



IMPORTANT FOR FUTURE REFERENCE

Please complete this information and retain this manual for the life of the equipment:

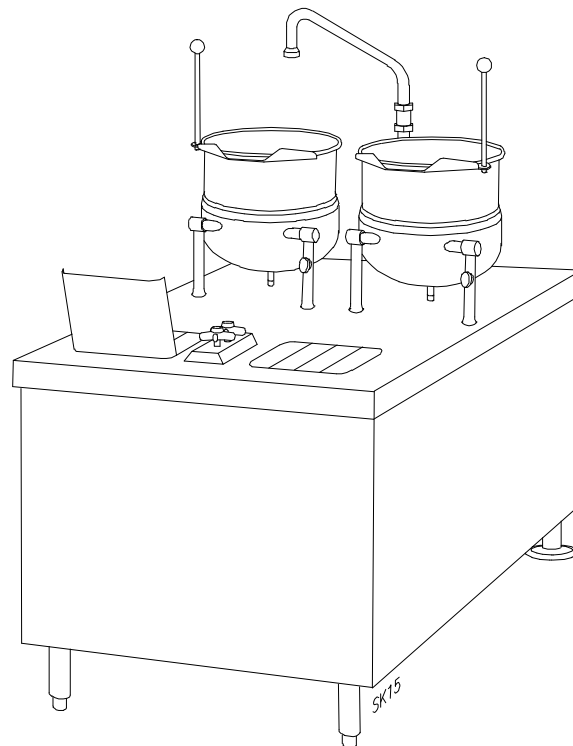
Model #: _____

Serial #: _____

Date Purchased: _____

INSTALLATION & OPERATION MANUAL


**Direct Steam Kettles on Electric Boiler Cabinet Base
EMT-6-(6,10,12) EMT-10-(6,10,12) EMT-12-(6,10,12)**



⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

CROWN FOOD SERVICE EQUIPMENT

 A Middleby Company

70 Oakdale Road, Downsview (Toronto) Ontario, Canada, M3N 1V9

Telephone: 919-762-1000 www.crownsteamgroup.com

Printed in Canada



INSTALLATION AND OPERATION MANUAL, DIRECT STEAM KETTLES MOUNTED ON
ELECTRIC BOILER BASE CABINET,
MODELS EMT-6, EMT-10, EMT-12, EMT-6-6, EMT-10-6, EMT-10-10

IMPORTANT NOTES FOR INSTALLATION AND OPERATION

It is recommended that this manual be read thoroughly and that all instructions be followed carefully.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



WARNING: Improper installation, operation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing, operating or servicing this equipment.



CAUTION: Operating, testing, and servicing should only be performed by qualified personnel.



WARNING: Disconnect the power supply to the appliance before cleaning or servicing.

Intended for commercial use only. Not for household use.

This manual should be retained for future reference.

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1.0 SERVICE CONNECTIONS

- ⚡ - Unless otherwise specified, Field Wire Electrical Connection to be 208, 220 or 240 volts, 3 Phase 60Hz. with grounding wire.
- Ⓛ - DRAIN: 2"IPS piped to open floor drain. No Solid Connection.
- Ⓢ - COLD WATER: 3/8" O.D. tubing at 25-50 PSI(170-345 kPa).
- Ⓡ - HOT WATER: 3/8" O.D. tubing at 25-50 PSI(170-345 kPa).
- Ⓢ - STEAM TAKE-OFF CONNECTION: 3/4"IPS optional to operate adjacent equipment.

WATER QUALITY STATEMENT

Water quality is the major factor affecting the performance of your appliance. If you are unsure of water quality, consult a local water treatment specialist and have the water analyzed. Your water supply must be within these general guidelines:

Total dissolved solids	Less than 60 PPM
Total alkalinity	Less than 20 PPM
Silica	Less than 13 PPM
Chlorine	Less than 1.5 PPM
pH Factor	7.0-8.5

Water which fails to meet these standards should be treated by installation of a water conditioner.

