

APEX™ Series

Stainless Steel, Condensing, Gas Fired Commercial Boiler



- **95% Thermal Efficiency**
- **Equipped with ABC 2.1 Control System**
 - **Multiple Boiler Lead/Lag for up to 8 Boilers**
 - **Multi-color LCD Touchscreen Display**
 - **Intuitive Text-based Menus**
 - **Includes Outdoor Reset**
- **Commercial Stainless Steel Heat Exchanger**
- **Multiple Venting Options**
- **Low NOx**
- **Negative Pressure Cabinet**
- **5:1 Modulation**

BURNHAM®
Commercial Boilers

Apex Boiler Features



High Performance Commercial Hydronic and Radiant Heating

Introducing the Apex from Burnham Commercial, a condensing boiler with thermal efficiency ratings of 95%. The Apex utilizes a stainless steel heat exchanger, designed to extract maximum heat from the combustion process, along with the Apex Boiler Control System which is designed to enhance boiler & system efficiency and provide easy installation and servicing. These intelligent features are wrapped in a sleek, modern appliance-like jacket, which makes the Apex both attractive and smart.

Stainless Steel Heat Exchanger

The heart of the Apex boiler is the ASME-certified stainless steel heat exchanger. Each heat exchanger is factory hydro-tested to insure quality and reliability.



The Apex Boiler Control System

The Apex Boiler Control System (ABC System) has many features which maximize the efficiency and comfort of a heating system, while providing unmatched ease of use (for a full description of these features, please see pages 4-5)

- Full color backlit touchscreen display
- Intuitive menus which provide data in simple text, not in cryptic codes
- Capable of linking up to eight boilers and three pumps simultaneously
- Control data logging
- Outdoor reset and warm weather shutdown
- Domestic hot water priority
- Full modulation with 5-to-1 turndown and adaptable firing rate output
- Built in provision for off-season pump exercising
- Plug & play connections
- Multiple & adjustable pump outputs
- Night setback & unoccupied modes
- 4-20mA and modbus inputs



Single Point Power

Boiler pump and DHW pump are powered directly from the Apex

Sealed Combustion with Negative Cabinet Pressure

Lower portion of the boiler cabinet operates under a negative pressure, creating an additional layer of safety

Simple Connections

All gas, water, and electrical connections are made from the left side of the boiler

Condensate Protection

Unique polypropylene condensate trap (patented) stands up to acidic condensate, and features an integral float switch which protects the heat exchanger from condensate back-up



Sealed Top Panel

The sealed top panel protects boiler controls from spills or leaks; the components are also isolated from the lower jacket to protect them from cold or moist combustion air

Smart Controls

ABC 2.1 control system offers multiple boiler lead/lag for up to 8 boilers, multicolor LCD touchscreen display, intuitive text-based menus, and outdoor reset

Efficient Combustion

Air and fuel are pre-mixed in the blower assembly for clean, balanced combustion, longer component life, and protection of mechanical fan components

Design Simplicity

Separate spark rod and flame sensor are used for longevity and reliability

Durable, efficient stainless steel heat exchanger

Maximizes heat transfer

Apex Boiler Control... Features Beyond Compare.

The Apex Boiler Control System is the next generation of advanced electronic controls designed specifically for condensing boilers. The ABC System was designed with many features that make the control simple to understand and use, as well as features that optimize boiler performance, flexibility and overall system efficiency and reliability. The ABC System is simply the most powerful, versatile, and user-friendly boiler control available.

Touch Screen LCD Display

- Simple setup! Requires only four inputs (boiler minimum and maximum water temperatures and outdoor air minimum and maximum temperatures)
- Boiler status, settings, and diagnostic information are all accessible from the display in simple English text.
- Control settings can be adjusted from the display, advanced settings are password protected.
- Built-in diagnostics allow simple trouble-shooting.
- No external laptop computer required for setup or adjustments, both can be accomplished via the LCD display.
- Display turns red in the event of error or blackout. Blinking buttons guide the user through diagnostic screens that explain the issue and how to resolve or repair the issue. Help screens are provided, offering detailed explanations of each setting in simple terms that are easy to understand.

