

COMMERCIAL BOILERS

COMMERCIAL ELECTRIC COMPACT BOILERS

STANDARD FEATURES

PRESSURE VESSEL AND ENCLOSURE

Built to 160 psi, 250 °F design standard

Wrapped with 4" thick blanket of fiberglass insulation.

Boiler vessel enclosure is 16-Gauge painted steel jacket mounted on a full-size, flanged steel base.

Electronic control panel built into the NEMA-1 compliant enclosure, accessible via key-locked door(s).

STANDARD ELECTRIC & CONTROL PACKAGE

Incoloy sheathed, U-Shaped heating elements rated to 75 watts-per-square-inch and individually mounted in 2-1/2 inch-square flanges for easy removal and replacement.

Main supply circuit lugs with integral branch circuit fusing.

Magnetic contactors rated @ 500,000 cycles

120 volt fused control transformer

Electronic Temperature Control

› BW*1: Automatic electronic temperature control varies by model:

1) For one and two step models, electronic multi-stage step control.

2) For three and four step models, Proportional Progressive Sequence Step Control

› BW*2 & BW*3: All models feature automatic electronic temperature control via Proportional

Progressive Sequencing. This feature extends the life of the heating elements inside the pressure vessel.

STANDARD TRIM PACKAGE

Drain valve

On/Off power switch with pilot light

Pressure gauge w/cock

ASME safety relief valve(s)

One status pilot light for each step

Water inlet & outlet connections:

› 3" NPT

Low Water Cut-Off Switch:

› Probe type with manual reset, test & pilot light to meet CSD-1 requirements.

KW Limiting Switch(es):

› All BW*1-3 models feature an On/Off toggle switch for each step. In the off position, the toggle switch cuts power to its assigned step,

disabling that step, thereby limiting the maximum KW output from the boiler.

High Temperature Limit Switches:

› All BW*1-3 models are equipped with two temperature limit switches: one with an auto reset and one with a manual reset.

Temperature Gauge:

› All BW*1-3 models are equipped with a dial type temperature gauge plus a digital electronic temperature readout on the temperature controller interface.

Flow Switch (BW*2 & BW*3):

› Installed on inlet side of boiler to prevent boiler heating when there is little or no water flow into the boiler. In a low flow or no flow condition, the temperature controller may detect a drop in boiler temperature and signal a call for heat, despite no inlet water flow into the boiler. The flow switch signal cuts power to the step controller, preventing the boiler from heating.

On-Board Alarm System (BW*2 & BW*3):

› Audible alarm buzzer with silencing switch, plus an additional common alarm light that signals any or all of the following abnormal boiler conditions:

(1) excessive tank temperature, (2) zero flow or low flow into the boiler tank, and/or (3) low water condition in the tank.



CODES & REGISTRATIONS

UL Subject 834

NEC/NFPA Article 424-G

ASME Safety Code CSD-1

ASME Certified, "H" Stamp / National Board

NEMA-1 (Electronic Control Panel)