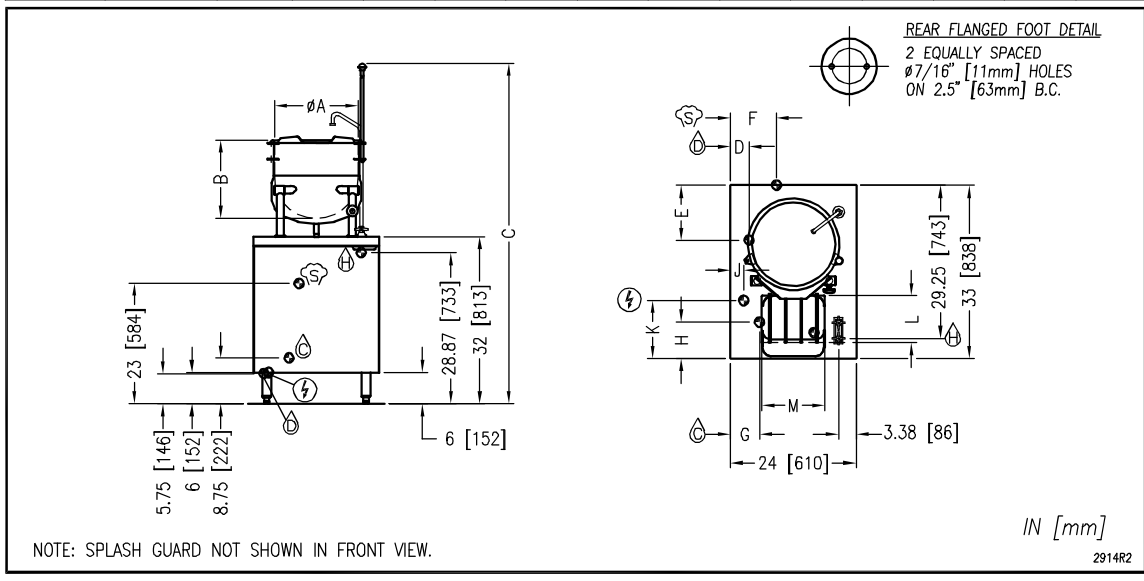
FAILURE OR MALFUNCTION OF THIS APPLIANCE DUE TO POOR WATER QUALITY IS NOT COVERED UNDER WARRANTY.

ELECTRICAL CHARACTERISTICS

MODEL	AMPS PER LINE								
	kW	PHASE	208V	220V	240V	380V	415V	480V	600V
EMT-6 EMT-10 EMT-12	24	3	66.6	63	57.7	36.5	33.4	28.9	23.1
	36	3	99.9	94.5	86.6	54.7	50.1	43.3	34.6
	42	3	116.6	110.2	101	63.8	58.4	50.5	40.4
	48	3	133.2	126	115.5	72.9	66.8	57.7	46.2

DIMENSIONS

MODEL	CAPACITY	UNITS	A	B	C	D	E	F	G	H	J	K	L	M
EMT-6	6 gallons 23 litres	inches mm	12 305	14.5 368	66.13 1680									
EMT-10	10 gallons 38 litres	inches mm	16 406	15 381	65.13 1654	3.5 89	10.5 267	8.75 222	5.5 140	7 178	2.5 64	11.12 283	9 229	12 305
EMT-12	12 gallons 45 litres	inches mm	16 406	17 432	67.13 1705									