Control Data Logging

- Can display and recall information from numerous control parameters.
- Previous five (5) lock-out events can be recalled on the display. Real time trending tracks the following four parameters: Supply Temperature, Return Temperature, Flame Signal, and Boiler Firing Rate in a running graphic display.
- Logs runtime hours for the boiler as well as the number of cycles for the boiler, the boiler pump, the DHW pump, and the system pump. This information can assist in diagnosing both boiler and system issues, saving valuable time on service calls.

Outdoor Reset

- Adjusts boiler temperature based on the outdoor temperature.
- Helps to keep the boiler in condensing mode longer, resulting in higher efficiency.
- Improves comfort by reducing overheating of the zones.
- Easily adjustable, using simple parameters (outdoor high and low temperatures, and boiler high and low temperatures).

Domestic Priority with Priority Protection

- Directs boiler output to the indirect water heater in order to minimize recovery time.
- Priority Protection is provided to allow the boiler to continue heating the building in the event of excessive domestic hot water demand.

Control Flexibility

- Responds to multiple heating demands, and features adjustable pump outputs, allowing for greater installation and piping flexibility.
- Pump outputs can be selected and adjusted for the boiler, the system, and the domestic hot water pumps.

Adaptable Firing Rate Output

- Allows the boiler's output to be adjusted for varying heat loads connected to the system.
- Reduces boiler cycling, wear and tear on parts, and enhances heating efficiency and comfort.

Multiple Firing Rate Sensor Options

- Accommodates piping arrangements that are better suited to select the firing rate of the boiler based on the header temperature, rather than the boiler supply temperature.
- Enhances the versatility of the Apex boiler by integrating into existing systems without requiring additional controls.

Warm Weather Shutdown

- Ideal for commercial installations that maintain heating loop temperatures year round.
- Can be adjusted to allow the heating loop to cool when the outdoor temperature reaches a specified temperature.
- Reduces unnecessary boiler/pump cycling and standby losses. but will still respond to DHW demands.

Freeze Protection

- If possible freezing water temperatures are detected, the ABC System will operate all pumps connected to the boiler. If water temperatures continue to drop, the boiler will fire and warm the system slightly in order to prevent freezing and damage to the system.

Pump Exercise

- Circulators connected to the ABC System control that don't operate for seven (7) days, are activated to run for ten (10) seconds.
- Reduces the possibility for pumps to seize and fail due to long periods of inactivity, improving the overall reliability of the heating system.



Staging and Modulation

- The ABC can be connected to external staging controls via a 4-20 mA and heat demand contact.
- External controls can modulate the boiler's firing rate in order to satisfy overall system demand.
- No external relays or adapters are required.

Energy Management System (EMS) Compatible

- Can be connected to a building's energy management system (EMS) using simple menu selections and wiring a 4-20 mA input.
- Connects to EMS using modbus protocol
- Allows EMS controls to adjust either the ABC central heating setpoint or the firing rate which allows it to be compatible with EMS controls that develop energy efficient setpoints based on outside air temperature, solar loading, and actual room air temperatures.

"Night Setback" and "Unoccupied" Control Modes

- EnviraCom™ enabled, allows the boiler to communicate directly with Honeywell EnviraCom™ thermostats.
- Allows the boiler to further enhance system efficiency by reducing the water temperature during "sleep" and "away" modes.

Reliability

- Built-in brown-out protection, with no additional devices such as "brown out relays" required.
- Internal fuse protection for pump outputs is NOT REQUIRED. The control is capable of handling up to 15 amps, and does not require additional relays to switch power to the circulators in most installations.

Ease of Connectivity...



Cat 5 Connections

- Enables easy connections between boilers or between boiler and building management system
- Utilizes ordinary RJ-45 (Cat 5 Ethernet) cord



Line Voltage Terminal Strip

- 120V AC power, pump outputs
- Strip slides out & hooks to boiler for easy access



Low Voltage Terminal Strip

- Adds additional inputs for header and DHW sensors

The Lower Cost, Higher Efficiency Alternative to Single Commercial Boilers

Modular/Multiple Boiler Concept

Modular/multiple boiler systems, such as the Apex put the efficiency, cost, and service advantages of compact gas boilers to work in heating applications where a single commercial boiler would not be sufficient. The systems connect any number of compact, self-contained gas boilers together and step-fire them to efficiently meet heating loads on demand.