DESIGNED ★ ENGINEERED ★ ASSEMBLED

USA



Lochinvar®

HIGH EFFICIENCY BOILERS & WATER HEATERS

OPTIONAL EQUIPMENT

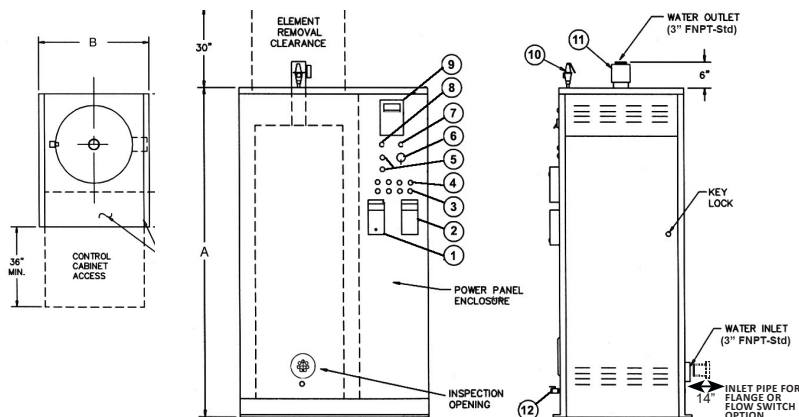
Flow Switch:	<ul style="list-style-type: none"> › Installed on inlet side of boiler to prevent boiler heating when there is little or no water flow into the boiler. In a low flow or no flow condition, the temperature controller may detect a drop in boiler temperature and signal a call for heat, despite no inlet water flow into the boiler. The flow switch signal cuts power to the step controller, preventing the boiler from heating. › Note that Flow Switch is included as Standard Equipment on BW*2 and BW*3 models.
Additional Step Control:	<ul style="list-style-type: none"> › When adding steps to standard models, note that the total number of steps cannot exceed the total number of available elements. Price includes On/Off toggle switch and status light. In the off position, the toggle switch cuts power to its assigned step, disabling that step, thereby limiting the maximum KW output from the boiler. › Price is per step.
Additional Step Control Circuits:	<ul style="list-style-type: none"> › When adding steps additional circuits may be required. Note that the space available inside the control cabinet is fixed, so there are limits to the number of circuits that can be added to each model. › Price is per circuit. › For more information, please contact factory.
Auxiliary Temperature Limit Switches:	<ul style="list-style-type: none"> › Auxiliary high temperature limit switches that interface with sensors that are typically installed outside the boiler, e.g. in the water loop. Includes switch, manual or auto reset (specify type), temperature sensor and dry-well.
High Pressure Limit Switch:	<ul style="list-style-type: none"> › Switch includes pressure sensor. When boiler pressure exceeds specified limit, switch cuts power to elements before excessive boiler pressure causes pressure relief valve to open.
Control Panel Door Solenoid Interlock:	<ul style="list-style-type: none"> › When main power to boiler is on, solenoid is energized and control panel door is locked. Turn-off main power to boiler, solenoid de-energizes and unlocks control panel door – allowing access.
Substitute Float-type Low Water Cut Off Switch:	<ul style="list-style-type: none"> › In lieu of probe-type LWCO. Complies with CSD-1
Auxiliary Low Water Cutoff Switch:	<ul style="list-style-type: none"> › Every BW*1, BW*2, and BW*3 model includes as standard equipment a probe-type low water cut-off switch with manual reset, test and pilot light to comply with CSD-1. This option adds an auxiliary, redundant LWCO that complies with CSD1. › Choose between Probe or Float type LWCO.
On-Board Alarm System (BW*1 Only):	<ul style="list-style-type: none"> › Audible alarm buzzer with silencing switch, plus an additional common alarm light that signals any or all of the following abnormal boiler conditions: (1) excessive tank temperature, (2) zero flow or low flow into the boiler tank, and/or (3) low water condition in the tank. › Note that On-Board Alarm System is included as Standard Equipment on BW*2 and BW*3 models.
BMS Alarm Interface:	<ul style="list-style-type: none"> › Upgrade to include dry contacts that permit connection with BMS. Interface allows BMS to monitor boiler conditions and recognize any or all of the following abnormal conditions: (1) excessive tank temperature, (2) zero flow or low flow into the boiler tank, and/or (3) low water condition in the tank.
BMS Remote Step Control:	<ul style="list-style-type: none"> › On-board manual switch. In “Local” position, switch gives control to on-board temperature controller. In “Remote” position, switch blocks signal from on-board controller and gives step control to BMS. Requires analog input signal from system.
BMS Remote Set-Point Control:	<ul style="list-style-type: none"> › Temperature controller upgrade that allows for a BMS link with onboard controller, permitting BMS to adjust boiler temperature set-point.
BMS 120 V Interface to Limit Boiler Power Demand:	<ul style="list-style-type: none"> › This option provides a terminal strip with dry contacts that allow a 120V interface for BMS. This interface permits BMS to interrupt power to specific steps, limiting maximum KW output from boiler when total power demand inside building peaks and power must be rationed. › Price is per step.
BMS 24V Interface to Limit Boiler Power Demand:	<ul style="list-style-type: none"> › This option adds 24V Relay(s) to provide an interface for BMS. This option permits BMS to interrupt power to specific steps, limiting maximum KW output from boiler when total building power demand peaks and total available power must be rationed. › Price is per step.
Outdoor Temperature Reset:	<ul style="list-style-type: none"> › Temperature controller upgrade that provides outdoor temperature sensor that the onboard controller uses to automatically adjust boiler set-point temperature. Set-point adjustment is predetermined and specified by operator inputs to the temperature controller. › Note that controller cannot accommodate both Outdoor Temperature Reset and BMS Remote Set-Point Control. › For more information, consult factory.
Time Clock (24-hr or 7-day):	<ul style="list-style-type: none"> › Controller upgrade that allows building management to predetermine boiler operating periods.
E-Stop Mushroom Button:	<ul style="list-style-type: none"> › Locally mounted on side on boiler or shipped loose for field installation.
Multifunction Power and Energy Meter	<ul style="list-style-type: none"> › Displays and records multiple values, including: Volts, Amps, kW, kVAR, PF, kVA, etc. Includes 4-20 mA output.
Ground Fault Detection (GFI):	<ul style="list-style-type: none"> › Interrupts power to boiler upon high ground current.
Single Phase (BW*1 Only)	<ul style="list-style-type: none"> › For more information consult factory.