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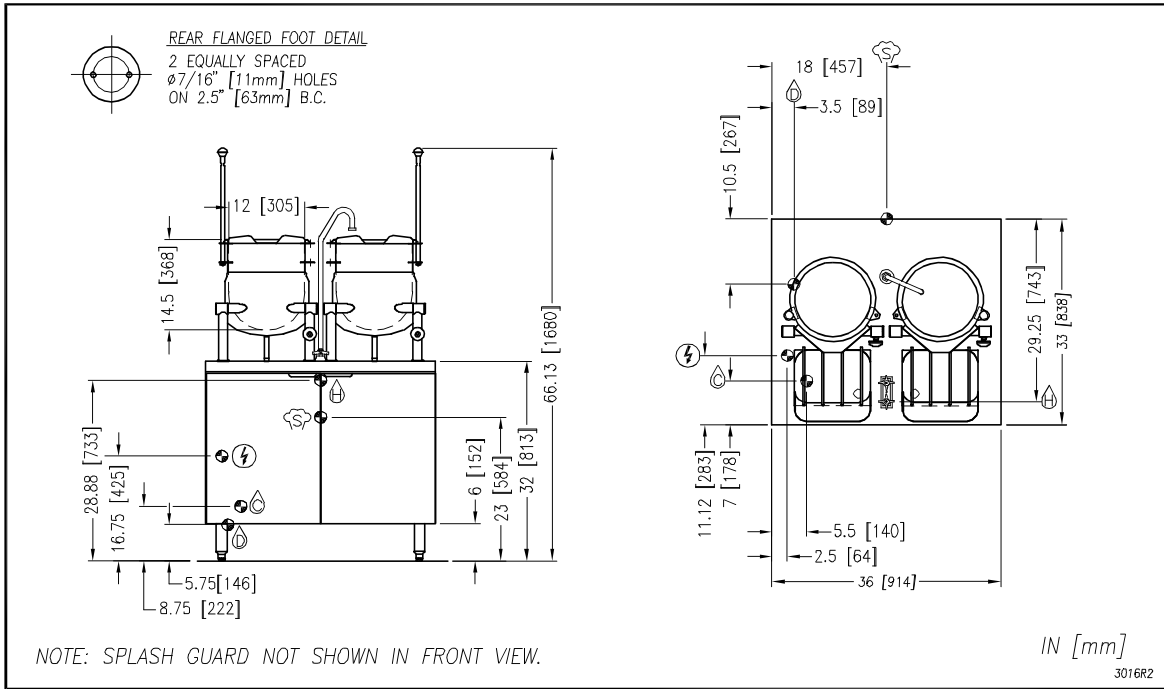
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	kW	PHASE	208V	220V	240V	380V	415V	480V	600V
EMT-6-6	24	3	66.6	63	57.7	36.5	33.4	28.9	23.1
	36	3	99.9	94.5	86.6	54.7	50.1	43.3	34.6
	42	3	116.6	110.2	101	63.8	58.4	50.5	40.4
	48	3	133.2	126	115.5	72.9	66.8	57.7	46.2



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- ⚡ – ELECTRICAL CONNECTION TO BE AS SPECIFIED ON RATING PLATE
- 💧 – DRAIN: 2"IPS piped to open floor drain. No Solid Connection.
- 💧 – COLD WATER: 3/8" O.D. tubing at 25–50 PSI(170–345 kPa).
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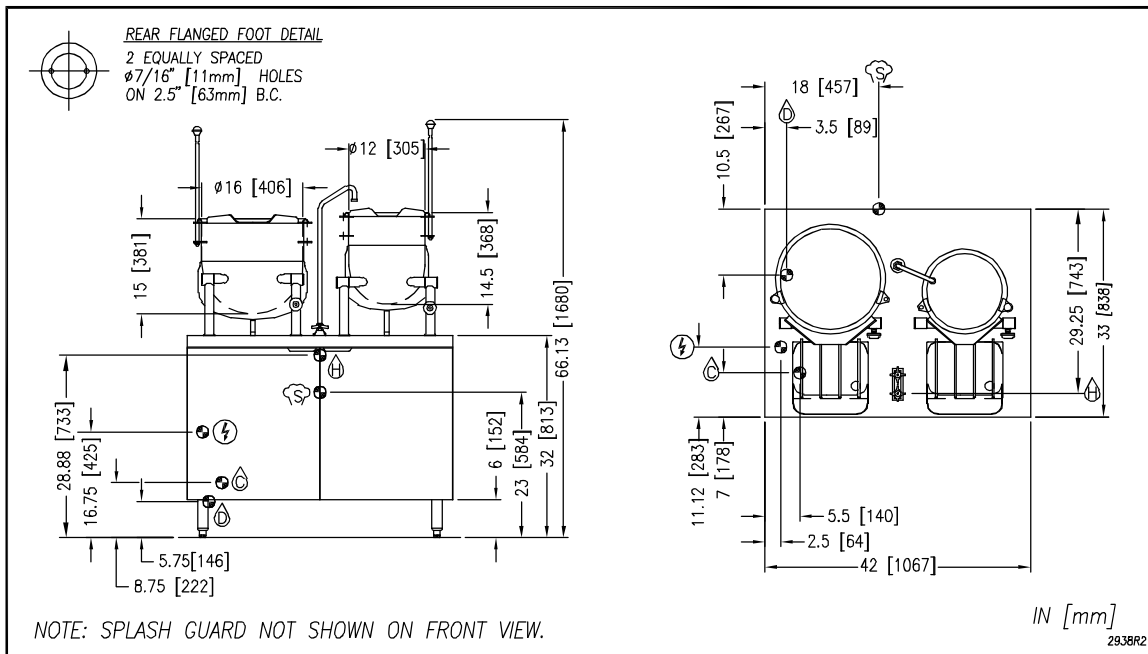
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ELECTRICAL CHARACTERISTICS

