hot water circuit under circulator approx. ¾ of the way open.
11. Punch a ¼" sampling hole in flue pipe as near to unit as possible in flue outlet and loosen 1/8" plug in front jacket (under burner) for use as a sampling location.

START UP PROCEDURE

- (1) Turn on power supply.
- (2) Adjust a thermostat to call for heat. Burner and main circulator should come on at the same time. If not, push primary control to reset.
- (3) Check for burner light off. On a one pipe system, it may be necessary to bleed air from fuel pump. On a two pipe system, several starts may be required to clear air from fuel pump.
- (4) On light off, water temperature and chimney temperature will start to rise. A slight odor is common on initial light off as combustion chamber and converter surfaces warm for the first time. If smoke test is greater than a No. 3, open air shutter slightly.
- (5) As Unit reaches temperature, Digital Manager "Heating" light will signal heat distribution to zone(s) calling for heat. (On first start up, this will usually be the hot water storage tank zone.) When water temperature reaches 160°-180° F, adjust flow to tank by setting valve under domestic circulator pump so water temperature going into tank is approx. 140° F. (Hand can be held on pipe just briefly.)
- (6) Allow system to run about 15 minutes before testing CO₂/O₂ levels. Levels should be set as follows:
 - a. **BURNER SET-UP:** For most reliable operation, it is best to set Air-Fuel mixture conservatively based on installation conditions.
 - b. CO₂/O₂ reading should be taken through front jacket opening just below boiler supply (see pg. 3, FIG. 3, item #20). Probe must extend at least six (6) inches into front cover to obtain accurate readings. Smoke test and stack temperature should be taken at outlet.

Installation Conditions	CO ₂ Setting	O ₂ Setting
Normal Conditions	11%	6.5%
Active Area (Washer, Dryer, Shop)	10 ½%	6.8%
Outside Oil Tank	10%	7.1%

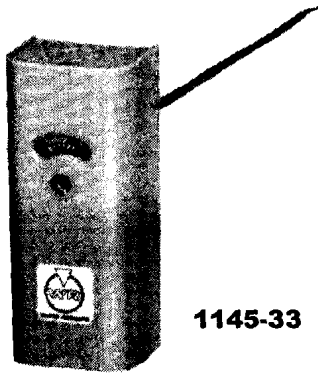
- Note 1:** For combinations of above, use lowest CO₂ level or highest O₂ level.
Note 2: When Air Box is used, CO₂ must be checked with cover in place. Set CO₂ to 11%.

c. CHECK AND RECORD:

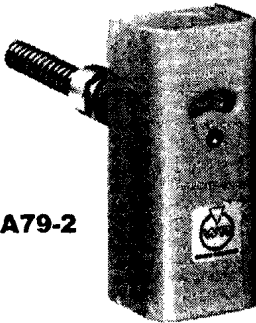
1. DRAFT AT BREECH/CHIMNEY Min. -.02 neg.*
2. CO₂/O₂ See table above
3. STACK TEMPERATURE 350° to 450° F
4. SMOKE TEST Set for 0 smoke at breech
5. DRAFT IN FRONT: Slightly Negative

*If not, recheck chimney, chimney base and flue pipe for blockage or clean out door openings.

Note: Air shutter opening should normally not be less than 6 - 7 on Beckett burner.



1145-33



11A79-2

FAST RESPONSE DIRECT IMMERSION CONTROLS

1145-33 Control has Thermal Element Immersed Directly in the Water for use as a High Limit and/or Operating Control. 11A79-2 for Immersion Directly in the Boiler Water. Use as a High Limit, Low Limit, Circulator Control or Combination Low Limit and Circulator Control.

FEATURES

- Specially designed hydraulic action element for fast response to temperature change.
- Temperature dial calibrated in °F and °C and can be adjusted through cover.
- Control mounts in any position without affecting performance.
- 3/4" bushing furnished with each control.

SPECIFICATIONS

Dimensions	(1145-33) 5 ³ / ₈ "H x 2 ⁵ / ₁₆ "W x 1 ⁷ / ₈ "D (11A79-2) 5 ³ / ₈ "H x 2 ⁵ / ₁₆ "W x 1 ⁷ / ₈ "D
Bulb Extensions	Element has 1/2" pipe threads (1145-33) 11 ³ / ₁₆ "beyond threads (11A79-2) 3 ³ / ₈ "beyond threads
Finish	Grey
Agency	U.L. listed and C.S.A. certified

PARTS AND ACCESSORIES See end of this section for parts and accessories

Model Number	Range	Differential	Thread Size	Switch Action	Full Electrical Rating	Motor Rating (Full Load)		Valves and Relays	
						120 VAC	240 VAC	24 VAC	0.3-12v DC
1145-33 ①	100 to 240°F (38 to 116°C)	5 to 45°F (3 to 25°C)	1/2"	Open on Rise	HTV See page 416	10.0A	6.0A	6.0A	1.0A
11A79-2 ②	100 to 240°F (38 to 116°C)	7 to 45°F (4 to 25°C)	1/2"	SPDT	HH See page 416	7.4A	3.7A	2.9A	—

① Dial has U.L. approved adjustable stop, factory pre-set at 185°F (85°C) maximum setting.
 ② Dial has U.L. approved adjustable stop, factory pre-set at 220°F maximum.

CONTRACTOR TIP: TESTING AUTOMATIC TEMPERATURE CONTROLS To verify a control is opening and closing properly, disconnect all power before testing. Testing must be performed with the sensing element at a temperature within the setting range of the control. For most hydronic controls with a range of 100 to 240°F, a pan of hot water is sufficient to reach the control range.

Attach an ohmmeter or continuity tester across the Open on Rise contacts. Lower the temperature setting dial to the lowest setting. If the lowest setting is below the temperature of the sensing element minus the differential of the control, the contacts should be open. Raise the temperature dial slowly. When the setting is raised above the temperature of the sensor, the contacts should close.

HYDRONIC

Downeast Energy – Springvale
 PO Box 704
 Springvale, ME 04083

Fax Cover Sheet—Springvale Daily Inventory

DATE: 5-25-11 **TIME:** 7:30 Am

TO: Transport Dispatch
 Downeast Energy **PHONE:** 799-5585 OR 1-800-472-9645

FAX: 799-5589

FROM: Carol
 Downeast Energy **PHONE:** 324-6777

FAX: 490-1113

RE: Daily Inventory

Number of pages including cover sheet: 1

Message:

Tank	Tank Size	Product	Inventory	Totals
T2	15,000	K1	<u>3896</u>	K1 <u>3896</u>
T1	30,000	#2	<u>8998.5</u>	
T3	12,000	0	<u>0</u>	Do not use tank empty & disconnected
→ T4	20,000	#2	<u>5980.79</u>	
→ T5	20,000	#2	<u>5980.79</u>	
→ T6	30,000	#2	<u>9858.00</u>	
→ T7	30,000	#2	<u>9755.5</u>	#2 <u>40,568.58</u>