Main Power Disconnect - Rotary Handle:	› The switch handle is mounted on the control panel door, but connects through the door to the switch mechanism. The switch mechanism is mounted on the control panel, and operated by this “through the door” handle design. The handle and shaft provide a door interlock; the door cannot be opened when the switch is in the “ON” position. › Rotary Handle Door Interlock can be combined with Control Panel Door Solenoid Interlock to enhance boiler room safety. › Non-Fused › Fused	
Main Power Disconnect - Circuit Breaker:	› Circuit breaker is mounted on the control panel, with the switch protruding through a slot in the control panel door. › Non-Auto › Auto	
Separate NEMA-1 120V Controls Enclosure:	› Option allows for two separate control panels and enclosures. One panel with enclosure for main power to heating elements, and a separate panel with enclosure for 120V boiler controls.	
SCR (Silicon Controlled Rectifier)	› Provides modulation capability with one step of elements.	
SCCR (Short Circuit Current Rating)	› 65,000 A › 100,000 A	
Mechanical Options	› 4”NPT Inlet/Outlet Connections (BW*3 only) › Upgrade to 3-inch Flanged Connections: › Upgrade to 4-inch Flanged Connections: › Lifting Lugs: › 304 Stainless Steel Vessel and Non-Ferrous Trim Note: Stainless Steel is limited to 210°F max temperature per ASME Code Section IV.	
BACnet & Modbus	› Provides an interface to Building Management Systems (BMS) that use the BACnet or Modbus communications protocols to monitor(read) or control (write) boiler operating parameters and pre-sets. Standard 4” Siemens HMI Touchscreen.	
	Standard Pre-Selected Monitoring and Control Points	
	› Monitor (Read) Boiler Parameter Boiler Temp/Pressure Set-Point Boiler Actual Temp/Pressure Boiler Low Water Alarm Boiler High Temperature Alarm Number of Heating Steps On Boiler Load Status (% Max Rated) Boiler Load Limit (% Max Rated) Alarm History	› Control (Write) Boiler Parameter Reset Boiler Temp/Pressure Set-Point Remote Boiler Start/Stop Reset Boiler Load Limit (% Max Rated)
	› Modbus › TCP/IP RTU IP Addresses Required: CPU HMI	› BACnet IP MSTP IP Addresses Required: CPU HMI Gateway

COMMERCIAL ELECTRIC COMPACT BOILER DIMENSIONS & SPECIFICATIONS

Model Number	Max. Flow (GPM)	Connection Sizes (NPT)	Dia (In)	Vol (Gal)	Dimensions		Weight	
					A	B	C	lbs.
BW*1-***C	230	3"	12"	22	52"	24"	30"	600
BW*2-***C	230	3"	16"	36	52"	28"	34"	800
BW*3-***C	230	3"	20"	56	52"	32"	38"	1,100

*Notes: 4"/300 GPM is Optional. Power Panel will be taller or wider for ABB Disconnect option. Consult factory. Optional equipment may change overall boiler dimensions. Please consult factory for dimensional information.



COMPONENTS

1. Temperature Limit, Auto Reset
2. Temperature Limit, Manual Reset
3. Manual Limit Switches
4. Pilot Lights, Amber (Steps “On”)
5. PB Switches
 - › (Low Water Cutoff “Test”/”Reset”)
6. Toggle Switch (Control Power)
7. Pilot Light, Amber (Control Power “On”)
8. Pilot Light, Red (Low Water)
9. Temperature Setpoint / Control / Readout
10. Safety Relief Valve
11. Temperature & Pressure Gauges
12. Drain Valve

Note: Detailed electrical and dimensional drawings are supplied with the shipment of the boiler. If these documents are required prior to unit order, please contact Customer Service as additional charges may apply.