MODEL	AMPS PER LINE							
	kW	PHASE	208V	220V	240V	380V	415V	480V
EMT-10-6	24	1	115.4	109.1	100	N/A	N/A	N/A
		3	66.6	63	57.7	36.5	33.4	28.9
	36	3	99.9	94.5	86.6	54.7	50.1	43.3
	42	3	116.6	110.2	101	63.8	58.4	50.5
	48	3	N/A	N/A	115.5	72.9	66.8	57.7



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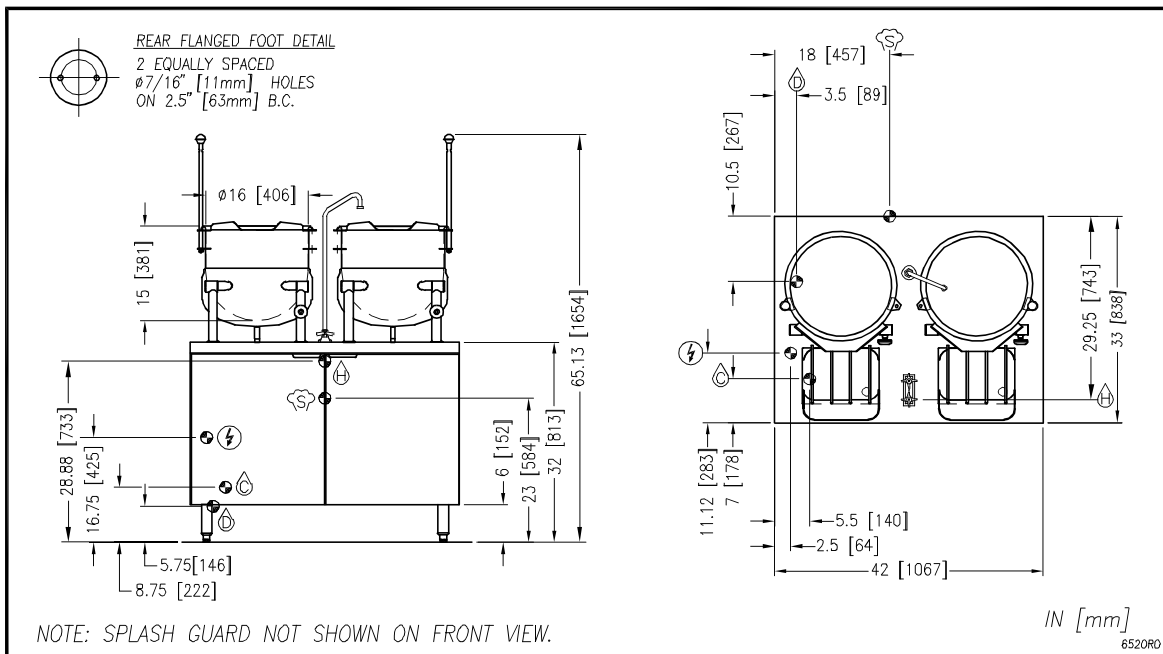
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ELECTRICAL CHARACTERISTICS

MODEL	AMPS PER LINE								
	kW	PHASE	208V	220V	240V	380V	415V	480V	600V
EMT-10-10	24	3	66.6	63	57.7	36.5	33.4	28.9	23.1
	36	3	99.9	94.5	86.6	54.7	50.1	43.3	34.6
	42	3	116.6	110.2	101	63.8	58.4	50.5	40.4
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2.0 INSTALLATION INSTRUCTIONS

GENERAL

Direct steam tilting kettle(s) mounted on a cabinet base, housing an ASME Code designed electric steam boiler approved as a steam boiler restricted to operation at pressure not to exceed 15 psi. Hot and cold water fill faucet, 5" (152 mm) deep sink with drain and splash guard(s). All models are suffixed with either -6, -10 or -12 to indicate the capacity of the kettle(s) in US gallons. The electric boiler may be rated at 24 kW, 36 kW, 42 kW or 48 kW. Operational on 208V, 220V, 240V, 380V, 415V or 480V and have optional CSD1 controls.

INSTALLATION

UNPACKING

Immediately after unpacking, check for possible shipping damage. If the appliance is found to be damaged, save the packaging material and contact the carrier within 15 days of delivery. Before installing, verify the electrical rating agrees with the specification on the rating plate.

LOCATION

Position the boiler in its installation location. Check that there are sufficient clearances to service the controls, door swing, etc. Also adequate clearance must be left for making the required supply and drain connections.