Firing to Load Demand Minimizes Standby Losses

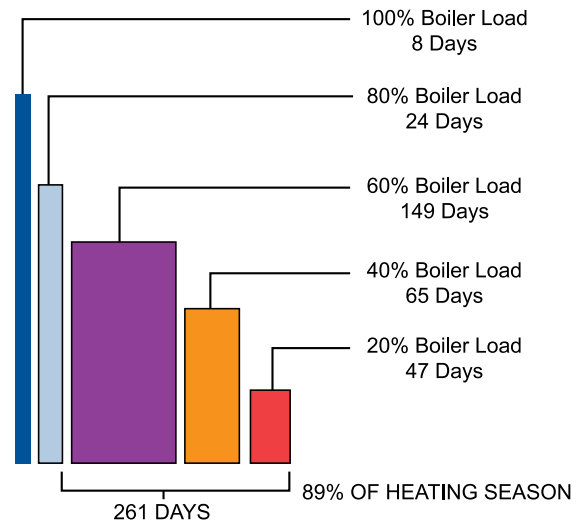
Maximum fuel utilization is achieved during long periods of full firing at the design temperature for each boiler. In comparison, a single large boiler would cycle on and off, more frequently during partial loads, not reaching its rated efficiency. During 90% of the average heating season less than 65% of the total heating capacity is required. Step-firing activates only those boilers needed to meet the load demand which reduces cycling and increases annual fuel efficiency.

Features & Benefits of Apex Boilers in Modular/Multiple Boiler Installations

Choosing a modular or multiple boiler system can have many benefits over a single boiler installation.

- **Cost Savings**
The basic cost of a modular/multiple system is typically less than that of a single large boiler of equal capacity in most applications.
- **Compact Design**
Lighter weight boilers like the Apex are suitable for installation on any floor, from basement to penthouse. A floor shield is required when installed on a combustible floor. The Apex is also designed with a stackable cabinet, so multiple boiler installations can be accommodated in tight spaces.
 - Apex boilers are readily portable, and can be brought through standard doorways using a common hand truck.
 - Boilers can be installed during any phase of construction.
 - Apex boilers can be interconnected via a common RJ45 ethernet cable (or by alternate three wire connection),

HOT WATER BOILER SIZING
SEASONAL BOILER LOAD DEMAND



Program Outdoor Air Reset Curve with only four points:

- Minimum boiler water temperature
- Maximum boiler water temperature
- Minimum outdoor air temperature
- Maximum outdoor air temperature

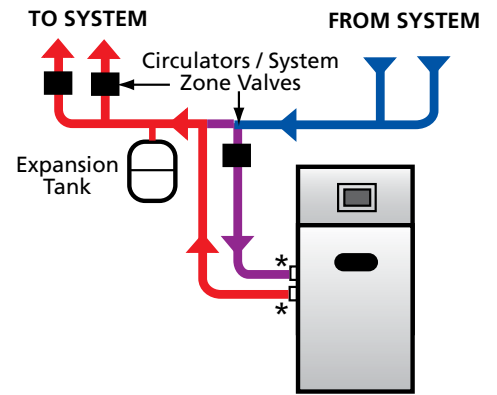
- **Base Loading**
The practice of replacing larger boilers with multiple, smaller modular units can offer numerous benefits such as greatly increased efficiencies with reduced standby losses, cycling and emissions.
- **Redundancy**
Increases the dependability of the boiler system by sharing the heating load between several boilers rather than having a single boiler responsible for heating the entire system.
- **Flexibility of Venting Options**
The ability to vent by using PVC material provides multiple venting options and enables a greater level of choice concerning the layout of a boiler room. Apex boilers can be vented horizontally with a sidewall penetration, or vertically. In addition to PVC, the Apex can be vented with concentric polypropylene, or with AL29-4C stainless steel piping.

System Piping

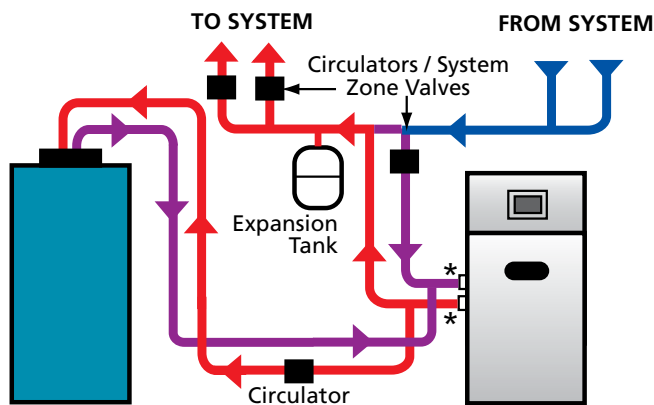
The Apex is designed to be installed in a variety of configurations. Shown here are four illustrated examples of how the Apex boiler can be piped into new or existing heating systems. Examples shown here include heat-only applications, building heat plus domestic hot water, alternate piping of heat plus domestic hot water, and a multiple boiler installation incorporating domestic hot water. The Apex provides outstanding flexibility by providing the capability of controlling up to three system pumps. In addition, an indirect water heater can be placed in either the primary or secondary loop, further enhancing the boiler's ability to accommodate a variety of systems.