COMMERCIAL ELECTRIC COMPACT BOILERS

RATINGS & CIRCUIT CONFIGURATIONS

Model Number	Rating MBH	kW	208 & 240 Volt				480 Volt				600 Volt			
			Elements Qty	kW	Number of : Circuits	Steps@ kW	Elements Qty	kW	Number of: Circuits	Steps@ kW	Elements Qty	kW	Number of: Circuits	Steps@ kW
BW*1-160C	546	160	N/A	N/A	N/A	N/A	8	20	4	4@40	N/A	N/A	N/A	N/A
BW*1-164C	559	163.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7	23.4	4	1@70.2, 2@46.8
BW*2-165C	563	165	11	15	11	1@45, 4@30	11	15	6	1@45, 4@30	N/A	N/A	N/A	N/A
BW*2-180C	614	180	12	15	12	6@30	9	20	5	4@40, 1@20	N/A	N/A	N/A	N/A
BW*1-187C	639	187.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8	23.4	4	4@46.8
BW*2-200C	682	200	N/A	N/A	N/A	N/A	10	20	5	5@40	N/A	N/A	N/A	N/A
BW*3-210C	717	210	N/A	N/A	N/A	N/A	14	15	7	7@30	N/A	N/A	N/A	N/A
BW*2-211C	719	210.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9	23.4	5	1@70.2, 3@46.8
BW*3-225C	768	225	N/A	N/A	N/A	N/A	15	15	8	1@45, 6@30	N/A	N/A	N/A	N/A
BW*2-234C	798	234	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10	23.4	5	5@46.8
BW*2-240C	819	240	N/A	N/A	N/A	N/A	12	20	6	6@40	N/A	N/A	N/A	N/A
BW*2-257C	878	257.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11	23.4	6	1@70.2, 4@46.8
BW*3-280C	955	280	N/A	N/A	N/A	N/A	14	20	7	7@40	N/A	N/A	N/A	N/A
BW*2-281C	985	280.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12	23.4	6	6@46.8
BW*3-300C	1024	300	N/A	N/A	N/A	N/A	15	20	8	1@20, 7@40	N/A	N/A	N/A	N/A
BW*3-304C	1038	304.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	23.4	7	1@70.2, 5@46.8
BW*3-320C	1092	320	N/A	N/A	N/A	N/A	16	20	8	8@40	N/A	N/A	N/A	N/A
BW*3-330C	1126	330	N/A	N/A	N/A	N/A	22	15	11	5@30, 3@60	N/A	N/A	N/A	N/A
BW*3-351C	1198	351	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15	23.4	8	1@70.2, 6@46.8
BW*3-360C	1228	360	N/A	N/A	N/A	N/A	18	20	9	9@40	N/A	N/A	N/A	N/A
BW*3-398C	1357	397.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17	23.4	9	1@70.2, 7@46.8
BW*3-400C	1365	400	N/A	N/A	N/A	N/A	20	20	10	6@40, 2@80	N/A	N/A	N/A	N/A
BW*3-421C	1437	421.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18	23.4	9	2@70.2, 6@46.8
BW*3-440C	1501	440	N/A	N/A	N/A	N/A	22	20	11	5@40, 3@80	N/A	N/A	N/A	N/A
BW*3-445C	1517	444.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19	23.4	10	3@70.2, 5@46.8
BW*3-468C	1597	468	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	20	23.4	10	4@70.2, 4@46.8
BW*3-491C	1677	491.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21	23.4	11	5@70.2, 3@46.8

Notes: # = Oversize control cabinets are supplied for these models at 208 & 240 volts.

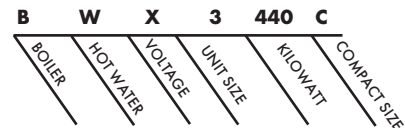
VOLTAGE SCHEDULE

B - 240V	3PH
K - 208V	3PH
X - 480V	3PH
N - 600V	3PH

Consult Factory for single phase

Normal Operating Pressure and Safety Relief Valve Setting are required prior to placing an order.

FOR EASE IN ORDERING BY MODEL NUMBER



This is a 480 volt, three phase, 440 Kilowatt compact size electric hot water boiler.

For technical information call 800-722-2101. Lochinvar, LLC reserves the right to make product changes or improvements without prior notice.



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