Allow enough space between any other piece of equipment or wall for service access. Service to the controls may be required on the left and/or right side panels of the cabinet.

INSTALLATION CODES AND STANDARDS

The boiler must be installed in accordance with:

In Canada:

Provincial and local codes, or in the absence of local codes, with the Canadian Electric Code, CSA C22.1 (latest edition). Copies may be obtained from the Canadian Standards Association, 178 Rexdale Blvd., Toronto, Ontario, Canada, M9W 1R3.

In the U.S.A.:

State and local codes, or in the absence of local codes, with the National Electrical Code, ANSI/NFPA-70 (latest edition). Copies may be obtained from The National Fire Protection Association, Batterymarch Park, Quincy, MA, U.S.A., 02269.

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LEVELLING AND ANCHORING THE CABINET

1. Place appliance in the installation position.
2. Place a carpenter's level on top of the appliance and turn the adjustable feet to level side-to-side and front-to-back.
3. Mark hole locations on the floor through the anchoring holes provided in the rear flanged adjustable feet.
4. Remove appliance from installation position and drill holes in locations marked on the floor. (See installation diagram on page 4.) Insert proper anchoring devices (not supplied).
5. Place appliance back in the installation position.
6. Place carpenter's level on top appliance and re-level side-to-side and front-to-back.
7. Bolt and anchor appliance securely to the floor.
8. Seal bolts and flanged feet with silastic or equivalent compound.

ELECTRICAL CONNECTIONS



WARNING: Electrical and grounding connections must comply with the applicable portions of the National Electrical Code and/or other local electrical codes.



WARNING: Disconnect electrical power supply and place a tag at the disconnect switch to indicate you are working on the circuit.

When making electrical connections, use copper wire suitable for at least 200°F (90°C). The steamer must be grounded in accordance with the National Electrical Code or applicable local codes. The wiring diagram is located on the inside of the right panel.

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EXHAUST HOOD

An exhaust system should be located directly above the boiler to exhaust steam and heat generated by the boiler.

PLUMBING CONNECTIONS (See Page 4)

WARNING: Plumbing connections must comply with applicable sanitary, safety, and plumbing codes.

Water Supply Connection

The incoming cold water supply connection, at the rear of the boiler cabinet, requires 3/8" tubing and water pressure of 25 - 50 psig. A manual shut-off valve must be provided convenient to the boiler; this valve should be open when the boiler is in operation.

Drain Connection

The boiler drain (2" IPS) should be piped to a floor drain near the boiler. There should be no solid drain connection; an "open gap" between the boiler and the floor drain is required.

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3.0 OPERATING INSTRUCTIONS

For CSD-1 equipped boilers, see section 4.0 CSD-1 Optional Feature for proper operating instructions.

BOILER CONTROLS (Inside Cabinet)

- Main Power Switch - ON fills the boiler tank and turns the boiler heaters on. You should allow 20 minutes to fill the tank and generate steam.
- OFF shuts off the boiler heaters and opens the Automatic Blowdown Valve, emptying the boiler tank and releasing water and steam to the drain. This should be done daily to remove sediment, lime, or scale.
- Pilot Light - Indicates main power is ON.
- Boiler Pressure Gauge - Should read 9 - 11 psig during operation; 0 psig during shutdown.
- Water Level Sight Glass - Observe level of water and water quality in the boiler. Murkiness in the water indicates inadequate water quality; the owner must supply proper water to the boiler (see Water Quality Statement, page 4).
- Water Level Control - While boiler is ON, briefly open the water level control valve once a day to remove any sediment that might accumulate. (See page 15 for detailed instructions.)
- Safety Valve - This valve will release (pop off) if the boiler has too much pressure. Once a week, this valve should be tripped during operation to make sure it functions properly.

OPERATION OF THE BOILER

Turn on water and power supply.

Open cabinet door and turn main power switch ON. Pilot light ignites and water begins to fill boiler - observe water gauge sight glass to verify that proper water level is reached.

Once the proper water level is reached, the heaters begin to heat the water. Heaters require about 15 minutes to begin steam generation. The boiler pressure gauge in the cabinet should indicate steam pressure in a range of 9 to 11 psig.

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3.0 OPERATING INSTRUCTIONS (Continued)

SHUT DOWN

Turn the Main Power Switch OFF. Open manual drain valve. If unit is supplied with Automatic Blowdown Valve, it will open, draining the boiler and releasing hot water and steam to the drain.