These illustrations are intended for informational purposes only, and are not intended for use as near boiler piping diagrams.

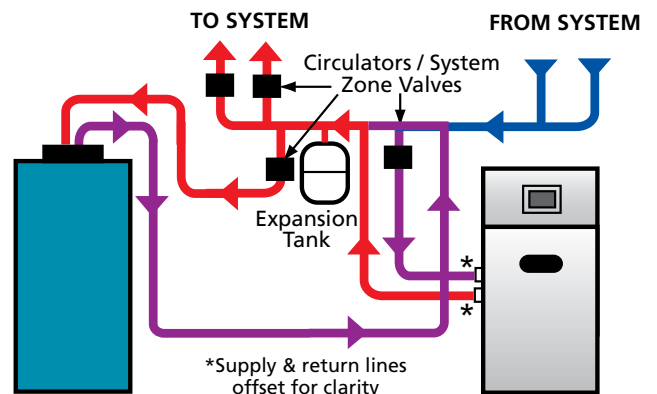
For further information on piping requirements, please see the Apex Installation & Operations Manual.



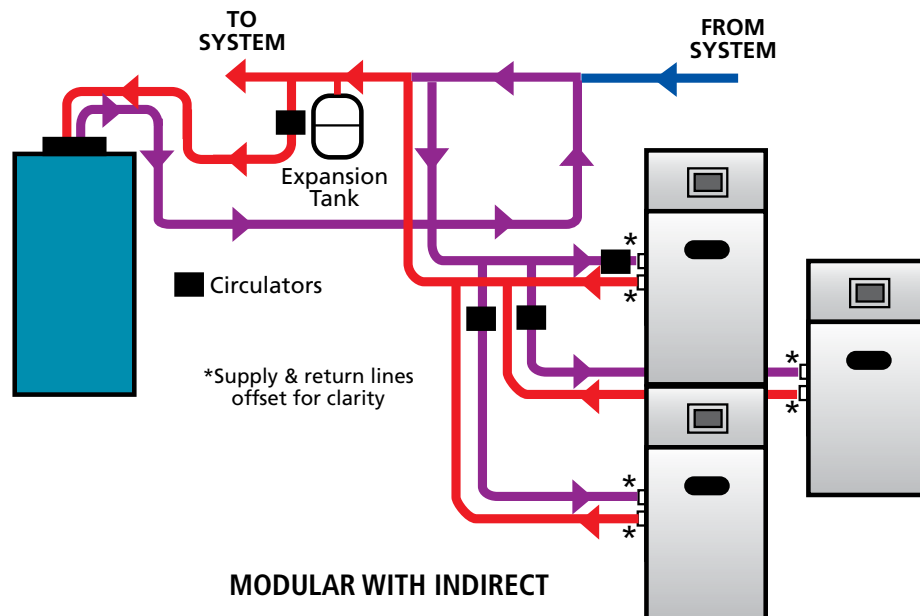
HEAT-ONLY APPLICATION



HEAT PLUS INDIRECT



HEAT PLUS INDIRECT (ALTERNATE)