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4.0 CSD-1 OPTIONAL FEATURE

OPERATING, TESTING, SERVICING AND CLEANING INSTRUCTIONS

Start-up Procedure

1. Close the manual blowdown valve.
2. Open cabinet door and turn "ON" power switch.

The green pilot light will come "ON." Water will begin to enter the boiler. When enough water has entered the boiler, the (amber) "STANDBY" pilot light will come on.

3. Press the "RESET" switch to begin boiler operation.
The "STANDBY" pilot light will go off and the boiler will begin operation.

Normal Boiler Operating Cycle

Water Fill Cycle

On the initial filling of the boiler, the reset switch must be activated to initialize the safety lockout circuit. Once the water in the boiler has reached the proper level, the level control will stop the flow of water to the boiler. As water is consumed in the production of steam, the level control will supply additional water to the boiler.

Firing Cycle

The elements are operated by pressure sensing devices. On initial operation, the boiler should reach 11 psi in approximately 15 minutes. At this point, the operating pressure switch will open, de-energizing the elements. Thereafter the operating pressure switch will cycle the elements between 9 and 11 psi boiler pressure.

Condensing Drain

A thermostat is located in the drain assembly and is activated by the temperature of steam. The thermostat operates the cooling solenoid, supplying water to the drain to condense the steam.

Automatic Blowdown Valve

If the unit has an automatic blowdown valve, it is activated when the main power switch is activated. The boiler will be drained should the main power switch be turned "OFF."

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SAFETY LOCKOUT CONDITIONS

High Temperature Condition

A high temperature safety device is installed on the boiler. Should the temperature exceed the limit of this device, the boiler will be shut down and put in a state of lockout. The "TEMPERATURE" pilot light (red), and the "STANDBY" pilot light (amber), will come on.

High Pressure Condition

A high pressure safety switch is installed on the boiler. Should the pressure exceed the limit of this device, the boiler will be shut down and put into a state of lockout. The "PRESSURE" pilot light (red), and the "STANDBY" pilot light (amber), will come on. Should this device fail to operate, the safety relief valve will open.

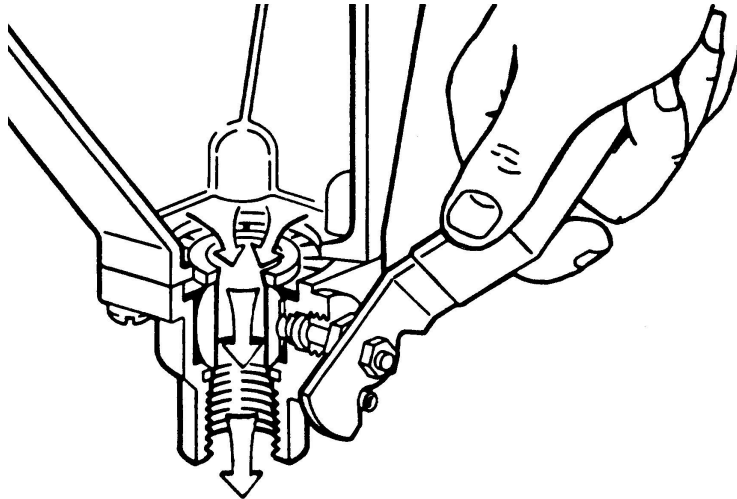
Low Water Condition

A second low water safety cut off is supplied with the boiler. Should the water level fall below normal operating levels, the boiler will be shut down and put into a state of lockout. The "LOW WATER" pilot light (red), and the "STANDBY" pilot light (amber) will come on.

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5.0 PERIODIC MAINTENANCE

Be sure to flush your boiler water level control daily. Failure to follow this procedure can cause the control to malfunction resulting in serious boiler damage.



The Boiler Water Level Control installed on your boiler requires periodic maintenance. As boiler water circulates into the float chamber, sand, scale and other sediment may be deposited in the float chamber. While the chamber has been designed with a large accumulation bowl, it is necessary to flush the sediment from the chamber by blowing down the control so that the accumulation of sediment does not interfere with the movement of the float in the control. Control must be flushed at least once a day.



CAUTION: Protect yourself. When flushing control, hot water and steam will flow out of the drain.

When flushing control, note water level in gauge glass, allow the boiler to fill if necessary, and also to come up to temperature.

Before flushing control, note that water level in gauge glass is within operating range and the boiler pressure is at least 6 psi. While the boiler is being fired, open blowdown valve at bottom of control by rotating the handle counterclockwise about 1/4 turn to fully open the valve. Opening the blowdown valve also checks the cut-off operation. Float should drop shutting elements off, hot water and steam will flow out the drain flushing away sediment.

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PERIODIC MAINTENANCE (Continued)

CAUTION: If heater does not shut off during blowdown, immediately discontinue use of appliance and call for service.

Continue draining water for about fifteen (15) seconds, from control until water is clean. Manually close valve. Recheck gauge glass. If water level has dropped significantly, wait for the boiler to restore water level and pressure and repeat if necessary.

1. Observe that the water in gauge glass is clean and clear. Extreme murkiness in water indicates inadequate water quality.
2. Safety valve should be tripped during operation once a week to assure that it functions properly.
3. Keep all exposed cleanable areas of unit clean at all times.



CAUTION: Take extra caution when blowing down water level control or tripping safety valve as extreme hot water and live steam are present.

DESCALING BOILER

It is recommended that the boiler be checked every 90 to 120 days for scale build up. Regular maintenance should be carried out at this time.

1. With boiler empty, close manual blowdown valve. If appliance is equipped with Automatic Blowdown, turn water supply to appliance OFF. Turn power switch ON. This will energize and close blowdown valve.
2. Remove 3/4" pipe plug from fitting on left front of boiler.
3. Insert appropriate hose or tube through fitting and pour in (½) half gallon (U.S.) of CLR Descaling Solution.

If available, use the Optional Deliming assembly DPA-1 available from your dealer.

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DESCALING BOILER (Continued)

4. Replace 3/4" pipe plug securely.
5. Open water supply to appliance allowing water to fill boiler to required level.
6. Let appliance cycle, allow two hours for descaling and cleaning. DO NOT TURN ON STEAM to attached appliances or to upper compartment.
7. Open both the blowdown and low water level control valves for complete drainage. After boiler drains, close both valves.
8. Turn appliance switch ON. When boiler is completely filled turn power switch OFF. This will rinse and drain boiler. Appliances with manual blowdown valve must be opened to drain.
9. Complete Step 8 twice to assure boiler is completely rinsed.
10. Appliance is now ready for use.

ADJUSTMENTS:

WARNING: At least twice a year have an authorized service person clean and adjust the unit for maximum performance.

TO CALIBRATE PRESSURE SWITCHES

NOTE: Pressure switches are factory set. Calibration is only required if pressure switches are replaced or if adjustment is required.

Pressure switch range is from 1 to 15 psi.

Adjust all settings to maximum on high signal adjustment screw on pressure switches.

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TO CALIBRATE PRESSURE SWITCHES (Continued)

Adjust in the following sequence:

- High limit pressure switch.
- Operating pressure switch.
- Turning screw clockwise to increase, counterclockwise to decrease pressure.
- Use relief valve to release pressure from boiler for settling adjustments.

1. HIGH LIMIT PRESSURE SWITCHES

Allow pressure to build until unit shuts off. This should occur at 15 psi. Set the high signal to switch at 14.5 psi on the gauge and the low signal to 13.0 psi.

2. OPERATING PRESSURE SWITCHES

Set the high signal to switch at 11 psi on the gauge and the low signal to 9 psi.

3. Release pressure in boiler to below 9 psi. Burner will come on. Once pressure has reached 11 psi, burners will shut off. Repeat this process several times to make sure burners come on at 9 psi and shut off at 11 psi.

Once completed, pressure switches have been calibrated.

SERVICE

Contact your local authorized service office for any repairs or adjustments needed on this equipment.

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6.0 TROUBLESHOOTING

NOTICE: Contact the factory, the factory representative or local service company to perform maintenance and repairs.

Water not being supplied to boiler

1. Water supply is "OFF".
2. Defective water fill solenoid.
3. Water level control clogged or defective, unable to operate fill valve.
4. Check drain valve is closed.
5. Supply water pressure too low.

Automatic blowdown valve does not drain

1. Defective blowdown valve.
2. Heat exchanger build up of scalant clogging drain lines and valve.

Boiler achieves pressure slower than normal

1. Heavy build up of lime on elements.
2. Loose element connections.

Safety valve blows

1. Defective safety valve.
2. Pressure too high, pressure switch requires adjustment (lower) or may be defective.

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7.0 INTRODUCTION - DIRECT STEAM KETTLES

FUNCTIONING MODE

Direct connected steam jacketed kettles consist of a stainless steel bowl and a stainless steel jacket which envelopes two thirds of the lower surface of the bowl thus forming a sealed pressure vessel (chamber) into which steam is introduced by means of a manual control valve.