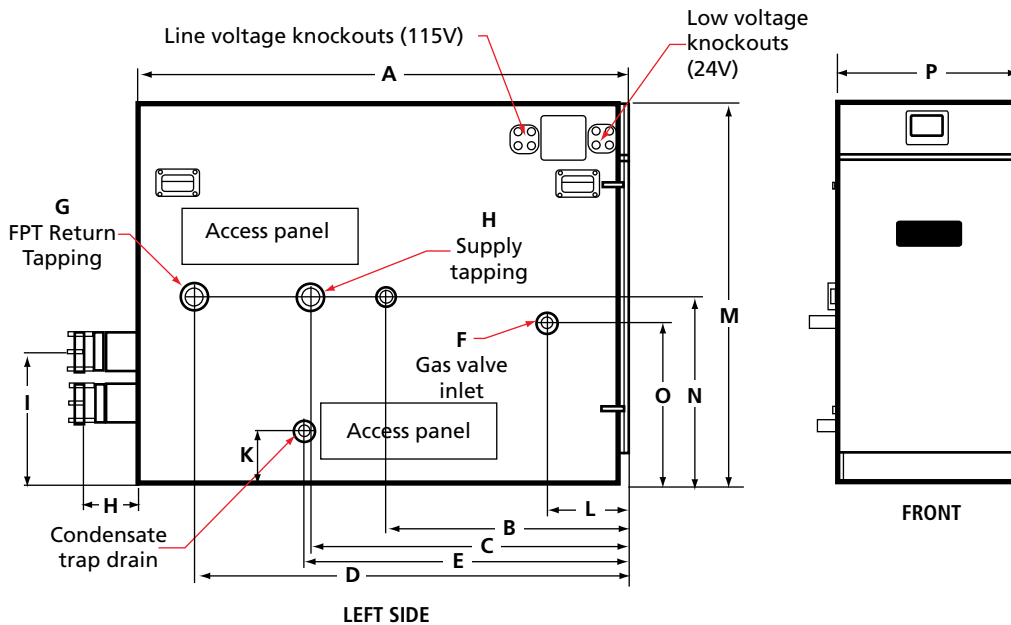


MODULAR WITH INDIRECT

Dimensions and Specifications

Dimensions

Model	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P
APX399	28-7/8"	6-13/16"	13-11/16"	23-3/4"	15-13/16"	3/4"	1-1/2"	1-1/2"	12-1/4"	5"	8-5/16"	43-7/16"	17-5/16"	32-7/16"	16-11/16"
APX500	44-7/8"	22-1/8"	29"	39-11/16"	29-3/8"	3/4"	1-1/2"	1-1/2"	12-1/4"	5"	7-7/16"	35"	17-5/16"	14-29/32"	16-11/16"
APX800	54-9/10"	28-3/8"	34-1/4"	48-1/16"	33-3/16"	1"	2"	2"	12-1/4"	5"	7-1/2"	35"	17-1/4"	7-1/4"	16-11/16"



Specifications & Ratings



MODEL	RATINGS			I=B=R NET RATING WATER (MBH)	THERMAL EFFICIENCY	GAS CONNECTION	WATER CONTENT (Gal.)	APPROX. SHIPPING WEIGHT (Lbs.)	HEAT TRFR. AREA (SQ. FT.)	INTAKE & VENT DIA.	SUPPLY & RETURN CONNECTIONS
	MIN. INPUT (MBH)	MAX. INPUT (MBH)	GROSS OUTPUT (MBH)								
APX399	80	399	377	328	95%	3/4" NPT	3.4	304	41.8	4"	1-1/2" NPT
APX500	100	500	475	413	95%	3/4" NPT	4.2	375	50.8	4"	1-1/2" NPT
APX800	160	800	760	661	95%	1" NPT	5.0	430	65.3	6"	2" NPT

Standard Equipment

Apex Boiler Control System Accepts 20mA for External Staging Built-in Outdoor Reset & Domestic Priority Built-in Diagnostics Touchscreen Display	Natural Gas Only Compact, Service Friendly Design 50 PSI Relief Valve (399/500) 60 PSI Relief Valve (800) 80 PSI and 100 PSI are optional on all models	Simple Layout & Wiring Low Voltage Terminal Strip Negative Pressure Lower Cabinet Sealed Control Compartment Slide-Out Control Panel	Built-In Lifting Handles 100' Equiv. Ft. Lengths for Combination Air & Vent Pipes
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Optional Equipment

Description	Part #
Condensate Neutralizer Kit	101876-01
80# Relief Valve Kit	102207-01
100# Relief Valve Kit	102212-01
Tekmar 265 3-Boiler Modulating Control	6016088

CSD-1 Equipment

Description	Part #
High and Low Gas Pressure Switch Kit	102772-01
Hydrolevel 550 M.R. LWCO w/ Test Button	80160641
M&M 750P-M.R. LWCO w/ Test Button	80160718
Honeywell L4006E Manual Reset High Limit	80160703