The kettle bowl is the container for the food product which ideally should be of a liquid or semi-liquid consistency to achieve complete contact with the bowl surface and thus fully absorb the heat transmitted through that surface.

The temperatures required for the cooking process to function adequately must be greater than the boiling point of the liquid food product. Further, the greater the steam pressure used, the higher the temperature and consequently the quicker the cooking process. For example, steam pressurized at 30 p.s.i. attains a temperature of 274 degrees Fahrenheit (135 degrees Celsius).

In the initial stages of the cooking process when the steam comes in contact with the cold kettle bowl surface it condenses and forms considerable amounts of water. A thermostatic steam trap has been plumbed to the exit end of the kettle jacket. This trap is a mechanical device that closes on high temperatures and opens when the temperature drops thus allowing the water formed from condensate to exhaust but retain steam under pressure.

INSTALLATION AND OPERATION MANUAL, DIRECT STEAM KETTLES MOUNTED ON
ELECTRIC BOILER BASE CABINET,
MODELS EMT-6, EMT-10, EMT-12, EMT-6-6, EMT-10-6, EMT-10-10

8.0 OPERATING PROCEDURES



CAUTION: The appliance and its parts are hot. Use care when operating, cleaning and servicing the appliance.

WITH BOILER IN OPERATION MODE

1. Fill kettle with product to desired level.
2. Slowly turn the steam control valve to full open position.
3. The water or food should boil 3 - 4 minutes per gallon. If it does not, then incoming pressure should be checked to determine that it is adequate to operate the kettle efficiently.
4. Regulate steam control valve depending on type of food being prepared.
5. When food is cooked, turn off steam, remove food and clean kettle immediately to prevent residue from drying on kettle bowl surface.

INSTALLATION AND OPERATION MANUAL, DIRECT STEAM KETTLES MOUNTED ON
ELECTRIC BOILER BASE CABINET,
MODELS EMT-6, EMT-10, EMT-12, EMT-6-6, EMT-10-6, EMT-10-10

9.0 CLEANING PROCEDURES



CAUTION: Do not use cleaning agents that are corrosive.

Your kettle should be cleaned immediately after each use.

1. Ensure that steam supply is OFF.
2. Pre-rinse inside of kettle thoroughly and tilt to remove any food particles.
3. Using a nylon brush, clean kettle with a mild detergent and warm water rinse. Never use steel wool or scouring powder as it will scratch stainless steel.
4. Tilt kettle and rinse thoroughly draining out detergent solution.

Use of cleaning agents that contain chloride, acids or salts are corrosive and may cause pitting and corrosion when used over a period of time; this will reduce the life of the appliances.

Should pitting or corrosion occur this is not covered by warranty.

Follow the recommended cleaning instructions. Use a mild detergent, warm water and rinse thoroughly.

WHAT TO DO IF SURFACE RUST APPEARS

Metal utensils should never be used as they will scratch the surface of the equipment and rust may begin to form. To remove surface accumulation of rust from the inadvertent use of such utensils, the following procedure may be used.



CAUTION: Improper use of this procedure may damage your appliance!

1. Use undiluted white vinegar with a non-abrasive scouring pad (plastic) or cloth on the affected area to remove the rust stain. The appliance should not be heated and remain at room temperature during the entire cleaning process.

INSTALLATION AND OPERATION MANUAL, DIRECT STEAM KETTLES MOUNTED ON
ELECTRIC BOILER BASE CABINET,
MODELS EMT-6, EMT-10, EMT-12, EMT-6-6, EMT-10-6, EMT-10-10

WHAT TO DO IF SURFACE RUST APPEARS (Continued)

2. If the stain resists removal, additional exposure time with vinegar may be required, to a maximum of one hour.
3. Thoroughly wash all of the vinegar away with fresh clear water. Dry the surface completely and allow one hour before using the appliance to cook.

Following daily and period maintenance procedures will prolong the life for your equipment. Climatic conditions - salt air - may require more thorough and frequent cleaning or the life of the equipment could be adversely affected.

10.0 PREVENTIVE MAINTENANCE

No preventive maintenance is required other than adhering to the Cleaning Procedure instructions.



NOTICE: Contact the factory, the factory representative or local service company to perform maintenance and repairs.